CHAPTER

22

AUTO FLIGHT

CHAPTER 22
AUTO FLIGHT

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

22-EFFECTIVE PAGES

CHAPTER 22
AUTO FLIGHT

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22-01-02 Config 6 (cont)		
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22-EFFECTIVE PAGES

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22-EFFECTIVE PAGES

CHAPTER 22
AUTO FLIGHT

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22-EFFECTIVE PAGES

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AUTO FLIGHT

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22-EFFECTIVE PAGES

CHAPTER 22
AUTO FLIGHT

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CHAPTER 22
AUTO FLIGHT

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AUTO FLIGHT - DESCRIPTION AND OPERATION

1. General

NOTE: The data contained in this document is for the aircraft before avionics upgrade modification.

A. Auto flight consists of those units and components that furnish a means of automatically controlling the flight path, safe reference speed, and trim condition of the airplane. The auto flight subsystems are packaged into two identical Digital Flight Guidance Computers (DFGC's), which are controlled by a glareshield mounted Flight Guidance Control panel. Combined with inputs from various airplane control/sensor systems, the DFGC, control servos and control panel form the Flight Guidance System.

B. Auto flight subsystems are defined as autopilot/flight director, speed-attitude-correction, and Autothrottle/Speed Control (AT/SC).

2. Autopilot/Flight Director

A. Autopilot consists of that portion of the system that uses radio beam signals, directional and vertical gyros, air data and manually selected inputs to automatically control yaw, pitch and roll axis of the airplane.

B. The autopilot contains the series yaw damper actuator, which automatically controls rudder movements to damp airplane dutch roll about the yaw axis. Yaw damper provides a full time limited authority rudder control which can be engaged independently of any other autopilot function. During autoland and single engine go-around, the autopilot controls the rudder through a duplex rudder servo to provide full parallel rudder authority, and decrab capability.

C. Various roll and pitch modes of operation can be selected to provide airplane in-flight guidance. These modes provide automatic control of ailerons and elevators to establish and maintain airplane attitude, altitude, heading, vertical speed, and automatic capture and guidance to localizer, glideslope and omni-range beams.

D. Flight director steering commands are computed within the digital flight guidance computers. The command bar within the attitude director indicators can be used to monitor corrective action when the autopilot is engaged, or when the flight crew is manually operating the airplane.

3. Speed-Attitude-Correction

A. Speed-attitude-correction is provided by a mach trim compensation system. The mach trim compensation system automatically adjusts the center position of the control column to compensate for nosedown pitching of the airplane caused by high mach number during flight. Mach trim compensation operation is independent of other functions of the auto flight system. Elevator control through mach trim compensation is separate from elevator movement control by the autopilot.

B. Automatic pitch trim is provided to relieve the autopilot from holding sustained up or down elevator due to actual or apparent changes of the center of gravity within the airplane. If an out-of-trim condition develops, commands to the alternate trim motor to move the horizontal stabilizer up or down will correct the out-of-trim condition.

4. Auto Throttle/Speed Control

A. Speed control can be programmed for a selected speed, mach number or for an angle-of-attack speed reference based on a safe margin above stall conditions. The system is usable throughout the entire flight envelope. When minimum safe stall margin is desired, i.e. during takeoff or go-around maneuvers, the agnle-of-attack speed reference affords the minimum rate stall margin throughout the process of cleaning up the gear, flaps, and slats. Selected speed or mach extends the control into cruise conditions, altitude changes, holding patterns, and approach conditions.

B. The auto throttle system automatically adjusts engine power settings for controlled thrust throughout all flight modes from takeoff to automatic retard mode. The system automatically controls the throttles to selected air speed, mach number, or EPR limit (engine pressure ratio).

C. The Digital Flight Guidance Computer (DFGC) features an automatic thrust restoration (ATR) function which increases thrust under certain conditions in the event of an engine failure or negative climb rate (-930 and subs) during takeoff. Once activated, the ATR function will unclamp and advance the throttles (if the autothrottle is engaged) equally until the left or right engine EPR reaches the G/A EPR limit.

ATR is armed when the following criteria is met:

(1) The flight director pitch axis is in the takeoff mode

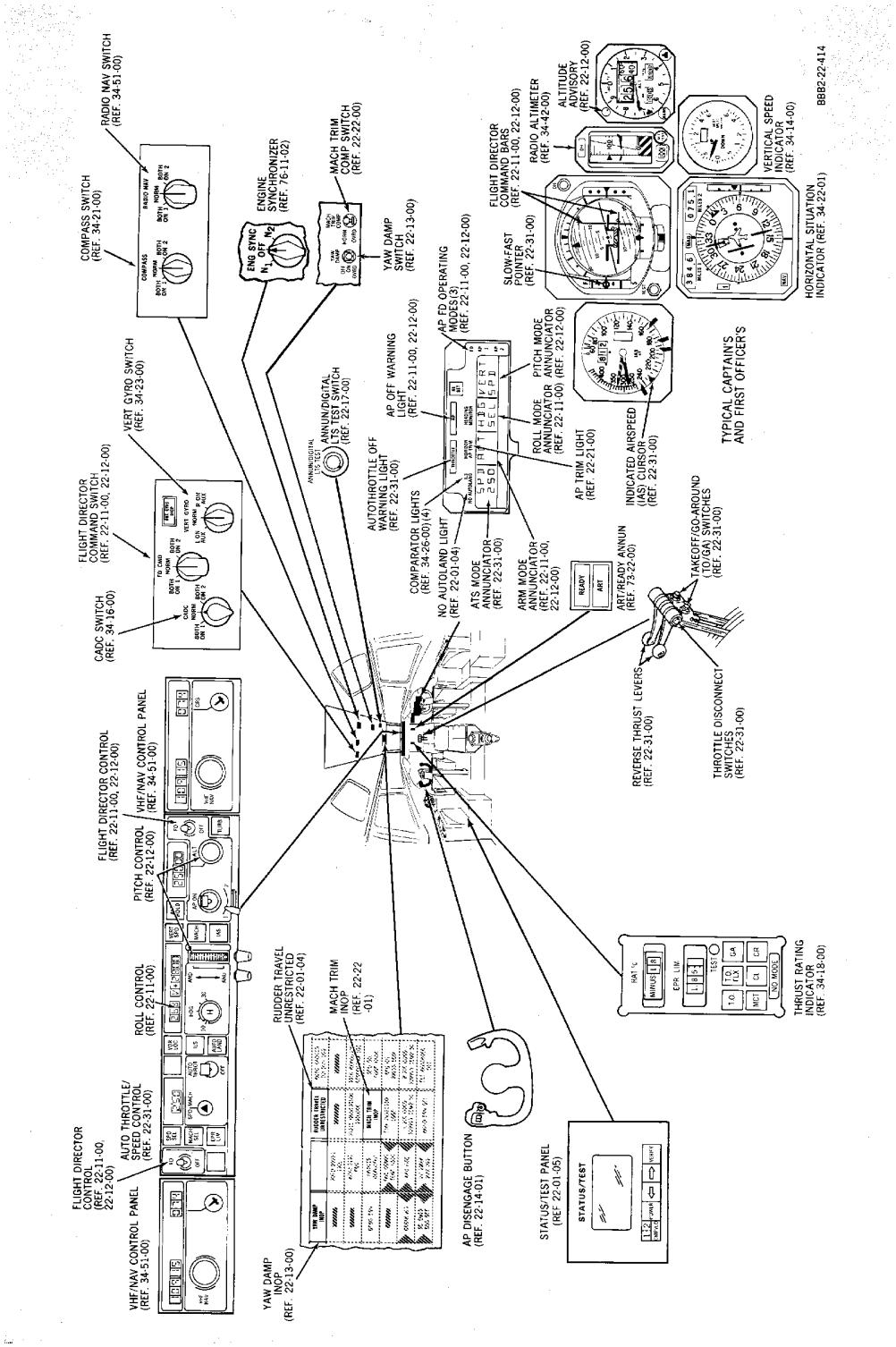
(2) The aircraft is at or above 350 feet radio altitude

(3) Both engine EPRs are below the G/A EPR limit

(4) A thrust cutback has been performed ((both EPRs reduced 0.1 EPR or greater) (-972 DFGC and subsequent))

After ATR is armed, the DFGC continuously monitors for an engine failure, and/or negative climb rate (-930 and subs). The ATR is activated if a difference of 0.25 EPR and 7% N1 is detected between the two engines (with both parameters low on the same engine), or if the aircraft vertical speed decreases to less than zero for 5 seconds cumulatively (-930 and subs). In either case, the throttles will unclamp and advance to the G/A EPR limit.

With the advent of the -972 and subsequent DFGC's, EPR from each engine is sampled every 100 msec, with the highest value saved from each 500 msec period. The highest EPR of each engine is then compared in order to determine if a 0.25 or greater split in EPR exists. A split of 0.25 EPR or greater must exist for 5 consecutive passes (2.5 sec) in conjunction with an N1 split of at least 7% N1 in order to satisfy ATR activation logic. This method of sampling the highest EPR of each engine allows the DFGC to effectively "Discriminate" between a failed engine and one which is surging.



Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A54

5. Flight Guidance System - Switching Capabilities

A. The flight guidance system employs various switching capabilities to allow a second or auxiliary source of data. The switches are located on the flight compartment overhead panel, and are as follows:

Table 1

SWITCH	POSITION
FD CMD	NORM, BOTH ON 1, BOTH ON 2
VERT GYRO	NORM, L ON AUX, R ON AUX
CADC	NORM, BOTH ON 1, BOTH ON 2
COMPASS	NORM, BOTH ON 1, BOTH ON 2
RADIO NAV	NORM, BOTH ON 1, BOTH ON 2
NOTE: DFGC's require certain number of inputs for a mode to become operational. Use of switching may make a mode inoperative; e.g., autopilot takeoff mode requires two air data inputs. If CADC selector switch is switched out of NORM position, autopilot takeoff mode becomes inoperative.	

B. FD CMD Switch

(1) The NORM position of the FD CMD switch provides DFGC-1 command inputs to the captain's ADI, and DFGC-2 provides command inputs to the first officer's ADI.

(2) The BOTH ON 1 position of the FD CMD switch is used if a malfunction in DFGC-2 renders the first officer's command bars or slow-fast pointer inoperative, providing the data source for both ADI's from DFGC-1. The BOTH ON 2 position is used if a malfunction in DFGC-1 renders the captain's command bar or slow-fast pointer inoperative, providing the data source to both ADI's from DFGC-2.

NOTE: When PMS mode is selected, the slow-fst pointer on the ADI's is driven by the PMS computer. Switching FD CMD would have no effect.

(3) When the FD CMD switch is in either BOTH ON 1, or BOTH ON 2 position, amber FD lights located on the captain's and first officer's instrument panels come on to indicate to the flight crew that flight directors are not operating in the normal position.

C. VERT GYRO Switch

(1) The NORM position of the VERT GYRO switch provides input signals from all three vertical gyros to DFGC-1 and DFGC-2. Placing the VERT GYRO switch out of the NORM position provides both DFGC's with switching unit position. Internal logic within the DFGC will cause VG-1 or VG-2 to be ignored when the VERT GYRO switch is activated.

(2) The L on AUX position of the VERT GYRO switch results in pitch and roll attitude data from VG-3 being used in the DFGC's in lieu of VG-1. The R on AUX position results in VG-3 being used in the DFGC's in lieu of VG-2.

(3) An amber AUX GYRO INOP light is located on the flight compartment overhead panel near the VERT GYRO switch. The AUX GYRO INOP light will come on any time vertical gyro-3 monitors detect a malfunction. The VERT GYRO switch should not be moved out of the NORM position when the AUX GYRO INOP light is on.

(4) Placing the VERT GYRO switch to the AUX positions, will cause momentary attitude and speed flags to come into view on the affective ADI while the switching transient occurs.

D. CADC Switch

(1) CADC-1 and CADC-2 data is provided to both DFGC's. The NORM position of the CADC switch results in DFGC-1 using the CADC-1 inputs if they are valid, and DFGC-2 using CADC-2 inputs if they are valid. Cross-channel inputs are used if the in-line CADC is invalid. Both DFGC's used the selected CADC data when the switch is not in the NORM position.

(2) The BOTH ON 1 position of the CADC switch is used when a flag relating to air data instrumentation appears on the first officer's instruments, and the BOTH ON 2 is used when a flag relating to air data instrumentation appears on the captain's instruments.

(3) When the CADC switch is in either the BOTH ON 1, or BOTH ON 2 position, CADC lights on the captain's and first officer's instrument panels will come on to indicate to the flight crew that air data instruments are not operating in the normal position.

E. COMPASS Switch

(1) The NORM position of the COMPASS switch provides compass system -1 data to the captain's HSI and first officer's RMI, and compass system -2 data to the first officer's HSI and captain's RMI. The NORM position of the COMPASS switch also provides compass -1 information to DFGC -1, and compass -2 information to DFGC -2.

(2) The BOTH ON 1 or BOTH ON 2 position of the COMPASS switch places both the captain's and first officer's HSI's and RMI's on a single compass system. The BOTH ON 1 position is normally used when a failure flag appears in the first officer's HSI and in the captain's RMI indicating compass system -2 has failed. The BOTH ON 2 position is used if the captain's HSI and first officer's RMI display compass system failure flags.

(3) When the COMPASS switch is in either BOTH ON 1 or BOTH ON 2 position, COMP lights on the captain's and first officer's instrument panels will come on to indicate to the flight crew that compasses are not operating in the normal position.

F. RADIO NAV Switch

(1) The NORM position of the RADIO NAV switch provides NAV (glideslope or LOC/VOR) information to the captain's and first officer's HSI's and ADI's. The NORM position of the RADIO NAV switch also provides NAV receiver -1 data to DFGC -1 and NAV receiver -2 data to DFGC -2.

(2) The BOTH ON 1 position of the RADIO NAV switch is normally used if a flag appears in the first officer's ADI or HSI indicating NAV receiver -2 has failed. The BOTH ON 2 position is used if a flag appears in the captain's ADI or HSI.

(3) When the RADIO NAV switch is in either BOTH ON 1 or BOTH ON 2 position, NAV lights on the captain's and first officer's instrument panels will come on to indicate to the flight crew that NAV receivers are not operating in the normal position.

6. Glossary of Terms and Abbreviations

A. The following terms and abbreviations may be found in both text and illustrations relating to the auto flight system.

Table 2

TERMS AND ABBREVIATIONS	DEFINITION
ADI	Attitude Director Indicator
Alarmed State	Condition of a units fault annunciator when a failure has been detected
Align	Forward slip maneuver, occurring at 145 feet to eliminate any crab-angle resulting from crosswinds
Altitude	Ambient static barometric pressure measured in feet above sea level

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
Analog	Continuous AC or DC signals which vary in amplitude. These signals are summed, integrated, etc., to provide a desired result.
A/P	Autopilot
Area of Confusion	The cone directly above a VOR transmitter in which directional radials are usable
ART	Automatic Reserve Thrust
A/T	Auto Throttle
Autoland	Autopilot automatic landing, with align and flare modes available to aircraft touchdown
Beam Capture Threshold	Voltage measured in millivolts of beam deviation, at which time automatic capture or track occurs
BIT	Built In Test
CADC	Central Air Data Computer
CAS	Calibrated Airspeed
Control Mode Select	A series of push-button on the flight guidance control panel which are pressed to select a control mode
Crab Angle	Relative angle between selected course heading and indicated aircraft magnetic heading
CRS	Course
D3A-Z	Dual 3-Axis Accelerometer
DEV	Deviation
DFGCP	Digital Flight Guidance Control Panel
DG	Directional Gyro
Digital	A computer that operates in numbers expressed directly as digits in a decimal binary (digital computer counts)
Discrete Signal	Has one of only two predetermined values, for example: zero or 28vdc
DLA-Y	Dual Longitudinal Axis
Dual Channel	Two separate, but identical, sets of components which control functions in one axis of operation
DFGC	Digital Flight Guidance Computer
DFGS	Digital Flight Guidance System
EPR	Engine Pressure Ratio
Fail Passive	A form of failure protection which ensures that no single failure can produce a significant aircraft upset
FGS	Flight Guidance System
FG Status/Test Panel (STP)	The STP is a trouble shooting aid. Failures in the DFGS detected during flight will be displayed on the STP. Also, by use of the STP, system interface can be completely checked out

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
Forward Slip Maneuver	The cross control maneuver during an automatic landing which provides the transition from a crab-angle to a heading reference that aligns the aircraft along the runway centerline
FMA	Flight Mode Annunciator
Gain Scheduling	The shaping or programming of certain gains to compensate for varying conditions, such as airspeed, beam convergence, radio altitude, etc.
G/S	Glide Slope
Heading Hold Threshold	The bank angle which establishes either roll attitude hold or heading hold mode of operation
Healed State	The condition of a units fault annunciator when an alarmed state has been corrected
HSI	Horizontal Situation Indicator
IAS	Indicated Airspeed
ILS	Instrument Landing System
Lateral Directional Axis	The combined roll and yaw axis of the aircraft
LOC	Localizer
LRU	Line Replaceable Unit - an LRU is a component or assembly of components that by design is packaged for removal or replacement as a single item
LWD	Left Wing Down
NCR	Noncorrective
Off-Side Computer	The DFGC not selected by the 1, 2 switch
On-Side Computer	The DFGC selected by the 1, 2 switch
PMS	Performance Management System
R/A	Radio Altimeter
RMI	Radio Magnetic Indicator
RWD	Right Wing Down
Slow-Fast Pointer	Located on the ADI, a speed control display in which SLOW commands a higher speed, and FAST commands a lower speed
Stability Augmentation	Automatic control functions which augment the basic aircraft stability
TED	Trailing Edge Down
TEU	Trailing Edge Up
TEL	Trailing Edge Left
TER	Trailing Edge Right
Valid or Validity Signal	Electrical input that verifies proper operation of sending system or sensor
Vertical Speed	Rate of climb or descent of the aircraft
VOR	Very High Frequency Omnirange
V_2	Takeoff Safety Speed

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
V_R	Rotation Speed
V_S	Airspeed at lg stall for a given aircraft configuration

AUTO FLIGHT - DESCRIPTION AND OPERATION

1. General

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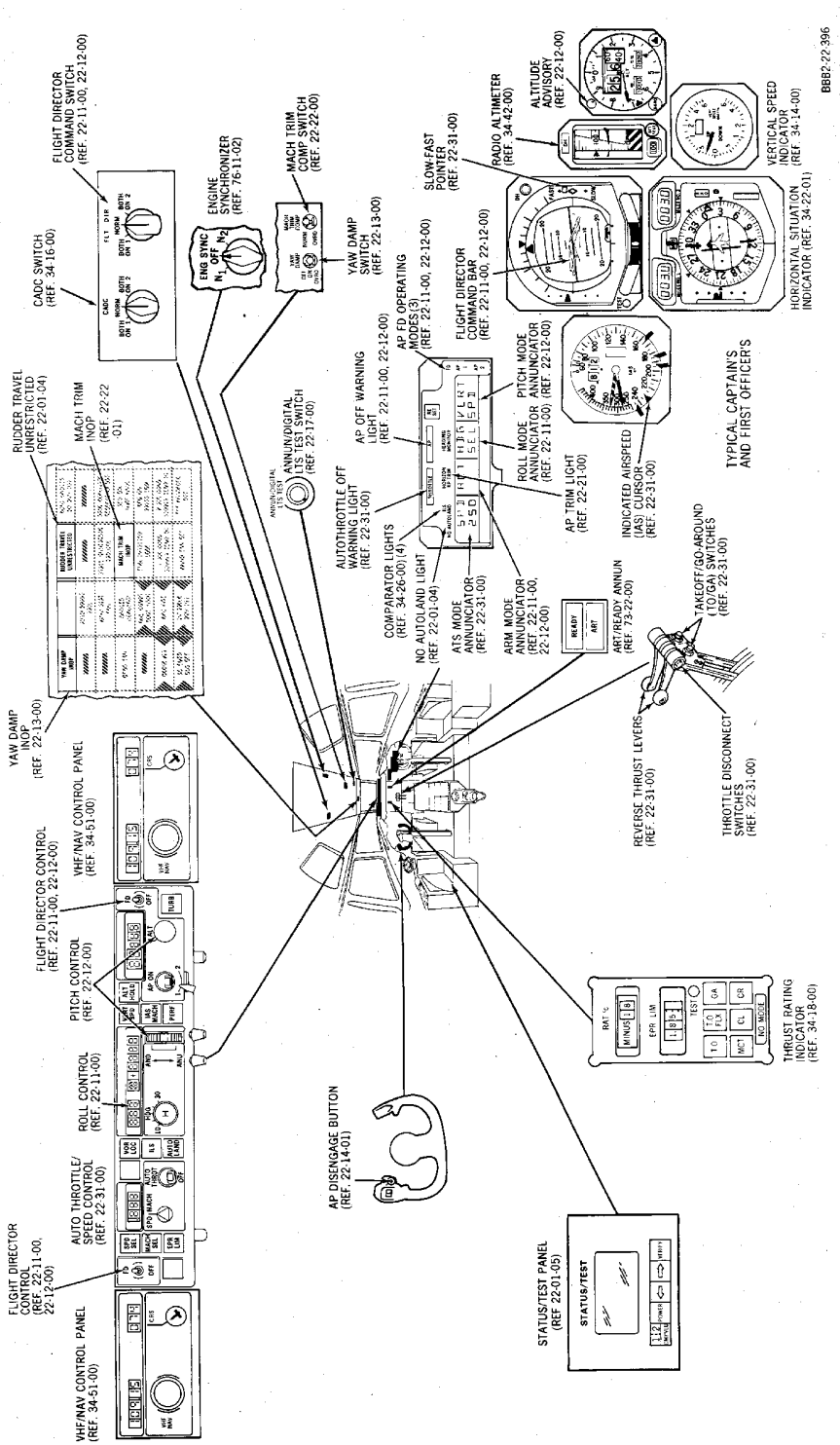
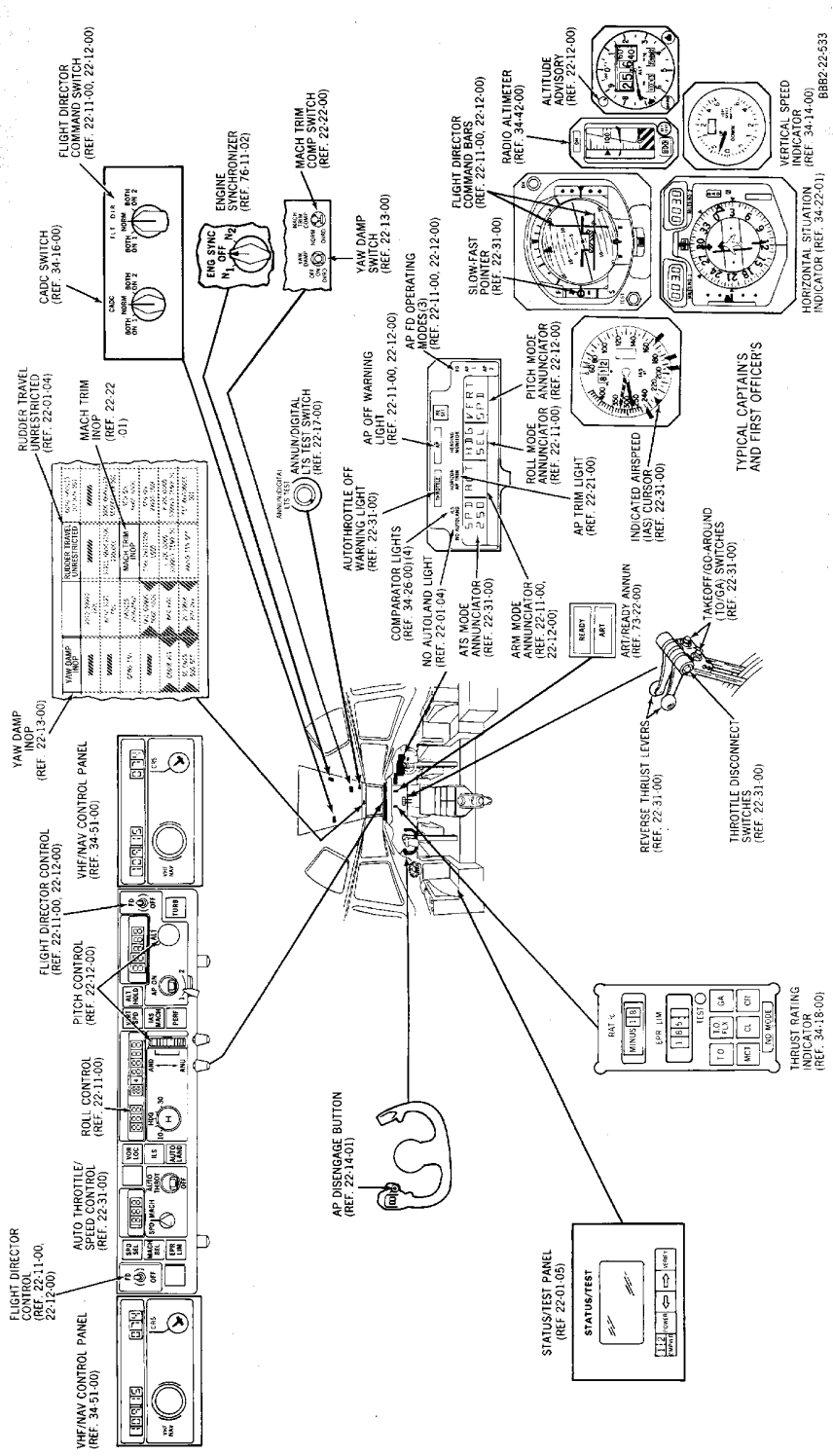


Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A55 (Sheet 1 of 3)



Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A55 (Sheet 2 of 3)

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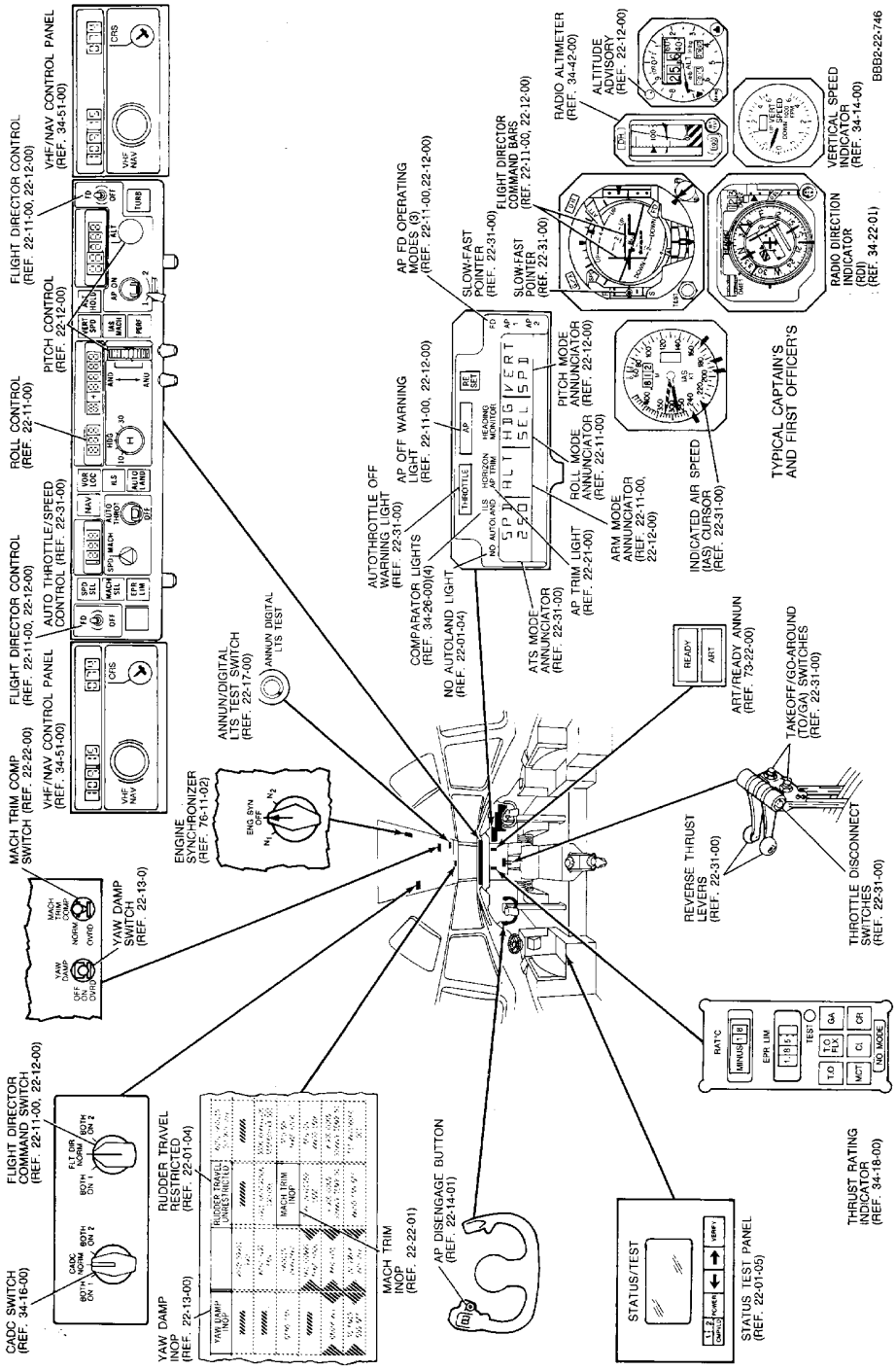
WJE 422, 425, 427, 868, 893



Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A55 (Sheet 3 of 3)

5. Flight Guidance System - Switching Capabilities

A. The flight guidance system employs various switching capabilities to allow a second or auxiliary source of data. The switches are located on the flight compartment overhead panel, and are as follows:

Table 1

SWITCH	POSITION
FD CMD	NORM, BOTH ON 1, BOTH ON 2
CADC	NORM, BOTH ON 1, BOTH ON 2
NOTE: DFGC's require certain number of inputs for a mode to become operational. Use of switching may make a mode inoperative; e.g., autopilot takeoff mode requires two air data inputs. If CADC selector switch is switched out of NORM position, autopilot takeoff mode becomes inoperative.	

B. FD CMD Switch

(1) The NORM position of the FD CMD switch provides DFGC-1 command inputs to the captain's ADI, and DFGC-2 provides command inputs to the first officer's ADI.

(2) The BOTH ON 1 position of the FD CMD switch is used if a malfunction in DFGC-2 renders the first officer's command bars or slow-fast pointer inoperative, providing the data source for both ADI's from DFGC-1. The BOTH ON 2 position is used if a malfunction in DFGC-1 renders the captain's command bar or slow-fast pointer inoperative, providing the data source to both ADI's from DFGC-2.

NOTE: When PMS mode is selected, the slow-fst pointer on the ADI's is driven by the PMS computer. Switching FD CMD would have no effect.

(3) When the FD CMD switch is in either BOTH ON 1, or BOTH ON 2 position, amber FD lights located on the captain's and first officer's instrument panels come on to indicate to the flight crew that flight directors are not operating in the normal position.

C. CADC Switch

(1) CADC-1 and CADC-2 data is provided to both DFGC's. The NORM position of the CADC switch results in DFGC-1 using the CADC-1 inputs if they are valid, and DFGC-2 using CADC-2 inputs if they are valid. Cross-channel inputs are used if the in-line CADC is invalid. Both DFGC's used the selected CADC data when the switch is not in the NORM position.

(2) The BOTH ON 1 position of the CADC switch is used when a flag relating to air data instrumentation appears on the first officer's instruments, and the BOTH ON 2 is used when a flag relating to air data instrumentation appears on the captain's instruments.

(3) When the CADC switch is in either the BOTH ON 1, or BOTH ON 2 position, CADC lights on the captain's and first officer's instrument panels will come on to indicate to the flight crew that air data instruments are not operating in the normal position.

6. Glossary of Terms and Abbreviations

A. The following terms and abbreviations may be found in both text and illustrations relating to the auto flight system.

Table 2

TERMS AND ABBREVIATIONS	DEFINITION
ADI	Attitude Director Indicator
Alarmed State	Condition of a units fault annunciator when a failure has been detected

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
Align	Forward slip maneuver, occurring at 145 feet to eliminate any crab-angle resulting from crosswinds
Altitude	Ambient static barometric pressure measured in feet above sea level
Analog	Continuous AC or DC signals which vary in amplitude. These signals are summed, integrated, etc., to provide a desired result.
A/P	Autopilot
Area of Confusion	The cone directly above a VOR transmitter in which directional radials are usable
ART	Automatic Reserve Thrust
A/T	Auto Throttle
Autoland	Autopilot automatic landing, with align and flare modes available to aircraft touchdown
Beam Capture Threshold	Voltage measured in millivolts of beam deviation, at which time automatic capture or track occurs
BIT	Built In Test
CADC	Central Air Data Computer
CAS	Calibrated Airspeed
Control Mode Select	A series of push-button on the flight guidance control panel which are pressed to select a control mode
Crab Angle	Relative angle between selected course heading and indicated aircraft magnetic heading
CRS	Course
D3A-Z	Dual 3-Axis Accelerometer
DFGCP	Digital Flight Guidance Control Panel
DG	Directional Gyro
Digital	A computer that operates in numbers expressed directly as digits in a decimal binary (digital computer counts)
Discrete Signal	Has one of only two predetermined values, for example: zero or 28vdc
DLA-Y	Dual Longitudinal Axis
Dual Channel	Two separate, but identical, sets of components which control functions in one axis of operation
DFGC	Digital Flight Guidance Computer
DFGS	Digital Flight Guidance System
EPR	Engine Pressure Ratio
Fail Passive	A form of failure protection which ensures that no single failure can produce a significant aircraft upset
FGS	Flight Guidance System

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
FG Status/Test Panel (STP)	The STP is a trouble shooting aid. Failures in the DFGS detected during flight will be displayed on the STP. Also, by use of the STP, system interface can be completely checked out
Forward Slip Maneuver	The cross control maneuver during an automatic landing which provides the transition from a crab-angle to a heading reference that aligns the aircraft along the runway centerline
FMA	Flight Mode Annunciator
Gain Scheduling	The shaping or programming of certain gains to compensate for varying conditions, such as airspeed, beam convergence, radio altitude, etc.
G/S	Glide Slope
Heading Hold Threshold	The bank angle which establishes either roll attitude hold or heading hold mode of operation
Healed State	The condition of a units fault annunciator when an alarmed state has been corrected
HSI	Horizontal Situation Indicator
IAS	Indicated Airspeed
ILS	Instrument Landing System
Lateral Directional Axis	The combined roll and yaw axis of the aircraft
LOC	Localizer
LRU	Line Replaceable Unit - an LRU is a component or assembly of components that by design is packaged for removal or replacement as a single item
LWD	Left Wing Down
NCR	Noncorrective
Off-Side Computer	The DFGC not selected by the 1, 2 switch
On-Side Computer	The DFGC selected by the 1, 2 switch
PMS	Performance Management System
PFD	Primary Flight Display. One of two video display units within EFIS
PMS	Performance Management System
R/A	Radio Altimeter
RMI	Radio Magnetic Indicator
RWD	Right Wing Down
Slow-Fast Pointer	Located on the ADI, speed control display in which SLOW commands a higher speed, and FAST commands a lower speed
Stability Augmentation	Automatic control functions which augment the basic aircraft stability
TED	Trailing Edge Down
TEU	Trailing Edge Up
TEL	Trailing Edge Left
TER	Trailing Edge Right

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
Valid or Validity Signal	Electrical input that verifies proper operation of sending system or sensor
Vertical Speed	Rate of climb or descent of the aircraft
VOR	Very High Frequency Omnirange
V_2	Takeoff Safety Speed
V_R	Rotation Speed
V_S	Airspeed at lg stall for a given aircraft configuration

AUTO FLIGHT - DESCRIPTION AND OPERATION

1. General

WJE 886, 887

A. Auto flight consists of those units and components that furnish a means of automatically controlling the flight path, safe reference speed, and trim condition of the aircraft. The auto flight subsystems are packaged into two identical Digital Flight Guidance Computers (DFGC's), which are controlled by a glareshield mounted Flight Guidance Control panel. Combined with inputs from various aircraft control/sensor systems, the DFGC, control servos and control panel form the Flight Guidance System.

B. Auto flight subsystems are defined as autopilot/flight director, speed-attitude-correction, and Autothrottle/Speed Control (AT/SC).

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879

C. Auto flight consists of those units and components that furnish a means of automatically controlling the flight path, safe reference speed, and trim condition of the aircraft. The auto flight subsystems which are defined as autopilot/flight director, speed-attitude-correction and autothrottle/speed control (AT/SC), are packaged into two identical Digital Flight Guidance Computers (DFGC's). The DFGC's are in turn controlled by the Digital Flight Guidance Control Panel (DFGCP) manual inputs and in the NAV/VNAV modes, the Advanced Flight Management Computer (AFMC) inputs. The Flight Guidance System then, is comprised of inputs from various aircraft control/sensor systems, DFGC's, control servos, DFGCP and the AFMC.

D. The Flight Management System (FMS) option is a fully selectable mode of the Digital Flight Guidance System (DFGS). Inputs from the FMS to the DFGS are comprised of several guidance functions one of which is the capability to transmit pitch, roll and thrust commands to the autopilot, autothrottle and flight director to fly an optimum vertical flight profile for climb, cruise, descent and approach while simultaneously following the lateral portion of the flight plan automatically. The FMS guidance commands are limited by the DFGS restrictions for roll angle, roll rate, pitch angle, pitch rate, EPR command and throttle movement rate. FMS/DFGS coupling is accomplished through the NAV/VNAV push-button located on the DFGCP. NAV provides lateral guidance, and VNAV provides vertical guidance.

(1) Navigation - Provides commands to capture and maintain a lateral profile path as established by the Flight Management System.

(2) Profile - Provides commands to capture and hold an appropriate vertical profile target as established by the Flight Management System.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879, 886, 887

2. Autopilot/Flight Director

WJE 886, 887

A. Autopilot consists of that portion of the system that uses radio beam signals, directional and vertical gyros, air data and manually selected inputs to automatically control yaw, pitch and roll axis of the aircraft.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879

B. Autopilot consists of that portion of the system that uses radio beam signals, aircraft attitude signals, air data and manually selected inputs to automatically control yaw, pitch and roll axis of the aircraft. In the FMS mode (VNAV/NAV) all inputs are fed into the AFMC software where vertical and lateral navigation commands are computed and then fed to the autopilot/flight director portion of the DFGC's.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879, 886, 887

C. The autopilot contains the series yaw damper actuator, which automatically controls rudder movements to damp aircraft dutch roll about the yaw axis. Yaw damper provides a full time limited authority rudder control which can be engaged independently of any other autopilot function. During autoland and single engine go-around, the autopilot controls the rudder through a duplex rudder servo to provide full parallel rudder authority, and decrab capability.

D. Various roll and pitch modes of operation can be selected to provide aircraft in-flight guidance. These modes provide automatic control of ailerons and elevators to establish and maintain aircraft attitude, altitude, heading, vertical speed, and automatic capture and guidance to localizer, glideslope and omni-range beams.

WJE 886, 887

E. Flight director steering commands are computed within the digital flight guidance computers. The roll and pitch command bars displayed on the Primary Flight Display (PFD) can be used to monitor corrective action when the autopilot is engaged, or when the flight crew is manually operating the airplane.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879

F. Flight director steering commands are computed within the AFMC when the FMS mode has been selected and properly initialized. This steering data is then relayed to the DFGC's and the EFIS symbol generators for roll and pitch command bar video displays on the captain's and first officer's EFIS Primary Flight Displays (PFD). The pitch and roll command bars can be used to monitor corrective action when the autopilot is engaged, or when the flight crew is manually operating the aircraft.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879, 886, 887

3. Speed-Attitude-Correction

A. Speed-attitude-correction is provided by a mach trim compensation system. The mach trim compensation system automatically adjusts the center position of the control column to compensate for nosedown pitching of the aircraft caused by high mach number during flight. Mach trim compensation operation is independent of other functions of the auto flight system. Elevator control through mach trim compensation is separate from elevator movement control by the autopilot.

B. Automatic pitch trim is provided to relieve the autopilot from holding sustained up or down elevator due to actual or apparent changes of the center of gravity within the aircraft. If an out-of-trim condition develops, commands to the alternate trim motor to move the horizontal stabilizer up or down will correct the out-of-trim condition.

4. Auto Throttle/Speed Control

A. Speed control can be programmed for a selected speed, mach number or for an angle-of-attack speed reference based on a safe margin above stall conditions. The system is usable throughout the entire flight envelope. When minimum safe stall margin is desired, i.e. during takeoff or go-around maneuvers, the angle-of-attack speed reference affords the minimum rate stall margin throughout the process of cleaning up the gear, flaps, and slats. Selected speed or mach extends the control into cruise conditions, altitude changes, holding patterns, and approach conditions.

WJE 886, 887

B. The auto throttle system automatically adjusts engine power settings for controlled thrust throughout all flight modes from takeoff to automatic retard mode. The system automatically controls the throttles to selected air speed, mach number, or EPR limit (engine pressure ratio).

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879

C. The DFGC transmits throttle commands to the auto throttle system which automatically adjusts engine power settings for controlled thrust throughout all flight modes from takeoff to automatic retard mode. The system automatically controls the throttles to selected or commanded air speed, mach number, or EPR limit (engine pressure ratio).

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879, 886, 887

D. The Digital Flight Guidance Computer (DFGC) features an automatic thrust restoration (ATR) function which increases thrust under certain conditions in the event of an engine failure or negative climb rate (-930 and subs) during takeoff. Once activated, the ATR function will unclamp and advance the throttles (if the autothrottle is engaged) equally until the left or right engine EPR reaches the G/A EPR limit.

ATR is armed when the following criteria is met:

(1) The flight director pitch axis is in the takeoff mode

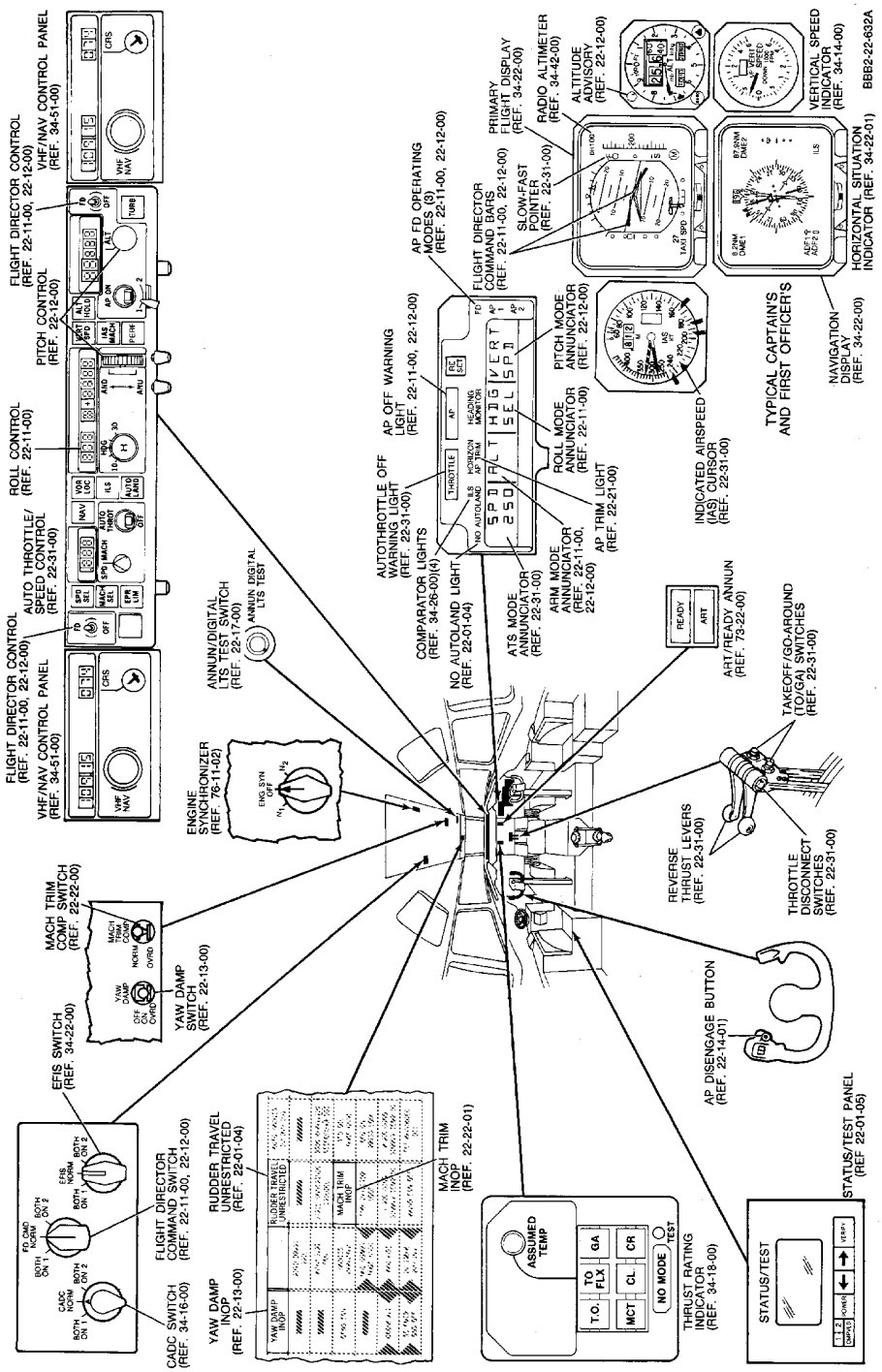
(2) The aircraft is at or above 350 feet radio altitude

(3) Both engine EPRs are below the G/A EPR limit

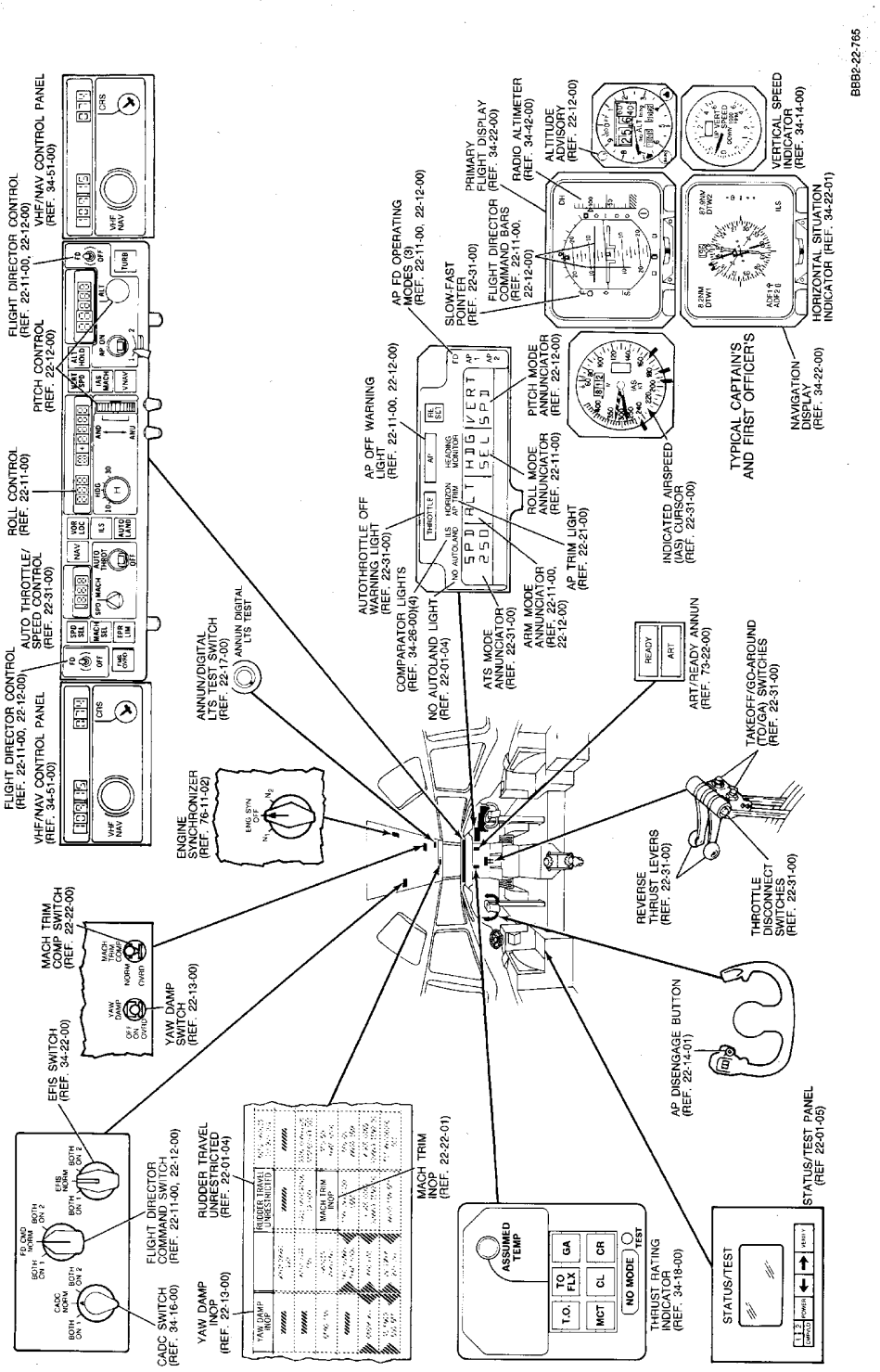
(4) A thrust cutback has been performed ((both EPRs reduced 0.1 EPR or greater) (-972 DFGC and subsequent))

After ATR is armed, the DFGC continuously monitors for an engine failure, and/or negative climb rate (-930 and subs). The ATR is activated if a difference of 0.25 EPR and 7% N1 is detected between the two engines (with both parameters low on the same engine), or if the aircraft vertical speed decreases to less than zero for 5 seconds cumulatively (-930 and subs). In either case, the throttles will unclamp and advance to the G/A EPR limit.

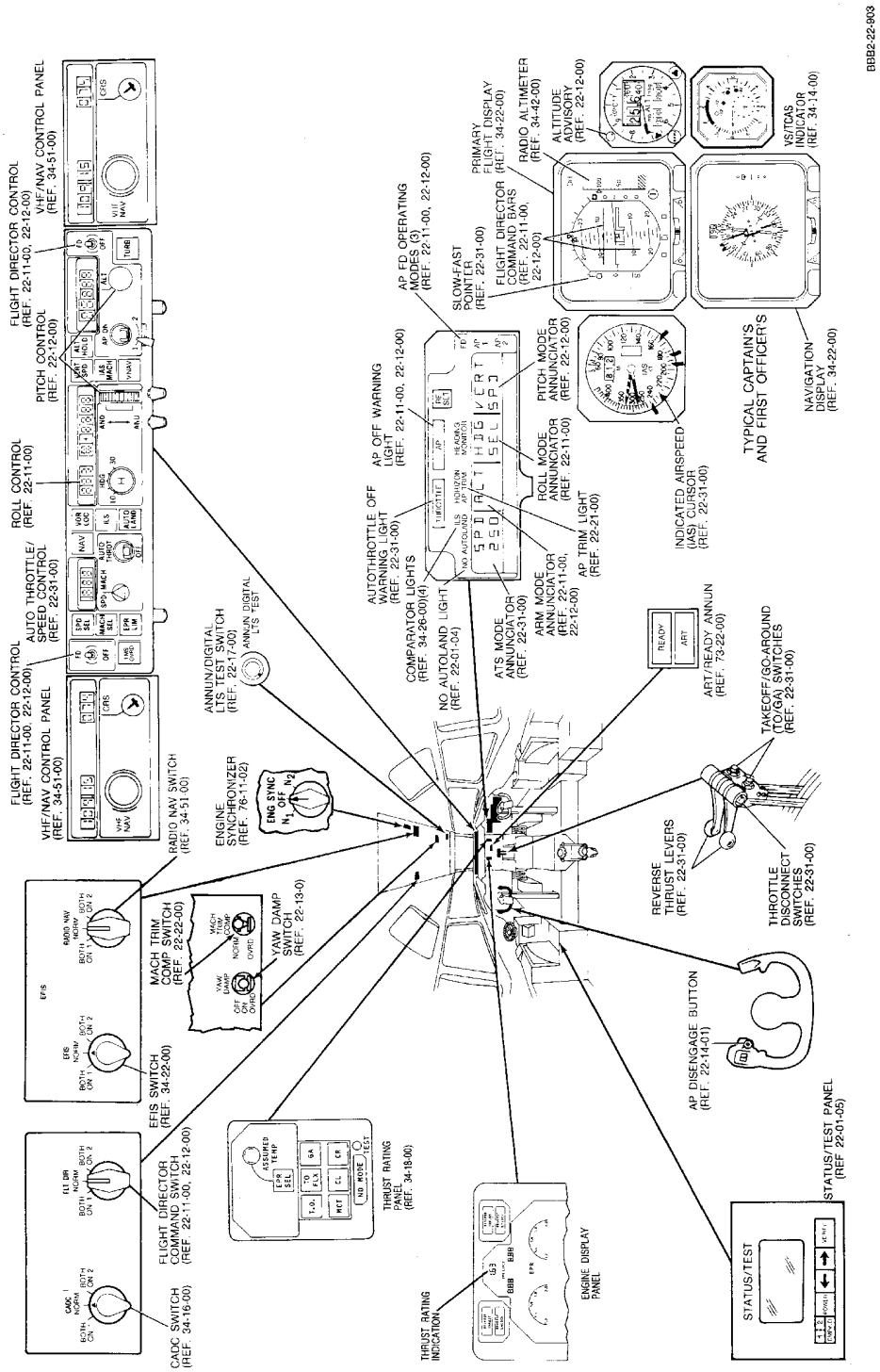
With the advent of the -972 and subsequent DFGC's, EPR from each engine is sampled every 100 msec, with the highest value saved from each 500 msec period. The highest EPR of each engine is then compared in order to determine if a 0.25 or greater split in EPR exists. A split of 0.25 EPR or greater must exist for 5 consecutive passes (2.5 sec) in conjunction with an N1 split of at least 7% N1 in order to satisfy ATR activation logic. This method of sampling the highest EPR of each engine allows the DFGC to effectively "Discriminate" between a failed engine and one which is surging.



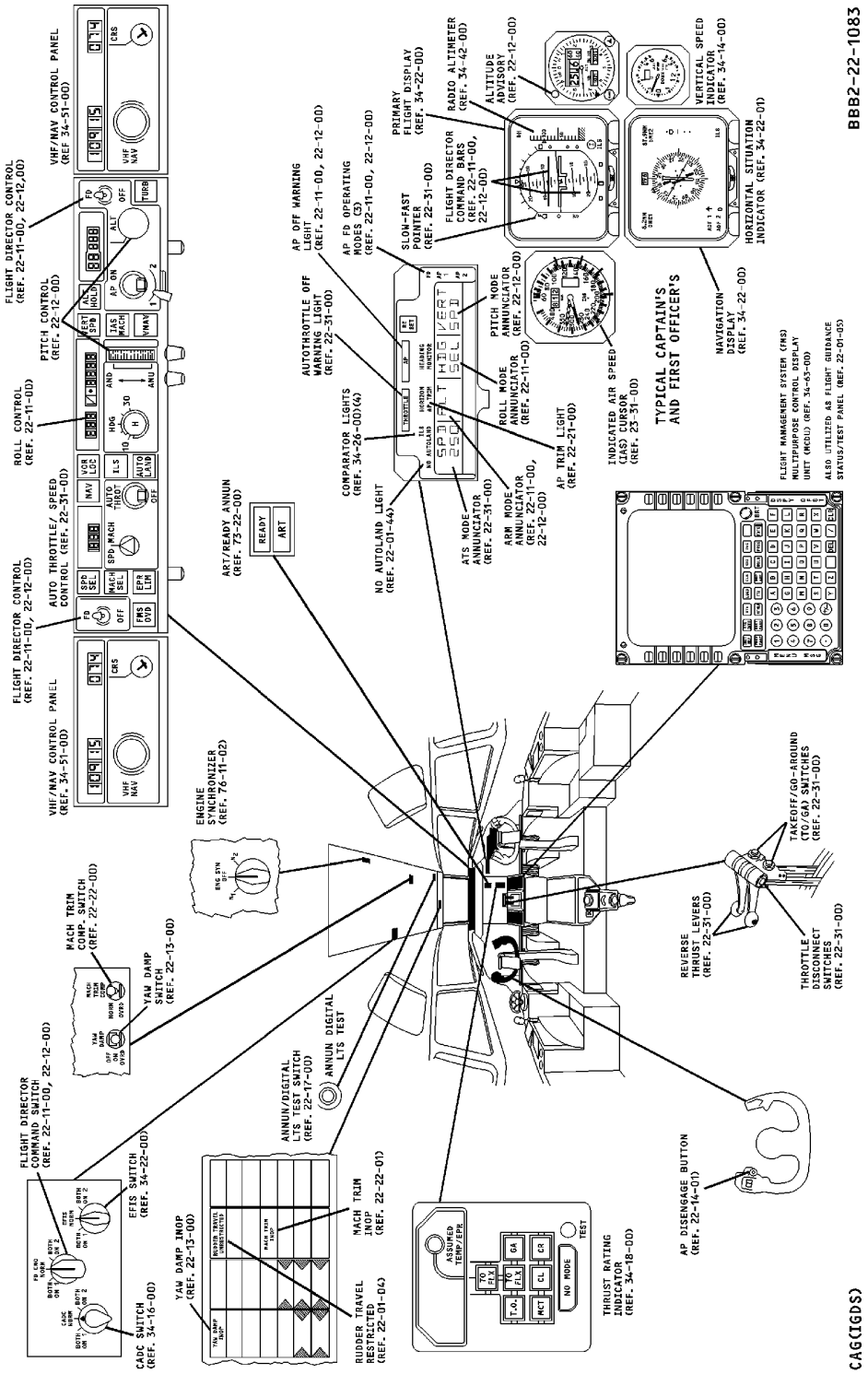
Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A59 (Sheet 1 of 4)



Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A59 (Sheet 2 of 4)



Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A59 (Sheet 3 of 4)



Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A59 (Sheet 4 of 4)

5. Flight Guidance System - Switching Capabilities

A. The flight guidance system employs various switching capabilities to allow a second or auxiliary source of data. The switches are located on the flight compartment overhead panel, and are as follows:

Table 1

SWITCH	POSITION
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 886, 887	
FD CMD	NORM, BOTH ON 1, BOTH ON 2
WJE 875-879	
FLT DIR	NORM, BOTH ON 1, BOTH ON 2
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879, 886, 887	
CADC	NORM, BOTH ON 1, BOTH ON 2
EFIS	NORM, BOTH ON 1, BOTH ON 2
NOTE: DFGC's require certain number of inputs for a mode to become operational. Use of switching may make a mode inoperative; e.g., autopilot takeoff mode requires two air data inputs. If CADC selector switch is switched out of NORM position, autopilot takeoff mode becomes inoperative.	

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 886, 887

B. FD CMD Switch

(1) The NORM position of the FD CMD switch provides DFGC-1 pitch and roll command inputs to the captain's Primary Flight Display, and DFGC-2 provides pitch and roll command inputs to the first officer's Primary Flight Display via the EFIS symbol generators 1 and 2.

(2) The BOTH ON 1 position of the FD CMD switch is used if a malfunction in DFGC-2 renders the first officer's command bars or slow-fast pointer inoperative, providing the data source for both Primary Flight Displays from DFGC-1. The BOTH ON 2 position is used if a malfunction in DFGC-1 renders the captain's command bar or slow-fast pointer inoperative, providing the data source to both Primary Flight Displays from DFGC-2.

(3) When the FD CMD switch is in either BOTH ON 1, or BOTH ON 2 position, amber FD lights located on the captain's and first officer's instrument panels come on to indicate to the flight crew that flight directors are not operating in the normal position.

WJE 875-879

C. FLT DIR Switch

(1) The NORM position of the FLT DIR switch provides DFGC-1 pitch and roll command inputs to the captain's Primary Flight Display, and DFGC-2 provides pitch and roll command inputs to the first officer's Primary Flight Display via the EFIS symbol generators 1 and 2.

(2) The BOTH ON 1 position of the FLT DIR switch is used if a malfunction in DFGC-2 renders the first officer's command bars or slow-fast pointer inoperative, providing the data source for both Primary Flight Displays from DFGC-1. The BOTH ON 2 position is used if a malfunction in DFGC-1 renders the captain's command bar or slow-fast pointer inoperative, providing the data source to both Primary Flight Displays from DFGC-2.

(3) When the FLT DIR switch is in either BOTH ON 1, or BOTH ON 2 position, amber FD lights located on the captain's and first officer's instrument panels come on to indicate to the flight crew that flight directors are not operating in the normal position.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879, 886, 887

D. CADC Switch

(1) CADC-1 and CADC-2 data is provided to both DFGC's. The NORM position of the CADC switch results in DFGC-1 using the CADC-1 inputs if they are valid, and DFGC-2 using CADC-2 inputs if they are valid. Cross-channel inputs are used if the in-line CADC is invalid. Both DFGC's used the selected CADC data when the switch is not in the NORM position.

(2) The BOTH ON 1 position of the CADC switch is used when a flag relating to air data instrumentation appears on the first officer's instruments, and the BOTH ON 2 is used when a flag relating to air data instrumentation appears on the captain's instruments.

WJE 401-404, 412, 414, 875-879, 886, 887

(3) The BOTH ON 2 position of the EFIS switch is used if a malfunction in SG-1 renders the captain's PFD and ND inoperative. Input display data will now travel from SG-2 to the first officer's PFD and ND; from there the data will be transmitted to the captain's PFD and ND through a repeater link connecting the display units. The data enters the captain's display units via the secondary input ports.

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

(4) The BOTH ON 1 position of the CADC switch is used when a flag relating to air data instrumentation appears on the First Officer's instruments, and the BOTH ON 2 is used when a flag relating to air data instrumentation appears on the Captain's instruments.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879, 886, 887

(5) When the CADC switch is in either BOTH ON 1 or BOTH ON 2 positions, EFI 1 or EFI 2 is displayed upon the PFD's and ND's to indicate to the flight crew that symbol generators are not operating in the NORMAL position.

E. EFIS Switch

(1) When the EFIS source select switch is in the NORM position, Symbol Generator-1 (SG-1) provides display data inputs to the captain's Primary Flight Display (PFD) and Navigation Display (ND), and SG-2 provides display data to the first officer's PFD and ND.

(2) The BOTH ON 1 position of the EFIS switch is used if a malfunction in SG-2 renders the first officer's PFD and ND inoperative. Input display data will now travel from SG-1 to the captain's PFD and ND; from there the data will be transmitted to the F.O.'s PFD and ND through a repeater link connecting the display units. The data enters the F.O.'s display units via the secondary input ports.

(3) The BOTH ON 2 position of the EFIS switch is used if a malfunction in SG-1 renders the captain's PFD and ND inoperative. Input display data will now travel from SG-2 to the first officer's PFD and ND; from there the data will be transmitted to the captain's PFD and ND through a repeater link connecting the display units. The data enters the captain's display units via the secondary input ports.

(4) When the EFIS switch is in either BOTH ON 1 or BOTH ON 2 positions, EFI 1 or EFI 2 is displayed upon the PFD's and ND's to indicate to the flight crew that symbol generators are not operating in the NORMAL position.

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Dual Channel	Two separate, but identical, sets of components which control functions in one axis of operation
DFGC	Digital Flight Guidance Computer
DFGS	Digital Flight Guidance System
EFIS	Electronic Flight Instrument System. Replaces conventional ADI, HSI, Radio Altitude Indicator, Marker Beacon Lights, Instrument Comparator, Taxi Speed Indicator and Weather Radar Indicator instruments with video displays
EPR	Engine Pressure Ratio

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
Fail Passive	A form of failure protection which ensures that no single failure can produce a significant aircraft upset
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LRU	Line Replaceable Unit - an LRU is a component or assembly of components that by design is packaged for removal or replacement as a single item
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PFD	Primary Flight Display. One of two video display units within EFIS
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RMI	Radio Magnetic Indicator
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Slow-Fast Pointer	Located on the PFD, a speed control display in which SLOW commands a higher speed, and FAST commands a lower speed

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
Stability Augmentation	Automatic control functions which augment the basic air craft stability
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TEU	Trailing Edge Up
TEL	Trailing Edge Left
TER	Trailing Edge Right
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Vertical Speed	Rate of climb or descent of the aircraft
VOR	Very High Frequency Omnirange
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B. The autopilot contains the series yaw damper actuator, which automatically controls rudder movements to damp aircraft dutch roll about the yaw axis. Yaw damper provides a full time limited authority rudder control which can be engaged independently of another autopilot function. During autoland and single engine go-around, the autopilot controls the rudder through a duplex rudder servo to provide full parallel rudder authority, and decrab capability.

C. Various roll and pitch modes of operation can be selected to provide aircraft in-flight guidance. These modes provide automatic control of ailerons and elevators to establish and maintain aircraft attitude, altitude, heading, vertical speed, and automatic capture and guidance to localizer, glideslope and omni-range beams.

D. Flight director steering commands are computed within the AFMC when the FMS mode has been selected and properly initialized. This steering data is then relayed to the DFGC's and the EFIS symbol generators for roll and pitch command bar video displays on the captain's and first officer's EFIS Primary Flight Displays (PFD). The pitch and roll command bars can be used to monitor corrective action when the autopilot is engaged, or when the flight crew is manually operating the aircraft.

3. Speed-Attitude-Correction

A. Speed-attitude-correction is provided by a mach trim compensation system. The mach trim compensation system automatically adjusts the center position of the control column to compensate for nosedown pitching of the aircraft caused by high mach number during flight. Mach trim compensation operation is independent of other functions of the auto flight system. Elevator control through mach trim compensation is separate from elevator movement control by the autopilot.

B. Automatic pitch trim is provided to relieve the autopilot from holding sustained up or down elevator due to actual or apparent changes of the center of gravity within the aircraft. If an out-of-trim condition develops, commands to the alternate trim motor to move the horizontal stabilizer up or down will correct the out-of-trim condition.

4. Auto Throttle/Speed Control

A. Speed control can be programmed for a selected speed, mach number or for an angle-of-attack speed reference based on a safe margin above stall conditions. The system is usable throughout the entire flight envelope. When minimum safe stall margin is desired, i.e. during takeoff or go-around maneuvers, the angle-of-attack speed reference affords the minimum rate stall margin throughout the process of cleaning up the gear, flaps, and slats. Selected speed or mach extends the control into cruise conditions, altitude changes, holding patterns, and approach conditions.

B. The DFGC transmits throttle commands to the auto throttle system which automatically adjusts engine power settings for controlled thrust throughout all flight modes from takeoff to automatic retard mode. The system automatically controls the throttles to selected or commanded air speed, mach number, or EPR limit (engine pressure ratio).

C. The Digital Flight Guidance Computer (DFGC) features an automatic thrust restoration (ATR) function which increases thrust under certain conditions in the event of an engine failure or negative climb rate (-930 and subs) during takeoff. Once activated, the ATR function will unclamp and advance the throttles (if the autothrottle is engaged) equally until the left or right engine EPR reaches the G/A EPR limit.

ATR is armed when the following criteria is met:

(1) The flight director pitch axis is in the takeoff mode

(2) The aircraft is at or above 350 feet radio altitude

(3) Both engine EPRs are below the G/A EPR limit

(4) A thrust cutback has been performed ((both EPRs reduced 0.1 EPR or greater) (-972 DFGC and subsequent))

After ATR is armed, the DFGC continuously monitors for an engine failure, and/or negative climb rate (-930 and subs). The ATR is activated if a difference of 0.25 EPR and 7% N1 is detected between the two engines (with both parameters low on the same engine), or if the aircraft vertical speed decreases to less than zero for 5 seconds cumulatively (-930 and subs). In either case, the throttles will unclamp and advance to the G/A EPR limit.

With the advent of the -972 and subsequent DFGC's, EPR from each engine is sampled every 100 msec, with the highest value saved from each 500 msec period. The highest EPR of each engine is then compared in order to determine if a 0.25 or greater split in EPR exists. A split of 0.25 EPR or greater must exist for 5 consecutive passes (2.5 sec) in conjunction with an N1 split of at least 7% N1 in order to satisfy ATR activation logic. This method of sampling the highest EPR of each engine allows the DFGC to effectively "Discriminate" between a failed engine and one which is surging.

5. Flight Guidance System - Switching Capabilities

A. The flight guidance system employs various switching capabilities to allow a second or auxiliary source of data. The switches are located on the flight compartment overhead panel, and are as follows:

Table 1

SWITCH	POSITION
FD CMD	NORM, BOTH ON 1, BOTH ON 2
AHRS (AIRCRAFT 104-110, 128-129, 151-153)	NORM, L ON AUX, R ON AUX
VERT GYRO (AIRCRAFT 101-103, 126-127, 130-132, 134-135, 137)	NORM, L ON AUX, R ON AUX
CADC	NORM, BOTH ON 1, BOTH ON 2
COMPASS (AIRCRAFT 101-103, 126-127, 130-137)	NORM, BOTH ON 1, BOTH ON 2
EFIS	NORM, BOTH ON 1, BOTH ON 2
FMS	NORM, BOTH ON 1, BOTH ON 2
RADIO NAV	NORM, BOTH ON 1, BOTH ON 2
NOTE: DFGC's require certain number of inputs for a mode to become operational. Use of switching may make a mode inoperative; e.g., autopilot takeoff mode requires two air data inputs. If CADC selector switch is switched out of NORM position, autopilot takeoff mode becomes inoperative.	

B. FD CMD Switch

(1) The NORM position of the FD CMD switch provides DFGC-1 command inputs to the captain's Primary Flight Display (PFD), and DFGC-2 provides command inputs to the first officer's PFD.

(2) The BOTH ON 1 position of the FD CMD switch is used if a malfunction in DFGC-2 renders the first officer's command bars or slow-fast pointer inoperative, providing the data source for both PFDs from DFGC-1. The BOTH ON 2 position is used if a malfunction in DFGC-1 renders the captain's command bars or slow-fast pointer inoperative, providing the data source to both PFDs from DFGC-2.

(3) When the FD CMD switch is in either BOTH ON 1, or BOTH ON 2 position, amber FD lights located on the captain's and first officer's instrument panels come on to indicate to the flight crew that flight directors are not operating in the normal position.

WJE 406-408, 411

C. AHRS Switch

(1) The NORM position of the AHRS switch (attitude heading reference system) provides pitch and roll attitude data as well as heading (compass) data from AHRS-1, -2 to the DFGC's and associated instruments i.e. PFD's, NAV displays (ND) and RMI's.

(2) L ON AUX position of the AHRS switch provides pitch, roll and heading data to the DFGC's and instruments that normally would operate using AHRS-1 data. This position is normally used if an attitude or heading flag appears on the captain's PFD or ND.

(3) R ON AUX of the switch provides pitch, roll and heading data from AHRS-2. This position is normally used if an attitude or heading flag appears on the first officer's PFD or ND.

WJE 406-408, 411 (Continued)

(4) An amber AUX AHRS INOP light is located on the flight compartment overhead panel near the AHRS switch. The AUX AHRS INOP light will come on any time AHRS-3 monitors detect a malfunction. The AHRS switch should not be moved out of the NORM position when the AUX AHRS INOP light is on.

(5) Placing the AHRS switch to the AUX positions, will cause momentary attitude and speed flags to come into view on the affective PFD while the switching transient occurs.

WJE 405, 409, 410, 880, 884

D. VERT GYRO Switch

(1) The NORM position of the VERT GYRO switch provides input signals from all three vertical gyros to DFGC-1 and DFGC-2. Placing the VERT GYRO switch out of the NORM position provides both DFGC's with switching unit position. Internal logic within the DFGC will cause VG-1 or VG-2 to be ignored when the VERT GYRO switch is activated.

(2) The L on AUX position of the VERT GYRO switch results in pitch and roll attitude data from VG-3 being used in the DFGC's in lieu of VG-1. The R on AUX position results in VG-3 being used in the DFGC's in lieu of VG-2.

(3) An amber AUX GYRO INOP light is located on the flight compartment overhead panel near the VERT GYRO switch. The AUX GYRO INOP light will come on any time vertical gyro-3 monitors detect a malfunction. The VERT GYRO switch should not be moved out of the NORM position when the AUX GYRO INOP light is on.

(4) Placing the VERT GYRO switch to the AUX positions, will cause momentary attitude and speed flags to come into view on the affective ADI while the switching transient occurs.

WJE 405-411, 880, 881, 883, 884; AFTER AVIONICS UPGRADE MOD

E. CADC Switch

(1) CADC-1 and CADC-2 data is provided to both DFGC's. The NORM position of the CADC switch results in DFGC-1 using the CADC-1 inputs if they are valid, and DFGC-2 using CADC-2 inputs if they are valid. Cross-channel inputs are used if the in-line CADC is invalid. Both DFGC's used the selected CADC data when the switch is not in the NORM position.

(2) The BOTH ON 1 position of the CADC switch is used when a flag relating to air data instrumentation appears on the first officer's instruments, and the BOTH ON 2 is used when a flag relating to air data instrumentation appears on the captain's instruments.

(3) When the CADC switch is in either the BOTH ON 1, or BOTH ON 2 position, CADC lights on the captain's and first officer's instrument panels will come on to indicate to the flight crew that air data instruments are not operating in the normal position.

WJE 405, 409, 410, 880, 881, 883, 884

F. COMPASS Switch

(1) The NORM position of the COMPASS switch provides compass system -1 data to the captain's ND and first officer's CI, and compass system -2 data to the first officer's ND and captain's CI. The NORM position of the COMPASS switch also provides compass -1 information to DFGC -1, and compass -2 information to DFGC -2.

(2) The BOTH ON 1 or BOTH ON 2 position of the COMPASS switch places both the captain's and first officer's ND's and CI's on a single compass system. The BOTH ON 1 position is normally used when a failure flag appears in the first officer's ND and in the captain's CI indicating compass system -2 has failed. The BOTH ON 2 position is used if the captain's ND and first officer's CI display compass system failure flags.

WJE 405, 409, 410, 880, 881, 883, 884 (Continued)

(3) When the COMPASS switch is in either BOTH ON 1 or BOTH ON 2 position, COMP lights on the captain's and first officer's instrument panels will come on to indicate to the flight crew that compasses are not operating in the normal position.

WJE 405-411, 880, 881, 883, 884; AFTER AVIONICS UPGRADE MOD

G. EFIS Switch

(1) When the EFIS source select switch is in the NORM position, Symbol Generator-1 (SG-1) provides display data inputs to the captain's Primary Flight Display (PFD) and Navigation Display (ND), and SG-2 provides display data to the first officer's PFD and ND.

(2) The BOTH ON 1 position of the EFIS switch is used if a malfunction in SG-2 renders the first officer's PFD and ND inoperative. Input display data will now travel from SG-1 to the captain's FPD and ND; from there the data will be transmitted to the F.O.'s PFD and ND through a repeater link connecting the display units. The data enters the F.O.'s display units via the secondary input ports.

(3) The BOTH ON 2 position of the EFIS switch is used if a malfunction in SG-1 renders the captain's PFD and ND inoperative. Input display data will now travel from SG-2 to the first officer's PFD and ND; from there the data will be transmitted to the captain's PFD and ND through a repeater link connecting the display units. The data enters the captain's display units via the secondary input ports.

(4) When the EFIS switch is in either BOTH ON 1 or BOTH ON 2 positions, EFI 1 or EFI 2 is displayed upon the PFD's and ND's to indicate to the flight crew that symbol generators are not operating in the NORMAL position.

H. FMS Switch

(1) When the FMS source select switch is in the NORM position, Flight Management Computer (FMC-1) provides flight data inputs to the captain's Primary Flight Display (PFD) and Navigation Display (ND), and FMC-2 provides flight data to the first officer's PFD and ND.

(2) The BOTH ON 1 position of the FMS switch is used if a malfunction in FMC-2 renders the first officer's PFD and ND inoperative. Input flight data will now travel from FMC-1 to the captain's FPD and ND; from there the data will be transmitted to the F.O.'s PFD and ND through a repeater link connecting the display units. The data enters the F.O.'s display units via the secondary input ports.

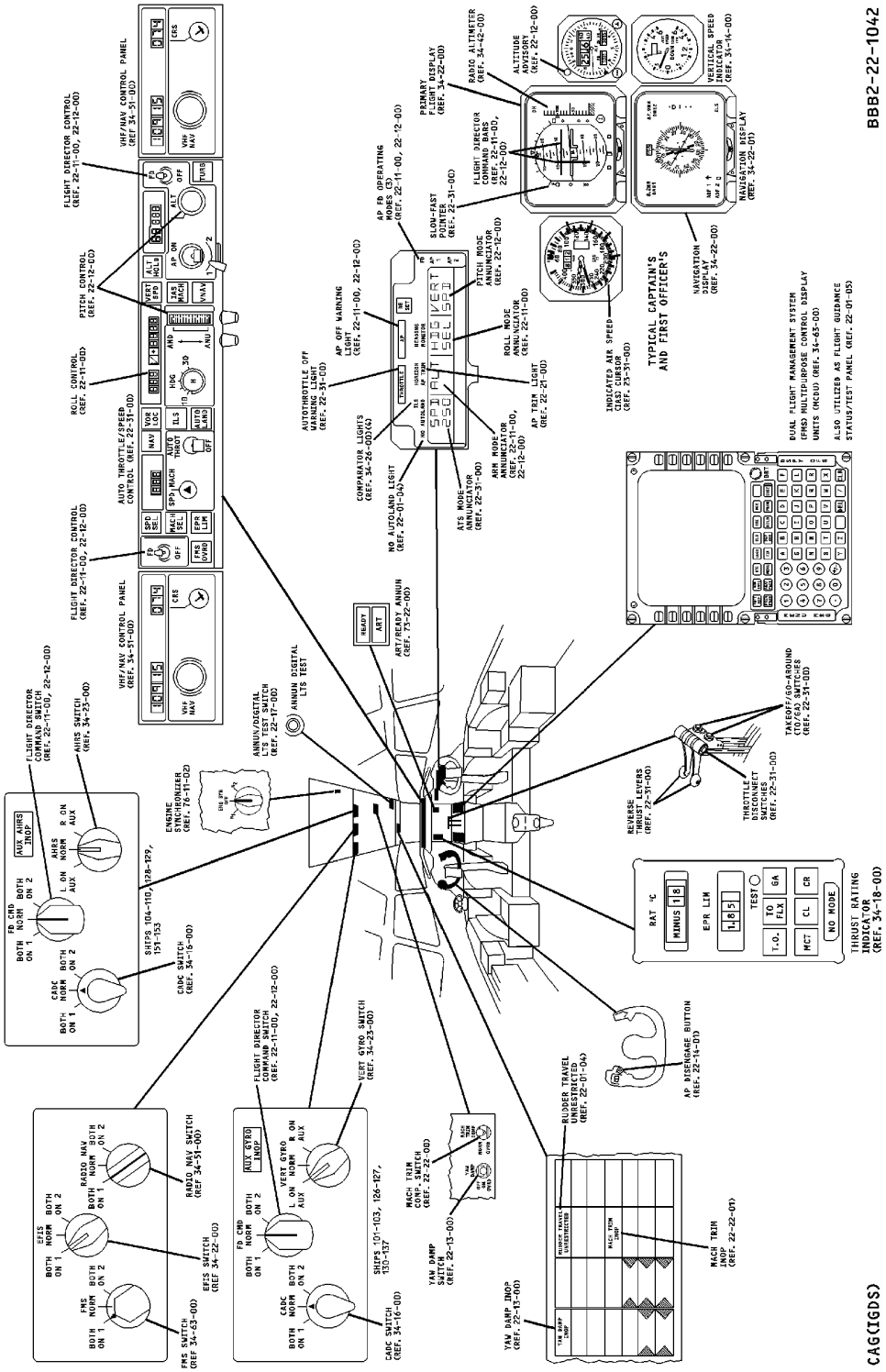
(3) The BOTH ON 2 position of the FMS switch is used if a malfunction in FMC-1 renders the captain's PFD and ND inoperative. Input flight data will now travel from FMC-2 to the first officer's PFD and ND; from there the data will be transmitted to the captain's PFD and ND through a repeater link connecting the display units. The data enters the captain's display units via the secondary input ports.

I. RADIO NAV Switch

(1) The NORM position of the RADIO NAV switch provides NAV (glideslope or LOC/VOR) information to the captain's and first officer's Primary and Navigation displays. The NORM position of the RADIO NAV switch also provides NAV receiver -1 data to DFGC -1 and NAV receiver -2 data to DFGC -2.

(2) The BOTH ON 1 position of the RADIO NAV switch is normally used if a flag appears in the first officer's Primary or Navigation Displays indicating NAV receiver -2 has failed. The BOTH ON 2 position is used if a flag appears in the captain's Primary or Navigation Displays.

(3) When the RADIO NAV switch is in either BOTH ON 1 or BOTH ON 2 position, NAV lights on the captain's and first officer's instrument panels will come on to indicate to the flight crew that NAV receivers are not operating in the normal position.



Auto Flight - Flight Compartment Controls and Displays
Figure 1/22-00-00-990-A62

6. Glossary of Terms and Abbreviations

A. The following terms and abbreviations may be found in both text and illustrations relating to the auto flight system.

Table 2

TERMS AND ABBREVIATIONS	DEFINITION
AHRS	Attitude Heading Reference System
Alarmed State	Condition of a units fault annunciator when a failure has been detected
Align	Forward slip maneuver, occurring at 145 feet to eliminate any crab-angle resulting from crosswinds
Altitude	Ambient static barometric pressure measured in feet above sea level
Analog	Continuous AC or DC signals which vary in amplitude. These signals are summed, integrated, etc., to provide a desired result.
A/P	Autopilot
Area of Confusion	The cone directly above a VOR transmitter in which directional radials are usable
ART	Automatic Reserve Thrust
A/T	Auto Throttle
Autoland	Autopilot automatic landing, with align and flare modes available to aircraft touchdown
Beam Capture Threshold	Voltage measured in millivolts of beam deviation, at which time automatic capture or track occurs
BIT	Built In Test
CADC	Central Air Data Computer
CAS	Calibrated Airspeed
Control Mode Select	A series of push-button on the flight guidance control panel which are pressed to select a control mode
Crab Angle	Relative angle between selected course heading and indicated aircraft magnetic heading
CRS	Course
D3A-Z	Dual 3-Axis Accelerometer
DEV	Deviation
DFGCP	Digital Flight Guidance Control Panel
DG	Directional Gyro
Digital	A computer that operates in numbers expressed directly as digits in a decimal binary (digital computer counts)
Discrete Signal	Has one of only two predetermined values, for example: zero or 28vdc
DLA-Y	Dual Longitudinal Axis
Dual Channel	Two separate, but identical, sets of components which control functions in one axis of operation
DFGC	Digital Flight Guidance Computer

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
DFGS	Digital Flight Guidance System
EFIS	Electronic Flight Instrument System. Replaces conventional ADI, HSI, Radio Altitude Indicator, Marker Beacon Lights, Instrument Comparator, Taxi Speed Indicator and Weather Radar Indicator instruments with video displays
EPR	Engine Pressure Ratio
Fail Passive	A form of failure protection which ensures that no single failure can produce a significant aircraft upset
FGS	Flight Guidance System
FG Status/Test Panel (STP)	The STP is a trouble shooting aid. Failures in the DFGS detected during flight will be displayed on the STP. Also, by use of the STP, system interface can be completely checked out
FMS	Flight Management System. In conjunction with other inter facing equipment in the aircraft, forms an integrated, full-flight regime control and information system that provides automatic navigation, guidance, map display, and in-flight performance optimization.
Forward Slip Maneuver	The cross control maneuver during an automatic landing which provides the transition from a crab-angle to a heading reference that aligns the aircraft along the runway centerline
FMA	Flight Mode Annunciator
Gain Scheduling	The shaping or programming of certain gains to compensate for varying conditions, such as airspeed, beam convergence, radio altitude, etc.
G/S	Glide Slope
Heading Hold Threshold	The bank angle which establishes either roll attitude hold or heading hold mode of operation
Healed State	The condition of a units fault annunciator when an alarmed state has been corrected
IAS	Indicated Airspeed
ILS	Instrument Landing System
Lateral Directional Axis	The combined roll and yaw axis of the aircraft
LOC	Localizer
LRU	Line Replaceable Unit - an LRU is a component or assembly of components that by design is packaged for removal or replacement as a single item
LWD	Left Wing Down
MCDU	Multifunction Control Display Unit. A means for programming flight plans into the FMS and reading system fault messages.
NCR	Noncorrective
ND	Navigation Display. One of two video display units within EFIS
Off-Side Computer	The DFGC not selected by the 1, 2 switch
On-Side Computer	The DFGC selected by the 1, 2 switch
PFD	Primary Flight Display. One of two video display units within EFIS

Table 2 (Continued)

TERMS AND ABBREVIATIONS	DEFINITION
R/A	Radio Altimeter
RMI	Radio Magnetic Indicator
RWD	Right Wing Down
Slow-Fast Pointer	Located on the PFD, a speed control display in which SLOW commands a higher speed, and FAST commands a lower speed
Stability Augmentation	Automatic control functions which augment the basic aircraft stability
TED	Trailing Edge Down
TEU	Trailing Edge Up
TEL	Trailing Edge Left
TER	Trailing Edge Right
Valid or Validity Signal	Electrical input that verifies proper operation of sending system or sensor
Vertical Speed	Rate of climb or descent of the aircraft
VOR	Very High Frequency Omnirange
V_2	Takeoff Safety Speed
V_R	Rotation Speed
V_S	Airspeed at lg stall for a given aircraft configuration

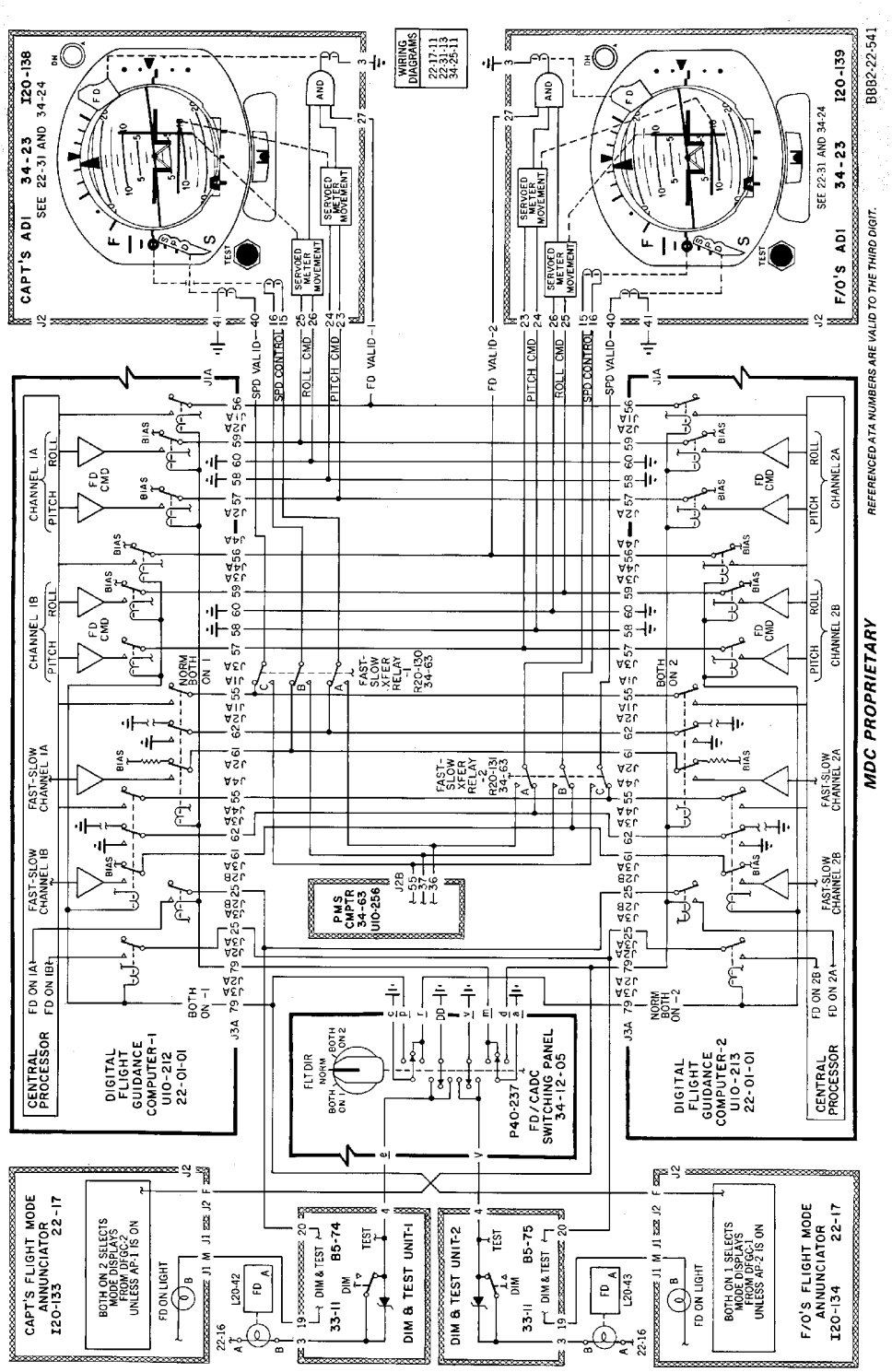
AUTO FLIGHT - TROUBLE SHOOTING

1. General

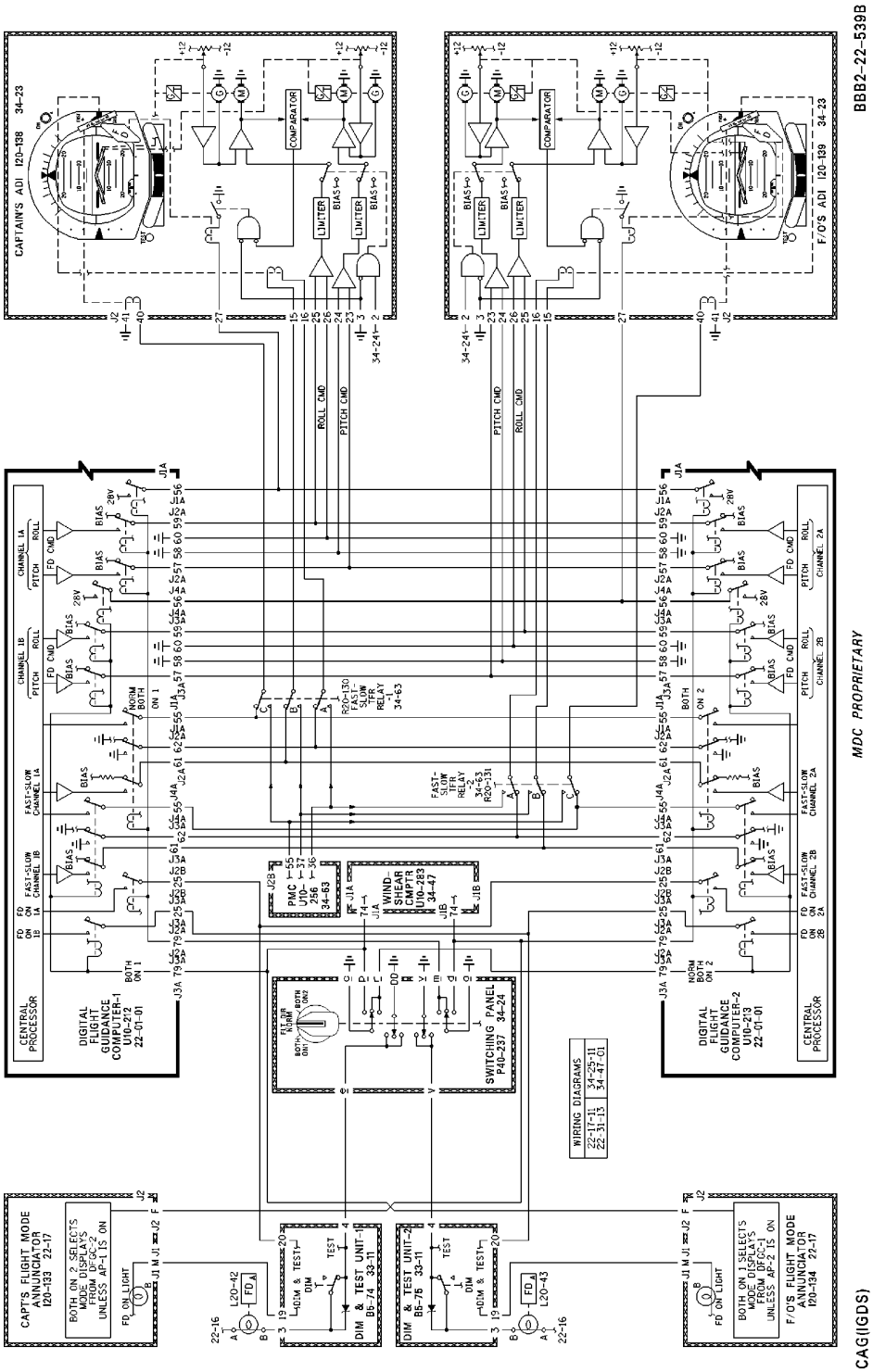
A. Prior to performing Auto Flight trouble shooting procedures, the Status Test Panel (STP) located below the captain's brief-case compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The Auto Flight system may be also verified by use of the Maintenance or Return-To-Service tests. (SUBJECT 22-01-05, Page 201)

B. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on the Auto Flight System is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to Auto Flight and associated system interface.

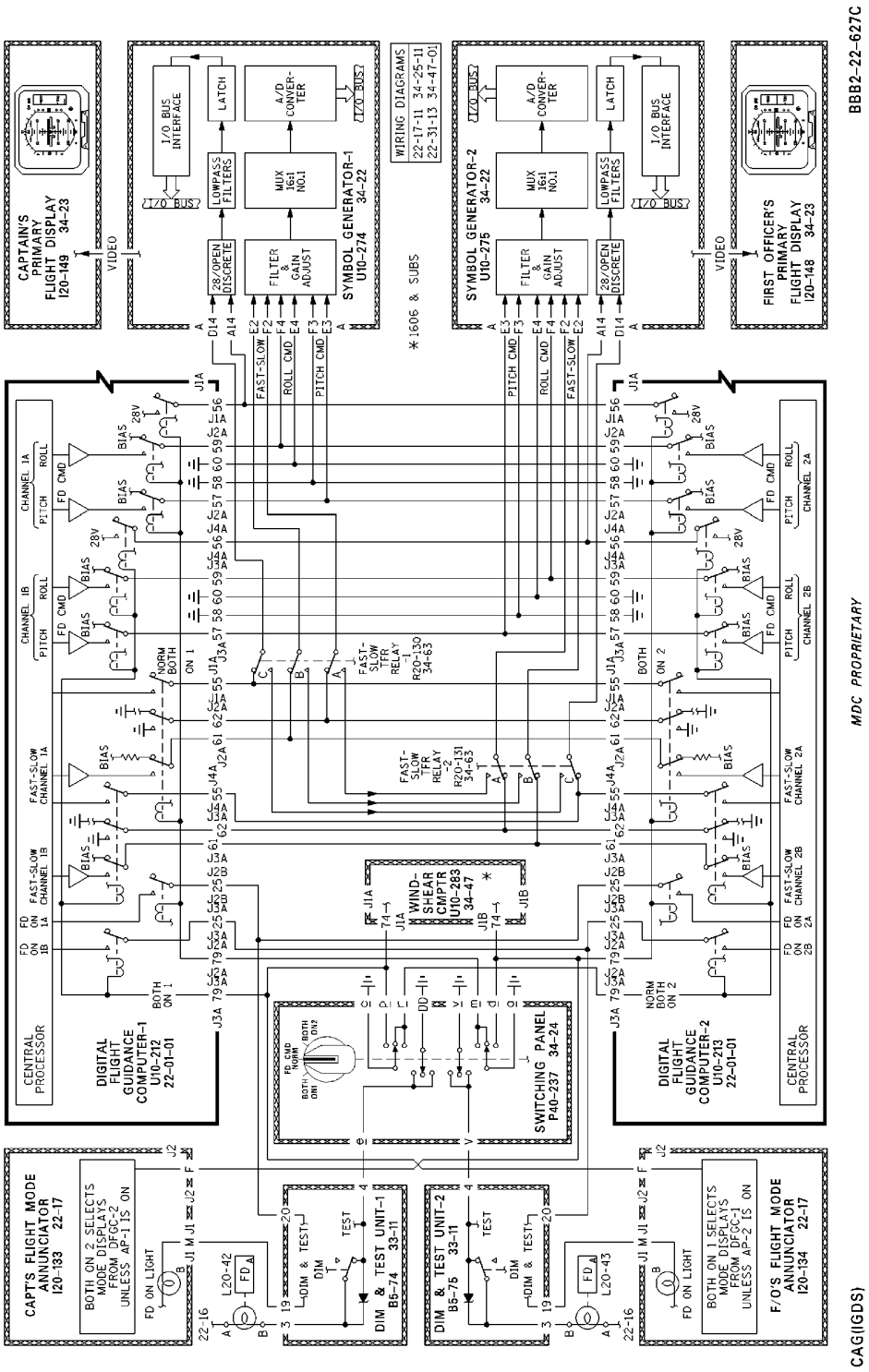
NOTE: The replacement of the Digital Flight Guidance Computer (DGFC) is not always required when the intermittent failure is reported during flight and no failure is found during Flight Fault Review (FFR) test and Return to Service (RTS) test using Status Test Panel (STP) at the ground check. However, if intermittent failures persist, further troubleshooting will be required.



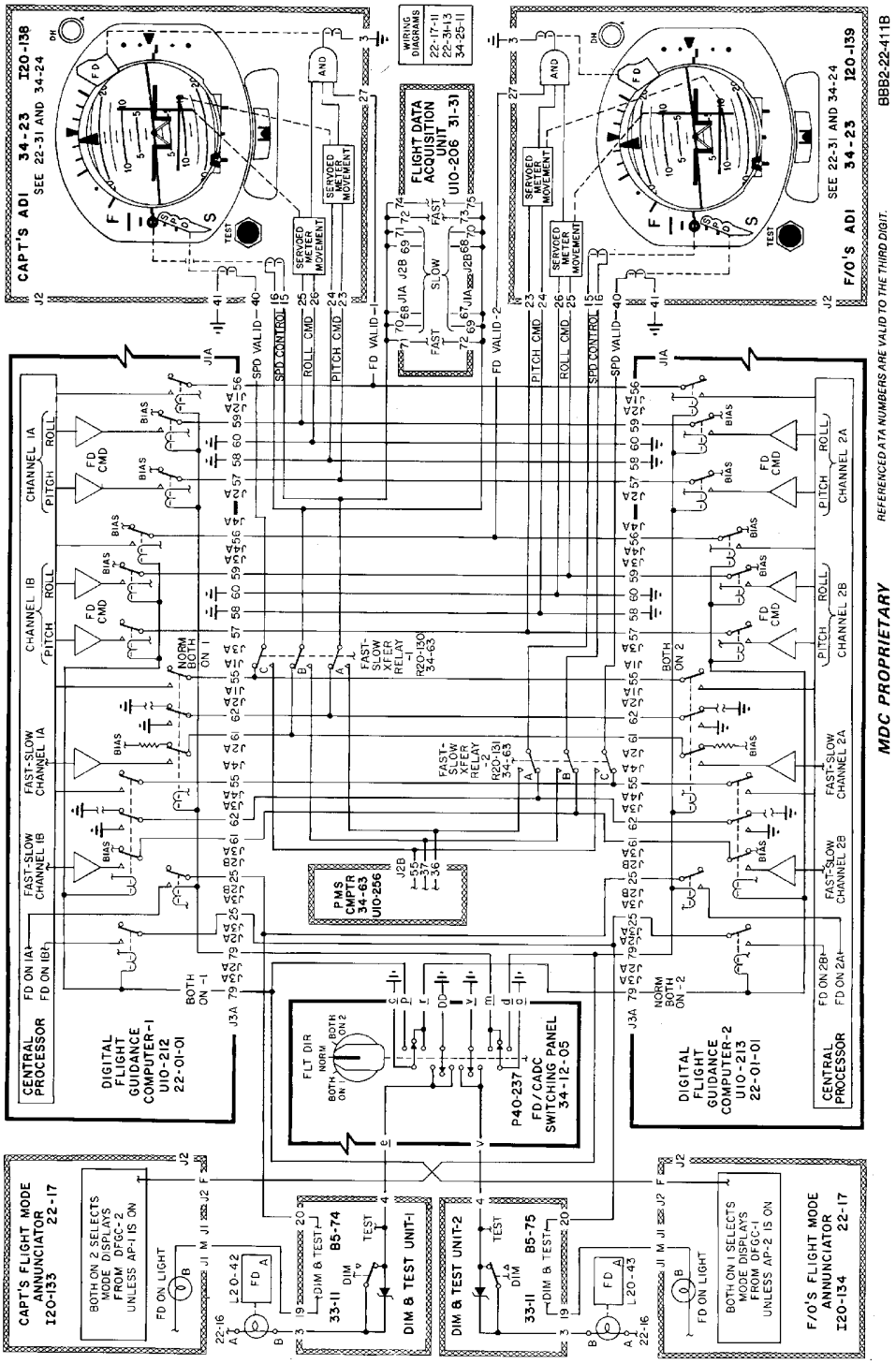
BOTH ON 1, BOTH ON 2 Switching
Figure 101/22-00-00-990-832



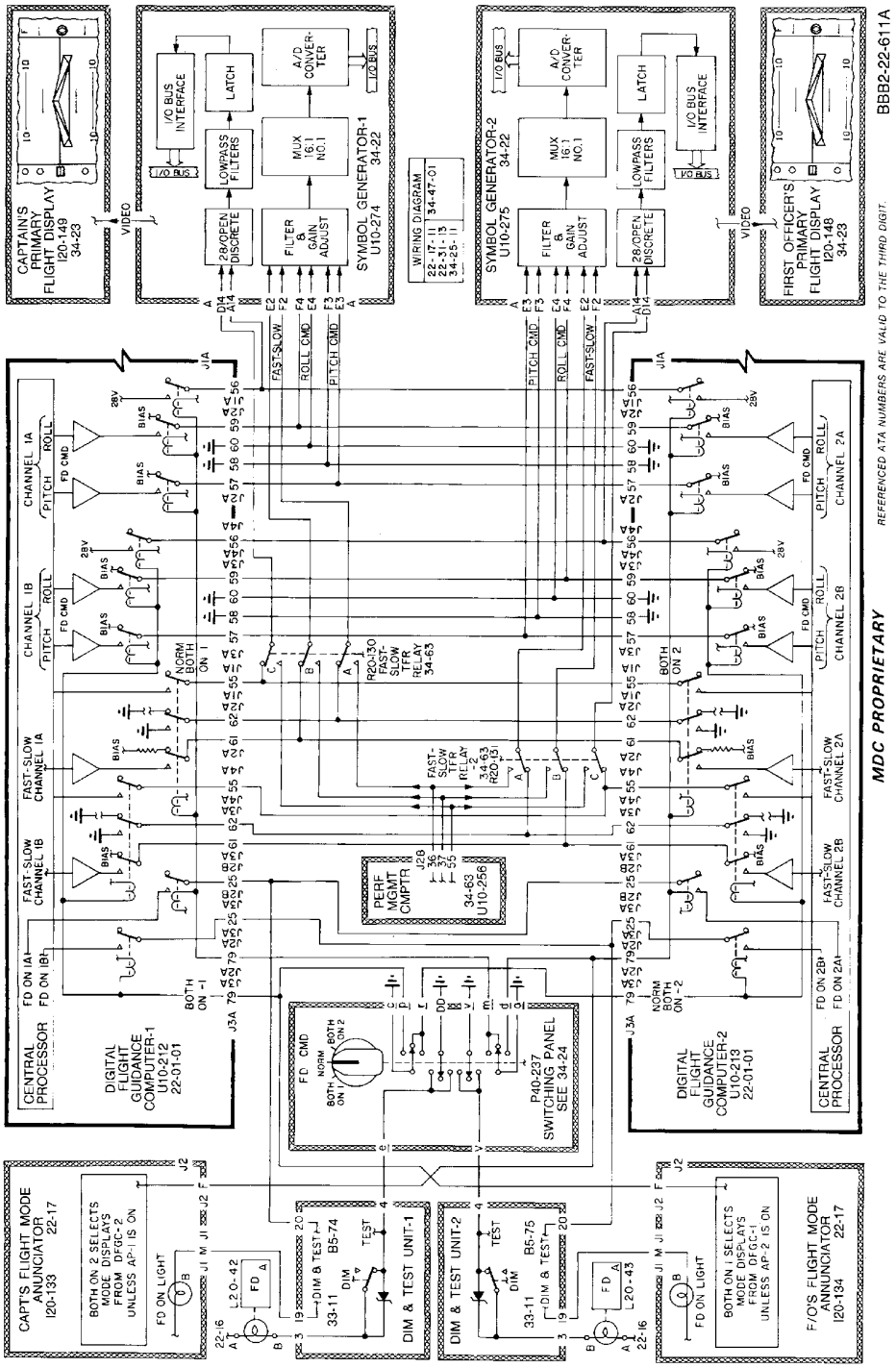
BOTH ON 1, BOTH ON 2 Switching
Figure 102/22-00-00-990-833



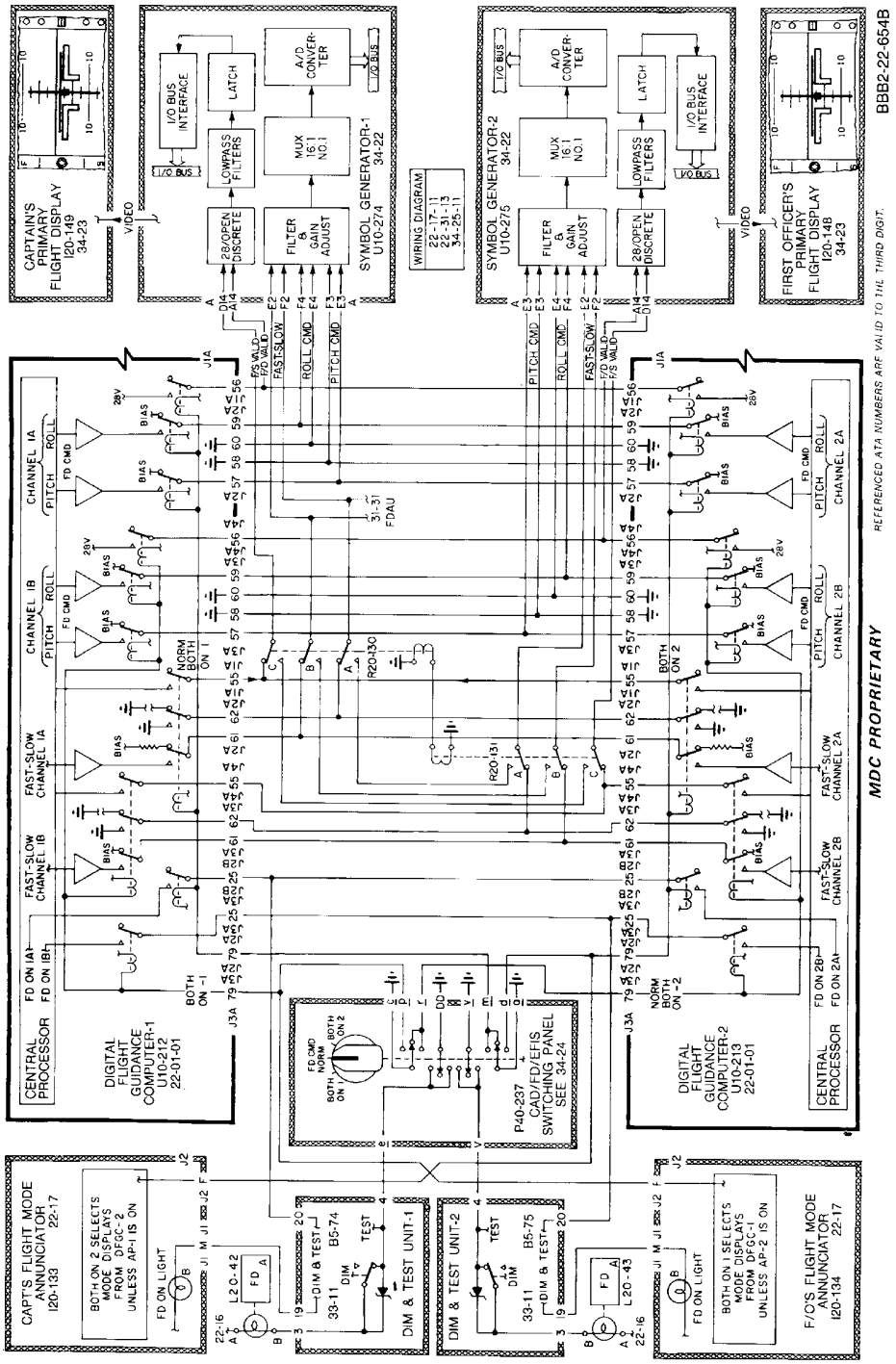
BOTH ON 1, BOTH ON 2 Switching
Figure 103/22-00-00-990-835



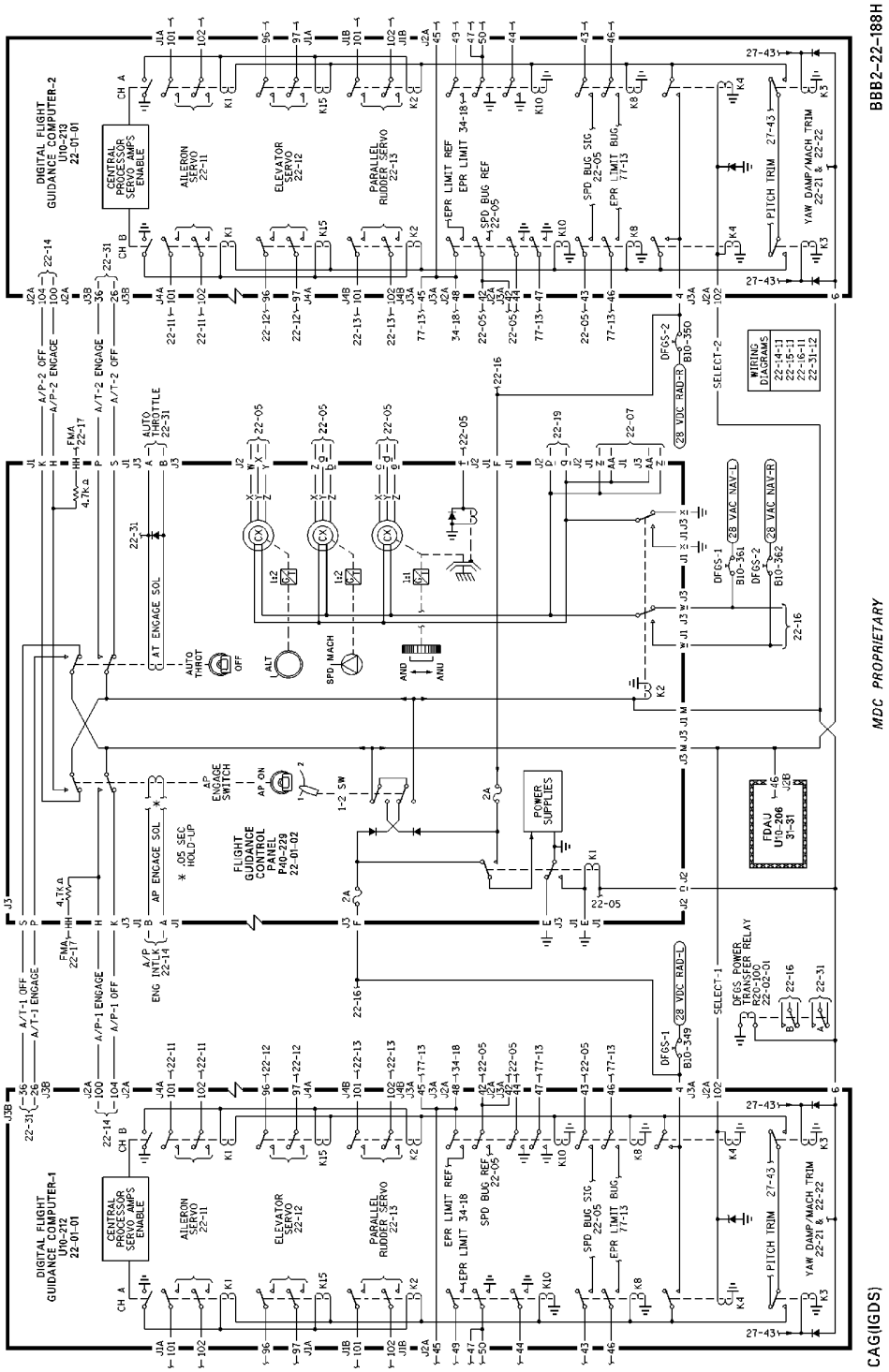
BOTH ON 1, BOTH ON 2 Switching
Figure 104/22-00-00-990-839



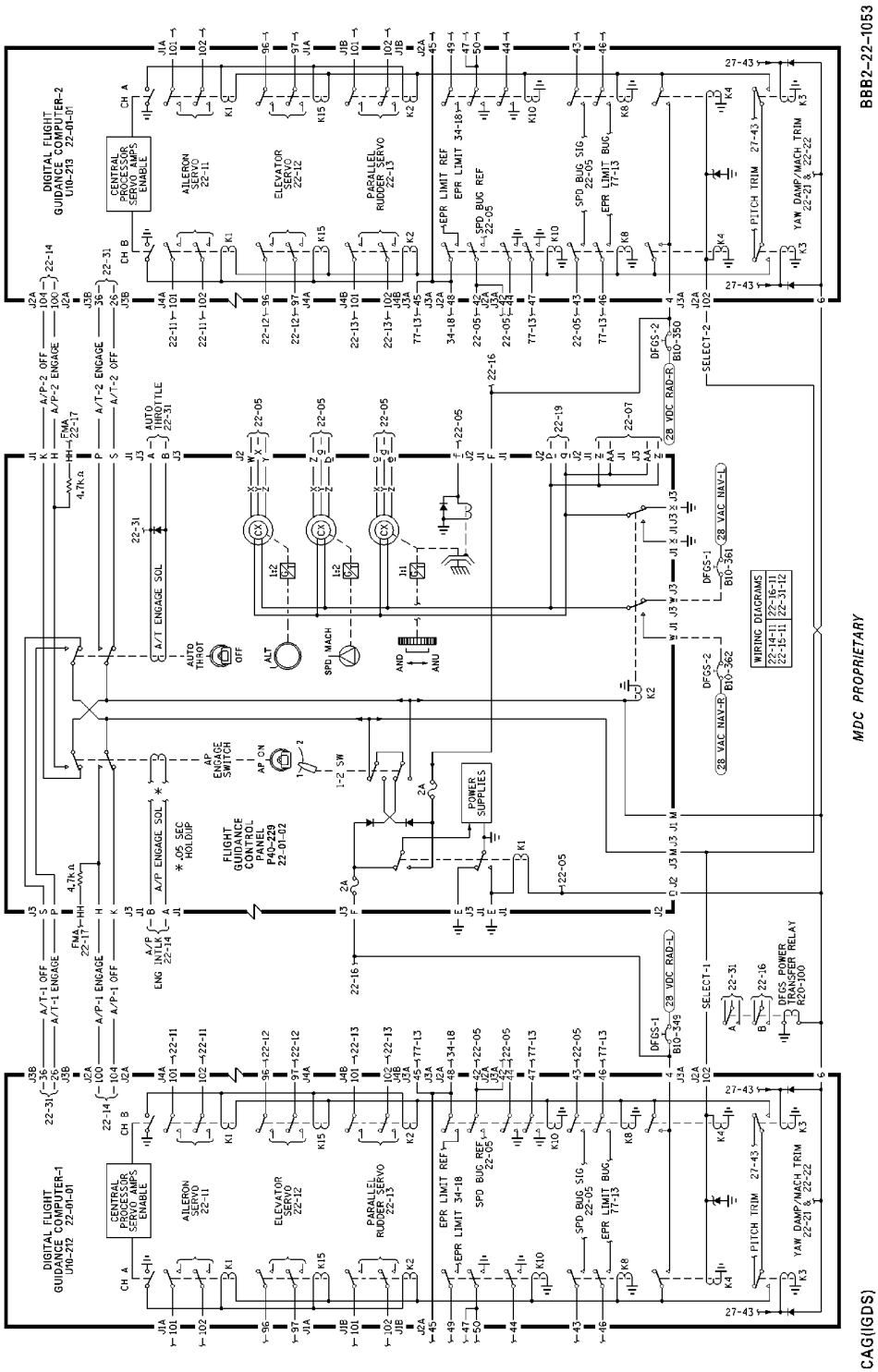
BOTH ON 1, BOTH ON 2 Switching
Figure 105/22-00-00-990-847



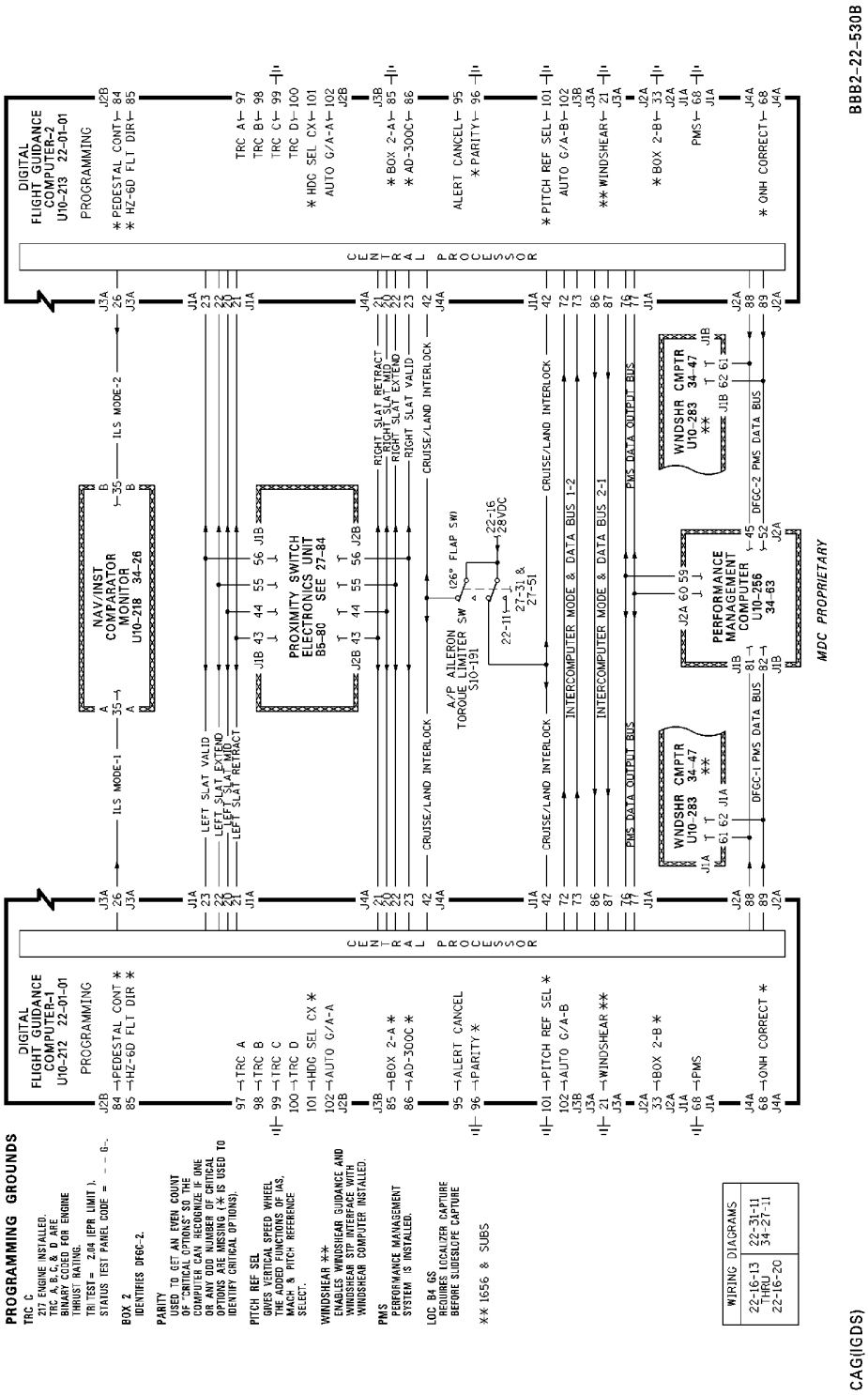
BOTH ON 1, BOTH ON 2 Switching
Figure 106/22-00-00-990-850



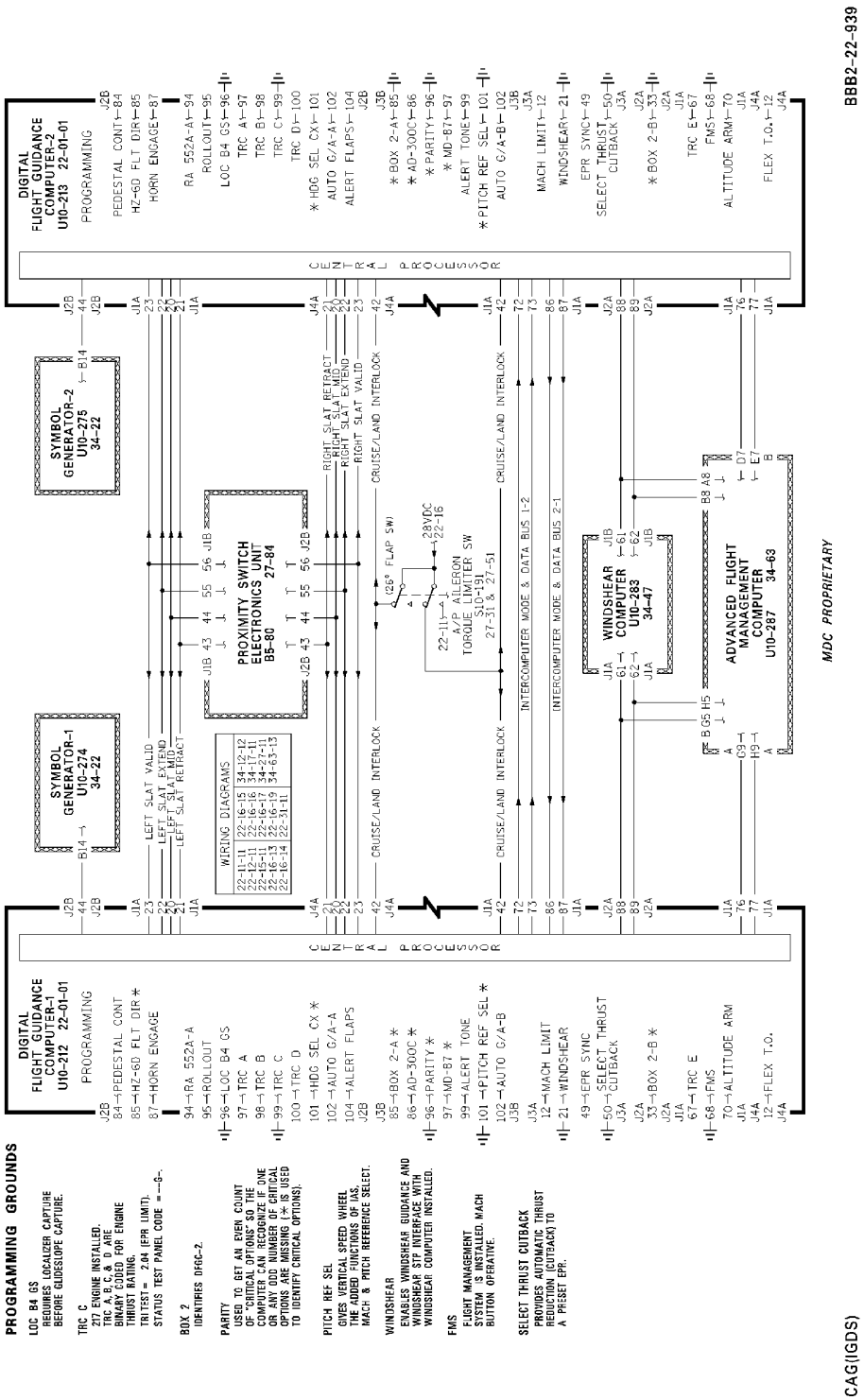
1-2 Switching & Vertical Speed
Figure 107/22-00-00-990-855



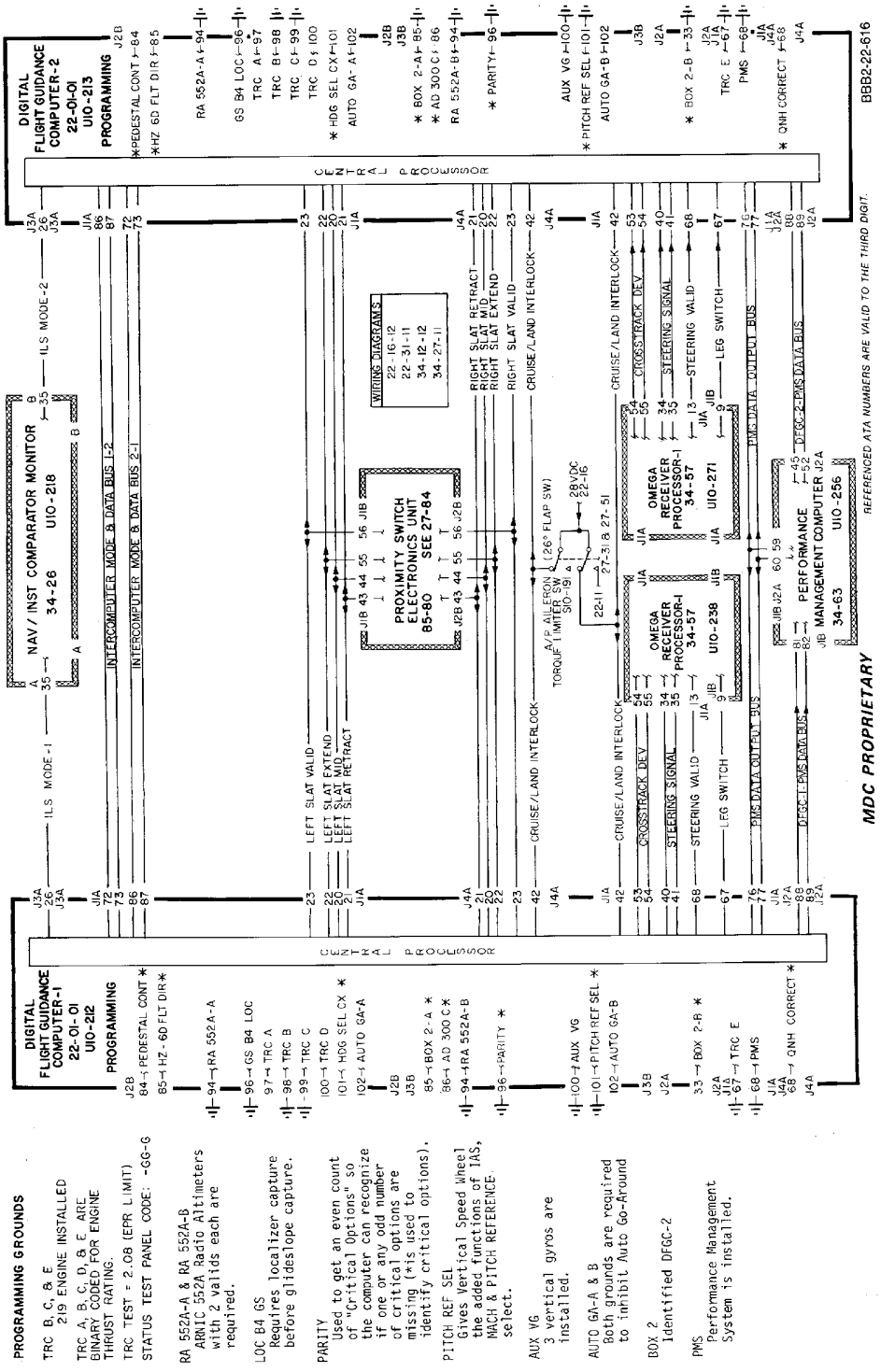
1-2 Switching
Figure 108/22-00-00-990-858



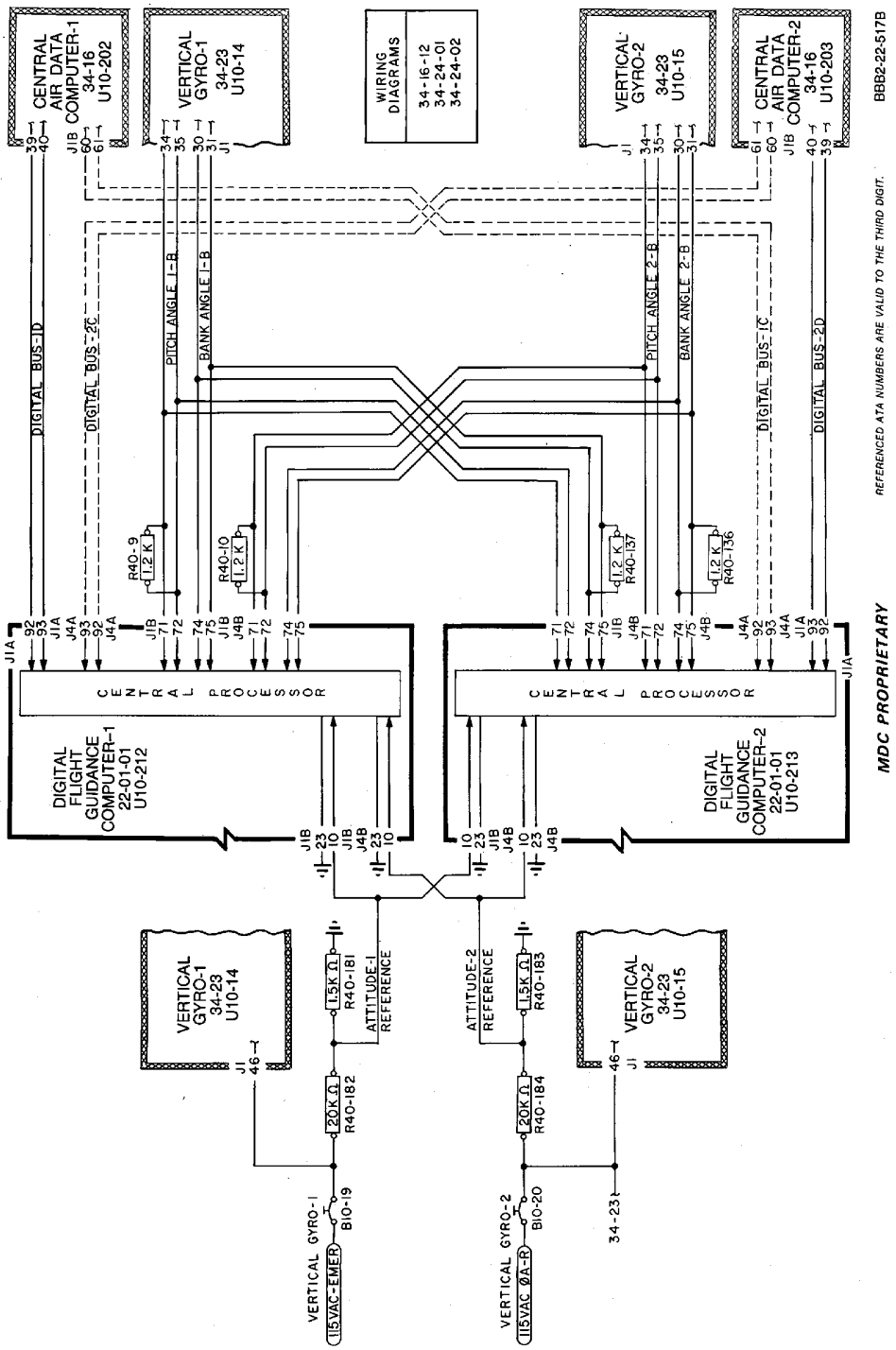
Program, Slat & Misc. Mode Circuits
Figure 109/22-00-00-990-869



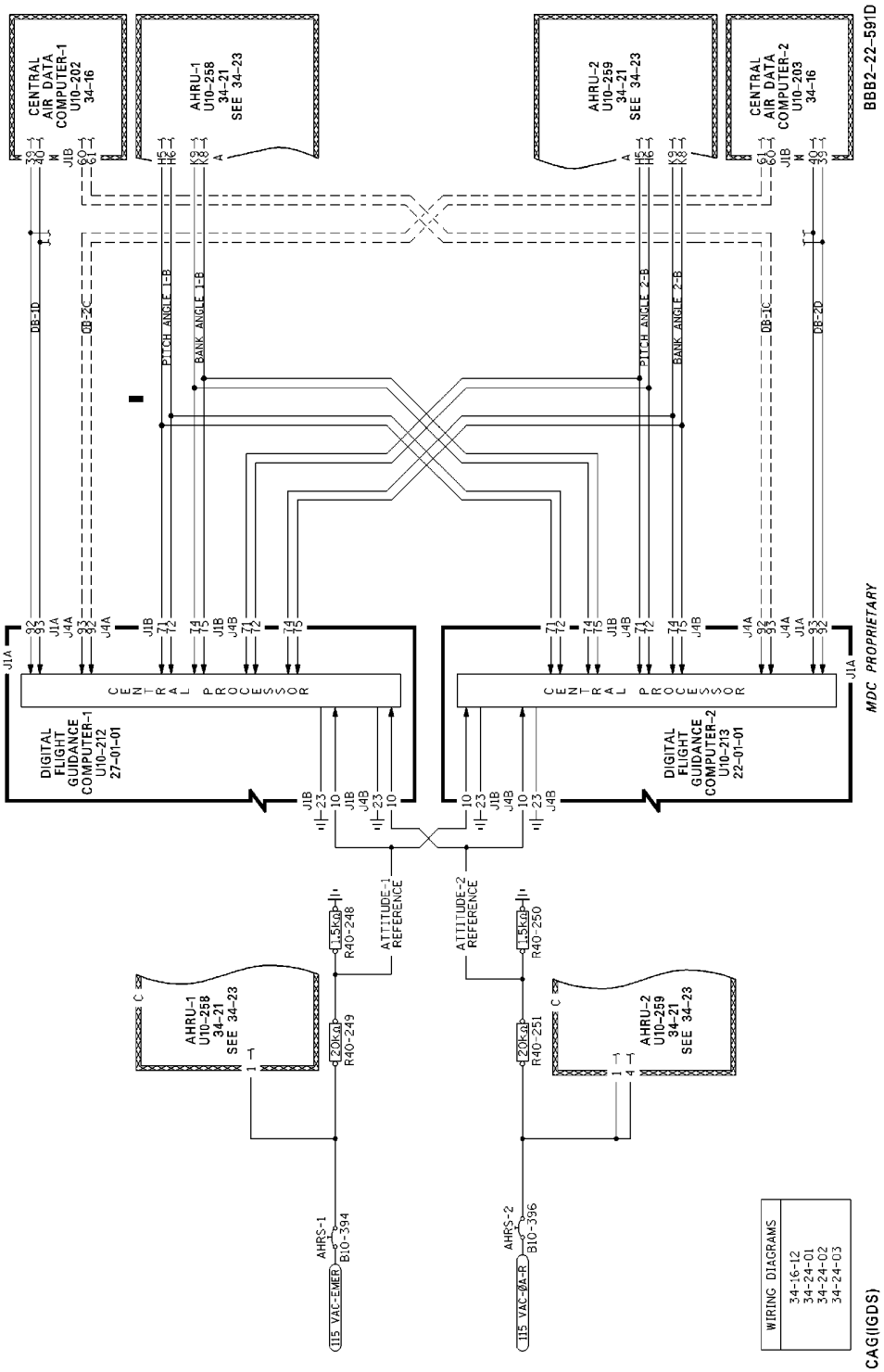
Program, Slat & Misc. Mode Circuits
Figure 110/22-00-00-990-871



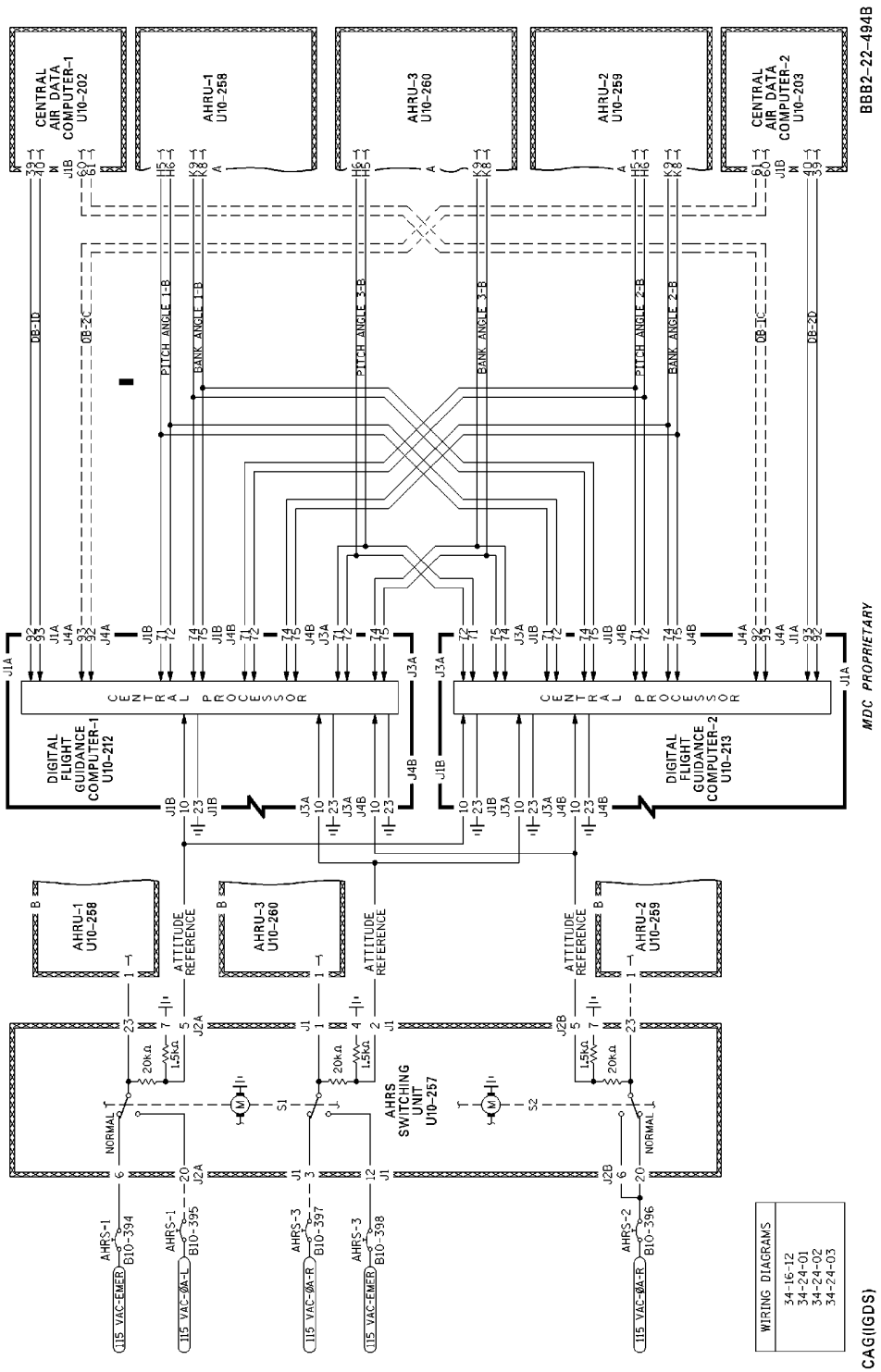
Program, Slat & Misc. Mode Circuits
Figure 111/22-00-00-990-877



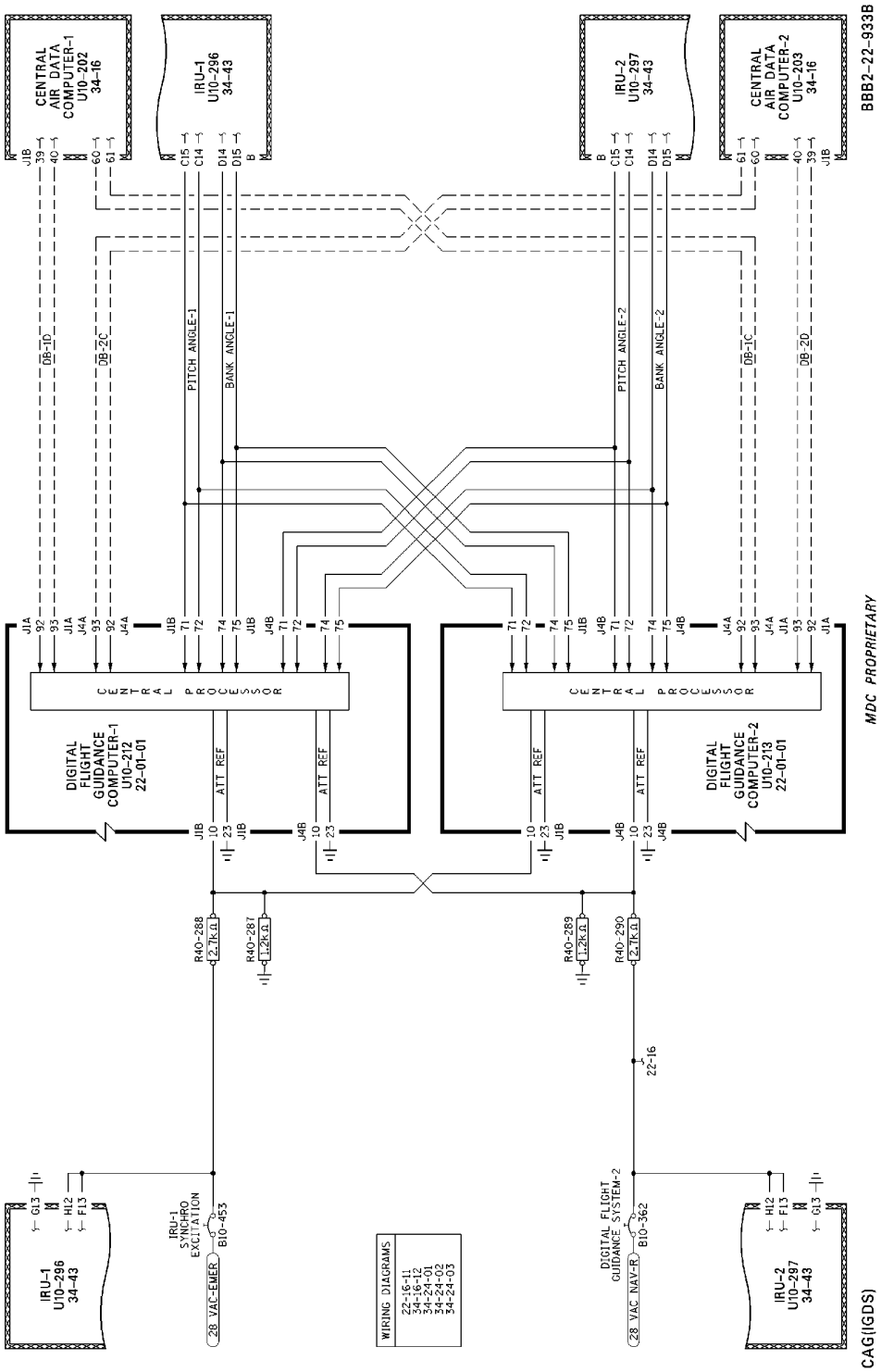
Attitude and CADC
Figure 112/22-00-00-990-882



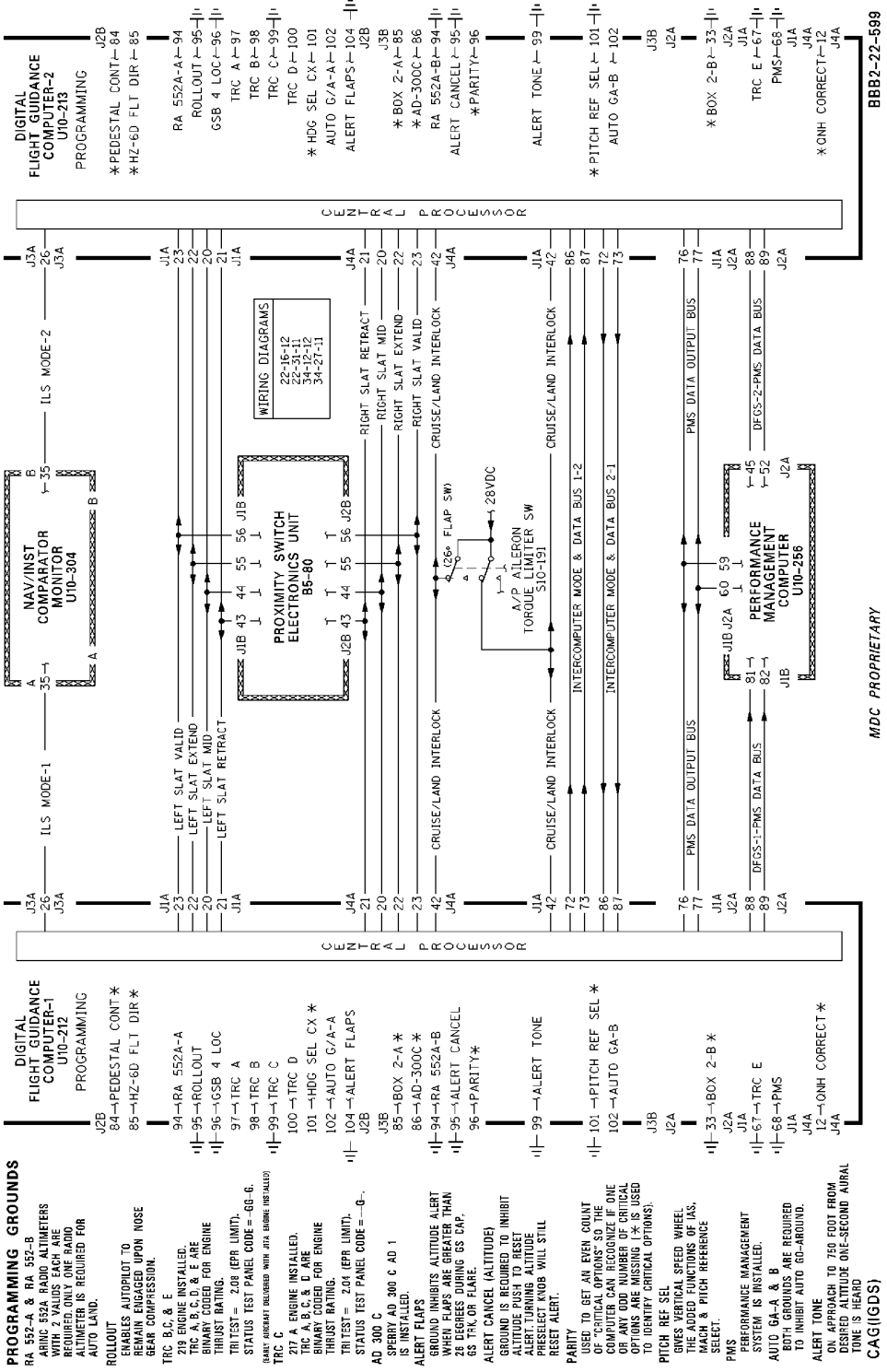
Attitude and CADC
Figure 113/22-00-00-990-895



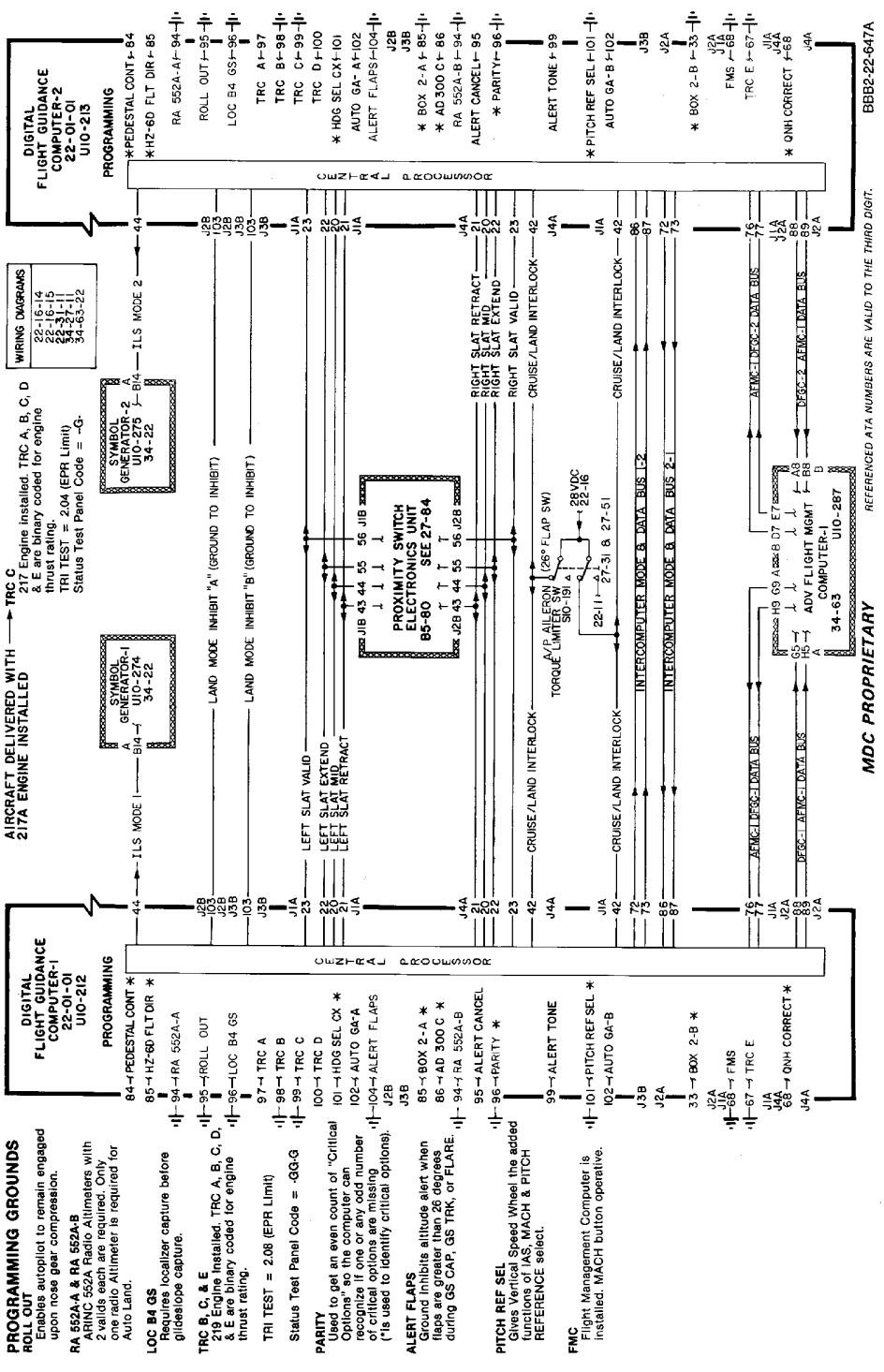
Attitude and CADC
Figure 114/22-00-00-990-898



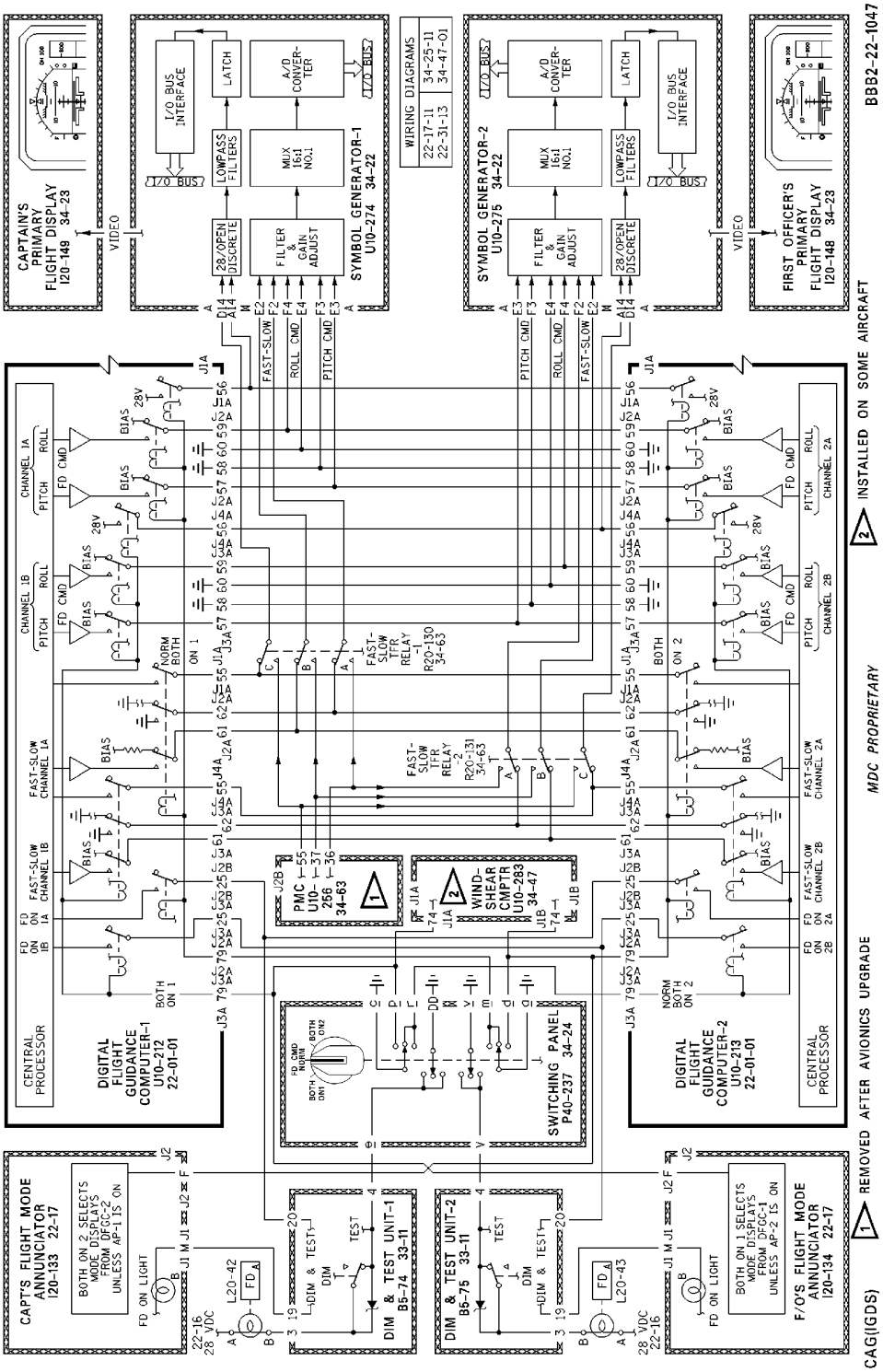
Attitude and CADC
Figure 115/22-00-00-990-899



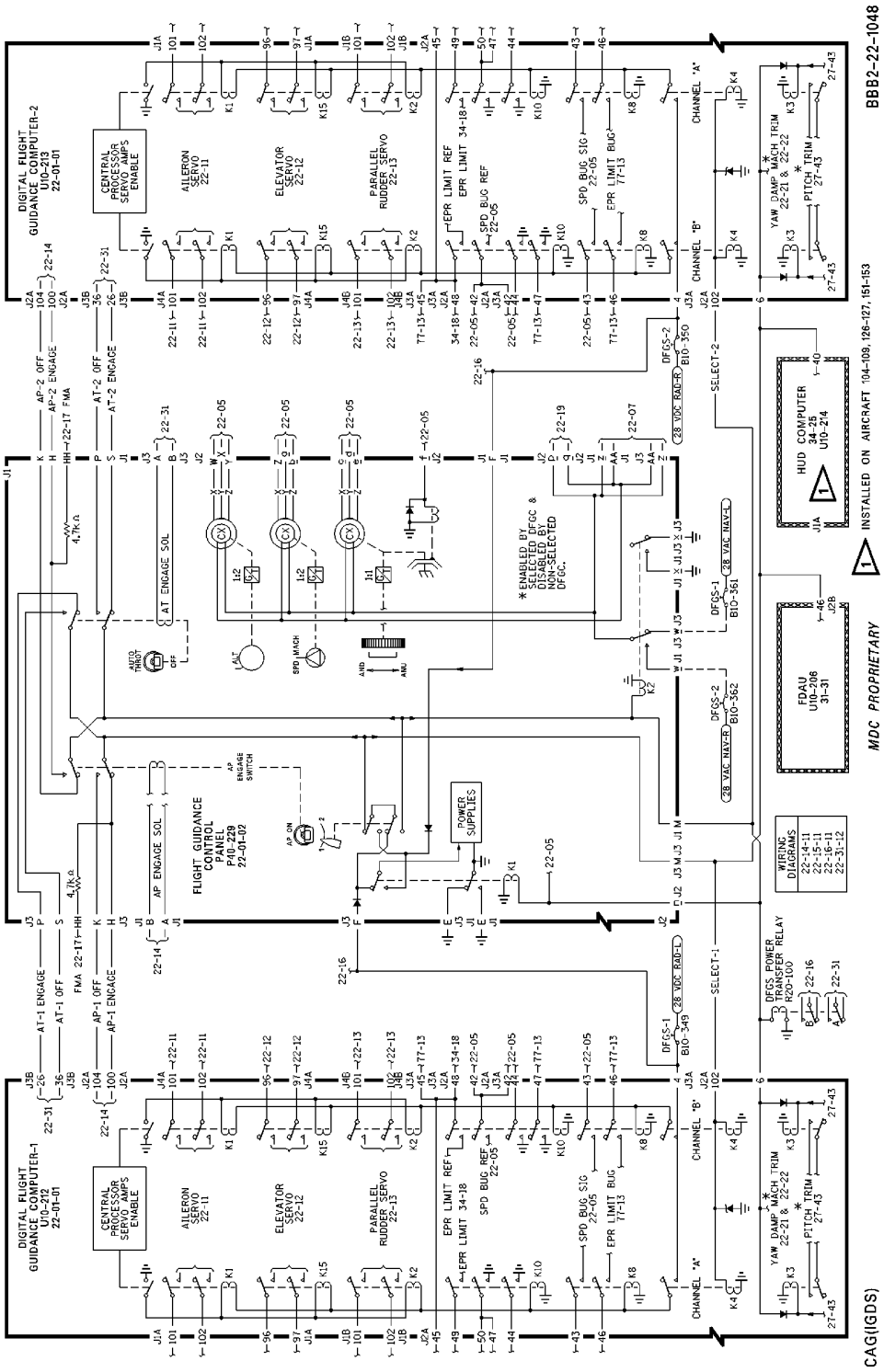
Program, Slat & Misc. Mode Circuits
Figure 116/22-00-00-990-910



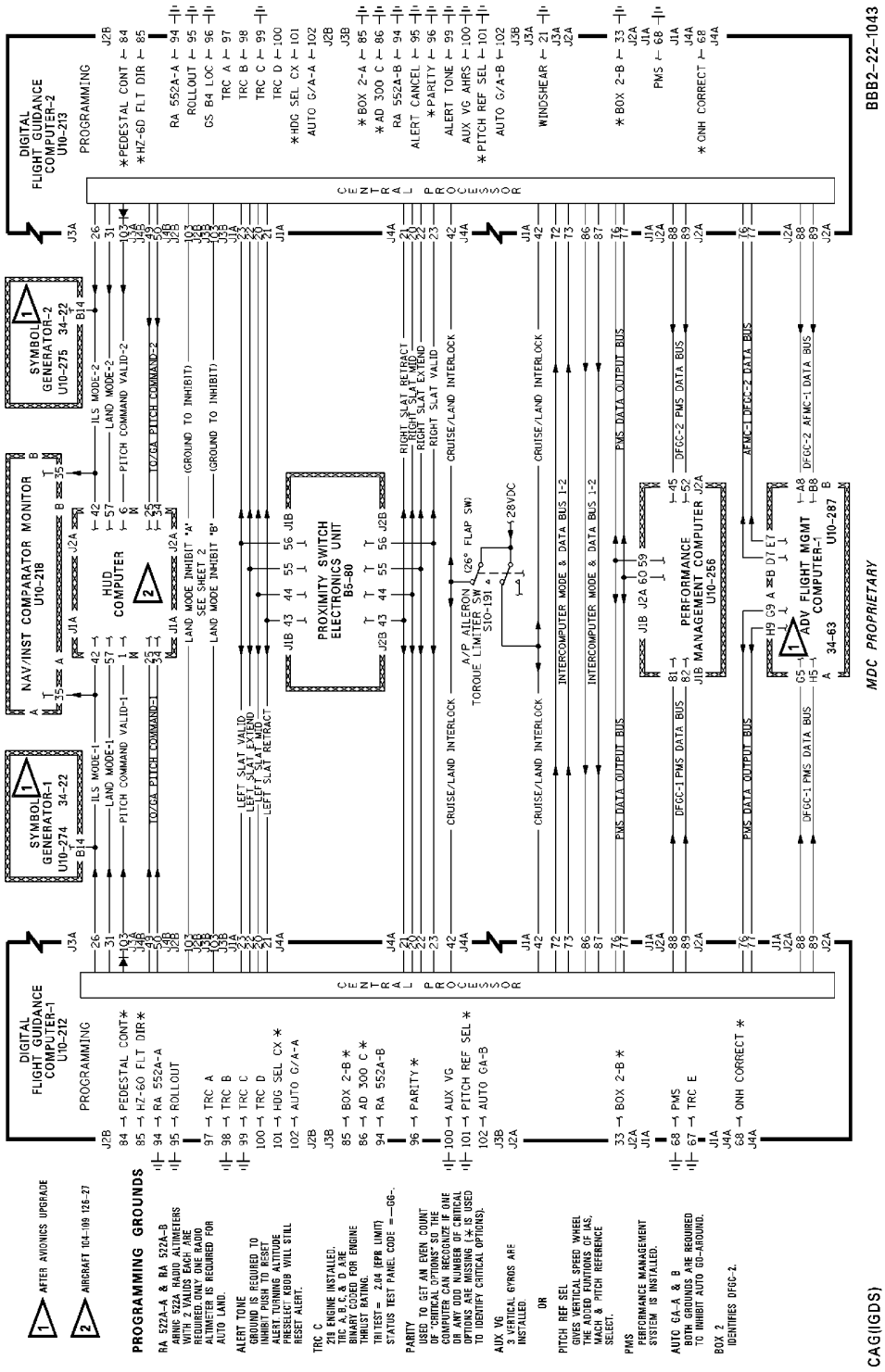
Program, Slat & Misc. Mode Circuits
Figure 117/22-00-00-990-911



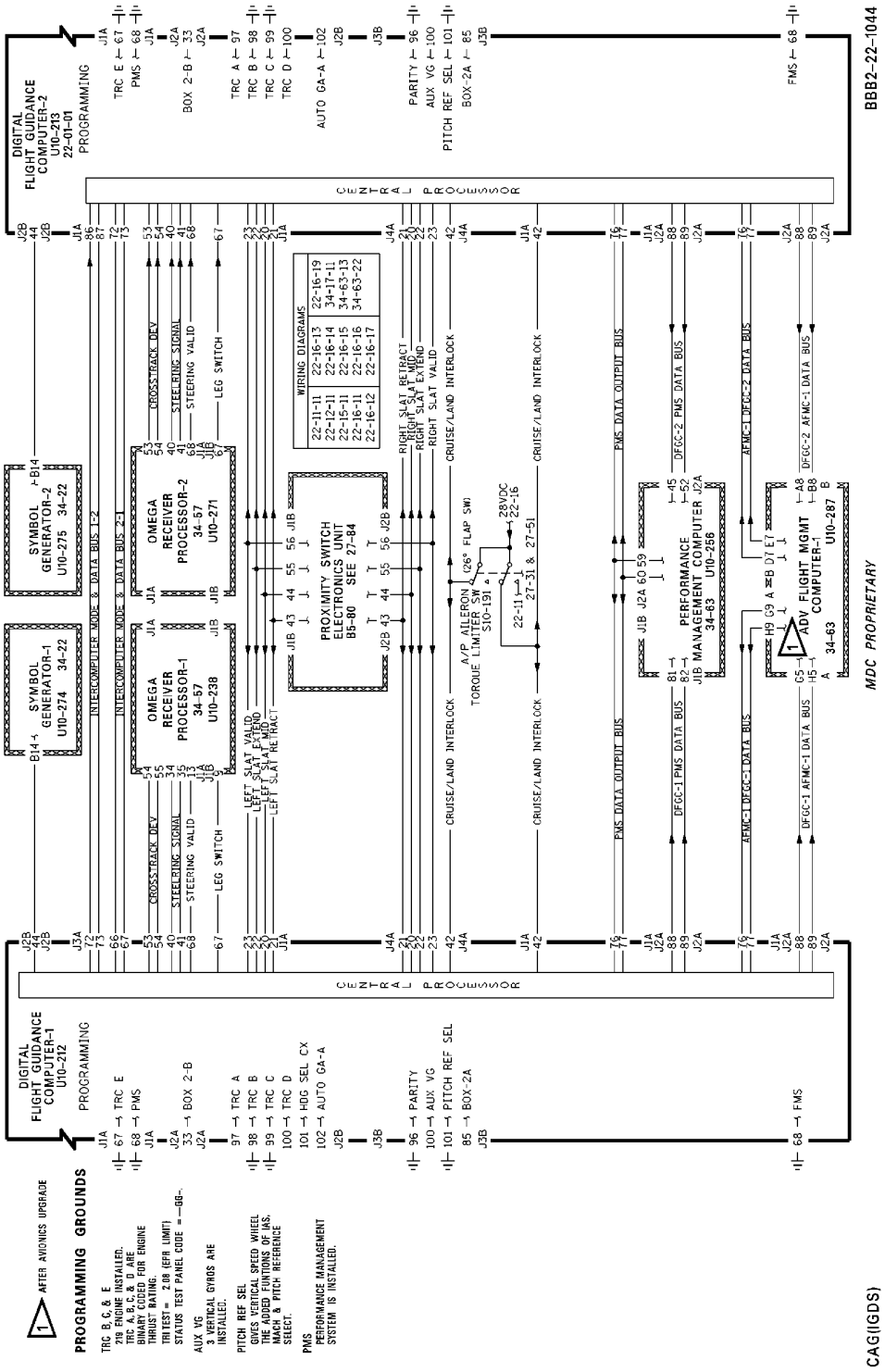
BOTH ON 1, BOTH ON 2 Switching
Figure 118/22-00-00-990-926



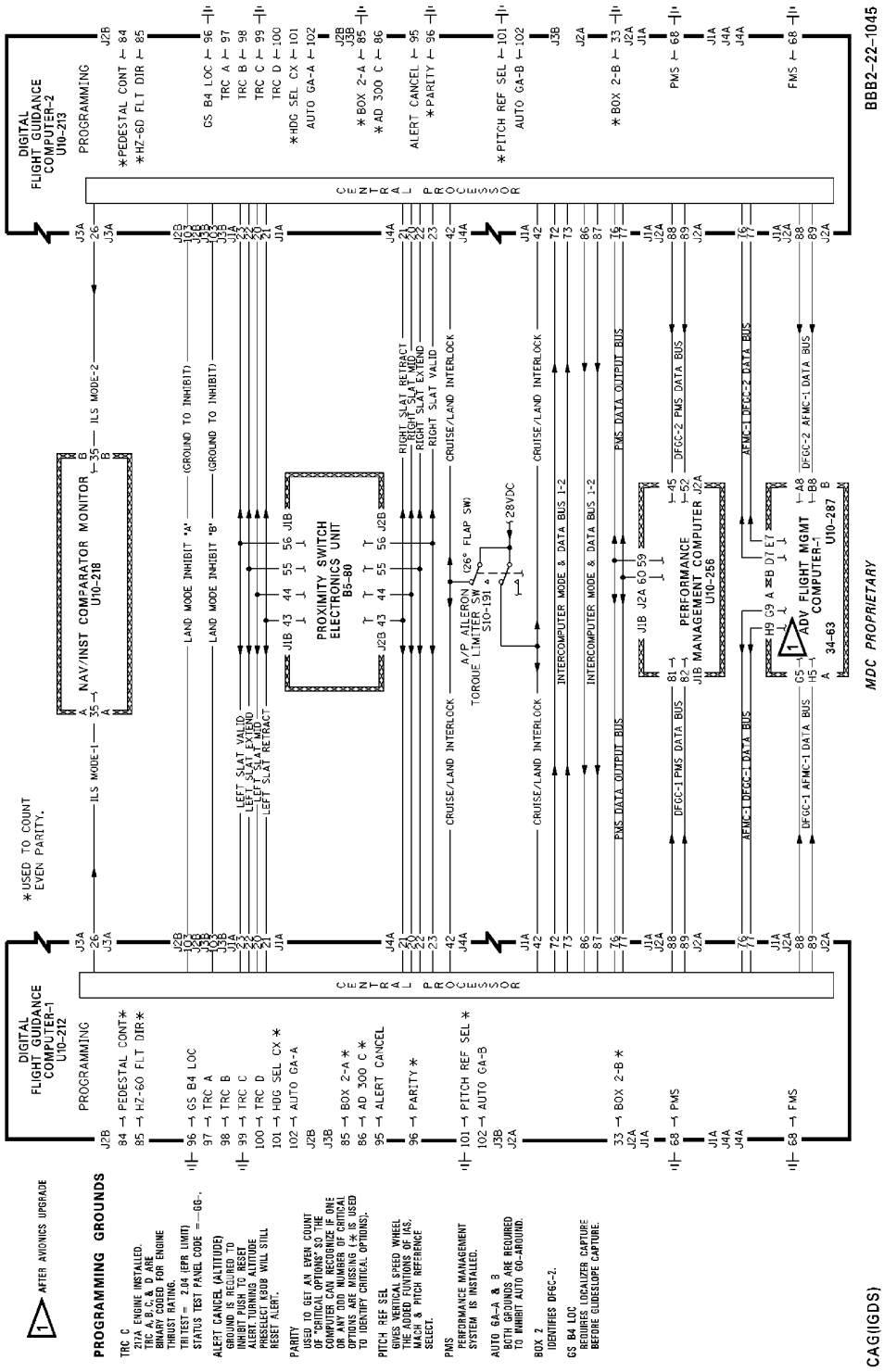
1-2 Switching
Figure 119/22-00-00-990-927



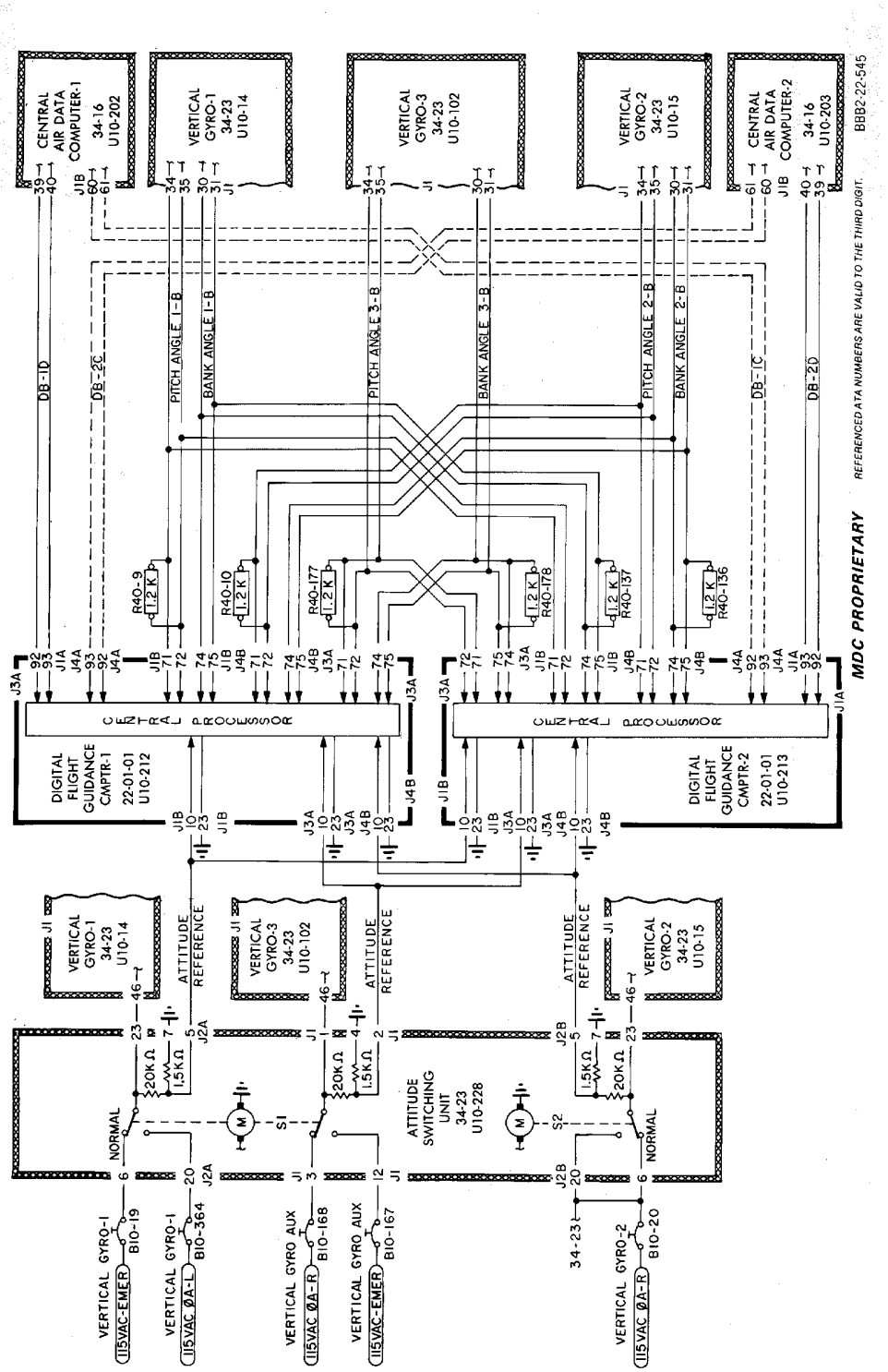
Program, Slat & Misc. Mode Circuits
Figure 120/22-00-00-990-928



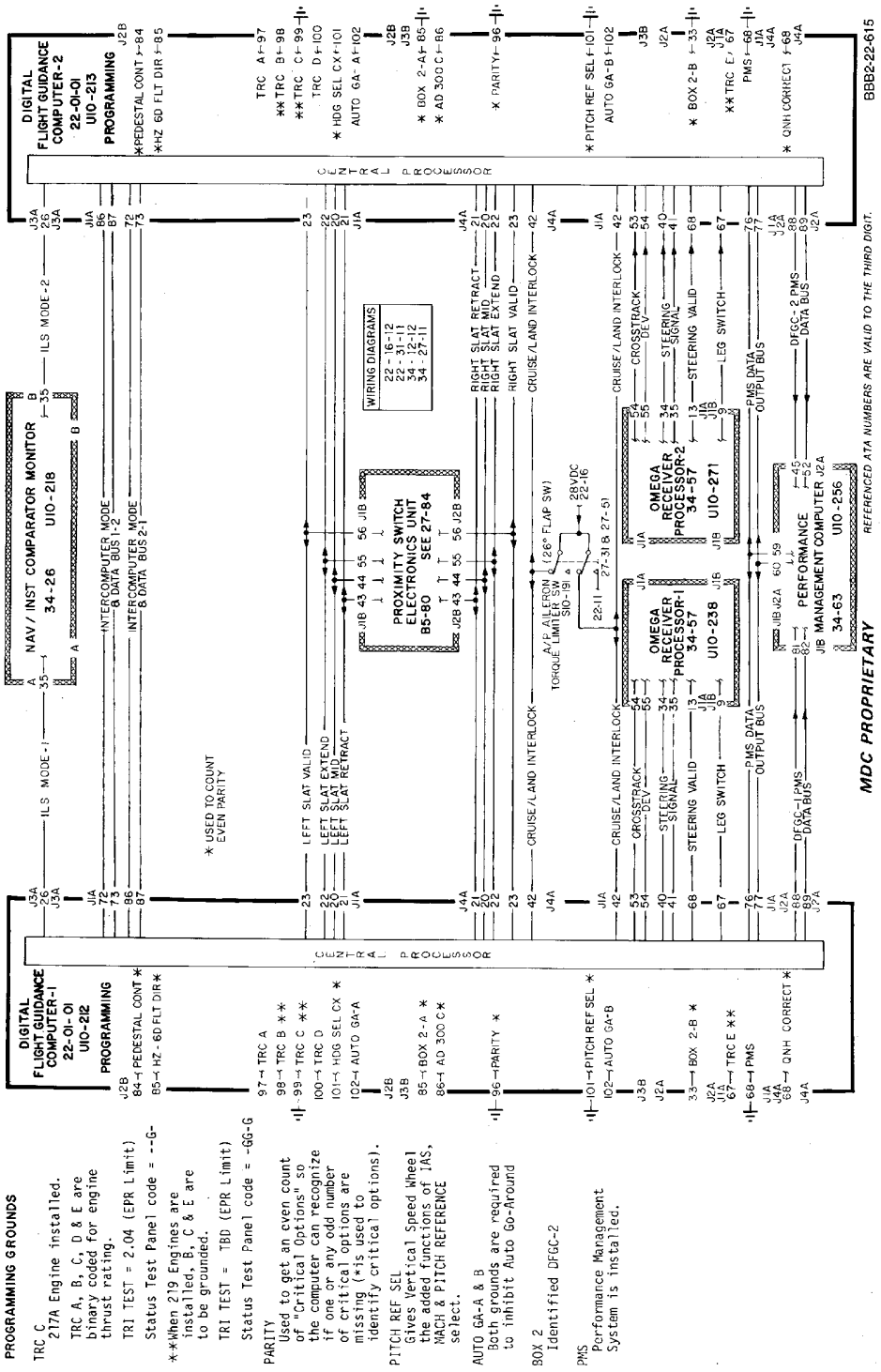
Program, Slat & Misc. Mode Circuits
Figure 121/22-00-00-990-929



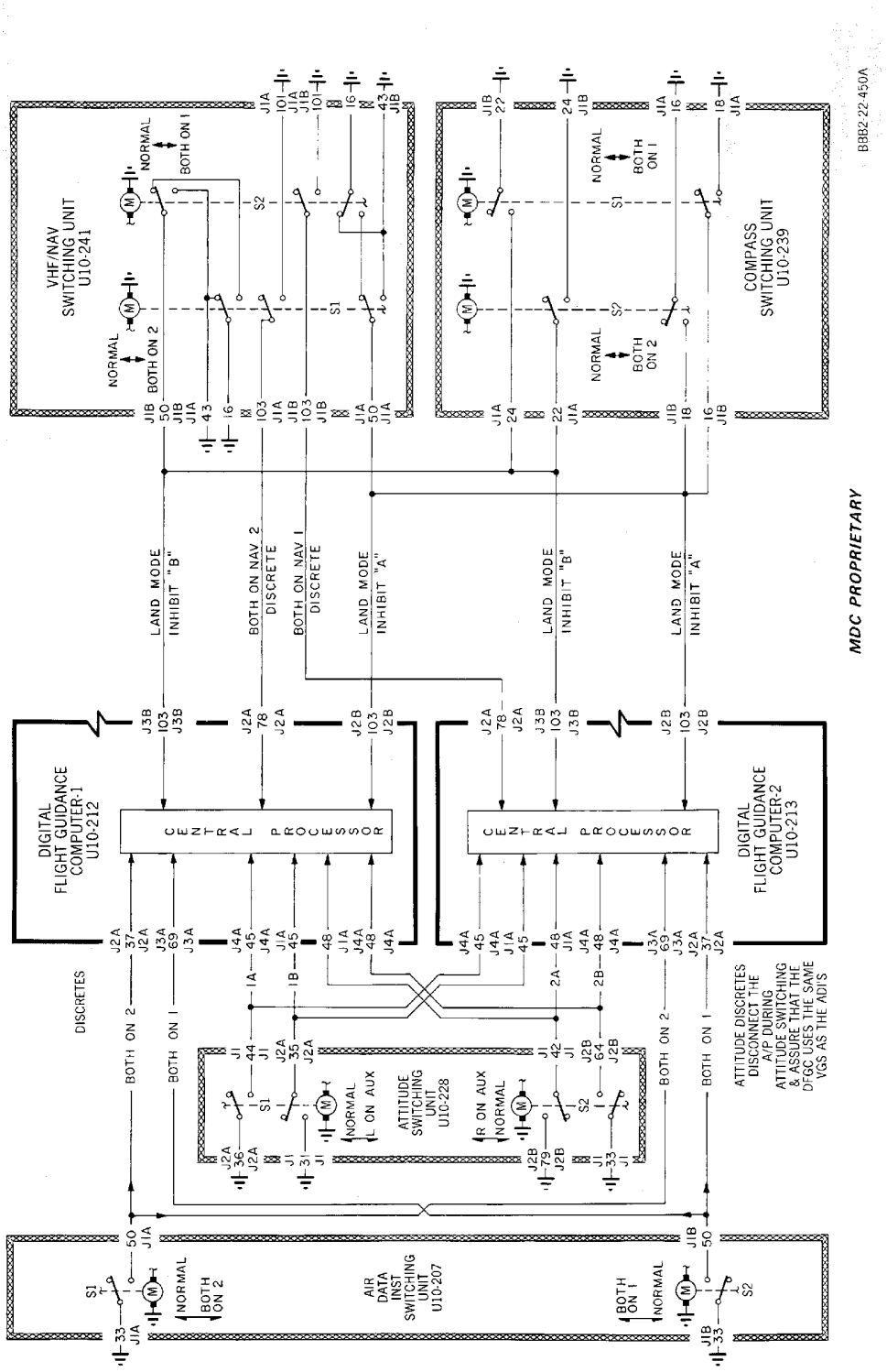
Program, Slat & Misc. Mode Circuits
Figure 122/22-00-00-990-930



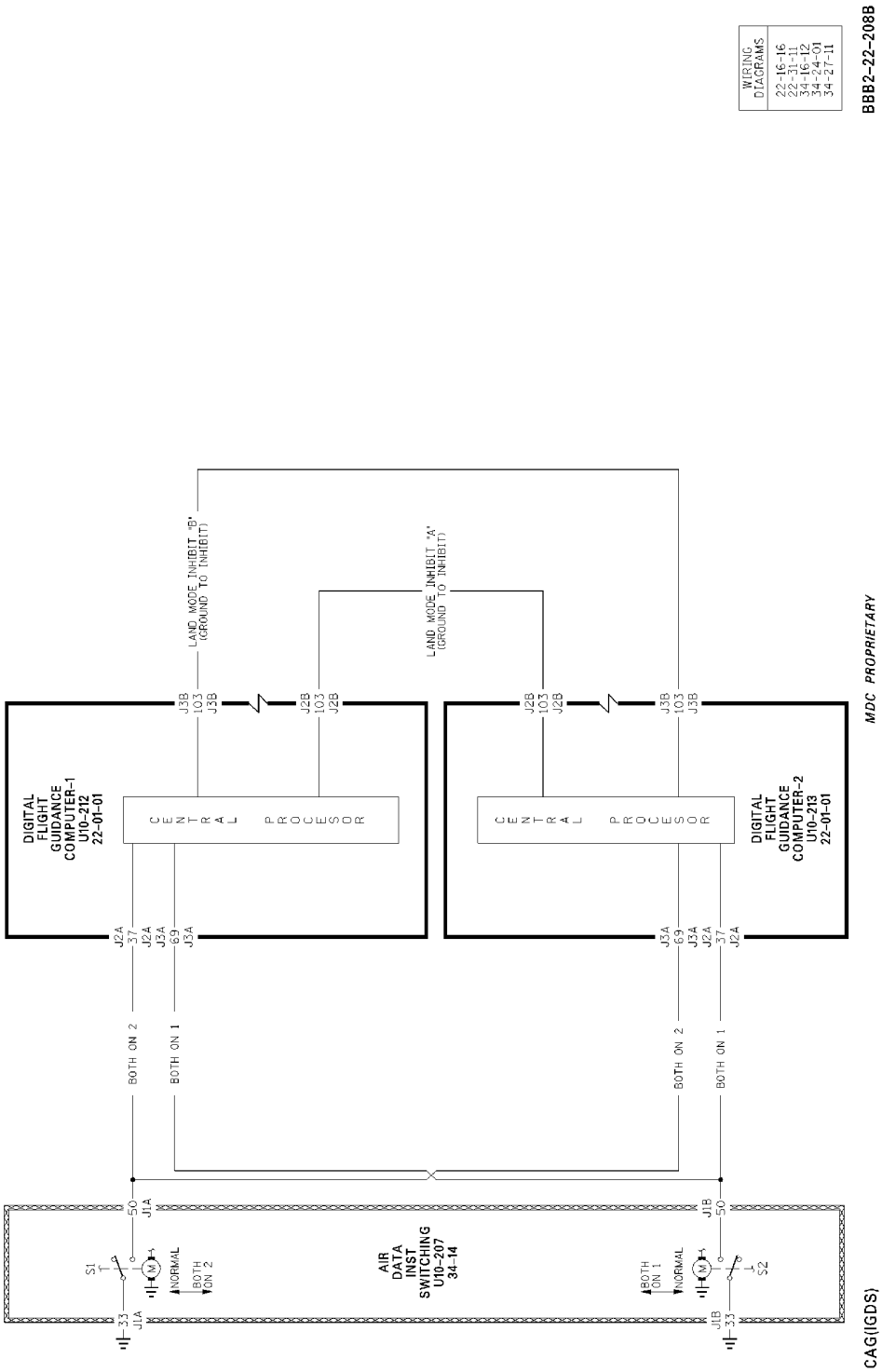
Attitude and CADC
Figure 123/22-00-00-990-949



Program, Slat & Misc. Mode Circuits
Figure 124/22-00-00-990-950

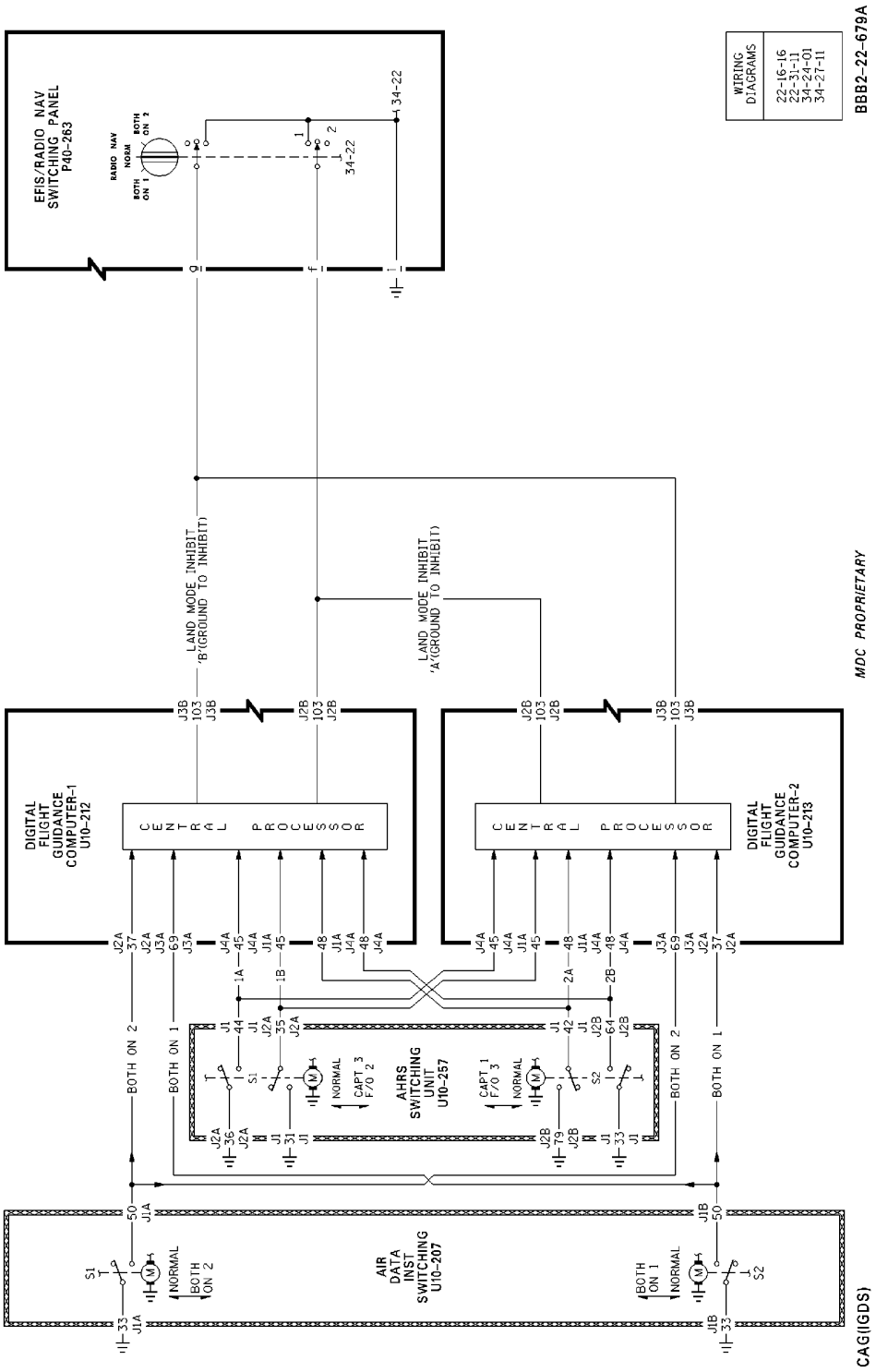


Switching Units Discretes and Inhibits
Figure 125/22-00-00-990-952

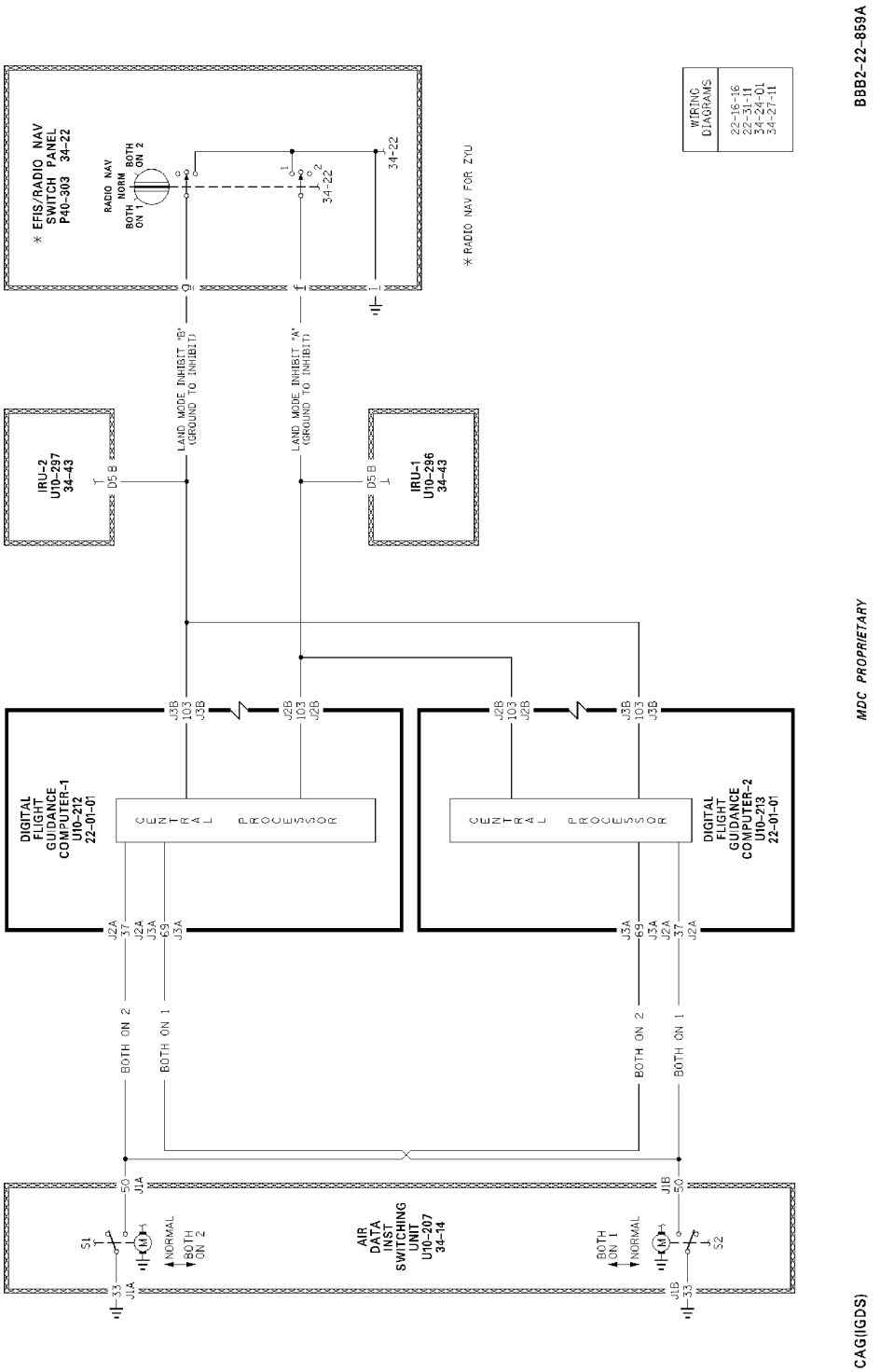


Switching Unit Discretes
Figure 126/22-00-00-990-954

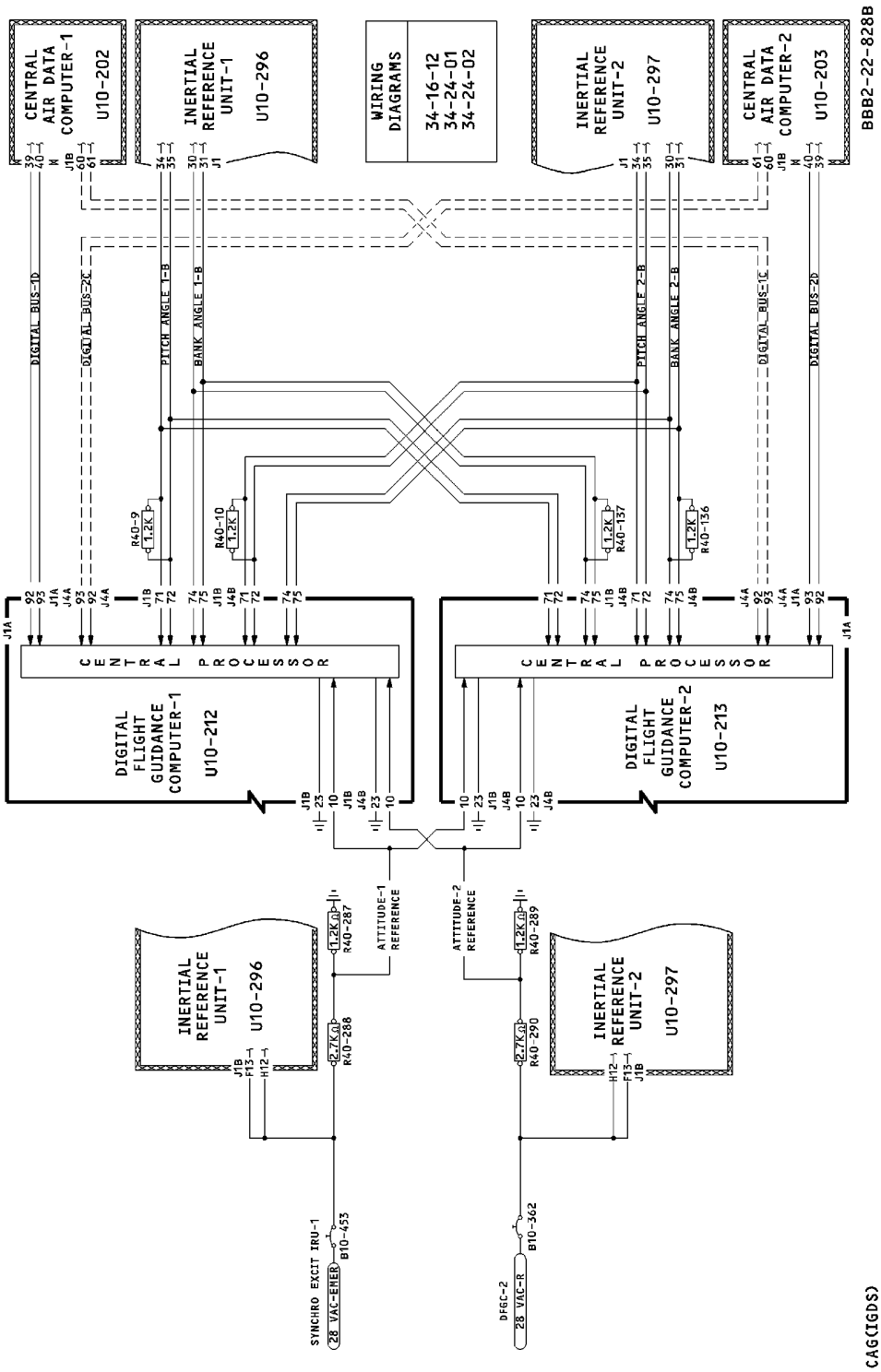
EFFECTIVITY
WJE 401-404, 412, 414-427, 429, 861-866, 868, 869, 871-874, 881, 883, 886, 887, 891-893



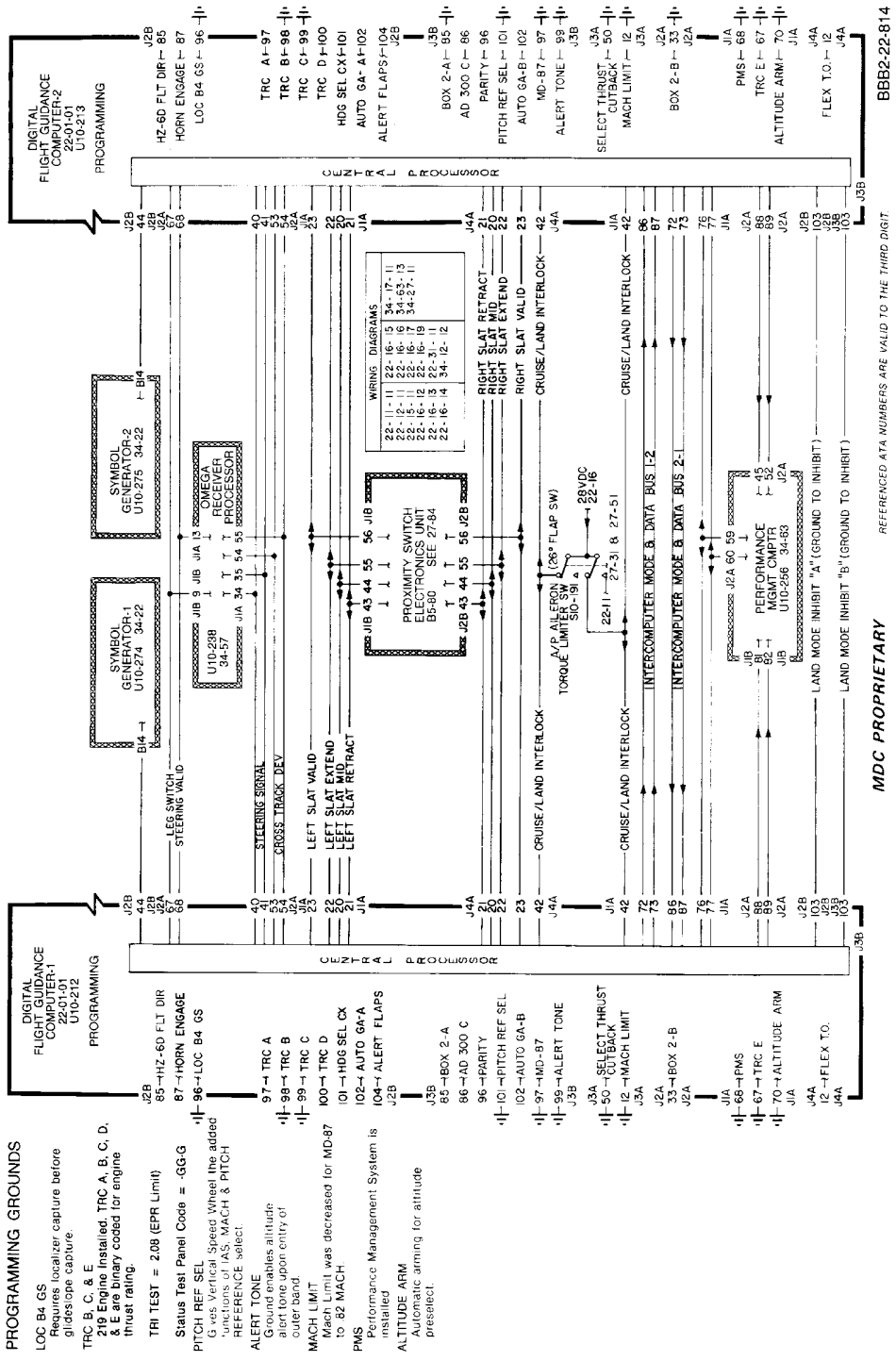
Switching Units Discretes
Figure 127/22-00-00-990-956



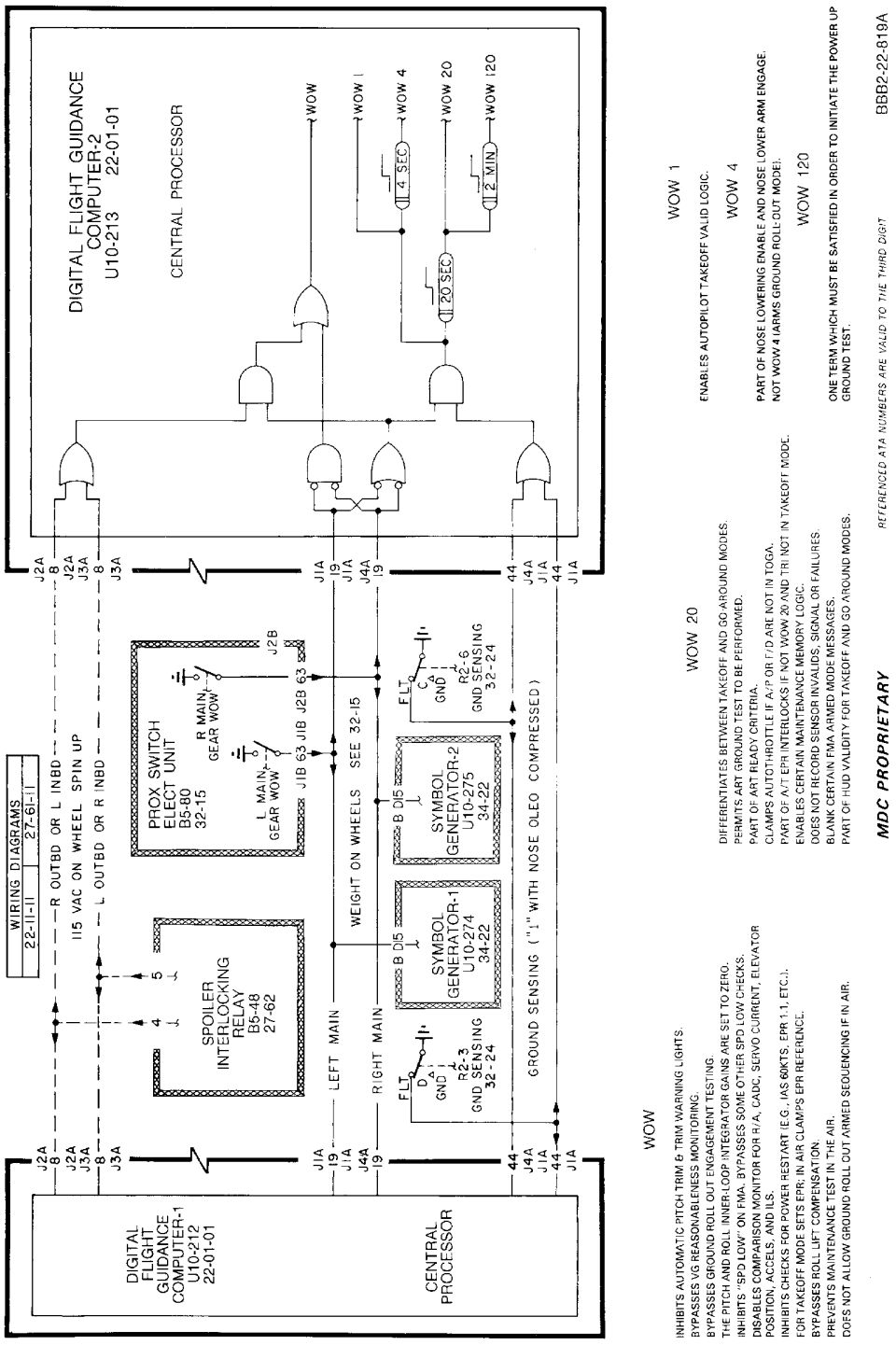
Switching Units Discretes
Figure 128/22-00-00-990-958



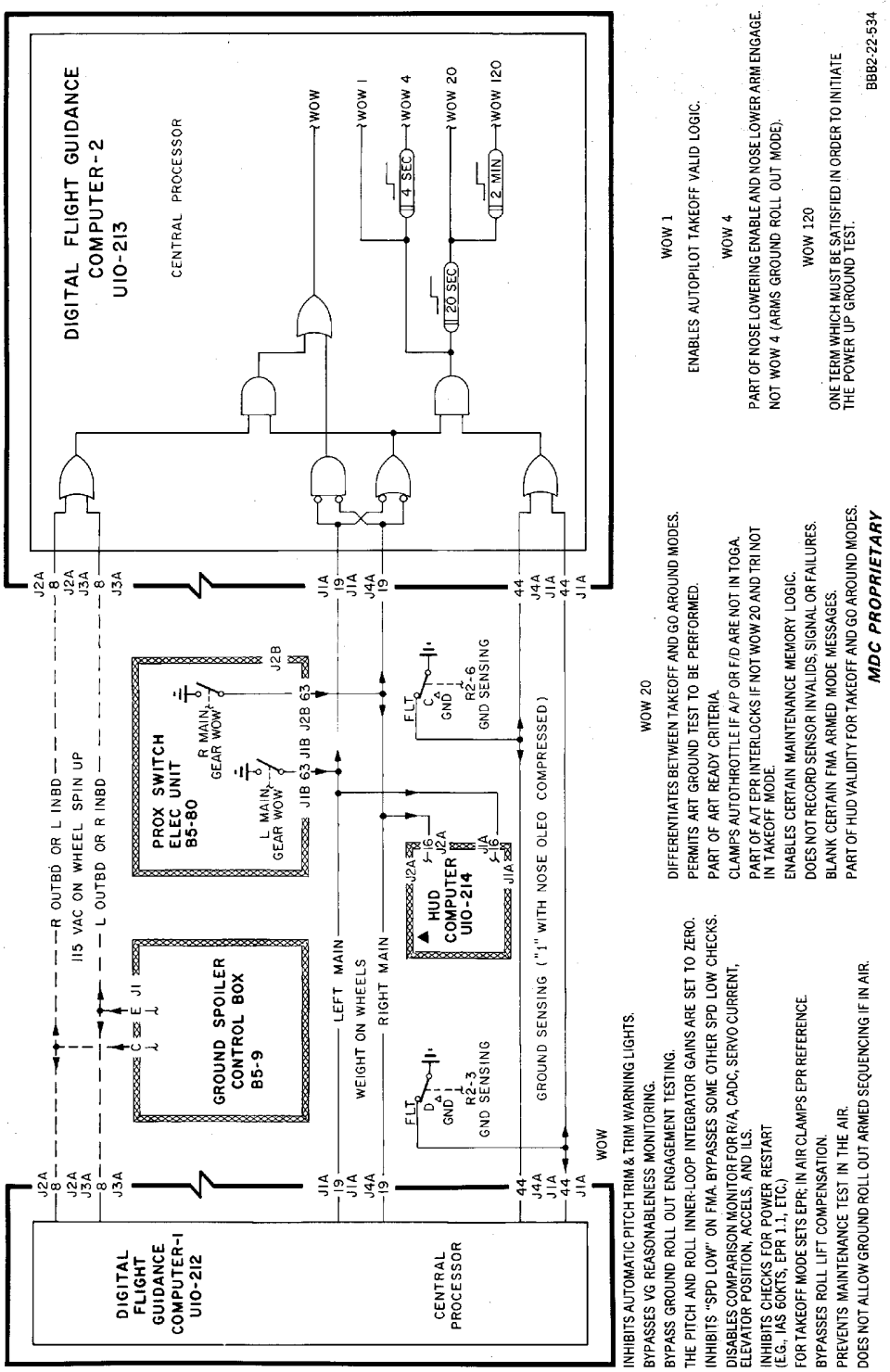
Attitude and CADC
Figure 129/22-00-00-990-969



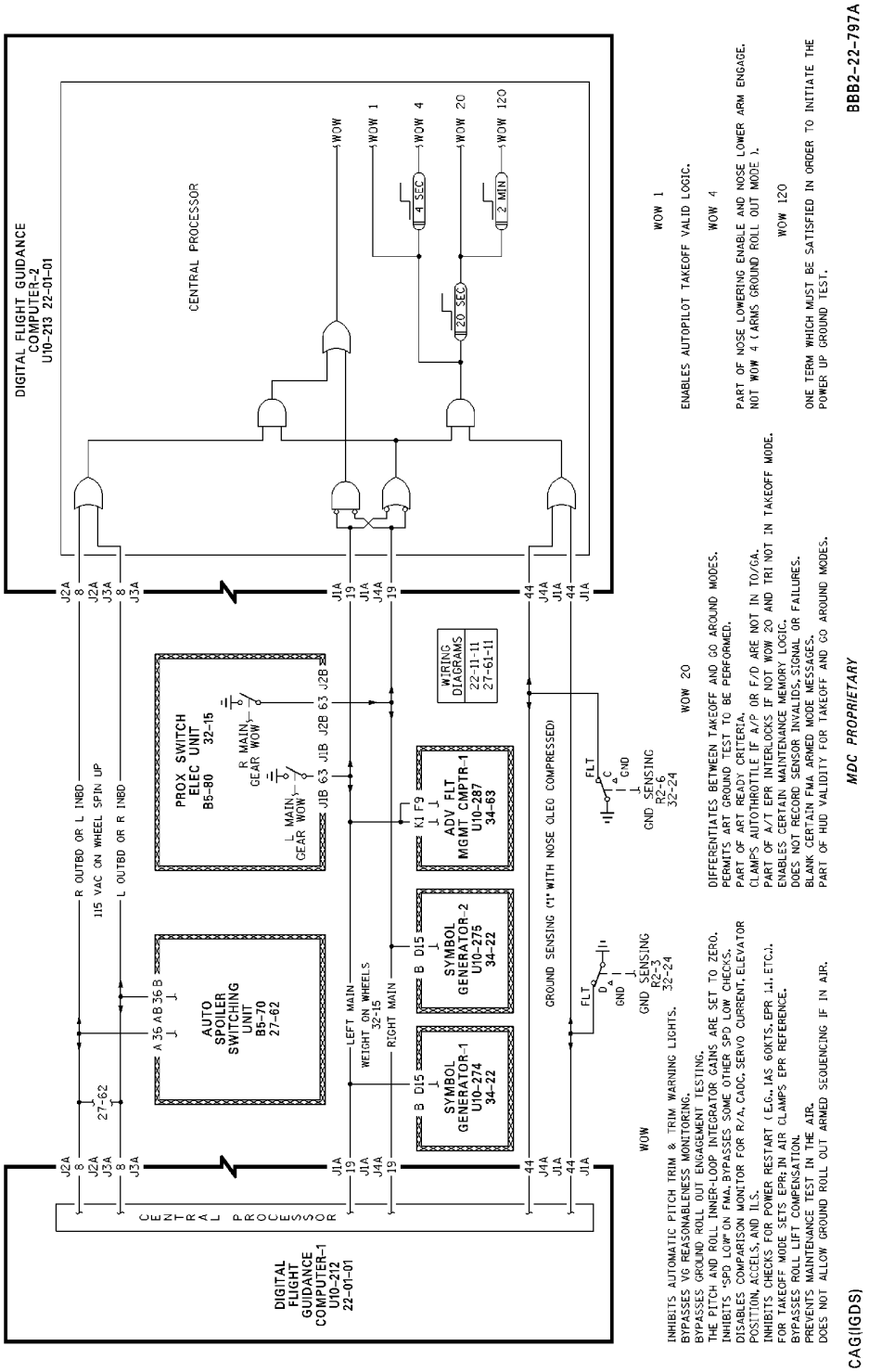
Switching Unit Discretes
Figure 130/22-00-00-990-970



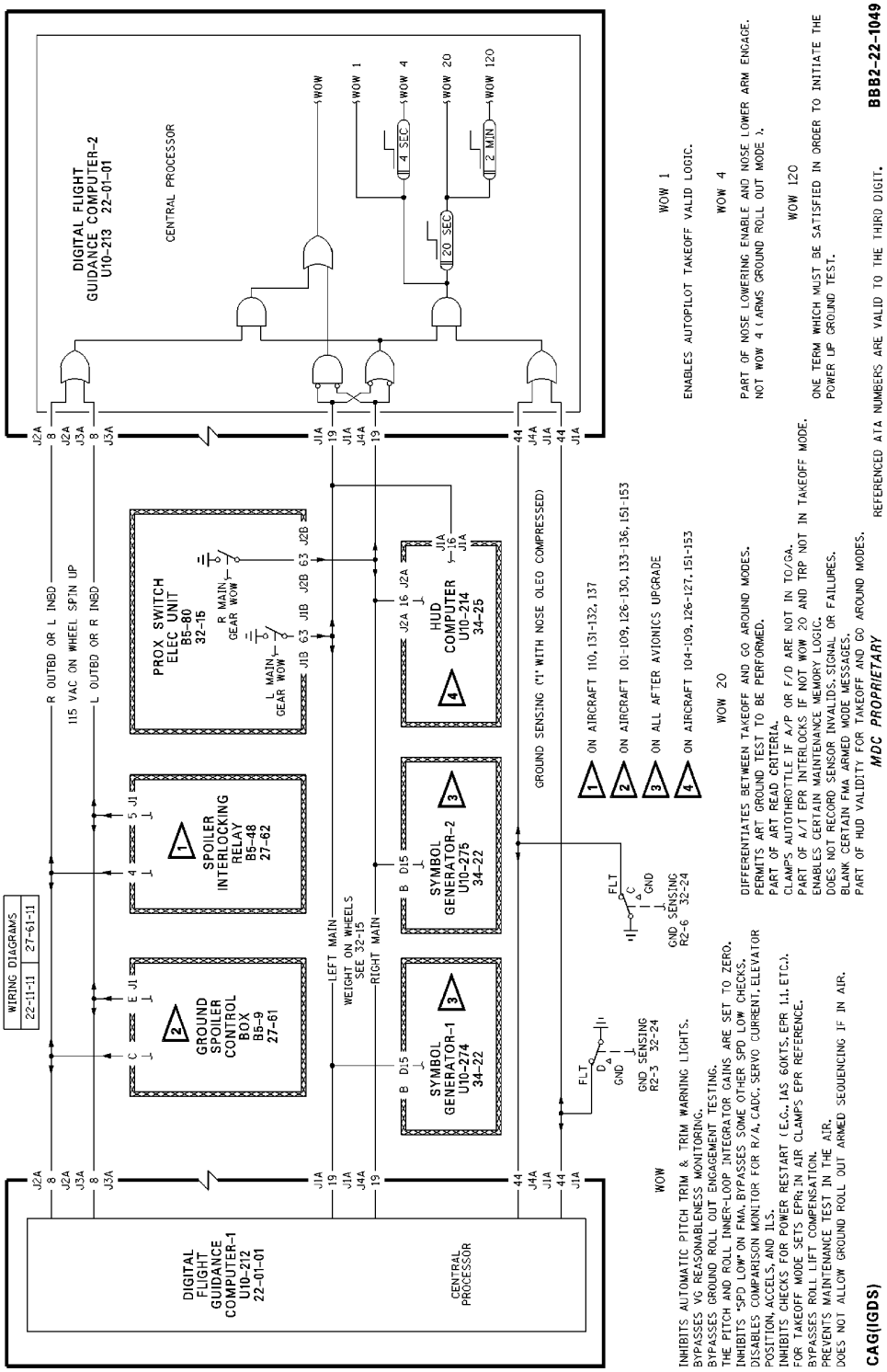
Spin up WOW and Ground Sensing
Figure 131/22-00-00-990-973



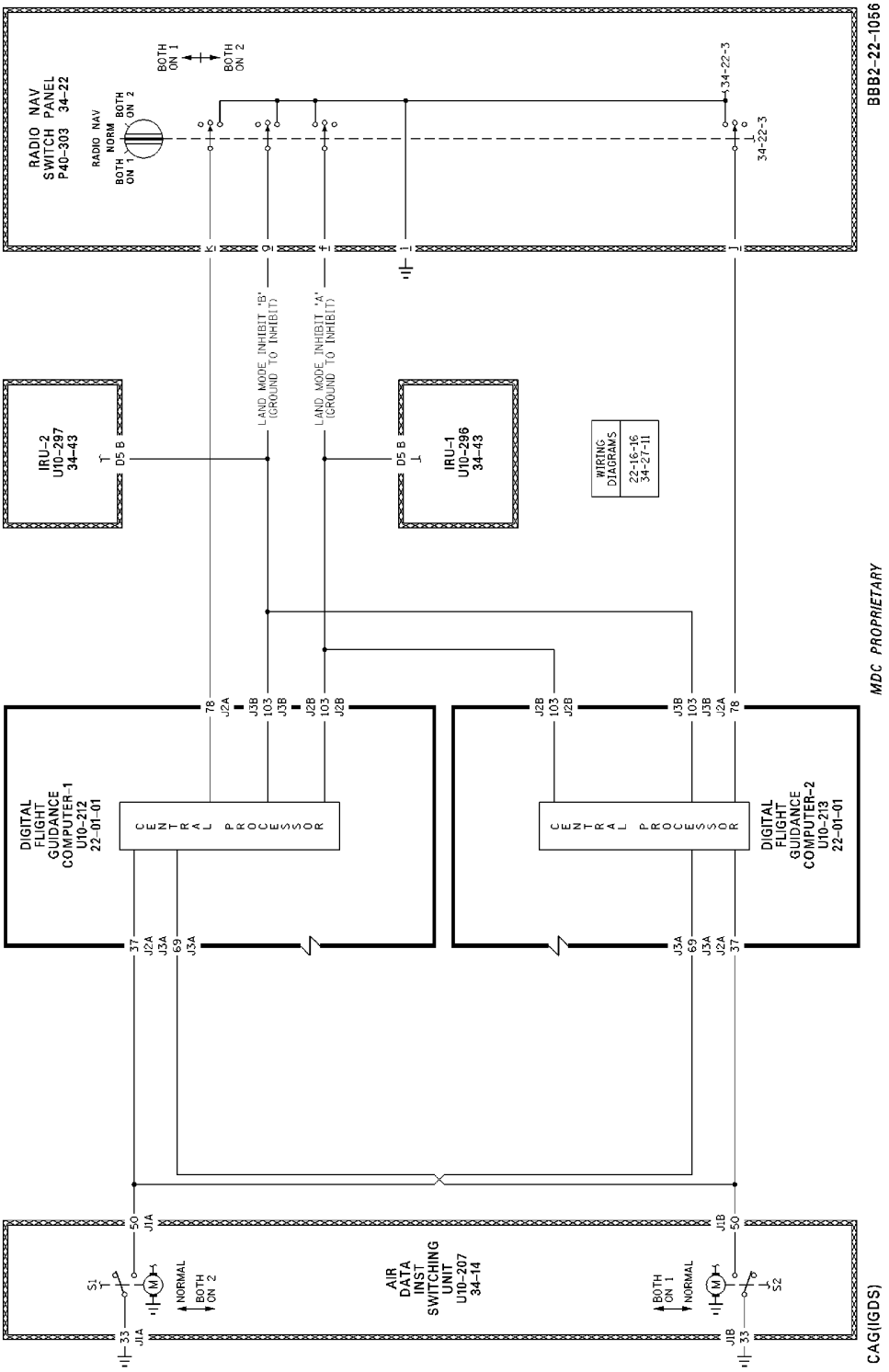
Spin up WOW and Ground Sensing
Figure 132/22-00-00-990-978



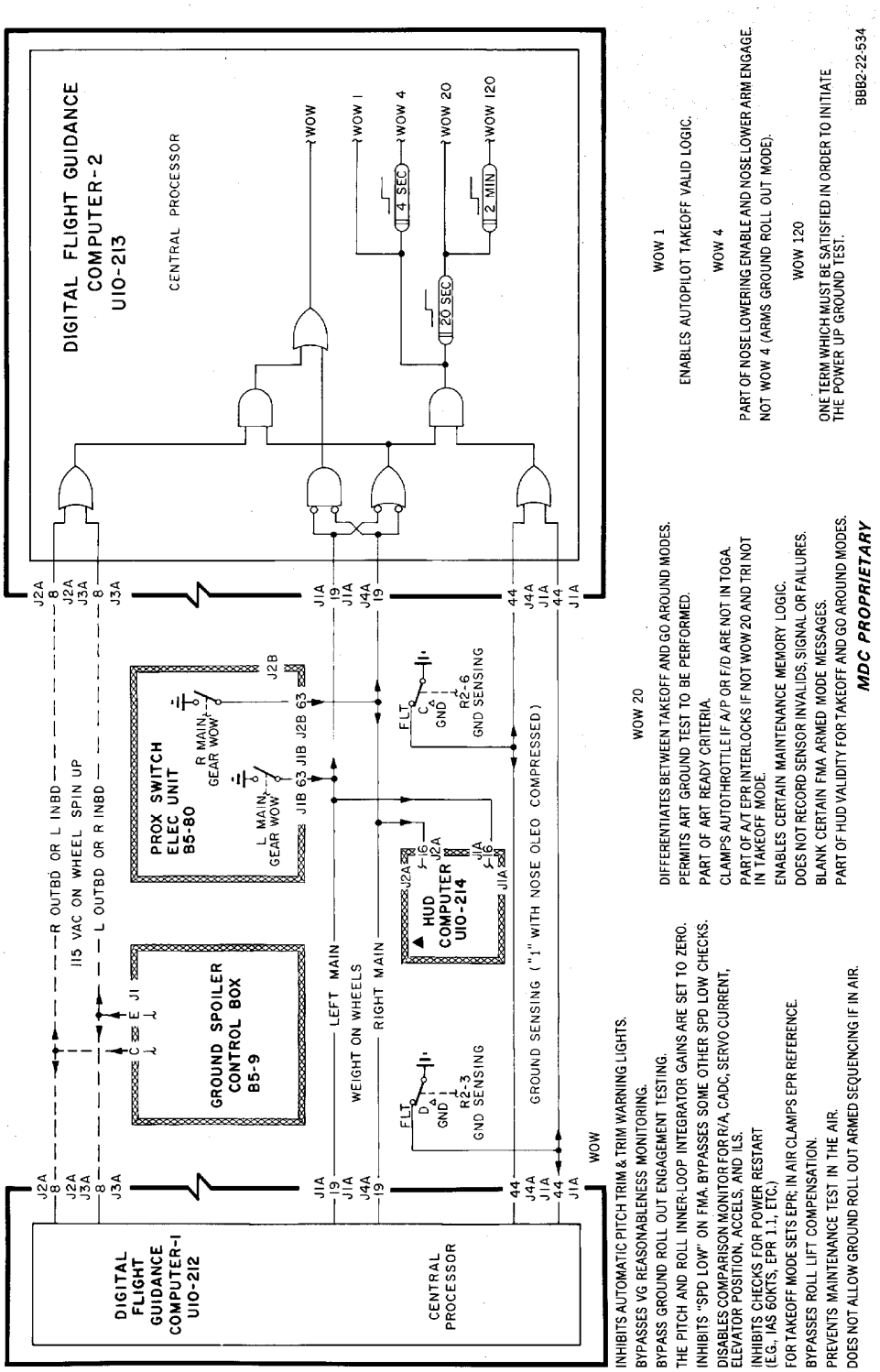
Spin up WOW and Ground Sensing
Figure 133/22-00-00-990-980



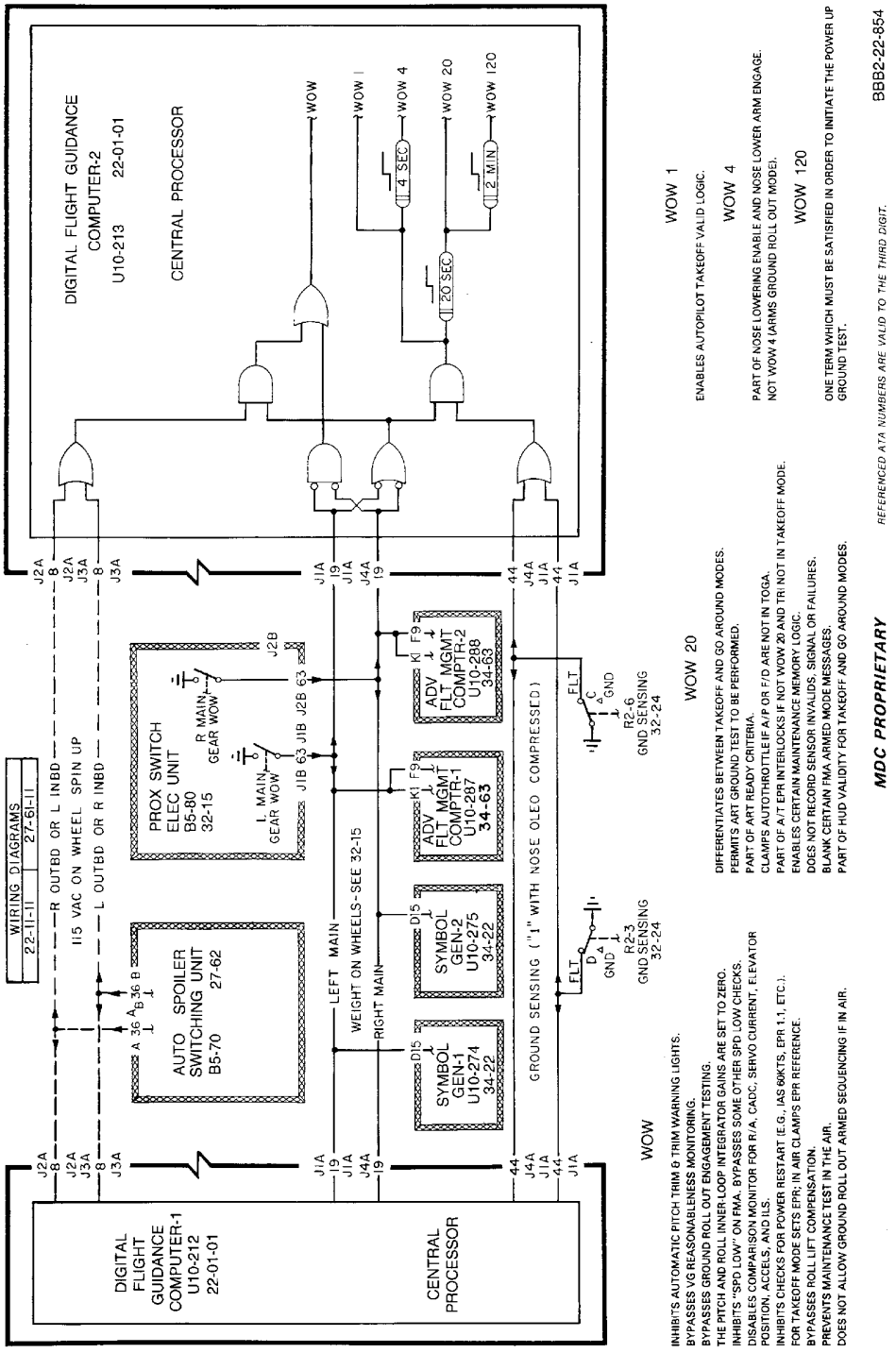
Spin up WOW and Ground Sensing
Figure 134/22-00-00-990-A02



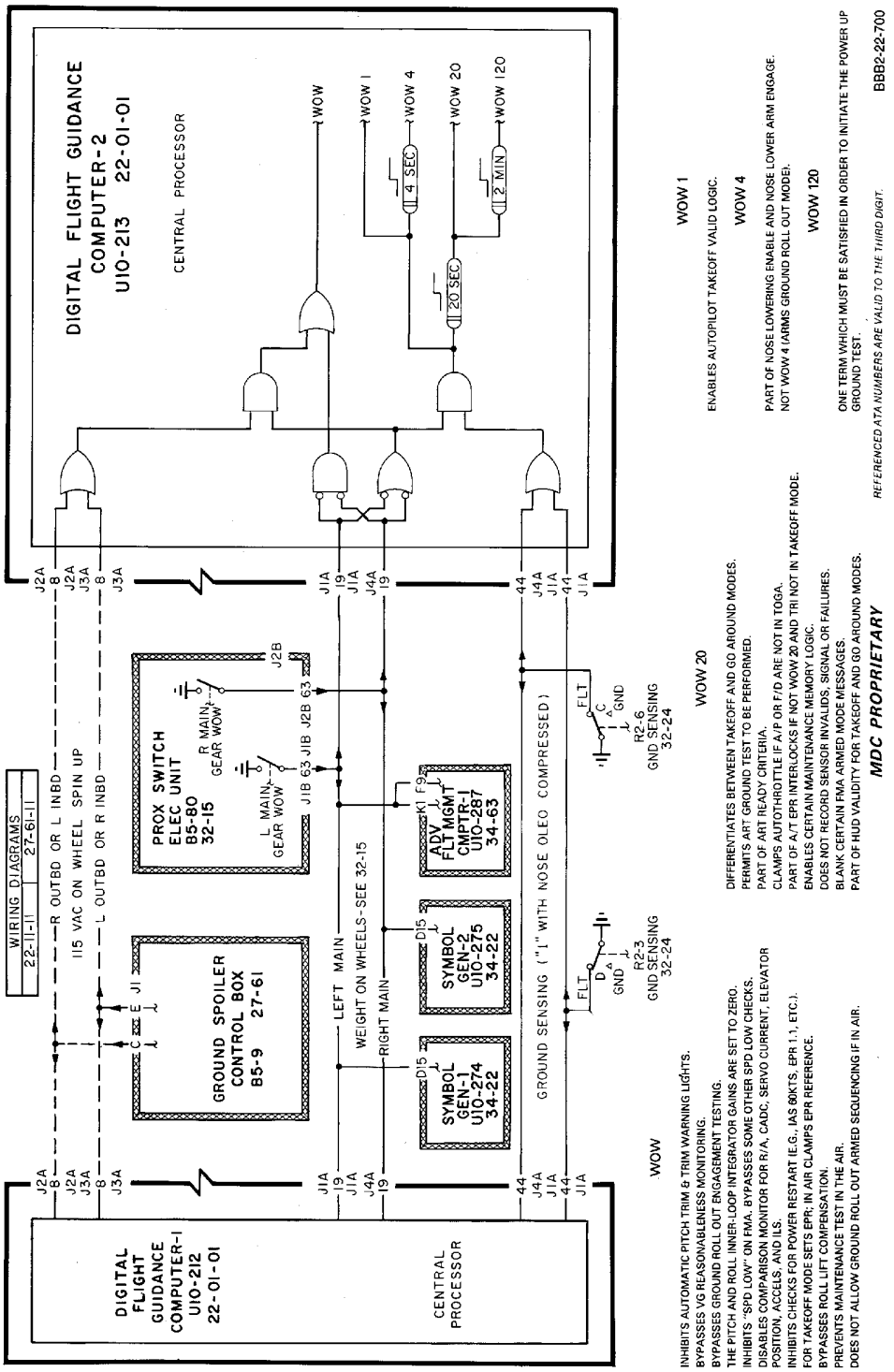
Switching Unit Discretes
Figure 135/22-00-00-990-A21



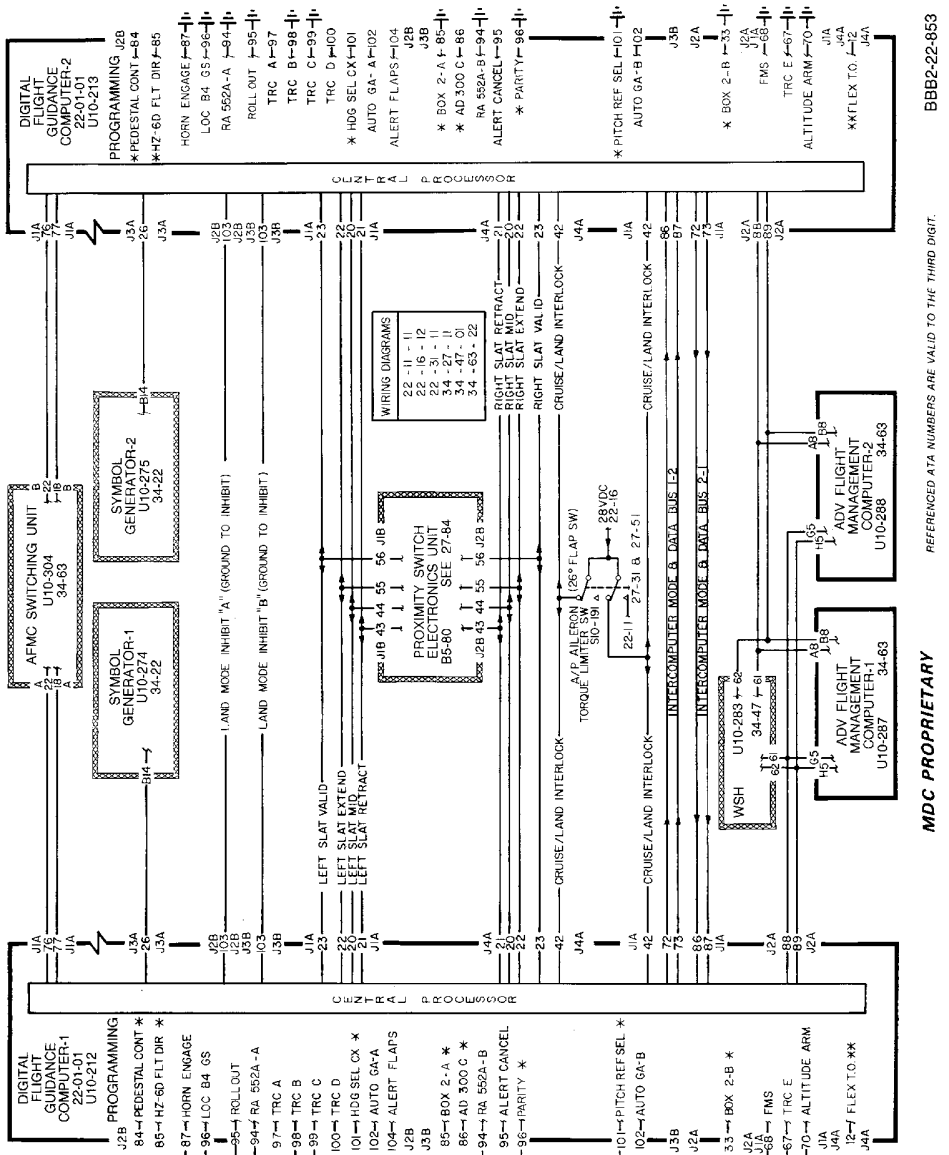
Spin up WOW and Ground Sensing
Figure 136/22-00-00-990-A29



Spin up, WOW and Ground Sensing
Figure 137/22-00-00-990-A31



Spin up WOW and Ground Sensing
Figure 138/22-00-00-990-A32



Program, Slat & Misc. Mode Circuits
Figure 139/22-00-00-990-A40

AUTO FLIGHT - MAINTENANCE PRACTICES

1. General

A. Auto flight consists of those units and components that furnish a means of automatically controlling the flight path, safe reference speed, and trim condition of the airplane. The auto flight subsystems are packaged in two identical Digital Flight Guidance Computers (DFGC's). Auto flight consists of the following subsystems:

(1) Autopilot

(2) Flight Director

(3) Automatic Pitch Trim

(4) Mach Trim Compensation

(5) Auto Throttle/Speed Control

B. Autopilot consists of that portion of the system that uses radio beam signals, directional and vertical gyros, air data and manually selected inputs to automatically control yaw, pitch and roll axis of the airplane.

C. Flight director steering commands are computed within the DFGC's and provide an output to flight director command bar displays. The roll and pitch command bars within the Attitude Director Indicators (ADI's) can be used to monitor corrective action when the autopilot is engaged, or to manually operate the airplane.

D. Automatic pitch trim is provided to relieve the autopilot from holding sustained up or down elevator due to change in airspeed or airplane configuration. If an out-of-trim condition develops, commands to move the horizontal stabilizer up or down will correct the out-of-trim condition.

E. Mach trim compensation automatically adjusts the center position of the control column to compensate for nose-down pitching of the airplane caused by high mach number during flight. Mach trim compensation operation is independent of other functions of the auto flight system. Elevator control through mach trim compensation is independent from elevator control by the autopilot.

F. Auto Throttle/Speed Control provides two separate flight functions, autothrottle control and speed control.

(1) The autothrottle automatically adjusts engine power settings for controlled thrust throughout all flight modes from take-off to automatic retard mode. The system automatically controls the throttles to selected air speed, mach number, or EPR limit (Engine Pressure Ratio).

(2) Speed control information is displayed by slow-fast pointers located on the captain's and first officer's ADI's. When minimum safe stall margin is desired, i.e. during takeoff or go-around maneuvers, the angle-of-attack speed reference affords the minimum rate stall margin throughout the process of cleaning up the gear, flaps and slats. Speed control is usable during cruise conditions, altitude changes, holding patterns, and approach conditions.

2. Auto Flight Testing

A. Auto flight tests provide a method of verifying the integrity of those LRU's and circuits used during operation of specific modes of the auto flight subsystems. Auto flight testing is provided during flight by Continuous Built-In-Test (BIT) within each of the DFGC's. On ground, the DFGC's manage a central integrated BIT of the Digital Flight Guidance System (DFGS).

B. An Autoland Preflight Test is available to the flight crew to provide assurance that the autoland mode of operation is available.

C. BIT information is displayed on a Status/Test Panel (STP) located below the captain's briefcase compartment.(DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

D. BIT provides three modes of testing available to the STP. Continuous BIT, System Maintenance BIT, and Return to Service (RTS) BIT.

(1) Continuous BIT - Continuous BIT begins operation with application of power to the DFGC. Continuous BIT does not interfere with the normal operation of the auto flight system, and does not require any operator participation.

(2) System Maintenance BIT - System Maintenance BIT is a command response type test requiring operator participation to perform specific actions. System Maintenance BIT is the most comprehensive of the four tests. This test is normally used after major airplane maintenance action has been performed affecting the DFGS (i.e. wiring rework between any of the major LRU's). Each system (DFGC -1 or DFGC -2) test is run separately, and can only be performed when the airplane is in the "on ground" condition. Hydraulic power should be applied to the airplane to make the test as complete as possible.

(3) Return To Service (RTS) BIT - The RTS BIT provides assurance that after repair action (i.e. LRU replacement), the airplane can be put back into non-restricted (including autoland) service. RTS requires minimal test set-up procedures and minimal operator participation. RTS can only be performed when the airplane is in the "on ground" condition, and IAS below 60 knots. Hydraulic power is not required for RTS. However, flaps must be greater than 26 degrees and rudder centered.

E. Autoland Preflight Test - The Autoland Availability Preflight BIT operates only when the airplane is in the "on ground" condition, both NAV receivers tuned to an ILS frequency, and the AUTO LAND pushbutton on the Flight Guidance Control panel has been pressed. The associated captain's or first officer's FMA's will display AUTO LND/PRE/FLT/TEST when the test is initiated, and go blank when the test is completed.

F. After Removal/Installation procedures of certain auto flight LRU's, a short test procedure may be given instead of using the STP, if the affected LRU does not interfere with the normal operation of other auto flight components (i.e. replacing a light segment display in the FMA, and using the ANNUN/DIGITAL LTS test switch for verification that the segment will display). Otherwise, all test procedure will be called out to reference the use of the STP.

3. Autoland Wiring

A. Two separate wire bundles (system 1 and system 2) are provided to assure the integrity of the autoland mode of operation. Also, two separate monitored sensors (channel A and channel B) within the DFGC continuously assess the safety of the autoland mode by assuring that all inputs/outputs are valid (i.e. attitude, radio altimeters, etc.). If the data does not agree, the monitoring will automatically disengage the autopilot.

B. To be effective, wiring between the two monitored sensors must be prevented from shorting together assuring that a failure(s) then cannot affect both sensors identically and simultaneously, thus providing false inputs to the sensors and not allowing proper autopilot disengagement.

C. System 1 autoland wiring is normally routed on the left side of the aircraft with other existing aircraft wiring and is secured with normal aircraft type white string ties. System 2 autoland wiring is routed on the right side of the aircraft and is easily identifiable by yellow string ties.

WARNING: THESE AUTOLAND CRITICAL WIRES MUST NEVER BE TAMPERED WITH UNLESS ABSOLUTELY NECESSARY TO PROVIDE SYSTEM MAINTENANCE OR WIRING REWORK. ASSURE THAT ALL PROCEDURES OUTLINED IN CHAPTER 20 OF THE WIRING DIAGRAM MANUAL ARE STRICTLY ADHERED TO.

D. System 2 autoland wires have run letters beginning with the letter S along with the yellow string ties. These system 2 wires are separated or isolated using combinations of physical separation, spacers and/or added material thickness such as conduit, sleeving or shielded wire. (Ref. 20-11-00, Page 201 of the Wiring Diagram Manual).

4. Circuit Breakers

A. The following circuit breakers affect the operation of the auto flight system and should remain closed for the duration of test procedures unless specifically instructed otherwise. Associated systems and equipment should be previously checked out and in proper operating condition.

The following circuit breakers affect the operation of the auto flight system and should remain closed for the duration of test procedures unless specifically instructed otherwise. Associated systems and equipment should be previously checked out and in proper operating condition. A failure message will appear on EFIS display units if applicable circuit breakers are not closed.

(1) Make sure that these circuit breakers are closed:

LOWER EPC, DC AIR CONDITIONING & MISCELLANEOUS

Row	Col	Number	Name
U	24	B1-772	LEFT ALTITUDE BIAS CONTROL
U	29	B1-82	RADIO RACK FAN CAUTION
W	24	B1-771	RIGHT ALTITUDE BIAS CONTROL
W	25	B1-228	RUDDER TRAVEL UNRESTRICT ADVISORY

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
W	32	B1-824	ART STATUS LIGHTS
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
X	33	B10-64	MACH TRIM OVERRIDE
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

LOWER EPC, LIGHTS - LEFT DC BUS

Row	Col	Number	Name
M	32	B1-845	CAPTAIN'S DIGITAL DISPLAY

LOWER EPC, LIGHTS - R DC BUS

Row	Col	Number	Name
N	32	B1-846	DIGITAL DISPLAY CENTER
N	33	B1-847	DIGITAL DISPLAY FIRST OFFICER'S
N	34	B1-848	DIGITAL DISPLAY WARNING LIGHT & TEST

LOWER EPC, MISCELLANEOUS LEFT DC BUS

Row	Col	Number	Name
P	38	B1-832	CAWS, SSRS-1, LDG GR, T/O, A/P, SP BK, CAB ALT

LOWER EPC, MISCELLANEOUS RIGHT DC BUS

Row	Col	Number	Name
R	36	B1-858	SLAT EXTEND FAILURE ADVISORY
R	38	B1-833	CAWS SSRS-2 ALT ALERT

OVERHEAD EMERGENCY AC BUS

Row	Col	Number	Name
WJE 405, 409, 881, 883, 884			
A	2	B10-405	OMEGA-1 28 VAC
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			
A	3	B10-319	CAPTAIN'S ALTIMETER 28 VAC
A	4	B10-77	VHF NAV-1 28 VAC
A	5	B10-314	CAPTAIN'S MACH AIRSPEED IND 28 VAC
WJE 405, 416, 420, 422, 424-427, 429, 862, 868, 874, 881, 883, 891-893			
A	6	B10-312	CAPTAIN'S VERTICAL SPEED IND 28 VAC
WJE 405, 861			
A	6	B10-79	COMPASS SINGLE POINTER 28 VAC
WJE 861			
A	7	B10-312	CAPTAIN'S VERTICAL SPEED IND 28 VAC
WJE 405, 409, 416, 420, 422, 424-427, 429, 862, 868, 874, 881, 883, 884, 891-893			
A	7	B10-79	COMPASS SINGLE POINTER 28 VAC
WJE 405, 409, 884			
B	2	B10-380	F/O COMPASS BOTH ON 2 28 VAC
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			
B	05	B10-19	VERTICAL GYRO-1
B	6	B10-10	FIRST OFFICER'S COMPASS
C	1	B10-316	AIR DATA CMPTR-1
WJE 405, 409, 884			
C	2	B10-167	AUX VERTICAL GYRO
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			
C	4	B10-86	EMERGENCY NAV INSTR XFMR

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 405, 409, 884			
A	9	B10-170	COMPASS SWITCHING
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			
B	9	B10-22	VHF NAV-1
WJE 405, 409, 416, 420, 422, 424-427, 429, 868, 874, 881, 883, 884, 891-893			
B	10	B10-26	GLIDESLOPE-1
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			
C	8	B10-321	AIR DATA SWITCHING UNIT
WJE 405, 409, 884			
C	10	B10-162	NAV SWITCHING
WJE 405, 409, 881, 883, 884			
C	11	B10-169	VERTICAL GYRO SWITCHING UNIT
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A

(Continued)

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, L AC BUS

Row	Col	Number	Name
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
A	11	B1-89	LEFT FLAP POSITION

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	19	B10-322	COMPARATOR MONITOR-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1
WJE 405, 409, 884			
F	15	B10-364	VERTICAL GYRO-1
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			
F	16	B10-83	NAV INST XFMR-1
F	17	B10-105	RADIO ALTMETER-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2
C	12	B10-339	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-1
C	13	B10-337	DIGITAL FLIGHT GUIDANCE SYSTEM FLAP POSITION-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	19	B10-324	COMPARATOR MONITOR-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1
G	15	B10-326	CAPTAIN'S ALTITUDE ALERT
G	17	B10-320	CADC SWITCHED LIGHT
G	25	B10-359	FLIGHT GUIDANCE STATUS & MAINT PNL
G	26	B10-343	MACH TRIM-1
G	27	B10-345	YAW DAMPER-1

UPPER EPC, LIGHTS - RIGHT AC BUS

Row	Col	Number	Name
L	16	B1-839	DFGS LIGHT CONTROL

UPPER EPC, R AC BUS

Row	Col	Number	Name
L	33	B1-24	RIGHT GROUND CONTROL RELAY

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	2	B1-90	RIGHT FLAP POSITION

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	6	B10-333	AUTO THROTTLE-2
D	7	B10-323	COMPARATOR MONITOR-2
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2
D	9	B10-62	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE A
D	10	B10-61	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE B
D	11	B10-60	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE C
F	2	B10-20	VERTICAL GYRO-2
F	3	B10-106	RADIO ALTMETER-2
F	08	B10-9	CAPTAIN'S COMPASS
F	10	B10-388	PERFORMANCE MGMT SYSTEM
F	12	B10-317	AIR DATA CMPTR -2
F	13	B10-84	NAV INST XFMR-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
B	1	B10-318	FIRST OFFICER'S ALTIMETER
B	2	B10-311	FIRST OFFICER'S VERTICAL SPEED INDICATOR
B	3	B10-315	FIRST OFFICER'S MACH AIRSPEED INDICATOR
B	5	B10-78	VHF NAV-2
B	6	B10-313	TRUE AIRSPEED & STATIC AIR TEMP
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2
C	3	B10-340	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-2
C	4	B10-338	DIGITAL FLIGHT GUIDANCE SYSTEM FLAP POSITION-2
C	7	B10-371	FIRST OFFICER'S HORIZON DISPLAY

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	07	B10-325	COMPARATOR MONITOR-2
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

(Continued)

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	12	B10-354	AUTOPILOT-2
G	2	B10-327	FIRST OFFICER'S ALTITUDE ALERT
WJE 405, 409, 416, 420, 422, 424-427, 429, 868, 874, 881, 883, 884, 891-893			
G	3	B10-28	GLIDESLOPE -2
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 881, 883, 884, 891-893			
G	7	B10-24	VHF NAV-2
G	10	B10-390	PERF MGMT LIGHTS
G	13	B10-346	YAW DAMPER-2

AUTO FLIGHT - MAINTENANCE PRACTICES

1. General

A. Auto flight consists of those units and components that furnish a means of automatically controlling the flight path, safe reference speed, and trim condition of the aircraft. The auto flight subsystems are packaged in two identical Digital Flight Guidance Computers (DFGC's). In addition, the Flight Management System (FMS) has been installed. The FMS option is a fully selectable mode of the Digital Flight Guidance System (DFGS). The FMS is integrated with the DFGS to command pitch, roll and thrust during climb, cruise and descent. The FMS guidance commands are limited by DFGS restrictions for roll angle, roll rate, pitch angle, pitch rate, EPR command and throttle movement rate. Auto flight consists of the following subsystems:

(1) Autopilot

(2) Flight Director

(3) Automatic Pitch Trim

(4) Mach Trim Compensation

(5) Auto Throttle/Speed Control

B. Autopilot consists of that portion of the system that uses radio beam signals, aircraft attitude signals, air data and manually selected inputs to automatically control yaw, pitch and roll axis of the aircraft.

C. Flight director steering commands are computed within the Advanced Flight Management Computer (AFMC) and then transmitted via data buses to the DFGC's to provide an output to flight director command bar displays. The roll and pitch command bars displayed on the captain's and first officer's Primary Flight Displays (PFD's) can be used to monitor corrective action when the autopilot is engaged, or to manually operate the aircraft.

D. Automatic pitch trim is provided to relieve the autopilot from holding sustained up or down elevator due to change in airspeed or aircraft configuration. If an out-of-trim condition develops, commands to move the horizontal stabilizer up or down will correct the out-of-trim condition.

E. Mach trim compensation automatically adjusts the center position of the control column to compensate for nose-down pitching of the aircraft caused by high mach number during flight. Mach trim compensation operation is independent of other functions of the auto flight system. Elevator control through mach trim compensation is independent from elevator control by the autopilot.

F. Auto Throttle/Speed Control provides two separate flight functions, autothrottle control and speed control.

(1) Autothrottle automatically adjusts engine power settings for controlled thrust throughout all flight modes from takeoff to automatic retard mode. System automatically controls throttles to selected air speed, mach number, or EPR limit (Engine Pressure Ratio).

(2) Speed control information is displayed by slow-fast pointers located on the captain's and first officer's PFD's. When minimum safe stall margin is desired, i.e. during takeoff or go-around maneuvers, the angle-of-attack speed reference affords the minimum rate stall margin throughout the process of cleaning up the gear, flaps and slats. Speed control is usable during cruise conditions, altitude changes, holding patterns, and approach conditions.

2. Auto Flight Testing

A. Auto flight tests provide a method of verifying the integrity of those LRU's and circuits used during operation of specific modes of the auto flight subsystems. Auto flight testing is provided during flight by Continuous Built-In-Test (BIT) within each of the DFGC's. On ground, the DFGC's manage a central integrated BIT of the Digital Flight Guidance System (DFGS).

B. An Autoland Preflight Test is available to the flight crew to provide assurance that the autoland mode of operation is available.

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

C. BIT information is displayed on the FMS Multipurpose Control Display Unit (MCDU) located on the forward pedestal. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WJE 401-404, 412, 414, 875-879

D. BIT information is displayed on the Status/Test Panel (STP) located below the captain's briefcase compartment. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

E. BIT provides three modes of testing available to the STP. Continuous BIT, System Maintenance BIT, and Return to Service (RTS) BIT.

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

F. BIT provides three modes of testing available to the MCDU. Continuous BIT, System Maintenance BIT, and Return to Service (RTS) BIT.

(1) Continuous BIT - Continuous BIT begins operation with application of power to the DFGC. Continuous BIT does not interfere with the normal operation of the auto flight system, and does not require any operator participation.

(2) System Maintenance BIT - System Maintenance BIT is a command response type test requiring operator participation to perform specific actions. System Maintenance BIT is the most comprehensive of the four tests. This test is normally used after major airplane maintenance action has been performed affecting the DFGS (i.e. wiring rework between any of the major LRU's). Each system (DFGC -1 or DFGC -2) test is run separately, and can only be performed when the aircraft is in the "on ground" condition. Hydraulic power should be applied to the aircraft to make the test as complete as possible.

(3) Return To Service (RTS) BIT - The RTS BIT provides assurance that after repair action (i.e. LRU replacement), the aircraft can be put back into non-restricted (including autoland) service. RTS requires minimal test set-up procedures and minimal operator participation. RTS can only be performed when the aircraft is in the "on ground" condition, and IAS below 60 knots. Hydraulic power is not required for RTS. However, flaps must be greater than 26 degrees and rudder centered.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879

G. Autoland Preflight Test - The Autoland Availability Preflight BIT operates only when the aircraft is in the "on ground" condition, both NAV receivers tuned to an ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control panel has been pressed. The associated captain's or first officer's FMA's will display AUTO LND/PRE/FLT/TEST when the test is initiated, and go blank when the test is completed.

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

H. After Removal/Installation procedures of certain auto flight LRU's, a short test procedure may be given instead of using the MCDU, if the affected LRU does not interfere with the normal operation of other auto flight components (i.e. replacing a light segment display in the FMA, and using the ANNUN/DIGITAL LTS test switch for verification that the segment will display). Otherwise, all test procedure will be called out to reference the use of the FMS MCDU.

WJE 401-404, 412, 414, 875-879

I. After Removal/Installation procedures of certain auto flight LRU's, a short test procedure may be given instead of using the STP, if affected LRU does not interfere with the normal operation of other auto flight components (i.e. replacing a light segment display in the FMA, and using the ANNUN/DIGITAL LTS test switch for verification that the segment will display). Otherwise, all test procedure will be called out to reference use of STP.

WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879

3. Autoland Wiring

A. Two separate wire bundles (system 1 and system 2) are provided to assure the integrity of the autoland mode of operation. Also, two separate monitored sensors (channel A and channel B) within the DFGC continuously assess the safety of the autoland mode by assuring that all inputs/outputs are valid (i.e. attitude, radio altimeters, etc.). If the data does not agree, the monitoring will automatically disengage the autopilot.

B. To be effective, wiring between the two monitored sensors must be prevented from shorting together assuring that a failure(s) then cannot affect both sensors identically and simultaneously, thus providing false inputs to the sensors and not allowing proper autopilot disengagement.

C. System 1 autoland wiring is normally routed on the left side of the aircraft with other existing aircraft wiring and is secured with normal aircraft type white string ties. System 2 autoland wiring is routed on the right side of the aircraft and is easily identifiable by yellow string ties.

WARNING: THESE AUTOLAND CRITICAL WIRES MUST NEVER BE TAMPERED WITH UNLESS ABSOLUTELY NECESSARY TO PROVIDE SYSTEM MAINTENANCE OR WIRING REWORK. ASSURE THAT ALL PROCEDURES OUTLINED IN CHAPTER 20 OF THE WIRING DIAGRAM MANUAL ARE STRICTLY ADHERED TO.

D. System 2 autoland wires have run letters beginning with the letter S along with the yellow string ties. These system 2 wires are separated or isolated using combinations of physical separation, spacers and/or added material thickness such as conduit, sleeving or shielded wire. (Ref. 20-11-00, Page 201 of the Wiring Diagram Manual).

4. Circuit Breakers

A. The following circuit breakers affect the operation of the auto flight system and should remain closed for the duration of test procedures unless specifically instructed otherwise. Associated systems and equipment should be previously checked out and in proper operating condition. A failure message will appear on EFIS display units if applicable circuit breakers are not closed.

(1) Make sure that these circuit breakers are closed:

LOWER EPC, DC AIR CONDITIONING & MISCELLANEOUS

Row	Col	Number	Name
U	24	B1-772	LEFT ALTITUDE BIAS CONTROL
U	29	B1-82	RADIO RACK FAN CAUTION
W	24	B1-771	RIGHT ALTITUDE BIAS CONTROL
W	25	B1-228	RUDDER TRAVEL UNRESTRICT ADVISORY

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
W	32	B1-824	ART STATUS LIGHTS
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
X	33	B10-64	MACH TRIM OVERRIDE
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

LOWER EPC, LIGHTS - LEFT DC BUS

Row	Col	Number	Name
M	32	B1-845	CAPTAIN'S DIGITAL DISPLAY

LOWER EPC, LIGHTS - R DC BUS

Row	Col	Number	Name
N	32	B1-846	DIGITAL DISPLAY CENTER
N	33	B1-847	DIGITAL DISPLAY FIRST OFFICER'S
N	34	B1-848	DIGITAL DISPLAY WARNING LIGHT & TEST

LOWER EPC, MISCELLANEOUS LEFT DC BUS

Row	Col	Number	Name
P	38	B1-832	CAWS, SSRS-1, LDG GR, T/O, A/P, SP BK, CAB ALT

LOWER EPC, MISCELLANEOUS RIGHT DC BUS

Row	Col	Number	Name
R	36	B1-858	SLAT EXTEND FAILURE ADVISORY
R	38	B1-833	CAWS SSRS-2 ALT ALERT

OVERHEAD EMERGENCY AC BUS

Row	Col	Number	Name
WJE 877			
A	2	B10-453	IRU-1 SYNCHRO EXCITATION 28 VAC
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
A	3	B10-319	CAPTAIN'S ALTIMETER 28 VAC
A	4	B10-77	VHF NAV-1 28 VAC
A	5	B10-314	CAPTAIN'S MACH AIRSPEED IND 28 VAC
WJE 415, 418, 863, 866			
A	6	B10-312	CAPTAIN'S VERTICAL SPEED IND 28 VAC
WJE 864			
A	6	B10-79	COMPASS SINGLE POINTER 28 VAC
WJE 401-404, 412, 414, 875, 876, 878, 879			
A	6	B10-453	IRU-1 SYNCHRO EXCITATION
WJE 417, 419, 421, 423, 865, 869, 871, 872			
A	6	B10-453	SYNCHRO EXCITATION
WJE 415, 418, 863, 866			
A	7	B10-79	COMPASS SINGLE POINTER 28 VAC
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
B	3	B10-431	CAPTAIN'S N.D.
B	4	B10-410	CAPTAIN'S PFD
WJE 415, 418, 863, 864, 866			
B	05	B10-19	VERTICAL GYRO-1
B	6	B10-10	FIRST OFFICER'S COMPASS
WJE 401-404, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 875-879			
B	7	B10-427	FIRST OFFICER'S RDMI
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
C	1	B10-316	AIR DATA CMPTR-1
C	3	B10-412	SYMBOL GENERATOR-1 POWER
C	4	B10-86	EMERGENCY NAV INSTR XFMR

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
B	9	B10-22	VHF NAV-1
WJE 415, 418, 863, 864, 866			
B	10	B10-26	GLIDESLOPE-1
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
C	9	B10-321	AIR DATA SWITCHING UNIT
WJE 875-879			
C	10	B10-162	NAV SWITCHING
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, L AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
K	30	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
K	33	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
A	11	B1-89	LEFT FLAP POSITION

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875, 876, 878, 879			
D	21	B10-419	FLIGHT MANAGEMENT SYSTEM-1 AFMC
D	22	B10-424	FLIGHT MANAGEMENT SYSTEM-1 MCDU
WJE 877			
F	15	B10-395	AHRS-1
WJE 401-404, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 875, 876, 878, 879			
F	15	B10-437	IRU-1
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
F	16	B10-83	NAV INST XFMR-1
F	17	B10-105	RADIO ALTMETER-1
WJE 877			
F	25	B10-288	OMEGA-1

WJE 877 (Continued)

(Continued)

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2
C	12	B10-339	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-1
C	13	B10-337	DIGITAL FLIGHT GUIDANCE SYSTEM FLAP POSITION-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	19	B10-414	CAPTAIN'S FMA/MODE SELECT
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1
G	15	B10-326	CAPTAIN'S ALTITUDE ALERT
G	17	B10-320	CADC SWITCHED LIGHT
G	25	B10-359	FLIGHT GUIDANCE STATUS & MAINT PNL
G	26	B10-343	MACH TRIM-1
G	27	B10-345	YAW DAMPER-1

UPPER EPC, LIGHTS - RIGHT AC BUS

Row	Col	Number	Name
L	16	B1-839	DFGS LIGHT CONTROL

UPPER EPC, R AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
L	30	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
L	33	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	2	B1-90	RIGHT FLAP POSITION

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	6	B10-333	AUTO THROTTLE-2
WJE 875-879			
D	7	B10-323	COMPARATOR MONITOR-2

WJE 875-879 (Continued)

(Continued)

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872			
D	7	B10-409	FIRST OFFICER'S N.D.
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2
D	9	B10-62	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE A
D	10	B10-61	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE B
D	11	B10-60	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE C
D	11	D10-409	FIRST OFFICER'S NAV DISPLAY
WJE 401-404, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 875, 876, 878, 879			
F	1	B10-438	IRU-2
WJE 877			
F	2	B10-396	AHRS-2
WJE **WJE 412, 414**			
WJE F	2	B10-455	F/O'S VERTICAL SPEED INDICATOR
WJE 415, 418, 863, 864, 866			
F	2	B10-20	VERTICAL GYRO-2
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
F	3	B10-106	RADIO ALTMETER-2
F	4	B10-413	SYMBOL GEN -2 POWER
WJE 401-404, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 875, 876, 878, 879			
F	7	B10-426	CAPTAIN'S RDMI
WJE 877			
F	7	B10-381	OMEGA-2
WJE 415, 418, 863, 864, 866			
F	08	B10-9	CAPTAIN'S COMPASS
WJE 401-404, 412, 414			
F	8	B10-411	FIRST OFFICER'S P.F.D.
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875, 876, 878, 879			
F	9	B10-420	FLIGHT MANAGEMENT SYSTEM-2 AFMC
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875, 876, 878, 879			
F	10	B10-425	FLIGHT MANAGEMENT SYSTEM-2 MCDU
WJE 877			
F	10	B10-388	PERFORMANCE MGMT SYSTEM
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
F	11	B10-411	FIRST OFFICER'S P.F.D.
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
F	12	B10-317	AIR DATA CMPTR -2
F	13	B10-84	NAV INST XFMR-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
B	1	B10-318	FIRST OFFICER'S ALTIMETER
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872			
B	2	B10-311	FIRST OFFICER'S VERTICAL SPEED INDICATOR
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
B	3	B10-315	FIRST OFFICER'S MACH AIRSPEED INDICATOR
B	5	B10-78	VHF NAV-2
B	6	B10-313	TRUE AIRSPEED & STATIC AIR TEMP
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2
C	3	B10-340	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-2
C	4	B10-338	DIGITAL FLIGHT GUIDANCE SYSTEM FLAP POSITION-2
WJE 401-404, 412, 414			
C	7	B10-371	FIRST OFFICER'S HORIZON DISPLAY

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
E	12	B10-354	AUTOPILOT-2
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
G	2	B10-327	FIRST OFFICER'S ALTITUDE ALERT
WJE 415, 418, 863, 864, 866, 877			
G	3	B10-28	GLIDESLOPE -2
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
G	7	B10-24	VHF NAV-2
WJE 877			
G	10	B10-390	PERF MGMT LIGHTS
WJE 401-404, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879			
G	13	B10-346	YAW DAMPER-2

UPPER EPC, RT AC

Row	Col	Number	Name
WJE 875-879			
J	16	B10-455	F/O VS/TCAS INDICATOR

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B. An Autoland Preflight Test is available to the flight crew to provide assurance that the autoland mode of operation is available.

C. BIT information is displayed on a Status/Test Panel (STP) located below the captain's briefcase compartment. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

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D. System 2 autoland wires have run letters beginning with the letter S along with the yellow string ties. These system 2 wires are separated or isolated using combinations of physical separation, spacers and/or added material thickness such as conduit, sleeving or shielded wire. (Ref. 20-11-00, Page 201 of the Wiring Diagram Manual).

4. Circuit Breakers

A. The following circuit breakers affect the operation of the auto flight system and should remain closed for the duration of test procedures unless specifically instructed otherwise. Associated systems and equipment should be previously checked out and in proper operating condition.

(1) Make sure that these circuit breakers are closed:

LOWER EPC, DC AIR CONDITIONING & MISCELLANEOUS

Row	Col	Number	Name
U	24	B1-772	LEFT ALTITUDE BIAS CONTROL
U	29	B1-82	RADIO RACK FAN CAUTION
W	24	B1-771	RIGHT ALTITUDE BIAS CONTROL
W	25	B1-228	RUDDER TRAVEL UNRESTRICT ADVISORY

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
W	32	B1-824	ART STATUS LIGHTS
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
X	33	B10-64	MACH TRIM OVERRIDE
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

LOWER EPC, LIGHTS - LEFT DC BUS

Row	Col	Number	Name
M	32	B1-845	CAPTAIN'S DIGITAL DISPLAY

LOWER EPC, LIGHTS - R DC BUS

Row	Col	Number	Name
N	32	B1-846	DIGITAL DISPLAY CENTER
N	33	B1-847	DIGITAL DISPLAY FIRST OFFICER'S
N	34	B1-848	DIGITAL DISPLAY WARNING LIGHT & TEST

LOWER EPC, MISCELLANEOUS LEFT DC BUS

Row	Col	Number	Name
P	38	B1-832	CAWS, SSRS-1, LDG GR, T/O, A/P, SP BK, CAB ALT

LOWER EPC, MISCELLANEOUS RIGHT DC BUS

Row	Col	Number	Name
R	36	B1-858	SLAT EXTEND FAILURE ADVISORY
R	38	B1-833	CAWS SSRS-2 ALT ALERT

OVERHEAD EMERGENCY AC BUS

Row	Col	Number	Name
WJE 880, 886, 887			
A	2	B10-405	OMEGA-1 28 VAC
WJE 406-408, 411, 880, 886, 887			
A	3	B10-319	CAPTAIN'S ALTIMETER 28 VAC
A	4	B10-77	VHF NAV-1 28 VAC

WJE 406-408, 411, 880, 886, 887 (Continued)

(Continued)

OVERHEAD EMERGENCY AC BUS

Row	Col	Number	Name
A	5	B10-314	CAPTAIN'S MACH AIRSPEED IND 28 VAC
WJE 410			
A	5	B10-77	VHF NAV-1 28 VAC
A	6	B10-314	CAPTAIN'S MACH AIRSPEED IND 28 VAC
WJE 406, 407			
A	6	B10-312	CAPTAIN'S VERTICAL SPEED IND 28 VAC
WJE 880			
A	6	B10-79	COMPASS SINGLE POINTER 28 VAC
WJE 410			
A	7	B10-79	COMPASS SINGLE POINTER 28 VAC
WJE 880			
B	2	B10-431	CAPTAIN'S N.D.
WJE 410, 880			
B	2	B10-380	F/O COMPASS BOTH ON 2 28 VAC
WJE 406-408, 411, 886, 887			
B	3	B10-431	CAPTAIN'S N.D.
WJE 410			
B	4	B10-431	CAPTAIN'S N.D.
WJE 406-408, 411, 880, 886, 887			
B	4	B10-410	CAPTAIN'S PFD
WJE 406-408, 886, 887			
B	5	B10-394	AHRS-1
WJE 410			
B	5	B10-410	CAPTAIN'S PFD
WJE 880			
B	05	B10-19	VERTICAL GYRO-1
B	6	B10-10	FIRST OFFICER'S COMPASS
WJE 410			
B	06	B10-19	VERTICAL GYRO-1
B	7	B10-10	FIRST OFFICER'S COMPASS
WJE 886, 887			
B	7	B10-427	FIRST OFFICER'S RDMI
WJE 406-408, 410, 411, 880, 886, 887			
C	1	B10-316	AIR DATA CMPTR-1
WJE 410, 880			
C	2	B10-167	AUX VERTICAL GYRO
WJE 406-408, 410, 411, 880, 886, 887			
C	3	B10-412	SYMBOL GENERATOR-1 POWER
C	4	B10-86	EMERGENCY NAV INSTR XFMR

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 880			
A	9	B10-170	COMPASS SWITCHING
WJE 410			
A	10	B10-170	COMPASS SWITCHING
WJE 406-408, 411, 880, 886, 887			
B	9	B10-22	VHF NAV-1
WJE 406-408, 411, 880			
B	10	B10-26	GLIDESLOPE-1
WJE 410			
B	10	B10-22	VHF NAV-1
B	11	B10-26	GLIDESLOPE-1
WJE 406-408, 411, 880			
C	8	B10-321	AIR DATA SWITCHING UNIT
WJE 406, 410, 886, 887			
C	9	B10-321	AIR DATA SWITCHING UNIT
WJE 407, 408, 411			
C	9	B10-162	NAV SWITCHING
WJE 406, 410, 880			
C	10	B10-162	NAV SWITCHING
WJE 406-408, 410, 411, 880			
C	11	B10-169	VERTICAL GYRO SWITCHING UNIT
WJE 406-408, 410, 411, 880, 886, 887			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, L AC BUS

Row	Col	Number	Name
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
A	11	B1-89	LEFT FLAP POSITION

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
WJE 880			
D	19	B10-322	COMPARATOR MONITOR-1
WJE 406-408, 410, 411, 880, 886, 887			
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(Continued)

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
WJE 406-408, 410, 411, 880			
D	21	B10-419	FMC-1
D	22	B10-424	MCDU-1
WJE 406-408, 886, 887			
F	15	B10-395	AHRS-1
WJE 880			
F	15	B10-364	VERTICAL GYRO-1
WJE 406-408, 411, 880, 886, 887			
F	16	B10-83	NAV INST XFMR-1
WJE 410			
F	16	B10-364	VERTICAL GYRO-1
WJE 406-408, 410, 411, 880, 886, 887			
F	17	B10-105	RADIO ALTMETER-1
WJE 410, 880, 886, 887			
F	25	B10-288	OMEGA-1
WJE 410			
f	17	B10-83	NAV INST XFMR-1
WJE 406-408, 410, 411, 880, 886, 887			

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2
C	12	B10-339	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-1
C	13	B10-337	DIGITAL FLIGHT GUIDANCE SYSTEM FLAP POSITION-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
WJE 406-408, 410, 411, 886, 887			
E	19	B10-414	CAPTAIN'S FMA/MODE SELECT
WJE 880			
E	19	B10-324	COMPARATOR MONITOR-1
WJE 406-408, 410, 411, 880, 886, 887			
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1
G	15	B10-326	CAPTAIN'S ALTITUDE ALERT
G	17	B10-320	CADC SWITCHED LIGHT
G	25	B10-359	FLIGHT GUIDANCE STATUS & MAINT PNL
G	26	B10-343	MACH TRIM-1
G	27	B10-345	YAW DAMPER-1

UPPER EPC, LIGHTS - RIGHT AC BUS

Row	Col	Number	Name
L	16	B1-839	DFGS LIGHT CONTROL

UPPER EPC, R AC BUS

Row	Col	Number	Name
L	33	B1-24	RIGHT GROUND CONTROL RELAY

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	2	B1-90	RIGHT FLAP POSITION

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	6	B10-333	AUTO THROTTLE-2
WJE 880			
D	7	B10-323	COMPARATOR MONITOR-2
WJE 406-408, 410, 886, 887			
D	7	B10-409	FIRST OFFICER'S N.D.
WJE 406-408, 410, 411, 880, 886, 887			
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2
D	9	B10-62	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE A
D	10	B10-61	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE B
D	11	B10-60	AUTOPILOT & ALTERNATE LONGITUDINAL TRIM PHASE C
D	11	D10-409	FIRST OFFICER'S NAV DISPLAY
WJE 406-408, 411, 886, 887			
F	2	B10-396	AHRS-2
WJE 410, 880			
F	2	B10-20	VERTICAL GYRO-2
WJE 406-408, 410, 411, 880, 886, 887			
F	3	B10-106	RADIO ALTMETER-2
WJE 886, 887			
F	4	B10-413	SYMBOL GEN -2 POWER
F	7	B10-426	CAPTAIN'S RDMI
WJE 406-408, 411			
F	7	B10-413	SYMBOL GEN -2 POWER
WJE 410, 880			
F	08	B10-9	CAPTAIN'S COMPASS
WJE 406-408, 410, 411, 880, 886, 887			
F	10	B10-388	PERFORMANCE MGMT SYSTEM
F	11	B10-411	FIRST OFFICER'S P.F.D.
WJE 880			
F	11	B10-381	OMEGA-2

WJE 880 (Continued)

(Continued)

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 406-408, 410, 411, 880, 886, 887			
F	12	B10-317	AIR DATA CMPTR -2
F	13	B10-84	NAV INST XFMR-2
WJE 410			
F	14	B10-413	SYMBOL GEN -2 POWER
F	15	B10-381	OMEGA-2
WJE 406-408, 410, 411, 880, 886, 887			

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
B	1	B10-318	FIRST OFFICER'S ALTIMETER
WJE 406, 880, 886, 887			
B	2	B10-311	FIRST OFFICER'S VERTICAL SPEED INDICATOR
WJE 406-408, 410, 411, 880, 886, 887			
B	3	B10-315	FIRST OFFICER'S MACH AIRSPEED INDICATOR
B	5	B10-78	VHF NAV-2
B	6	B10-313	TRUE AIRSPEED & STATIC AIR TEMP
WJE 880			
B	8	B10-406	OMEGA-2
WJE 406-408, 410, 411, 880, 886, 887			
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2
C	3	B10-340	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-2
C	4	B10-338	DIGITAL FLIGHT GUIDANCE SYSTEM FLAP POSITION-2
WJE 407, 408, 411, 880			
C	7	B10-371	FIRST OFFICER'S HORIZON DISPLAY

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 880			
E	07	B10-325	COMPARATOR MONITOR-2
WJE 406-408, 410, 411, 880, 886, 887			
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	12	B10-354	AUTOPILOT-2
G	2	B10-327	FIRST OFFICER'S ALTITUDE ALERT
WJE 406-408, 410, 411, 880			
G	3	B10-28	GLIDESLOPE -2
WJE 406-408, 410, 411, 880, 886, 887			
G	7	B10-24	VHF NAV-2
G	10	B10-390	PERF MGMT LIGHTS

(Continued)

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
G	13	B10-346	YAW DAMPER-2

UPPER EPC, RT AC

Row	Col	Number	Name
WJE 406-408, 410, 411, 880			
B	15	B10-420	FMC-2
B	16	B10-425	MCDU-2
WJE 407, 408, 410, 411			
J	16	B10-455	F/O VS/TCAS INDICATOR

DIGITAL FLIGHT GUIDANCE SYSTEM (DFGS) - DESCRIPTION AND OPERATION

1. General

A. There are two identical Digital Flight Guidance Systems in the airplane. Each System is independent of the other, and only one is in command during operation. Each System is controlled by a separate Digital Flight Guidance Computer (DFGC). The other System (off-side) is continuously receiving and processing parallel input signals in event selection is required.

B. A switch located below the AP engage switch on the Flight Guidance Control Panel, labeled 1, 2, provides the capability for selection of either DFGC -1 or DFGC -2 for all functions except flight director. With Flight Director Switch in NORM position, an isolated output signal is provided from each System to the slow-fast pointer and flight director pitch and roll commands in the captain's and first officer's ADI's. When the flight director switch (on overhead panel) is operating in BOTH ON 1 or BOTH ON 2 position, both ADI's are driven from the selected computer regardless of position of the DFGC 1, 2 switch.

2. Digital Flight Guidance System (DFGS)

A. System Interface

(1) The Digital Flight Guidance System provides control data for various airplane functions. These functions include:

(a) Autopilot - The autopilot functions are generated within the DFGC which automatically provides control of roll, pitch and yaw axis of the airplane. Operationally, the autopilot controls the airplane attitude, heading, altitude, airspeed, or flight path as required by the selected mode of operation. In addition, the autopilot also provides stability augmentation. (SUBJECT 22-10-00)

(b) Flight Director- The flight director displays visual commands for the flight crew to manually control the airplane heading and attitude, through pitch and roll steering commands generated within the Flight Director System. (SUBJECT 22-10-00)

(c) Yaw Damper - The yaw damper function utilizes yaw rate derived from accelerometers to provide damping of the airplane dutch roll characteristics. When the localizer is captured, yaw damper provides automatic turn coordination through rudder control to minimize lateral acceleration during all lateral/directional maneuvers. The yaw damper is engaged any time the autopilot is on, or the yaw damper switch is in the ON position. (SUBJECT 22-13-00)

(d) Mach Trim - Mach trim compensates for pitching moments generated as a function of mach number. The function utilizes mach number output from the CADC to generate a servo command that positions a linear actuator which repositions the control column to counteract nose down trim during high mach number. (SUBJECT 22-22-00)

(e) Autothrottle/Speed Control (SUBJECT 22-31-00). The autothrottle/speed control (AT/SC) system provides control of speed/mach/thrust throughout the takeoff, flight and landing phases of airplane operations.

(f) Auto Reserve Thrust - The auto reserve thrust (ART) function detects engine failures during takeoff by monitoring engine parameters. When an engine failure is detected, ART provides a signal to the fuel controllers on both engines which will increase thrust to the full certified value. (PAGEBLOCK 73-20-00/101)

(g) Thrust Rating Scheduled Computations - The thrust rating computation accepts total air temperature, airspeed and altitude data from the CADC, engine transducers and engine bleed conditions to provide EPR limit data and NO MODE data for display on the TAT/ Thrust Rating Indicator. Also, thrust rating computations provide engine-out logic and error signals between the highest EPR and the EPR limit to the autothrottle. (SUBJECT 34-18-00)

WJE 405, 409, 880, 881, 883, 884

(h) Head-Up Display . The head-up display (HUD) provides augmented guidance and visual cues for takeoff, landing, initial go-around and rollout (runway) guidance.

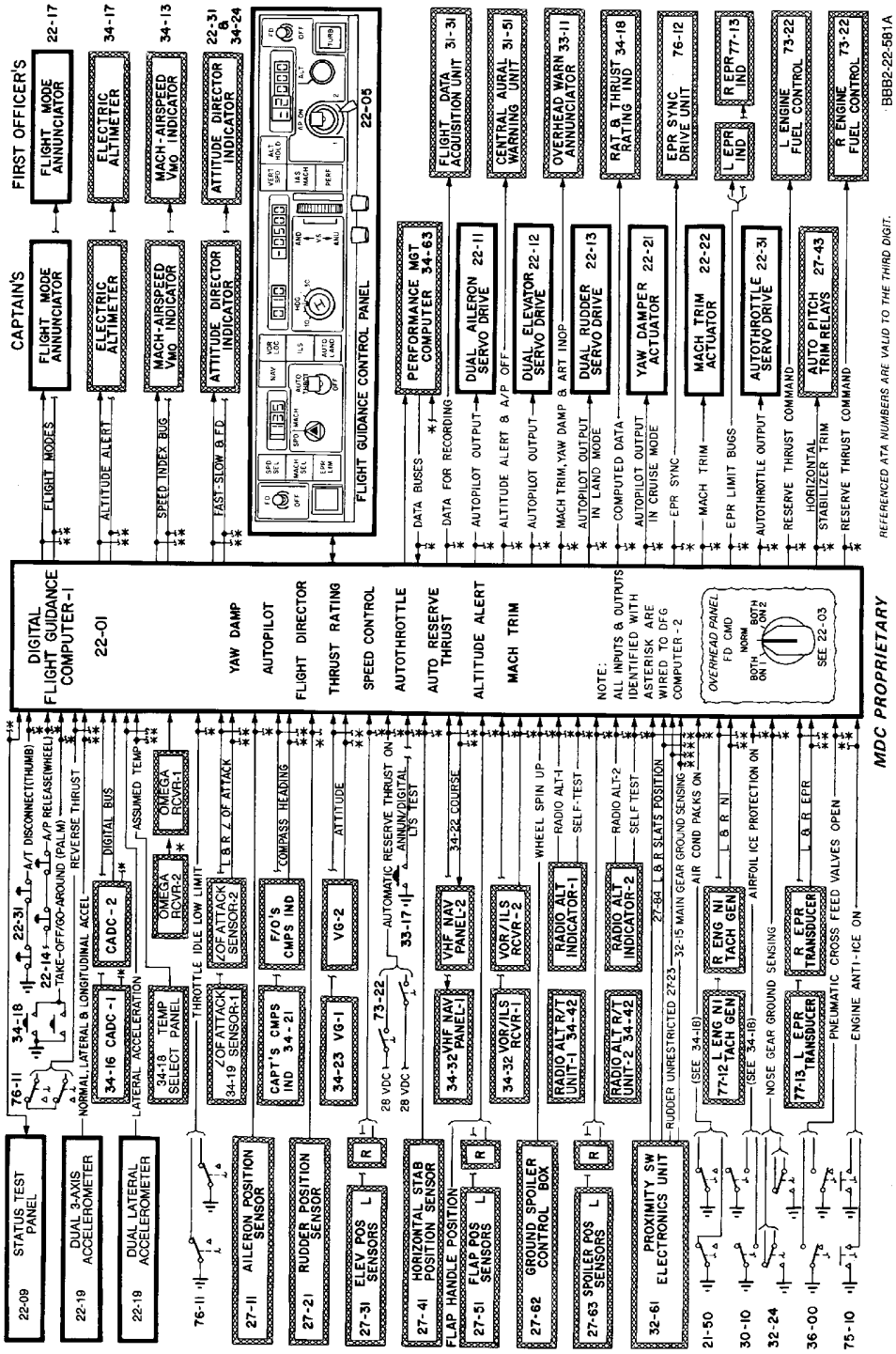
WJE 407, 408, 411

(i) Head-Up Display . The head-up display (HUD) provides augmented guidance and visual cues for takeoff, landing, initial go-around and rollout (runway) guidance. (SUBJECT 34-25-00)

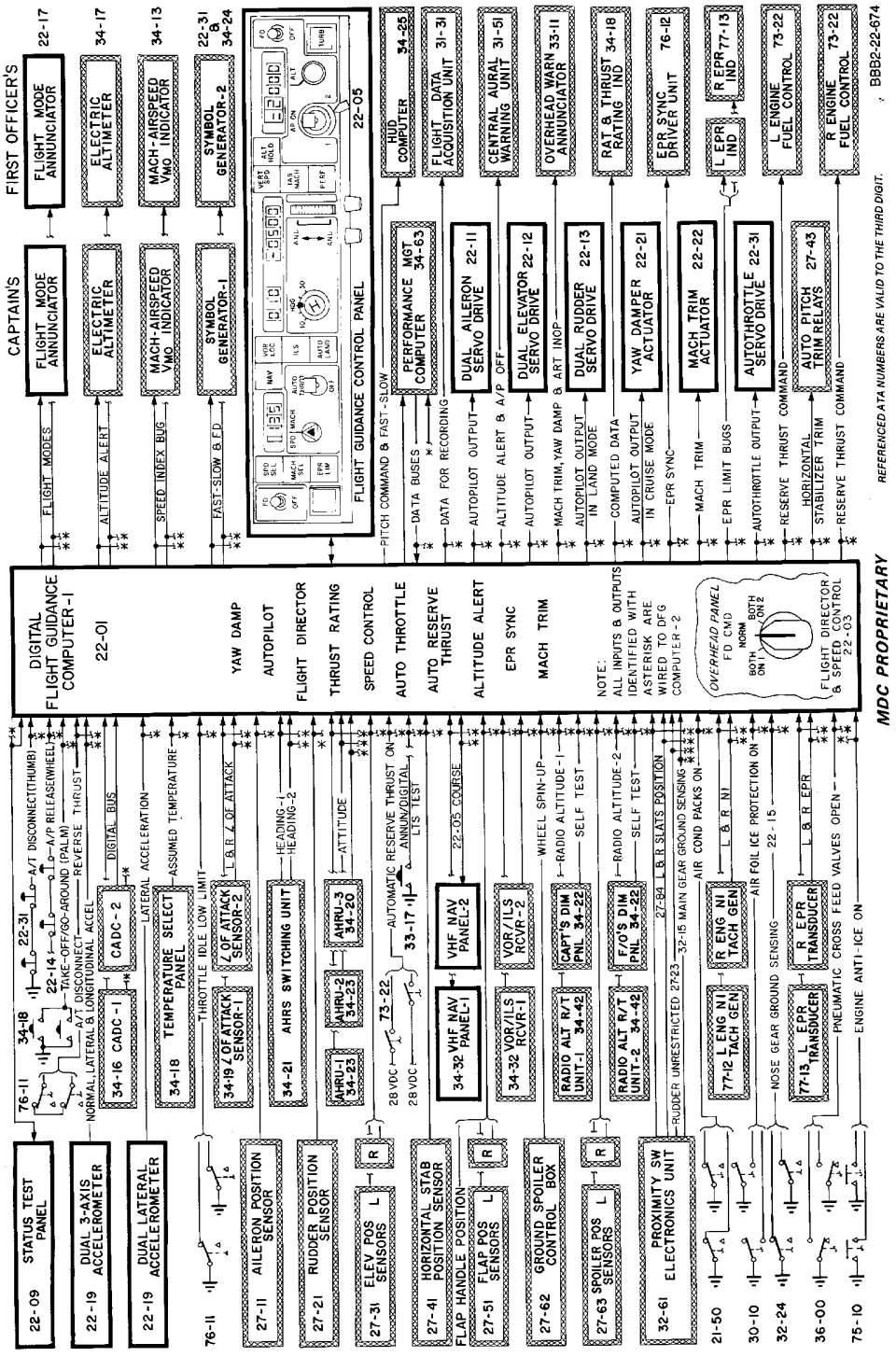
WJE 405, 407-409, 411, 880, 881, 883, 884

(j) Altitude Advisory-. The altitude advisory function provides visual and aural cues to the flight crew upon approaching a pre-selected altitude, and deviation from a preselected altitude. (SUBJECT 34-17-00)

(k) EPR Synchronizer- The EPR Synchronizer utilizes the existing N_1/N_2 Engine Synchronizer actuator to provide adjustment of the left engine EPR to match the right engine EPR when the autothrottle is engaged in the EPR LIM mode and the ENG SYNC switch on the overhead panel is in the OFF position. (SUBJECT 76-11-02)



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-906 (Sheet 1 of 2)



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-906 (Sheet 2 of 2)

DIGITAL FLIGHT GUIDANCE SYSTEM (DFGS) - DESCRIPTION AND OPERATION

1. General

A. There are two identical Digital Flight Guidance Systems in the aircraft. Each System is independent of the other, and only one is in command during operation. Each System is controlled by a separate Digital Flight Guidance Computer (DFGC). The other System (off-side) is continuously receiving and processing parallel input signals in event selection is required.

WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 891-893

B. A switch located below the AP engage switch on the Flight Guidance Control Panel, labeled 1, 2, provides the capability for selection of either DFGC -1 or DFGC -2 for all functions except flight director. With Flight Director Switch in NORM position, an isolated output signal is provided from each System to the slow-fast pointer and flight director pitch and roll commands in the captain's and first officer's ADIs. When the flight director switch (on overhead panel) is operating in BOTH ON 1 or BOTH ON 2 position, both ADI's are driven from the selected computer regardless of position of the DFGC 1,2 switch.

WJE 886, 887

C. A switch located below the AP engage switch on the Flight Guidance Control Panel, labeled 1, 2, provides the capability for selection of either DFGC -1 or DFGC -2 for all functions except flight director. With Flight Director Switch in NORM position, an isolated output signal is provided from each System via the EFIS symbol generators, to the slow-fast pointers and flight director pitch and roll command displays located on the Primary Flight Displays (PFD's). When the flight director switch (on overhead panel) is operating in BOTH ON 1 or BOTH ON 2 position, both PFD's are driven from the selected computer regardless of position of the DFGC 1,2 switch.

WJE 406, 410

D. A switch located below the AP engage switch on the Flight Guidance Control Panel, labeled 1, 2, provides the capability for selection of either DFGC -1 or DFGC -2 for all functions except flight director. With Flight Director Switch in NORM position, an isolated output signal is provided from each System to the slow-fast pointer and flight director pitch and roll command bars in the captain's and first officer's ADI's. On aircraft with EFIS, slow-fast pointer and command bars are displayed on the Primary Flight Display (PFD's). When the flight director switch (on overhead panel) is operating in BOTH ON 1 or BOTH ON 2 position, both ADI's (PFD's) are driven from the selected computer regardless of position of the DFGC 1,2 switch.

WJE 406, 410, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 886, 887, 891-893

2. Digital Flight Guidance System (DFGS)

A. System Interface

(1) The Digital Flight Guidance System provides control data for various aircraft functions. These functions include:

(a) Autopilot - The autopilot functions are generated within the DFGC which automatically provides control of roll, pitch and yaw axis of the aircraft. Operationally, the autopilot controls the aircraft attitude, heading, altitude, airspeed, or flight path as required by the selected mode of operation. In addition, the autopilot also provides stability augmentation. (SUBJECT 22-10-00)

WJE 406, 410

(b) Flight Director -The flight director displays visual commands for the flight crew to manually control the aircraft heading and attitude, through pitch and roll steering commands generated within the ADI's (PFD's). (SUBJECT 22-10-00)

WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 874, 891-893

(c) Flight Director-. The flight director displays visual commands for the flight crew to manually control the aircraft heading and attitude, through pitch and roll steering commands generated within the ADI's. (SUBJECT 22-10-00)

WJE 873, 874, 886, 887, 892, 893

(d) Flight Director - The flight director displays visual commands for the flight crew to manually control the airplane heading and attitude, through pitch and roll steering commands generated within the Flight Director System. (SUBJECT 22-10-00)

WJE 406, 410, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 886, 887, 891-893

(e) Yaw Damper - The yaw damper function utilizes yaw rate derived from accelerometers to provide damping of the airplane dutch roll characteristics. When the localizer is captured, yaw damper provides automatic turn coordination through rudder control to minimize lateral acceleration during all lateral/directional maneuvers. The yaw damper is engaged any time the autopilot is on, or the yaw damper switch is in the ON position. (SUBJECT 22-13-00)

(f) Mach Trim - Mach trim compensates for pitching moments generated as a function of mach number. The function utilizes mach number output from the CADC to generate a servo command that positions a linear actuator which repositions the control column to counteract nose down trim during high mach number. (SUBJECT 22-22-00)

(g) Autothrottle/Speed Control - The autothrottle/speed control (AT/SC) system provides control of speed/mach/thrust throughout the takeoff, flight and landing phases of airplane operations. (SUBJECT 22-31-00)

(h) Auto Reserve Thrust -. The auto reserve thrust (ART) function detects engine failures during take-off by monitoring engine parameters. When an engine failure is detected, ART provides a signal to the fuel controllers on both engines which will increase thrust to the full certified value.(PAGEBLOCK 73-20-00/101)

(i) Thrust Rating Scheduled Computations.

WJE 406, 410, 416, 420, 422, 424-427, 429, 861, 862, 868, 886, 887, 891

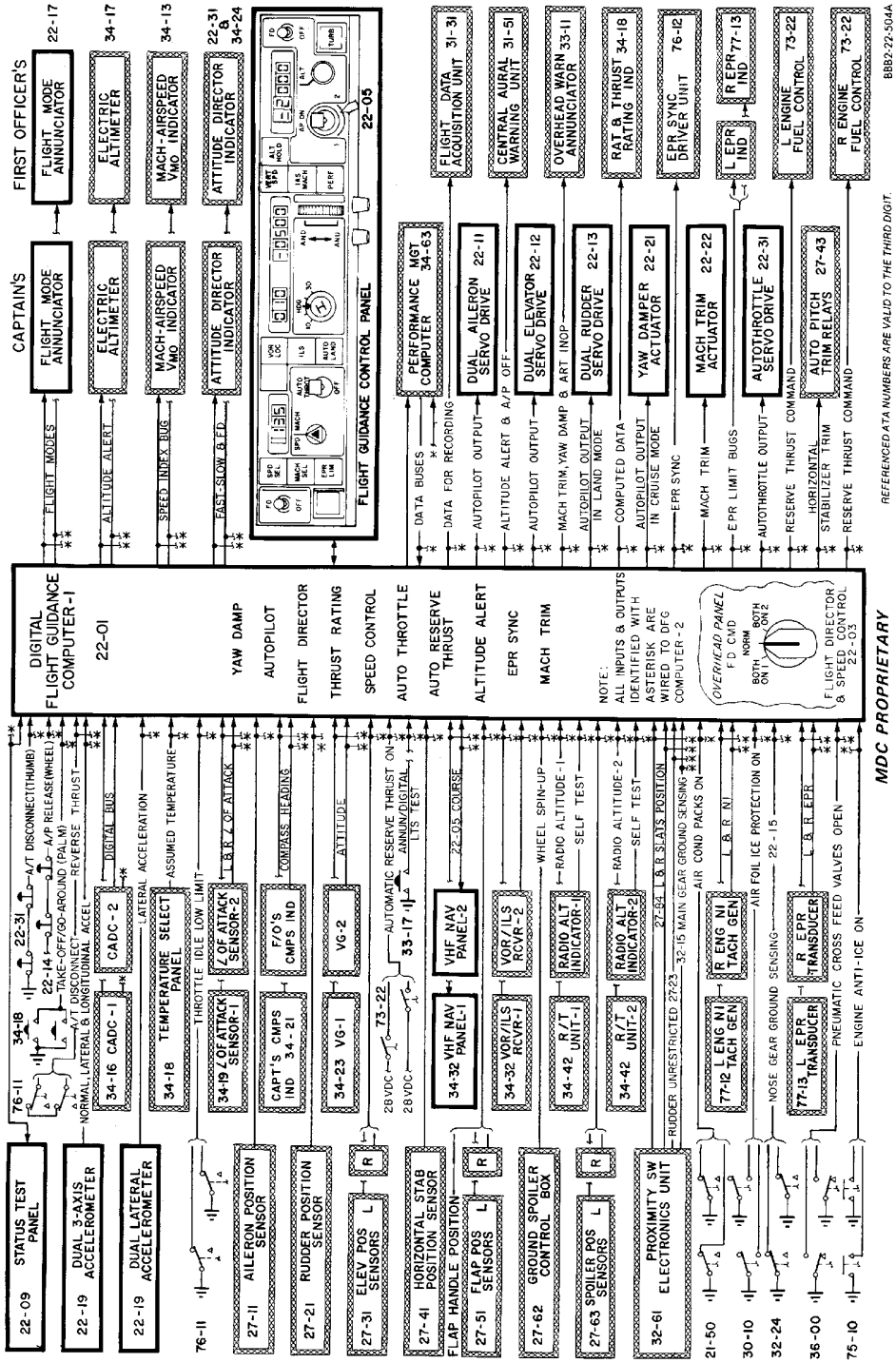
(SUBJECT 34-18-00)

The thrust rating computation accepts total air temperature, airspeed and altitude data from the CADC, engine transducers and engine bleed conditions to provide EPR limit data and NO MODE data for display on the TAT/Thrust Rating Indicator. Also, thrust rating computations provide engine-out logic and error signals between the highest EPR and the EPR limit to the autothrottle.

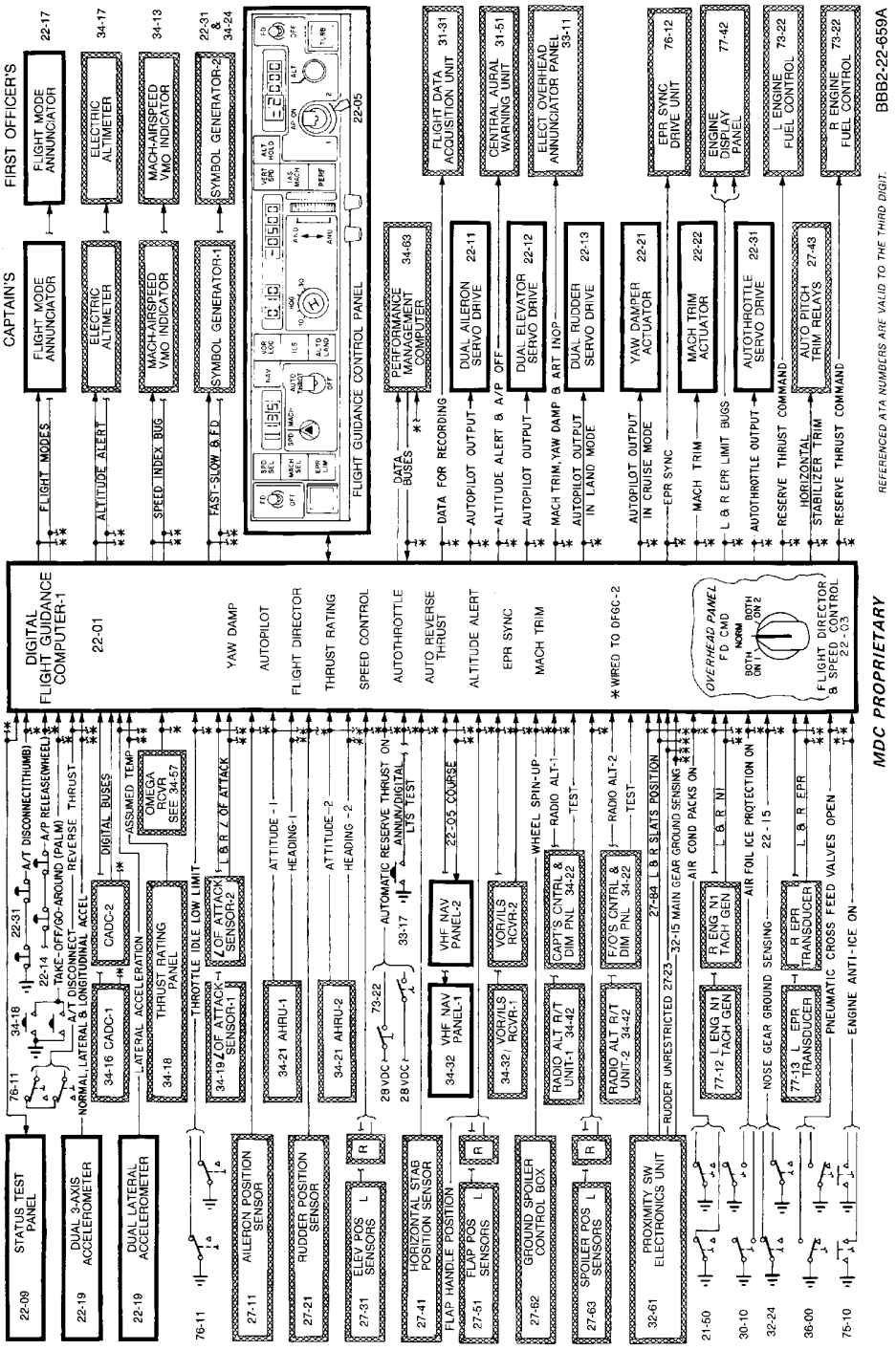
WJE 406, 410, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 886, 887, 891-893

(j) Altitude Advisory- . The altitude advisory function provides visual and aural cues to the flight crew upon approaching a pre-selected altitude, and deviation from a preselected altitude. (SUBJECT 34-17-00)

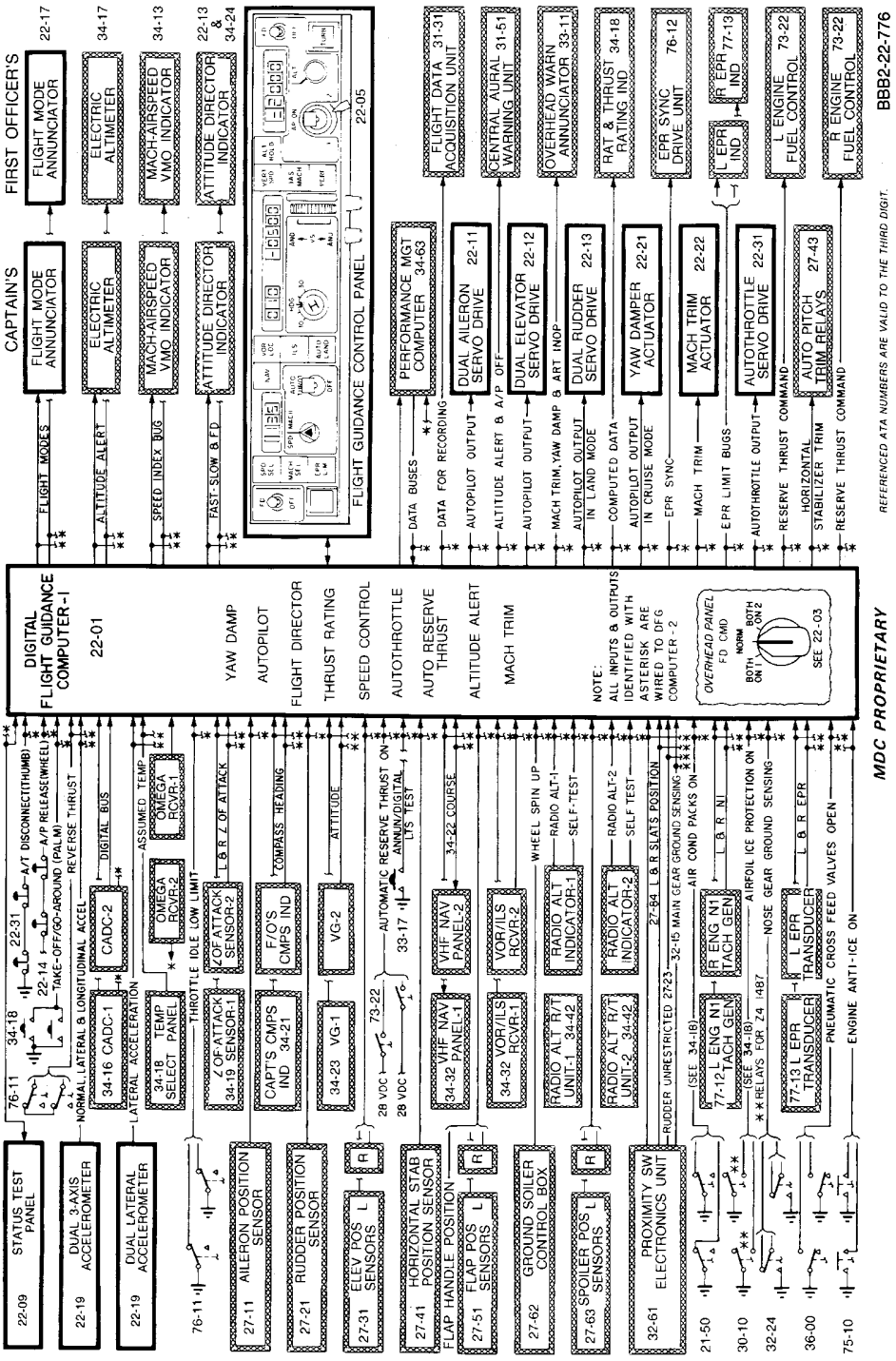
(k) EPR Synchronizer- The EPR Synchronizer utilizes the existing N_1/N_2 Engine Synchronizer actuator to provide adjustment of the left engine EPR to match the right engine EPR when the autothrottle is engaged in the EPR LIM mode and the ENG SYNC switch on the overhead panel is in the OFF position. (SUBJECT 76-11-02)



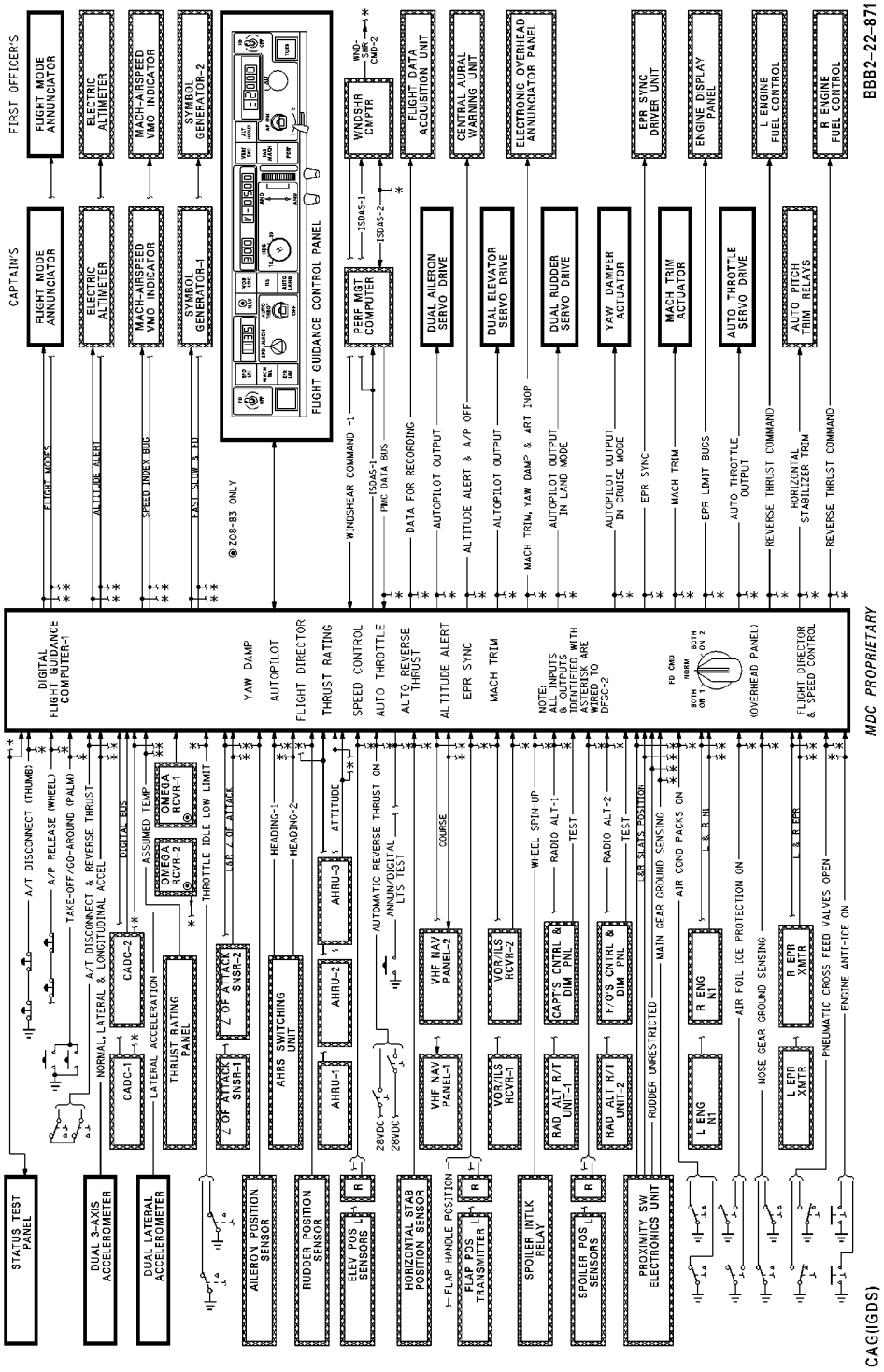
Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-907 (Sheet 1 of 6)



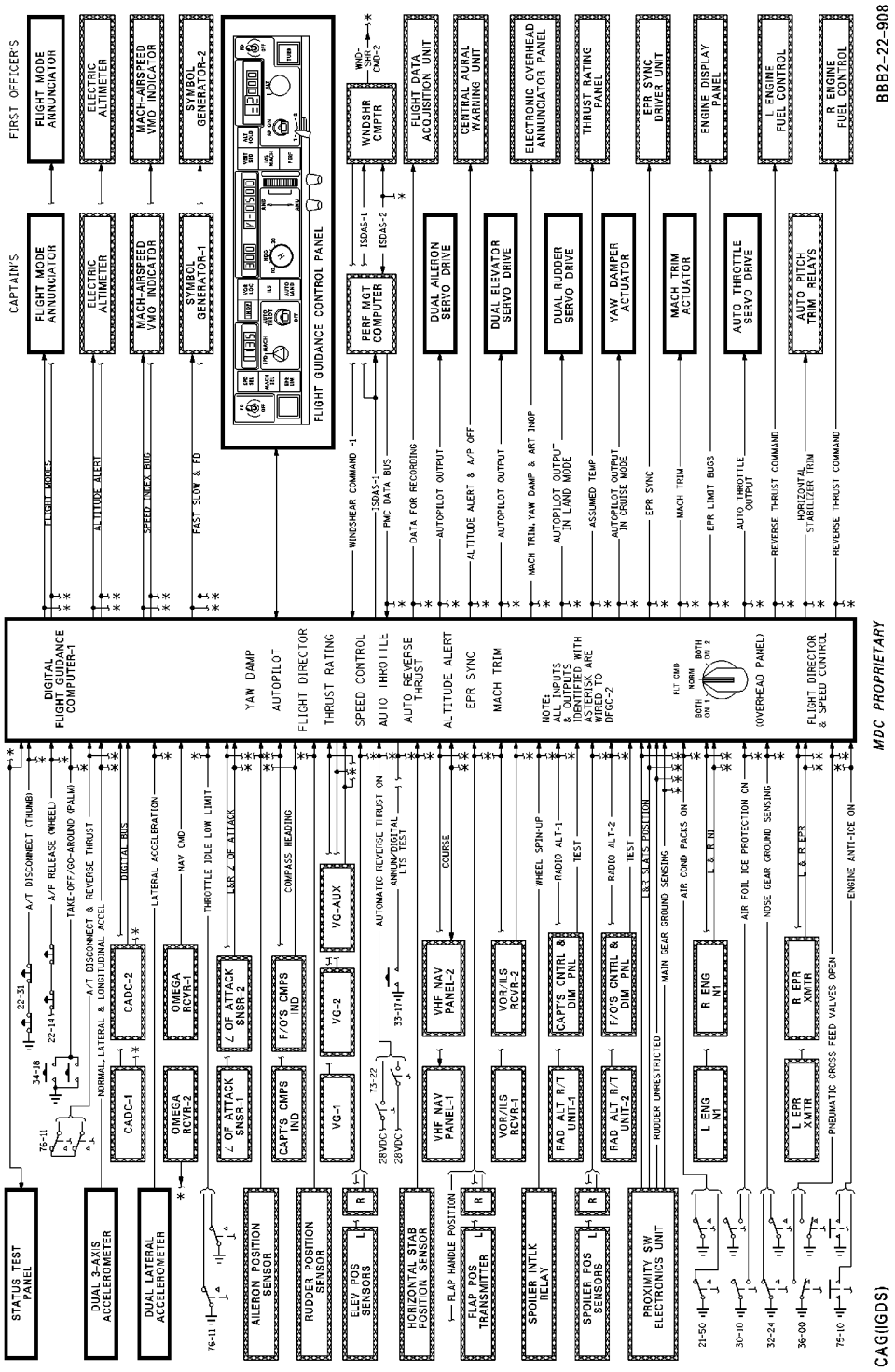
Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-907 (Sheet 2 of 6)



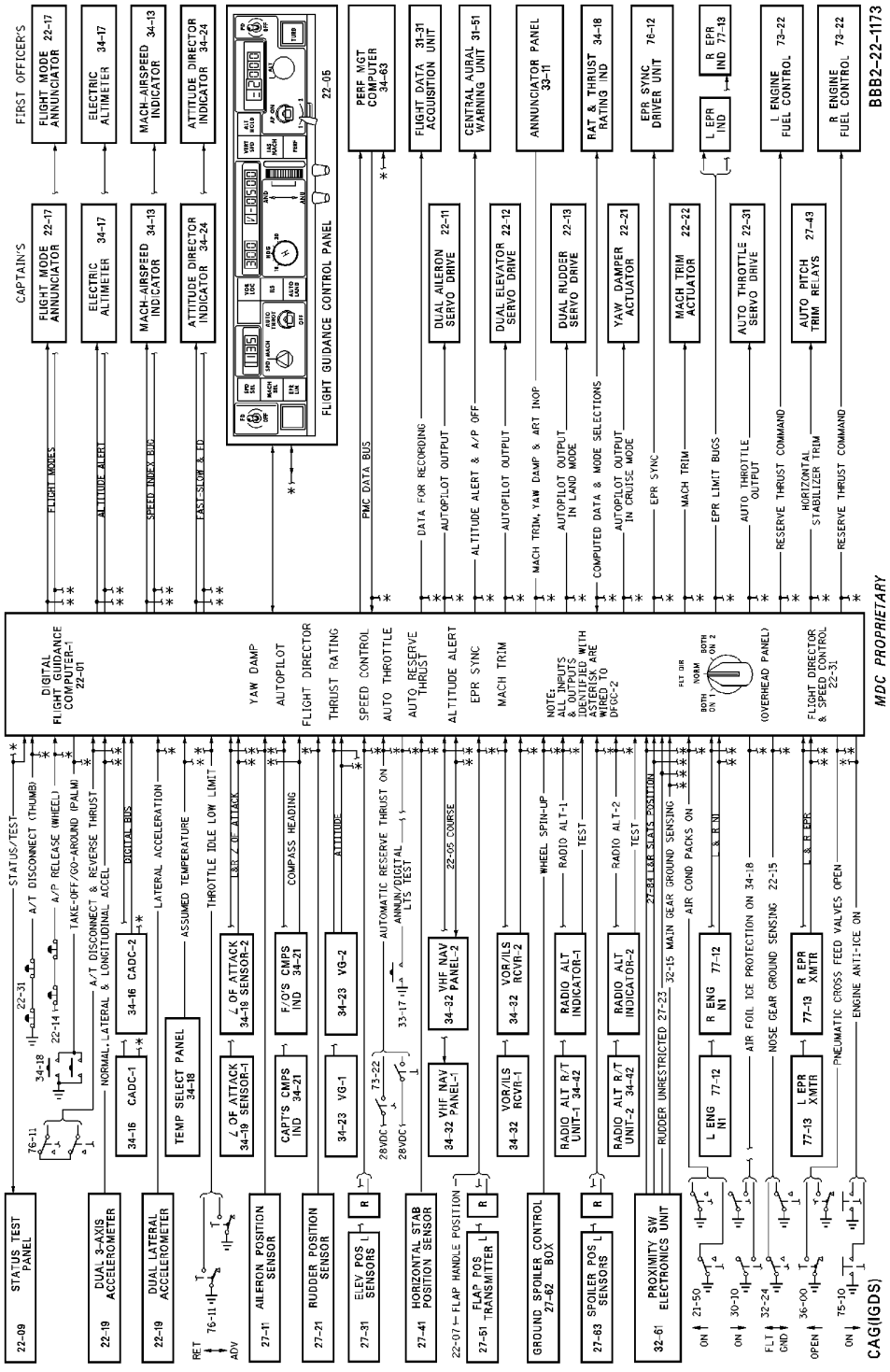
Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-907 (Sheet 3 of 6)



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-907 (Sheet 4 of 6)



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-907 (Sheet 5 of 6)



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-907 (Sheet 6 of 6)

DIGITAL FLIGHT GUIDANCE SYSTEM (DFGS) - DESCRIPTION AND OPERATION

1. General

A. There are two identical Digital Flight Guidance Systems in the aircraft. Each System is independent of the other, and only one is in command during operation. Each System is controlled by a separate Digital Flight Guidance Computer (DFGC). The other System (off-side) is continuously receiving and processing parallel input signals in event selection is required.

B. The Flight Management System (FMS) option, which is a fully selectable mode of the DFGS, is integrated with the DFGS to command pitch, roll and thrust during climb, cruise and descent. The FMS guidance commands are limited by DFGS restrictions for roll angle, roll rate, pitch angle, pitch rate, EPR command and throttle movement rate. The Advanced Flight Management Computer (AFMC) processes data from only one DFGC at a time. The DFGC data selected for processing depends on the status of the DFGS. In general, the selection is based on the following criteria, given in the order of descending priority: autopilot engagement, autothrottle engagement, and flight director engagement. The AFMC selects the engaged side, providing the associated data interface is active. Alternatively, if either 1) both flight directors only are engaged, or 2) none of the autopilots, autothrottles, or flight directors are engaged, then DFGC 1 is used. In the event that the selected side DFGC is not providing valid data, FMS engagement utilizing that channel is not possible. However, FMS engagement utilizing the alternative channel may be possible and should be attempted.

C. A switch located below the AP engage switch on the Flight Guidance Control Panel, labeled 1, 2, provides the capability for selection of either DFGC -1 or DFGC -2 for all functions except flight director. With Flight Director Switch in NORM position, an isolated output signal is provided from each System via the EFIS symbol generators, to the slow-fast pointers and flight director pitch and roll command displays located on the Primary Flight Displays (PFD's). When the flight director switch (on overhead panel) is operating in BOTH ON 1 or BOTH ON 2 position, both PFD's are driven from the selected computer regardless of position of the DFGC 1, 2 switch.

2. Digital Flight Guidance System (DFGS)

A. System Interface

(1) The Digital Flight Guidance System provides control data for various aircraft functions. These functions include:

(a) Autopilot (SUBJECT 22-10-00) . The autopilot functions are generated within the DFGC which automatically provides control of roll, pitch and yaw axis of the aircraft. Operationally, the autopilot controls the aircraft attitude, heading, altitude, airspeed, or flight path as required by the selected mode of operation. In addition, the autopilot also provides stability augmentation.

(b) Flight Director (SUBJECT 22-10-00). The flight director displays visual commands for the flight crew to manually control the aircraft heading and attitude, through pitch and roll steering commands generated within the AFMC/DFGC's, then transmitted via data buses to the EFIS symbol generators and then to the captains and first officers PFD's.

(c) Yaw Damper (SUBJECT 22-13-00). The yaw damper function utilizes yaw rate derived from accelerometers to provide damping of the airplane dutch roll characteristics. When the localizer is captured, yaw damper provides automatic turn coordination through rudder control to minimize lateral acceleration during all lateral/directional maneuvers. The yaw damper is engaged any time the autopilot is on, or the yaw damper switch is in the ON position.

(d) Mach Trim (SUBJECT 22-22-00). Mach trim compensates for pitching moments generated as a function of mach number. The function utilizes mach number output from the CADC to generate a servo command that positions a linear actuator which repositions the control column to counteract nose down trim during high mach number.

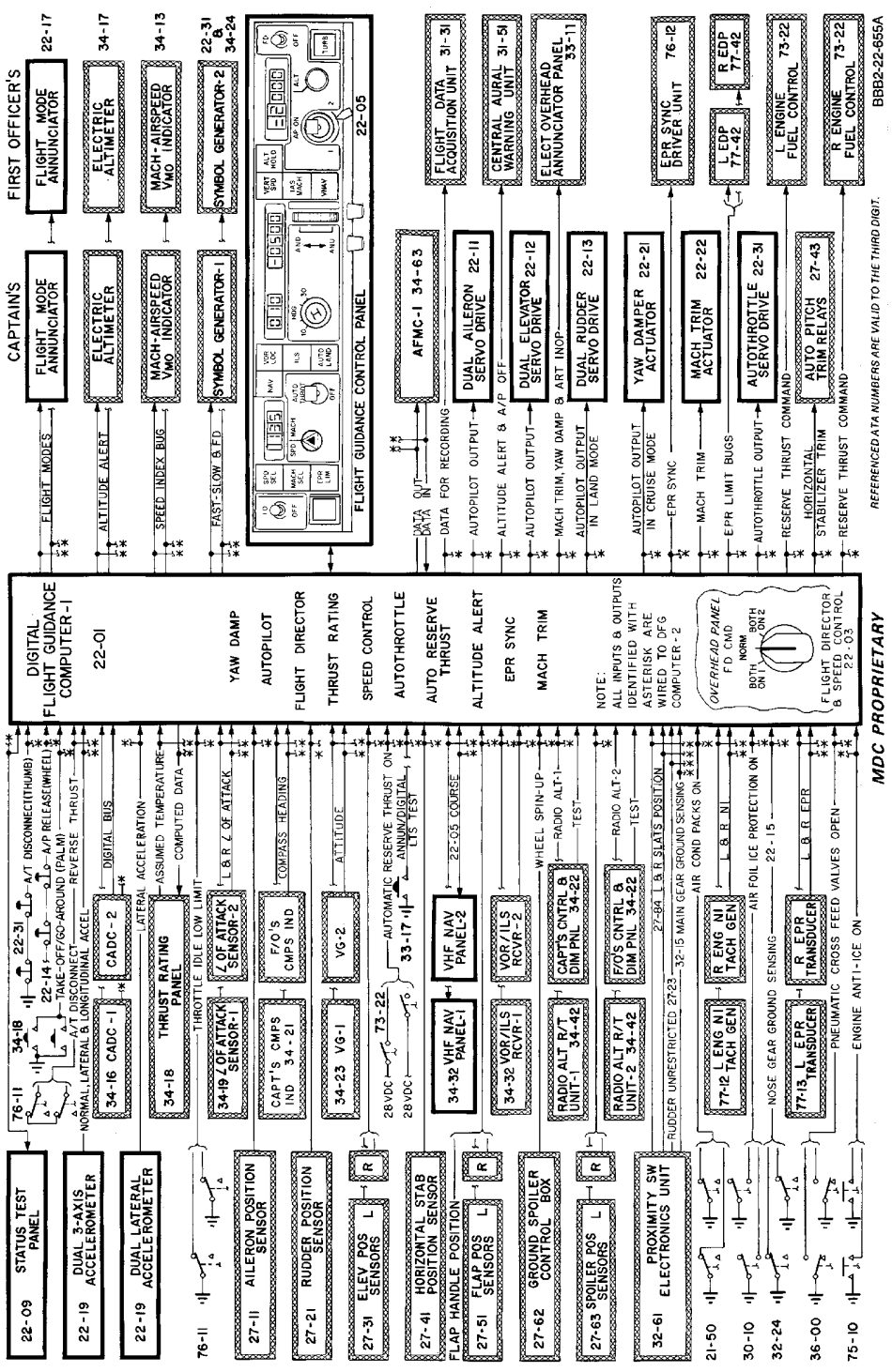
(e) Autothrottle/Speed Control (SUBJECT 22-31-00). The autothrottle/speed control (AT/SC) system provides control of speed/mach/thrust throughout the takeoff, flight and landing phases of airplane operations.

(f) Auto Reserve Thrust (PAGEBLOCK 73-20-00/101). The auto reserve thrust (ART) function detects engine failures during take-off by monitoring engine parameters. When an engine failure is detected, ART provides a signal to the fuel controllers on both engines which will increase thrust to the full certified value.

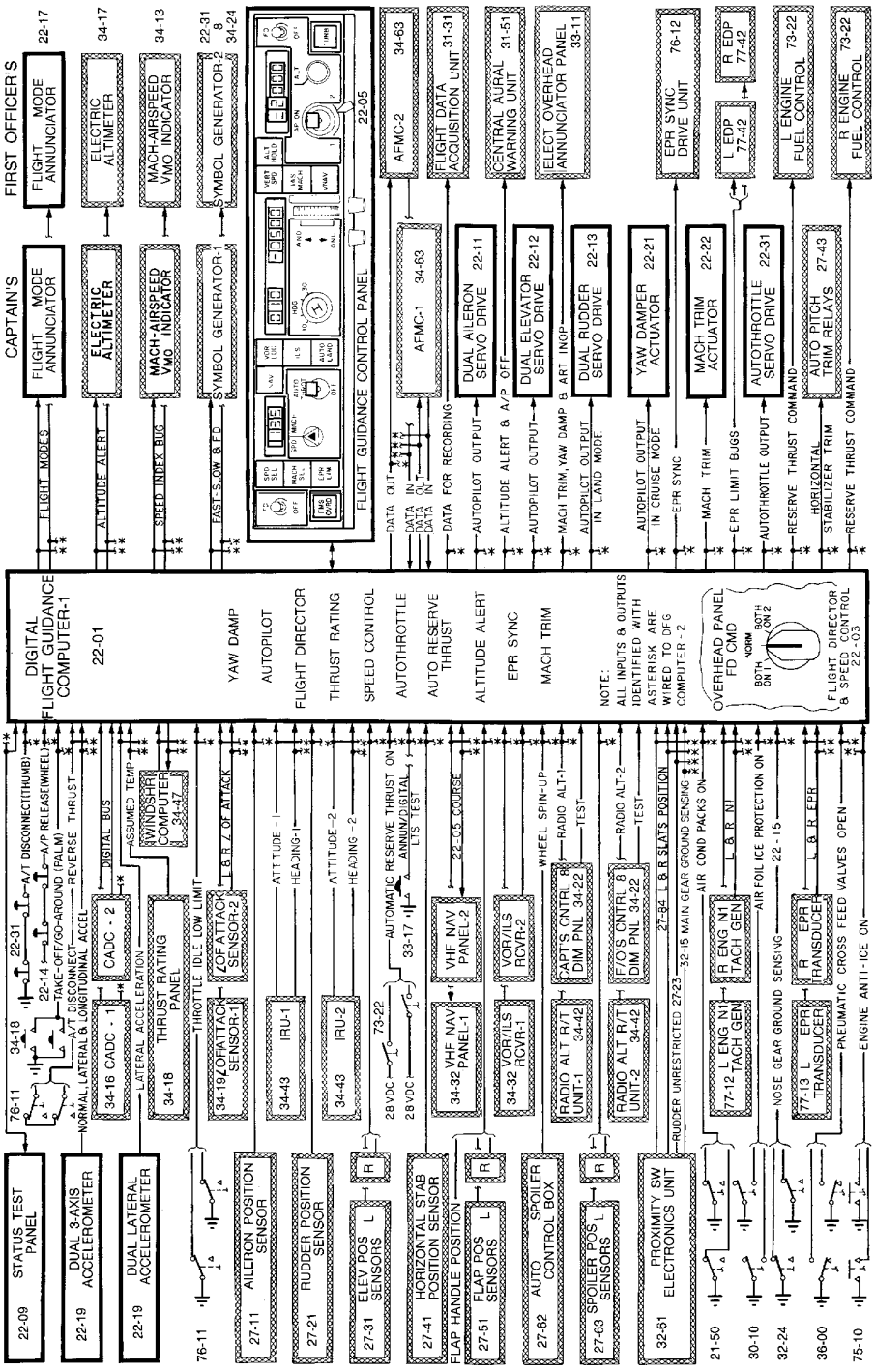
(g) Thrust Rating Scheduled Computations (SUBJECT 34-18-00). The thrust rating computation accepts total air temperature, airspeed and altitude data from the CADC, engine transducers and engine bleed conditions to provide EPR limit data for display on the TAT/Thrust Rating Indicator. Also, thrust rating computations provide engine-out logic and error signals between the highest EPR and the EPR limit to the autothrottle. NO MODE will be displayed if an illegal condition occurs (i.e., wrong bleed configuration, no RAT input, etc.).

(h) Altitude Advisory (SUBJECT 34-17-00). The altitude advisory function provides visual and aural cues to the flight crew upon approaching a pre-selected altitude, and deviation from a preselected altitude.

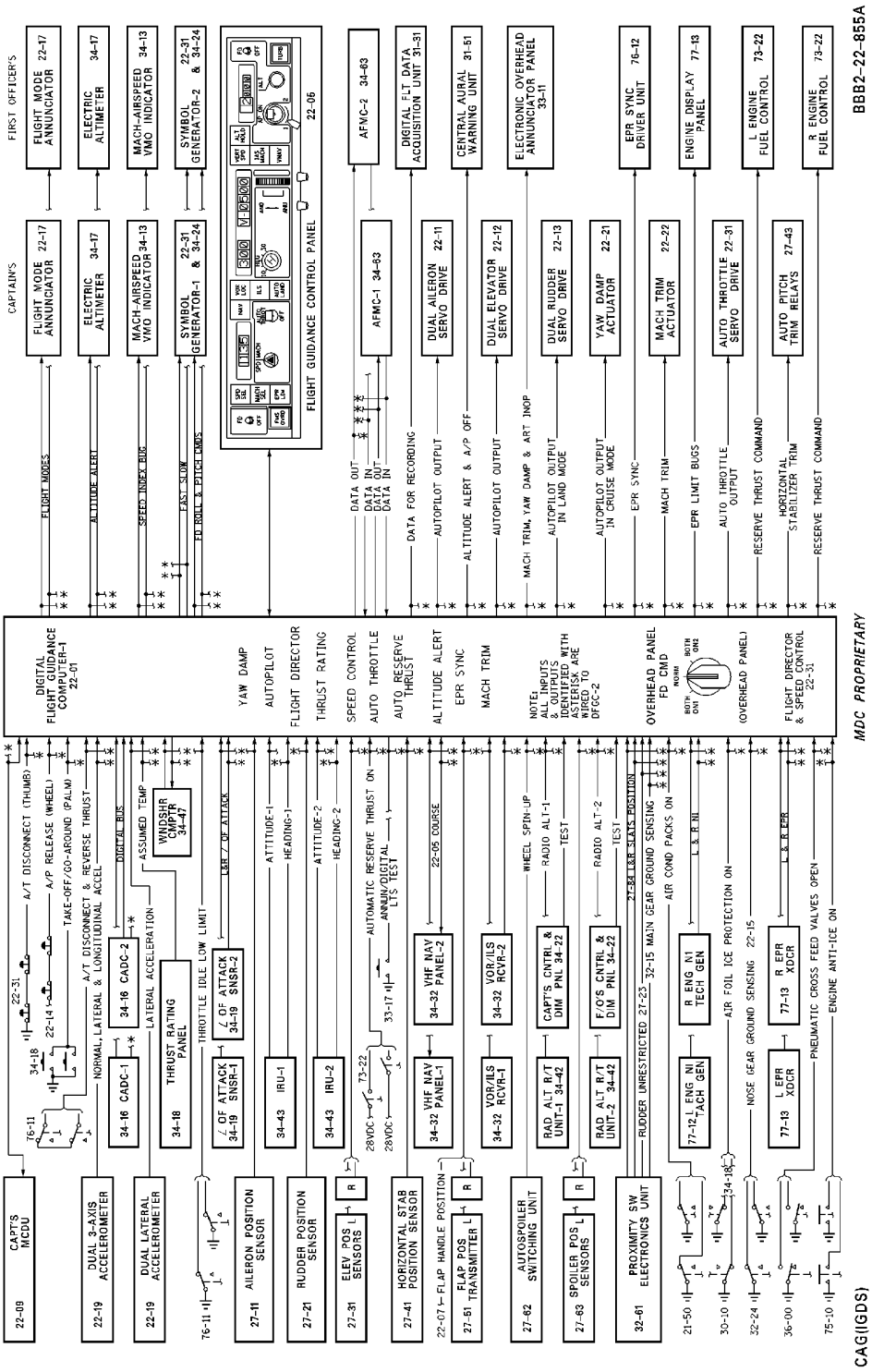
(i) EPR Synchronizer (SUBJECT 76-11-02). The EPR Synchronizer utilizes the existing N_1/N_2 Engine Synchronizer actuator to provide adjustment of the left engine EPR to match the right engine EPR when the autothrottle is engaged in the EPR LIM mode and the ENG SYNC switch on the overhead panel is in the OFF position.



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-908 (Sheet 1 of 3)



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-908 (Sheet 2 of 3)



Digital Flight Guidance System (DFGS) - Simplified Schematic
Figure 1/22-01-00-990-908 (Sheet 3 of 3)

DIGITAL FLIGHT GUIDANCE SYSTEM (DFGS) - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing Digital Flight Guidance System (DFGS) trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The DFGS may be also verified by use of the Maintenance or Return-To-Service tests. (SUBJECT 22-01-05, Page 201)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing Digital Flight Guidance System (DFGS) trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The DFGS may be also verified by use of the Maintenance or Return-To-Service tests. (SUBJECT 22-01-05, Page 201)

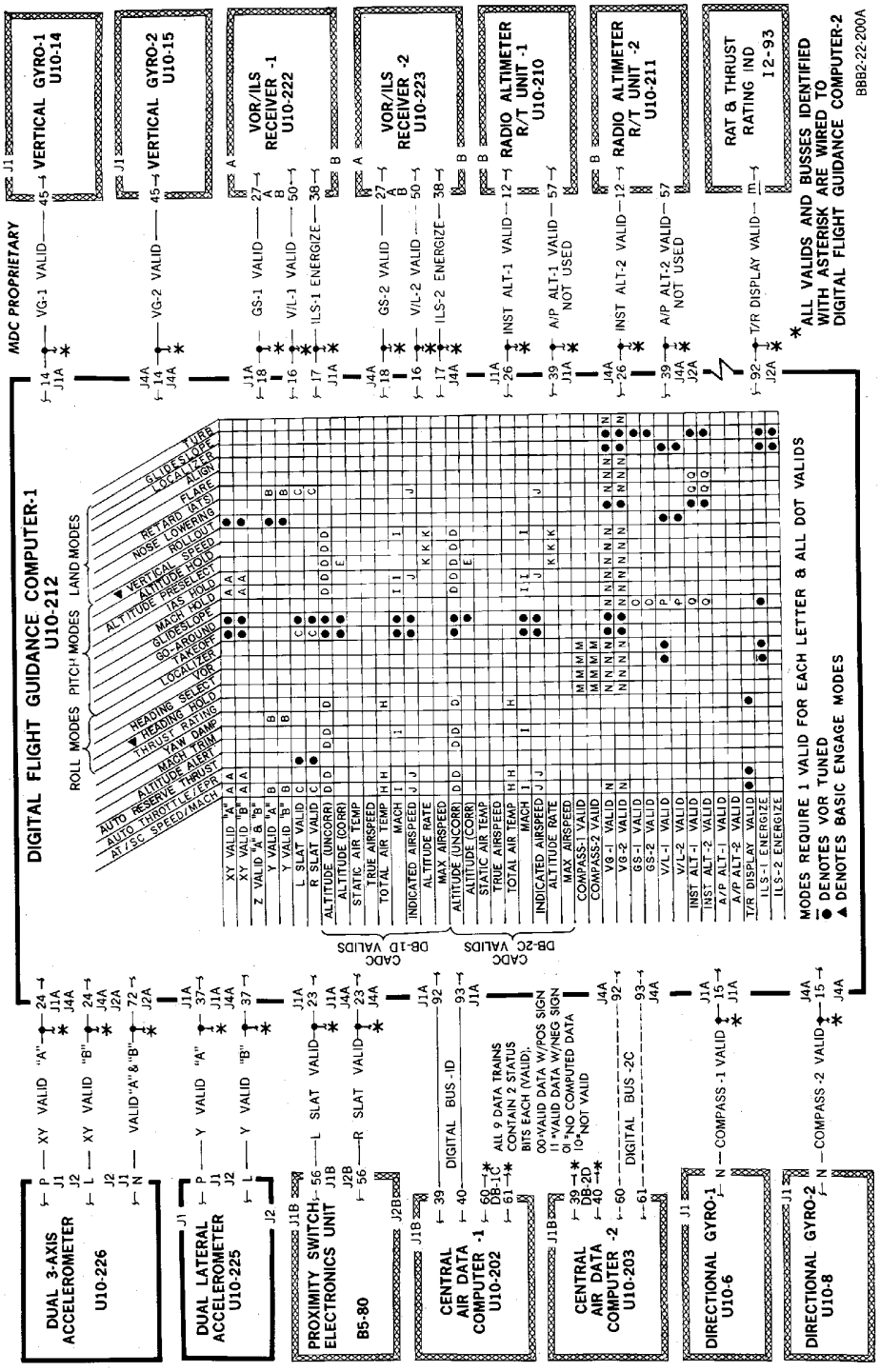
C. Prior to performing Digital Flight Guidance System (DFGS) trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on the forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The DFGS may be also verified by use of the Maintenance or Return-To-Service tests. (SUBJECT 22-01-05, Page 201).

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

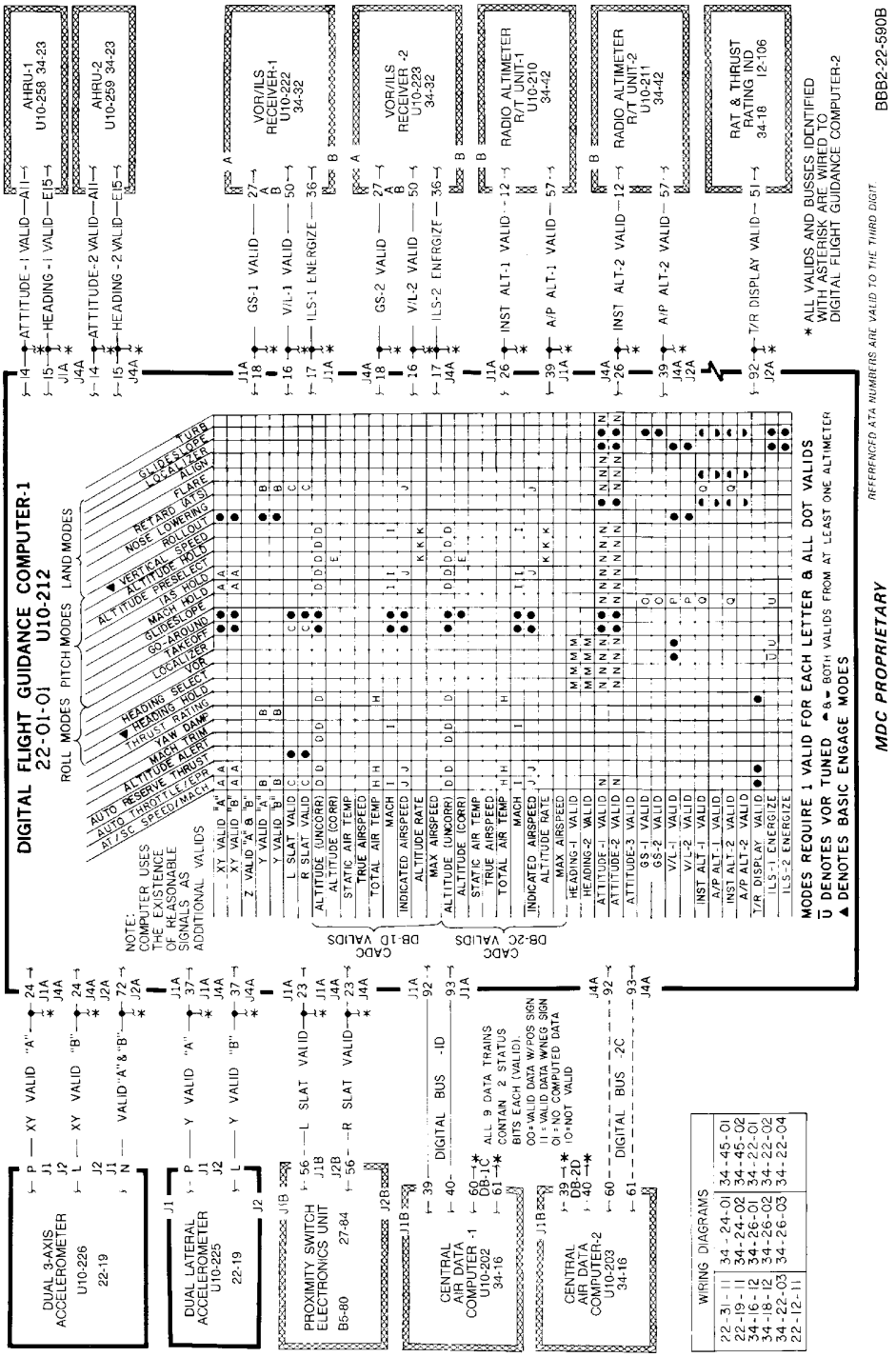
D. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on DFGC is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to DFGC and associated system interface.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

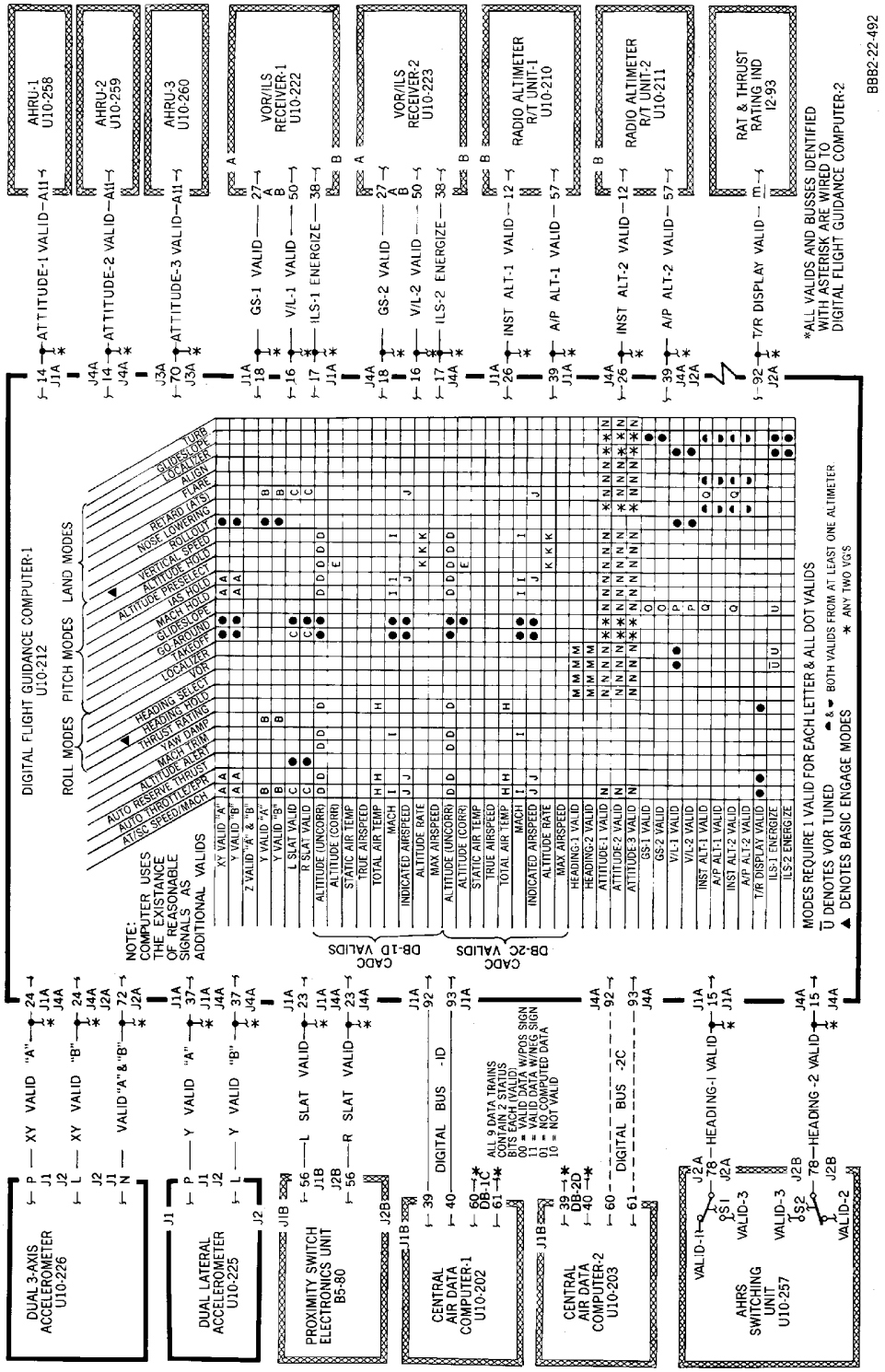
E. Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on DFGC is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to DFGC and associated system interface.



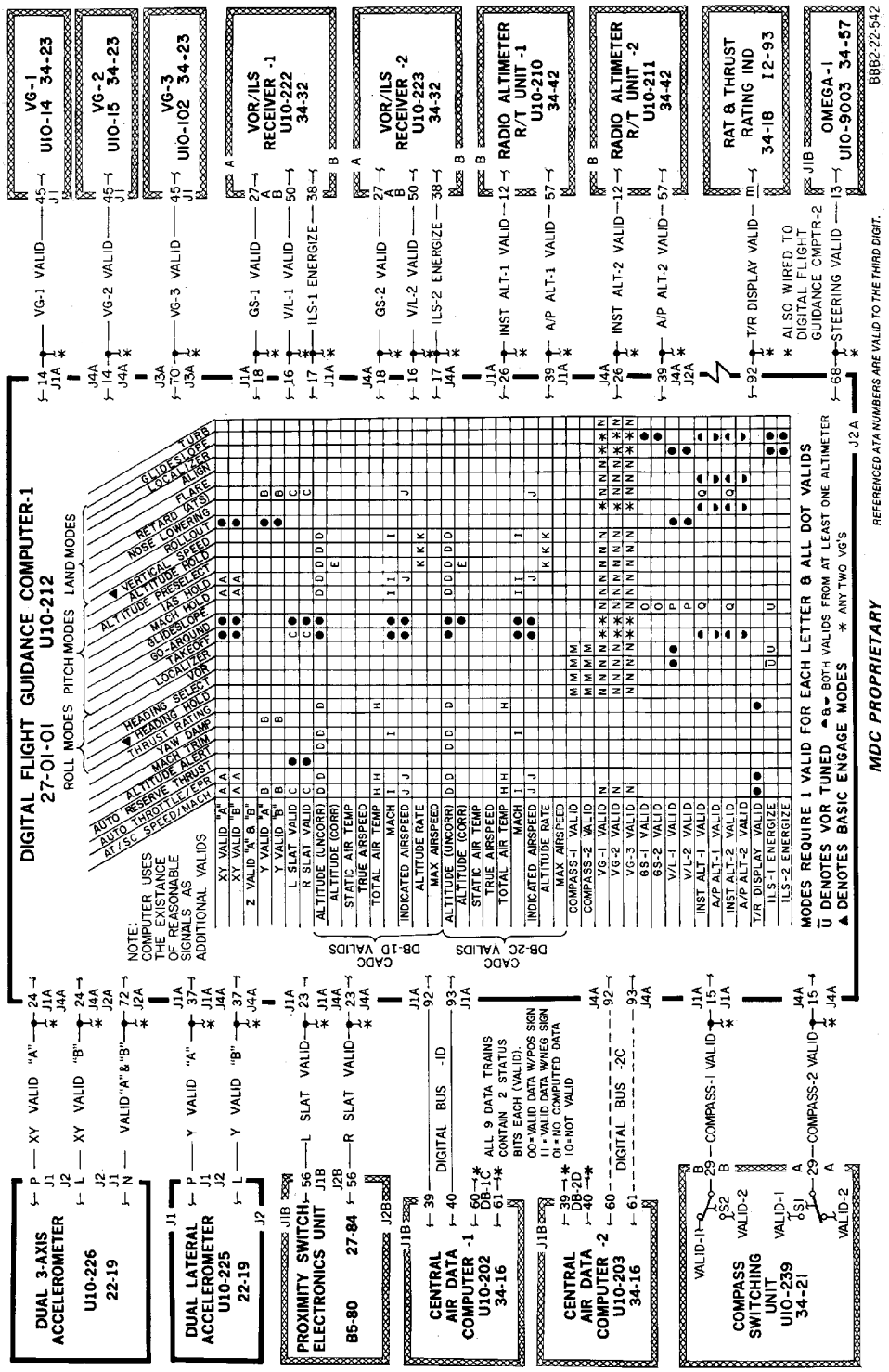
DFGC Input Valids
Figure 101/22-01-00-990-852



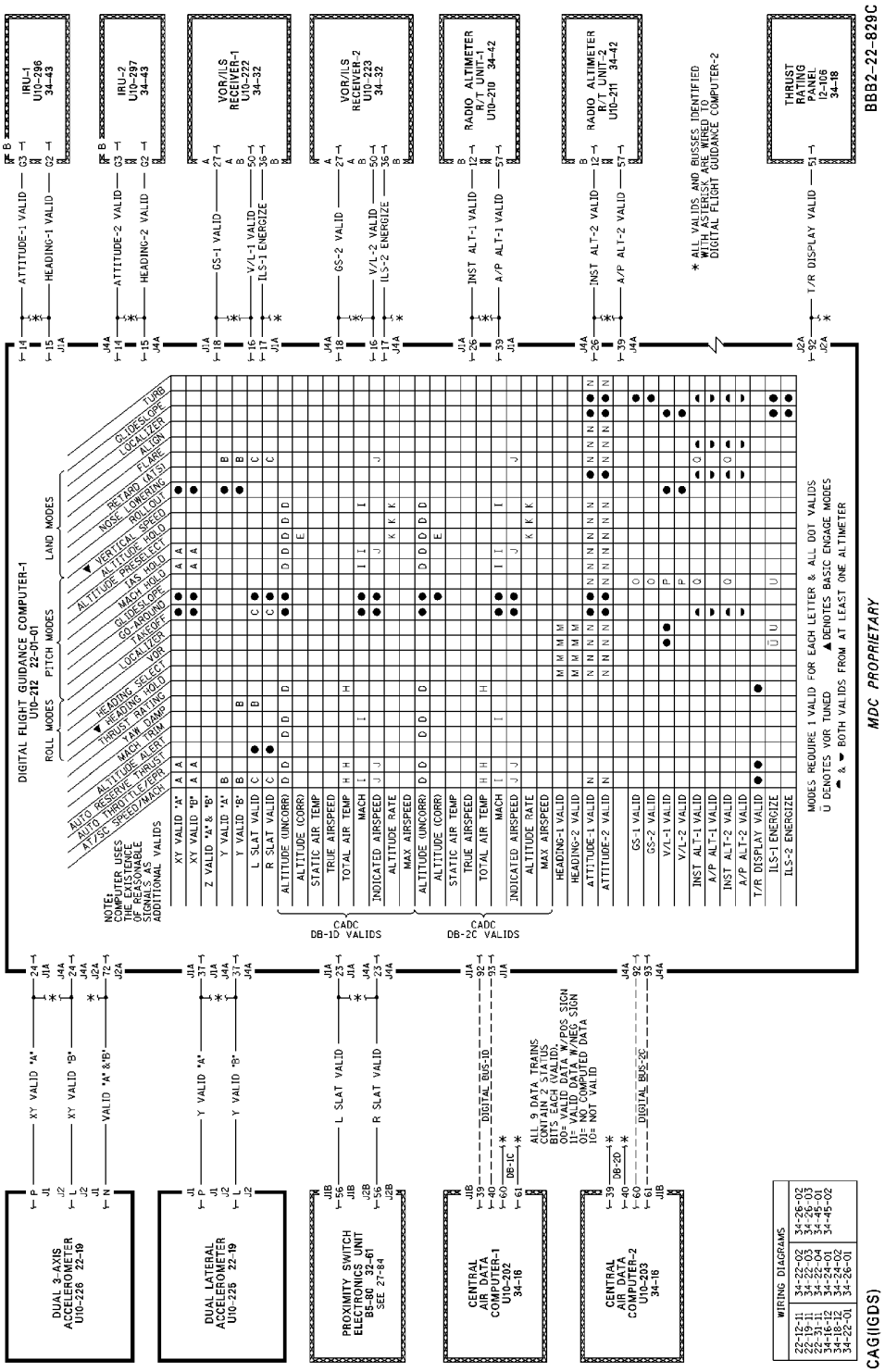
DFGC Input Valids
Figure 102/22-01-00-990-853



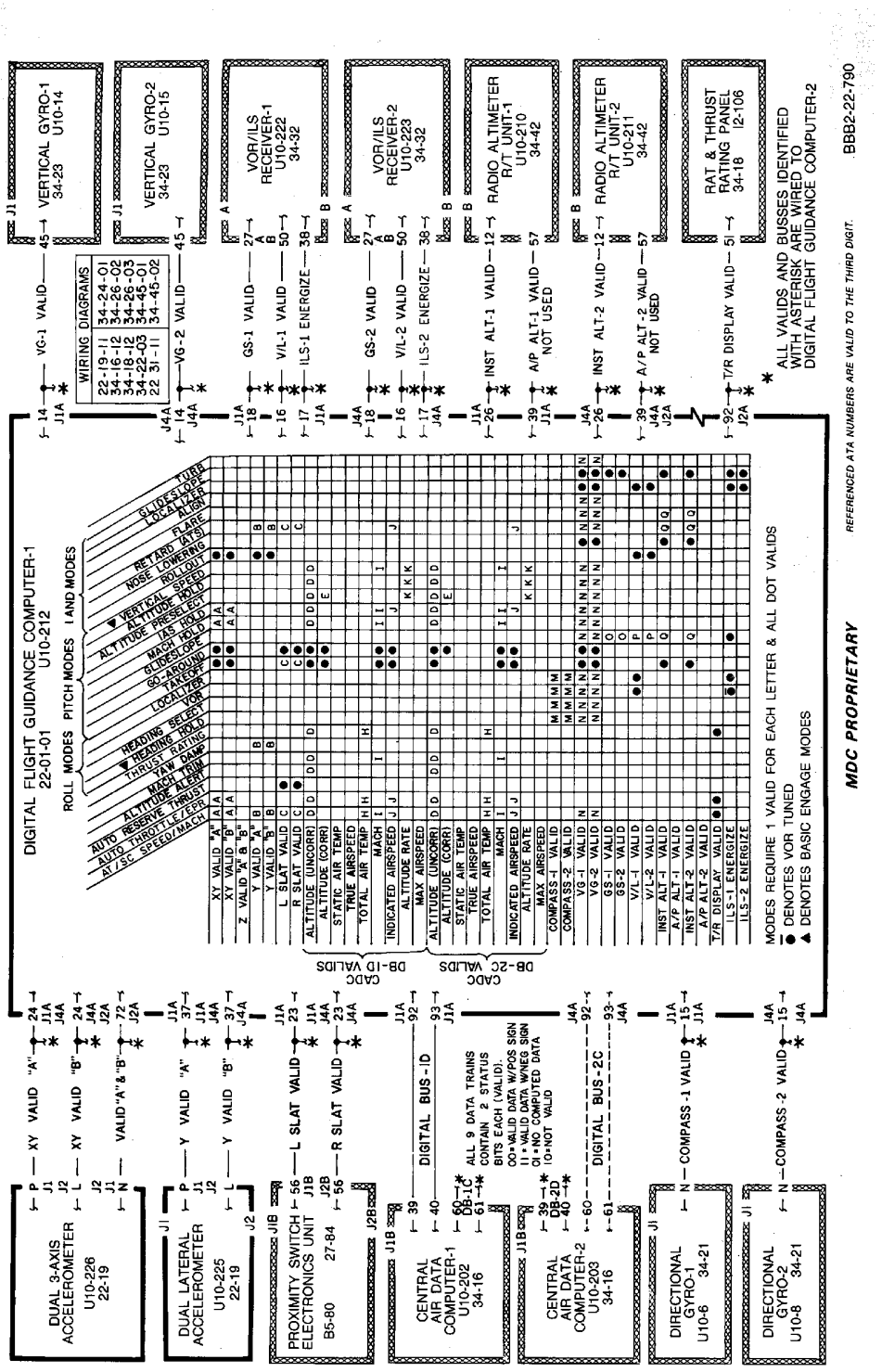
DFGC Input Valids
Figure 103/22-01-00-990-854



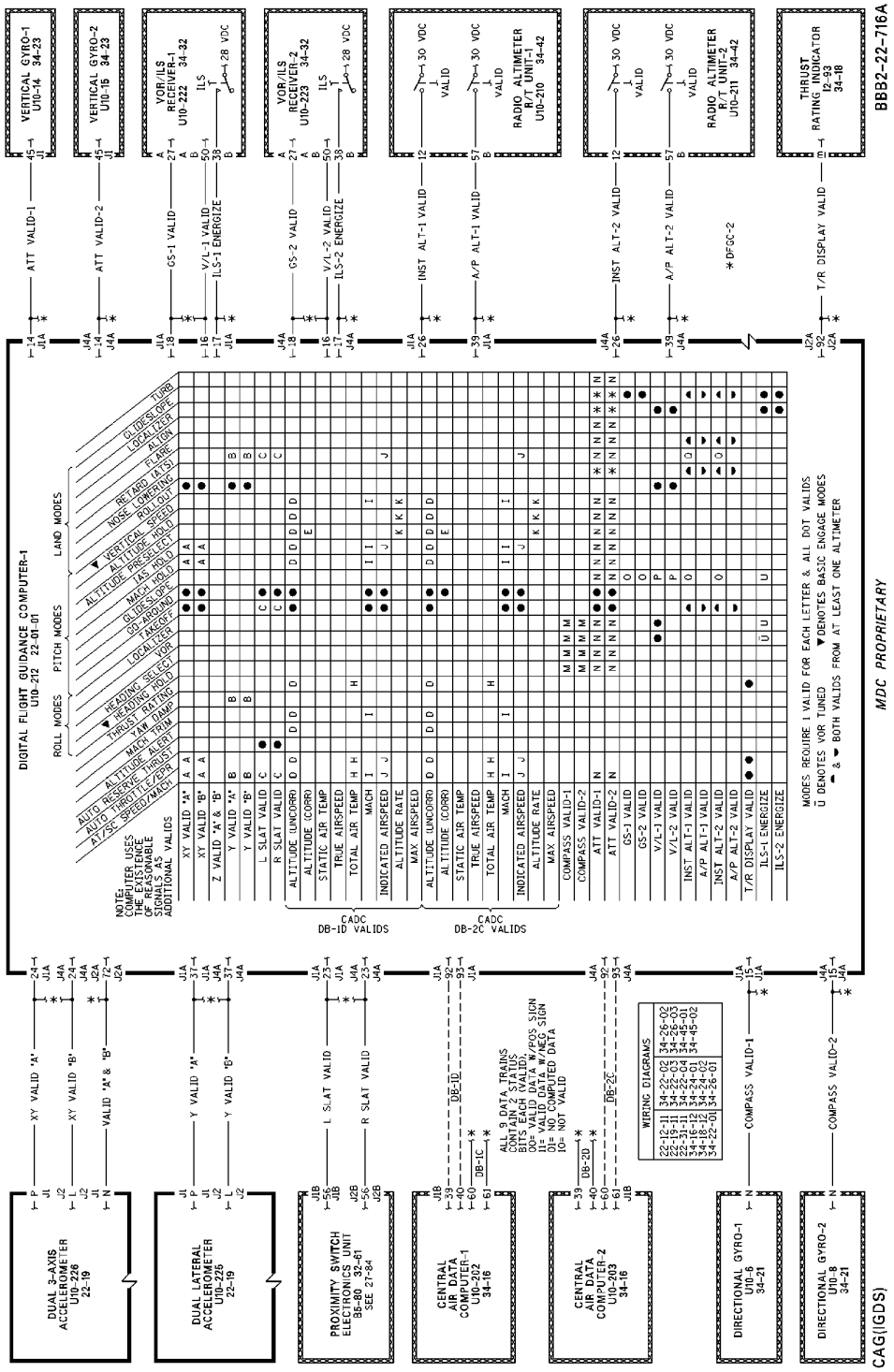
DFGC Input Valids
Figure 104/22-01-00-990-858



DFGC Input Valids
Figure 105/22-01-00-990-859



DFGC Input Valids
Figure 106/22-01-00-990-860



DFGC Input Valids Figure
Figure 107/22-01-00-990-861

▲ = DENOTES BASIC ENGAGE MODES.

1 = AT LEAST 1 VALID SENSOR IS REQUIRED.

2 = 2 VALID SENSORS ARE REQUIRED.

5 = 2 >20°

6 = 2 >24°

7 = 2 <24°

8 = 1 <50 FT

A = LEFT SENSOR FOR LEFT OR RIGHT SENSOR FOR RIGHT COMPUTER (CAT I ONLY).

B = LOC B4 GS REQUIRED.

B = RUDDER

REA = RUDDER, ELEVATOR & AILERON SERVO VALIDS.

RET = RETRACT

◯ = REQUIRED UNDER CERTAIN CONDITIONS.

– = LOGICAL NOT, i.e. THE INVERSE STATE IS REQUIRED.

A VALID SENSOR IS ONE WHICH WHERE APPLICABLE:

- HAS A DISCRETE VALIDITY WHICH IS VALID (SEE SHEET 1).
- HAS A SYNCHRO WHICH HAS NOT FAILED.
- HAS A REASONABLE VALUE FOR THE AIRCRAFT CONDITION.
- AGREES WITH THE OTHER SIDE FOR A DUAL SENSOR PAIR, AS APPROPRIATE TO THE DFGC MODE.
- ⊕ EITHER AN AUTOPILOT OR FLT DIRECTOR ON IS REQUIRED FOR PERF MODE.

BACK COURSE SAME AS CAP LOCALIZER.

* = PARALLEL RUDDER ENGAGE AVAILABLE WITH ENGINE OUT.

ATTENTION:
IF AIRCRAFT IS PARKED WITH WINGS TILTED, ALLOW CLOSE TO A MAGNETIC DISTURBANCE, COMPASS HEADINGS -1 & -2 MAY DISAGREE; AUTOPILOT AND FLIGHT DIRECTOR WILL NOT OPERATE UNTIL HEADINGS AGREE ±6°.

BBB2-22-443D

ATA NO.		PERF A/T, A/P, FD	EPR SYNC	SPEED VALID	AT/SC SP/MACH	AUTO THROT/EPR	AUTO RSV THR	A/T EPR T/O	MACH TRIM	⊕ AUTO C/A	▲ HDG HOLD	HDG SELECT	VOR	CAP LOC	FD TAKEOFF	GO-AROUND	GLS/G/S	MACH HOLD	IAS HOLD	ALT PRESEL	ALT HOLD	▲ VERT SPD	VNAV FMS	ROLLOUT	NOSE LOWERING	RETARD (ATS)	FLARE	ALIGN	LOCALIZER	GLIDESLOPE	FD TURB/AP TURB	FLT DIR VALID	AUTOLAND ENGAGE	PITCH TRIM	ILS ARM	ALTITUDE ALERT	YAW DAMPER	PARALLEL RUDDER
22-02	ASSOC FGC PANEL SYNCHRO																																			
22-07	HORIZONTAL STAB POSITION											1																								
22-07	FLAP/SLAT HANDLE POSITION			(1)	(2)			1			(1)					(1) (A)									(1)											
22-07	FLAP POSITION			(2)	(2)						<3° 6					7 6										5										
22-07	RUDDER POSITION		1																		1							1	1						(1)	
22-07	SPOILER POSITION																																			
22-06	NOT TO/GA MODE		1																									1								
22-11	VALID SVO'S RUD, ELEV, AIL, MT, YD		*									MT REA												REG	REA	REA		REA							YD	R
22-14	A/P ENGAGED			1	1	1	1					1												1	1	1		1	1							1
22-19	LONGITUDINAL ACCELERATION "X"		1													2	1		1	1				2		1	2		2			2				
22-19	NORMAL ACCELERATION "Z"		1									1				1	1	1	1	1	1			2		1	2		2			2				
22-19	LATERAL ACCEL "Y" (FWD)		1									2												2					2			2			1	2
22-19	LATERAL ACCEL "Y" (AFT)		1									2												2					2			2			1	2
22-31	ANGLE OF ATTACK											2				2	1									1			2							
27-23	RUDDER UNRESTRICTED				1																															
27-61	WHEEL SPIN-UP											2																								
27-84	SLAT VALID & POSITION		1		1	1	1	1	1			50	RET	1			1		1	1				(1) (X) (2)												
32-15	WEIGHT ON WHEELS		1	–	1	1	1	1	1			1		–			1		1	1				1												
32-24	GROUND SENSING		1	–	1	1	1	1	1			1		–			1		1	1				(2) 2					1				2 2			
22-07	AILERON POSITION																																			
34-16	ELEVATOR POSITION																																			
C	ALTITUDE (UNCORR)		1	1	1	1	1			1								1			1	1	1					2						1		
A	ALTITUDE (CORR)		1																		1															
D	TOTAL AIR TEMP		1	1	1	1			2							1	2	1	1	1	1	1														
C	MACH		1	1	1				1			1					2	1		1	1	1														
	INDICATED AIRSPEED		1	–	1	1			1			1					2	1		1	1	1														
	ALTITUDE RATE		1																		1															
	MAX AIRSPEED																																			
	STATIC AIR TEMP		1		T		T																													
	TRUE AIRSPEED		1																																	
34-18	APPROPRIATE T.R. IND MODE		1	1			1		1																											
34-18	BLEED CONDITION		1				1		1																											
34-18	THRUST RATING DISPLAY VALID		1				1		1																											
34-21	HEADING OR COMPASS SYSTEM		1									2	1	1	1	1																			2	
34-22	HEADING ERROR				1								1																							
34-23	ATTITUDE (ROLL & PITCH)		1		1							2	1	1	1	1	2	1	1	1	1	1	1	1	2		1	2	2	2	1	2	2	2			
22-31	AUTO THROTTLE ENGAGED		1	(1)		1	1		1			1													1											
34-32	GLIDESLOPE											(A)									(A)	A						2	2			(2)	2			
34-32	LOCALIZER											2											B					2	2			(2)	2			
34-32	VOR																				A															
34-32	ILS ENERGIZE																				A	1						2	2	2		2		A		
34-32	COURSE																				A	A						2	2			(2)	2			
34-42	INST RADIO ALTITUDE											1					1		1	1	1							2	2			2	1			2
34-63	PMC GROSS WEIGHT ENTERED		1																									2	2							
73-31	FUEL FLOW		2																																	
77-12	ENGINE N1		2	2	2	2	2	2	2																											
77-13	ENGINE PRESSURE RATIO		1	(2)	2	2	2																													

CAG(IGDS)

MDC PROPRIETARY

BBB2-22-443D

DFGC Validity Requirements
Figure 108/22-01-00-990-873

▲ = DENOTES BASIC ENGAGE MODES.

1 = AT LEAST 1 VALID SENSOR IS REQUIRED.

2 = 2 VALID SENSORS ARE REQUIRED.

5 = 2 > 20°

6 = 2 > 24°

7 = 2 < 24°

8 = 1 < 60 FT

A = LEFT SENSOR FOR LEFT OR RIGHT SENSOR FOR RIGHT COMPUTER (CAT I ONLY).

B = LOC B4 GS REQUIRED.

B = RUDDER

REA = RUDDER, ELEVATOR & AILERON SERVO VALIDS.

RET = RETRACT

◯ = REQUIRED UNDER CERTAIN CONDITIONS.

- = LOGICAL NOT, i.e. THE INVERSE STATE IS REQUIRED.

A VALID SENSOR IS ONE WHICH WHERE APPLICABLE:

- HAS A DISCRETE VALIDITY WHICH IS VALID (SEE SHEET 1).
- HAS A SYNCHRO WHICH HAS NOT FAILED.
- HAS A REASONABLE VALUE FOR THE AIRCRAFT CONDITION.
- AGREES WITH THE OTHER SIDE FOR A DUAL SENSOR PAIR, AS APPROPRIATE TO THE DFGC MODE.
- ⊛ EITHER AN AUTOPILOT OR FLT DIRECTOR ON IS REQUIRED FOR FMS VNAV MODE.

BACK COURSE SAME AS CAP LOCALIZER.

✳ = PARALLEL RUDDER ENGAGE AVAILABLE WITH ENGINE OUT.

ATTENTION:
IF AIRCRAFT IS PARKED WITH WING TO FLUX VALVE CLOSE TO A MAGNETIC DISTURBANCE, COMPASS HEADINGS -1 & -2 MAY DISAGREE; AUTOPILOT AND FLIGHT DIRECTOR WILL NOT OPERATE UNTIL HEADINGS AGREE ±6°.

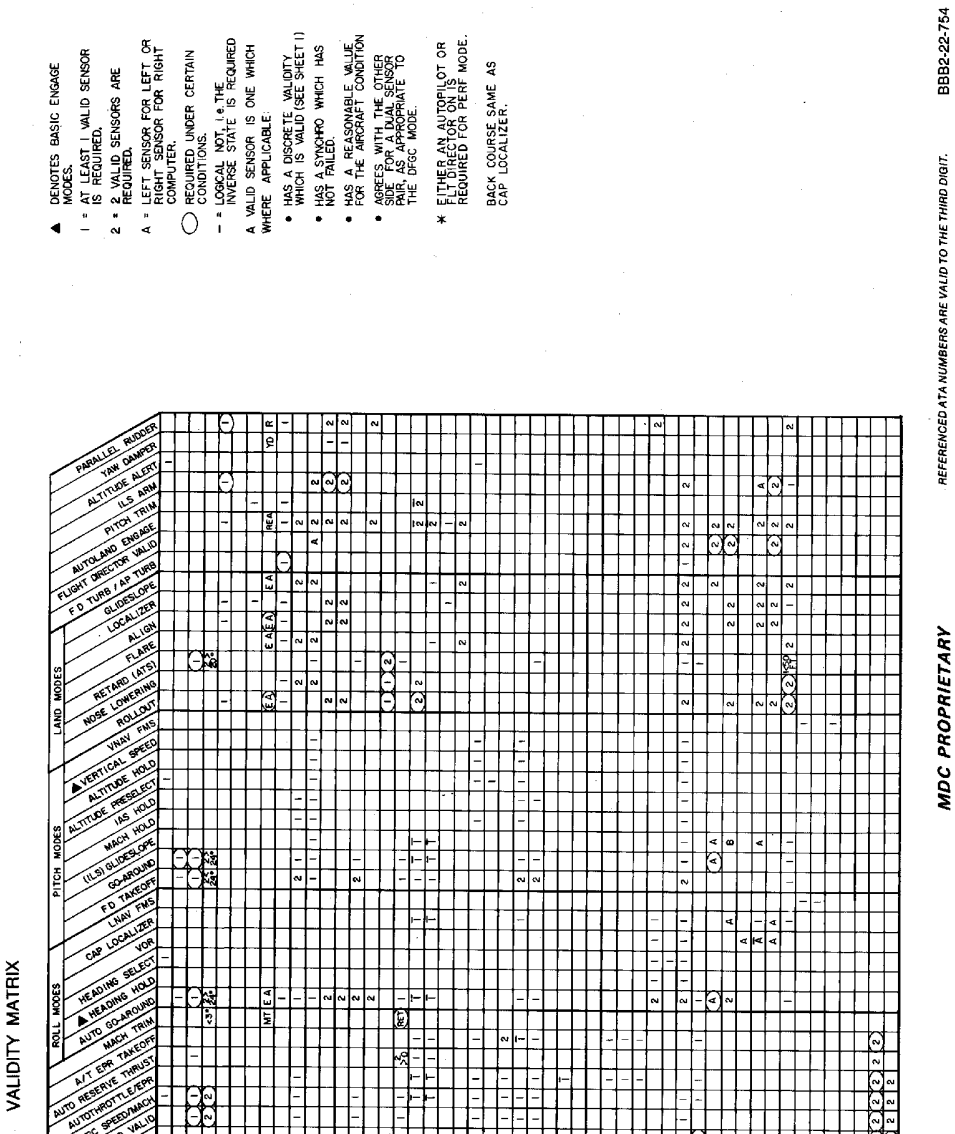
BBB2-22-852B

ATA NO.		VNAV A/T, A/P, FD	EPR SYNC	SPEED VALID	AT/SC SP/MACH	AUTO THROT/EPR	AUTO RSV THR	A/T EPR T/O	MACH TRIM	⊛ AUTO G/A	▲ HDG HOLD	NDC SELECT	VOR	CAP LOC	LNAV FMS	FD TAKEOFF	GO-AROUND	(LS) G/S	MACH HOLD	IAS HOLD	ALT PRESEL	ALT HOLD	▲ VERT SPD	VNAV FMS	ROLL OUT	NOSE LOWERING	RETARD (ATS)	FLARE	AILON	LOCALIZER	GLIDESLOPE	FD TURB/AR TURB	FLT DIR VALID	AUTOLAND ENGAGE	PITCH TRIM	ILS ARM	ALTITUDE ALERT	YAW DAMPER	PARALLEL RUDDER
22-02	ASSOC FGC PANEL SYNCHRO										1																										1
22-07	HORIZONTAL STAB POSITION										1							1 (1)																				
22-07	FLAP/SLAT HANDLE POSITION			(1) (2)		(1) (2)		1			<5° 6							1 (1) 7 6									1 (1) 5										
22-07	FLAP POSITION																													1	1						
22-07	RUDDER POSITION																													1							1
22-07	SPOILER POSITION	1																																	1		
22-06	NOT TO/GA MODE	1																												1							
22-11	VALID SYO'S RUD, ELEV, AIL, MT, YD	*									MT REA																REA	REA	REA							YD R	
22-14	A/P ENGAGED		1	1	1	1					1																1	1	1	(1)						1	
22-19	LONGITUDINAL ACCELERATION "X"		1	1	1	1					1							2 1		1	1						2	1	2	2							
22-19	NORMAL ACCELERATION "Z"	1									1							1 1		1	1	1	1				2	1	2								
22-19	LATERAL ACCEL "Y" (FWD)	1									2																2	2									
22-19	LATERAL ACCEL "Y" (AFT)	1									2																2	2									
22-31	ANGLE OF ATTACK		1	1							2							2 1									1										
27-23	RUDDER UNRESTRICTED										2																										
27-61	WHEEL SPIN-UP																										(1)	(1)	(2)								
27-84	SLAT VALID & POSITION	1		1	1						(RET)	1						1 1									1										
32-15	WEIGHT ON WHEELS	1	T		T	T	T	1	1		T				T			1 T	T								2	2									
32-24	GROUND SENSING	1	T		T	T	T	1	1		T				T			1 T	T									1									
22-07	AILERON POSITION	1																												1					2		
34-16 C A D	INDICATED AIRSPEED	1		1	1	1		T	1		1				1			2 1		1	1	1	1														
	ALTITUDE RATE	1						1	1									2 1				1					1										
	MAX AIRSPEED		T				T																														
	STATIC AIR TEMP	1																																			
	TRUE AIRSPEED	1																																			
34-18	APPROPRIATE T.R. IND MODE	1	1					1																													
34-18	BLEED CONDITION		1					1																													
34-18	THRUST RATING DISPLAY VALID	1	1					1																													
34-43	HEADING OR COMPASS SYSTEM	1																2 1	1	1																	2
34-22	HEADING ERROR																	1																			
34-43	ATTITUDE (ROLL & PITCH)	1		1	1						2	1	1	1	1			2 1	1	1	1	1	1				2	1	2	2	2	1	2	2	2		
22-31	AUTO THROTTLE ENGAGED	1	(1)		1	1		1			1																1				2						
34-32	GLIDESLOPE										(4)							(4) A														(2)	2				
34-32	LOCALIZER										2							B									2	2				(2)	2				
34-32	VOR																	A																			
34-32	ILS ENERGIZE																	A 1			A						2		2	2		2	2		A		
34-32	COURSE																	A A									1		2	2		(2)	2	(2)			
34-42	INST RADIO ALTITUDE										1							1		1	1	1					(2)	(2)	8	2		1	2		1		2
34-63	FMS ISTALLED (OPTION PIN)																		1								1										
34-63	L NAV VALID																1																				
34-63	V NAV VALID																									1										
73-31	FUEL FLOW	2																																			
77-12	ENGINE NI	2	(2)	2	(2)	2		(2)	2																												
77-13	ENGINE PRESSURE RATIO	1	(2)	2	2	2		2																													

CAG(IGDS)

MDC PROPRIETARY

DFGC Validity Requirements By Mode
Figure 109/22-01-00-990-874



DFGC Validity Requirements By Mode
Figure 110/22-01-00-990-878

DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - DESCRIPTION AND OPERATION

1. General

A. There are two identical Digital Flight Guidance Computers (DFGC's), located in the Electrical/ Electronics (E/E) compartment. Each DFGC is mounted in a full ATR case.

Internally the DFGC is divided into three card bays. Card interconnection is provided by tuning fork contact connectors, and wire wrap terminations on pressed in wire pins in a metal motherboard.

B. Each DFGC is independent of the other, and only one is in command during operation. The other DFGC (off-side) is continuously receiving and processing parallel input signals in event selection is required. A switch located below the AP engage switch labeled 1, 2, on the Flight Guidance Control Panel, provides the capability for selection of either DFGC -1 or DFGC -2 for all functions except flight director. With Flight Director switch in NORM position, an isolated output signal is provided from each DFGC to the slow-fast pointer and flight director command bars in the captain's and first officer's ADI's (PFD's). With flight director switch (on overhead panel) in BOTH ON 1 or BOTH ON 2 position, the ADI's (PFD's) are driven from the selected computer regardless of DFGC 1, 2 position.

C. The DFGC provides control data for various aircraft functions.

These system functions include:

- Autopilot
- Flight Director
- Yaw Damper
- Mach Trim
- Auto Throttle/Speed Control (AT/SC)
- Auto Reserve Thrust (ART)
- Thrust Rating Schedule Computations
- Altitude Advisory

D. The DFGC performs the control law computations and manages the engage and mode logic for the Autopilot, Flight Director, Yaw Damper, Mach Trim, AT/SC and ART functions. The DFGC also provides pre-flight test and in-flight failure monitoring for these functions along with altitude advisory and thrust rating schedule computations.

WJE 401-406, 409, 410, 412, 414-427, 429, 861-866, 868, 869, 871-879, 881, 883, 884, 886, 887, 891-893

E. Analog output signals are provided for ADI (PFD) pitch and roll steering commands, slow-fast pointer, altitude alert, Thrust Rating Indicator EPR LIM display, EPR Indicator bugs, and for the reference airspeed pointers in the Mach/Airspeed indicators. Power output discretes are provided for various engage solenoids and warning lights, and also for ART thrust solenoids.

WJE 407, 408, 411, 880

F. Analog output signals are provided for ADI pitch and roll steering commands, slow-fast pointers, altitude alert, HUD display information, Thrust Rating Indicator EPR LIM display, EPR Indicator bugs, and for the reference airspeed pointers in the Mach/Airspeed indicators. Power output discretes are provided for various engage solenoids and warning lights, and also for ART thrust solenoids.

WJE 401-406, 409, 410, 412, 414-427, 429, 861-866, 868, 869, 871-879, 881, 883, 884, 886, 887, 891-893

G. Serial Digital information is provided for the Flight Mode Annunciators, VHF/NAV Control panel displays, Flight Guidance Control Panel displays, and In-Service Data Acquisition System (ISDAS).

WJE 407, 408, 411, 880

H. Serial Digital information is provided for the Flight Mode Annunciators, VHF/NAV Control panel displays, Flight Guidance Control panel displays, Status/Test panel, and In-Service Data Acquisition System (ISDAS).

NOTE: ISDAS information is provided from the front connector on the DFGC.

WJE ALL

I. The DFGC contains the dual servo electronics for dual aileron, elevator, and rudder servo drives, and single electronics for the Yaw Damper Actuator, Mach Trim Actuator, and autothrottle actuator.

J. Redundancy and channelization are provided in the DFGC for the Fail Passive Autoland system. The system interface is through four dual insert connectors on the rear of the DFGC. The two outboard connectors have been primarily assigned to redundant input and output signals and logic. The two inboard connectors are used for the remaining system functions. In addition to separation of redundant functions, pin isolation techniques are provided to isolate power from other functions to minimize the effect of pin-to-pin shorts.

2. DFGC Functional Partitioning

A. The following card functions are incorporated within the DFGC.(Figure 1)

Table 1

Card Name	DFGC Function
ANALOG	16 demods, 16 dc inputs plus associated multiplexers. 8 sample hold outputs plus associated demultiplexer.
A/D-D/A	A/D and associated control; side A/side B mux. D/A and associated RAM and control logic. I/O memory map decoder.
SERIAL DATA I/O	2 ARINC 575 receivers. 1 ARINC 429 receiver. 6 ARINC 429 transmitters.
SERIAL DATA CONTROL	Control for serial data I/O. DMA interface to memory.
DISCRETE I/O and SERIAL DATA TEST	9 ground type discrete inputs, 9 - 28 volt type discrete outputs, 6 ground type discrete outputs. Serial receiver data bus test pattern generation and control.
DISCRETE INPUTS	45 ground type discrete inputs. 27 - 28 volt type discrete inputs. Line voltage compensated demods for one set of pitch and roll attitude inputs plus associated rate takers. Demod reference.
DISCRETE OUTPUTS	29 ground type discrete outputs. 19 - 5 volt type discrete outputs (used internally). Buffering for localizer and glideslope inputs (one side). Power supply monitoring engage/warning clock. A/P warning light flasher.
PARALLEL RUD/AIL SA	Single channel aileron and rudder servo amplifiers. Demod reference.
A/P ENG ESA	Single channel elevator servo amplifier. Switching for single channel parallel rudder, aileron and elevator servo brakes. Switching for: trim, AS bug, EPR bug, wheel spinup and other miscellaneous A/P engage functions.
ART CONTROL	Line voltage compensated demods for one set of pitch and roll attitude inputs plus associated rate takers. F/D converters for N1L and N1R. EPR reference buffering. ART control functions. 12 - 5 volt input discretes, and 10 - 5 volt type output discretes (used internally).
YD/MT SA	Servo amplifiers for yaw damper and Mach trim. Parallel rudder clutch switching. 200 ms bus transfer switching. Timing discrete for FDAU interface.
AUTO THROTTLE	Autothrottle servo amplifier. Autothrottle control field switching. Autothrottle warning functions.

Table 1 (Continued)

Card Name	DFGC Function
MAINT MEMORY	Semi conductor non-conductor type memory plus memory timing and address decoding for 1024-4 bit words.
PROC 0-11	Processor section - bits 0-11
PROC 12-17	Processor section - bits 12-17
PROC CS 0-23	Processor control store - bits 0-23
PROC CS 24-51	Processor control store - bits 24-51
BUS/MEMORY CONTROL	Memory address and data bus controller. Memory address decoding and timing. Provision for I/O interrupts.
RAM	4K x 18 bit RAM memory. Bus transceivers for interface between memory data bus and I/O data bus.
PROM 0/1	6K x 18 bit PROM memory
PROM 76/77	6K x 18 bit PROM memory
PROM 74/75	6K x 18 bit PROM memory
PROM 72/73	4K x 18 bit PROM memory (growth provision to 6K)
POWER SUPPLY	Transformer, rectifiers and filter capacitors. Switching regulator for main +5V. Linear regulators for +15V, -15V and RAM +5V. Power interrupt circuitry which interfaces to the processor.
TRANSIENT SUPPRESSION BOARD	28 volt dc transient suppression circuitry.

3. Description

A. DFGC Elements

(1) The DFGC can be subdivided into three primary computer elements. A Central Processor, Memory, and Input/Output (I/O). The I/O contains circuits for interfacing with airplane servos, sensors and displays. The primary elements associated with the I/O are analog I/O, discrete I/O, and serial data I/O sections. The majority of the functions interface through analog and discrete I/O sections, i.e., servo amplifiers receive their command as analog outputs, and feedback is sent to software as analog inputs.

(2) The DFGC interface with the Memory over various parallel buses are managed by a Memory Bus Controller. The Memory Bus Controller responds to requests for the Memory Address and Data Buses by the following priority:

(a) Serial Data I/O

(b) Central Processor

(c) Panel I/O Processor (PIOP)(Maintenance device only)

(3) I/O, except Serial Data I/O, interfaces with the Memory Data Bus from the I/O Data Bus. The portion of I/O which is connected to the I/O Data Bus is memory mapped and is handled as part of Memory for data communication, i.e., output of data is accomplished by executing software STORE instructions, and input of data is accomplished by executing ENTER instructions.

(4) The Memory Address and Data Buses are wired to the front connectors on the DFGC for interfacing to the PIOP and external core memory for test purposes.

B. Central Processor (Figure 4)

(1) The Central Processor performs as an 18-bit micro-programmed processor that can execute instructions from either core or semi-conductor memory. The processor is an accumulator type machine with two 18-bit accumulators linked to form a 36-bit accumulator for extended precision or dual length operations. There are eight separate index registers that have limited arithmetic capabilities and are used for direct or indexed addressing. The list utilizes a stack pointer for subroutine linkage and temporary storage.

(2) The basic cycle time of the memory is 1.1 microseconds. Cycle time of the microprogram control is 278 nanoseconds. The processor interfaces with an external memory provided within the DFGC to provide information for the Status/Test panel.

C. Memory

(1) The DFGC Memory is contained on separate Random Access Memory (RAM), and Programmable Read Only Memory (PROM) cards. Each PROM card contains 6K X 18 bit words of memory that is used for fixed instructions and constants of the flight profile. A separate PROM card is dedicated to AT/SC and Thrust Rating functions so that the change required for operating the airplane with different engines is minimized.

(2) The RAM (read/write) memory card provides the variable memory required in the program. In order to meet power transient requirements, memory is retained for several seconds after loss of DFGC power. A 1K X 4 bit EAROM MNOS (Metal Nitride Oxide Semiconductor) MNOS memory is provided for storage of in-flight failure diagnostic data.

D. Analog I/O (Figure 5)

(1) Analog input signals (except engine N_1 TACH signals required for ART) are processed by demodulators or first order lag filters as required and multiplexed to provide the analog input signal to the Analog to Digital (A/D) converter. The A/D converts the analog input to 12 bit digital data which is placed on the I/O Data Bus when enabled by the A/D select. (The A/D select is generated for an "ENTER" type of software instruction.) The analog Input Sequence controls which input is applied to the A/D analog input by controlling the Multiplexer Address. Frame synchronization is controlled from the software by executing a TEST instruction which provides a pulse to the A/D analog Input Sequencer.

(2) The analog Input Sequence is RESET to zero by the sync pulse and is incremented at the termination of each conversion. However, software input scaling and associated data handling requires 20 microseconds or more so the analog input rate is limited by software.

(3) The I/O Data Bus is enabled to a RAM by the D/A select signal. (D/A select is generated for a "STORE" type software instruction.) The lower 5 bits of information supplies the RAM address and the next 12 bits of information provides the data. When the D/A select is inactive, the RAM is placed in the read mode and the data is read by D/A. The D/A is de-multiplexed and stored in an analog sample hold which corresponds to the RAM address where the data is stored. The analog output sequence sequentially updates the sample hold outputs at a rate of approximately 4 micro-seconds per sample hold. The sample hold outputs are wired to the analog inputs for end-around verification.

E. Analog Inputs and Outputs

(1) The DFGC provides input and output analog signal capacity for 64 ac and 64 dc signals. Additionally, all 32 analog output signals are end-arounded.

F. Discrete Inputs and Outputs (Figure 6)

(1) Input discretes are mechanized by interfacing the input discrete signals to the CMOS I/O Data Bus with 3-State Buffers. The SELID signal provides the 3-state enable which causes discrete signals to be placed on the Data Bus. Resistor divider networks on the inputs of the buffers level shift the input voltages to levels which are appropriate for the CMOS Buffers. For inputs that have an active state 28 volts, the input is divided down. For inputs that have an active state ground, the input is pulled up to 15 volts through a resistor. Internal 5 volt logic signals that are developed within the DFGC, are applied to the 3-State Buffers directly without the resistor network.

(2) Output discrete data on the I/O Data Bus is clocked into CMOS latches with the SELOD signal. The CMOS latches drive either Darlington outputs or Hi-Level outputs as required for active state ground or active state 28 volt outputs. Internal type outputs are connected directly to the CMOS latches.

G. Serial Data I/O

(1) The Serial Data I/O is a DMA (Digital Memory Address) that is separate from the rest of the I/O. The Serial Data I/O is responsible for generating the address information for reading and writing for RAM. Frame synchronization is controlled from software SYNC instructions and discrete output. The discrete output is used to enable Serial Data I/O section to generate memory requests. Separate receiver and transmitter SYNC instructions are used to control the receiver and transmitter instructions.

(2) The Serial Transmitter data comes from RAM (2 locations for each serial word) over the Memory Data Bus. All six transmitter outputs share a common parallel to serial conversion. The address information for enabling the proper line driver corresponding to the desired transmitter output is contained in the locations stored in RAM, along with Serial Data.

NOTE: The bit rate for all ARINC 429 transmitters and receivers is 100 KHz.

(3) The following is a list of Serial Transmitter interfaces:

(a) ARINC 429 to other DFGC

(b) ARINC 429 to Flight Guidance Control Panel

(c) ARINC 429 to FMA -1

(d) ARINC 429 to FMA -2

(e) ARINC 429 to Status/Test panel (MCDU)

(f) ARINC 429 to ISDAS

(4) The Serial Receiver provides 32 bit data information to separate line receivers and Serial to Parallel Conversion functional blocks. The parallel Serial Receiver Data Bus interfaces with the Memory Data Bus for storing the data in RAM (2 locations are required for each serial word).

The receiver identification is contained in the information stored in RAM along with the Serial Data.

(5) The following is a list of Serial Receiver interfaces:

(a) ARINC 429 from other DFGC

(b) ARINC 575 from CADC -1

(c) ARINC 575 from CADC -2

4. DFGC Functions

A. Autopilot Hardware Logic and Computation (Figure 8)

(1) Autopilot related logic and computation that is generated by hardware within the DFGC are as follows:

(a) Computer Hardware Monitors

(b) Autopilot Engage and Shutdown Logic

(c) Autopilot Warning Logic

(d) Indicator Drive Switching

(e) Flight Director Switching

(f) Derived Attitude Rates

(g) Miscellaneous Special Circuits

(2) Computer Hardware Monitors

(a) There are two Computer Hardware Monitors that perform continuous monitoring of the system heartbeat (system valids) and of all computer power. The system valid software discrete is a 10 hertz +5 VDC square wave when the computer is performing all software tasks properly. The Heart Beat Monitor will shutdown if the heartbeat ceases or changes significantly. Loss of 5 VDC (or basic 115 VAC) results in loss of the heartbeat and subsequent shutdown. The monitor also detects loss of 28 VDC and ±15 VDC.

(3) Autopilot Engage and Shutdown Logic (Figure 8)

(a) The autopilot engage, shutdown, and warning logic is dual (channnel A and B) tested logic. The A/B logic controls the A/B dual servo amplifiers, and switching relays that in turn control the dual servo clutches and the autopilot engage switch solenoid.

(b) The engage and shutdown logic is configured to allow an independent test of the dual logic at power up without engaging the servo clutches. Channel A logic controls high side logic for the elevator clutch and low side logic for the aileron clutch. Channel B logic controls low side logic for the elevator clutch and high side logic for the aileron clutch. In this manner, either A or B logic can be toggled and inspected at power up without providing both high and low side logic to activate a clutch.

(c) The A/B computer valid (heartbeat and power monitor) is anded with A/B AP VALIDS from software and autopilot disconnect switch logic. This combination of logic provides the A/B dual servo amplifier directly without hold-over for loss of power. This same logic is anded with autopilot engage logic and is used to control switching relays (43K13, 43K14, 37K13 and 37K14) that control the high and low side of the dual servo clutches. The high side relays (43K13 and 43K14) are also controlled directly without holdover for loss of power. However, a cross-channel dc power relay is controlled from the A and B logic containing a .3 second holdover for loss of power. When loss of in-line power occurs, the high side 43K13 and 43K14 relays drop out immediately and power is then provided from the cross-channel bus for the .3 second hold-over period. The low side relays (37K13 and 37K14) are also held for .3 seconds for loss of power to provide the clutch solenoid return current path.

(d) The parallel rudder engage software discrete enables both the high and low sides of the parallel rudder clutch. The power and ground to the clutch are through contacts of the autopilot high and low side switching relays. The high and low side logic for the rudder clutch is end-arounded for comparison against the parallel rudder engage software discrete. This assures the parallel rudder is not engaged inadvertently due to a failure of the discrete. If the end-around test fails, the autopilot valids are cleared and all axis are shut down.

(e) High and low side clutch logic and autopilot engage and off logic are back to software for use in power up testing and engage interlocking. When a computer is powered up and selected, an automatic test is performed to verify the dual shutdown logic. The test first checks to assure that the autopilot engage switch is not failed to on. If not, the power up test is activated, placing 28 VDC on the high side of the engage relays. AP VALID A is the set high and the elevator high side and aileron low side logic is checked for an off-to-on transition. HEARTBEAT A is then stopped, and the same logic is checked for an on-to-off transition. After AP VALID A is cleared and HEARTBEAT A is restored, the test is then performed on the B side logic.

(f) Any failure detected by the test inhibits the A/P valids so that servos cannot be engaged via the selected DFGC. If no failures are detected, the test relay is deactivated. When the test sequence is complete, servo amplifiers are enabled and servo synchronization occurs. Sensor monitoring, servo monitoring, and other system monitoring is active. If servos are synchronized and valid, basic sensors are valid, and dual servo logic (high and low) is in the off state, the autopilot will engage when the engage switch is placed in the on position. If these requirements are not met, servos will not engage and the engage switch will not latch on. After engagement, all autopilot failures monitored in software result in loss of both autopilot valids, and shutdown via the dual engage/shutdown logic. Autopilot warning will occur. Similarly, computer heartbeat or DFGC power failures result in shutdown and warning via the dual hardware monitors and shutdown logic. Servo amplifiers will be disabled simultaneously, but will be re-enabled in the sync mode if all sync valid conditions are met and the computer is valid.

(4) Autopilot Warning Logic

(a) Warning of loss of autopilot engage is provided by Transfer Bus Powered Warning Logic Monitors. In addition, Channel A card monitors for loss of high or low side elevator clutch engage logic, and Channel B card monitors for loss of high or low side aileron clutch engage logic.

(b) The warning latches are reset whenever Transfer power is turned on. The warning latches are set by loss of the high or low side servo clutch engage logic, resulting in a flashing AP red light on the flight compartment Flight Mode annunciators. The lights can be reset by re-engaging the autopilot, or pressing either control wheel AP disconnect button.

(c) A single push option is provided within the DFGC. The push option operates in conjunction with the control wheel AP disconnect buttons. If the push option is grounded, pressing the AP disconnect button (with autopilot engaged) will result in AP warning lights for 3 seconds only. If the push option is not grounded, pressing either AP disconnect button will result in the flashing red lights. The lights will continue to flash until the autopilot is engaged, or the AP disconnect button is pressed the second time. The AP red lights flash at a rate determined by dual synchronized flashing units.

(d) An aural warning is also provided. The aural warning function is enabled any time the LAND mode is engaged, or by an airplane ground option pin.

(5) Indicator Drive Switching

(a) The DFGC provides five indicator amplifier drives. The amplifiers drive left airspeed and EPR bugs, right airspeed and EPR bugs, and the EPR LIM indicator. D/A outputs are routed through relays that provide side select switching of the signals and of a reference +11 VDC and signal ground.

(6) Flight Director Switching

(a) The DFGC provides flight director signals and logic to the ADI/PFD. D/A (digital to analog) outputs and valid discretes are routed through signal relays that provide the BOTH ON 1, NORM, and BOTH ON 2 switching capabilities.

(7) Derived Attitude Rates

(a) The DFGC is configured to accept two wire pitch and roll attitude data from separate attitude systems. Pitch and roll attitude data is demodulated, filtered, and differentiated. The resulting filtered attitude and attitude rate signals are then routed to the A/D inputs.

(8) Miscellaneous Special Circuits

(a) The DFGC provides several Miscellaneous Special Circuits. The circuits are as follows:

1) N_1 tachometer inputs are converted to digital data.

2) ILS receiver inputs are amplified and filtered.

3) Radio Altimeter self-test is inhibited during localizer and glideslope.

4) Wheel spin-up AC valid is converted to DC valid.

B. Dual Servo Electronics (Figure 9)

(1) The Dual Servo Electronics consists of three voltage to current amplifiers for elevator, aileron and rudder actuators. Servo commands from D/A outputs are summed with synchro position signals. A lead/lag network on the position signal provides damping to assure stability.

(2) Servo amplifier outputs are filtered and fed back to an A/D input. The outputs to the motor are relay switched as a function of both side select and shutdown logic.

(3) The maximum output current limit on the aileron servo amplifier is variable to provide software torque limiting capability. All servo position signals are routed back to the A/D converter to allow software monitoring.

C. Yaw Damper/Mach Trim Servo Electronics (Figure 10)

(1) Two voltage to current amplifiers are required to drive the Yaw Damper Actuator and Mach Trim Actuator. Servo commands from D/A outputs are summed with demodulated tachometer and synchro position. Position and tach signals are routed back to the A/D converter for software monitoring.

(2) The outputs of the yaw damper servo amplifier are relay switched by series rudder shutdown logic. The series rudder shutdown logic consists of the Computer Hardware Monitor valids and software valids, and parallel rudder not engage logic.

(3) The yaw damper off output goes low when both the parallel rudder clutch logic and series rudder engage logic if off.

D. Autothrottle Engage, Warn and Servo Electronics (Figure 11 and Figure 12)

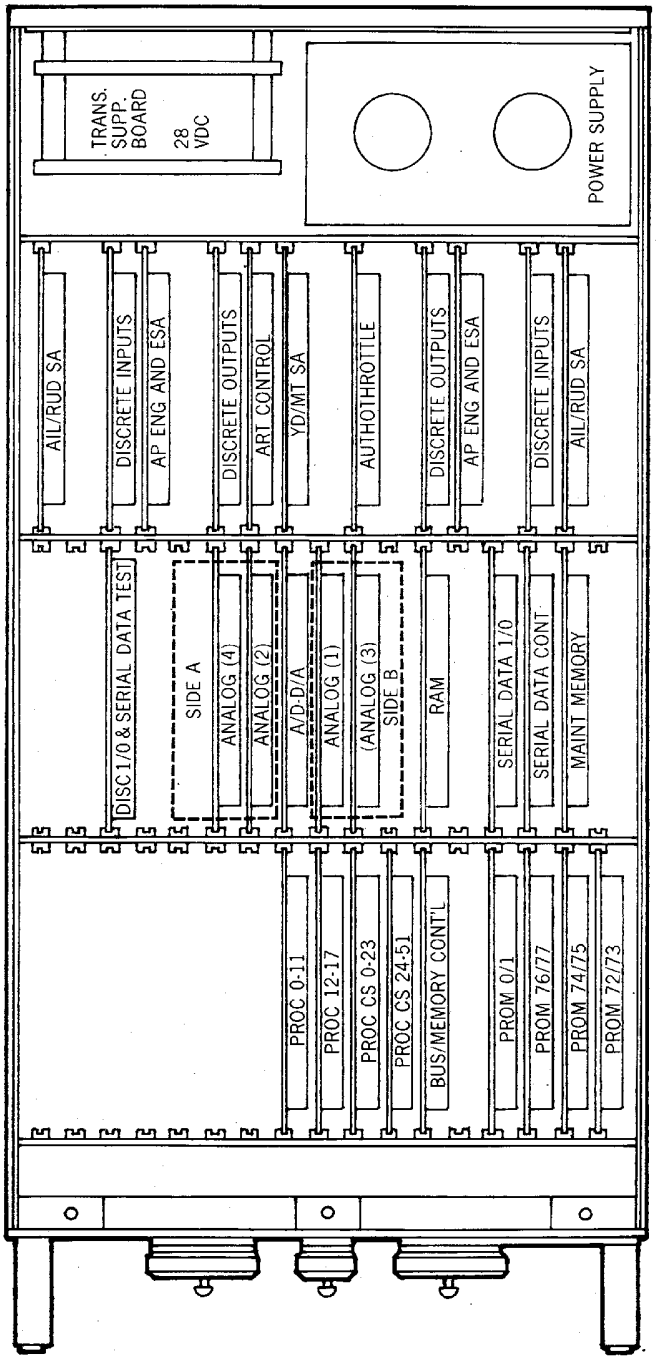
(1) An autothrottle servo amplifier within the DFGC is provided to drive an AC throttle servo motor. An autothrottle command from an D/A converter is summed with demodulated and filtered tachometer signals in the servo amplifier. The servo amplifier then generates a motor drive signal that is ±90 degrees out of phase with input power (115 VAC A Phase).

(2) The autothrottle engage switch and motor control relays are driven from side select and switch engage logic from the Flight Guidance Control Panel. The driver is inhibited by logic consisting of Computer Monitor A, a software valid that includes all autothrottle monitoring, and throttle disconnect switch logic.

(3) The low side of the relays are grounded through side B logic analogs to the A logic for inhibiting the high side driver. The high and low side logic is routed to software through discrete inputs for pre-flight and pre-engaging testing.

(4) Autothrottle warning circuitry is provided by transfer bus powered warning circuitry monitors to monitor the high and low side and autothrottle engage logic. The warning latch is reset whenever transfer power is turned on. After the latches are set by loss of any of the monitored logic, the resulting flashing red lights can be reset by re-engaging the autothrottle, or by pressing either throttle disconnect switch on the throttle levers.

(5) For throttle disconnects due to pressing the throttle disconnect switch, the lights will flash until the switch is pressed the second time, or the autothrottle is engaged. The flashing function is provided by a 1 Hz hardware flasher. The warning circuits are inhibited if disconnect is provided by the reverse thrust levers.



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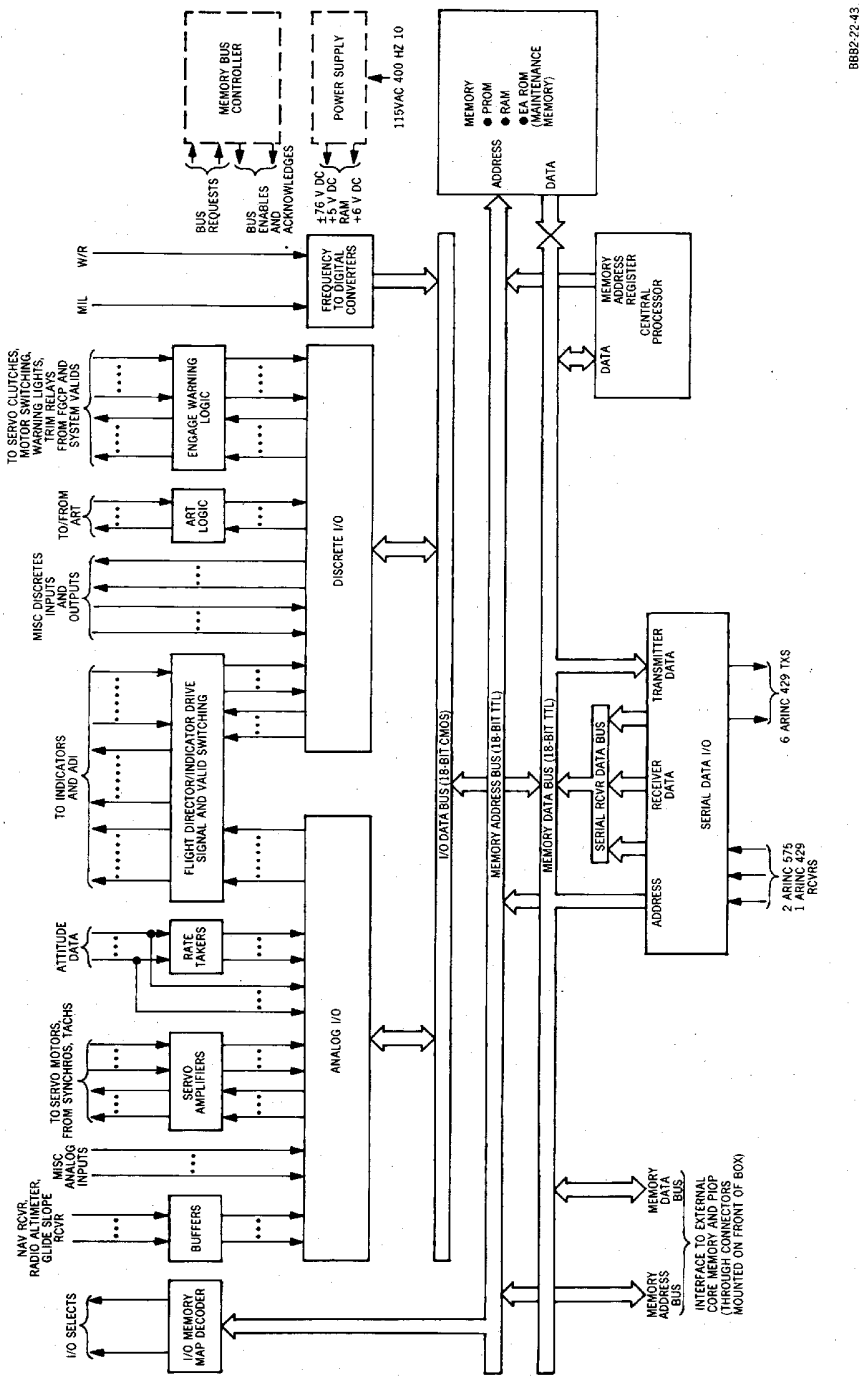
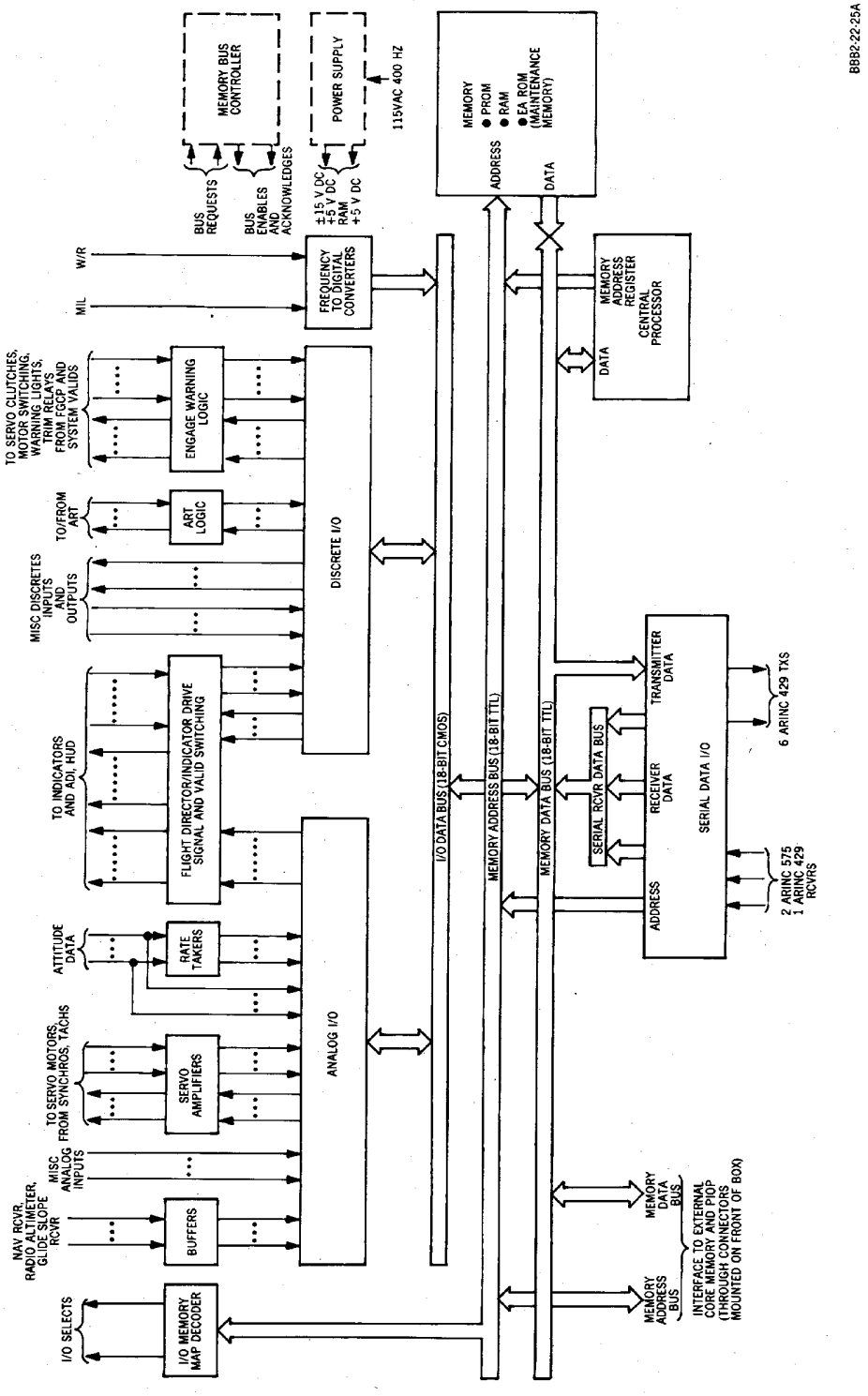
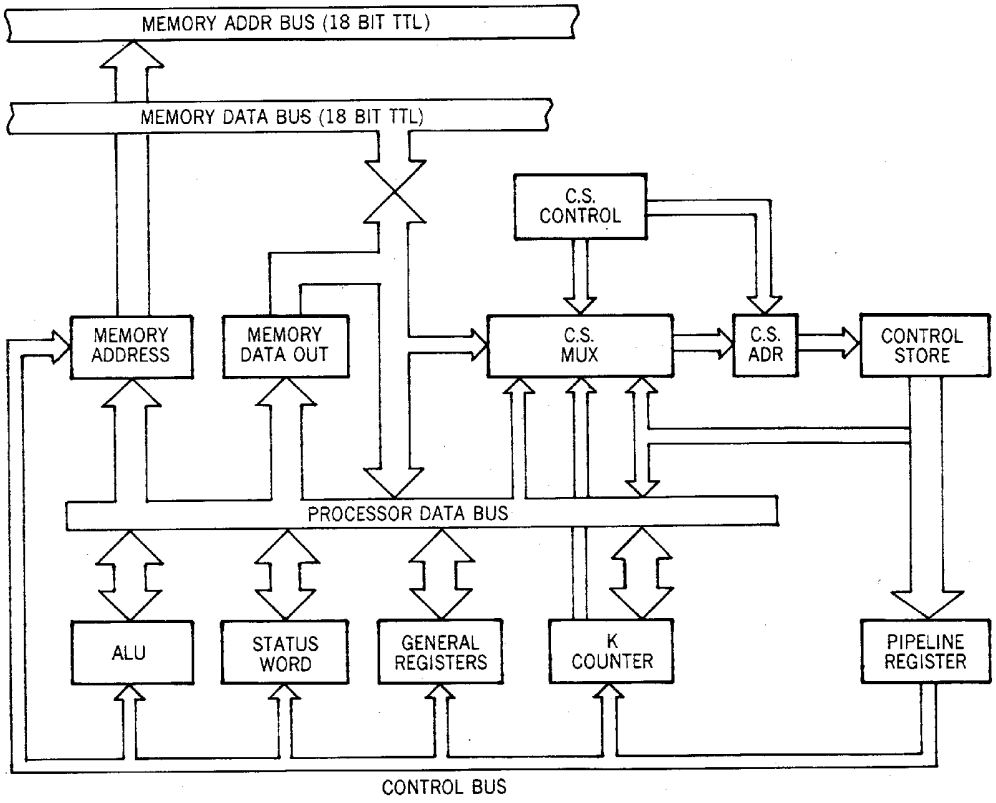
DFGC Card Partitioning
Figure 1/22-01-01-990-801



DFGC Elements -- Simplified Block Diagram
Figure 2/22-01-01-990-803



DFGC Elements -- Simplified Block Diagram
Figure 3/22-01-01-990-805



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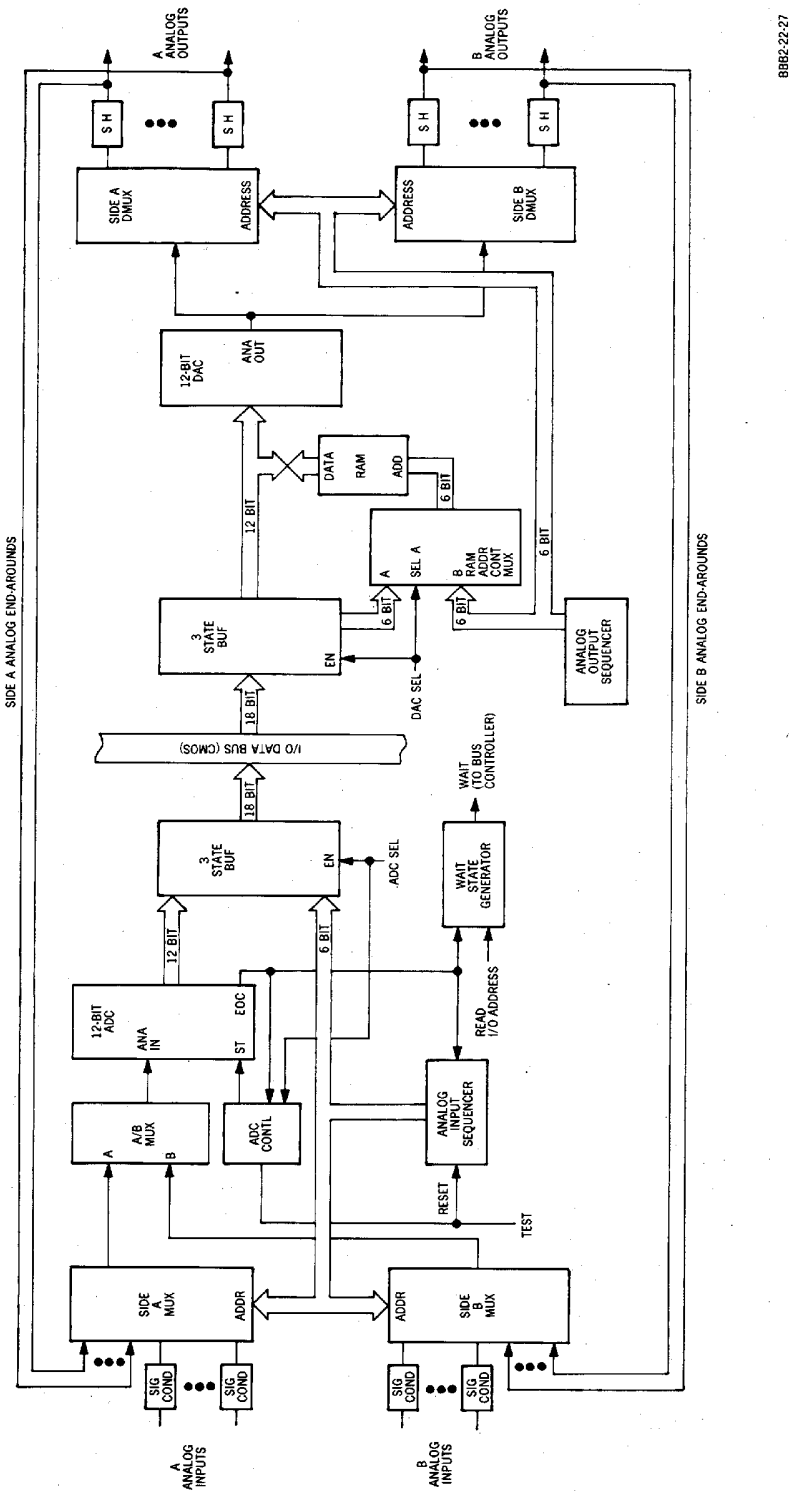
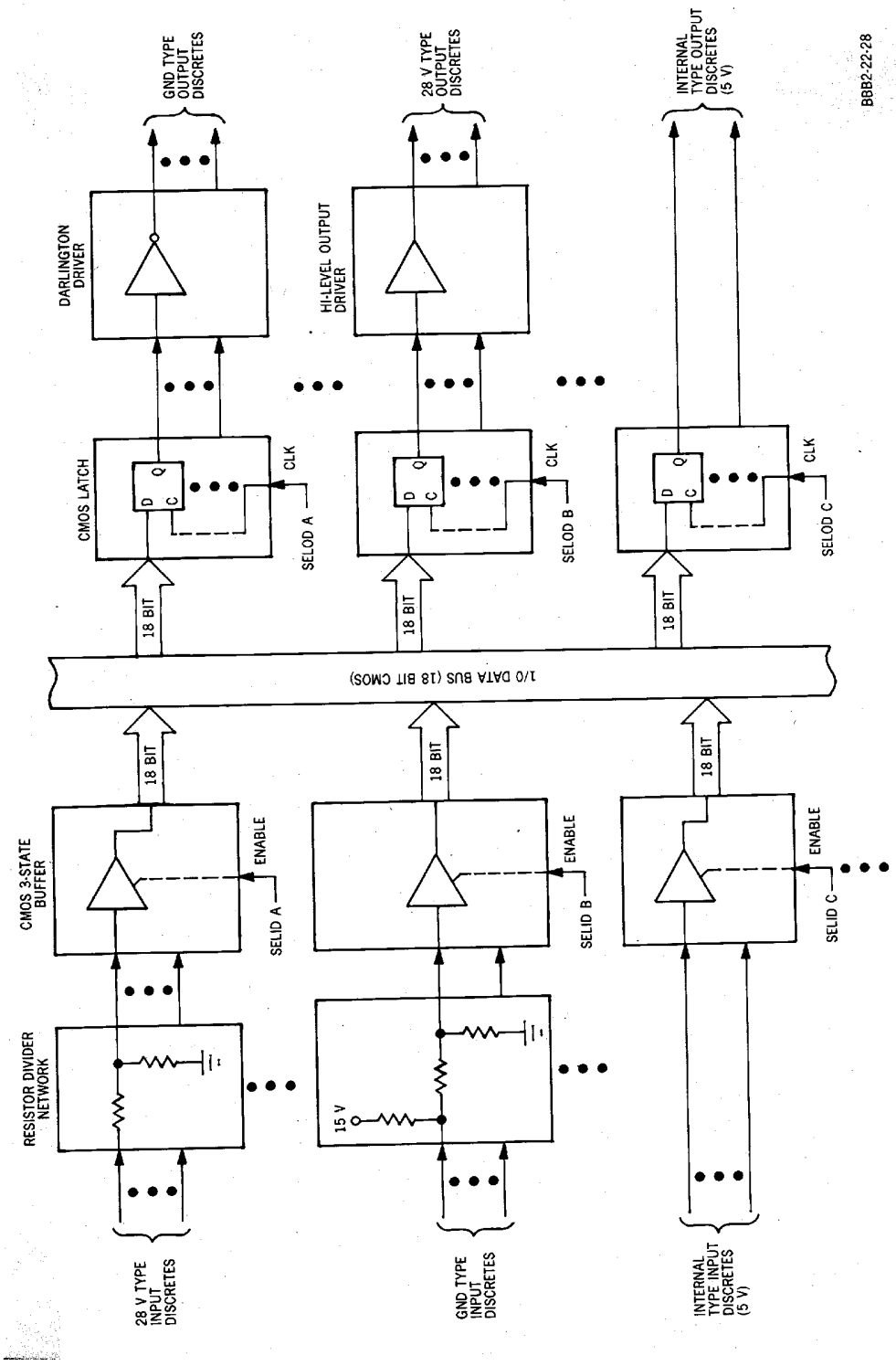
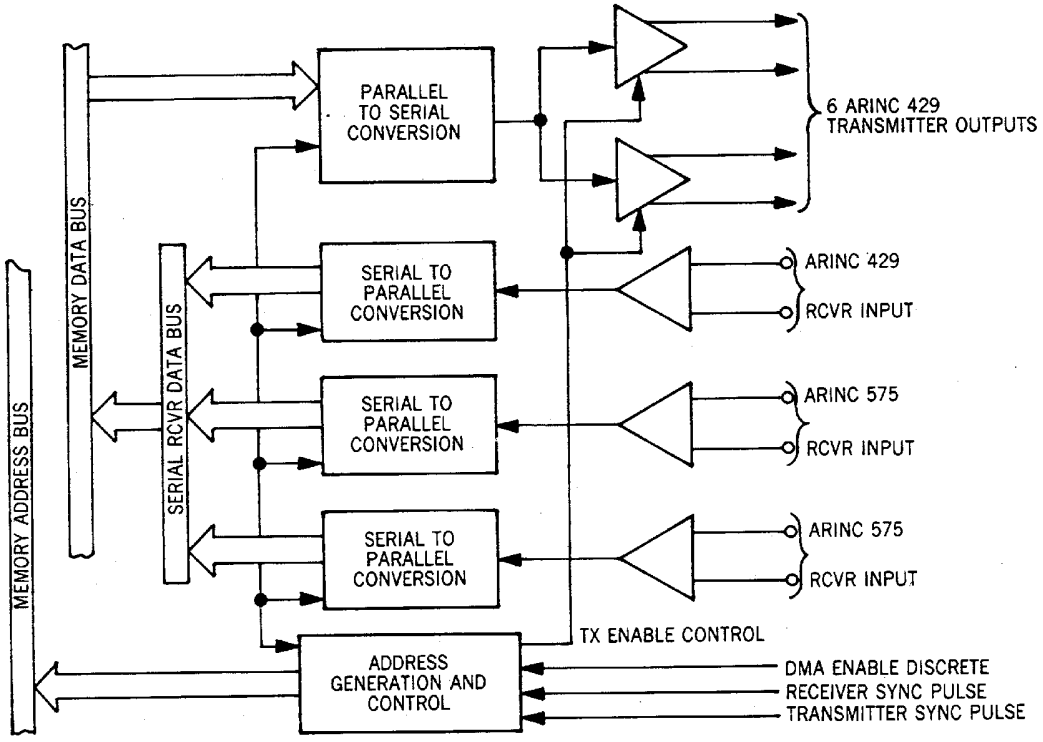
Central Processor -- Simplified Block Diagram
Figure 4/22-01-01-990-806



Analog I/O -- Simplified Block Diagram
Figure 5/22-01-01-990-809



Discrete I/O -- Simplified Block Diagram
Figure 6/22-01-01-990-812



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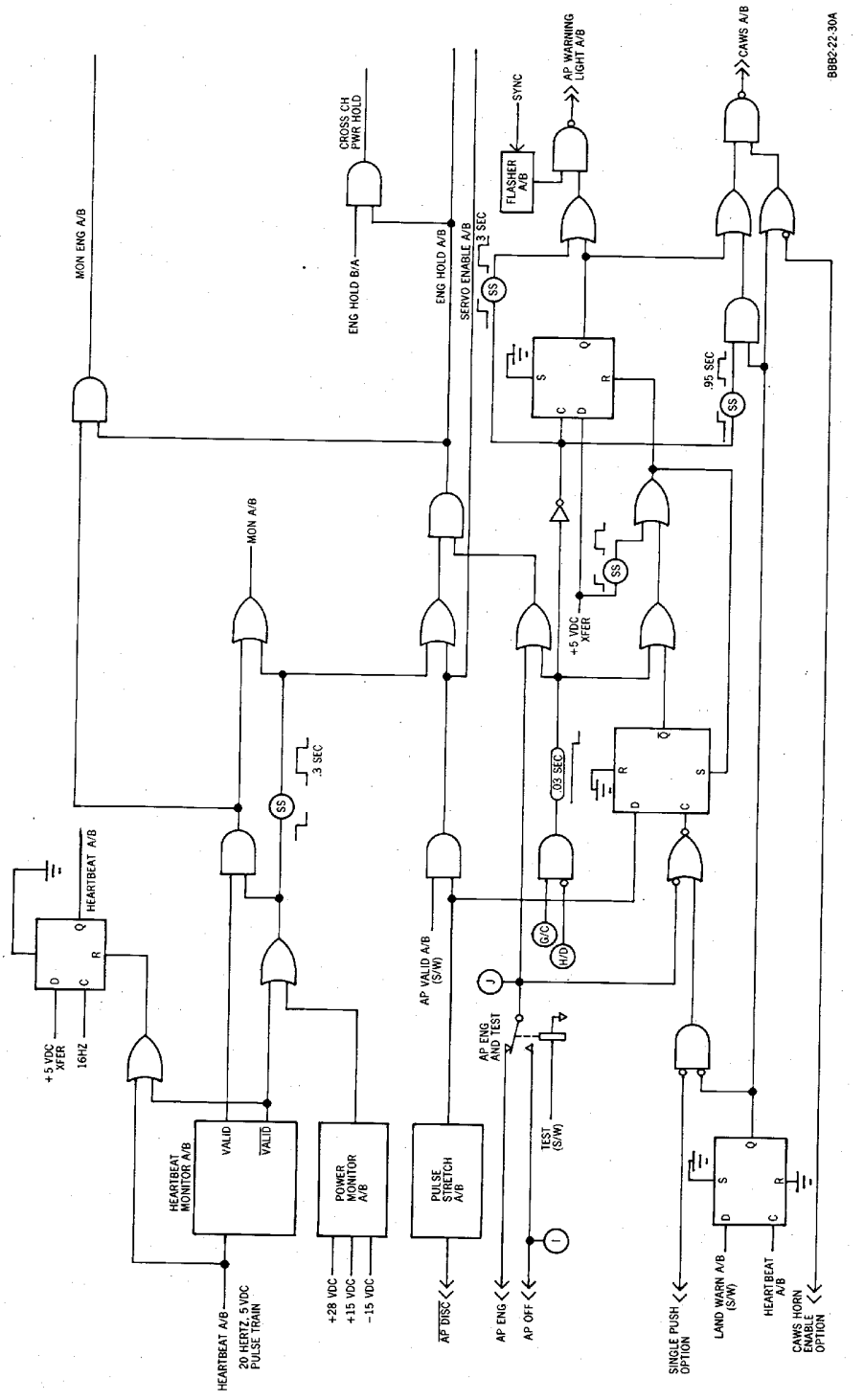
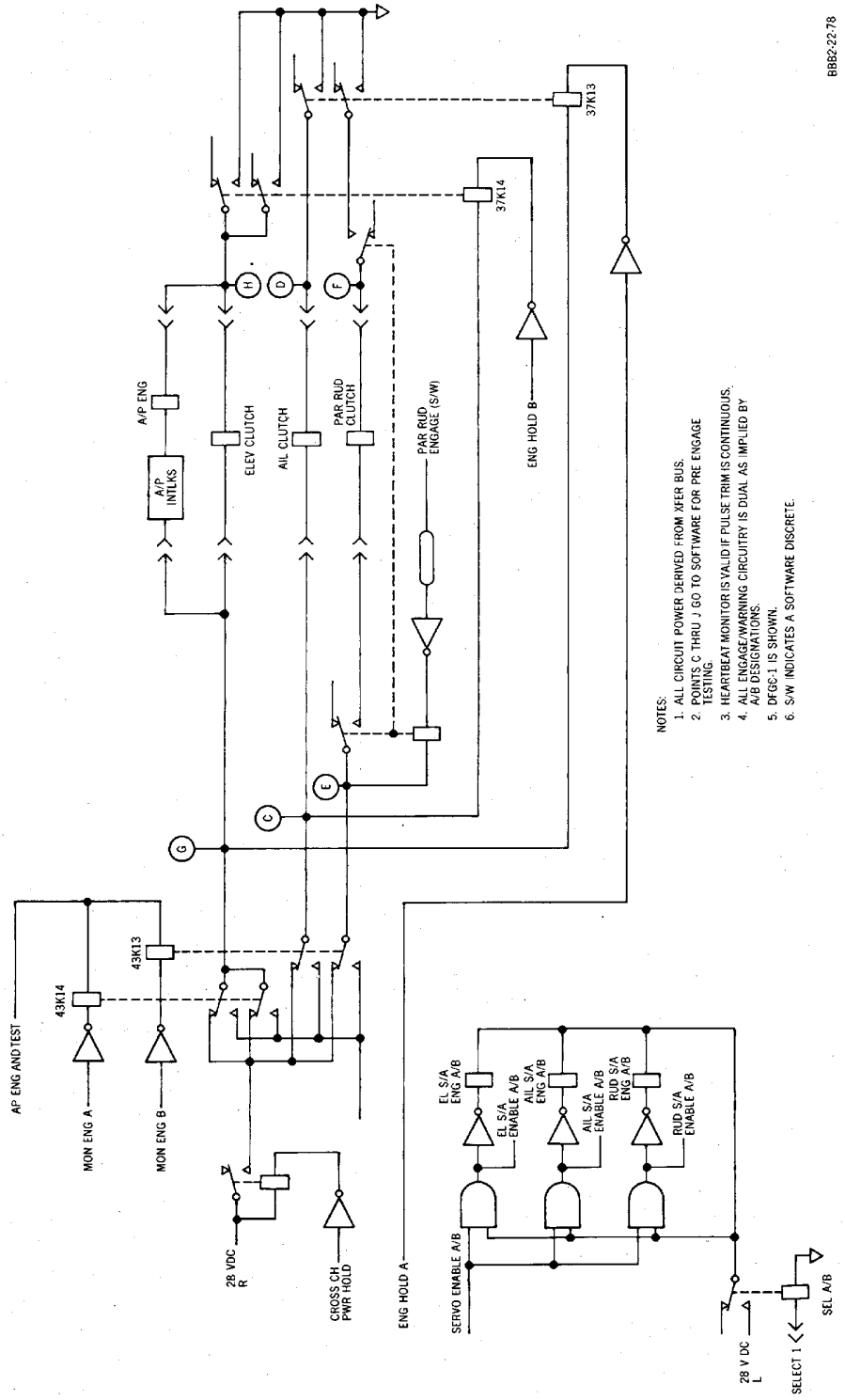
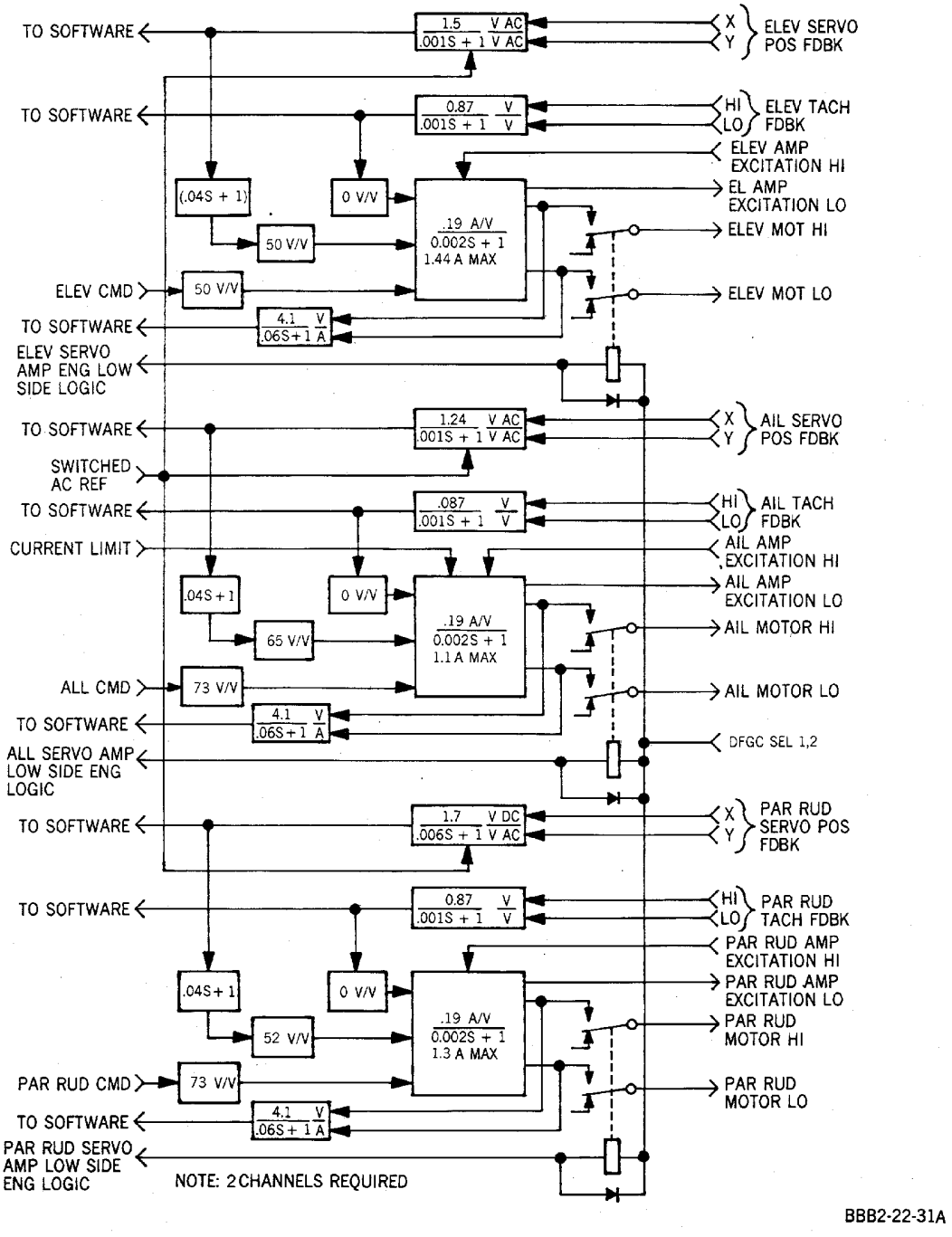
Serial Data I/O -- Simplified Block Diagram
Figure 7/22-01-01-990-813



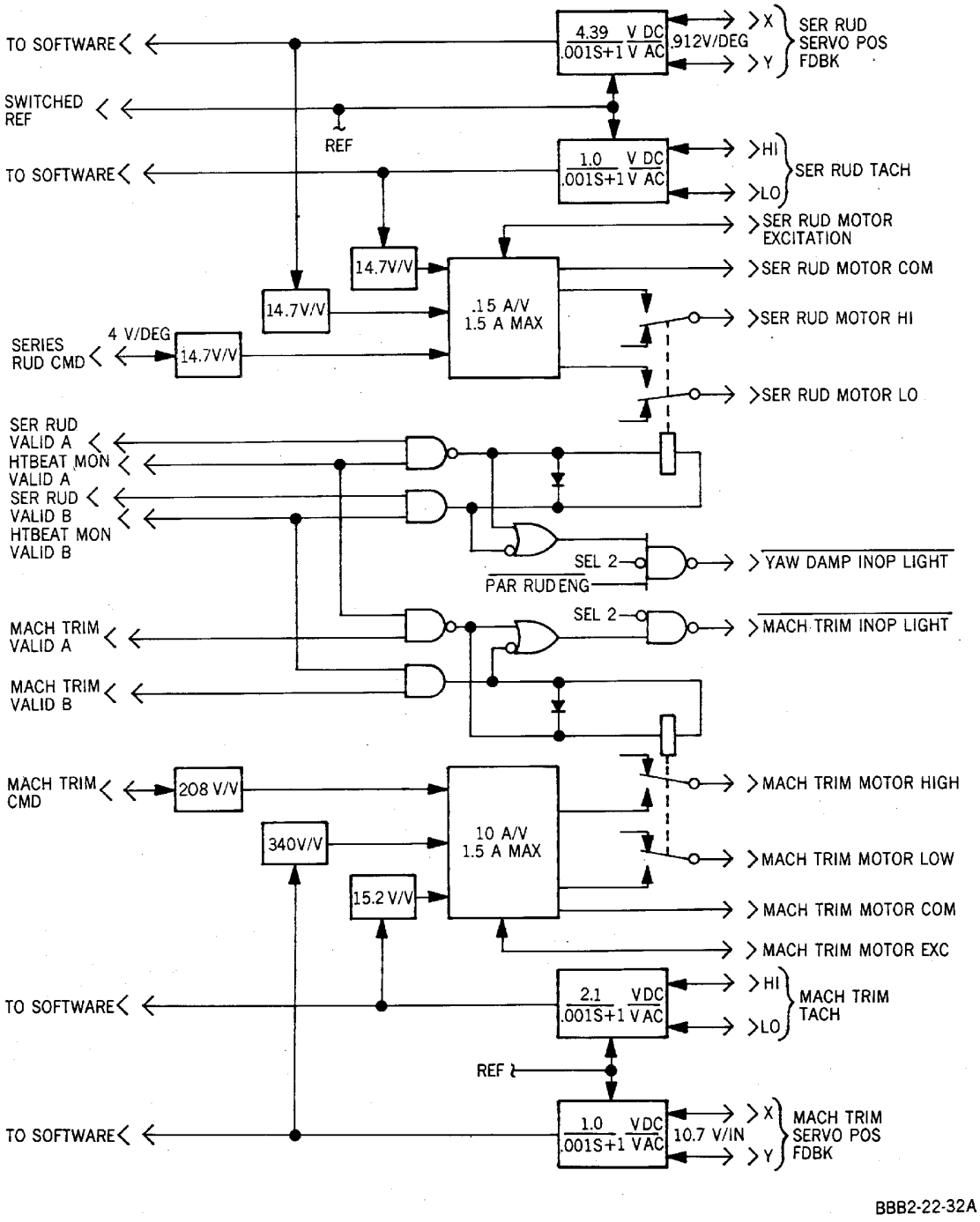
Autopilot Hardware Logic and Computation -- Simplified Schematic
Figure 8/22-01-01-990-814 (Sheet 1 of 2)



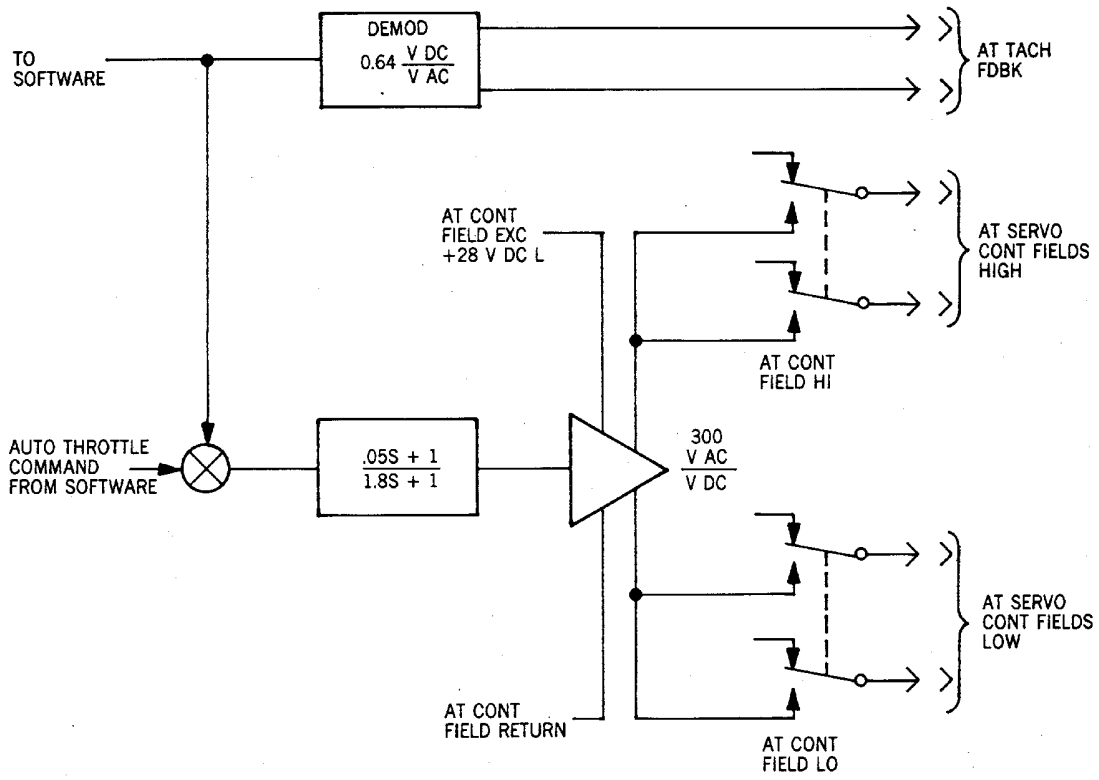
Autopilot Hardware Logic and Computation -- Simplified Schematic
Figure 8/22-01-01-990-814 (Sheet 2 of 2)



Dual Servo Electronics -- Simplified Schematic
Figure 9/22-01-01-990-815



Yaw Damper/Mach Trim Servo Electronics -- Simplified Schematic
Figure 10/22-01-01-990-816



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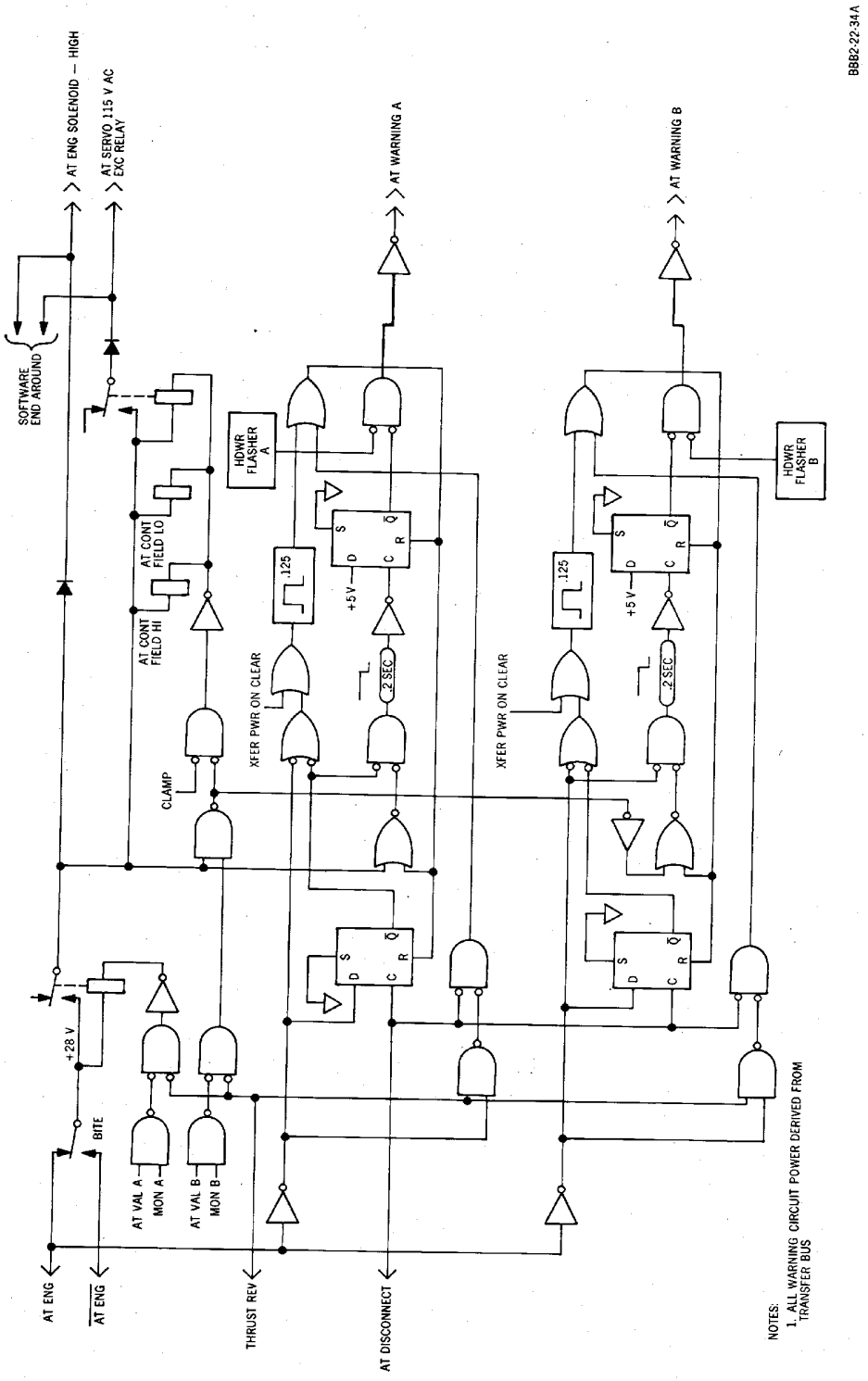
Autothrottle Servo Electronics -- Simplified Schematic
Figure 11/22-01-01-990-817



Channels A and B Autothrottle Engage and Warning -- Simplified Schematic
Figure 12/22-01-01-990-821

5. -972 DFGC System Description

A. Flight Guidance Control Panel (FGCP) Reference Jumps

An investigation of the DFGC/FGCP interface showed that a jump in the thumbwheel reference may occur when the pitch control knob is moved back and forth rapidly. The jump could occur in all displayed references including vertical speed, airspeed, Mach and pitch modes. If the reference jump occurs, flight director/autopilot guidance will be controlled to the newly displayed reference. Normal pitch wheel control may be immediately restored by rotating the pitch wheel in the appropriate direction. Investigation also showed that this same reference jump could occur for the altitude select and speed/Mach select knobs although the possibility of occurrence was less due to mechanics of these knobs.

The cause was traced to a change implemented in the -970 DFGC to improve noise immunity. The jumps do not occur with -960 and previous DFGCs. A software change has been made to the -972 DFGC software to correct this problem.

B. Automatic Thrust Restoration

In the -971 DFGC, the Automatic Thrust Restoration (ATR) function is armed and available at all times during takeoff. However, ATR is required only after a cutback during takeoff. Therefore, the logic for ATR has been revised such that ATR will only be available following a cutback while in takeoff mode.

C. Maintenance Test RAM Failure

A software anomaly existed such that if the STP/MCDU On/Off switch is set to OFF during the maintenance test of the altitude advisory light, the DFGC logs a RAM failure. A software change has been made to correct this.

D. Altitude Capture while Moving Thumbwheel

A software anomaly in the DFGC sometimes prevents proper initialization of the vertical speed display when altitude capture mode is engaged. This may cause the vertical speed reference to be incorrectly initialized when the Vertical Speed Wheel is used. A small pitch transient will occur when the vertical speed mode is subsequently selected. The DFGC software has been updated to correct this anomaly.

E. Nuisance Glideslope Valid Failure Messages

After an autoland, the selected DFGC often records a "GLIDESLOPE VALID X FAILURE" message, where X is the non-associated NAV receiver. This failure message should not be recorded upon exiting the glideslope mode during the approach. The logging of this message is a software glitch in the -971 DFGC. A change to the DFGC software has been made to correct the glitch.

F. FMA Altitude Arm Reversion after Landing

With the automatic altitude arming option, altitude inadvertently arms upon autopilot disconnect after an autoland. This occurs because the pitch mode first reverts to glideslope track and then to a basic mode after the disconnect. The automatic altitude arm is required to arm the selected altitude when the pitch mode leaves glideslope capture or track which includes flare and nose lowering. A change has been made to the DFGC such that if the aircraft is on the ground when the glideslope capture/track mode is exited to a mode other than G/A, the altitude will not be armed.

G. DFGS Takeoff Lower Pitch Limit with Flap Position Change

If the flaps are raised during a takeoff, the takeoff reference speed increases. The DFGC will not allow the aircraft to pitch the nose down sufficiently to accelerate to the new speed reference. This occurs because a pitch command lower limit, effective during takeoff and go-around, was included to improve performance during a windshear encounter. A software change has been made which will enable the speed reference to be achieved after flaps are retracted.

H. Altitude Reference Changes Causing Disarming of Altitude

Several reports from operators stated that the FGCP altitude reference changed without input from the flight crew by 3000 feet from the value previously selected and that the armed altitude disarmed. Per design, the altitude preselect mode is disarmed in response to an altitude reference change. The FGCP/DFGC interface software has been changed in an effort to reduce the altitude reference jumps. There is no operational difference due to this change.

I. Maintenance Test Cockpit Display

On aircraft with single cue Flight Directors the portion of the Maintenance Test that should display centered Flight Director indications had the FD bias out of view instead. This operation has been corrected with a software change.

J. Slat Extended Mach Limiting

The MD-80 placard Mach limit for slats extended is 0.57 M. DFGC software Mach limit is 0.57 M for flaps set greater than or equal to 3° and 0..57 M for flaps set less than 3°. T

K. TRP Lockout During Remote G/A

If the DFGC activates the Thrust Rating Panel (TRP) remote G/A discrete (for example during a windshear or ATR) and if the TRP or the DFGC discrete output has failed such that the TRP mode did not change to G/A, the DFGC holds the remote G/A discrete active. This is equivalent to depressing and holding a TRP mode select button. In this state all other button selections are locked out and the pilot is unable to select another thrust rating mode. Mode selection is locked until the remote G/A discrete is released by the DFGC.

A change to the DFGC has been incorporated so that if the TRP does not change to G/A within a reasonable amount of time (a few seconds), the remote G/A discrete will be released. This will allow the pilot to manually select another mode.

L. Aileron Torque Limiting Monitor

In response to several customer requests, Douglas has offered an optional DFGS change which will eliminate the Autoland Certified Maintenance Requirements (CMR) which requires the DFGC Return to Service Test (RTS) to be performed every 450 hours to comply with the autoland certification.

The purpose of this RTS inspection is to detect latent failures in the system which might otherwise go undetected and affect autoland performance. In particular, the RTS checked the 26° flap switch to verify that the aileron torque limiting rheostat was bypassed when the flaps were in a landing configuration.

Changes to the DFGC hardware and software allow the DFGC to continuously monitor the 26° flap switch in landing flap configurations to eliminate the 450 hour RTS test. An additional wire from the 26° flap switch to each DFGC is installed to facilitate the extra monitoring.

A DFGC option pin will be used for the installation of this function.

M. Manual Reversion from Windshear Guidance via Altitude Hold

The MD-80 Windshear System Requirements Specification requires that if throttles are clamped when windshear autothrottle guidance is activated, they will be clamped upon reversion out of windshear guidance. During testing on the Integrated Test Facility (ITF), it was discovered that the throttles reverted to speed mode instead of clamping when altitude hold was used to cancel windshear guidance, after a Flex T/O. Note that when other pitch modes were used to cancel W/S or when a normal T/O was performed with this procedure, the throttles remained clamped. A change to the DFGC software has been made to correctly implement the clamp requirement.

N. Pitch Guidance in EPR SEL

With the flight director in takeoff mode and EPR select cutback armed, cutback remains armed and will be activated if the EPR SEL button is pressed. This will occur even after a sensor failure which would invalidate takeoff pitch guidance (flight director bar biased out of view and autopilot disconnected if engaged). The DFGC software has been changed to disarm the EPR select cutback after liftoff if flight director pitch guidance is not available.

O. Stabilizer Monitor for Trim Runaway

If a stabilizer alternate trim switch is stuck in an active position, every time the autopilot trim releases the trim brake in order to trim, the stabilizer will move in the direction of the stuck relay. The autopilot will eventually (if not initially) try to trim in the opposite direction. This will result in a stabilizer runaway. A stabilizer direction monitor has been implemented which senses the rate of change of the stabilizer position. When stabilizer rate exceeds a fixed threshold, the polarity of the rate is compared to the direction of the autopilot trim command. If the stabilizer is not moving (that is below the rate threshold) or if the polarity of the rate is the same as that being commanded by the DFGC, a trim valid bit is set. If the polarity of the rate is opposite of that commanded, the trim valid bit is cleared. The trim valid bit is then used directly in the autopilot engage enable equation, resulting in an autopilot disconnect if it is zero.

P. Ground Roll-Out

During crosswind landing demonstrations for the FAA certification of the MD-90 -901 DFGC, six out of nine landings were rated unsatisfactory because of excessive lateral control inputs shortly after main gear contact. A change is included in the -972 to eliminate lateral control inputs after touch down by modifying the ground roll-out initiation logic.

Q. 972/-971 DFGC Intermix

Douglas has certified intermixed operation of the -972 and -971 DFGCs in order to give the operator flexibility in using mixed avionics should the operator so desire. This would be especially advantageous to the operator while changing over from -971 to -972 DFGCs. If a -971 and -972 are used together, certain differences in operation require changes which will ensure that no operational differences between the two DFGCs are apparent to the pilot.

Douglas has used the DFGS intercomputer data bus to determine intermix configurations.

The serial bus has been used to inhibit those -972 changes in an intermixed configuration which are considered incompatible with -971 operation.

The following list describes those changes which have been inhibited in the -972 DFGC via the serial bus:

(1) FMA Altitude Arm Reversion after Landing

The change implemented for this item will prevent the reversion to altitude arm once the aircraft is on the ground following a landing. While this reversion does not always occur, a situation may arise in which a -971 DFGC would revert while the -972 DFGC would not thereby causing a mismatch between the two FMA arm windows. Therefore, the new logic will not be used in an intermixed configuration.

6. -973 DFGC Improvements as Compared to -972 DFGC

A. 20 Foot Decision Height (Customer Option)

This change is the result of a customer request for a 20 foot decision height (DH) certification with their local regulatory agency. The DFGC software will have a 20 foot go-around capability with a wheel strike occurring only once in ten thousand go-arounds.

A DH signal from each pilot's Electronic Flight Instrument System (EFIS) control panel is provided to the DFGC. When both DHs are set to 20 feet, autothrottle retard will be delayed until the aircraft reaches 25 feet. This delay in retard will permit a go-around at 20 feet with a wheel strike occurring only once in ten thousand go-arounds.

Additionally, if the 20 foot DH has been selected and the aircraft is on approach, the Flight Mode Annunciator (FMA) arm annunciations will be as follows:

- At or below 1500 feet, the FMA arm window will annunciate "20 G/A" (instead of AUT G/A which is the standard FMA arm annunciation on approach below 1500 feet).
- At 50 feet, the FMA pitch window will display flare (FLAR) and the throttle window will display clamp (CLMP).
- At 25 feet, the FMA throttle window will display retard (RETD).

NOTE: In the standard approach FLAR and RETD are both annunciated at 50 feet.

The logic for this will be option pin selectable and requires that the Honeywell Electronic Flight Instrument System (EFIS) and Sextant Avionics Heads Up Display (HUD) System be installed.

B. Autopilot Solenoid Switch Failure

In certain instances it is possible for the autopilot (A/P) engage solenoid switch located on the Flight Guidance Control Panel (FGCP) to experience an internal mechanical failure to the "ON" position. This failure can prevent the flight crew from disconnecting the A/P in the normal manner.

A change to the DFGC General Logic module will insure that the A/P will remain disconnected if the yellow yoke A/P disconnect buttons are pressed but the A/P engage discretes do not change states. A change has been made to allow the A/P disconnect aural and visual warnings to be canceled with a second press of the disconnect pushbutton.

C. Autothrottle Solenoid Switch Failure

As the Autothrottle (A/T) engage solenoid switch is the same part number as the A/P engage solenoid switch, it is subject to the same potential failure. When the A/T engage switch is failed to the "ON" position, the A/T will remain engaged with a normal disconnect button push. Pushing and holding either autothrottle disconnect pushbutton will cause the red A/T "OFF" FMA annunciation to begin flashing. If the disconnect pushbutton is held in the disconnect position, the A/T will disconnect when an A/T speed change is commanded. However, the FMA red A/T disconnect warning is not resetable with a second disconnect button push. Further, the FMA throttle window annunciations will still indicate A/T engaged states.

A change to the logic has been made to ensure that the A/T remains disconnected if the throttle lever disconnect pushbutton is pressed but the A/T engage discrete remains high. The A/T disconnect warnings will be canceled with a second push of the throttle lever disconnect pushbutton. Also, the FMA throttle window annunciations have been modified to prevent a misleading annunciation.

DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES

1. General

A. There are two identical Digital Flight Guidance Computers (DFGC's) located in the Electrical/ Electronics compartment. The computers are identified as DFGC 1 and DFGC 2 and are both mounted in full ATR racks. DFGC 1 is located on the aft left radio rack on shelf No. 1, and DFGC 2 is located on the forward right radio rack on shelf No. 2.

WJE ALL POST MD80-22-124

NOTE: The Honeywell DFGCs part number 4034241-972 has been upgraded to part number 4034241-973. The DFGCs software has been upgraded on the -973 DFGCs. There is no change in testing.

WJE ALL

B. A Return to Service (RTS) test should be performed after removal/installation procedures on the replaced/disturbed DFGC. (DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 1 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 3 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 6 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 4 or DFGS STATUS/ TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 5 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/ 201 Config 10 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 11)

NOTE: When used for autoland, the DFGS return to service (RTS) test must be performed on each DFGC after DFGS system integrity has been disturbed or a DFGS LRU has been removed or replaced for aircraft with -970 DFGC's or prior. Aircraft with -971 and subsequent installed need only perform the RTS test on the affected side DFGC.

NOTE: Removal/installation procedures for both computers are identical except for circuit breaker placarding.

2. Removal/Installation DFGC

WARNING: DO NOT INSTALL -930 AND PRIOR DIGITAL FLIGHT GUIDANCE COMPUTERS (DFGC) ON MD-80 SERIES AIRCRAFT. THIS WILL HAVE A DIRECT IMPACT ON FLIGHT SAFETY.

A. Remove DFGC

NOTE: The -974DFGC cannot be intermixed with any other DFGC.

NOTE: The -971 DFGC can be intermixed with the -970 DFGC. The DFGC intercomputer serial data bus (or an option pin) will inhibit the -971 changes that are incompatible with the -970 DFGC.

NOTE: If aircraft configuration permits, all AC power may be removed and the bus control switches on the overhead turned “OFF” and tagged as an alternate circuit breaker opening.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags: The following circuit breakers correspond to removal of DFGC 1.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1
G	26	B10-343	MACH TRIM-1
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

Open these circuit breakers and install safety tags: The following circuit breakers correspond to removal of DFGC 2.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	6	B10-333	AUTO THROTTLE-2
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	6	B10-366	AUTO THROTTLE -2
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

G	13	B10-346	YAW DAMPER-2

(2) On appropriate DFGC, press release button on top of handles; pull inner portion of handles down to release locking pins.

(3) Carefully pull DFGC straight out of mounting rack until electrical connectors are disengaged from mounting rack support, and remove DFGC.

(4) If DFGC is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install DFGC

(1) Verify the following circuit breakers are open, tagged, and safetied: The following circuit breakers correspond to DFGC 1.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1
G	26	B10-343	MACH TRIM-1
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

Verify the following circuit breakers are open, tagged, and safetied: The following circuit breakers correspond to DFGC 2.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	6	B10-333	AUTO THROTTLE-2
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	6	B10-366	AUTO THROTTLE -2
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
E	12	B10-354	AUTOPILOT-2
WJE ALL			
G	13	B10-346	YAW DAMPER-2

(2) Visually check DFGC connector plugs, and mating connectors on mounting rack for loose, bent, or dirty connector pins.

(3) Carefully slide DFGC straight into mounting rack, ensuring that connectors are properly aligned, and that latch handles engage on keeper pins.

(4) Close locking handles and press firmly until securely locked into place.

(5) Remove tags and close the following circuit breakers: The following circuit breakers correspond to DFGC 1.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1
G	26	B10-343	MACH TRIM-1
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

Remove tags and close the following circuit breakers: The following circuit breakers correspond to DFGC 2.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	6	B10-333	AUTO THROTTLE-2
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	6	B10-366	AUTO THROTTLE -2
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

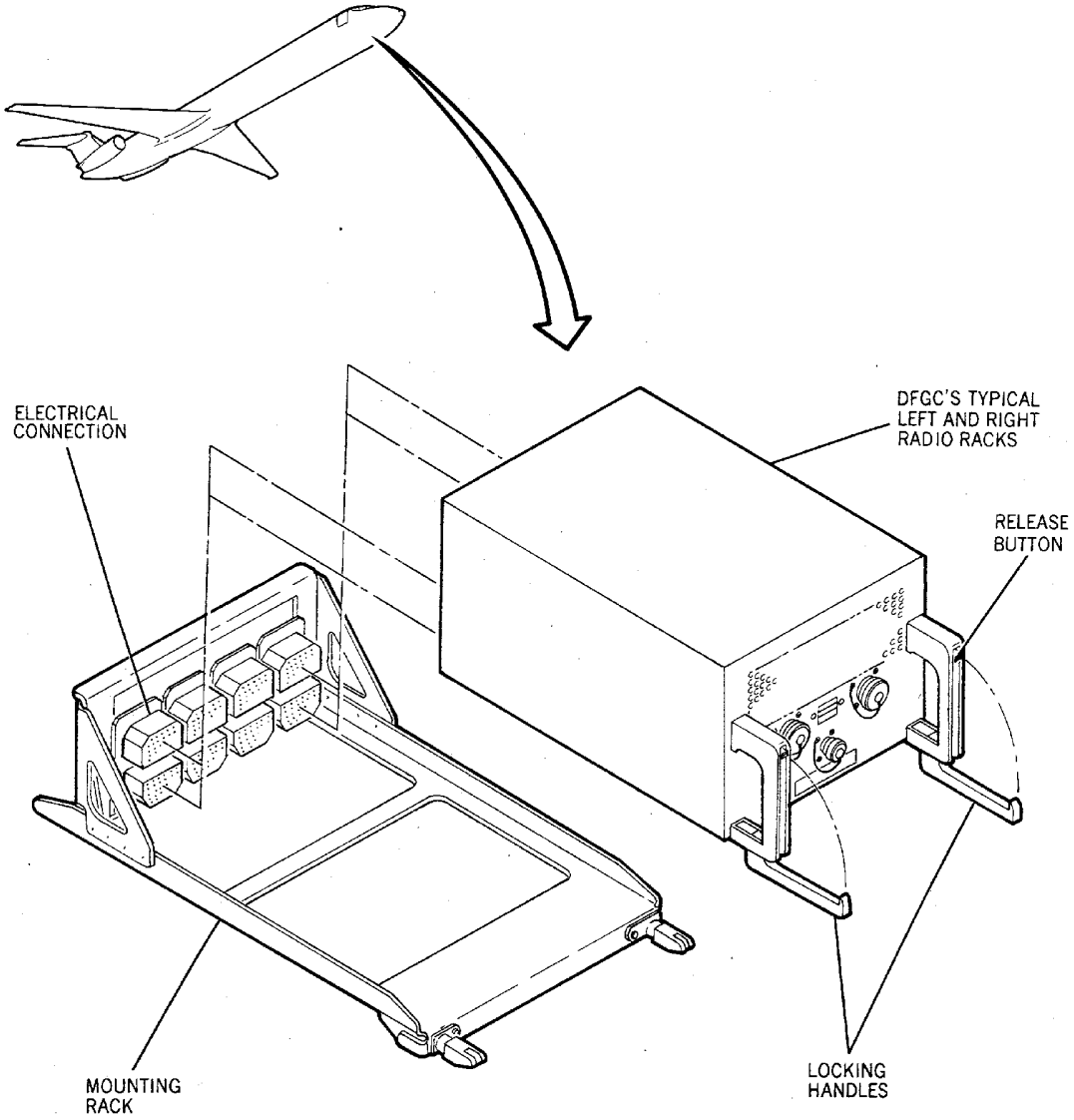
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

G	13	B10-346	YAW DAMPER-2

(6) Perform Return to Service (RTS) test. (DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 1 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 3 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 6 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 4 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 5 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 10 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 11)



Digital Flight Guidance Computer (DFGS) -- Removal/Installation
Figure 201/22-01-01-990-822

DIGITAL FLIGHT GUIDANCE COMPUTER - ADJUSTMENT/TEST

1. General

A. This procedure contains task card data.

B. Refer to DC-9-80 Fixed Maintenance Intervals Report MDC-J1271, CMR No 34–3.

TASK 22-01-01-710-801

2. Operational Check of the Selected Thrust Cutback System

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure is a CMR task.

NOTE: Refer to DC-9-80 Fixed Maintenance Intervals Report MDC-J1271, CMR No 34–3.

(2) This task is applicable to airplanes with Engine Pressure Ratio (EPR) select mode for automatic noise abatement.

B. Selected Thrust Cutback System Operational Check

SUBTASK 22-01-01-865-001

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, L AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
K	30	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, R AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
L	30	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	33	B1-24	RIGHT GROUND CONTROL RELAY

WJE ALL

SUBTASK 22-01-01-710-001

(2) Make sure that the DFGC is in the flight mode.

NOTE: Insure flight directors are ON.

(3) Push the T/O button on Thrust Rating Indicator (TRI) to put it into the T/O mode.

SUBTASK 22-01-01-865-002

(4) Remove the safety tags and close these circuit breakers:

UPPER EPC, L AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
K	30	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, R AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
L	30	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	33	B1-24	RIGHT GROUND CONTROL RELAY

WJE ALL

SUBTASK 22-01-01-710-002

(5) Before 20 seconds has elapsed, push the TOGA switches on the throttles and verify that the TRI changes to the Go-Around (GA) mode.

C. Job Close-up

SUBTASK 22-01-01-942-001

(1) Remove all the tools and equipment from the work area. Make sure the area is clean.

——— **END OF TASK** ———

DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - DESCRIPTION AND OPERATION

1. General

A. The Digital Flight Guidance Control Panel (DFGCP) is located in the flight compartment mounted on the center of the glare-shield. The DFGCP provides the primary interface between the flight crew and the Digital Flight Guidance System (DFGS).

B. The DFGCP contains reference select, mode select, and mode engage switches along with data readout to control/display various flight modes. Internally the DFGCP consists of fourteen assemblies; four synchro assemblies, one switch assembly, seven component cards, a power supply and chassis assembly.

2. Description

A. Internal Description

(1) Internally the DFGCP consists of four synchro assemblies that provide Speed/Mach, Heading, Pitch Attitude, and Altitude with external knobs geared to turn the synchros and set their specific functions. The switch assembly (autopilot switch) is provided to engage the autopilot and select the DFGC to be used during flight. There are also seven printed wire boards (PWB's), consisting of serial receiver logic/crs -1 decoders, serial receiver input/selector, speed/mach display drives/crs -2 decoders, heading display drives, and altitude display drives.

B. Push-buttons

(1) There are thirteen backlighted push-buttons that provide momentary discrete inputs to the DFGC. The push-button provide four categories, combined control, pitch control, roll control and autothrottle control.

(a) Combined Control - consists of AUTO LAND, ILS, and TURB push-buttons with one spare push-button for growth.

(b) Pitch Control - consists of IAS/MACH, VERT SPD, ALT HOLD and PERF push-buttons with one spare push-button for growth.

(c) Roll Control - consists of VOR LOC with one spare push-button for growth.

(d) Autothrottle Control - consists of SPD SEL, MACH SEL, and EPR LIM.

C. Engage Switches

(1) The DFGCP engage switches consist of flight director (2), autopilot and autothrottle.

(a) Flight Director - non-solenoid held type switches located at each end of the DFGCP.

(b) Autopilot - two-position solenoid-held type switch with a position type rotary switch concentrically located around the engage switch for selection of either DFGC.

(c) Autothrottle - two-position solenoid type switch.

D. Control Knobs

(1) The control knobs consist of a SPD/MACH knob, Heading (H) knob, Altitude (ALT) knob, Pitch Wheel and two Dimming knobs.

(a) SPD/MACH knob - rotary control with three axial positions, normal, push and push twice.

(b) H knob - rotary control containing two concentric knobs, one to select heading and the other to select bank-angle. H knob has four axial positions, pull, normal, push and push twice.

(c) ALT knob - rotary control with three axial positions, pull, normal and push.

(d) Pitch Wheel - proportional displacement wheel (output signal is proportional to displacement of wheel).

(e) Dimming knobs - potentiometer type knobs, one to control brightness for readout displays, the other to control panel edge lighting and push-button background lighting.

E. Display Readouts

(1) The display readouts on the DFGCP are SPD/MACH, Heading, Pitch Profile and altitude. Each numerical display readout consists of seven-segment digit numerical characters. When MACH is displayed it is preceded by a decimal point. The pitch profile display has a + or - readout to show aircraft pitch attitude or vertical speed, and a sixteen-segment character to display operating modes as follows.

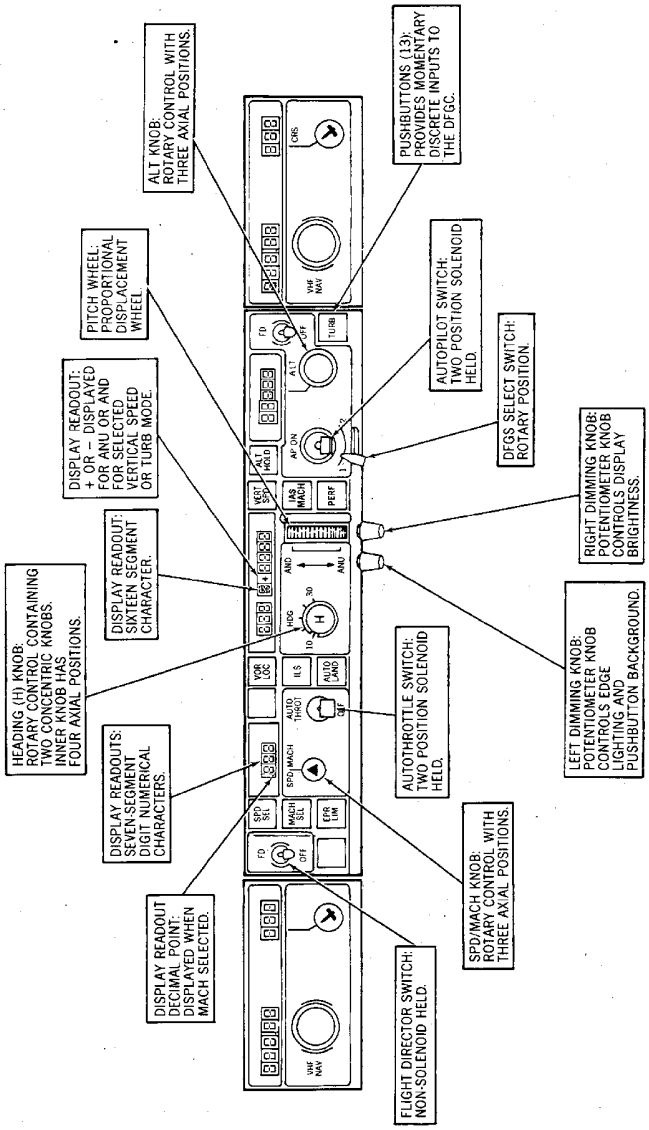
(a) "V" - Vertical Speed

(b) "S" - Indicated Airspeed

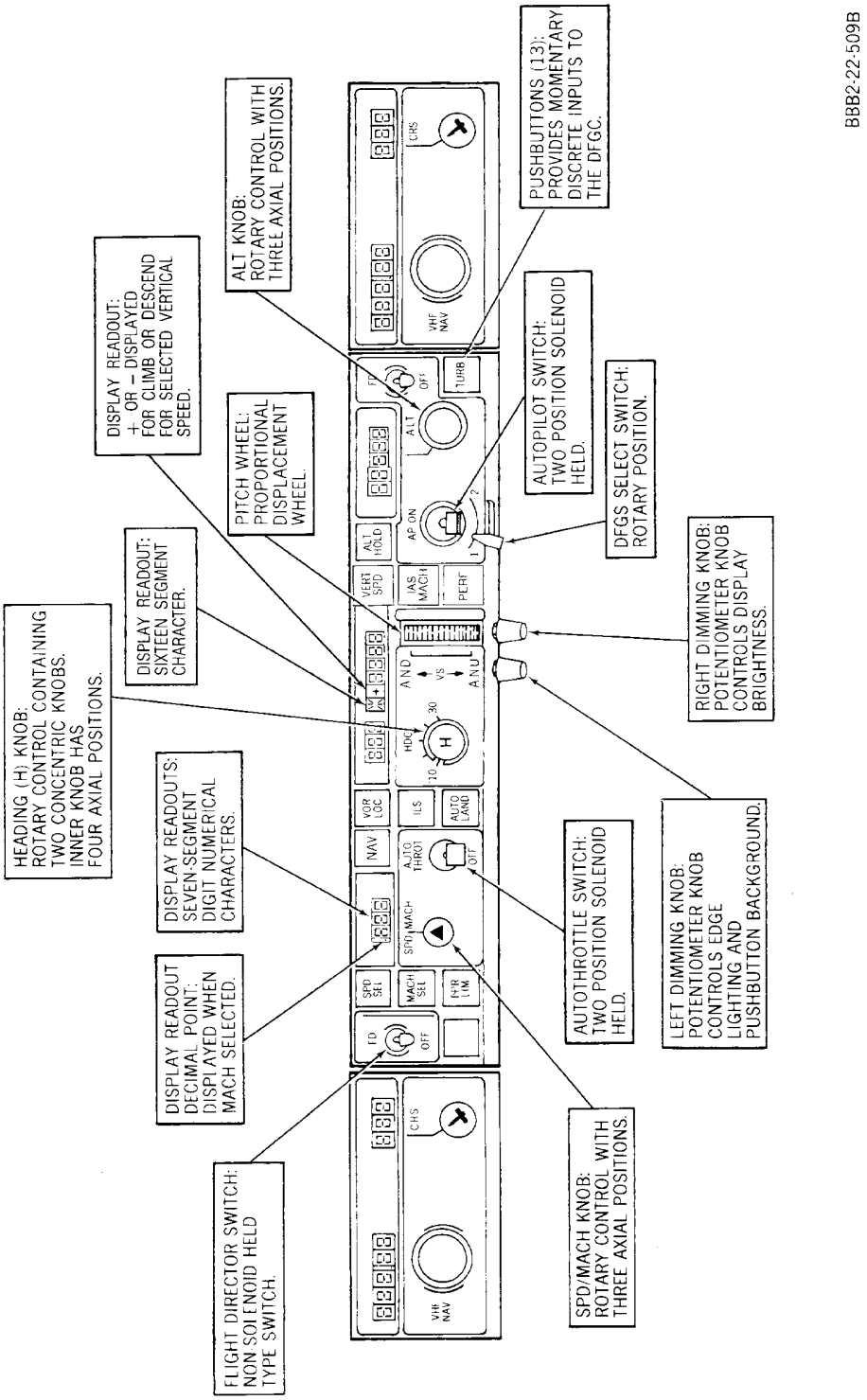
(c) "M" - Mach Number

(d) "P" - Pitch Attitude

BBB2-22-397



DFGCP Controls & Indications
Figure 1/22-01-02-990-877 (Sheet 1 of 2)



DFGCP Controls & Indications
Figure 1/22-01-02-990-877 (Sheet 2 of 2)

3. Operation

A. Power Supply (Figure 2)

(1) Figure 2 depicts operation of the power supply, dimming knobs, K1 select relay, receiver selector, decoder/memory, dropout detector, drivers and reference display.

(2) The power supply has three distinct functions, to regulate +2.32 VDC from the external EMER Bus 28 VDC power supply; provide a regulated +5 VDC logic output; and apply selected 28 VDC Hi and power ground through select relay K1 contacts to the power supply.

(3) The EMER Bus 28 VDC power supply is regulated to +2.32 VDC. This voltage is applied to the right dimming pot. The output of the dimming pot voltage is then applied internally to the lamp power supply section and externally to the Navigation Control Panels lamp power supply. Turning the right dimming knob CW will cause the displays to go brighter and turning the dimming knob CCW will cause the displays to go dimmer. When THUNDERSTORM switch is on, and both fuel shutoff levers are OFF (engines off), the GROUND MAINT pin on the DFGCP will be grounded, and the displays will go to reduced brightness. When the overhead panel THUNDERSTORM switch is selected, the THUNDERSTORM pin will be grounded and the displays will go to full brightness.

(4) The left dimming knob controls a potentiometer that is connected to a variable power supply. The variable power supply provides 0 - 5 VAC to the panel edge lighting and push-button background lamps. Rotating the dimming knob CW produces a dimming of the lamps, and CCW provides brightness of the lamps along with the edge lighting.

(5) Figure 2 depicts DFGS -1 selected (28 VDC -1 Hi and POWER GROUND -1) through select relay K1. Selecting DFGS -2 will provide a signal to pick up select relay K1 and to select logic in the RECEIVER/SELECTOR. The RECEIVER/SELECTOR selects the serial data input to be used and processes it into the DECODER/MEMORY, where the serial data is decoded and stored in memory. This data then provides signals to the Navigation Control Panels course display and internally to the REFERENCE DISPLAY DRIVERS. These drivers provide display for SPD/MACH, Pitch Profile, and Altitude.

(6) On ground if valid serial data is not received, a POC (POWER ON CLEAR) pulse is generated to blank all displays. The displays will remain blank until valid serial data is again received. During flight, a DROPOUT DETECTOR will blank all displays if valid serial data is not received for more than 1.5 seconds. The displays will then remain blank until valid serial data is again received.

B. Autopilot/Autothrottle Engage Switches (Figure 3)

(1) The autopilot engage switch contains a two position rotary type switch that is capable of selecting either DFGS -1 or DFGS -2. The switch determines which 28 VDC power bus is to be applied to the selected logic as SEL 1 or SEL 2 (SEL 1 corresponds to DFGS -1 and SEL 2 corresponds to DFGS -2) when SEL 1 or SEL 2 power is applied to the autopilot and autothrottle engage switches. Also, the output from SEL 2 will energize the K2 select relay. (Figure 5)

(2) The autopilot and autothrottle are two-position solenoid-held switches used to engage their respective systems. The switches will not hold in position unless their respective interlocks are satisfied. The autopilot engage switch solenoid has .05 SEC HOLD UP circuitry and the autothrottle engage switch solenoid has .2 SEC HOLD UP circuitry to maintain power across the solenoids in case of power interruptions.

C. Control Switches and Push-buttons (Figure 4)

(1) The Bank Angle Limit switch is a rotary, five position switch. Turning the switch through its positions (15 through 30 degrees) closes one switch at a time to provide an output discrete signal (DSC) to FGCP/DFGC DSC.

(2) The HDG (H) switch is a four position axial type switch with synchro control, spring-loaded to center. The pull out position provides HDG SEL. The second push in position provides HDG HOLD. The first push in position and normal position are used to adjust the heading synchro (Figure 5).

(3) SPD/MACH is a three position axial type switch with synchro control, spring-loaded to normal position. The switch is momentarily pushed to the first detent for FAST CHG and to the second detent for RECALL. The FAST CHG and normal position of the switch are used to adjust the synchro (Figure 5).

(4) The ALT switch is a three position axial type switch with synchro control, spring-loaded to center. The switch is momentarily pulled out to arm for altitude and pushed in for SLOW CHG. The SLOW CHG and center position of the switch are used to adjust the synchro (Figure 5).

(5) The two FD switches (captain's and first officer's) are toggle SPST (single pole, single throw) type switches. When set to FD, the switch will cause the respective DFGC to display steering command information to the same side ADI. However, a FD CMD switch, located on the overhead panel allows both flight directors to be controlled from a single DFGC.

(6) The push-button switches are backlighted, momentary captive type switches. A momentary push on the switch will provide a signal to the DFGC for respective mode engagement.

D. Control Synchros (Figure 5)

(1) The HDG knob in the normal position provides a slow synchro adjustment. The first pushed in detent position provides a fast adjustment of the synchros. The output of the synchros are fed to their individual RDI's and DFGC's, where the DFGC's process the signals and return serial data information to the DFGCP for HDG display.

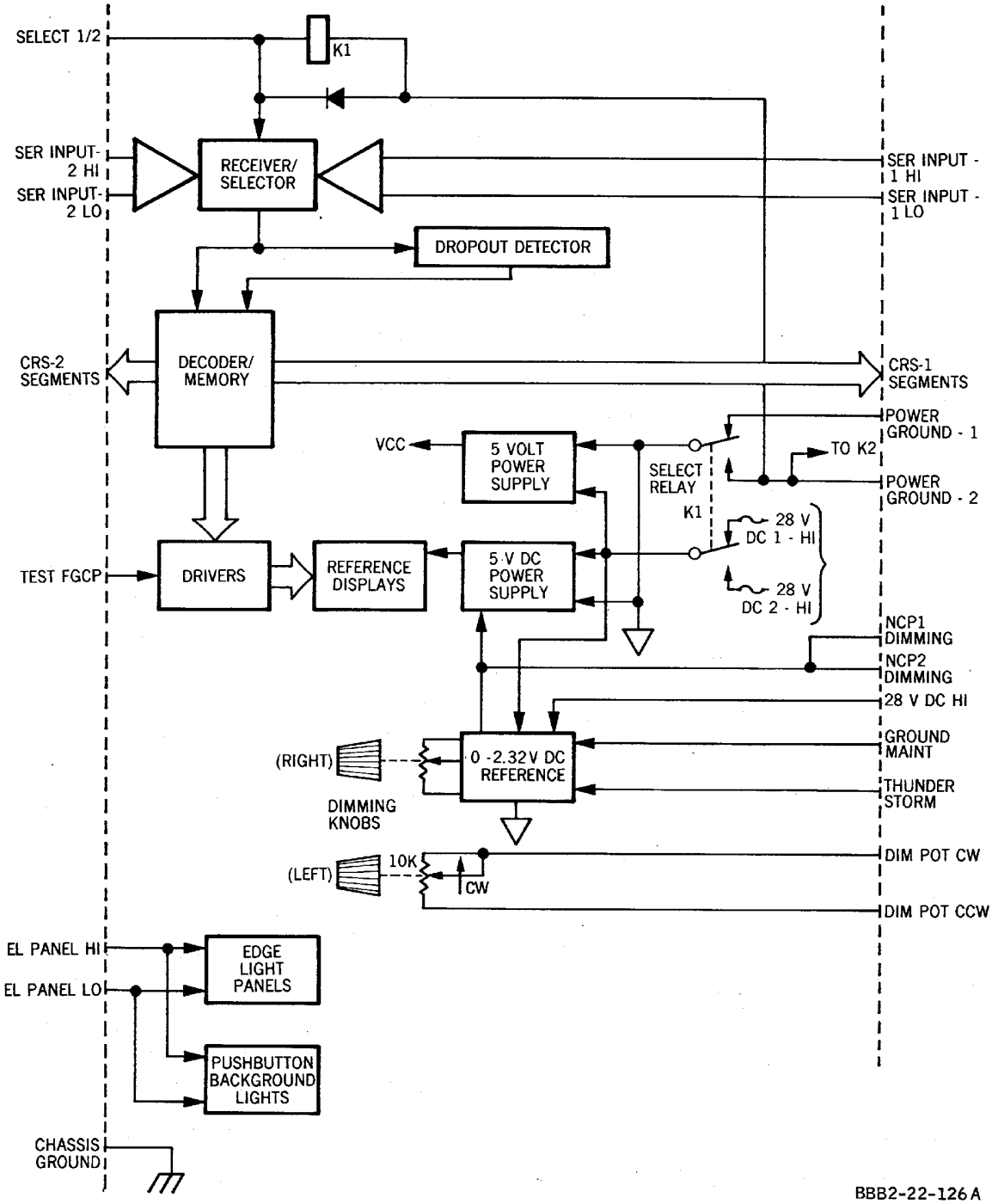
(2) When the ALT knob is in the normal position and also pulled out for ARM, rotating the knob will provide 1000 foot increment synchro adjustments. When the ALT knob is pushed in, 100 foot increment synchro adjustments are provided. The ALT REF output is processed through the DFGC's and return serial data information to the DFGCP for altitude display.

(3) In the normal position the SPD/MACH knob provides a slow slew synchro rate. In either of the pushed in detents, a fast slew synchro rate is provided. The SPD/MACH REF output is processed through the DFGC's and serial data information is returned to the DFGCP as SPD/MACH display.

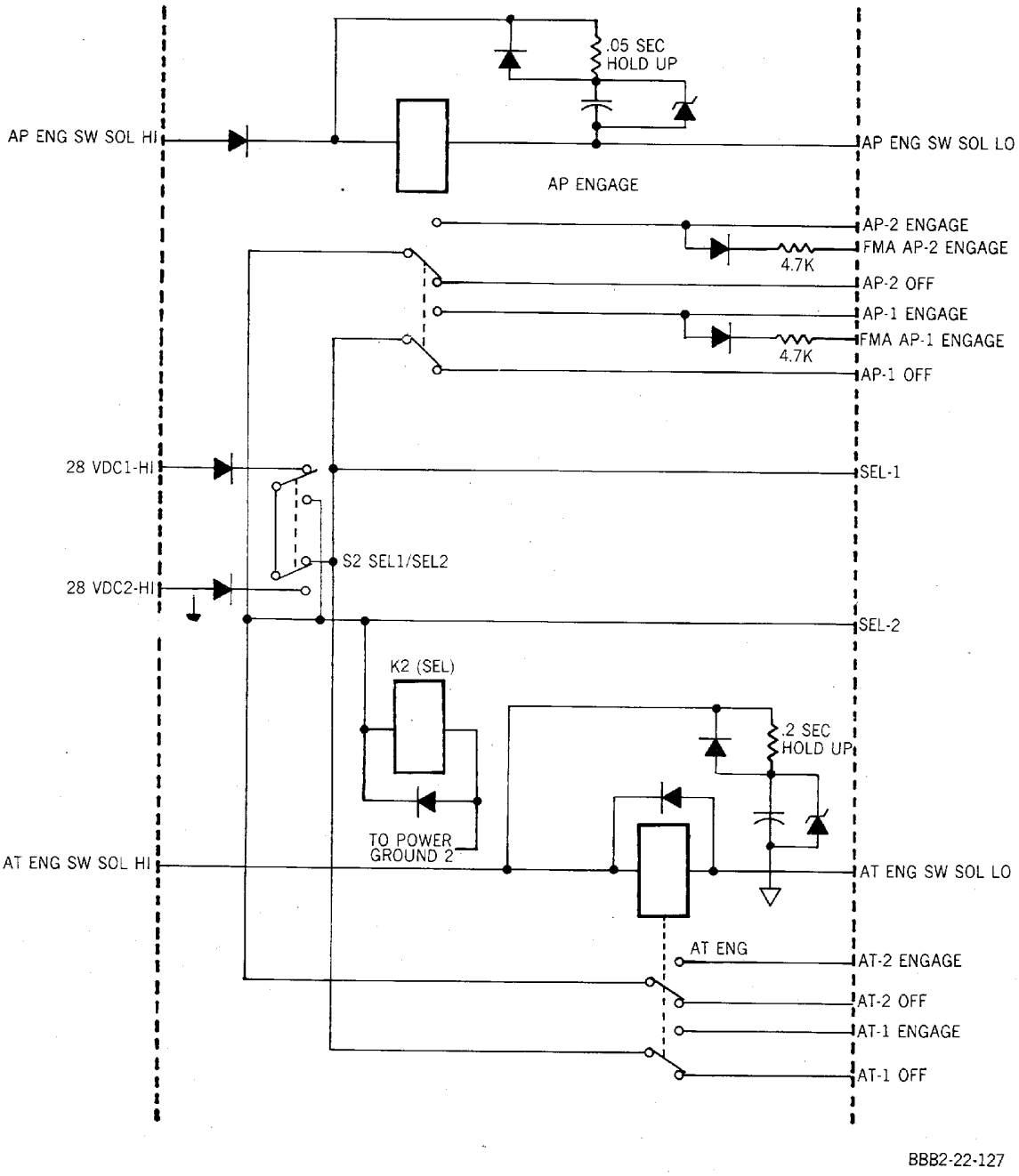
(4) The pitch wheel is a proportional displacement type wheel that provides VERT SPD, IAS, MACH, TURB and PERF mode references that can be adjusted as required to select a different value than that displayed on the pitch profile readout window. The V/S REF is processed through the DFGC's and serial data information is returned to the DFGCP as pitch profile display.

(5) V/S solenoid power is applied to the pitch wheel friction clutch to provide less than 0.5 pounds of drag on the pitch wheel. when power is removed from the solenoid, the drag on the pitch wheel increases to approximately 1 pound.

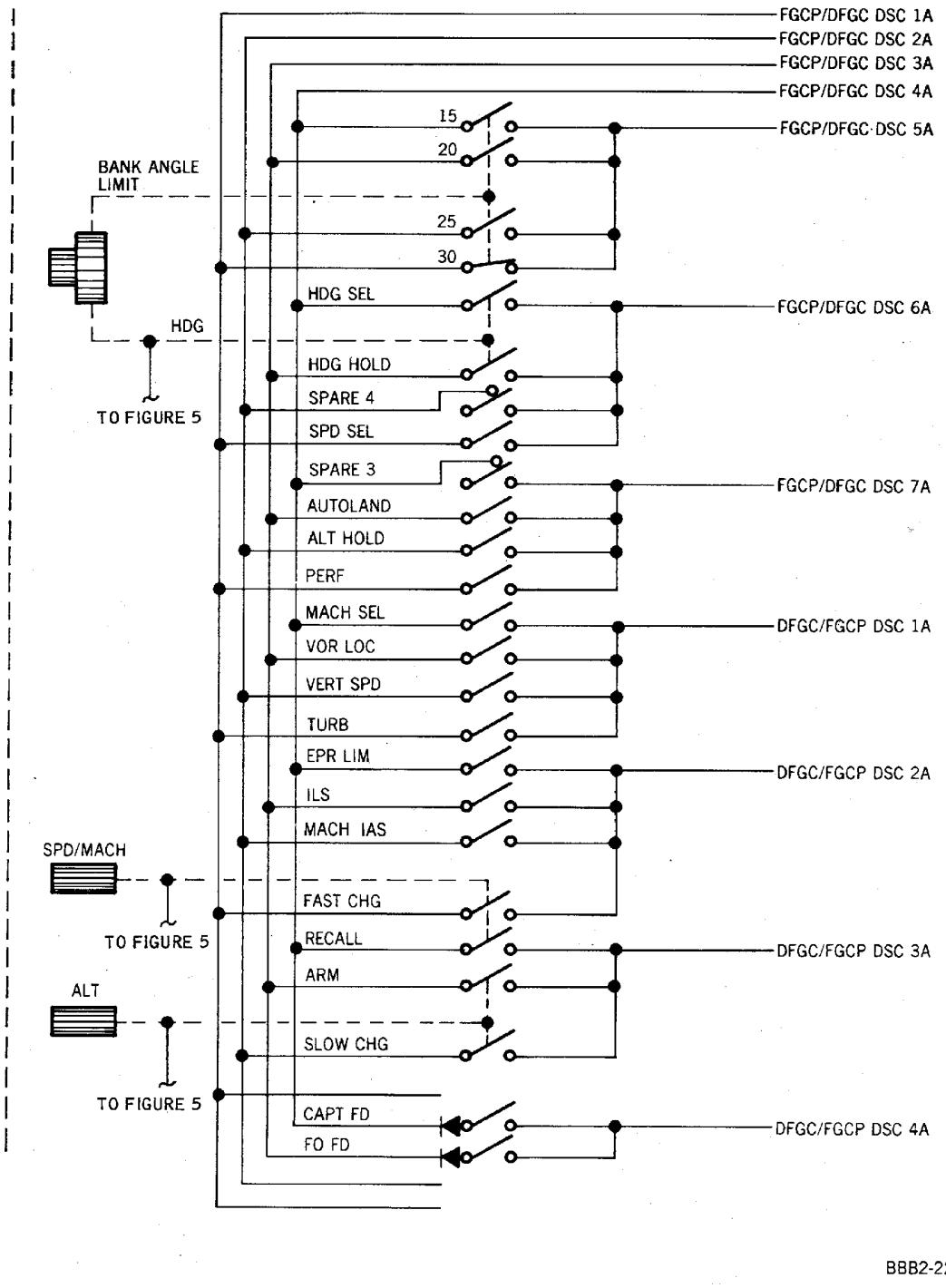
(6) The K2 select relay is energized only when the DFGS switch is in the number 2 position. 26 VAC is then selected to match the system under use.



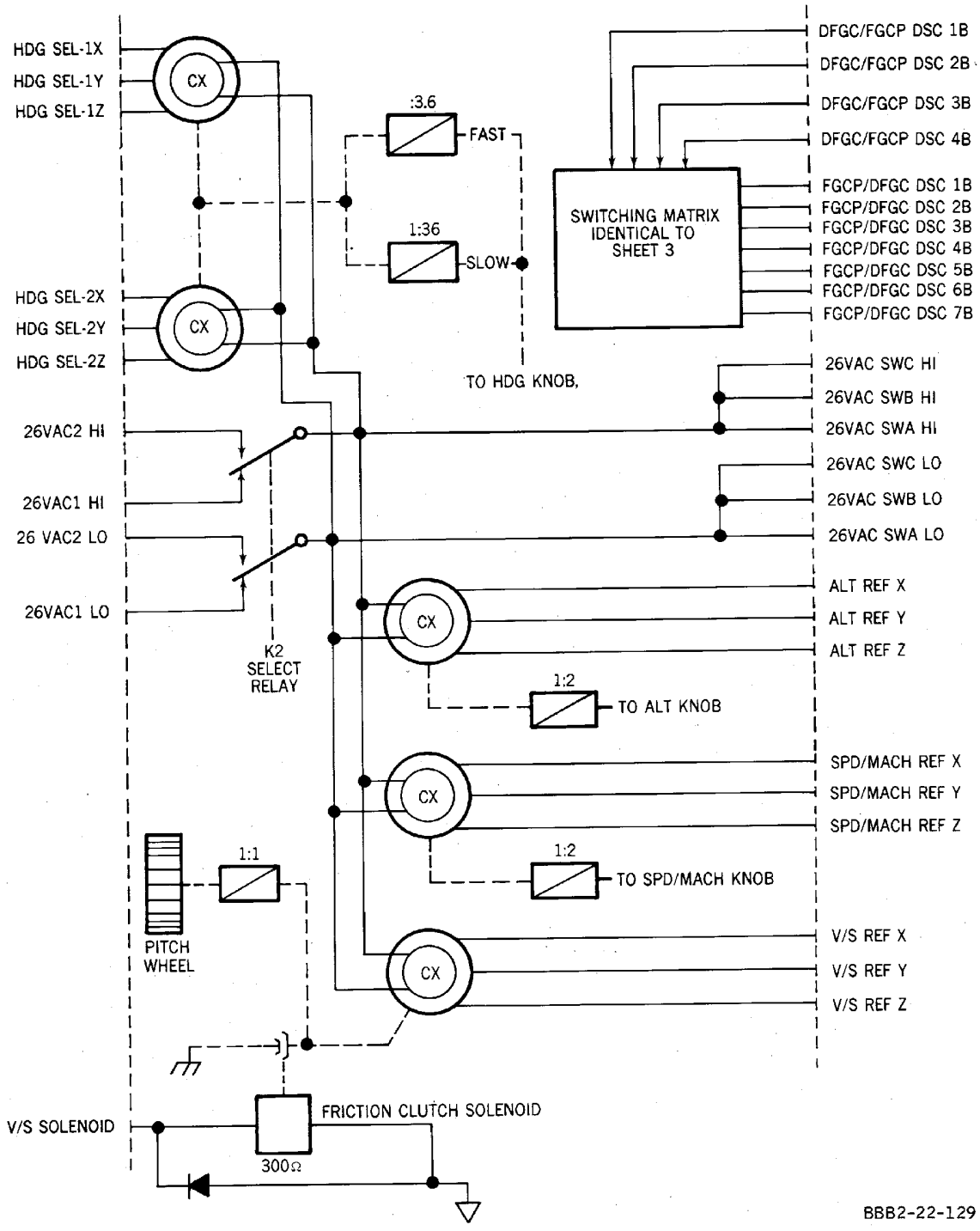
Power Supply
Figure 2/22-01-02-990-878



Autopilot/Autothrottle Engage Switch
Figure 3/22-01-02-990-879



Control Switches and Push-buttons
Figure 4/22-01-02-990-880



Control Synchros
Figure 5/22-01-02-990-881

4. To Operate DFGCP

A. Push-button Switches

Table 1

(1) SPD SEL -	Automatically engages autothrottle in SPD SEL mode, if autothrottle engaged in MACH SEL, EPR LIM or CLAMP mode.
(2) MACH SEL -	Automatically engages autothrottle in MACH SEL mode, if autothrottle engaged in SPD SEL, EPR LIM or CLAMP mode.
(3) EPR LIM -	Automatically engages autothrottle in EPR LIM mode, if autothrottle engaged in SPD SEL, MACH SEL, RETD, or CLAMP mode.
(4) VOR LOC -	Automatically arms the system for VOR or localizer, if Navigation Control Panel is tuned to desired frequency.
(5) ILS -	Establishes preliminary conditions for ILS Approach Mode, if Navigation Control Panel is tuned to ILS frequency and course set to inbound localizer heading.
(6) AUTO LAND -	Establishes preliminary conditions for AUTO LAND mode, if Navigation Control Panel is tuned to ILS frequency and course set to inbound localizer heading.
(7) VERT SPD -	Establishes Vertical Speed Mode. Maintains existing vertical speed at time of engagement.
(8) MACH -	Establishes and maintains MACH Hold Mode. If autopilot engaged, pitch attitude adjusted to maintain MACH value.
(9) IAS -	Establishes and maintains Indicated Airspeed Mode. If autopilot engaged, pitch attitude adjusted to maintain airspeed value.
(10) ALT HOLD -	Establishes Altitude Hold Mode. If auto- pilot engaged, pitch attitude adjusted to maintain altitude at time of engagement.
(11) TURB -	Provides a low gain pitch attitude response. Disengages autothrottle, inhibits automatic pitch trim, and provides wings level command.
(12) PERF -	Establishes and maintains performance mode, if autopilot and autothrottle engaged. Pitch attitude will adjust to CDU commands and autothrottle will adjust to EPR Limit.
WJE 405, 409, 881, 883, 884, 886, 887, 892	
(13) NAV -	Couples the OMEGA NAV steering signals to the autopilot.
WJE 405-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 886, 887, 891-893	

B. Engage Switches

Table 2

(1) FD (2) -	Establishes basic flight director modes; HDG HOLD, ALT HOLD (VERT SPD).
(2) AUTO THROT -	Automatically engages throttle servo motor to adjust engine power settings throughout all flight modes, from takeoff to automatic retard mode.
(3) AP ON -	Automatically engages Flight Guidance System into existing flight director modes after takeoff liftoff. Autopilot modes then may be selected.

C. Rotary Switches and Potentiometers

Table 3

(1) SPD/MACH -	Selects speed or mach reference values for AT/SC.
	(a) Normal position selects SPD/MACH at a slow slew rate.

Table 3 (Continued)

	(b) Pushed to mid-detent position, selects SPD/MACH at a fast slew rate.
	(c) Pushed in to maximum position, selects fast slew rate and alternately switches SPD/MACH reference signals to the SPD/MACH readout window. Either may be changed for storage within the DFGC's.
(2) HDG (H) -	Selects desired magnetic heading for heading select/heading hold modes.
	INNER Knob
	(a) Normal position provides slow heading adjustment.
	(b) First push-in momentary detent position provides fast adjustment.
	(c) Second push-in momentary detent position provides HDG HOLD mode.
	(d) Pull-out momentary position provides HDG SEL mode (no rotation).
	OUTER Knob
	(a) Sets Bank Angle Maximum from 10 to 30 degrees in 5 degree steps in all roll modes except localizer, where it is overridden to a maximum of 30 degrees.
(3) Pitch Wheel -	Adjusts pitch attitude to obtain desired vertical speed, indicated airspeed, mach, or attitude reference during TURB Mode. The pitch wheel gives pitch attitude displacement proportional to pitch wheel displacement.
(4) AP 1, 2 -	Selects DFGC to be used during flight. The off-side DFGC (in standby) is continually receiving and processing parallel input signals in case selection is required.
(5) ALT -	Selects barometric altitude for Altitude Preselect to level the airplane.
	(a) Normal position provides 1000 feet increment adjustments.
	(b) Momentarily pull-out position arms system for a preselected altitude capture and for altitude advisory. Provides fast adjustments.
	(c) Push-in provides 100 feet increment adjustments and cancels altitude preselect mode.
(6) Dimmers -	Right - controls brightness of readout displays.
	Left - controls an external power supply to control brightness of edgelight panels and push-button background lights.

D. Display Readouts

Table 4

(1) SPD/MACH -	Indicates airspeed in knots with 3 digits (250), or mach value with decimal and 3 digits (.560).
(2) HDG -	Indicates magnetic heading in degrees with 3 digits (185).
(3) Pitch Profile -	Indicates vertical speed in feet per minute (V+2000), airspeed value in knots (S+0250), MACH value (M+.560) or pitch attitude reference during TURB mode in degrees (P+0003).
(4) ALT -	Indicates desired altitude in feet in 5 digits (25000). Units, tens, and hundreds show 0 through 9 or are blank. The 1000's and 10,000's digits have individually con- trolled segments and will indicate 1 through 9 or a specified symbol (=) in lieu 0.
(5) Edge Lighting -	Lights up indicator panels.

DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - DESCRIPTION AND OPERATION

1. General

A. The Digital Flight Guidance Control Panel (DFGCP) is located in the flight compartment mounted on the center of the glare-shield. The DFGCP provides the primary interface between the flight crew and the Digital Flight Guidance System (DFGS).

B. The DFGCP contains reference select, mode select, and mode engage switches along with data readout to control/display various flight modes. Internally the DFGCP consists of fourteen assemblies; four synchro assemblies, one switch assembly, seven component cards, a power supply and chassis assembly.

2. Description

A. Internal Description

(1) Internally the DFGCP consists of four synchro assemblies that provide Speed/Mach, Heading, Pitch Attitude, and Altitude with external knobs geared to turn the synchros and set their specific functions. The switch assembly (autopilot switch) is provided to engage the autopilot and select the DFGC to be used during flight. There are also seven printed wire boards (PWB's), consisting of serial receiver logic/crs -1 decoders, serial receiver input/selector, speed/mach display drives/crs -2 decoders, heading display drives, and altitude display drives.

B. Push-buttons

(1) There are thirteen backlighted push-buttons that provide momentary discrete inputs to the DFGC. The push-button provide four categories, combined control, pitch control, roll control and autothrottle control.

(a) Combined Control - consists of AUTO LAND, ILS, and TURB push-buttons with one spare push-button for growth.

(b) Pitch Control - consists of IAS/MACH, VERT SPD, ALT HOLD and VNAV push-buttons with one spare push-button for growth.

(c) Roll Control - consists of VOR LOC and NAV with one spare push-button for growth.

(d) Autothrottle Control - consists of SPD SEL, MACH SEL, and EPR LIM.

C. Engage Switches

(1) The DFGCP engage switches consist of flight director (2), autopilot and autothrottle.

(a) Flight Director - non-solenoid held type switches located at each end of the DFGCP.

(b) Autopilot - two-position solenoid-held type switch with a position type rotary switch concentrically located around the engage switch for selection of either DFGC.

(c) Autothrottle - two-position solenoid type switch.

D. Control Knobs

(1) The control knobs consist of a SPD/MACH knob, Heading (H) knob, Altitude (ALT) knob, Pitch Wheel and two Dimming knobs.

(a) SPD/MACH knob - rotary control with three axial positions, normal, push and push twice.

(b) H knob - rotary control containing two concentric knobs, one to select heading and the other to select bank-angle. H knob has four axial positions, pull, normal, push and push twice.

(c) ALT knob - rotary control with three axial positions, pull, normal and push.

(d) Pitch Wheel - proportional displacement wheel (output signal is proportional to displacement of wheel).

(e) Dimming knobs - potentiometer type knobs, one to control brightness for readout displays, the other to control panel edge lighting and push-button background lighting.

E. Flight Management System Push-button (If Installed)

(1) FMS OVRD - Push-button switch (push on/push off) changes the selected speed retaining speed prior to new selected speed and capable of return when disengaged.

F. Display Readouts

(1) The display readouts on the DFGCP are SPD/MACH, Heading, Pitch Profile and altitude. Each numerical display readout consists of seven-segment digit numerical characters. When MACH is displayed it is preceded by a decimal point. The pitch profile display has a + or - readout to show aircraft pitch attitude or vertical speed, and a sixteen-segment character to display operating modes as follows.

(a) "V" - Vertical Speed

(b) "S" - Indicated Airspeed

(c) "M" - Mach Number

(d) "P" - Pitch Attitude

G. Flight Management System

(1) On aircraft with Flight Management System (FMS) the selected speed may be changed in the FMS mode via the flight guidance control panel by engaging the FMS OVRD switch on the DFGCP. Disengaging the FMS OVRD switch shall return the system to the speed selected prior to the engagement of the FMS OVRD. The SPD/MACH display will display the prior selected speed.

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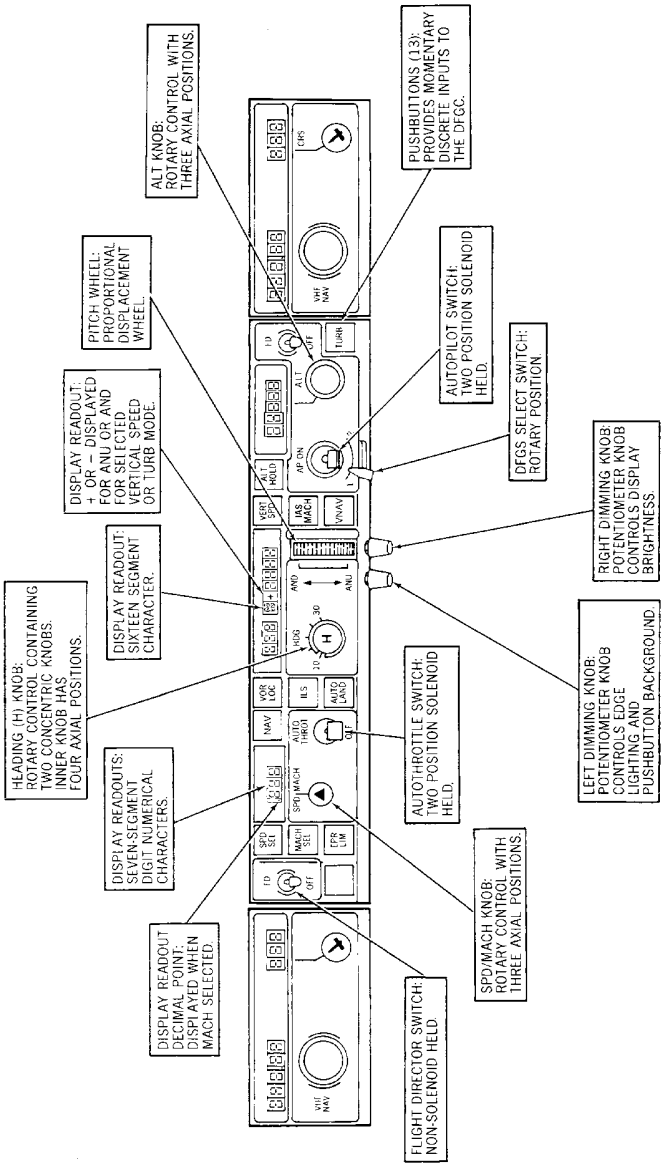
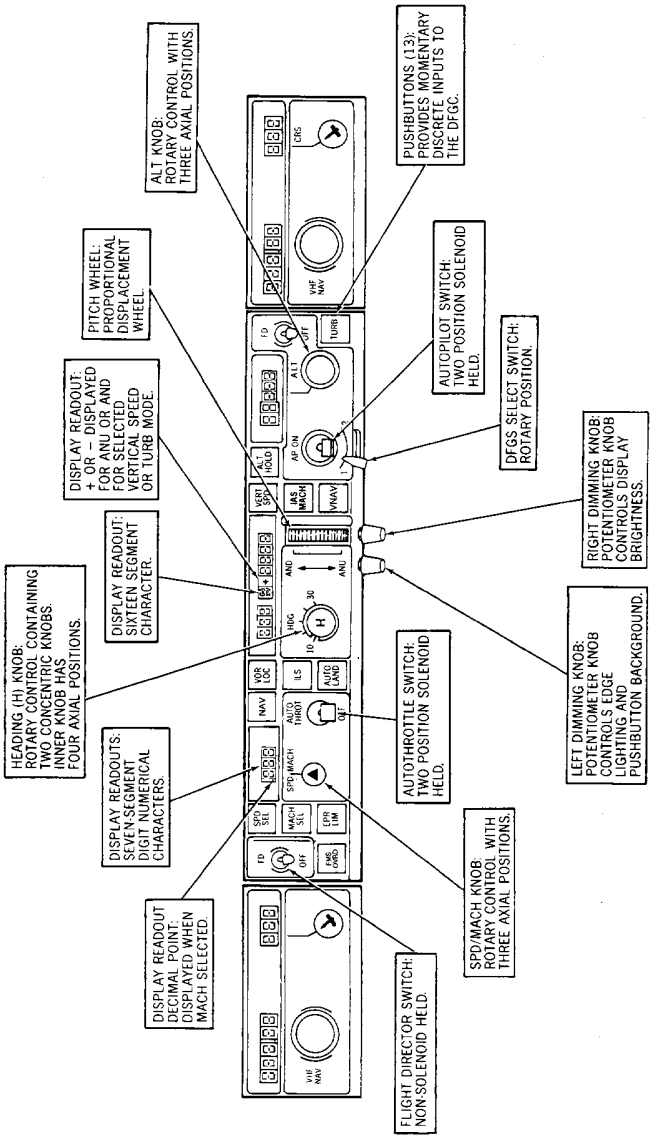


DFGCP Controls & Indications
Figure 1/22-01-02-990-887 (Sheet 1 of 2)

BBB2-22-767



DFGCP Controls & Indications
Figure 1/22-01-02-990-887 (Sheet 2 of 2)

3. Operation

A. Power Supply (Figure 2)

(1) Figure 2 depicts operation of the power supply, dimming knobs, K1 select relay, receiver selector, decoder/memory, dropout detector, drivers and reference display.

(2) The power supply has three distinct functions, to regulate +2.32 VDC from the external EMER Bus 28 VDC power supply; provide a regulated +5 VDC logic output; and apply selected 28 VDC Hi and power ground through select relay K1 contacts to the power supply.

(3) The EMER Bus 28 VDC power supply is regulated to +2.32 VDC. This voltage is applied to the right dimming pot. The output of the dimming pot voltage is then applied internally to the lamp power supply section and externally to the Navigation Control Panels lamp power supply. Turning the right dimming knob CW will cause the displays to go brighter and turning the dimming knob CCW will cause the displays to go dimmer. When THUNDERSTORM switch is on, and both fuel shutoff levers are OFF (engines off), the GROUND MAINT pin on the DFGCP will be grounded, and the displays will go to reduced brightness. When the overhead panel THUNDERSTORM switch is selected, the THUNDERSTORM pin will be grounded and the displays will go to full brightness.

(4) The left dimming knob controls a potentiometer that is connected to a variable power supply. The variable power supply provides 0 - 5 VAC to the panel edge lighting and push-button background lamps. Rotating the dimming knob CW produces a dimming of the lamps, and CCW provides brightness of the lamps along with the edge lighting.

(5) Figure 2 depicts DFGS -1 selected (28 VDC -1 Hi and POWER GROUND -1) through select relay K1. Selecting DFGS -2 will provide a signal to pick up select relay K1 and to select logic in the RECEIVER/SELECTOR. The RECEIVER/SELECTOR selects the serial data input to be used and processes it into the DECODER/MEMORY, where the serial data is decoded and stored in memory. This data then provides signals to the Navigation Control Panels course display and internally to the REFERENCE DISPLAY DRIVERS. These drivers provide display for SPD/MACH, Pitch Profile, and Altitude.

(6) On ground if valid serial data is not received, a POC (POWER ON CLEAR) pulse is generated to blank all displays. The displays will remain blank until valid serial data is again received. During flight, a DROPOUT DETECTOR will blank all displays if valid serial data is not received for more than 1.5 seconds. The displays will then remain blank until valid serial data is again received.

B. Autopilot/Autothrottle Engage Switches (Figure 3)

(1) The autopilot engage switch contains a two position rotary type switch that is capable of selecting either DFGS -1 or DFGS -2. The switch determines which 28 VDC power bus is to be applied to the selected logic as SEL 1 or SEL 2 (SEL 1 corresponds to DFGS -1 and SEL 2 corresponds to DFGS -2) when SEL 1 or SEL 2 power is applied to the autopilot and autothrottle engage switches. Also, the output from SEL 2 will energize the K2 select relay (Figure 5).

(2) The autopilot and autothrottle are two-position solenoid-held switches used to engage their respective systems. The switches will not hold in position unless their respective interlocks are satisfied. The autopilot engage switch solenoid has .05 SEC HOLD UP circuitry and the autothrottle engage switch solenoid has .2 SEC HOLD UP circuitry to maintain power across the solenoids in case of power interruptions.

C. Control Switches and Push-buttons (Figure 4)

(1) The Bank Angle Limit switch is a rotary, five position switch. Turning the switch through its positions (15 through 30 degrees) closes one switch at a time to provide an output discrete signal (DSC) to FGCP/DFGC DSC.

(2) The HDG (H) switch is a four position axial type switch with synchro control, spring-loaded to center. The pull out position provides HDG SEL. The second push in position provides HDG HOLD. The first push in position and normal position are used to adjust the heading synchro (Figure 5).

(3) SPD/MACH is a three position axial type switch with synchro control, spring-loaded to normal position. The switch is momentarily pushed to the first detent for FAST CHG and to the second detent for RECALL. The FAST CHG and normal position of the switch are used to adjust the synchro (Figure 5).

(4) The ALT switch is a three position axial type switch with synchro control, spring-loaded to center. The switch is momentarily pulled out to arm for altitude and pushed in for SLOW CHG. The SLOW CHG and center position of the switch are used to adjust the synchro (Figure 5).

(5) The two FD switches (captain's and first officer's) are toggle SPST (single pole, single throw) type switches. When set to FD, the switch will cause the respective DFGC to display steering command information to the same side Primary Flight Display. However, a FD CMD switch, located on the overhead panel allows both flight directors to be controlled from a single DFGC.

(6) The push-button switches are backlighted, momentary captive type switches. A momentary push on the switch will provide a signal to the DFGC for respective mode engagement.

D. Control Synchros (Figure 5)

(1) The HDG knob in the normal position provides a slow synchro adjustment. The first pushed in detent position provides a fast adjustment of the synchros. The output of the synchros are fed to their individual RDI's and DFGC's, where the DFGC's process the signals and return serial data information to the DFGCP for HDG display.

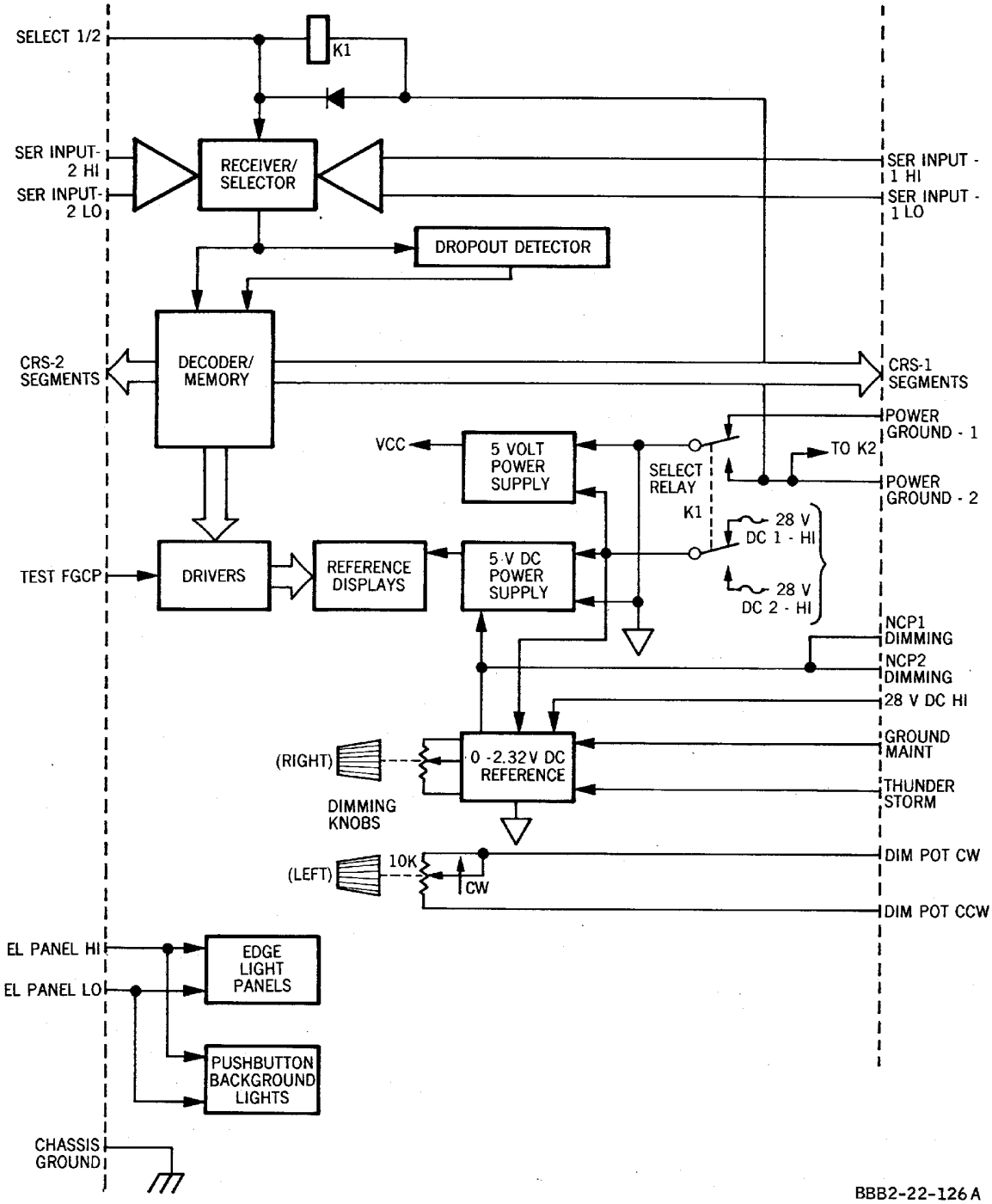
(2) When the ALT knob is in the normal position and also pulled out for ARM, rotating the knob will provide 1000 foot increment synchro adjustments. When the ALT knob is pushed in, 100 foot increment synchro adjustments are provided. The ALT REF output is processed through the DFGC's and return serial data information to the DFGCP for altitude display.

(3) In the normal position the SPD/MACH knob provides a slow slew synchro rate. In either of the pushed in detents, a fast slew synchro rate is provided. The SPD/MACH REF output is processed through the DFGC's and serial data information is returned to the DFGCP as SPD/MACH display.

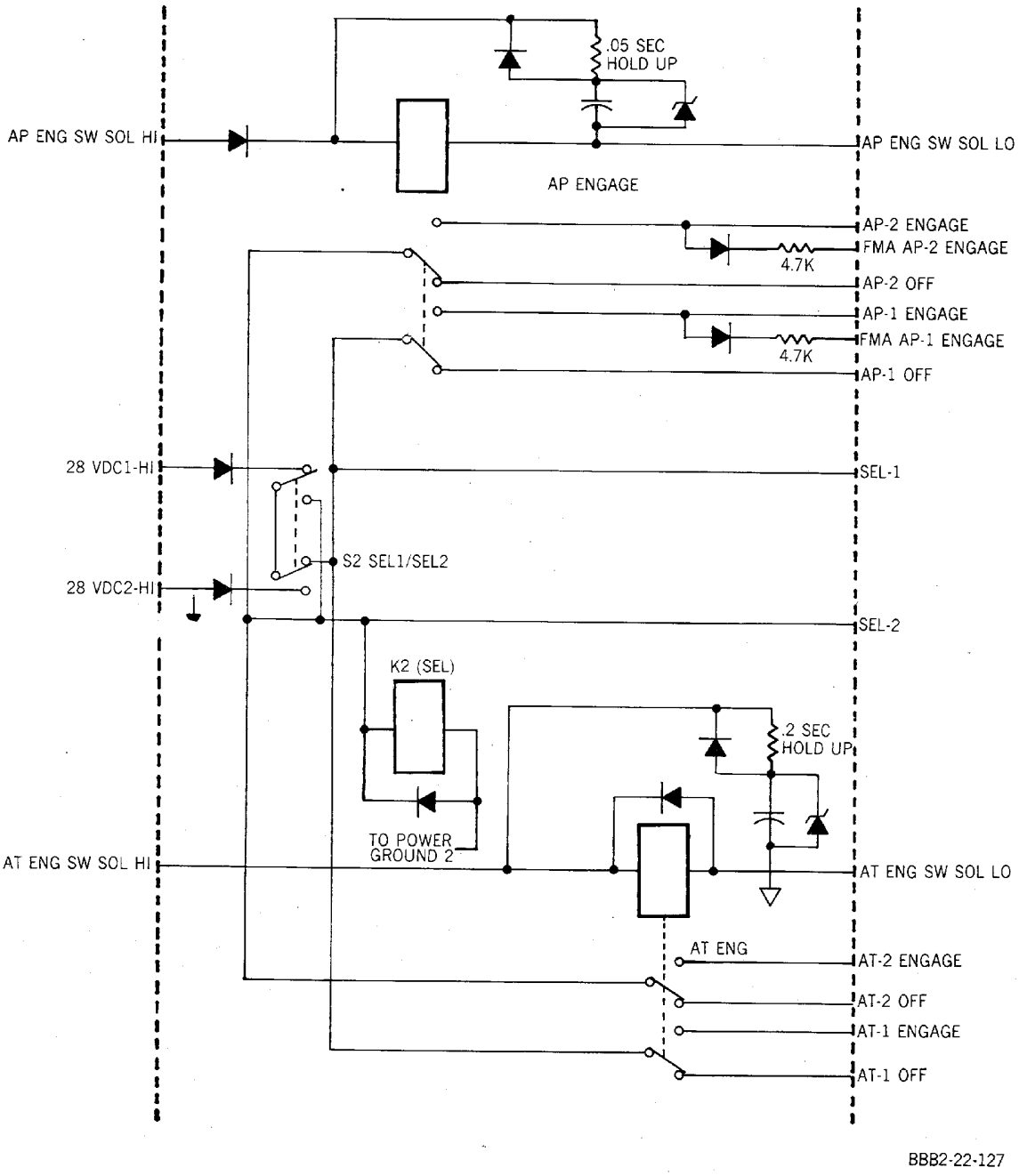
(4) The pitch wheel is a proportional displacement type wheel that provides VERT SPD, IAS, MACH and TURB mode references that can be adjusted as required to select a different value than that displayed on the pitch profile readout window. The V/S REF is processed through the DFGC's and serial data information is returned to the DFGCP as pitch profile display.

(5) V/S solenoid power is applied to the pitch wheel friction clutch to provide less than 0.5 pounds of drag on the pitch wheel. when power is removed from the solenoid, the drag on the pitch wheel increases to approximately 1 pound.

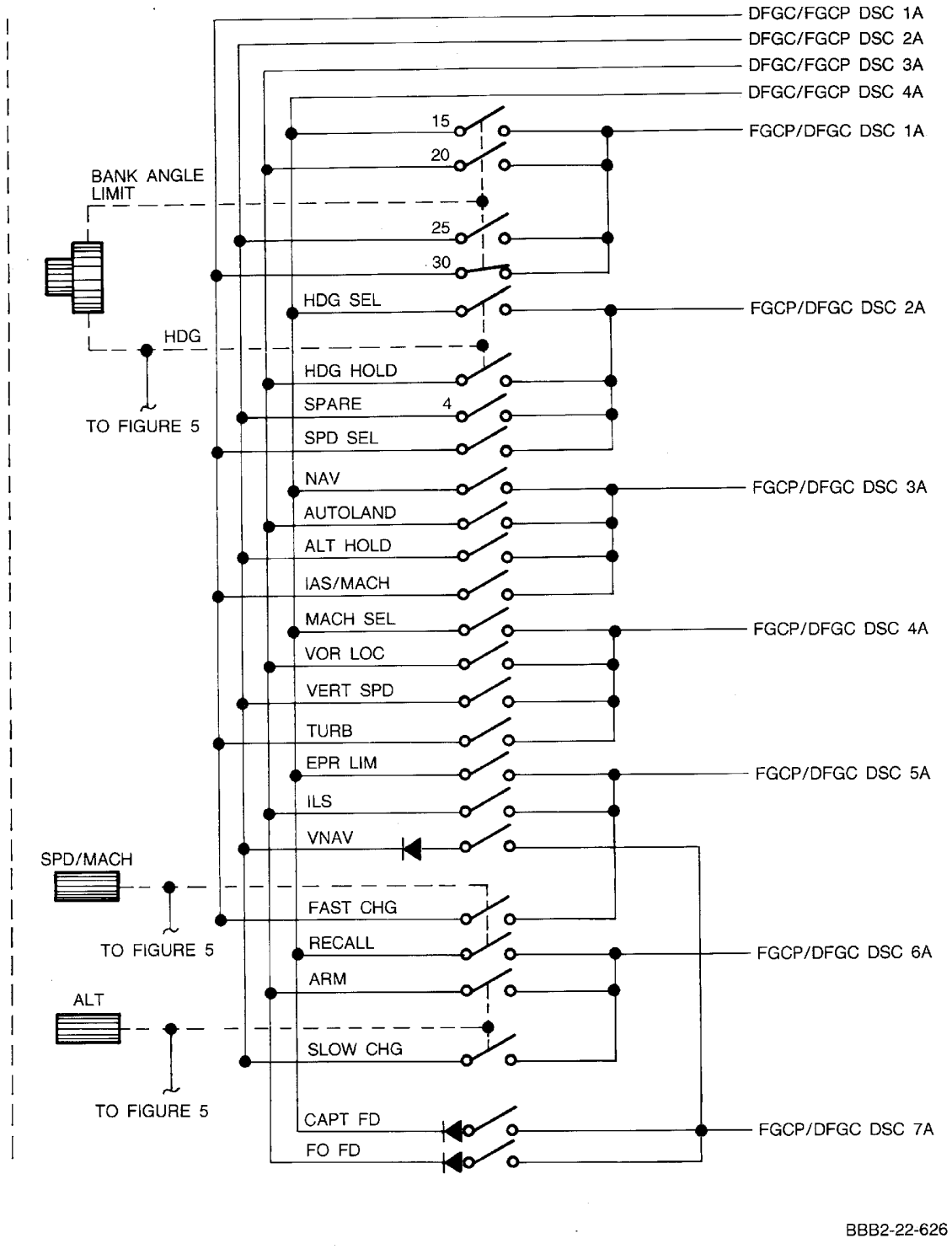
(6) The K2 select relay is energized only when the DFGS switch is in the number 2 position. 26 VAC is then selected to match the system under use.



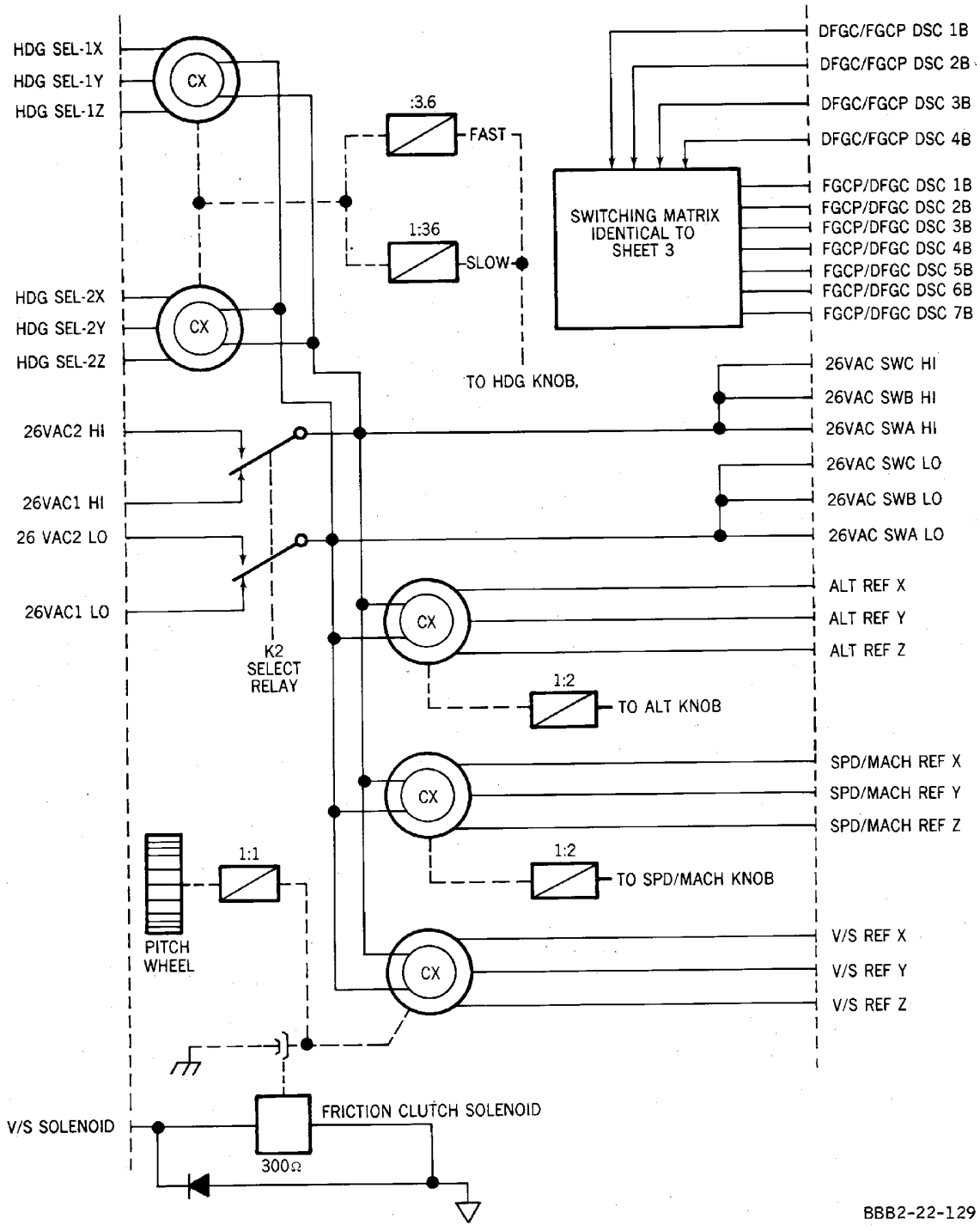
Power Supply
Figure 2/22-01-02-990-888



Autopilot/Autothrottle Engage Switch
Figure 3/22-01-02-990-889



Control Switches and Push-buttons
Figure 4/22-01-02-990-890



Control Synchros
Figure 5/22-01-02-990-891

4. To Operate DFGCP

A. Push-button Switches

Table 1

(1) SPD SEL -	Automatically engages autothrottle in SPD SEL mode, if autothrottle engaged in MACH SEL, EPR LIM or CLAMP mode.
(2) MACH SEL -	Automatically engages autothrottle in MACH SEL mode, if autothrottle engaged in SPD SEL, EPR LIM or CLAMP mode.
(3) EPR LIM -	Automatically engages autothrottle in EPR LIM mode, if autothrottle engaged in SPD SEL, MACH SEL, RETD, or CLAMP mode.
(4) VOR LOC -	Automatically arms the system for VOR or localizer, if Navigation Control Panel is tuned to desired frequency.
(5) ILS -	Establishes preliminary conditions for ILS Approach Mode, if Navigation Control Panel is tuned to ILS frequency and course set to inbound localizer heading.
(6) AUTO LAND -	Establishes preliminary conditions for AUTO LAND mode, if Navigation Control Panel is tuned to ILS frequency and course set to inbound localizer heading.
(7) VERT SPD -	Establishes Vertical Speed Mode. Maintains existing vertical speed at time of engagement.
(8) IAS/MACH -	MACH portion establishes and maintains MACH Hold Mode by pressing the IAS/MACH push-button above 27,000 feet. The first push engages the MACH mode. If autopilot engaged, pitch attitude adjusted to maintain MACH value.
	IAS portion establishes and maintains Indicated Airspeed Mode by pressing IAS/MACH push-button below 27,000 feet. The second push engages the IAS mode. If autopilot engaged, pitch attitude adjusted to maintain airspeed value.
(9) ALT HOLD -	Establishes Altitude Hold Mode. If auto- pilot engaged, pitch attitude adjusted to maintain altitude at time of engagement.
(10) TURB -	Provides a low gain pitch attitude response. Disengages autothrottle, inhibits automatic pitch trim, and provides wings level command.
(11) NAV -	Establishes and maintains lateral navigation mode if autopilot or flight director is engaged. Roll attitude will adjust to Flight Management Computer (FMC) commands.
(12) VNAV -	Establishes and maintains vertical navigation mode, if autopilot and autothrottle engaged. Pitch attitude will adjust to FMC commands and autothrottle will adjust to EPR command.

B. Engage Switches

Table 2

(1) FD (2) -	Establishes basic flight director modes; HDG HOLD, ALT HOLD (VERT SPD).
(2) AUTO THROT -	Automatically engages throttle servo motor to adjust engine power settings throughout all flight modes, from takeoff to automatic retard mode.
(3) AP ON -	Automatically engages Flight Guidance System into existing flight director modes after takeoff liftoff. Autopilot modes then may be selected.

C. Rotary Switches and Potentiometers

Table 3

(1) SPD/MACH -	Selects speed or mach reference values for AT/SC.
	(a) Normal position selects SPD/MACH at a slow slew rate.

Table 3 (Continued)

	(b) Pushed to mid-detent position, selects SPD/MACH at a fast slew rate.
	(c) Pushed in to maximum position, selects fast slew rate and alternately switches SPD/MACH reference signals to the SPD/MACH readout window. Either may be changed for storage within the DFGC's.
(2) HDG (H) -	Selects desired magnetic heading for heading select/heading hold modes.
	INNER Knob
	(a) Normal position provides slow heading adjustment.
	(b) First push-in momentary detent position provides fast adjustment.
	(c) Second push-in momentary detent position provides HDG HOLD mode.
	(d) Pull-out momentary position provides HDG SEL mode (no rotation).
	OUTER Knob
	(a) Sets Bank Angle Maximum from 10 to 30 degrees in 5 degree steps in all roll modes except localizer, where it is overridden to a maximum of 30 degrees.
(3) Pitch Wheel -	Adjusts pitch attitude to obtain desired vertical speed, indicated airspeed, mach, or attitude reference during TURB Mode. The pitch wheel gives pitch attitude displacement proportional to pitch wheel displacement.
(4) AP 1, 2 -	Selects DFGC to be used during flight. The off-side DFGC (in standby) is continually receiving and processing parallel input signals in case selection is required.
(5) ALT -	Selects barometric altitude for Altitude Preselect to level the airplane.
	(a) Normal position provides 1000 feet increment adjustments.
	(b) Momentarily pull-out position arms system for a preselected altitude capture and for altitude advisory. Provides fast adjustments.
	(c) Push-in provides 100 feet increment adjustments and cancels altitude preselect mode.
(6) Dimmers -	Right - controls brightness of readout displays.
	Left - controls an external power supply to control brightness of edgelight panels and push-button background lights.

D. Display Readouts

Table 4

(1) SPD/MACH -	Indicates airspeed in knots with 3 digits (250), or mach value with decimal and 3 digits (.560).
(2) HDG -	Indicates magnetic heading in degrees with 3 digits (185).
(3) Pitch Profile -	Indicates vertical speed in feet per minute (V+2000), airspeed value in knots (S+0250), MACH value (M+.560) or pitch attitude reference during TURB mode in degrees (P+0003).
(4) ALT -	Indicates desired altitude in feet in 5 digits (25000). Units, tens, and hundreds show 0 through 9 or are blank. The 1000's and 10,000's digits have individually con- trolled segments and will indicate 1 through 9 or a specified symbol (=) in lieu 0.
(5) Edge Lighting -	Lights up indicator panels.

E. Flight Management System Push-button

(1) FMS OVRD -	Push-button switch changes the selected speed retaining speed prior to new selected speed and capable of return when disengaged (on aircraft with FMS system).

DIGITAL FLIGHT GUIDANCE CONTROL PANEL - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing Digital Flight Guidance Control Panel (DFGCP) trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The DFGCP may be also verified by use of the Maintenance tests. (DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 1 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 3 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 6 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 4 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 5 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 10 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 11)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing Digital Flight Guidance Control Panel (DFGCP) trouble shooting procedures, the Multipurpose Control Display Unit (MCDU), located on the forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The DFGCP may be also verified by use of the Maintenance tests. (DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 3 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 5)

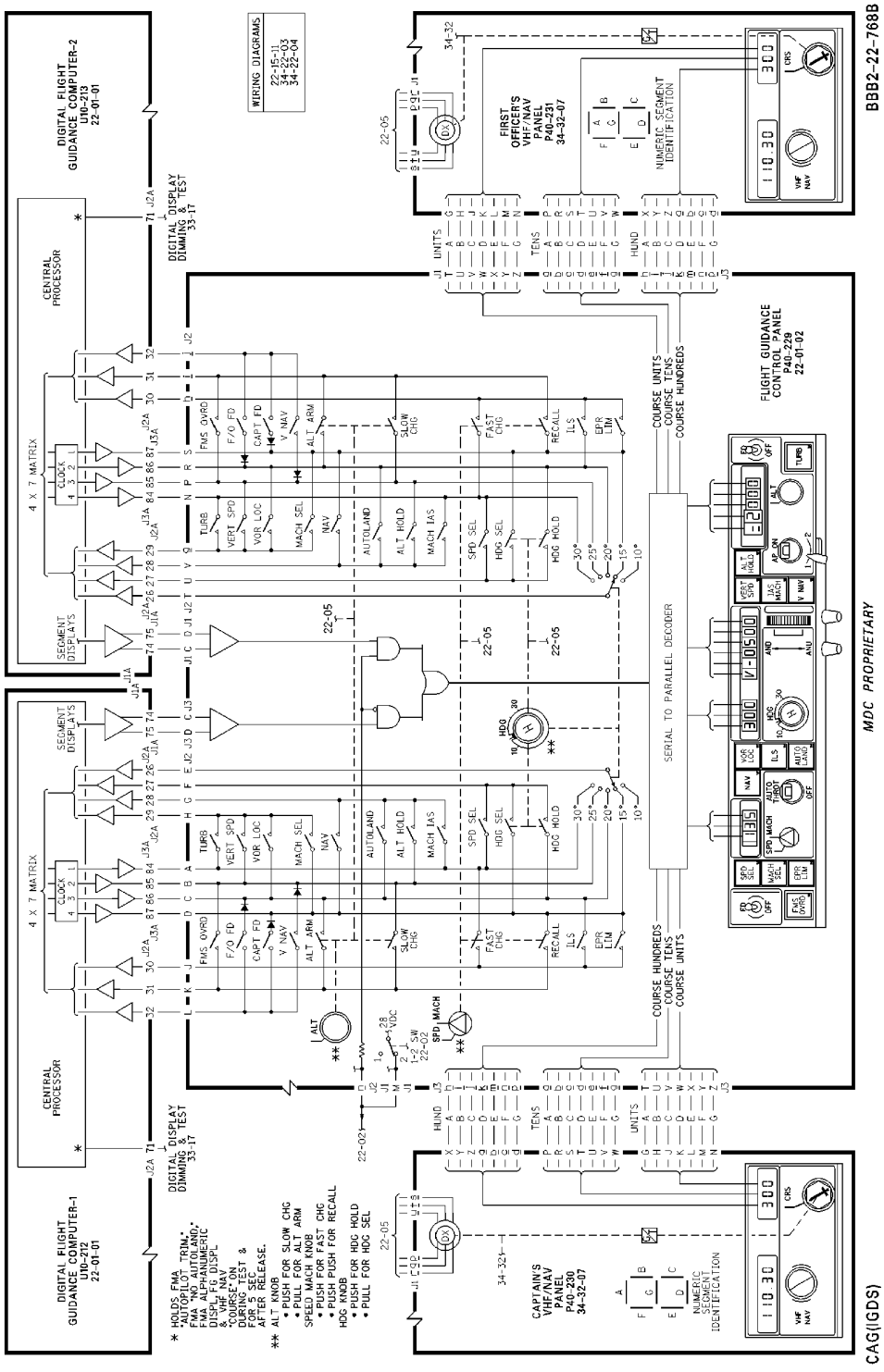
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on DFGCP is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to DFGCP and associated system interface.

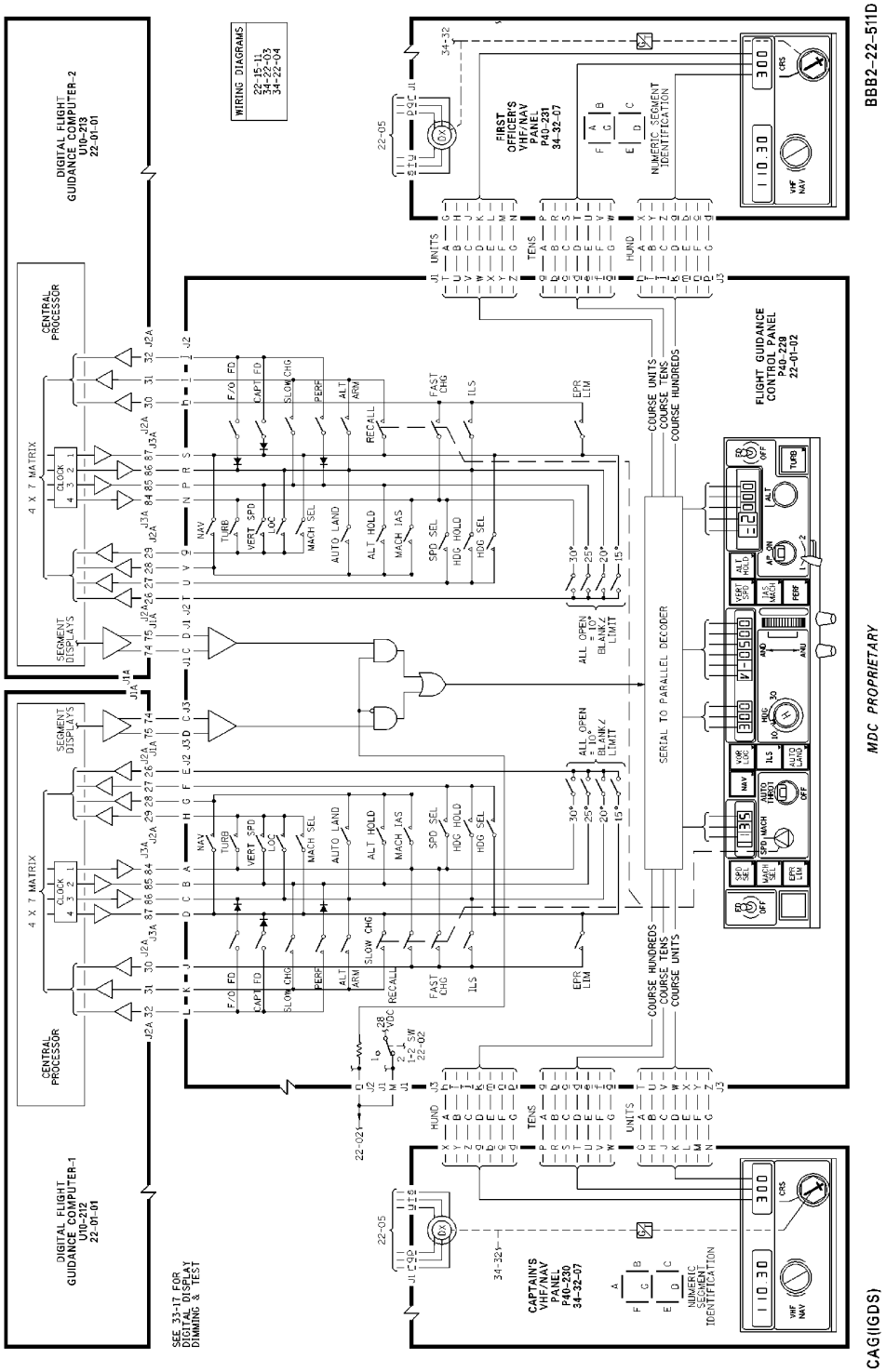
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

D. Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on DFGCP is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to DFGCP and associated system interface.

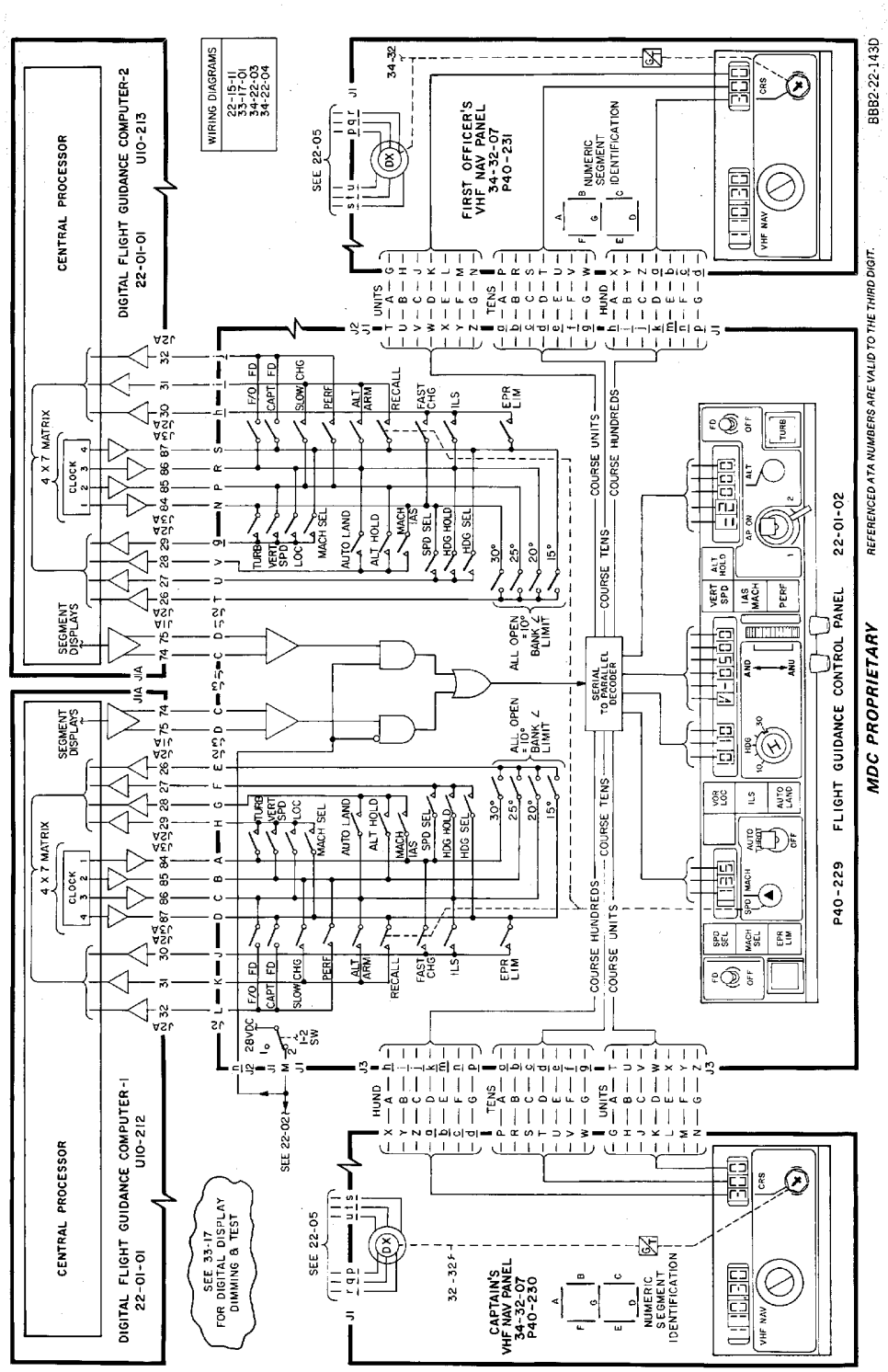
WJE ALL



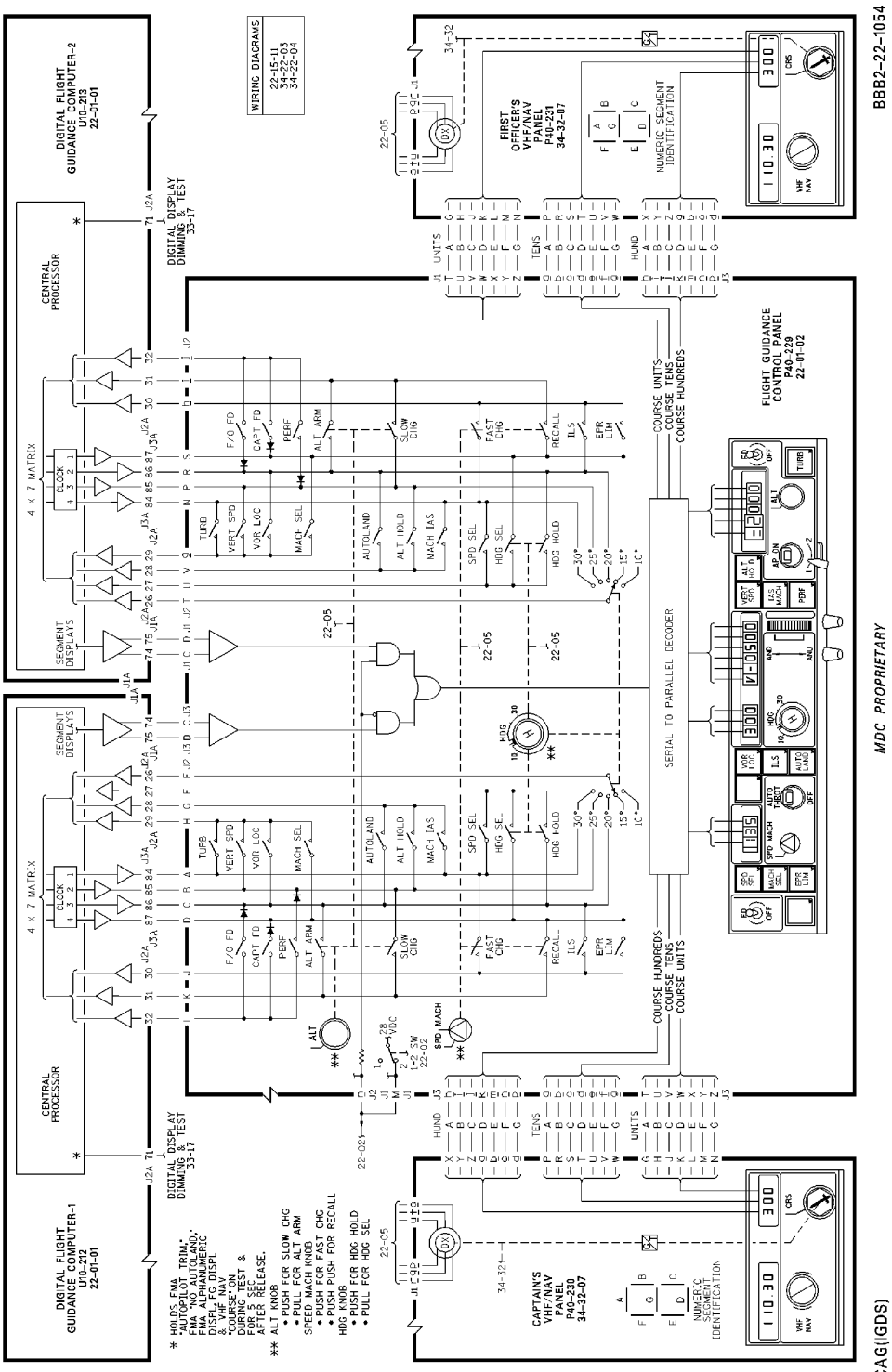
Mode Switching (4 x 7 Matrix) & Segment Displays
Figure 101/22-01-02-990-803 (Sheet 1 of 5)



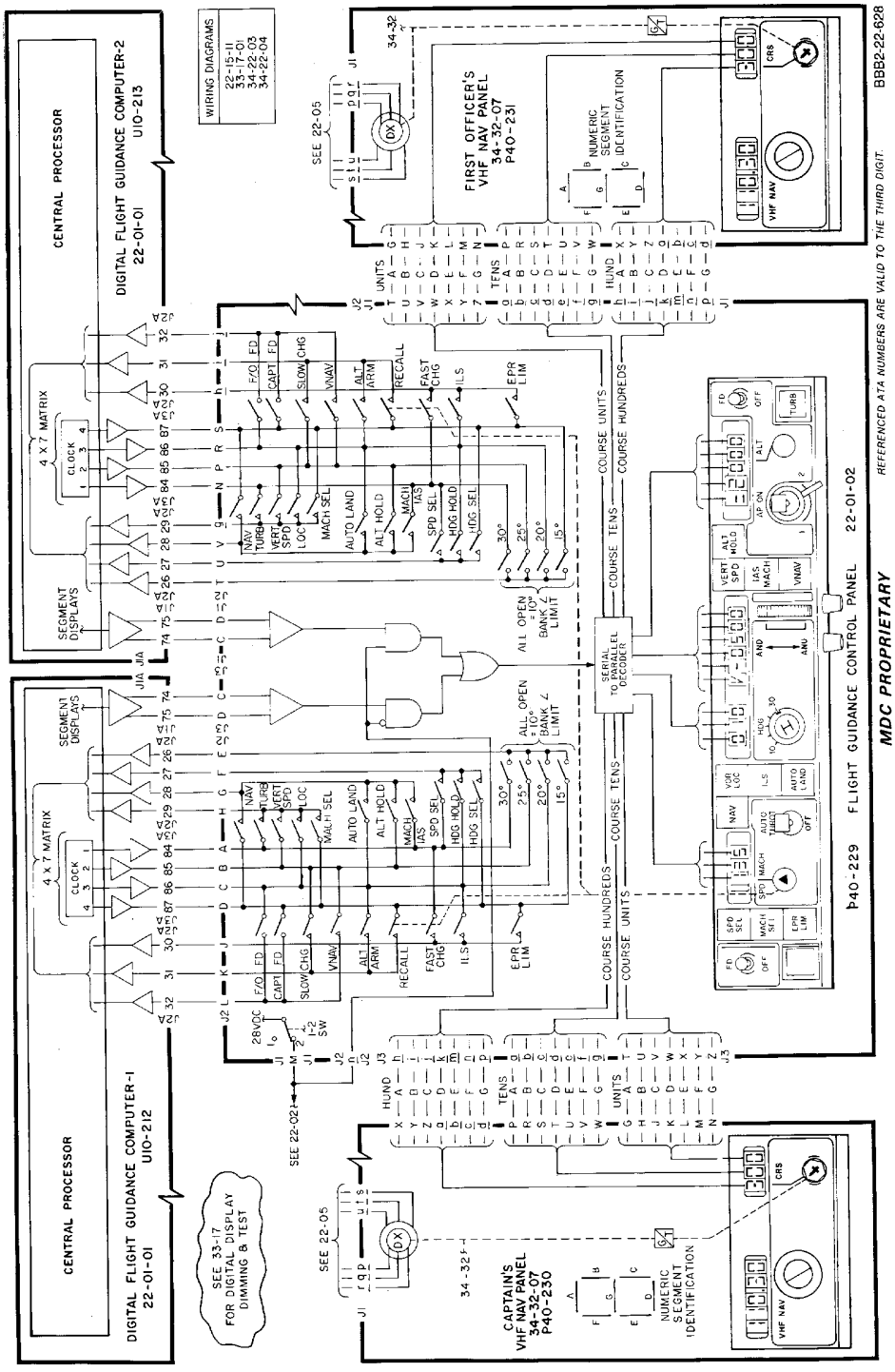
Mode Switching (4 x 7 Matrix) & Segment Displays
Figure 101/22-01-02-990-803 (Sheet 2 of 5)



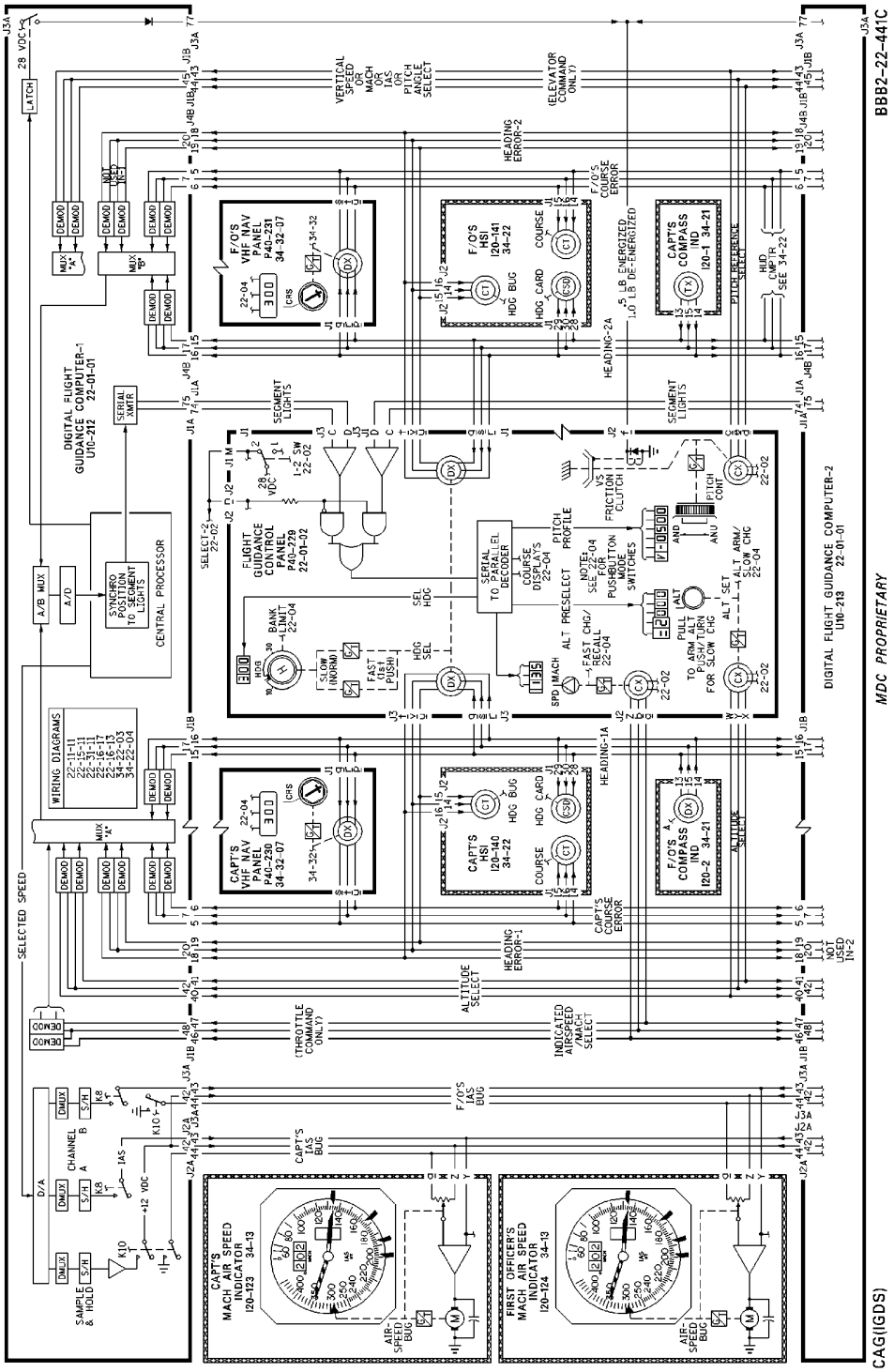
Mode Switching (4 x 7 Matrix) & Segment Displays
Figure 101/22-01-02-990-803 (Sheet 3 of 5)



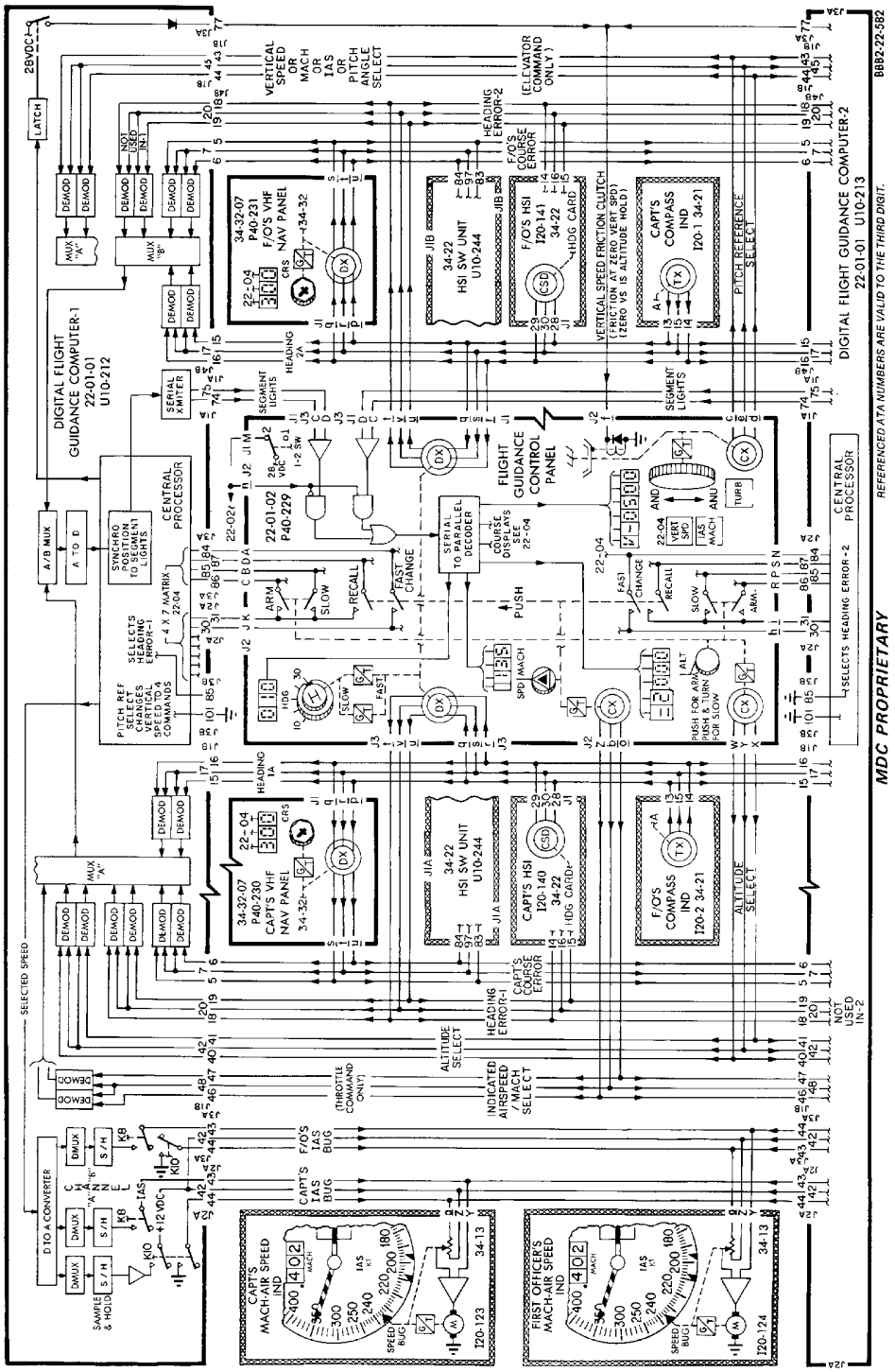
Mode Switching (4 x 7 Matrix) & Segment Displays
Figure 101/22-01-02-990-803 (Sheet 4 of 5)



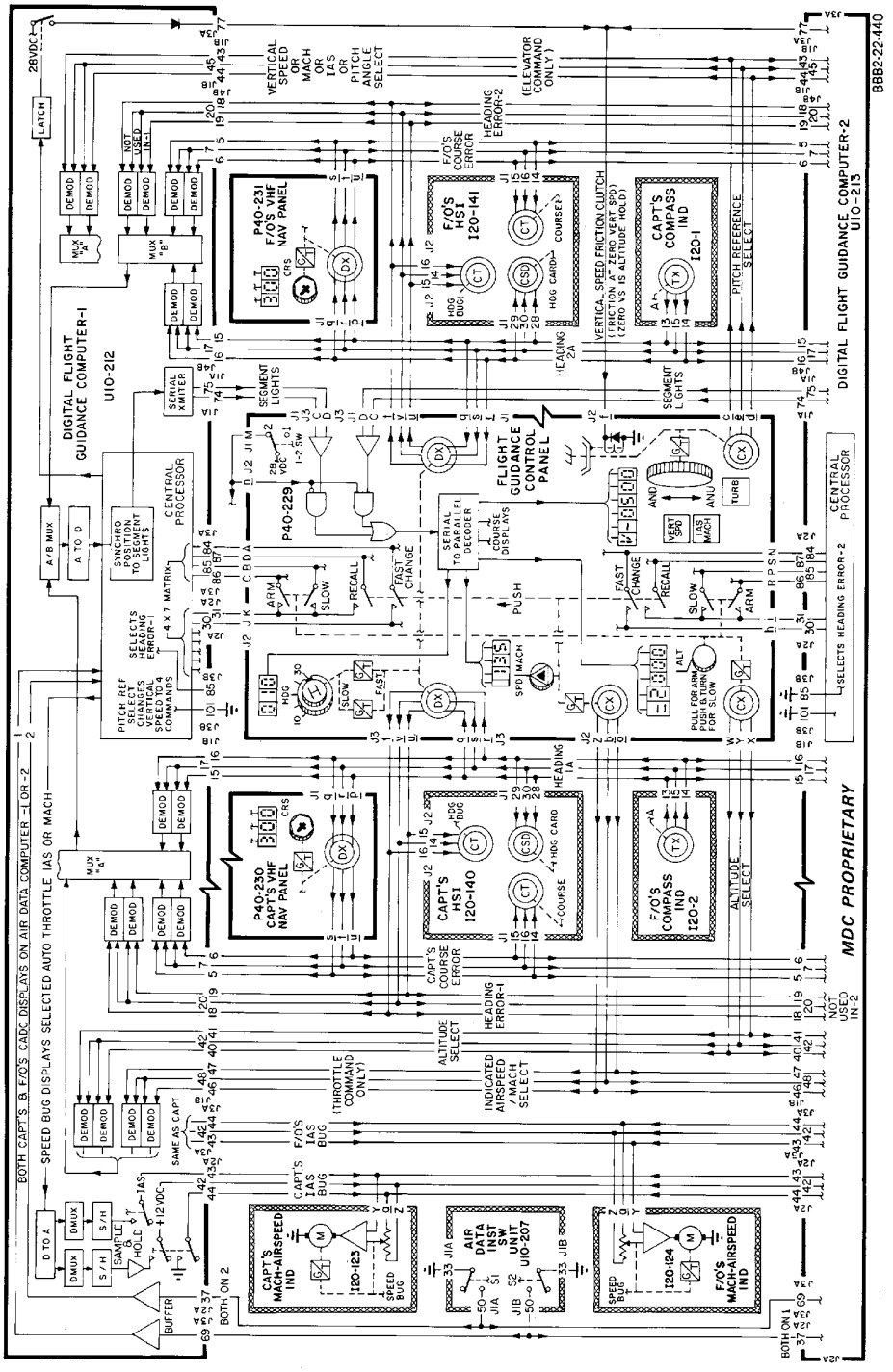
Mode Switching (4 x 7 Matrix) & Segment Displays
Figure 101/22-01-02-990-803 (Sheet 5 of 5)



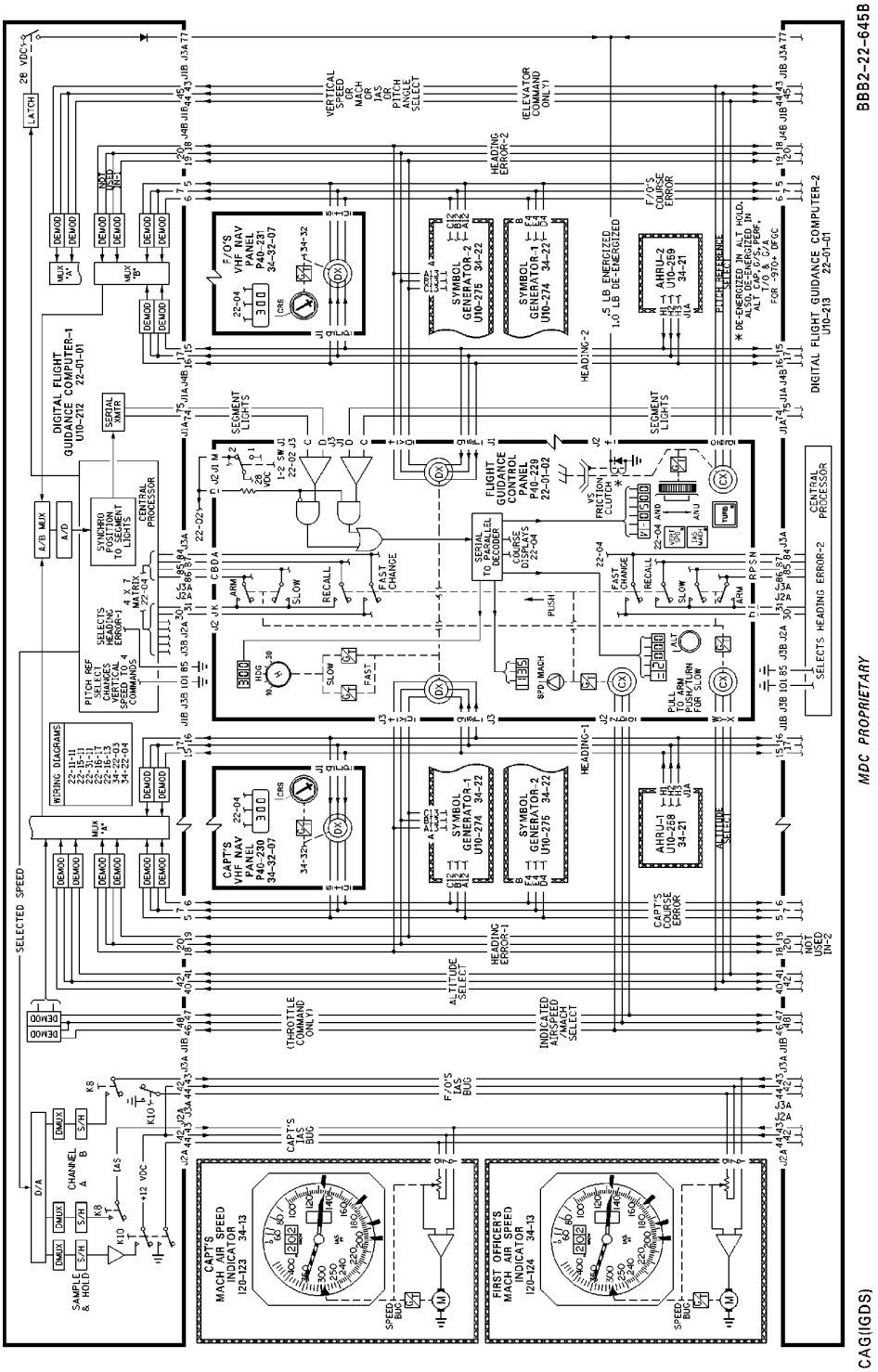
Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 1 of 9)



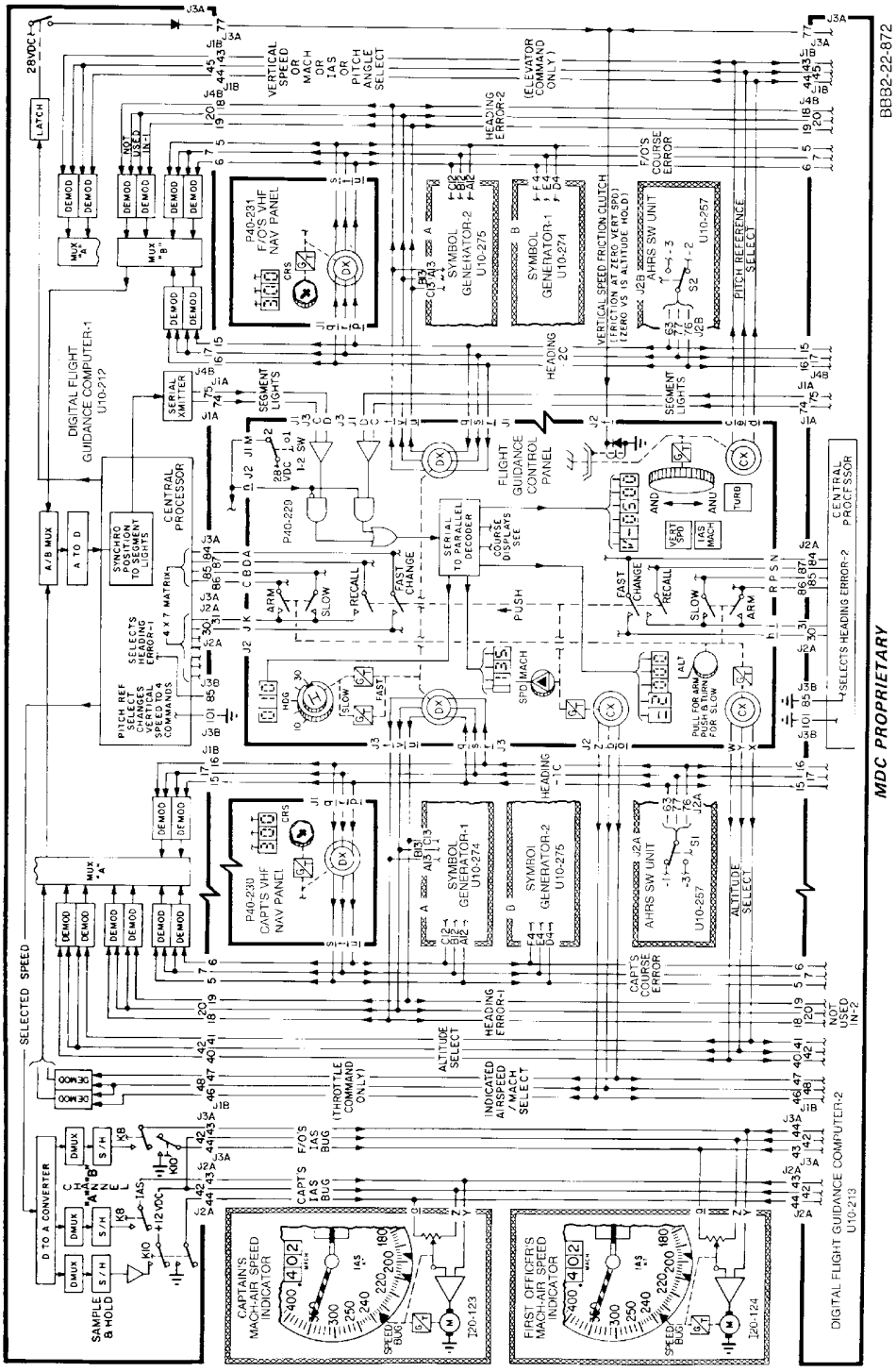
Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 2 of 9)



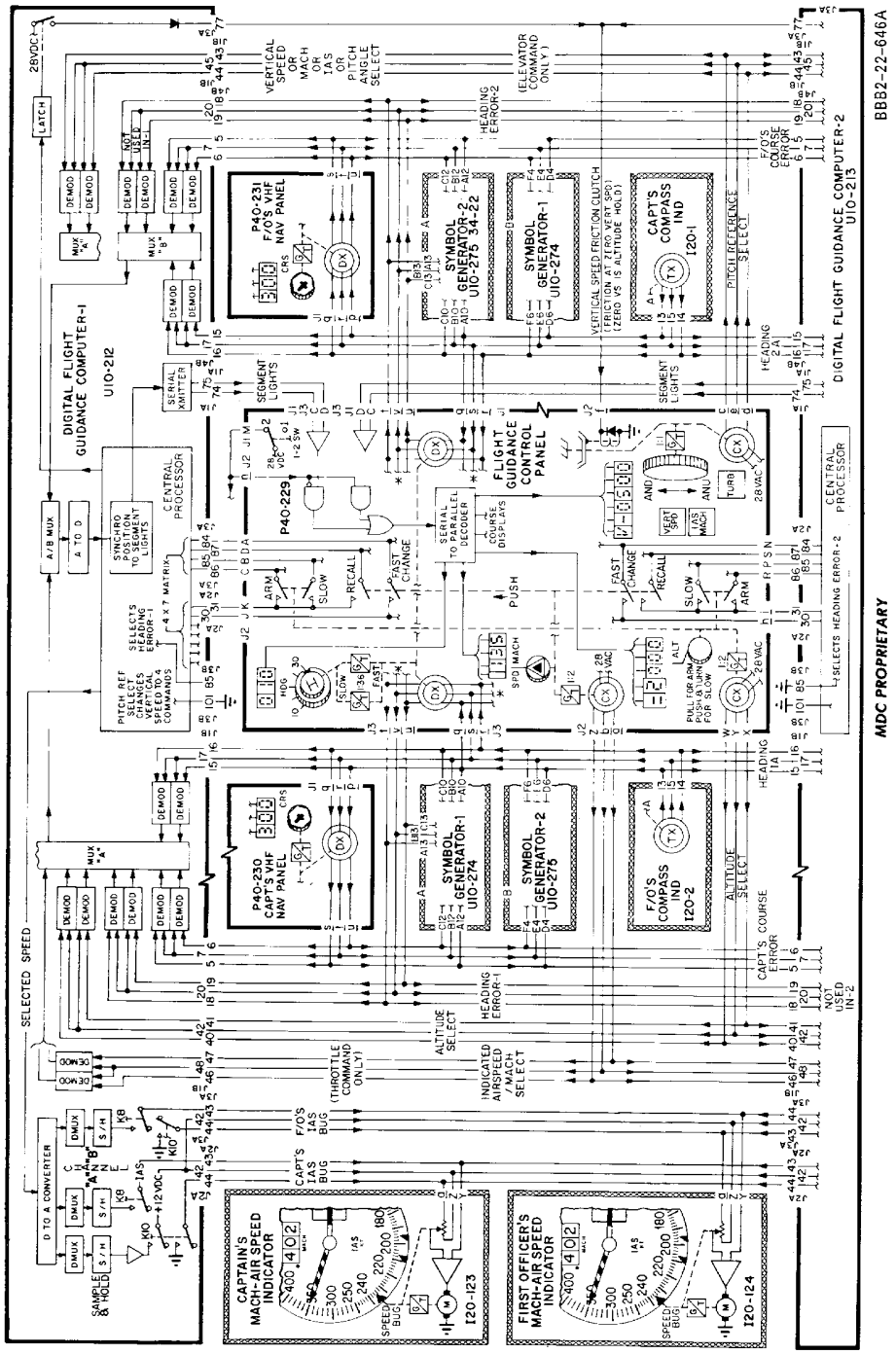
Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 3 of 9)



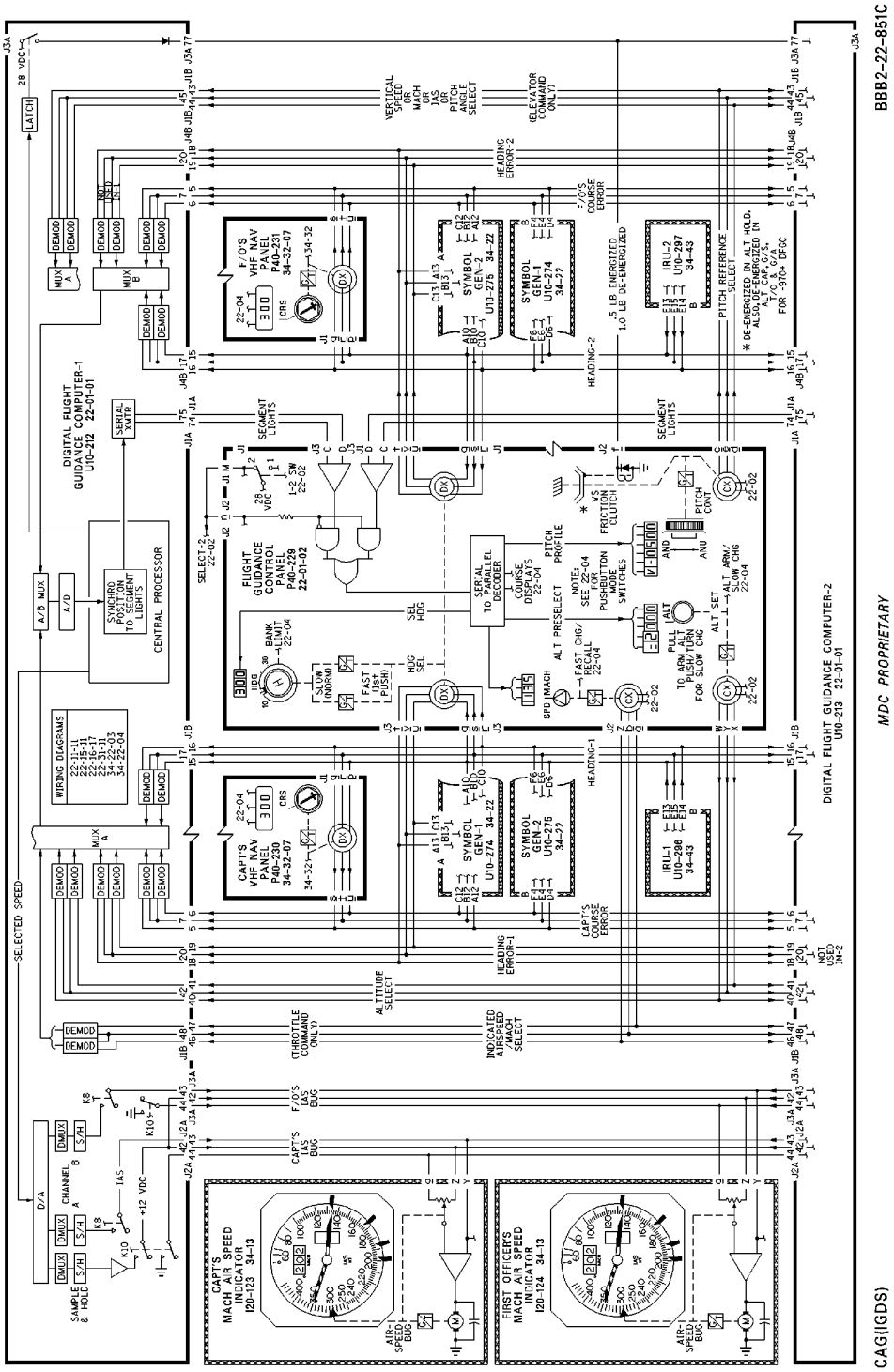
Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 4 of 9)



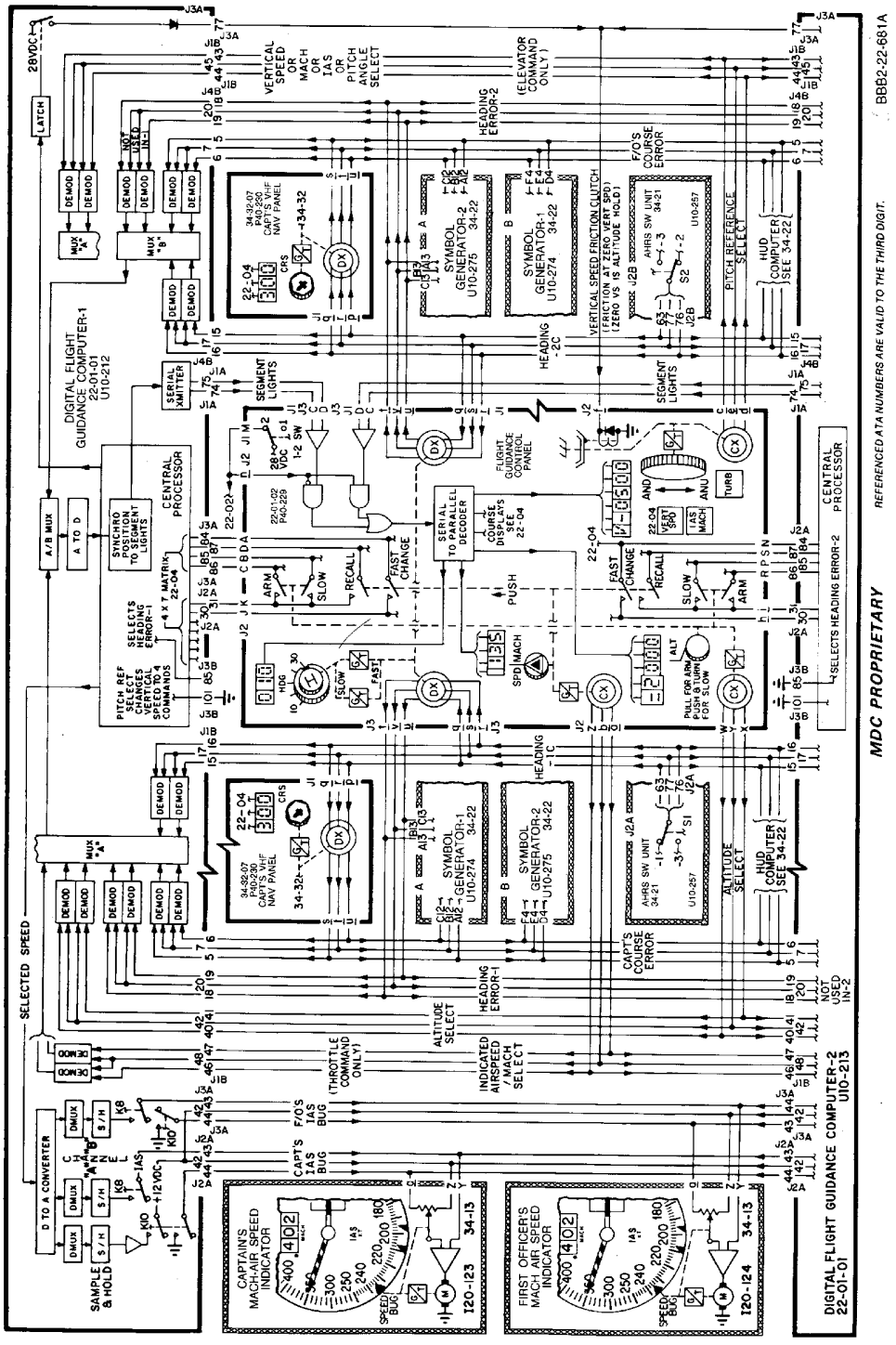
Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 5 of 9)



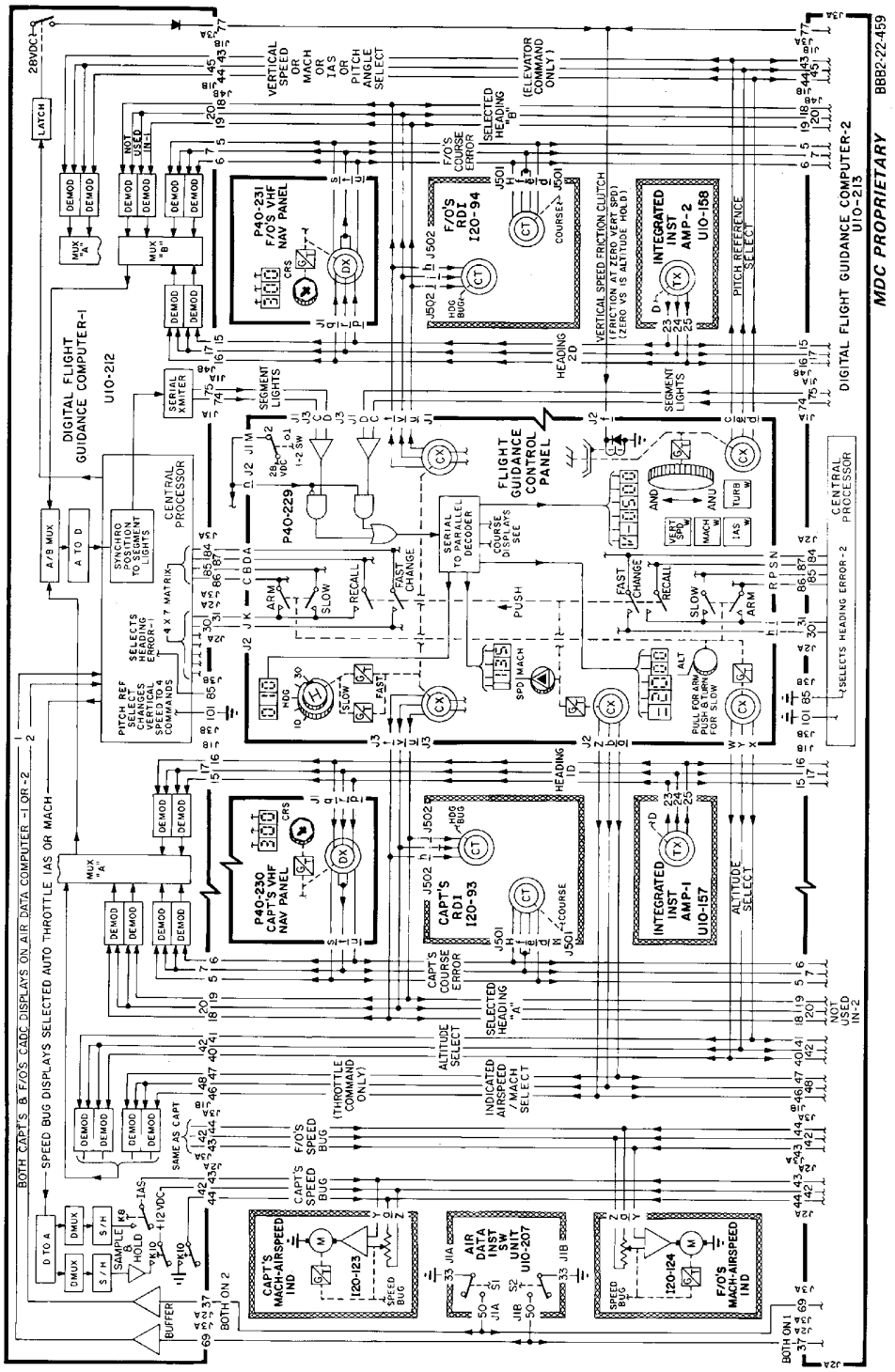
Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 6 of 9)



Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 7 of 9)



Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 8 of 9)



Panel Controls and Displays
Figure 102/22-01-02-990-804 (Sheet 9 of 9)

DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES

1. General

A. The Digital Flight Guidance Control Panel (DFGCP) is located in the flight compartment on the center of the glareshield. The DFGCP provides the primary interface between the flight crew and Digital Flight Guidance System (DFGS).

B. After removal/installation of the DFGCP, systems and components associated with DFGS operation should be in proper operating condition for DFGCP testing.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. DFGCP testing is accomplished by performing a Maintenance Test from the Status Test Panel. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

D. DFGCP testing is accomplished by performing a Maintenance Test from the MCDU. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WJE ALL

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Tool kit 4037494	Sperry
04-50 DPF (SPN 4035956-3)	Sperry
04-50 (SPN 4035956-1)	Sperry
04-45 (SPN 4035956-4)	Sperry
04-50PM (SPN 4035956-2)	Sperry
06-50 (SPN 4035956-6)	Sperry

3. Removal/Installation Digital Flight Guidance Control Panel (DFGCP)

A. Remove DFGCP

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 401-409, 411, 412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
B	9	B10-22	VHF NAV-1
WJE 410			
B	10	B10-22	VHF NAV-1
WJE ALL			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
G	7	B10-24	VHF NAV-2

(2) On underside of DFGCP, remove attaching screws (4) that secure DFGCP to glareshield. Retain attaching screws.

(3) Carefully pull DFGCP straight out of glareshield and disconnect electrical connectors (3).

(4) Install protective covering to airplane electrical harness and DFGCP electrical connectors.

(5) If DFGCP is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install DFGCP

(1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 401-409, 411, 412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
B	9	B10-22	VHF NAV-1
WJE 410			
B	10	B10-22	VHF NAV-1
WJE ALL			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
G	7	B10-24	VHF NAV-2

(2) Check electrical connectors on DFGCP and airplane electrical harness for loose, damaged or dirty connector pins.

NOTE: Prior to installing electrical connectors to DFGCP, verify connectors mate to proper plugs on DFGCP (J1, J2 AND J3 respectively).

(3) Place DFGCP into position at glareshield and connect electrical connectors.

CAUTION: MAKE CERTAIN PANEL ATTACHING SCREWS ARE SAME LENGTH AS THOSE REMOVED IF ATTACHING SCREWS WERE NOT RETAINED. OVER LENGTH SCREWS WILL BOTTOM OUT IN CAP NUT AND CAUSE DAMAGE TO THE DFGCP.

(4) Carefully slide DFGCP into mounting bracket and install attaching screws (4).

(5) Remove the safety tags and close these circuit breakers:

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 401-409, 411, 412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
B	9	B10-22	VHF NAV-1
WJE 410			
B	10	B10-22	VHF NAV-1
WJE ALL			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
G	7	B10-24	VHF NAV-2

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

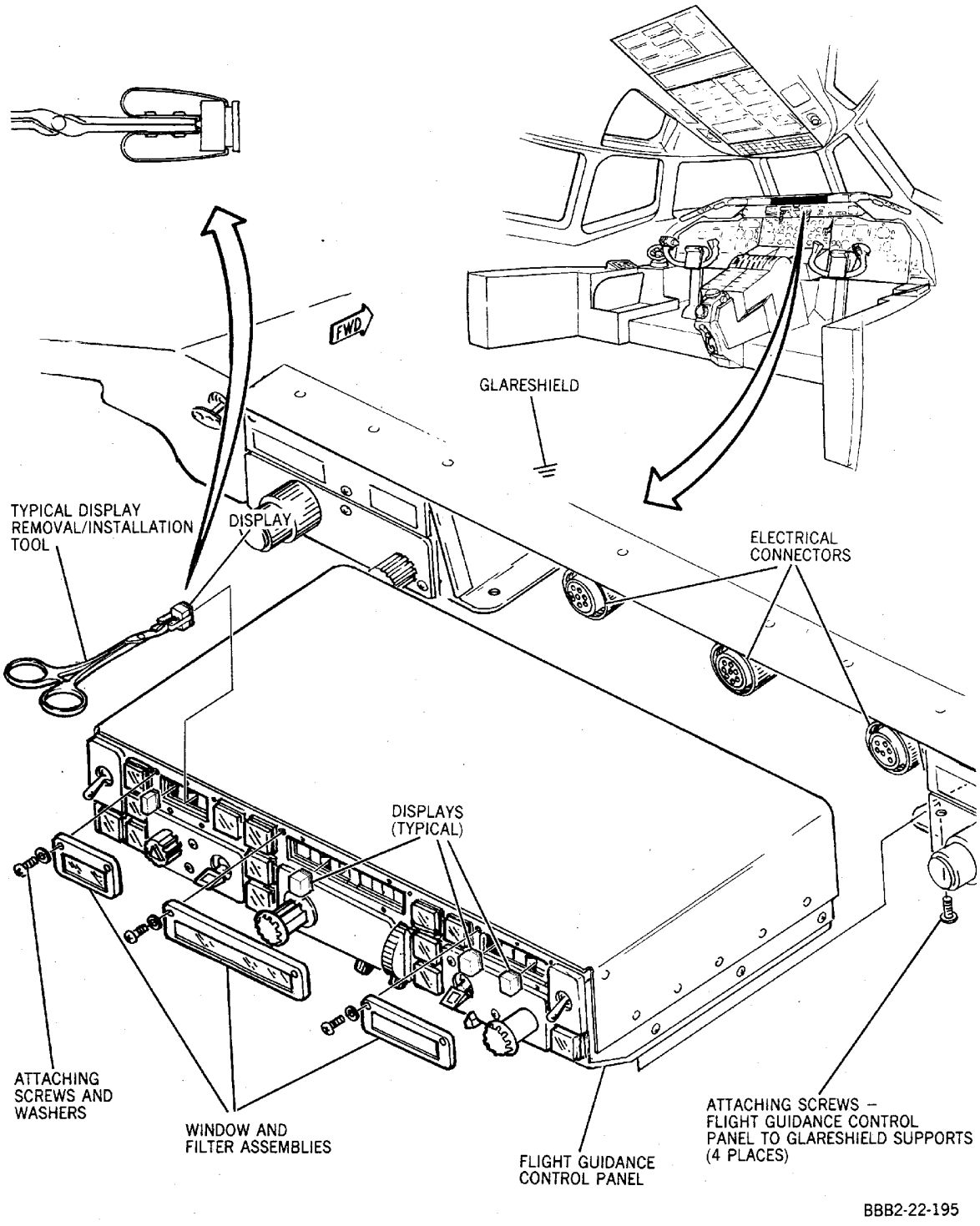
(6) Perform System Maintenance BIT, Sequence Three "SWITCHES AND BUTTONS", Diagnostic Numbers 146 through 177 and a Return-to-Service (RTS) test by use of the STP. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(7) Perform System Maintenance BIT, Sequence Three "SWITCHES AND BUTTONS", Diagnostic Numbers 146 through 177 and Return-to-Service (RTS) test by use of the MCDU located on pedestal. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WJE ALL

(8) Return aircraft to required configuration.



Digital Flight Guidance Control Panel (DFGCP) -- Removal/Installation
Figure 201/22-01-02-990-801

4. Removal/Installation Flight Guidance Control Panel Displays

A. Remove Display

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 401-409, 411, 412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
B	9	B10-22	VHF NAV-1
WJE 410			
B	10	B10-22	VHF NAV-1
WJE ALL			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
G	7	B10-24	VHF NAV-2

(2) Remove applicable window and filter in panel for display(s) to be removed by removing attaching screws in control panel.

(3) Engage removal/installation tool to display being removed (make certain tool is engaged with display idents).

(4) Carefully pull tool and display straight out from control panel connector.

B. Install Display

(1) Make sure that these circuit breakers are open and have safety tags:

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 401-409, 411, 412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
B	9	B10-22	VHF NAV-1
WJE 410			
B	10	B10-22	VHF NAV-1
WJE ALL			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
G	7	B10-24	VHF NAV-2

CAUTION: EXERCISE CARE WHEN INSTALLING DISPLAYS SO AS NOT TO DAMAGE FACE OF DISPLAY WITH REMOVAL/INSTALLATION TOOL.

(2) Place display in removal/installation tool so tool properly engages display idents.

(3) Insert display into place in flight guidance control panel and push straight in so as to carefully engage display electrical pins with panel electrical connector.

(4) Install the applicable filter and window with attaching screws and washers.

(5) Remove the safety tags and close these circuit breakers:

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 401-409, 411, 412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
B	9	B10-22	VHF NAV-1
WJE 410			
B	10	B10-22	VHF NAV-1
WJE ALL			

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1
G	7	B10-24	VHF NAV-2

(6) Perform applicable part of System Maintenance BIT, Sequence Three, SWITCHES and BUTTONS. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

(7) Return airplane to required configuration.

SURFACE POSITION SENSORS - DESCRIPTION AND OPERATION

1. General

A. There are seven surface position sensors located throughout the aircraft. The sensors provide the Digital Flight Guidance System (DFGS), control surface information for speed control law computations, and autopilot performance monitoring during the landing modes of operation.

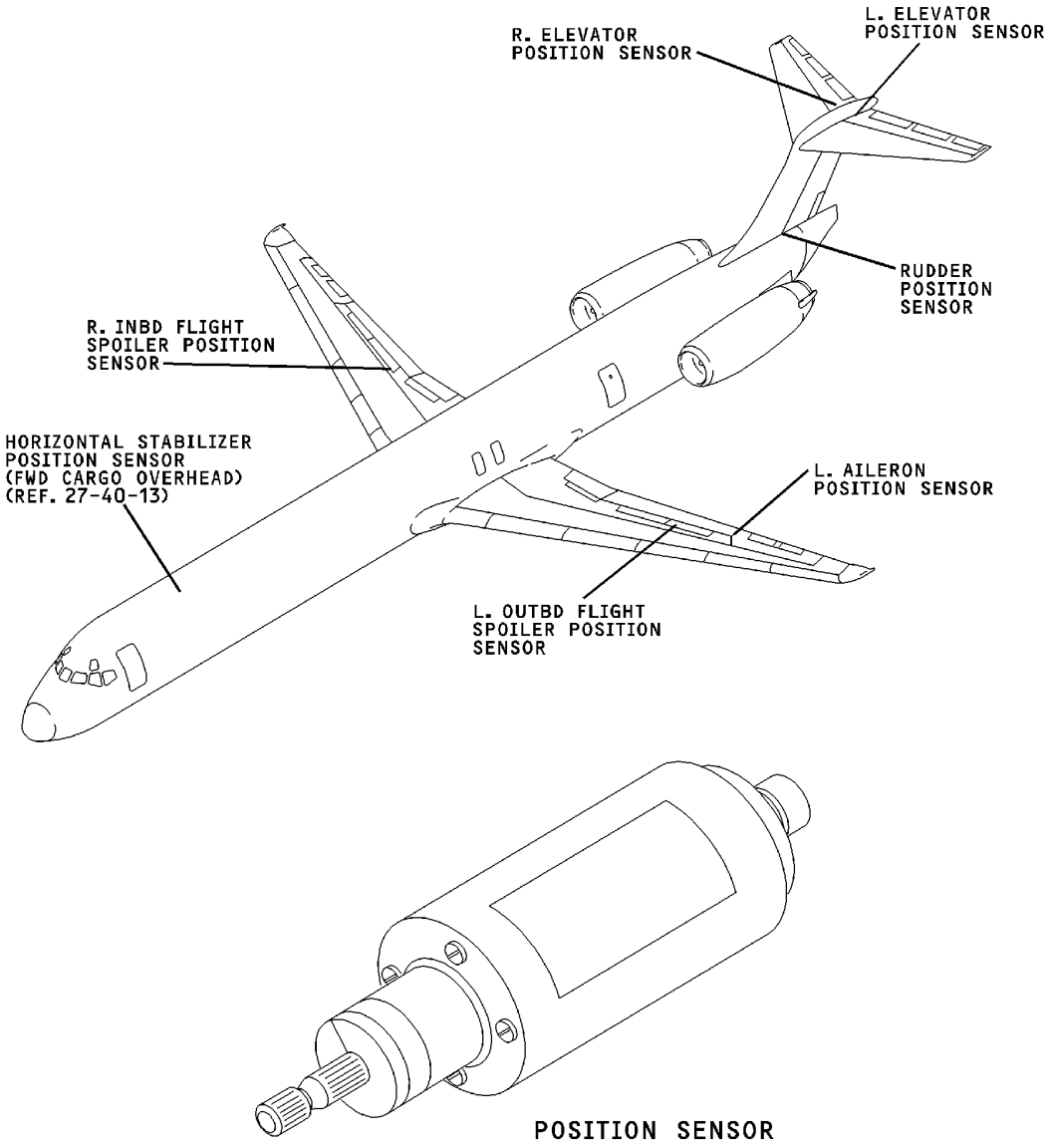
B. The sensors are comprised of two spoiler position sensors, two elevator position sensors, a single aileron, rudder and horizontal stabilizer position sensor. The sensors are completely interchangeable.

2. Description

A. Aileron, Elevator, Spoiler, Rudder and Stabilizer Position Sensors

(1) The aileron, elevator, spoiler, rudder and stabilizer position sensors are electromechanical synchro type assemblies that provide surface position deflection information to the DFGC. The sensors are unitized packages consisting of a connector, brushless synchros, splined shaft and gasket sealed housing. The synchros are comprised of a single-winding rotor and three winding stator, the rotor being integral to the stator. A mechanical stop within the sensors is used to limit shaft rotation to 125(±15) degrees in either direction from center (null) position.

(2) The surfaces are mechanically coupled to the splined shaft of the sensors. Movement of the surface causes a mechanical movement of the rotor shaft within the stator field, inducing an AC output signal. The AC output signal, whose magnitude and phase are a function of the mechanical and electrical inputs, are transmitted to the DFGC for control law computations and monitoring.



Surface Position Sensors
Figure 1/22-01-03-990-801

SURFACE POSITION SENSORS - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing trouble shooting procedures on the surface position sensors, the Status Test Panel (STP) located beneath the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The Sensors may be also verified by use of the Maintenance or Return-To-Service tests. (SUBJECT 22-01-05, Page 201)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

Prior to performing trouble shooting procedures on the surface position sensors, the Multipurpose Control Display Unit (MCDU) located on the forward pedestal, is used to perform these tests. This may be accomplished by use of Flight Fault Review. The Sensors may be also verified by use of the Maintenance or Return-To-Service tests. (SUBJECT 22-01-05, Page 201)

WJE ALL

NOTE: Nulls of the aileron, rudder and elevator position sensors are not checked by the Return-To-Service test. To check nulls these surfaces must be faired and the Maintenance Test, Sensor Values, sequence checked.

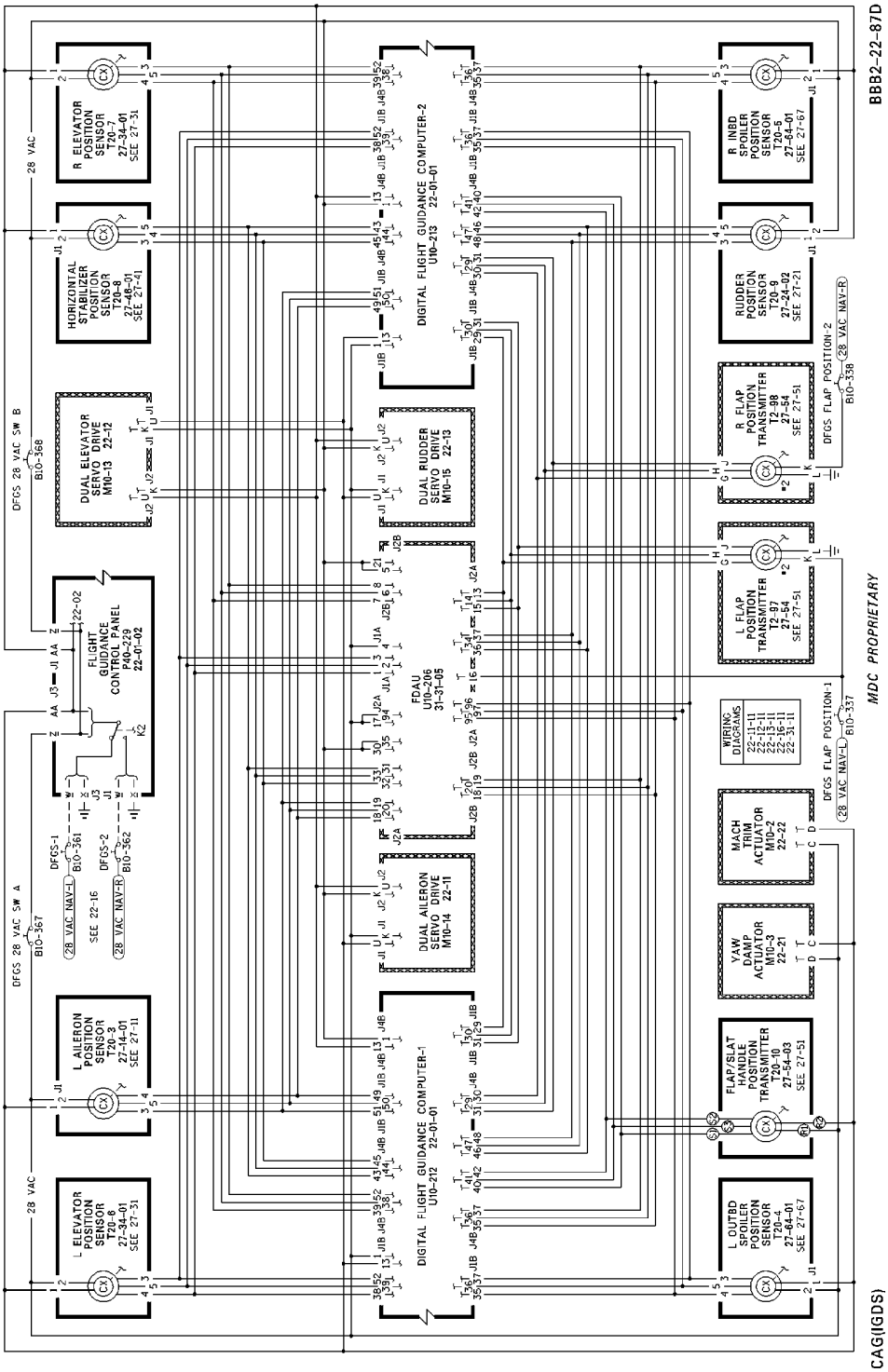
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

B. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on the surface position sensors is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to the surface position sensors and associated system interface.

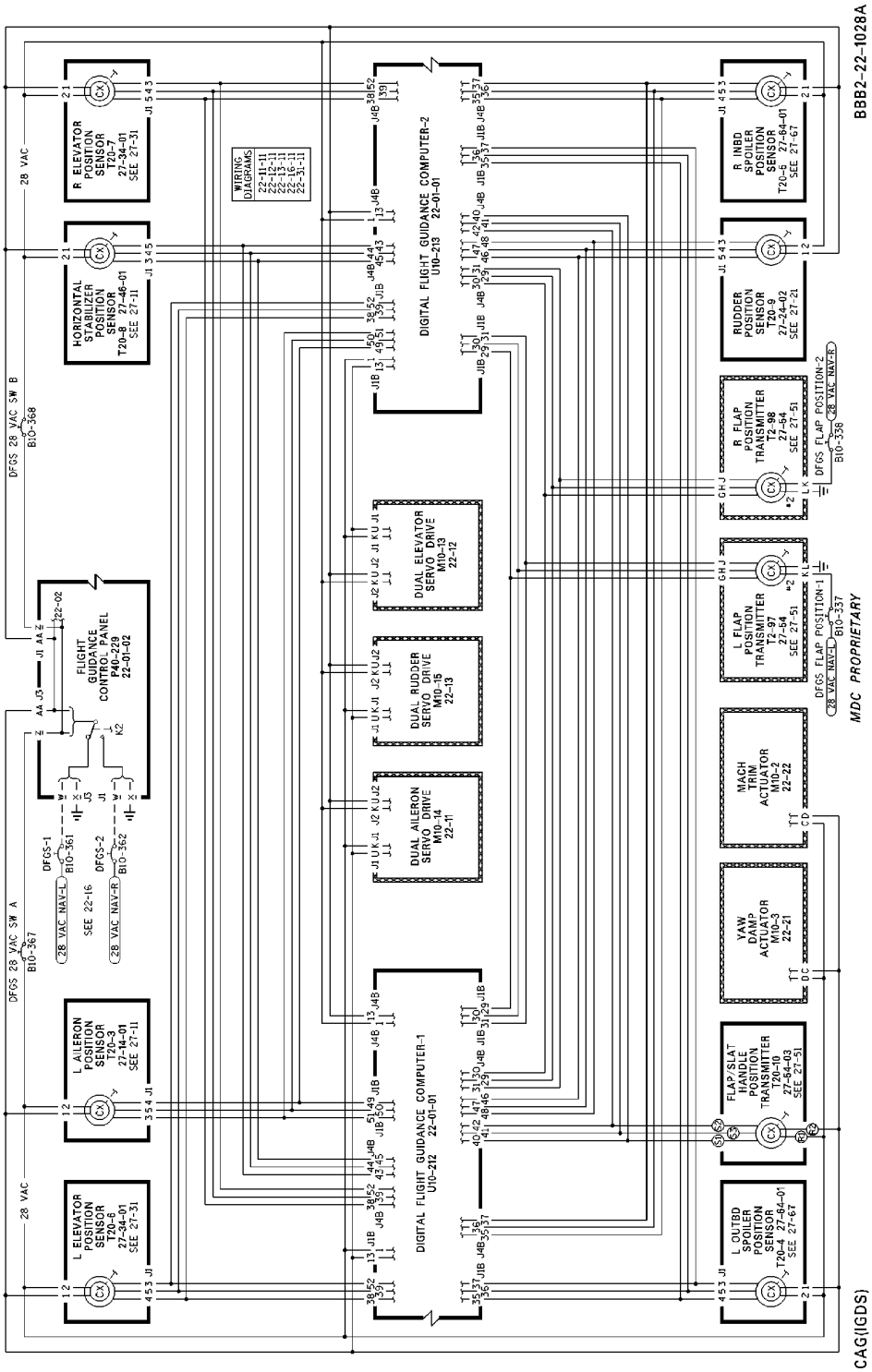
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on the surface position sensors is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to the surface position sensors and associated system interface.

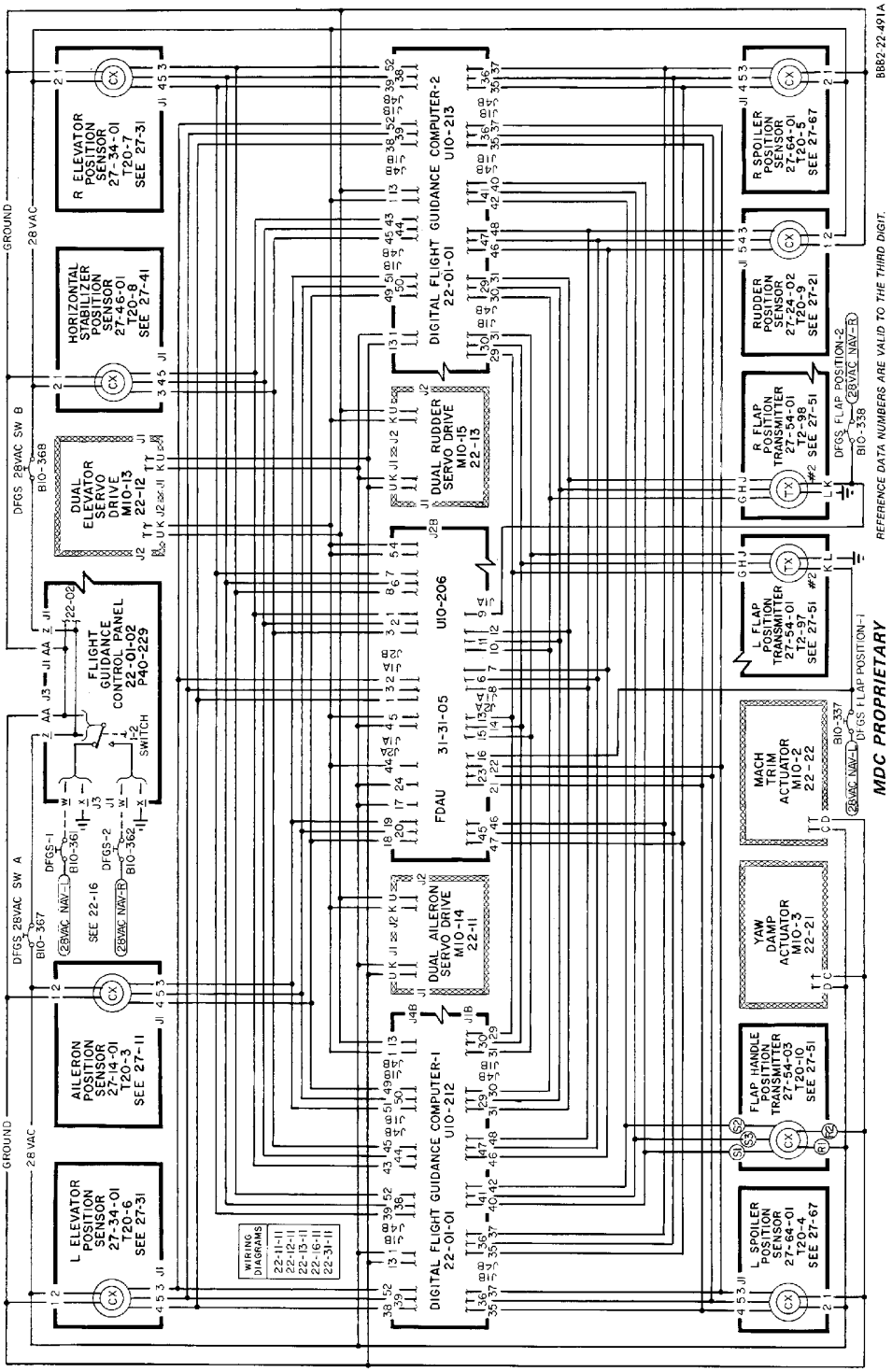
WJE ALL



Surface Position Sensors
Figure 101/22-01-03-990-802



Surface Position Sensors
Figure 102/22-01-03-990-803



Surface Position Sensors
Figure 103/22-01-03-990-806

SURFACE POSITION SENSORS - MAINTENANCE PRACTICES

1. General

A. Removal/Installation procedures are similar for all surface positions, except for access and locations of the sensors throughout the aircraft.

B. After Removal/Installation procedures, or anytime a surface position sensor is disturbed, a System Maintenance BIT test of the appropriate sensor(s) must be performed. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WARNING: PRIOR AND DURING REMOVAL/INSTALLATION PROCEDURES OF THE SURFACE POSITION SENSORS, DO NOT ATTEMPT TO OPERATE ANY FLIGHT CONTROL SYSTEMS OR DAMAGE TO CONTROL MECHANISMS AND INJURY TO PERSONNEL MAY RESULT.

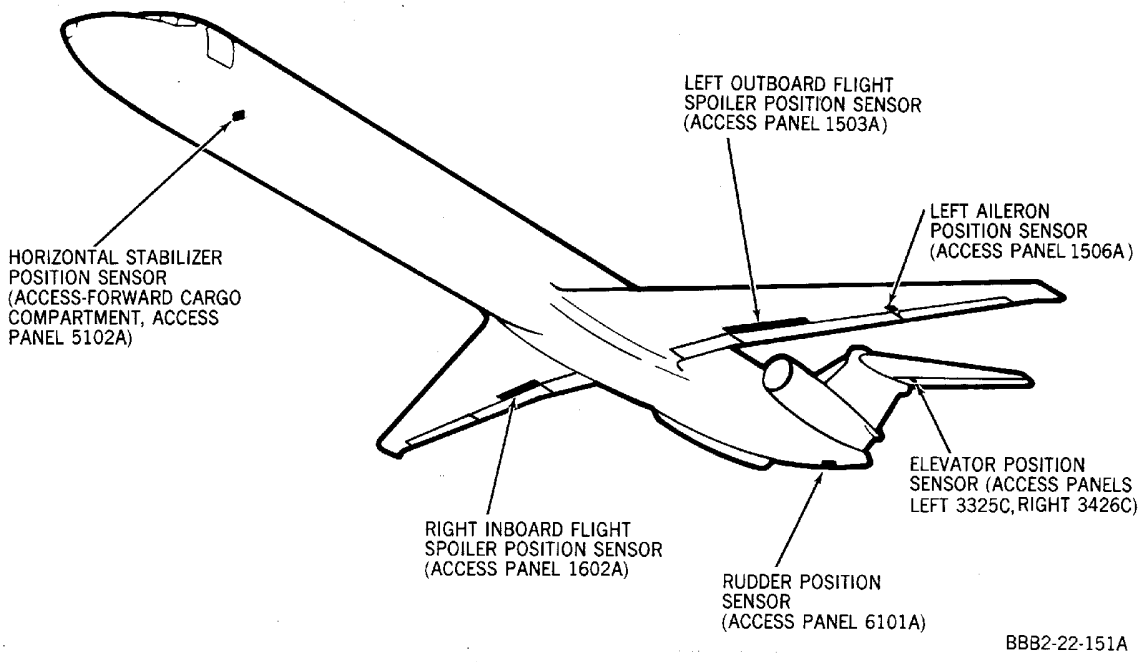
C. The surface position sensors have the same part number 4034233-901. The removal/installation procedure for each surface position sensor may vary due to differences in attaching hardware and orientation and location.

2. Surface Position Sensor Access and Surface Positions

A. The following access and control surface adjustments are provided for identification to the aircraft areas prior to removal/installation of the surface position sensors. (Figure 201)

Table 201

Item	Access	Surface Positions
Left Aileron Position Sensor	1506A	Ailerons faired with adjacent wing structure.
Left Outboard Flight Spoiler Position Sensor	1503A	Fully retracted.
Right Inboard Flight Spoiler Position Sensor	1602A	Fully retracted.
Horizontal Stabilizer Position Sensor	FWD Cargo Cmpt (5102A)	Stabilizer aligned with neutral rivet ±1/8 inch.
Left Elevator Position Sensor	3325C	Stabilizer and Elevators aligned with neutral rivet within ±1/16 inch.
Right Elevator Position Sensor	3426C	Stabilizer and Elevators aligned with neutral rivet within ±1/16 inch.
Rudder Position Sensor	6101A	Rudder in neutral position with center of upper at corner rudder aligned within 1/8 inch of center of vertical stabilizer trailing edge.



Surface Position Sensors - Access Locations
Figure 201/22-01-03-990-810

3. Removal/Installation Spoiler or Aileron Position Sensors

A. Remove Spoiler or Aileron Position Sensor (Figure 202)

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Gain access to appropriate Aileron or Spoiler Position Sensor. (Paragraph 2. and Figure 201)

(3) Remove link bolt from position arm, and separate link arm from position arm.

(4) Loosen position arm attaching hardware, and remove position arm from sensor shaft.

(5) Remove electrical connector from sensor.

(6) While holding Aileron or Spoiler Position Sensor, loosen clamp mount attaching hardware and remove sensor.

B. Install Aileron or Spoiler Position Sensor

NOTE: It is possible for position arm to be installed inverted on position sensor shaft. For correct installation. (Figure 202)

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Install Aileron or Spoiler Position Sensor into clamp mount, and tighten only to sufficiently support sensor.

(3) Install position arm on sensor shaft, and tighten position arm attaching hardware.

CAUTION: SURFACE POSITION SENSOR HAS LIMITED ROTATION AND SENSOR MUST BE DETENTED TO THE PROPER CONTROL SURFACE ADJUSTMENT, OR DAMAGE TO THE SENSOR MAY RESULT. (PARAGRAPH 2.)

(4) Manually move position arm until detent is acquired in sensor.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

NOTE: Null should be checked on the Aileron and Spoiler Position Sensors by use of the STP. Proceed to System Maintenance BIT, Sequence Four, Diagnostic Numbers 221-225 for applicable sensors. Verify electrical connector is installed, and circuit breakers closed if checking null at this time.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

NOTE: Null should be checked on the Aileron and Spoiler Position Sensors by use of the MCDU. Proceed to System Maintenance BIT, Sequence Four, Diagnostic Numbers 221-225 for applicable sensors. Verify electrical connector is installed, and circuit breakers closed if checking null at this time.

WJE ALL

(5) Manually support Aileron or Spoiler Position Sensor, and without moving sensor out of detent, loosen clamp mount attaching hardware securing sensor.

(6) Manually adjust entire body of Aileron or Spoiler Position Sensor to align position arm bolt hole with link arm bolt hole.

(7) Tighten clamp mount attaching hardware to secure sensor in clamp mount.

(8) Place link bolt through position arm and link arm, and secure link bolt with attaching hardware.

(9) Connect electrical connector to Aileron or Spoiler Position Sensor.

(10) Secure access panel as applicable. (Figure 201)

(11) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

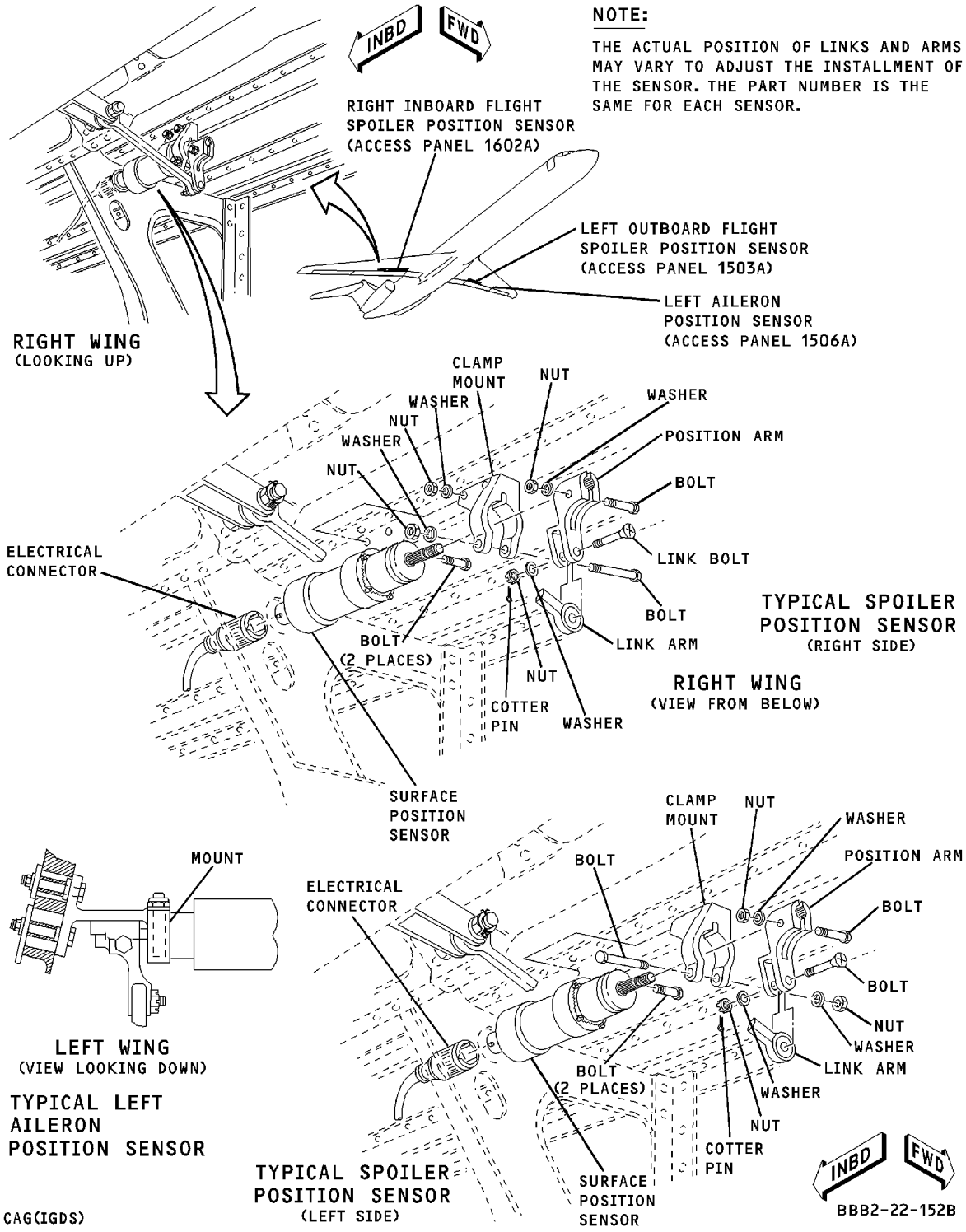
(12) Perform System Maintenance BIT of the Aileron or Spoiler Position Sensor(s). Refer to following table for null values and tolerances of surface position sensors. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

(13) Perform the Return to Service (RTS) (BIT) test. (DFGS STATUS/TEST, SUBJECT 22-01-05, paragraph 3.C)

(14) Position Sensor Null Values and Tolerances

Table 202 Position Sensor Null Values and Tolerances

Position Sensor	Null Values and Tolerances
Left Aileron	0 ±0.5 degrees
Left Outboard Spoiler	0 ±0.5 degrees
Right Inboard Spoiler	0 ±0.5 degrees



Spoiler and Aileron Position Sensors - Removal/Installation
Figure 202/22-01-03-990-811

4. Removal/Installation Horizontal Stabilizer Position Sensor

A. Remove Horizontal Stabilizer Position Sensor (Figure 203)

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Gain access to horizontal stabilizer position sensor. (Paragraph 2. and Figure 203)

NOTE: The horizontal stabilizer position sensor is in the horizontal stabilizer control mechanism. It is in the upper left corner of the mechanism. (Figure 203)

(3) Remove link bolt from position arm, and separate link arm from position arm.

(4) Loosen position arm attaching hardware, and remove position arm from sensor shaft.

(5) Remove electrical connector from sensor.

(6) While holding horizontal stabilizer position sensor, loosen clamp mount attaching hardware and remove horizontal stabilizer position sensor.

B. Install Horizontal Stabilizer Position Sensor (Figure 203)

NOTE: It is important that position arm be installed on horizontal stabilizer position sensor shaft for correct operation. (Figure 203)

CAUTION: THE POSITION ARM MUST BE INSTALLED CORRECTLY. THIS WILL PREVENT DAMAGE TO HORIZONTAL STABILIZER CONTROL MECHANISM.

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Install Horizontal stabilizer position sensor into clamp mount, and tighten only to sufficiently support sensor.

NOTE: Orient sensor correctly within clamp mount.

(3) Install position arm on horizontal stabilizer position sensor shaft, and tighten position arm attaching hardware.

CAUTION: SURFACE POSITION SENSOR HAS LIMITED ROTATION AND SENSOR MUST BE DETENTED TO THE PROPER CONTROL SURFACE ADJUSTMENT , OR DAMAGE TO THE SENSOR MAY RESULT. (PARAGRAPH 2.)

(4) Manually move position arm until detent is acquired in horizontal stabilizer position sensor.

NOTE: Null should be checked on the Horizontal Stabilizer position sensor by use of the Status Test Panel (STP). Proceed to System Maintenance BIT, Sequence Four, Diagnostic Numbers 221-225. Verify that electrical connector is installed, and circuit breakers are closed if checking null at this time.

NOTE: On some aircraft, a MCDU is used instead of STP.

(5) Manually support horizontal stabilizer position sensor, and without moving sensor out of detent, loosen clamp mount attaching hardware securing sensor.

(6) Manually adjust entire body of horizontal stabilizer position sensor to align position arm bolt hole with link arm bolt hole.

(7) Tighten clamp mount attaching hardware to secure sensor clamp mount.

(8) Place link bolt through position arm and link arm, and secure link bolt with attaching hardware.

(9) Connect electrical connector to horizontal stabilizer position sensor.

(10) Secure access panel as applicable. (Figure 201)

(11) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

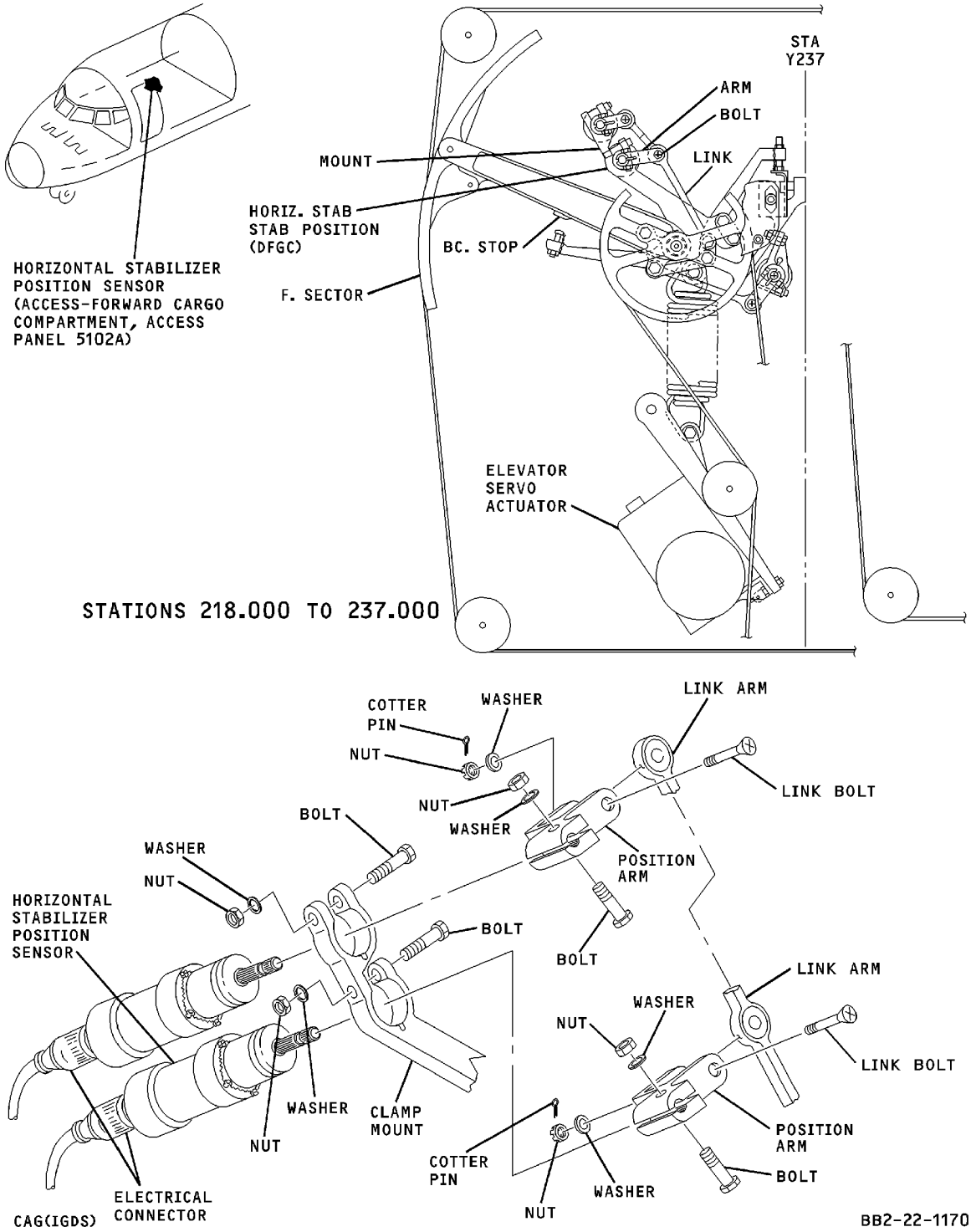
Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(12) Perform System Maintenance BIT of the horizontal stabilizer position sensor. Refer to following table for null value and tolerance of horizontal stabilizer position sensor. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

Table 203

Position Sensor	Null Value and Tolerance
Horizontal Stabilizer	0 ±0.25 degrees

(13) Perform the Return to Service (RTS) (BIT) test. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)



Horizontal Stabilizer Position Sensor - Removal/Installation
Figure 203/22-01-03-990-812

5. Removal/Installation Elevator Position Sensors

A. Remove Elevator Position Sensor(s) (Figure 204)

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Gain access to elevator position sensor(s). (Paragraph 2. and Figure 204)

(3) Remove link bolt from position arm, and separate link arm from position arm.

(4) Loosen position arm attaching hardware, and remove position arm from sensor shaft.

(5) Remove electrical connector from sensor.

(6) While holding elevator position sensor, loosen clamp mount attaching hardware and remove elevator position sensor.

B. Install Elevator Position Sensor(s) (Figure 204)

NOTE: It is important that position arm be installed on elevator position sensor shaft for correct operation. (Figure 204)

CAUTION: THE POSITION ARM MUST BE INSTALLED CORRECTLY. THIS WILL PREVENT DAMAGE TO ELEVATOR POSITION SENSOR(S).

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Install elevator position sensor(s) into clamp mount, and tighten only to sufficiently support sensor.

NOTE: Orient sensor(s) correctly within clamp mount.

(3) Install position arm on elevator position sensor shaft, and tighten position arm attaching hardware.

CAUTION: SURFACE POSITION SENSOR HAS LIMITED ROTATION AND SENSOR MUST BE DETENTED TO THE PROPER CONTROL SURFACE ADJUSTMENT , OR DAMAGE TO THE SENSOR MAY RESULT. (PARAGRAPH 2.)

(4) Manually move position arm until detent is acquired in elevator position sensor.

NOTE: Null should be checked on the elevator position sensor(s) by use of the Status Test Panel (STP). Proceed to System Maintenance BIT, Sequence Four, Diagnostic Numbers 221-225. Verify that electrical connector is installed, and circuit breakers are closed if checking null at this time.

NOTE: On some aircraft, a MCDU is used instead of STP.

(5) Manually support elevator position sensor(s), and without moving sensor out of detent, loosen clamp mount attaching hardware securing sensor.

NOTE: If left or right elevator position sensors were removed, adjust sensor. (PAGEBLOCK 27-30-00/501)

(6) Manually adjust entire body of elevator position sensor to align position arm bolt hole with link arm bolt hole.

(7) Tighten clamp mount attaching hardware to secure sensor clamp mount.

(8) Place link bolt through position arm and link arm, and secure link bolt with attaching hardware.

(9) Connect electrical connector to elevator position sensor.

(10) Secure access panel as applicable. (Figure 201)

(11) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

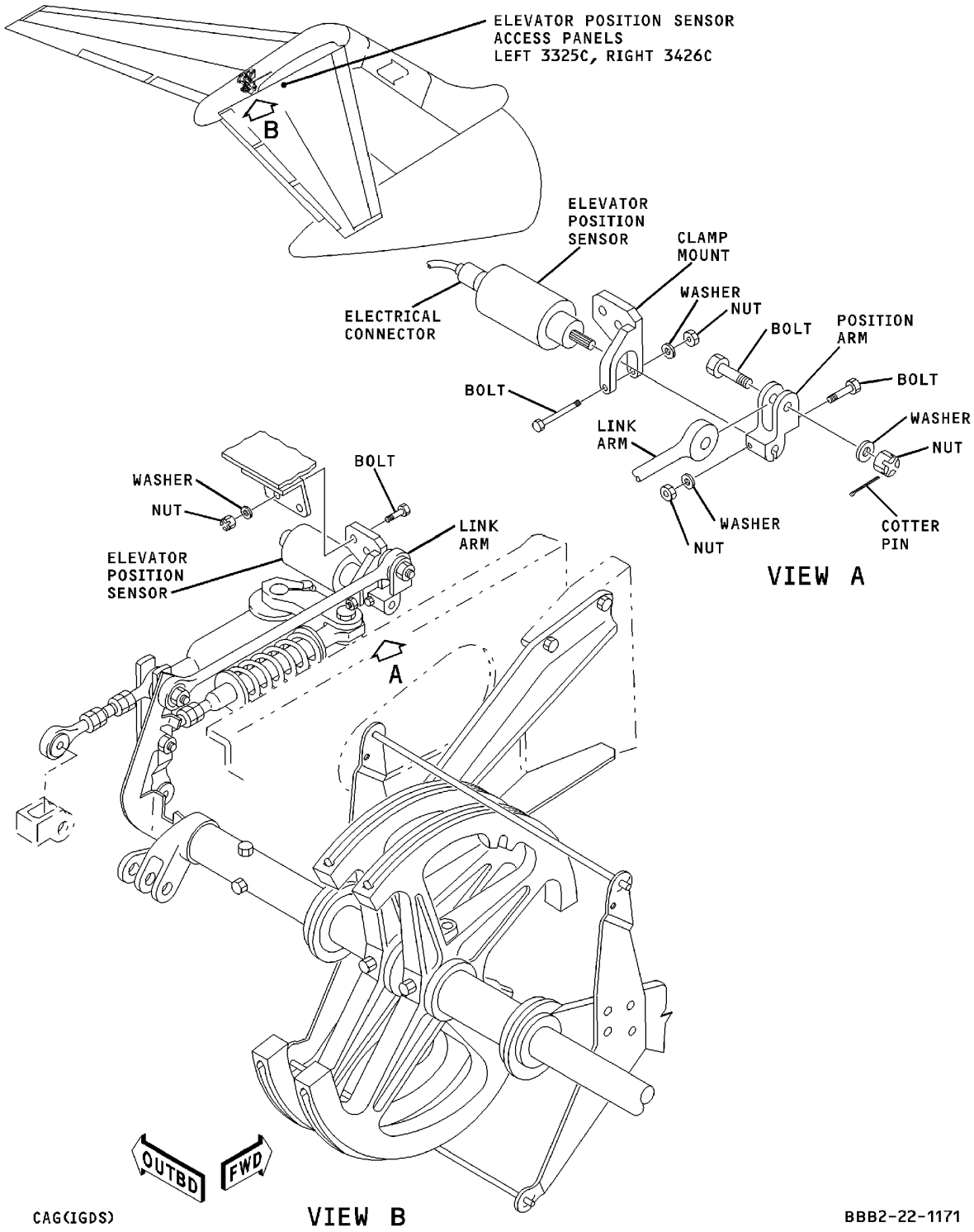
(12) Perform System Maintenance BIT of the elevator position sensor . Refer to following table for null value and tolerance of elevator position sensor. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

(13) Position Sensor Null Values and Tolerances

Table 204 Position Sensor Null Values and Tolerances

Position Sensor	Null Value and Tolerance
Left Elevator	0 ±0.25 degrees
Right Elevator	0 ±0.25 degrees

(14) Perform the Return to Service (RTS) (BIT) test. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)



Elevator Position Sensors - Removal/Installation
Figure 204/22-01-03-990-813

6. Removal/Installation Rudder Position Sensor

A. Remove Rudder Position Sensor (Figure 205)

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Gain access to rudder position sensor. (Paragraph 2. and Figure 205)

(3) Remove link bolt from position arm, and separate link arm from position arm.

(4) Loosen position arm attaching hardware, and remove position arm from sensor shaft.

(5) Remove electrical connector from sensor.

(6) While holding rudder position sensor, loosen clamp mount attaching hardware and remove rudder position sensor.

B. Install Rudder Position Sensor (Figure 205)

NOTE: It is important that position arm be installed on rudder position sensor shaft for correct operation. (Figure 205)

CAUTION: THE POSITION ARM MUST BE INSTALLED CORRECTLY. THIS WILL PREVENT DAMAGE TO RUDDER POSITION SENSOR.

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(2) Install rudder position sensor into clamp mount, and tighten only to sufficiently support sensor.

NOTE: Orient sensor correctly within clamp mount.

(3) Install position arm on rudder position sensor shaft, and tighten position arm attaching hardware.

CAUTION: SURFACE POSITION SENSOR HAS LIMITED ROTATION AND SENSOR MUST BE DETENTED TO THE PROPER CONTROL SURFACE ADJUSTMENT , OR DAMAGE TO THE SENSOR MAY RESULT.

(4) Manually move position arm until detent is acquired in rudder position sensor.

NOTE: Null should be checked on the rudder position sensor by use of the Status Test Panel (STP). Proceed to System Maintenance BIT, Sequence Four, Diagnostic Numbers 221-225. Verify that electrical connector is installed, and circuit breakers are closed if checking null at this time.

NOTE: On some aircraft, a MCDU is used instead of an STP.

(5) Manually support rudder position sensor, and without moving sensor out of detent, loosen clamp mount attaching hardware securing sensor.

(6) Manually adjust entire body of rudder position sensor to align position arm bolt hole with link arm bolt hole.

(7) Tighten clamp mount attaching hardware to secure sensor clamp mount.

(8) Place link bolt through position arm and link arm, and secure link bolt with attaching hardware.

(9) Connect electrical connector to rudder position sensor.

(10) Secure access panel as applicable. (Figure 201)

(11) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

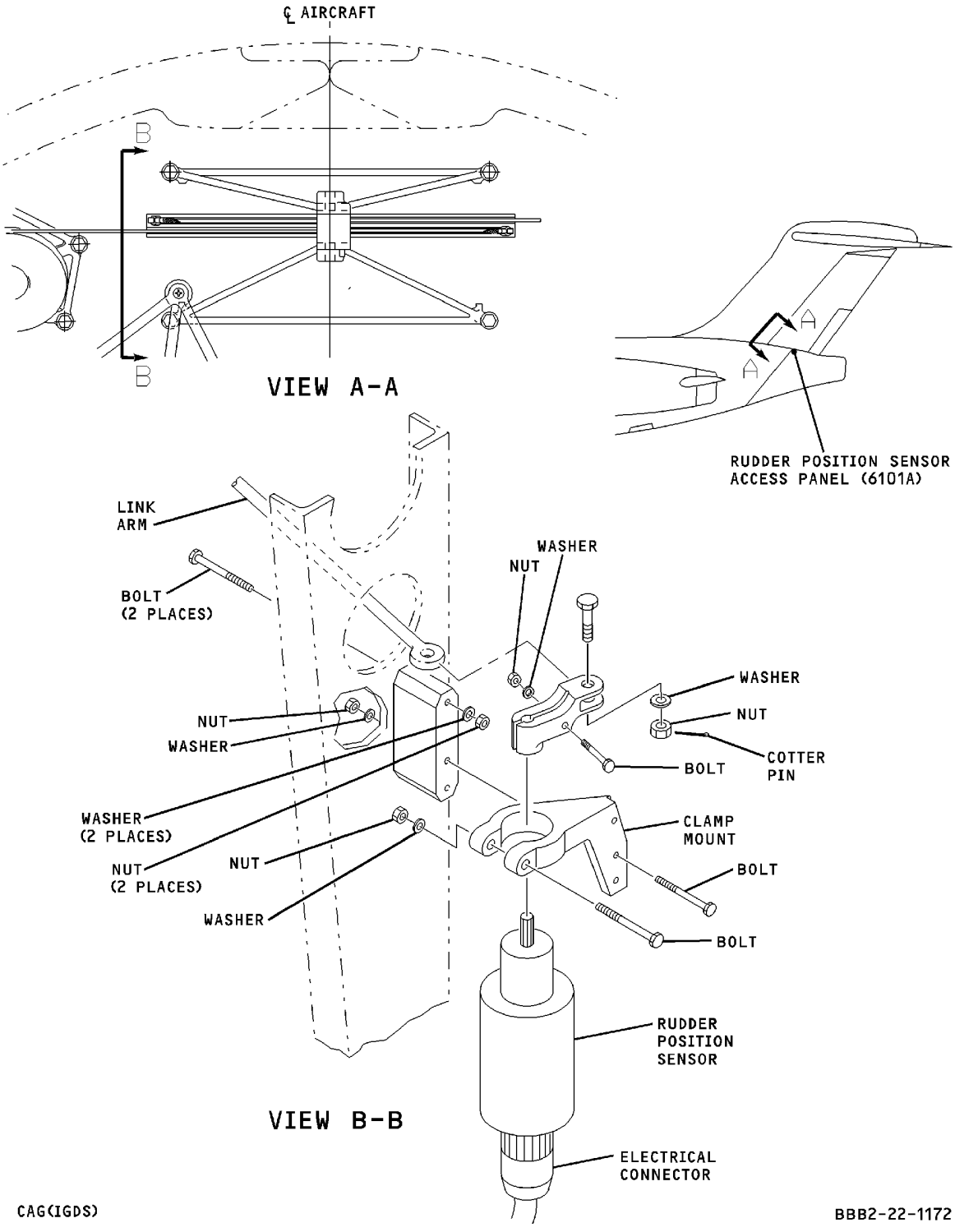
(12) Perform System Maintenance BIT of the rudder position sensor. Refer to following table for null value and tolerance of rudder position sensor. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

(13) Position Sensor Null Value and Tolerance

Table 205 Position Sensor Null Value and Tolerance

Position Sensor	Null Value and Tolerance
Rudder	0 ±0.5 degrees

(14) Perform the Return to Service (RTS) (BIT) test. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)



Rudder Position Sensor - Removal/Installation
Figure 205/22-01-03-990-814

DIGITAL FLIGHT GUIDANCE CONTROL - DESCRIPTION AND OPERATION

1. General

A. Digital Flight Guidance Control includes both autopilot and flight director functions. Autopilot engage, flight director FD - OFF, and mode selection is accomplished at the flight guidance control panel located on the flight compartment glareshield.

B. Autopilot computed pitch, roll and yaw channels are packaged into two identical Digital Flight Guidance Computers (DFGC's), and are controlled by the AP engage switch. A switch located below the AP engage switch, labeled 1, 2, provides the capability for selection of either DFGC-1 or DFGC-2.

C. Various autopilot roll and pitch modes of operation can be selected to provide airplane in-flight guidance. These modes provide automatic control of ailerons, elevators, and rudder to establish and maintain airplane attitude, altitude, heading, rate of climb or descent, and automatic capture and guidance to localizer, glideslope and omni-range beams.

D. Each flight director, when placed to FD position, displays steering command information from its respective DFGC (i.e. DFGC-1 to captain's ADI). However, a flight director switch, located on the overhead panel allows both flight directors to be controlled from a single DFGC.

E. Takeoff and go-around modes are initiated by pressing either TO/GA switch located on the throttle levers. The TO/GA switch programs flight director pitch control for pitch commands to maintain the takeoff or go-around safe reference. During go-around, with autopilot engaged, pitch control will automatically maintain go-around reference speed. Roll control provides wings level and heading hold when in flight.

WJE 406

F. Each control wheel contains an "AP quick disconnect" button to provide disengagement of the autopilot, and also turn off the AP off warning lights. The AP off warning lights are located in each Flight Mode/Instrument Warning Annunciator located on the captain's and first officer's instrument panels. When the autopilot is disconnected by any means other than the quick disconnect buttons, the AP off warning lights will come on red and flash. The AP off warning lights can be turned off by pressing either "AP quick disconnect" switch. An aural warning will sound any time the autopilot is disconnected.

WJE 401-404, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

G. Each control wheel contains an "AP quick disconnect" button to provide disengagement of the autopilot, and also turn off the AP off warning lights. The AP off warning lights are located in each Flight Mode/Instrument Warning Annunciator located on the captain's and first officer's instrument panels. Any time the AP is disconnected, an aural warning will sound and the AP off warning lights will come on red and flash. The AP off warning lights can be turned off by pressing either "AP quick disconnect" switch.

NOTE: If the DFGS should shut down (Flight Guidance Control Panel blank, Mach Trim and Yaw Damper OFF lights ON), momentarily pressing either "AP quick disconnect" button or cycling the DFGS circuit breakers may bring the system back on line.

WJE 407, 408, 410, 411, 880

H. Each control wheel contains an "AP quick disconnect" button to provide disengagement of the autopilot, and also turn off the AP off warning lights. The AP off warning lights are located in each Flight Mode/Instrument Warning Annunciator located on the captain's and first officer's instrument panels. The AP off warning lights will come on red and flash anytime the autopilot is disconnected. During autoland selection, an aural warning tone will also sound if the autopilot is disconnected. The AP off warning lights can be turned off by pressing either "AP quick disconnect" switch.

WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

2. Flight Guidance Operation

A. Following is the operating conditions associated with some of the functions provided by the Flight Guidance Control system.

Table 1

TITLE	PARAGRAPH
Takeoff	Paragraph 2.B.
Altitude Preselect and Advisory	Paragraph 2.C.
WJE 401-404, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891	
Flight Management System	Paragraph 2.E.
WJE 406-408, 410, 411, 880	
Performance Management System	Paragraph 2.D.
WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891	
VHF Omni-Range	Paragraph 2.F.
Turbulence Penetration	Paragraph 2.G.
AP ILS Approach	Paragraph 2.H.
Automatic Go-Around	Paragraph 2.I.
Autoland	Paragraph 2.J.

B. Takeoff (Figure 1)

(1) During takeoff, after lift off, flight director pitch commands can be followed to adjust the pitch attitude of the airplane, to maintain a safe margin above stall airspeed. The roll (steer) command bar provides commands to maintain wings level and heading hold.

(2) Figure 1, step 1, shows the initial conditions for takeoff with the airplane in the ground mode. Placing the flight director to the FD position, establishes the basic flight director modes, HDG HLD, ALT HLD (VERT SPD). The pitch and roll steering command bars come into view and the slow-fast pointers remain in view on the slow side in both ADI's. If the autothrottle switch is placed to AUTO THROT position, the ATS mode annunciator will display CLMP, and power is removed from the autothrottle servo drive.

(3) Step 2 provides the action taken at or just prior to the initial takeoff roll. Selecting T.O. or (T.O. FLX) on the Thrust Rating Indicator and pressing either TO/GA switch on the throttle levers, will initiate the flight director takeoff mode of operation. The pitch and roll mode annunciators will display TAK OFF and with autothrottle engaged, the ATS mode annunciators will display EPR TO. The throttles will advance to the maximum takeoff EPR limit, the pitch command bar will display a nose-up attitude and the slow-fast pointer will be on the slow side (the slow-fast pointer is invalid until after aircraft rotation). The roll steering command is centered to the runway heading for climbout.

NOTE: Prior to the takeoff roll, a departure heading may be selected by use of the H knob on the flight guidance control panel. Momentarily pulling out the H knob will establish the selected heading (HDG SEL) mode of operation.

(4) Prior to aircraft rotation as shown in step 3, power is removed from the throttle servo at approximately 60 knots indicated airspeed. The ATS mode annunciators will again display CLMP and the throttles will remain stationary at the EPR power setting established for the takeoff mode. However, the throttles may be manually overpowered at any time. Slow-fast and pitch commands provide the takeoff speed reference consistent with aircraft configuration and gross weight conditions.

(5) Step 4 provides the takeoff conditions during climbout. Placing the autopilot switch on results in autopilot control of pitch attitude during the takeoff mode of operation, unless another pitch mode is selected (i.e. rotating pitch wheel etc.). Pressing the CL push-button on the Thrust Rating Indicator will establish the EPR limit for climbout. With autothrottle engaged, the throttles will adjust to the established EPR limit, and the ATS mode annunciators will display EPR CL.

C. Altitude Preselect and Advisory (Figure 2)

(1) The altitude preselect function provides automatic capture of a preset barometric altitude, which is selected by an altitude set knob located on the Flight Guidance Control panel. The altitude set knob has three positions, spring-loaded to center. Rotating the knob in the center position provides 1000 foot increment altitude adjustments that are read on a selected altitude readout window directly above the altitude set knob. Prior to the -930 Digital Flight Guidance Computer (DFGC), the momentary pull-out position arms the system for a preselected altitude capture. With the advent of the -930 DFGC, the altitude preselect mode is armed automatically without the momentary pull-out of the set knob. This is true also when a new altitude is set in the altitude window or when go-around is engaged, but only if the preselected altitude is higher than the altitude existing at the time of the go-around mode engagement. Rotating the knob in the push-in position provides 100 foot increment adjustments, and cancels the altitude preselect mode.

(2) Altitude preselect operates only through autopilot or flight director guidance. The altitude advisory function is operational with or without autopilot or flight director. The advisory function only requires that the DFGC is receiving valid altitude signals from the CADC.

WJE 407, 408, 411, 880

(3) The altitude advisory system provides two functions. To alert the flight crew when the aircraft is approaching a preselected altitude, and to alert the flight crew when the aircraft deviates from a selected altitude. Altitude advisory turns on a steady amber light in the upper left corner of the altimeters to alert the flight crew that the aircraft is approximately 750 feet from selected altitude. At approximately 150 feet prior to selected altitude the light goes off.

WJE 401-404, 406, 410, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

(4) The altitude advisory system provides two functions. To alert the flight crew when the aircraft is approaching a preselected altitude, and to alert the flight crew when the aircraft deviates from a selected altitude. Altitude advisory turns on a steady amber light in the upper left corner of the altimeters to alert the flight crew that the aircraft is approximately 750 feet from selected altitude. At approximately 250 feet prior to selected altitude the light goes off.

WJE 406

NOTE: On CAA certified aircraft, the altitude advisory light and aural tone will come on 750 feet prior to preselected altitude.

WJE 407, 408, 411, 880

(5) If the aircraft deviates beyond the 750 foot band before it enters the 150 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. The advisory lights will stop flashing after reentering the 750 foot band and they will extinguish when the aircraft is within 150 feet of the selected altitude or when a new altitude has been selected. If the aircraft is maneuvered beyond the 150 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. If the aircraft continues to deviate beyond the 750 foot band, the advisory lights will continue to flash. The advisory lights will extinguish when the aircraft is again within 150 feet of the selected altitude or when a new altitude has been selected.

NOTE: The voice warning "ALTITUDE" is activated only on aircraft which have the voice option included.

WJE 401-404, 406, 410, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

(6) If the aircraft deviates beyond the 750 foot band before it enters the 250 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. The advisory lights will stop flashing after reentering the 750 foot band and they will extinguish when the aircraft is within 250 feet of the selected altitude or when a new altitude has been selected. If the aircraft is maneuvered beyond the 250 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. If the aircraft continues to deviate beyond the 750 foot band, the advisory lights will continue to flash. The advisory lights will extinguish when the aircraft is again within 250 feet of the selected altitude or when a new altitude has been selected.

NOTE: The voice warning "ALTITUDE" is activated only on aircraft which have the voice option included.

WJE 406, 415-427, 429, 861-866, 868, 869, 871, 872, 891

NOTE: Each voice message shall be preceded by an associated tone warning. The voice message and its associated tone warning shall be cycled, one second tone followed by one second voice message for the duration of the warning period.

WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

(7) Figure 2 illustrates a maneuver utilizing altitude preselect and advisory with autopilot in control. The initial conditions show the cockpit displays pertinent to the altitude preselect mode. The autopilot is engaged, either or both flight directors are on, and the system is armed for altitude capture. The aircraft is climbing through 20,300 feet, utilizing vertical speed of 2000 FPM to capture 25,000 feet preselected altitude. Roll control is maintaining a selected heading.

(8) The threshold for the altitude capture maneuver is variable with rate of climb or descent. As selected altitude is approached, an altitude for initiation of the level-off maneuver is computed within the DFGC. A command signal is developed that results in the autopilot making a smooth capture maneuver to the preselected altitude. At a 2000 FPM climb, as illustrated in Figure 2, altitude capture is initiated at approximately 500 feet from selected altitude, however, the altitude advisory light will have come on 750 feet prior to preselected altitude. The arm mode annunciator will go blank, and the pitch mode annunciator will display ALT CAP. The pitch profile readout will follow actual vertical speed. If the autothrottle was used in the EPR Limit mode to climb to selected altitude, SPD SEL (or MACH SEL, whichever was preselected) mode will be displayed at time of altitude capture.

WJE 407, 408, 411, 880

(a) Vertical speed increases exceeding 500 FPM above the existing vertical speed while climbing or descending will disengage the ALT CAP mode.

WJE 401-404, 407, 408, 411, 412, 414, 880

(9) The DFGC shall enable automatic arming of the preselected altitude when the following occurs:

(a) The glideslope capture or track mode is exited by engaging the go-around mode and the preselected altitude is at least 90 feet greater than the altitude existing at the time of go-around mode engagement. If the glideslope capture or track mode is exited by engaging the go-around mode but the preselected altitude is less than 90 feet higher than the existing altitude at the time of go-around engagement, the preselected altitude will not arm automatically until another pitch mode is selected.

(b) The glideslope capture or track mode is exited by engaging any pitch mode other than the go-around mode.

WJE 407, 408, 411, 880

(10) At approximately 150 feet prior to the level-off maneuver, the altitude advisory light will go off. During the level-off maneuver, the pitch profile readout is blank. After the level-off maneuver has been completed (pitch profile readout less than approximately 100 feet), the pitch mode annunciator will display ALT HLD, and the pitch profile readout displays zero vertical speed reference. At level flight, the altitude preselect function is terminated as an autopilot/flight director function. The altitude advisory system remains armed for possible airplane deviation outside ±150 feet.

WJE 401-404, 406, 410, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

(11) At approximately 250 feet prior to the level-off maneuver, the altitude advisory light will go off. During the level-off maneuver, the pitch profile readout is blank. After the level-off maneuver has been completed (pitch profile readout less than approximately 100 feet), the pitch mode annunciator will display ALT HLD, and the pitch profile readout displays zero vertical speed reference. At level flight, the altitude preselect function is terminated as an autopilot/flight director function. The altitude advisory system remains armed for possible airplane deviation outside ±250 feet.

WJE 406-408, 410, 411, 880

D. Performance Management System (Figure 3)

(1) The Performance Management System (PMS) provides coordinated control of pitch and thrust throughout the entire flight envelope from climbout to descent. Figure 3 shows a typical PMS mode of operation. CL is selected on the Thrust Rating Indicator and the autothrottle and autopilot are engaged on the Flight Guidance Control Panel.

(2) Pressing the PERF push-button on the Flight Guidance Control Panel, establishes the PMS mode of operation as seen on the Control Display Unit (CDU) located the pedestal. The CDU is displaying the commanded EPR and computed EPR limit. The PMS is operating in the CLB optimum mode, with a vertical speed of 2000 FPM at 300 knots. An altitutde is armed for 30,000 feet with capture at 42 nautical miles in seven minutes. The optimum and maximum flight levels are also displayed.

(3) The Flight Mode Annunciators (FMA's) also display the PMS operating mode. The ATS and pitch mode annunciators display PERF CL for thrust control and pitch attitude. The arm mode annunciator displays ALT arm and the roll mode annunciator displays the selected heading.

(4) Fifteen seconds prior to the vertical leg change (armed altitude and nautical miles), the VERTICAL ALERT light located on the captain's and first officer's instrument panels will come on to advise the flight crew. The light will go off at the vertical leg change.

WJE 406-408, 410, 411, 880 (Continued)

(5) Pressing the CR push-button on the Thrust Rating Indicator establishes the EPR cruise limit. The CDU displays the top of descent (TOD) at 213 nautical miles in 34 minutes. Cruise mach is displayed with 14,000 pounds of fuel remaining at TOD.

(6) The FMA's display the cruise operating modes. The airplane is tracking the VOR. The VOR and DME are used as inputs for PMS computations. During cruise the flight crew selects and arms the first cleared altitude below them, this brings up the descent page.

(7) Two minutes prior to TOD, the CDU displays SPD alternately flashing with SEL as a cue to the flight crew to select line select key 1. Pressing line select key 1 arms the system to initiate descent at the top of descent (TOD).

(8) During descent the throttles retard to idle EPR, and PERF DES is displayed in the FMA's. Altitude is armed for 8000 feet bottom of descent (BOD) at 85 nautical miles in 15 minutes. Pitch control is displaying a vertical speed of -2150 FPM.

(9) After the airplane reaches the BOD and levels off, the PERF CRZ mode is then again reestablished if preprogrammed in the flight plan. Selection of another DFGS operating mode will automatically override the PMS mode.

(10) Reference SUBJECT 34-63-00 for further details of Performance Management System.

WJE 401-404, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

E. Flight Management System (Figure 4)

(1) The Flight Management System (FMS) option is a fully selectable mode of the Digital Flight Guidance System (DFGS). When engaged or commanded, FMS provides automatic navigation, horizontal and vertical guidance commands, speed commands, EFIS map and plan display information, and in-flight performance optimization. The FMS hardware consists of single Advanced Flight Management Computers (AFMC) and two Multipurpose Control and Display Units (MCDU). The FMS integrates information from the Central Air Data Computer (CADC), aircraft attitude system, VOR, DME, DFGC, engine and fuel sensors, GMT, FMS performance and navigation data bases, and crew-entered data to perform data display, navigation, performance optimization and lateral and vertical guidance for all flight modes.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(2) The Flight Management System (FMS) option is a fully selectable mode of the Digital Flight Guidance System (DFGS). When engaged or commanded, FMS provides automatic navigation, horizontal and vertical guidance commands, speed commands, EFIS map and plan display information, and in-flight performance optimization. The FMS hardware consists of single Flight Management Computers (FMC) and two Control and Display Units (CDU). The FMS integrates information from the Central Air Data Computer (CADC), aircraft attitude system, VOR, DME, DFGC, engine and fuel sensors, GMT, FMS performance and navigation data bases, and crew-entered data to perform data display, navigation, performance optimization and lateral and vertical guidance for all flight modes.

WJE 401-404, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

(3) FMS performance function optimizes the entire flight profile during preflight and continuously updates the flight plan for changing flight conditions. Winds, gross weight, route modifications, remaining flight and flight plan advisory changes are displayed to the pilots via the MCDU with related savings or penalty information. The performance section also uses current aircraft conditions to maintain flight envelope protection for altitude and speed for all gross weights and altitudes. Also included is a hard speed restriction of 250 knots below 10,000 feet. Performance information such as Estimated Time of Arrival (ETA), Distance to Waypoint (DTW), and Gross Weight (GW) at waypoint are calculated continuously and are displayed for the active and provisional flight plan, or any modification to the flight plan.

(4) The FMS is integrated with the DFGS to command pitch, roll and thrust during climb, cruise and descent. Submodes available to climb are: ECON CLB, SEL SPD CLB, MAX ANGLE CLB, and E/O CLB. Submodes available in cruise are: ECON CRZ, SEL SPD CRZ, LRC CRZ, CRZ CLB, CRZ DES, and E/O CRZ. Descent submodes are: ECON DES, CRZ DES and SEL SPEED DES. The FMS guidance commands are limited by DFGS restrictions for roll angle, roll rate, pitch angle, pitch rate, EPR command, and throttle movement rate. While in climb, FMS will not climb higher than the FGCP clearance altitude. While in cruise FMS will not leave the current altitude until a new cruise altitude has been armed, entered and executed by the pilot. FMS will not descend lower than the clearance altitude while in descent. When FMS encounters a DFGCP clearance altitude restriction during a vertical maneuver, it will level off until the restriction has been removed by the pilot.

WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

F. VHF Omni-Range (Figure 5)

(1) The VHF Omni-Range (VOR) provides four modes of operation. The modes consist of arm, capture, track and course. Figure 5 illustrates a sequence of VOR operations from initial arming of the system to selecting an outbound VOR radial.

(2) The initial conditions illustrated in Figure 5, is arming the system for VOR. Tuning the VHF NAV receivers to a desired VOR frequency and course, and pressing the VOR LOC push-button on the Flight Guidance Control panel will automatically arm the system for VOR. VOR will appear in the arm mode annunciators. The VOR mode will not arm if the VOR signal is not valid. This is indicated by a NAV flag coming into view. The roll control responds to the selected heading, and with autopilot engaged, automatic capture of the VOR radial will occur.

(3) Automatic capture of the VOR is initiated when the airplane intercepts the VOR radial capture zone (approximately 2 dots depending upon capture rate) as shown on the HSI. VOR CAP will be displayed on the roll mode annunciators to verify capture has occurred. The flight director command bars will respond accordingly to autopilot control.

(4) When the airplane centers on the VOR radial, approximately 1/2 dot, as shown on the HSI, the roll mode annunciators will display VOR TRK, and the autopilot will maintain roll and pitch control, and provide crosswind correction as necessary to maintain beam center. The HSI will display any beam deviation during track on the VOR radial.

(5) During over-the-station (zone of confusion) passage, the roll mode annunciators will display VOR CRS, and a new VOR radial may be selected without disengaging the VOR mode. A NAV flag will appear if the signal received is invalid, and the TO FROM pointer will bias out of view in the HSI's. If the airplane is in the VOR CRS mode for more than 30 seconds, the roll mode annunciators will automatically switch to roll control basic mode HDG HLD.

(6) When the new VOR radial is captured, the NAV flag will bias out of view, and the TO FROM pointer will reappear on the HSI's. The roll command bars will come back in view when NAV valid is again reestablished. The roll mode annunciators will display VOR CAP initially, until the airplane settles on beam center, then VOR TRK will be displayed.

G. Turbulence Penetration (Figure 6)

(1) Turbulence penetration provides dampened pitch response and wings level hold during turbulent atmospheric conditions. The mode is established when the TURB push-button on the Flight Guidance Control panel is pressed.

(2) (Figure 6) illustrates a typical turbulence mode of operation. The initial conditions, step 1, illustrates a normal flight guidance cruise operation. Autopilot is engaged maintaining altitude and heading, and the autothrottle is engaged in the selected speed mode.

(3) Step 2 illustrates the action of pressing the TURB push-button. The pitch mode annunciator displays TURB, and the roll mode annunciator displays WNG LVL. The pitch profile readout displays command attitude to the closest degree. The autothrottle disengages and THROTTLE off warning lights come on and flash red. During the TURB mode of operation, the attitude reference in the pitch profile readout can be adjusted as desired by use of the pitch wheel. Automatic pitch trim functions are inhibited during the TURB mode.

(4) Selecting another pitch control mode terminates the TURB mode of operation. Step 3, illustrates the action of pressing the ALT HOLD push-button. The pitch mode annunciator displays ALT HLD, and the roll mode annunciator displays the roll basic mode HDG HLD. The flight guidance system responds to the mode selection.

H. AP ILS Approach (Figure 7)

(1) The AP ILS Approach mode is usable for category I, or category II weather conditions. The mode is compatible with autopilot and both flight directors, autopilot only, or flight director(s) only. (Figure 7) illustrates a typical AP ILS Approach mode of operation. The initial conditions, step 1, show both flight director switches are in FD position, autopilot engaged, and autothrottle engaged. The pitch mode annunciator displays ALT HLD, the roll mode annunciator displays HDG SEL, and the ATS mode annunciator displays selected speed.

(2) Pressing the ILS push-button (as shown in step 2) on the Flight Guidance Control panel after tuning the associated NAV receiver to the ILS frequency, and setting the CRS knob to the published inbound localizer heading, establishes the preliminary conditions for the AP ILS Approach mode. ILS appears in the arm mode annunciator. The pitch wheel may be used to arrive at approach entry altitude.

(3) When the localizer beam deviation reduces to the capture threshold, as seen on the Horizontal Situation Indicator (HSI), localizer capture occurs as shown in step 3. The airplane automatically turns as required to establish the localizer beam center. During localizer operation, the bank angle limiter is overridden, and bank is limited as a function of radio altitude up to a 30 degree maximum. The roll mode annunciator switches from HDG SEL to LOC CAP.

(4) As the airplane settles on beam center, the roll mode annunciator changes from LOC CAP to LOC TRK (Ref. step 4). While tracking the localizer, if a crosswind is present, the localizer track mode will establish a crab-angle into the wind so the airplane will maintain localizer beam center with no steady stand-off. The direction and amount of crab-angle will be displayed on the HSI as the angular difference between the airplane heading and the setting on the course select pointer. As wind conditions change while tracking the localizer, the crab-angle will change to maintain beam center. Approach speed may be selected by adjusting the SPD/MACH select knob.

(5) As the airplane approaches glideslope center, the pitch mode annunciator changes to G/S CAP as shown in step 5. The actual capture point is variable and is a function of rate of beam closure, plus beam deviation. Automatic capture commences and the airplane maneuvers as required to settle on beam center.

(6) When the airplane settles on beam center (Ref. step 6), the pitch mode annunciator changes from G/S CAP to G/S TRK. Pitch control then automatically controls the airplane to maintain beam center if radio altitude is less than 1500 feet. The duplex rudder servodrive comes on the line to provide the proper rudder authority. The RUDDER TRAVEL UNRESTRICTED light on the overhead panel should come on if airspeed is less than 145 knots. Gain programming within the DFGC, based on radio altitude, dampens the tendency for over correction maneuvers resulting from beam convergence as the radio source is approached.

(7) After glideslope track, with duplex rudder servo on the line, approach conditions satisfied, and radio altitude less than 1500 feet, the arm mode annunciator changes from ILS to AUT GA (Ref. step 7). This communicates to the flight crew that the system is armed for autopilot go-around in the event an automatic go-around maneuver must be performed.

(8) At the required decision height, pressing either control wheel autopilot disconnect button will disengage the autopilot (Ref. step 8). The AP off warning lights will come on red and flash. The duplex rudder servo will go off the line and the yaw damper system will again be in the series mode of operation. The arm mode annunciator will change from AUT GA to FD GA. When FD GA is annunciated the flight crew must manually follow pitch and roll steering commands in event a go-around maneuver is required. Pressing the autopilot disconnect button the second time on either control wheel will turn off the AP red lights.

(9) As the airplane arrives at approximately 50 feet radio altitude, the autothrottle retard mode is initiated (Ref. step 9). The ATS mode annunciators change from selected speed to RETD. The throttles will start driving to the aft mechanical stop.

(10) As the airplane touches down, and main gear wheel spin-up occurs, as shown in step 10, the throttles will be driven at an increased rate to the aft mechanical stop (idle stop position). The arm mode will go blank indicating to the flight crew that a flight director go-around maneuver is not available.

(11) After main gear wheel spin-up (Ref. step 11), actuating the reverse thrust levers automatically disengages the autothrottle. The THROTTLE off warning lights will not come on when autothrottle is disengaged using reverse thrust levers. Placing flight director switches to OFF (Ref. step 12), will place the mode annunciators in a blank condition.

(12) Figure 7 (Sheet 2), step 1, shows the annunciation during an abnormal AP ILS APPROACH condition. If the autopilot remains engaged below the required decision height, approximately 100 feet radio altitude, NO FLR annunciates and flashes for approximately 3 seconds in the pitch mode annunciators, to alert the flight crew to the abnormal approach operating conditions.

(13) Step 2, shows the condition if go-around guidance is not available. If the arm mode annunciator previously has been displaying AUT GA or FD GA, and loss of go-around guidance occurs, i.e., loss slat transducer signals, etc., the arm mode annunciator will display MAN GA. This advises the flight crew that in event a go-around maneuver must be performed, the maneuver must be performed manually without the autopilot or flight director.

I. Automatic Go-Around (Figure 8)

(1) The autopilot go-around mode of operation is initiated when the flaps are extended in land configuration (28 to 40 degrees), and either TO/GA switch on the throttle levers are pressed. The autopilot go-around mode provides pitch steering command displays and elevator control to provide a climb-out at the go-around airspeed, consistent with aircraft configuration. Roll control logic is provided to roll the aircraft to wings level and maintain existing heading, when the bank-angle is reduced to less than 3 degrees. The rudder parallel servo must be operational for the single engine automatic go-around mode.

(2) Figure 8 illustrates a typical autopilot go-around mode of operation. The initial conditions, step 1, illustrate the airplane in a landing configuration. Autopilot and autothrottle are engaged, and the flight mode annunciators display the Flight Guidance System configuration. With the -930 and later DFGC's, the preselected altitude displayed in the altitude window will be armed automatically when the go-around mode is engaged if it is higher than the aircraft altitude existing at the time of go-around engagement.

(3) Step 2, shows the action of pressing either TO/GA switch. The pitch and roll mode annunciators display GO RND. The ATS mode annunciator displays EPR G/A, and GA is automatically selected and annunciated on the Thrust Rating Indicator. The ADI displays a pitch command and the autopilot responds to maintain the go-around speed reference and a roll command for wings level. With autothrottle engaged, the throttles will automatically adjust to the maximum go-around EPR LIM displayed on the Thrust Rating Indicator and the pitch profile window will follow existing vertical speed.

(4) Rotating the pitch wheel (or selecting another pitch mode), as shown in step 3 will automatically terminate the autopilot go-around mode of operation. Go-around mode will also terminate at time of altitude capture. With autothrottle engaged, selecting another EPR mode, or autothrottle operating mode, will automatically cause the throttles to adjust to seek and maintain the selected mode.

WJE 407, 408, 410, 411, 880

(5) The glideslope capture or track mode is exited by engaging the go-around mode when the preselected altitude is at least 90 feet greater than the altitude existing at the time of go-around mode engagement. If the glideslope capture or track mode is exited by engaging the go-around mode but the preselected altitude is less than 90 feet higher than the existing altitude at the time of go-around engagement, the preselected altitude will not arm automatically until another pitch mode is selected. The glideslope capture or track mode is exited by engaging any pitch mode other than the go-around mode.

WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

J. Autoland (Figure 9)

(1) The autoland mode of operation provides a Fail Passive automatic landing. Each Flight Mode and Instrument Warning Annunciator (captain's and first officer's instrument panels), contain a NO AUTOLAND legend. The NO AUTOLAND legend appears when the continuous built in test circuits within the selected DFGC detect a failure(s) that is critical to the autoland mode of operation. If the NO AUTOLAND legend appears, switching to the opposite DFGC may cause the legend to go off, in this case, the second system is usable for an automatic landing.

(2) Figure 9, illustrates a typical autoland mode of operation. The initial conditions, step 1, illustrate the airplane at a cruise altitude of 5000 feet, autopilot and flight directors engaged, and the pitch and roll mode annunciators displaying the FGS selected modes, HDG SEL and ALT HLD. The autothrottle is engaged in a selected speed mode.

(3) Tuning the associated NAV receiver to the ILS frequency, setting the CRS knob to the published inbound localizer heading, and pressing the AUTOLAND push-button on the Flight Guidance Control panel establishes the initial conditions for the autoland mode of operation (Ref. step 2). LND appears in the arm mode annunciators. The pitch wheel may be used to arrive at approach entry altitude.

(4) When the localizer beam deviation reduces to the capture threshold, as seen on the Horizontal Situation Indicator (HSI), localizer capture occurs as shown in step 3. The airplane automatically turns as required to establish the localizer beam center. During localizer operation, the bank angle limiter is overridden and the airplane can bank to a maximum of 30 degrees. This maximum 30 degree bank decreases as radio altitude is decreased. The roll mode annunciator switches from HDG SEL to LOC CAP.

(5) As the airplane settles on beam center, the roll mode annunciator changes from LOC CAP to LOC TRK (Ref. step 4). While tracking the localizer, if a crosswind is present, the localizer track mode will establish a crab-angle into the wind so the airplane will maintain localizer beam center with no steady stand-off. The direction and amount of crab-angle will be displayed on the HSI as the angular difference between the airplane heading and the setting on the course select pointer. As wind conditions change while tracking the localizer, the crab-angle will change to maintain beam center.

(6) As the airplane approaches the glideslope beam, the pitch mode annunciator changes to G/S CAP as shown in step 5. The actual capture point is variable and is a function of rate of beam closure, plus beam deviation. Automatic capture commences and the airplane maneuvers as required to settle on beam center. The approach speed may be selected by adjusting the SPD/MACH select knob.

(7) When the airplane settles on beam center (Ref. step 6), the pitch mode annunciator changes from G/S CAP to G/S TRK. Pitch control then automatically controls the airplane to maintain beam center. Gain programming within the DFGC, based on radio altitude, dampens the tendency for over correction maneuvers resulting from beam convergence as the radio source is approached.

(8) When glideslope track is established, command signals to the series yaw damper actuator are removed. The RUDDER TRAVEL UNRESTRICTED light on the overhead panel should come on (rudder pedals begin to move). Command signals to the rudder is then provided by a duplex rudder servodrive, which is in parallel with the rudder pedals and provide the rudder authority required during the align mode of operation. The parallel rudder engages when the aircraft is less than 1500 feet radio altitude and the localizer and glideslope track modes are established.

(9) After glideslope track with radio altitude less than 1500 feet, AUT GA appears in the arm mode annunciators as shown in step 7. The annunciation is provided to alert the flight crew that the autopilot is armed and logic is available in the event an autopilot go-around maneuver must be performed. If automatic go-around logic is not available, FD GA will be annunciated. If flight director go-around logic is not available, then the arm mode annunciator will display MAN GA. This will have no affect on the automatic landing, but the flight crew is advised in event of a go-around maneuver, the maneuver must be performed manually.

(10) Also, after glideslope track mode (step 8), the DFGC verifies that all autoland control sensors are on the line to provide a complete Fail Passive autoland system. The pitch and roll mode annunciators display AUT LND alerting the flight crew that autoland conditions are satisfied.

NOTE: If the elevator, aileron or rudder position sensors are not nulled correctly, the system will not go into LND mode. LND arm will remain engaged until 300 feet radio altitude and the autopilot will disengage.

(11) When the airplane descends to approximately 150 feet radio altitude, the autopilot executes a runway alignment maneuver to remove any crab-angle that the autopilot may have been maintaining to oppose crosswinds. The roll mode annunciator will change from AUT LND to ALN as shown in step 9. The forward slip maneuver is performed primarily by yaw control (rudder). The course error signal (difference between existing and runway heading) provides guidance to the rudder. The turning moment generated by the rudder is opposed by a limited aileron cross control to afford a turn toward the centerline of the localizer. Beam center is maintained, but the aircraft is turned to cancel the course error signal.

(12) As the airplane arrives at the runway threshold (approximately 50 feet from touchdown), the autopilot flare and the autothrottle retard modes are initiated (Ref. step 10). The pitch mode annunciator will change from AUT LND to FLR, the ATS mode annunciator will display RETD, and the slow-fast pointers on the ADI's will be biased out of view. During the flare maneuver, the autopilot commands a slight nose-up attitude, and the airplane is programmed for a smooth flare to set the airplane down at a low sink rate. At the same time the throttles will be automatically driven aft toward the mechanical stops.

(13) As the airplane makes the touchdown maneuver, and main gear spin-up occurs, the pitch and roll mode annunciators switch to ROL OUT (Ref. step 11). Localizer deviation signals then control the rudder and nose wheel steering to maintain localizer center. Also, at main gear wheel spin-up, the throttles will move rapidly to the aft idle stop position, and the arm mode annunciator will display FD GA indicating to the flight crew that a flight director go-around maneuver is available.

WJE 406

NOTE: With Service Bulletin 22-89 incorporated ground rollout will occur only when two main landing gears (MLG) wheels spin-up instead of one MLG wheel spinning up.

WJE 401-404, 407, 408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

(14) At nose gear touchdown, step (12), the ground roll out is available. The pitch and roll mode annunciators continue to display ROL OUT and the ADI displays roll command for steering guidance and pitch command to zero degrees.

WJE 401-404, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

NOTE: With SCN 6512B incorporated, autoland rollout guidance provides commands to maintain the localizer centerline following an automatic landing utilizing the nose gear steering system.

WJE 406

(15) 5 seconds after nose gear touchdown as shown in step 12, the pitch and roll mode annunciators go blank. The command bars bias out of view in both the captain's and first officer's ADI's. The autopilot disconnects, the AP off warning lights will come on red and flash, and aural warning tone will sound. The AP off warning and aural warning tone can be reset by pressing either control wheel disconnect button.

NOTE: On some aircraft the pitch and roll mode annunciators continue to display ROL OUT and the ADI displays roll command for steering guidance and pitch command to zero degrees.

NOTE: With SCN 6512B incorporated, autoland rollout guidance provides commands to maintain the localizer centerline following an automatic landing utilizing the nose gear steering system.

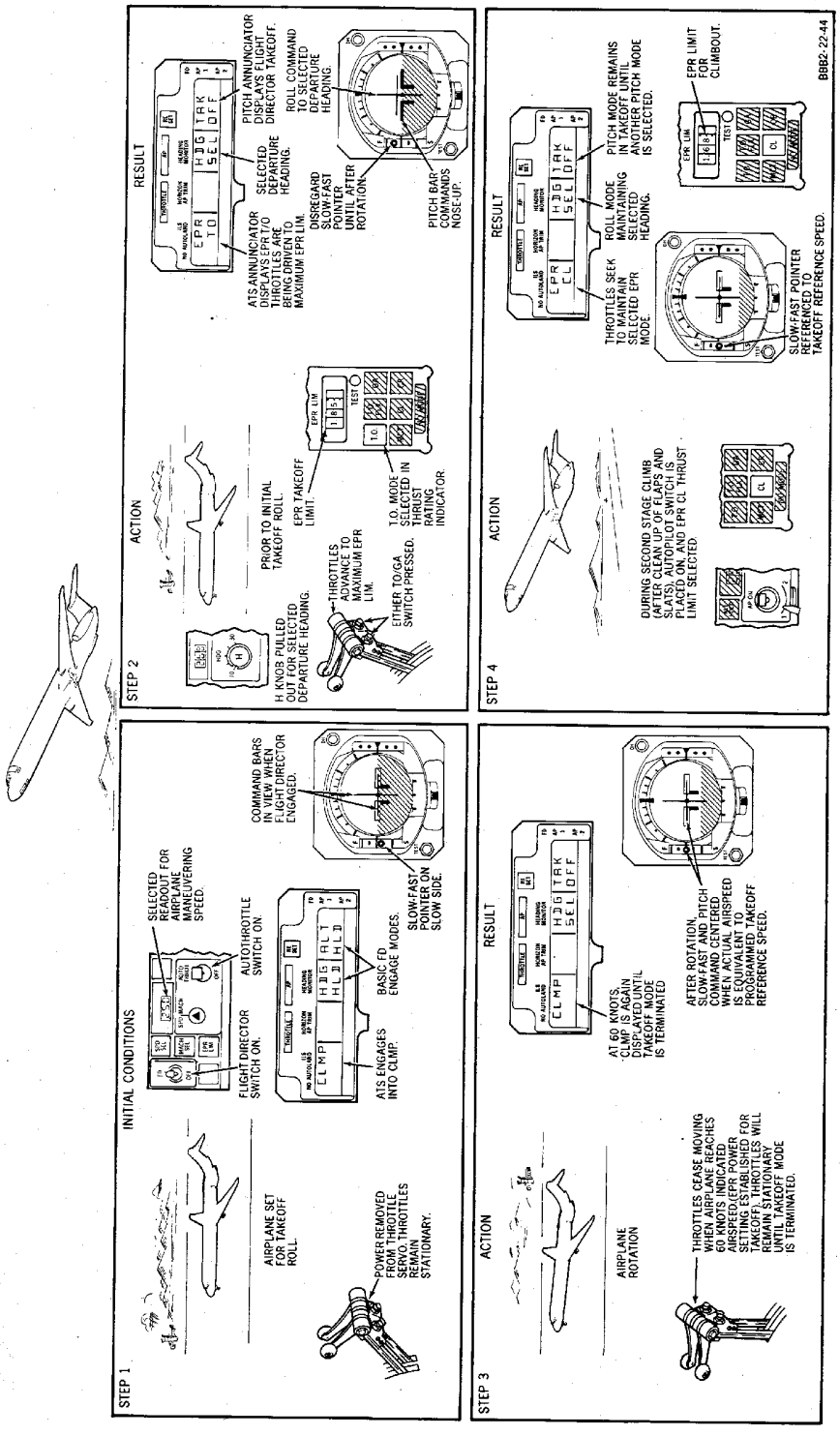
WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

(16) When reverse thrust is initiated, the autothrottle engage switch will drop to the OFF position (Ref. step 13). The THROTTLE off warning lights will not come on, and the ATS mode annunciators will go blank.

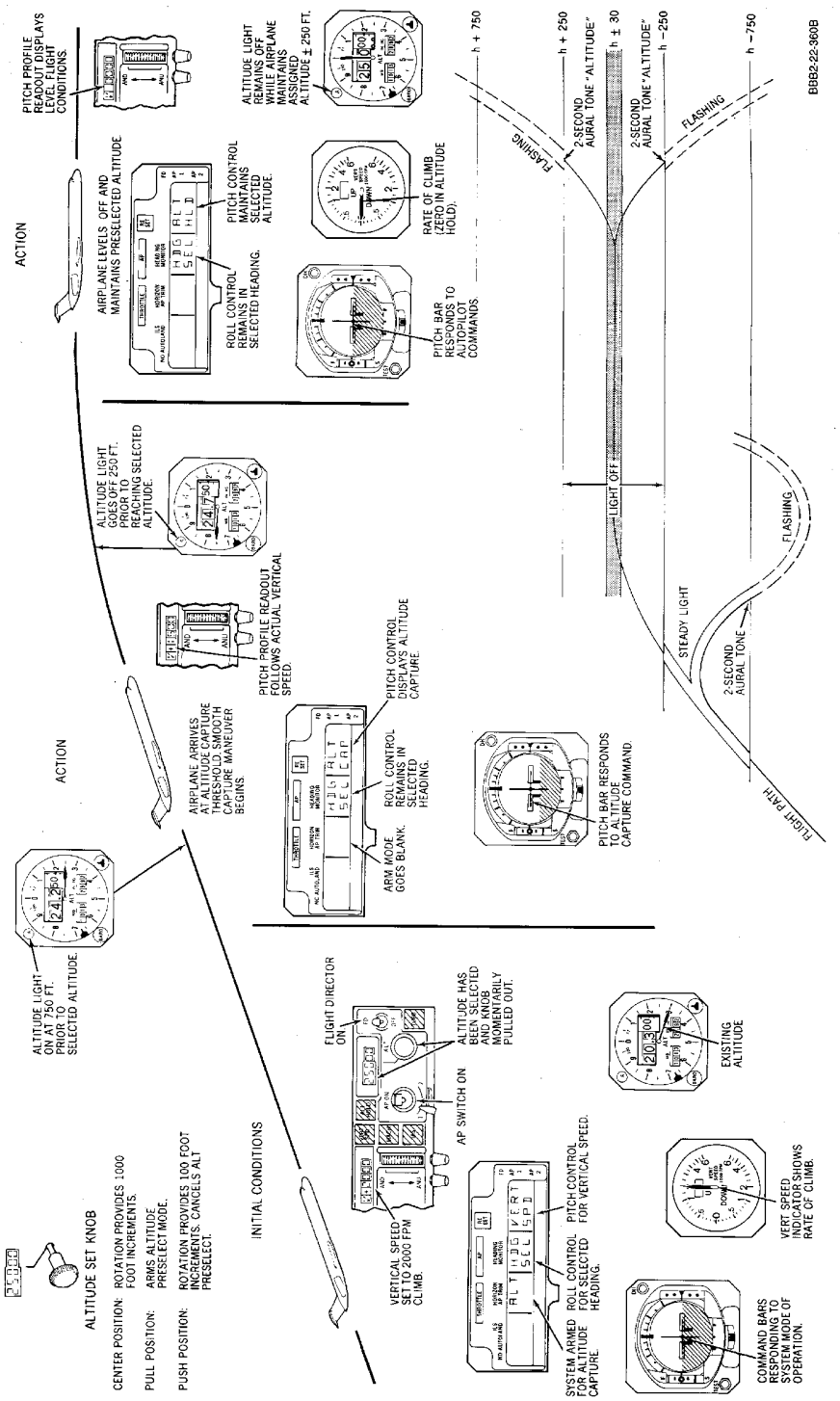
WJE 401-404, 407, 408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

(17) Manually disengaging the autopilot as shown in step (14), the pitch and roll mode annunciators go blank. The pitch and roll command bars bias out of view in both the captain's and first officer's ADI's. The AP off warning lights come on red and flash, and aural warning tone will sound. The AP off warning and aural warning tone can be reset by pressing either control wheel disconnect button.

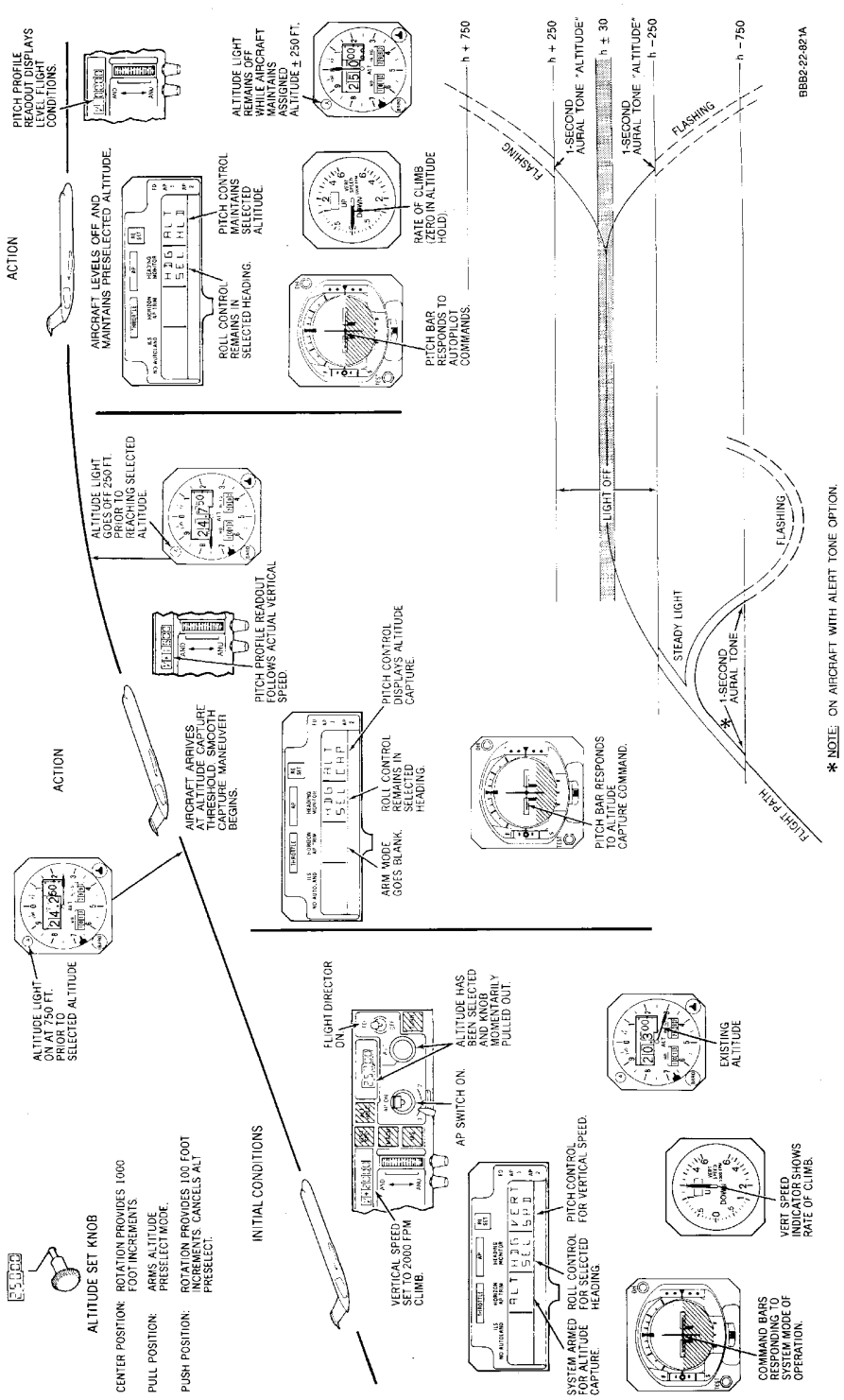
WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891



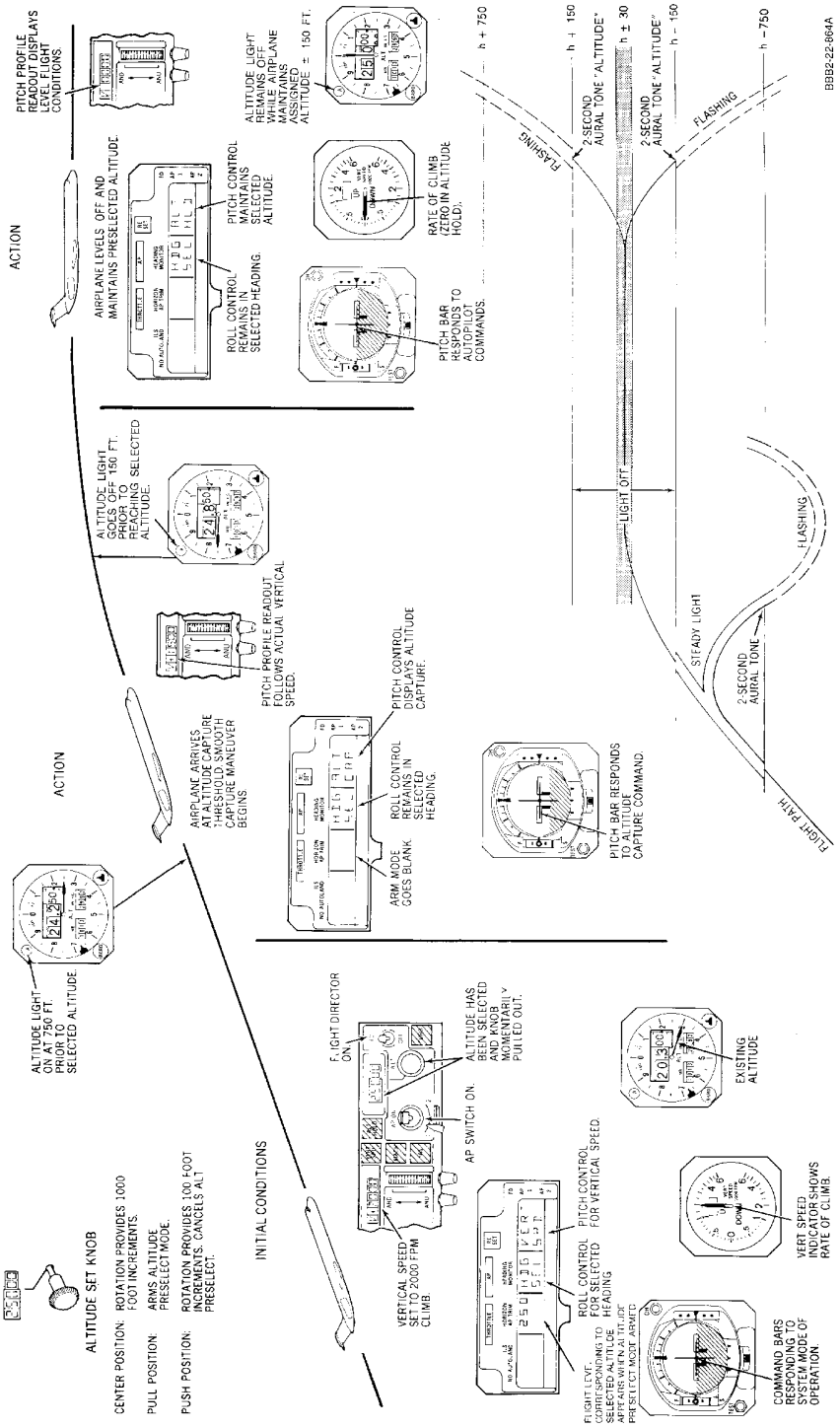
Takeoff - Mode of Operation
Figure 1/22-01-04-990-816



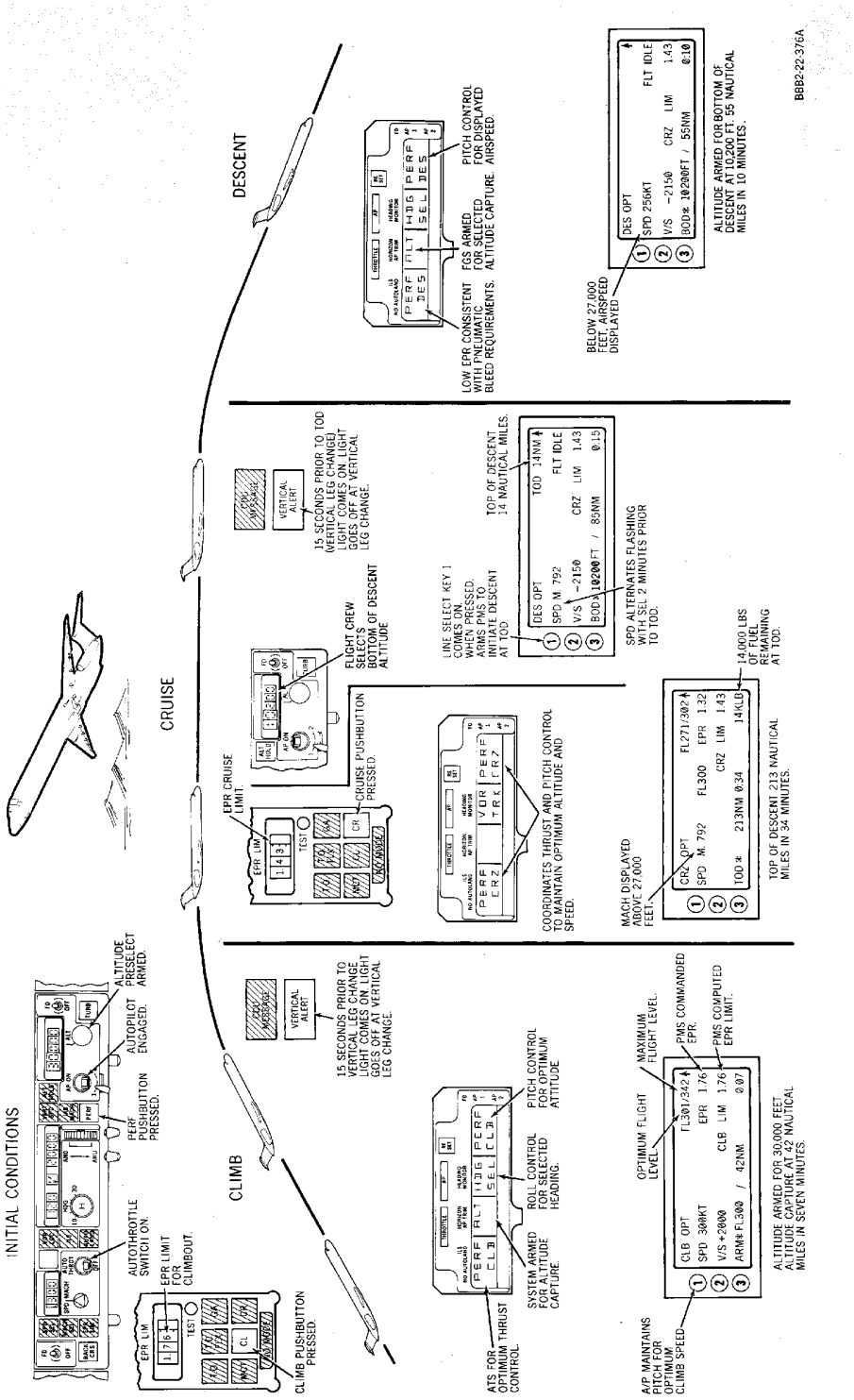
Altitude Preselect and Advisory - Mode of Operation
Figure 2/22-01-04-990-817 (Sheet 1 of 3)



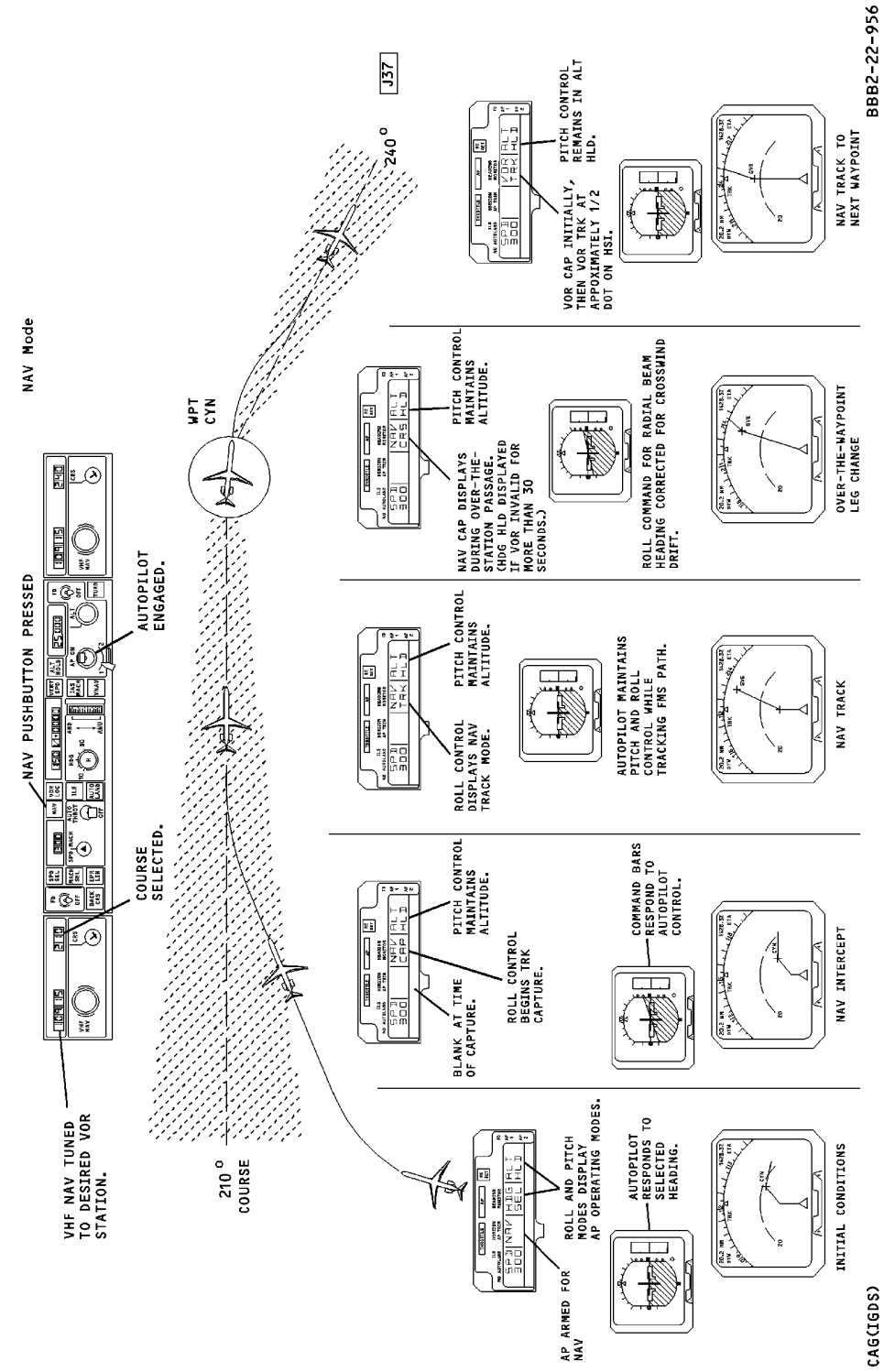
Altitude Preselect and Advisory - Mode of Operation
Figure 2/22-01-04-990-817 (Sheet 2 of 3)



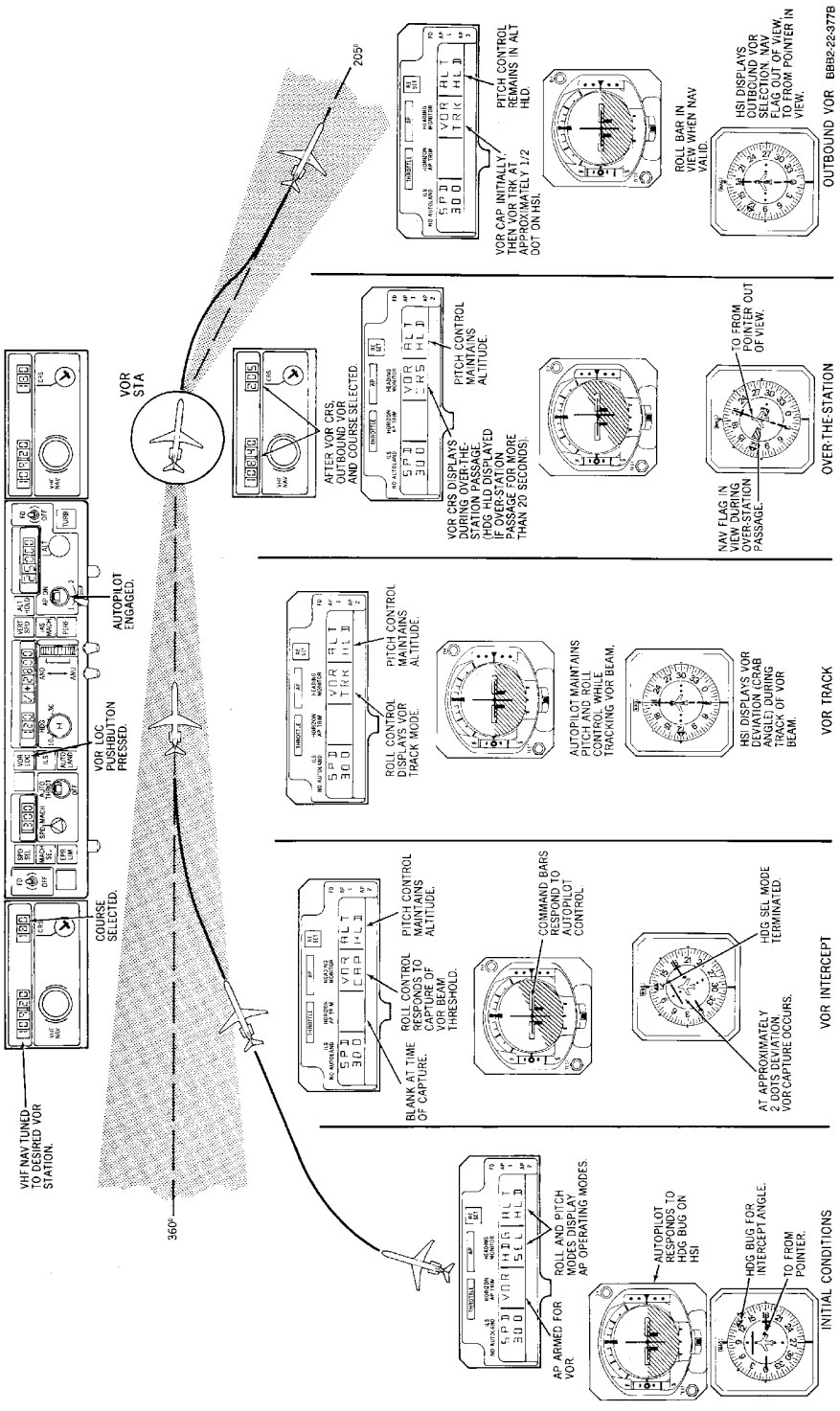
Altitude Preselect and Advisory - Mode of Operation
Figure 2/22-01-04-990-817 (Sheet 3 of 3)



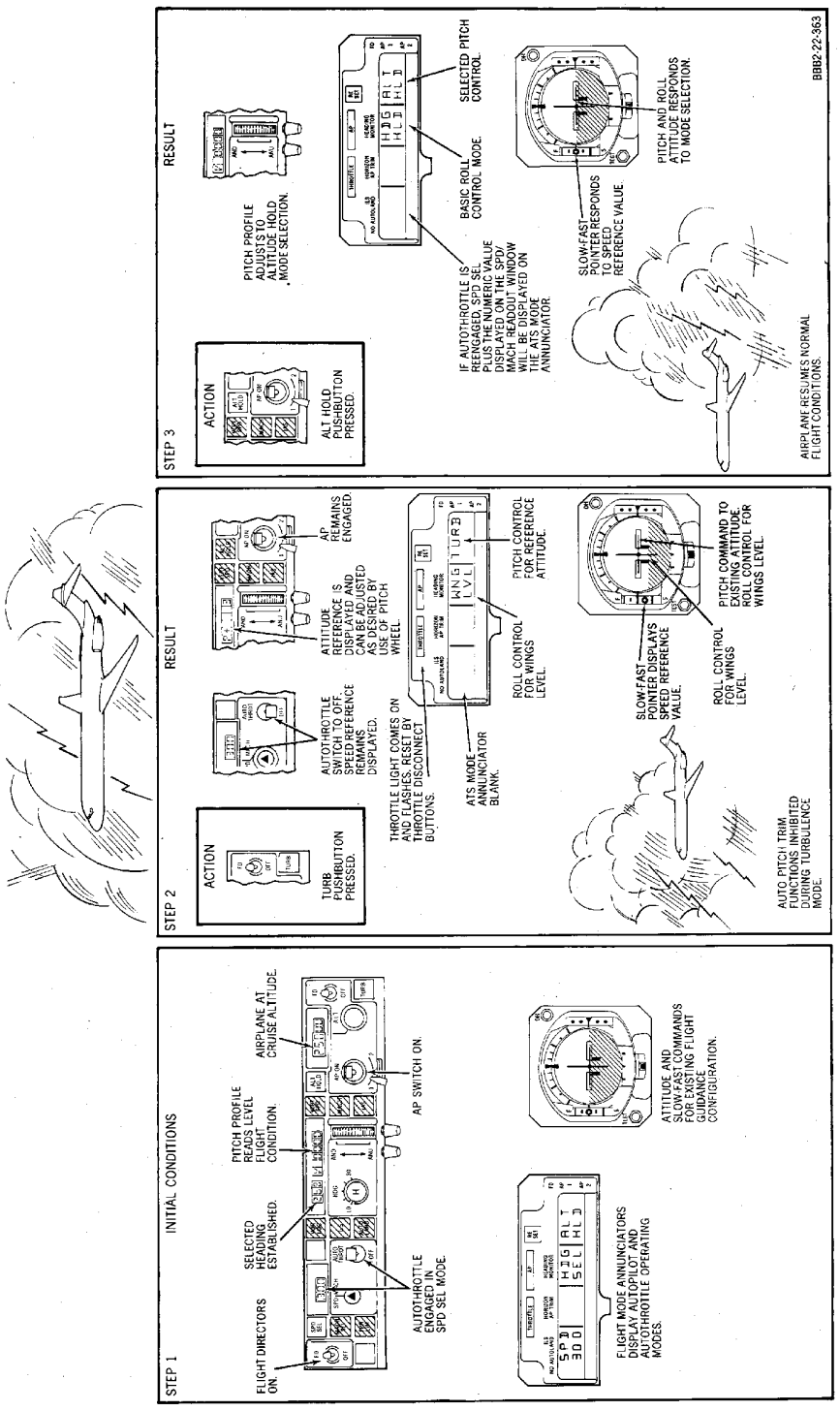
PMS - Mode of Operation
Figure 3/22-01-04-990-818



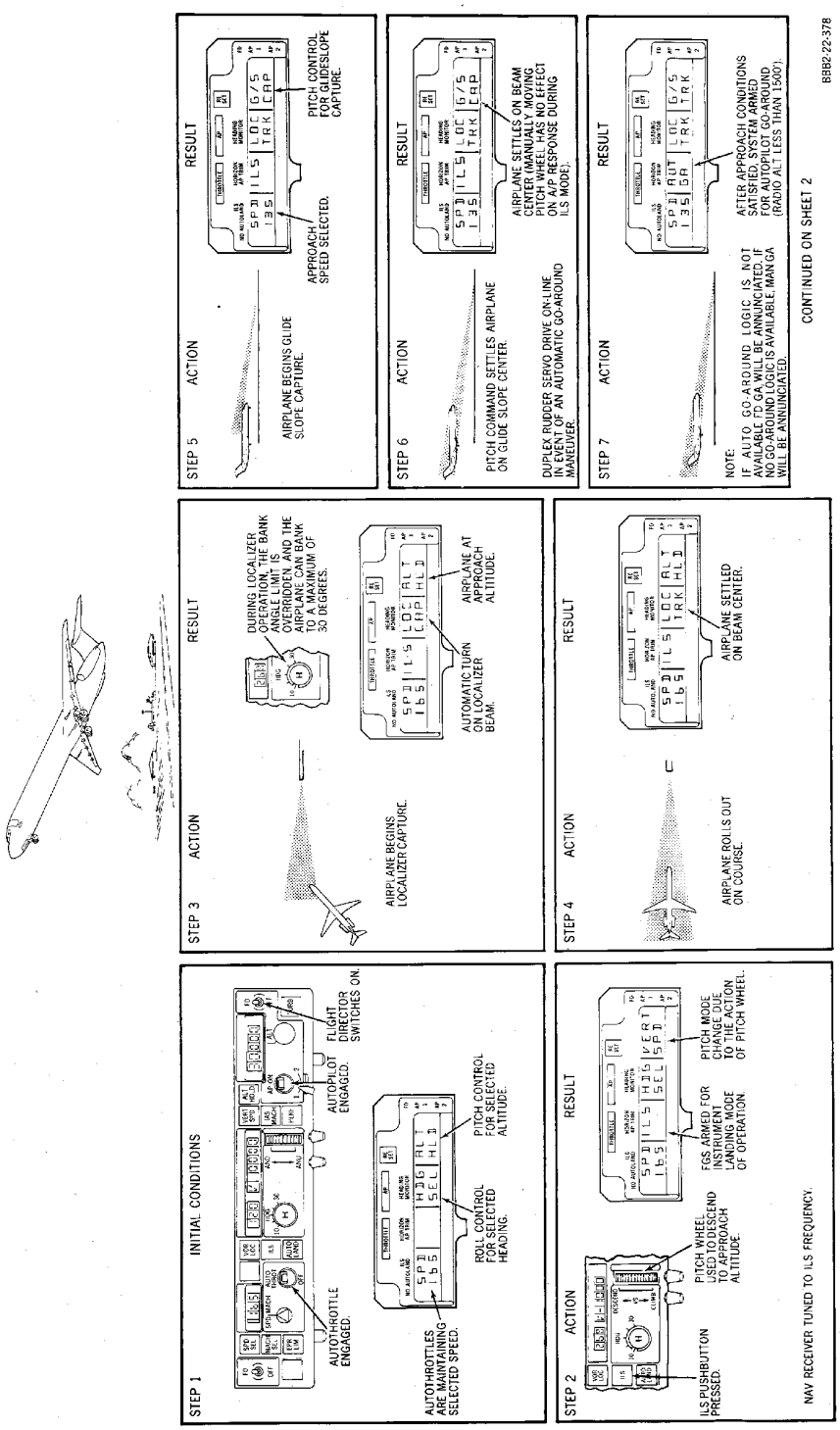
FMS - NAV Mode of Operation
Figure 4/22-01-04-990-819



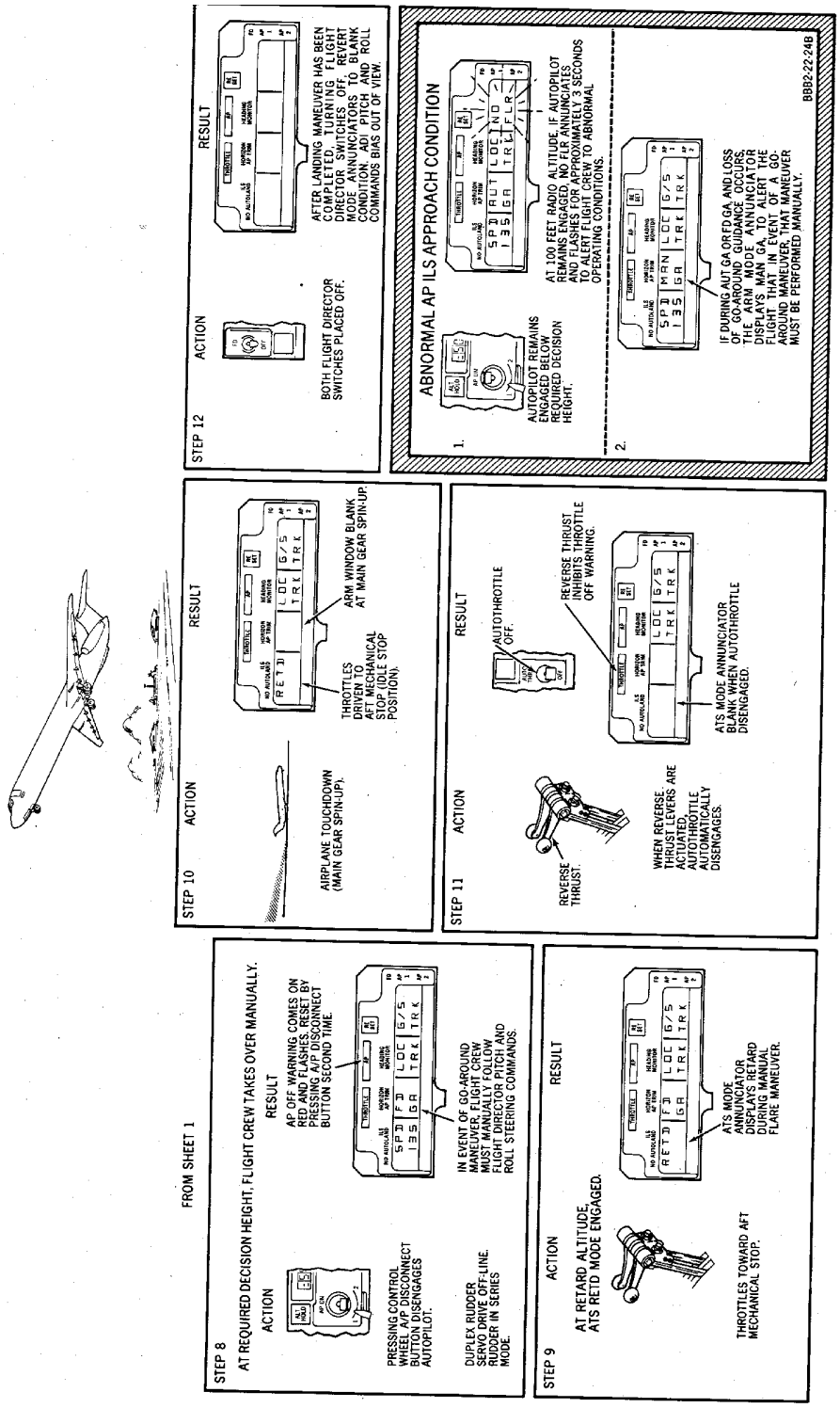
VHF Omni-Range - Mode Of Operation
Figure 5/22-01-04-990-820



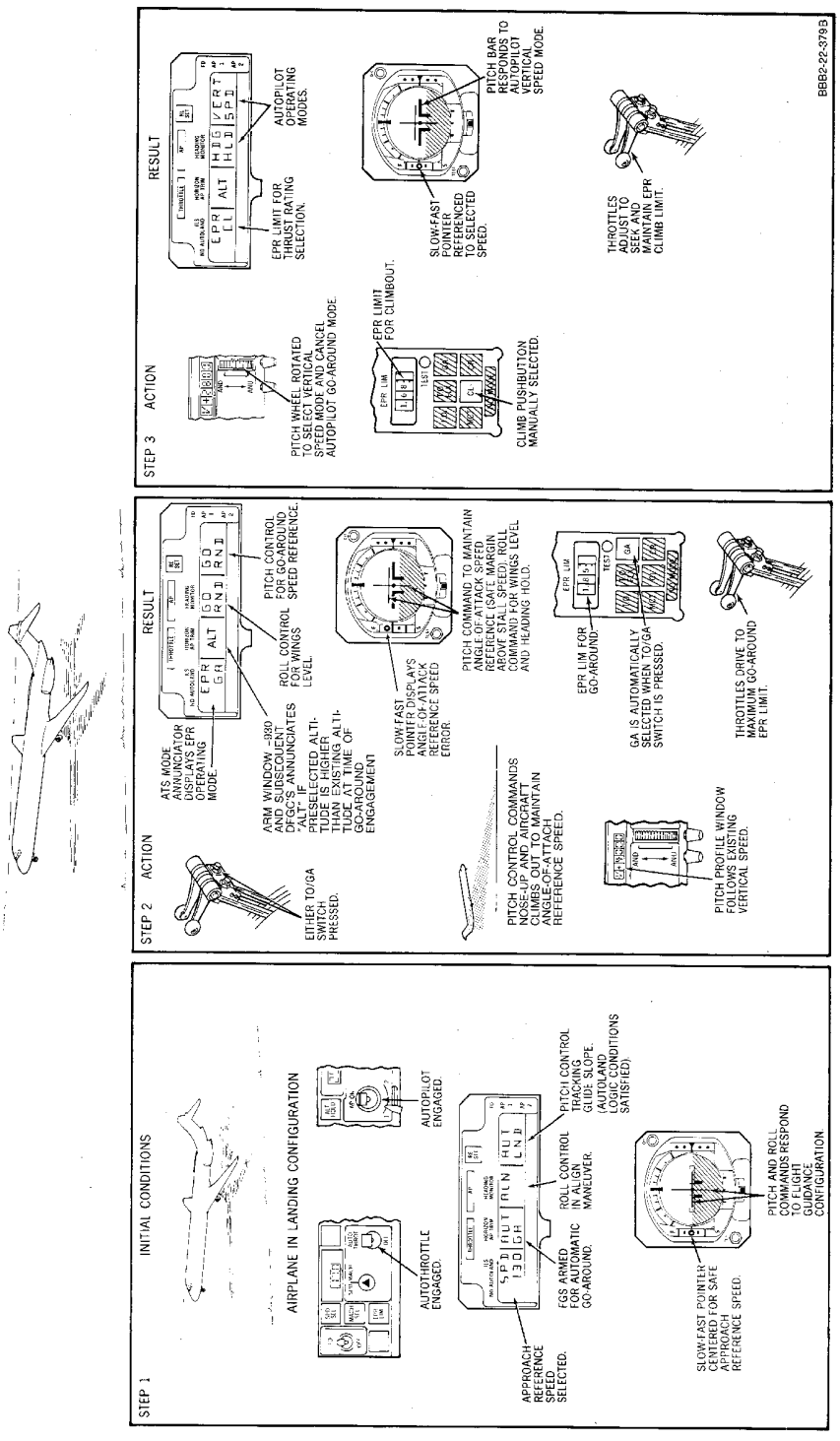
Turbulence Penetration - Mode Of Operation
Figure 6/22-01-04-990-821



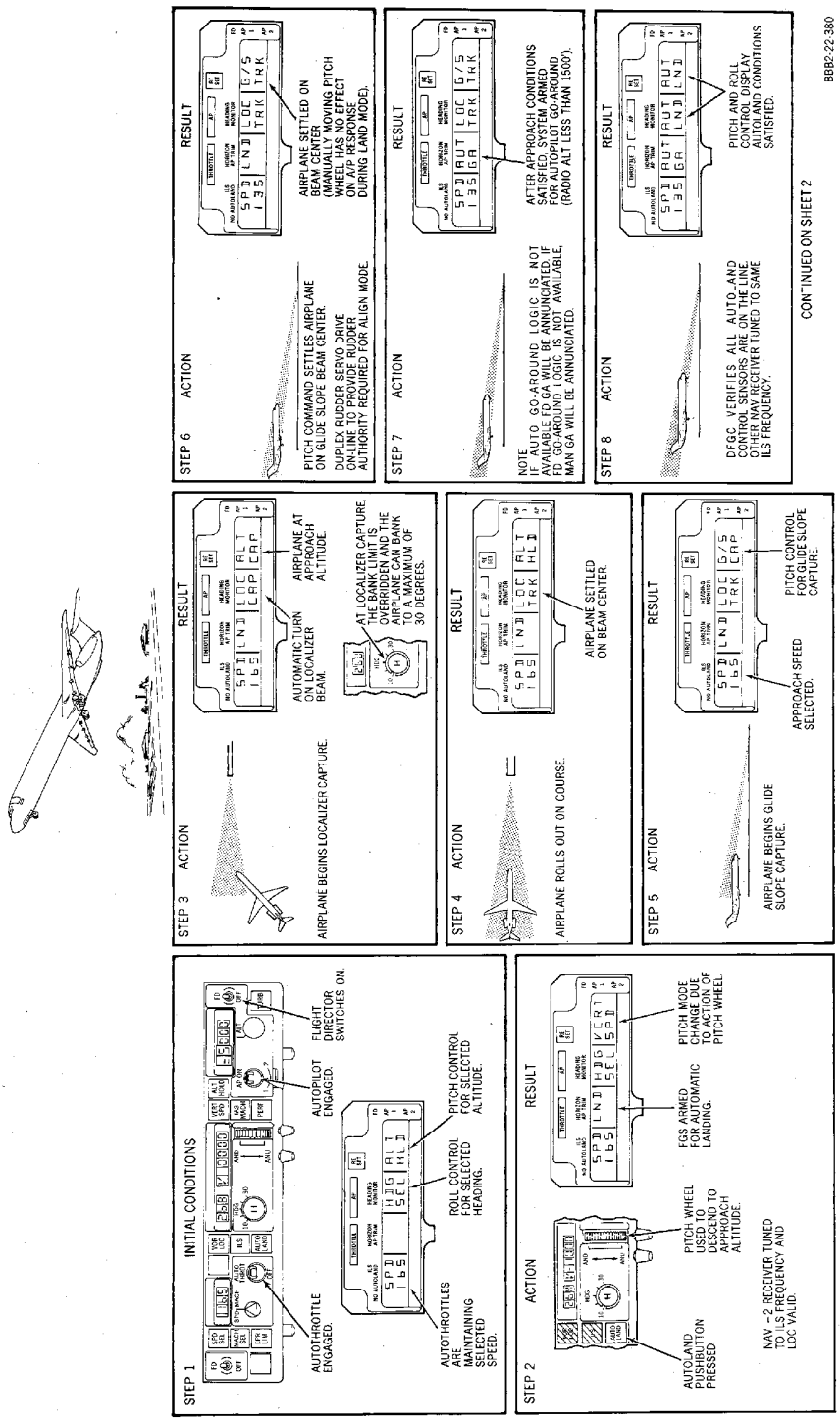
AP ILS Approach - Mode Of Operation
Figure 7/22-01-04-990-822 (Sheet 1 of 2)



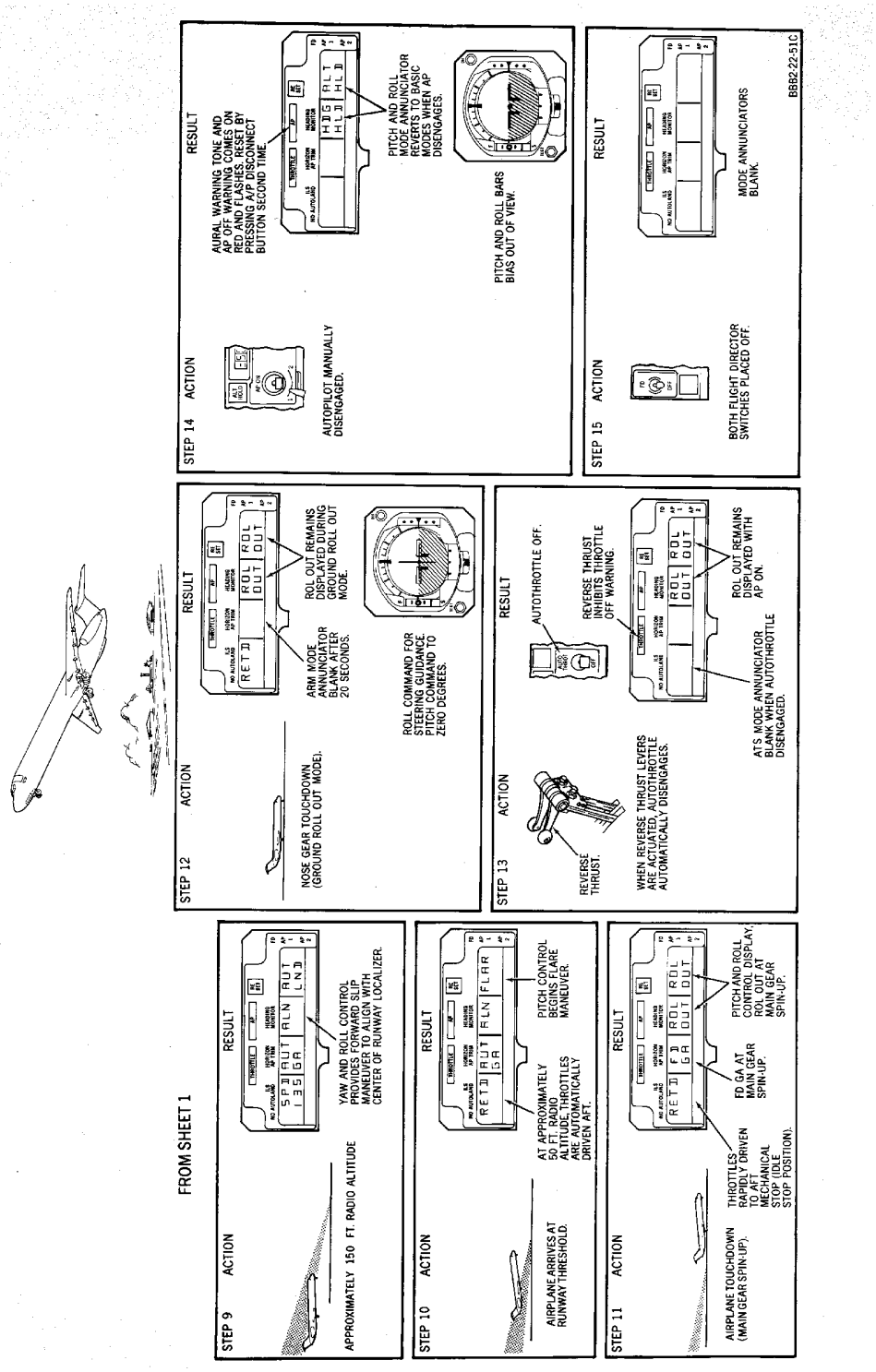
AP ILS Approach - Mode Of Operation
Figure 7/22-01-04-990-822 (Sheet 2 of 2)



Go-Around - Mode Of Operation
Figure 8/22-01-04-990-823



Autoland - Mode Of Operation
Figure 9/22-01-04-990-824 (Sheet 1 of 2)



Autoland - Mode Of Operation
Figure 9/22-01-04-990-824 (Sheet 2 of 2)

EFFECTIVITY
WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 891

3. Windshear Alerting and Guidance System

A. General The aircraft Windshear Alerting and Guidance System (WAGS) is designed to provide detection, alerting and guidance through hazardous windshear conditions. The system consists of a Windshear Computer (WSC) and associated interfacing systems. The windshear computer receives attitude, acceleration and other data from the Digital Flight Guidance Computers (DFGC). The WSC also receives air data from the Central Air Data Computers (CADC). The WSC uses this data from the DFGC's and CADC's to provide windshear alerting and guidance during windshear encounter.

When the CADC's and DFGC's provide data to the WSC, indicating an adverse wind condition, the WSC provides windshear guidance via DFGC to the Primary Flight Display (PFD). The WSC also interfaces with the Central Aural Warning System (CAWS) for windshear alerts and with the Flight Data Acquisition Unit (FDAU). In addition, under specified conditions, the WSC provides data that will inhibit the Ground Proximity Warning System (GPWS) and Post Stall Recovery System (PSRS).

(1) Indications and Guidance

When the WSC detects a windshear condition, it provides both audio and visual cockpit signals. A red windshear (decreasing performance windshear) warning or an amber windshear (increasing performance windshear) caution will be displayed on the glareshield and on the PFD when the WSC detects the appropriate windshear condition. The WSC also enables the CAWS to generate a warning tone and the windshear vocal message, TAILWIND SHEAR or HEADWIND SHEAR, as appropriate. The Flight Mode Annunciator (FMA) will display appropriate windshear annunciations.

The WSC provides pitch guidance commands for all windshear encounters during all takeoff and go around operations. Using data provided by both the DFGC's and CADC's, the WSC provides pitch guidance commands for the Flight Director (FD) and Auto Pilot (AP) through both DFGC's and will be displayed on the PFD.

A visual indication of the relationship between the aircraft angle of attack and the stick shaker angle of attack is provided by the Pitch Limit Indicator (PLI). The PLI will be displayed on the PFD whenever the WSC is operational and the IAS is 60 or greater and the aircraft is at or below 1500 feet AGL. If the slats are extended, the PLI will be displayed at any altitude. The PLI display intensity will increase when a windshear condition is detected.

During windshear guidance, the PFD slow/fast display is removed and will not re-appear until the system reverts to DFGC operation.

During windshear guidance, the ADI slow/fast display is removed and will not reappear until the system reverts to DFGC operation.

The Post Stall Recovery System will be inhibited any time that the red warning windshear light on the glareshield is illuminated.

(2) Windshear Encounter Guidance The WSC provides guidance to achieve an energy conserving flight path which enhances the aerodynamic efficiency of the aircraft in a windshear encounter. When a decreasing performance windshear is detected and guidance is active and there is sufficient energy available, the WSC provides flight director and/or autopilot guidance to achieve and maintain an inertial flight path of plus 1.5 degrees. This fight path angle provides a near optimum energy conservation flight path through the windshear field while also providing a positive flight path through the air.

Above 450 feet radio altitude, this system will allow a zero or even slightly descending flight path in the presence of strong downdrafts in order to be more energy efficient when proximity to the ground is not a factor.

Below 450 feet radio altitude, when degraded energy no longer makes maintaining a positive flight path angle of plus 1.5 degrees possible, the windshear computer will guide to stick shaker angle of attack and loss of altitude will occur as necessary in order to prevent a stall.

When an increasing performance windshear is detected and guidance is active, the WSC provides energy absorbing flight director and/or autopilot guidance during takeoff and go-around. The WSC will command an inertial flight path angle of plus 1.5 degrees until the appropriate energy levels (airspeeds) are achieved. The WSC will then provide pitch guidance which maintains these enhanced energy levels.

For takeoff, this is a speed of V_2 + 30 KIAS. For a go-around, the speed is the go-around reference speed plus 20 KIAS. In the event of a microburst encounter, the greater the energy level of the aircraft when decreasing performance is encountered, the more survivable it is.

(3) Windshear Pop-Up Guidance If the WSC detects a windshear and the flight directors are turned off, windshear guidance is still available. If the engine EPR is within 95 percent of the maximum go-around EPR limit, the flight directors will come into view and windshear guidance is automatic. If the EPR is not within 95 percent of the maximum go-around EPR limit, the pilot is required to press the TOGA button or manually advance the throttles to within 95 percent. Windshear pop-up guidance will continue until safe conditions are achieved (V_2 + 10 kts and 750 fpm climb for at least 30 seconds). Unless the Flight Director switch is placed to on after windshear encounter, the flight director commands will disappear.

(4) Windshear Guidance Reversion During windshear guidance, the pilot may exit WSC commands by selecting a non-TOGA pitch mode on the Fight Guidance Control Panel (FGCP). WSC guidance may be re-selected by pressing the TOGA switches.

When the windshear condition no longer exists, all windshear detection annunciations cease. Windshear pitch and roll guidance will continue until safe conditions are achieved. Safe conditions are defined as a minimum of 750 fpm climb rate and attainment of the takeoff or go-around reference speeds minus 5 knots, for at least 15 seconds. At this time, the aircraft will revert to a normal takeoff (or whatever mode the system was in prior to the WSC action) mode automatically.

If, when windshear guidance occurred, the flight directors were turned off (windshear pop-up guidance), the FD commands will be displayed approximately 15 seconds after safe conditions have been met before disappearing.

B. Windshear System Operation

The windshear system provides detection and alerting information during the takeoff roll. The system provides detection, alerting, and guidance information during takeoff and go-around. The system may be checked for proper operation before takeoff.

(1) Windshear Test

When the aircraft is on the ground and airspeed is less than 30 KIAS, the windshear system and all of the associated aircraft components may be checked for proper response. The windshear eight second test is initiated by moving the switch to the momentary TEST position.

(2) Windshear Encounter During Takeoff Roll and Takeoff

Any time the aircraft is accelerated to 60 knots or more, the windshear system is enabled to detect and provide alerting to the presence of windshear. If a windshear is detected, the WSC will cause the alerts to be displayed on the glareshield, on the PFD's, in the Flight Mode Annunciator (FMA) pitch window and aurally through CAWS. Decreasing performance windshears always have annunciation priority over increasing performance windshears. (Figure 11 and Figure 12)

When either a decreasing or an increasing windshear is detected, the autothrottles will remain clamped and the EPR bugs and EPR limits move to maximum takeoff power and the Automatic Reserve Thrust (ART), if armed, will fire. For a flex takeoff, the autothrottles will unclamp, set maximum go-around thrust and reclamp.

NOTE: Autothrottle operation in windshear conditions is not compatible with ART operation. If the autothrottles are enabled to set maximum go-around thrust, the ART system must be disabled. If normal ART operation is desired, then the autothrottles must automatically disconnect when windshear guidance is initiated. This feature is available only if the "Automatic Autothrottle Disengage" option had been selected and is operational.

The FMA autothrottle, arm, roll and pitch windows will reflect the change in WAGS system modes. For a decreasing performance windshear, the roll and pitch mode windows will flash "HDG HLD" and "WIND SHR" simultaneously five times. For an increasing performance windshear, the roll window will remain unchanged and the pitch window will flash "WIND SHR" five times. The arm window blanks the altitude display during windshear conditions. After the roll and pitch window annunciations flash, the annunciations will remain steady.

If an EPR cutback has been made, transition to windshear guidance is automatic. If a takeoff is made without the FD in T/O mode, then either a TOGA press or advance of the throttles to at least 95 percent of go-around EPR is required to get windshear guidance.

If a windshear is detected, the windshear warning or caution annunciations will flash three times then remain steady. The CAWS activates an aural warning of three cycles of "TAILWIND SHEAR" or "HEADWIND SHEAR". If a windshear warning has been annunciated, a second warning will not be annunciated unless a caution had been annunciated since the warning. If the first annunciation was a caution, another caution will not be annunciated unless a warning occurs first.

If a windshear is detected prior to V_1, and a takeoff abort is initiated and the throttles are retarded to the aft stops, the windshear annunciation will be cancelled. If a windshear is detected after V_1, and the takeoff is continued, the WSC will provide windshear guidance after nose oleo extension. Prior to nose oleo extension, the flight director bars will be positioned at 12 degrees nose-up.

(3) Windshear Encounter on Approach or Go-around Upon windshear detection, the windshear aural and visual alerts are similar to takeoff. In addition, either "AUT W/S" or "F/D W/S" will be displayed in the FMA arm window. "F/D W/S" displayed in the arm window means that a sensor failure has been isolated by the WSC and only Flight Director guidance is available. When "AUT W/S" is displayed, autopilot guidance is available. (Figure 16)

The TRP (Thrust Rating Panel) will be switched to go-around (G/A) if not already in go-around. WND SHR will be displayed in the FMA throttle window indicating that the autothrottle approach speed reference has been changed to 1.3 Vs + 20 kts. This feature enhances the energy level of the aircraft during windshear conditions. When windshear conditions no longer exist this speed bias will revert to selected approach speed at a rate of one-half knot per second. During this revisionary mode, the autothrottle window displays "ALFA SPD".

WSC guidance is not activated during the approach mode unless the TOGA button is pressed or either engine EPR is within 95 percent of the go-around EPR limit.

Once WSC guidance is activated, the FMA will annunciate the pitch and roll mode changes similar to a windshear encounter during takeoff. The autothrottles will set go-around thrust. Windshear guidance continues until the windshear is no longer present and safe conditions have been met. The DGFC will then revert to normal go-around.

If a windshear is detected after a go-around has been initiated, the aural and visual alerts will be activated and WSC guidance will be initiated automatically the same as during takeoff. DGFC reversion is the same as during takeoff.

C. Windshear System Options

The following describes various windshear system options that, if incorporated, will effect the system operation.

(1) Takeoff Roll Windshear Detection Inhibit

This option inhibits all windshear detection during the takeoff roll. Windshear detection then becomes active only when the nose oleo strut extends or main gear liftoff is sensed.

(2) Takeoff Roll Increasing Performance Windshear Aural Annunciation Inhibit

This option inhibits the aural (tone and voice) caution alert caused by an increasing performance shear during the takeoff ground roll. The amber light caution alert annunciation will remain active. All detection annunciations (aural and visual) remain fully active for decreasing performance windshears.

(3) Takeoff/Go-Around Increasing Performance Windshear Aural Annunciation Inhibit This option inhibits the aural (tone and voice) caution alert caused by an increasing performance shear during the takeoff/go-around (in flight). The amber light caution alert annunciation will remain active. All detection annunciations (aural and visual) remain fully active for decreasing performance windshears.

(4) Approach Increasing Performance Shear Aural Annunication Inhibit

This option inhibits the aural (tone and voice) caution alert caused by an increasing performance shear annunciation during the approach. The amber light increasing performance caution alert annunciation will remain active. All detection annunciations (aural and visual) remain fully active for decreasing performance windshears.

(5) Alternate Windshear Voice Detection Alert

This option provides for "WINDSHEAR" as the voice warning for both decreasing and increasing performance shears. This annunciation would be used instead of the "TAILWIND SHEAR" annunciation (decreasing performance windshear) and "HEADWIND SHEAR" (for increasing performance windshear).

(6) Slow/Fast Display During Windshear Guidance

Slow-fast information will be displayed on both the Captain's and First Officer's PFD during windshear guidance. The center mark of the PFD slow/fast indicator displays either the takeoff (normally, V_2 + 10 kts) or go-around reference speeds, as appropriate. The fast mark represents the center reference speed plus 20 KIAS. The slow mark represents the stick-shaker angle of attack.

The Pitch Limit Indicator (PLI) shaker margin symbol remains in view and provides the primary indication of angle of attack margin to stick shaker.

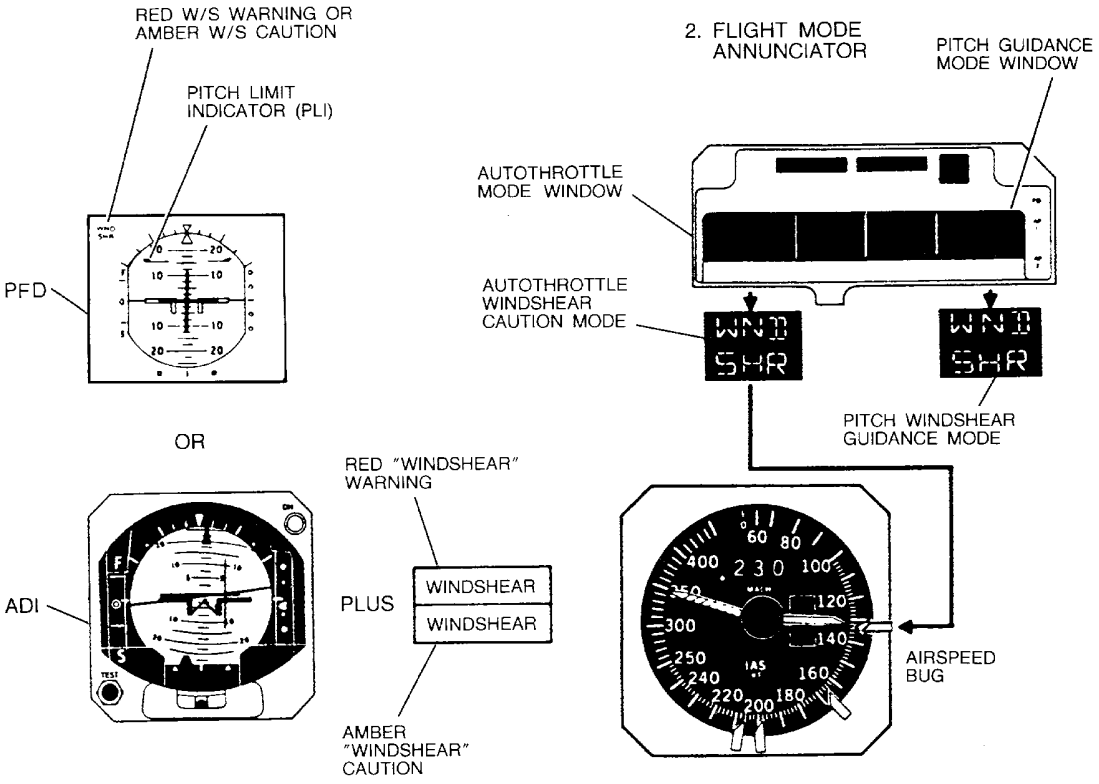
This option is applicable only to aircraft with EFIS displays.

(7) Automatic Autothrottle Disengage

This option provides for automatic autothrottle disconnect whenever windshear guidance is in effect.

(8) Windshear Guidance Inhibit

This option provides for windshear detection and alerting only. All other windshear functions, such as flight director or autopilot guidance, autothrottle and thrust rating functions, PLI, etc., are disabled.



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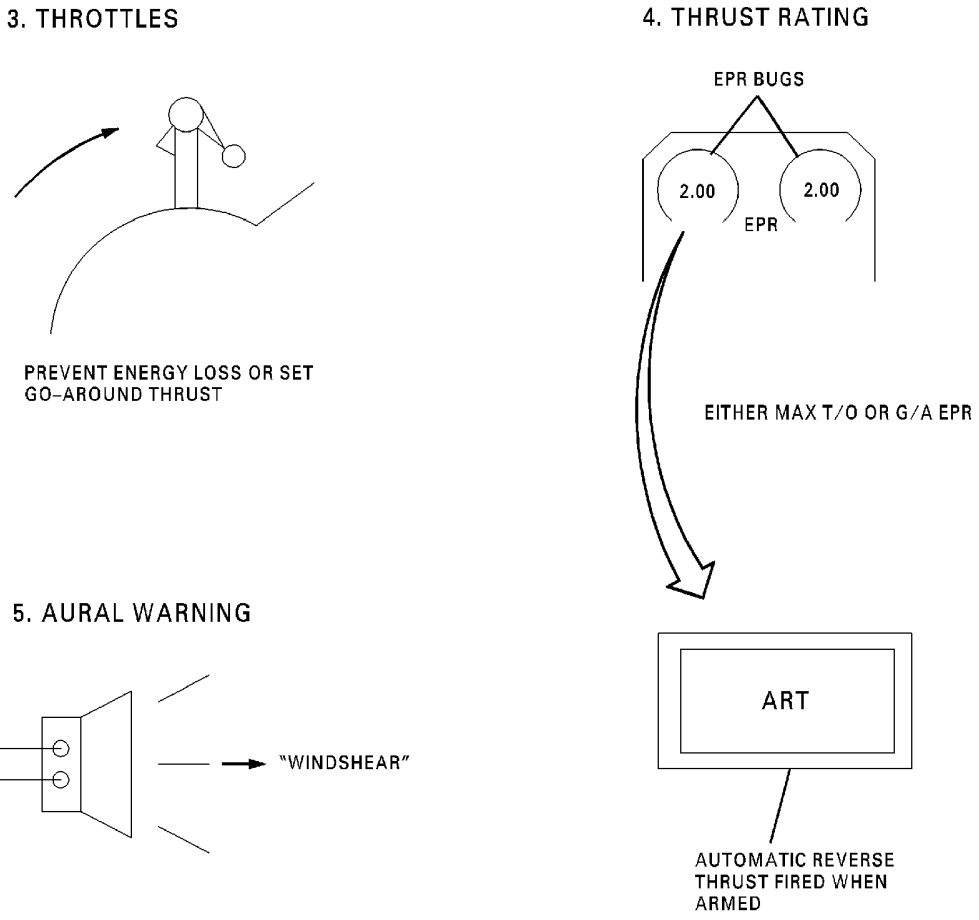
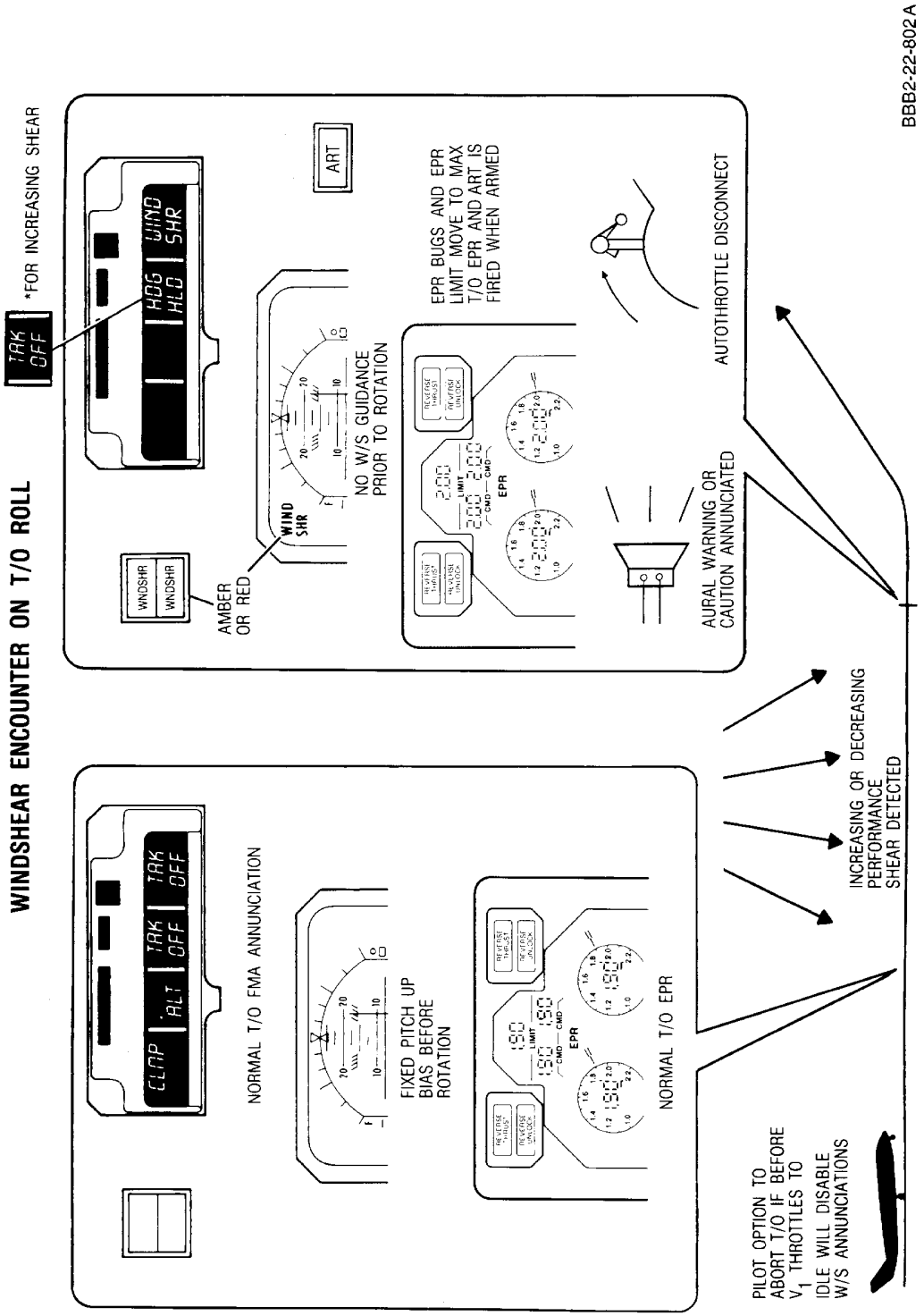
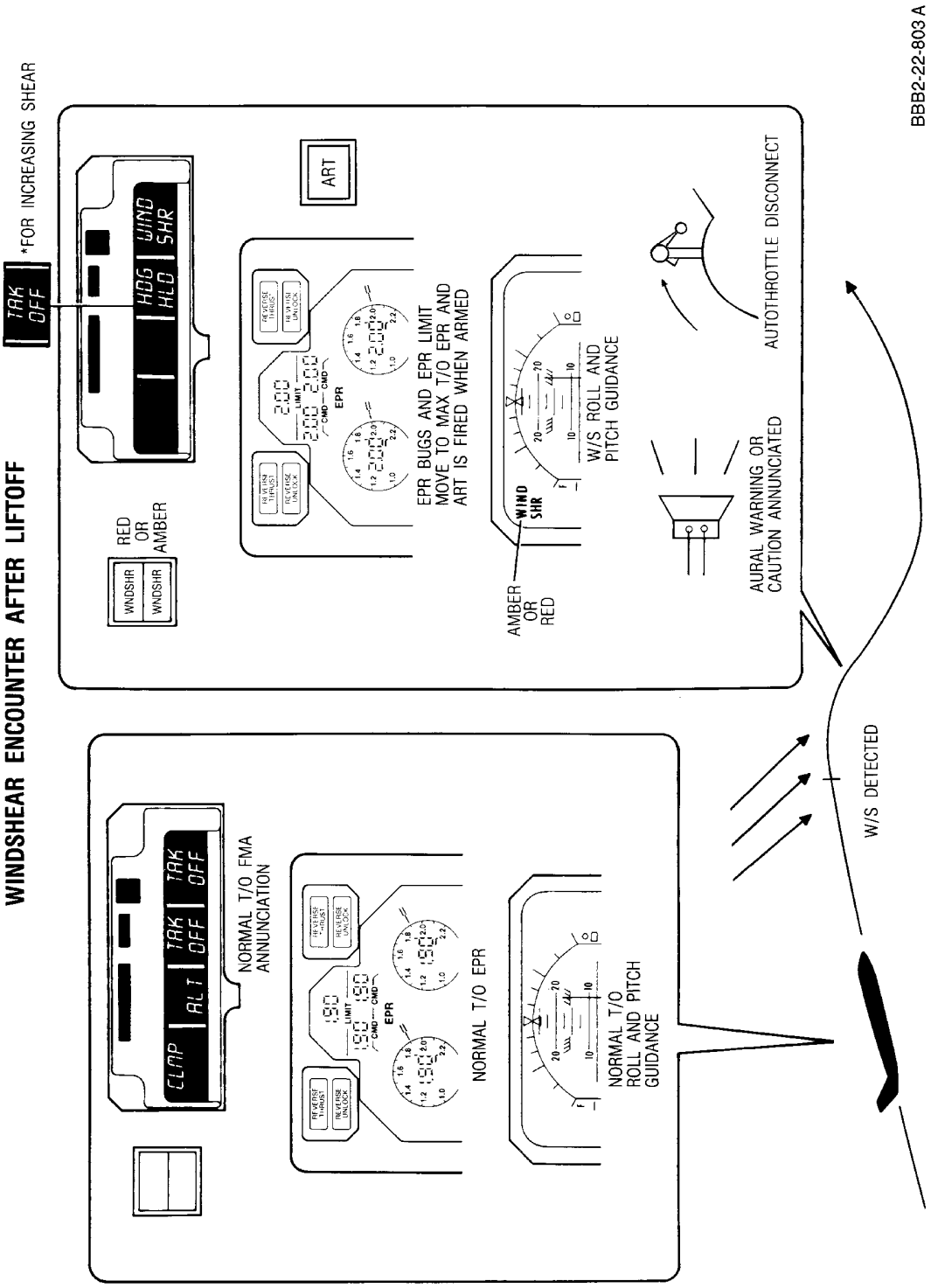
Flight Compartment Displays/Controls
Figure 10/22-01-04-990-825 (Sheet 1 of 2)



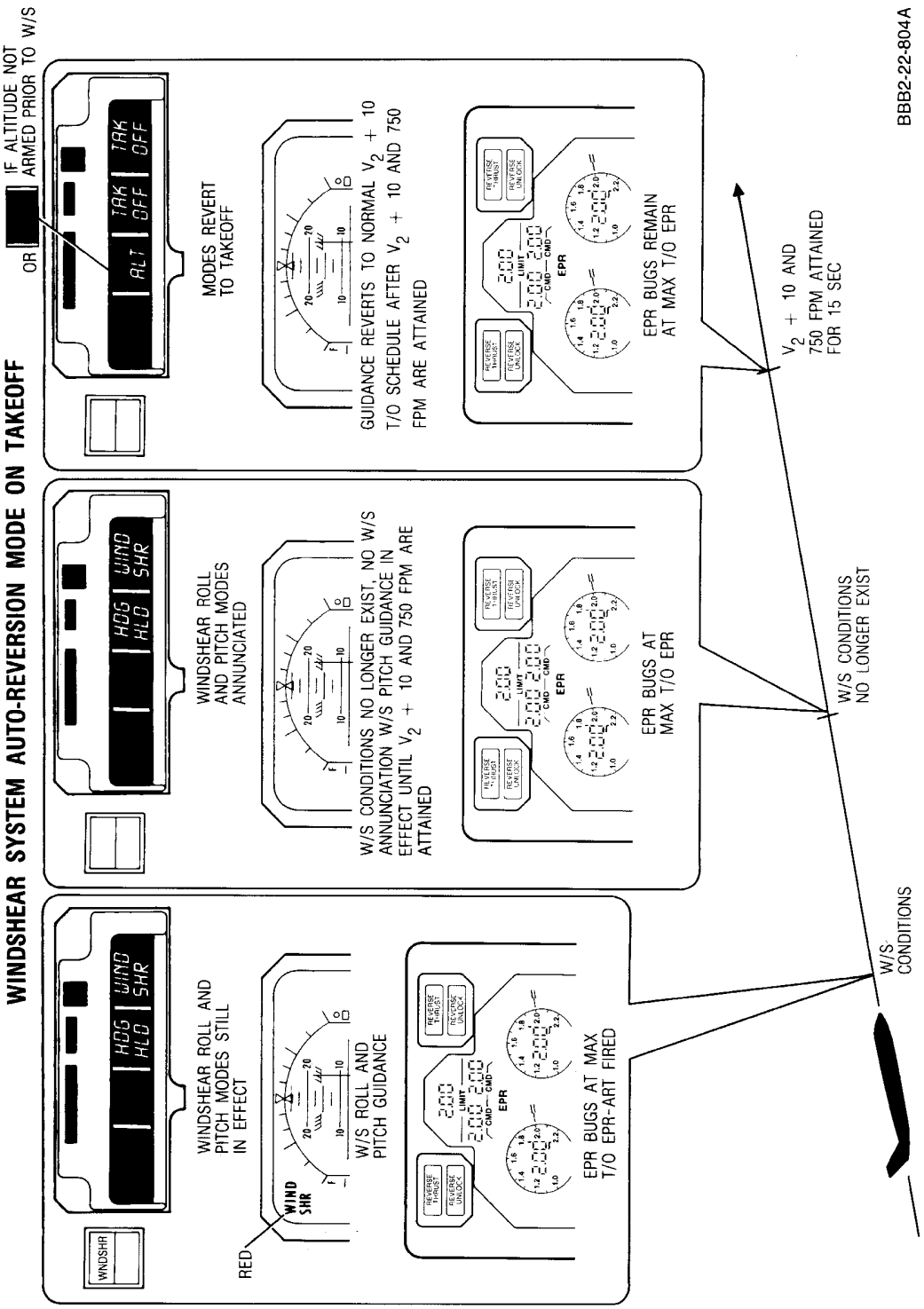
Flight Compartment Displays/Controls
Figure 10/22-01-04-990-825 (Sheet 2 of 2)



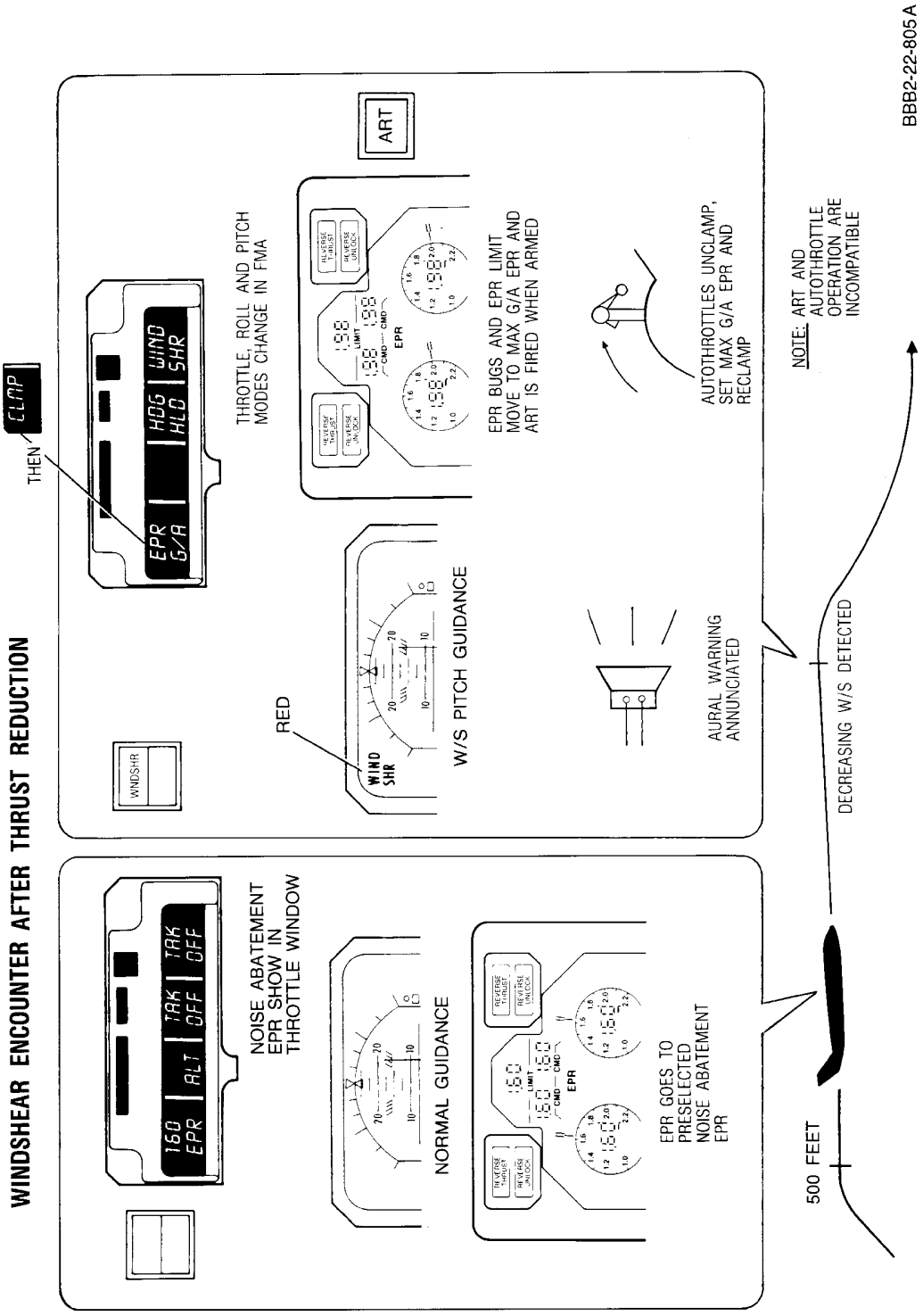
Windshear Encounter on Takeoff Roll
Figure 11/22-01-04-990-826



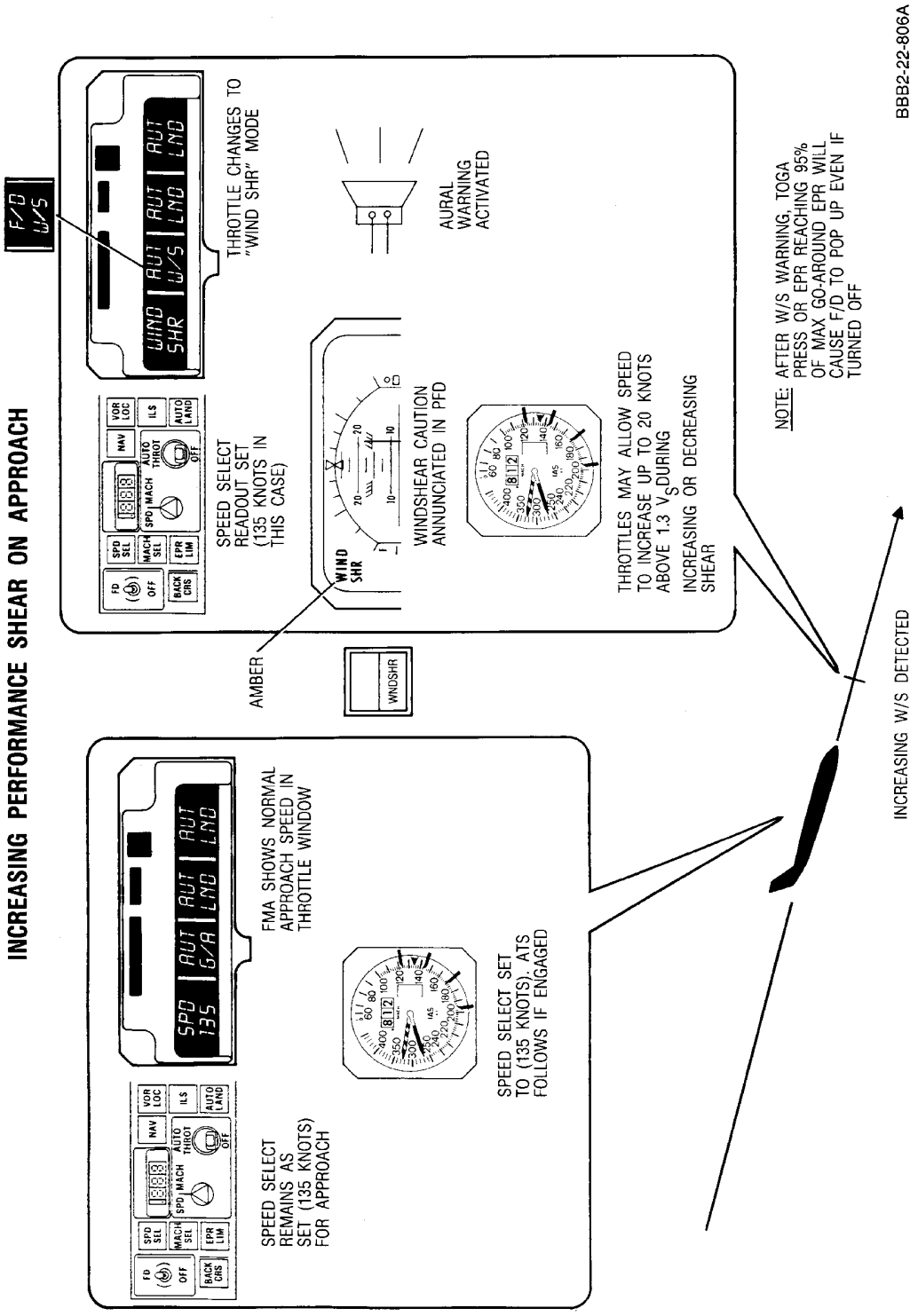
Windshear Encounter After Takeoff Roll
Figure 12/22-01-04-990-827



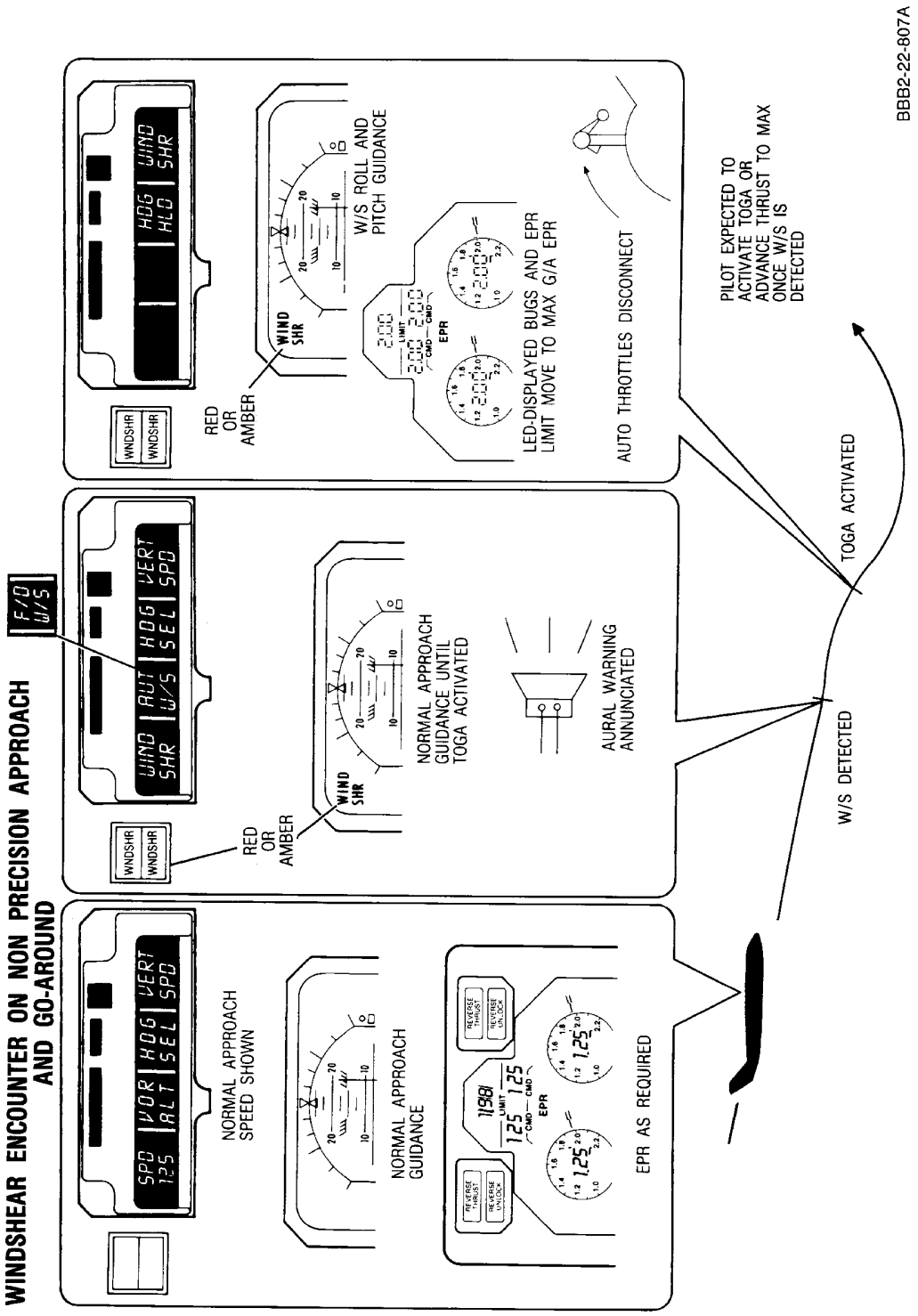
Windshear System Auto-Reversion Mode on Takeoff
Figure 13/22-01-04-990-828



Windshear Encounter After Thrust Reduction
Figure 14/22-01-04-990-829



Moderate Increasing Performance Shear On Approach
Figure 15/22-01-04-990-830



Windshear Encounter on Approach and Go-Around
Figure 16/22-01-04-990-831

DIGITAL FLIGHT GUIDANCE CONTROL - DESCRIPTION AND OPERATION

1. General

A. Digital Flight Guidance Control includes both autopilot and flight director functions. Autopilot engage, flight director FD - OFF, and mode selection is accomplished at the flight guidance control panel located on the flight compartment glareshield.

B. Autopilot computed pitch, roll and yaw channels are packaged into two identical Digital Flight Guidance Computers (DFGC's), and are controlled by the AP engage switch. A switch located below the AP engage switch, labeled 1, 2, provides the capability for selection of either DFGC-1 or DFGC-2.

C. Various autopilot roll and pitch modes of operation can be selected to provide airplane in-flight guidance. These modes provide automatic control of ailerons, elevators, and rudder to establish and maintain airplane attitude, altitude, heading, rate of climb or descent, and automatic capture and guidance to localizer, glideslope and omni-range beams.

D. Each flight director, when placed to FD position, displays steering command information from its respective DFGC (i.e. DFGC-1 to captain's ADI). However, a flight director switch, located on the overhead panel allows both flight directors to be controlled from a single DFGC.

E. Takeoff and go-around modes are initiated by pressing either TO/GA switch located on the throttle levers. The TO/GA switch programs flight director pitch control for pitch commands to maintain the takeoff or go-around safe reference. During go-around, with autopilot engaged, pitch control will automatically maintain go-around reference speed. Roll control provides wings level and heading hold when in flight.

F. Each control wheel contains an "AP quick disconnect" button to provide disengagement of the autopilot, and also turn off the AP off warning lights. The AP off warning lights are located in each Flight Mode/Instrument Warning Annunciator located on the captain's and first officer's instrument panels. The AP off warning lights will come on red and flash anytime the autopilot is disconnected. During autoland selection, an aural warning tone will also sound if the autopilot is disconnected. The AP off warning lights can be turned off by pressing either "AP quick disconnect" switch.

NOTE: If the DFGS should shut down (Flight Guidance Control Panel blank, Mach Trim and Yaw Damper OFF lights ON), momentarily pressing either "AP quick disconnect" button or cycling the DFGS circuit breakers may bring the system back on line.

2. Flight Guidance Operation

A. Following is the operating conditions associated with some of the functions provided by the Flight Guidance Control system.

Table 1

TITLE	PARAGRAPH
Takeoff	Paragraph 2.B.
Altitude Preselect and Advisory	Paragraph 2.C.
Performance Management System	Paragraph 2.D.
VHF Omni-Range	Paragraph 2.E.
Turbulence Penetration	Paragraph 2.F.
AP ILS Approach	Paragraph 2.G.
Automatic Go-Around	Paragraph 2.H.
Autoland	Paragraph 2.I.

B. Takeoff (Figure 1)

(1) During takeoff, after lift off, flight director pitch commands can be followed to adjust the pitch attitude of the airplane, to maintain a safe margin above stall airspeed. The roll (steer) command bar provides commands to maintain wings level and heading hold.

(2) (Figure 1), step 1, shows the initial conditions for takeoff with the airplane in the ground mode. Placing the flight director to the FD position, establishes the basic flight director modes, HDG HLD, ALT HLD (VERT SPD). The steering command bars come into view and the slow-fast pointers remain in view on the slow side in both ADI's. If the autothrottle switch is placed to AUTO THROT position, the ATS mode annunciator will display CLMP, and power is removed from the autothrottle servo drive.

(3) Step 2 provides the action taken at or just prior to the initial takeoff roll. Selecting T.O. or (T.O. FLX) on the Thrust Rating Indicator and pressing either TO/GA switch on the throttle levers, will initiate the flight director takeoff mode of operation. The pitch and roll mode annunciators will display TAK OFF and with autothrottle engaged, the ATS mode annunciators will display EPR TO. The throttles will advance to the maximum takeoff EPR limit, the command bar will display a nose-up attitude and the slow-fast pointer will be on the slow side (the slow-fast pointer is invalid until after aircraft rotation). The roll steering command is centered to the runway heading for climbout.

NOTE: Prior to the takeoff roll, a departure heading may be selected by use of the H knob on the flight guidance control panel. Momentarily pulling out the H knob will establish the selected heading (HDG SEL) mode of operation.

(4) Prior to aircraft rotation as shown in step 3, power is removed from the throttle servo at approximately 60 knots indicated airspeed. The ATS mode annunciators will again display CLMP and the throttles will remain stationary at the EPR power setting established for the takeoff mode. However, the throttles may be manually overpowered at any time. Slow-fast and pitch commands provide the takeoff speed reference consistent with aircraft configuration and gross weight conditions.

(5) Step 4 provides the takeoff conditions during climbout. Placing the autopilot switch on results in autopilot control of pitch attitude during the takeoff mode of operation, unless another pitch mode is selected (i.e. rotating pitch wheel etc.). Pressing the CL push-button on the Thrust Rating Indicator will establish the EPR limit for climbout. With autothrottle engaged, the throttles will adjust to the established EPR limit, and the ATS mode annunciators will display EPR CL.

C. Altitude Preselect and Advisory (Figure 2)

(1) The altitude preselect function provides automatic capture of a preset barometric altitude, which is selected by an altitude set knob located on the Flight Guidance Control panel. The altitude set knob has three positions, spring-loaded to center. Rotating the knob in the center position provides 1000 foot increment altitude adjustments that are read on a selected altitude readout window directly above the altitude set knob. Prior to the -930 Digital Flight Guidance Computer (DFGC), the momentary pull-out position arms the system for a preselected altitude capture. With the advent of the -930 DFGC, the altitude preselect mode is armed automatically without the momentary pull-out of the set knob. This is true also when a new altitude is set in the altitude window or when go-around is engaged, but only if the preselected altitude is higher than the altitude existing at the time of the go-around mode engagement. Rotating the knob in the push-in position provides 100 foot increment adjustments, and cancels the altitude preselect mode.

(2) Altitude preselect operates only through autopilot or flight director guidance. The altitude advisory function is operational with or without autopilot or flight director. The advisory function only requires that the DFGC is receiving valid altitude signals from the CADC.

(3) The altitude advisory system provides two functions. To alert the flight crew when the aircraft is approaching a preselected altitude, and to alert the flight crew when the aircraft deviates from a selected altitude. Altitude advisory turns on a steady amber light in the upper left corner of the altimeters to alert the flight crew that the aircraft is approximately 750 feet from selected altitude. At approximately 250 feet prior to selected altitude the light goes off.

WJE 405, 409, 873, 874, 881, 883, 884, 892, 893

(4) If the aircraft deviates beyond the 750 foot band before it enters the 250 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. The advisory lights will stop flashing after reentering the 750 foot band and they will extinguish when the aircraft is within 250 feet of the selected altitude or when a new altitude has been selected. If the aircraft is maneuvered beyond the 250 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. If the aircraft continues to deviate beyond the 750 foot band, the advisory lights will continue to flash. The advisory lights will extinguish when the aircraft is again within 250 feet of the selected altitude or when a new altitude has been selected.

NOTE: The voice warning "ALTITUDE" is activated only on aircraft which have the voice option included.

WJE 886, 887

If the aircraft deviates beyond the 750 foot band before it enters the 250 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. The advisory lights will stop flashing after reentering the 750 foot band and they will extinguish when the aircraft is within 250 feet of the selected altitude or when a new altitude has been selected. If the aircraft is maneuvered beyond the 250 foot band, the advisory lights flash, a two-second or one-second (with SCN 5986B incorporated) aural tone activates, and an altitude voice warning sounds. If the aircraft continues to deviate beyond the 750 foot band, the advisory lights will continue to flash. The advisory lights will extinguish when the aircraft is again within 250 feet of the selected altitude or when a new altitude has been selected.

NOTE: The voice warning "ALTITUDE" is activated only on aircraft which have the voice option included.

NOTE: On aircraft with SCN 5986B incorporated, at 750 feet from the preselected altitude, or an altitude greater than 750 feet that is proportional to the aircraft vertical speed, a one-second aural warning shall sound and the amber lights shall illuminate and remain on until the aircraft is 250 feet from the preselected altitude.

WJE 405, 409, 873, 874, 881, 883, 884, 886, 887, 892, 893

(5) Figure 2 illustrates a maneuver utilizing altitude preselect and advisory with autopilot in control. The initial conditions show the cockpit displays pertinent to the altitude preselect mode. The autopilot is engaged, either or both flight directors are on, and the system is armed for altitude capture. The aircraft is climbing through 20,300 feet, utilizing vertical speed of 2000 FPM to capture 25,000 feet preselected altitude. Roll control is maintaining a selected heading.

(6) The threshold for the altitude capture maneuver is variable with rate of climb or descent. As selected altitude is approached, an altitude for initiation of the level-off maneuver is computed within the DFGC. A command signal is developed that results in the autopilot making a smooth capture maneuver to the preselected altitude. At a 2000 FPM climb, as illustrated in Figure 2, altitude capture is initiated at approximately 500 feet from selected altitude, however, the altitude advisory light will have come on 750 feet prior to preselected altitude. The arm mode annunciator will go blank, and the pitch mode annunciator will display ALT CAP. The pitch profile readout will follow actual vertical speed. If the autothrottle was used in the EPR Limit mode to climb to selected altitude, SPD SEL (or MACH SEL, whichever was preselected) mode will be displayed at time of altitude capture.

(7) At approximately 250 feet prior to the level-off maneuver, the altitude advisory light will go off. During the level-off maneuver, the pitch profile readout is blank. After the level-off maneuver has been completed (pitch profile readout less than approximately 100 feet), the pitch mode annunciator will display ALT HLD, and the pitch profile readout displays zero vertical speed reference. At level flight, the altitude preselect function is terminated as an autopilot/flight director function. The altitude advisory system remains armed for possible airplane deviation outside ±250 feet.

D. Performance Management System (Figure 3)

(1) The Performance Management System (PMS) provides coordinated control of pitch and thrust throughout the entire flight envelope from climbout to descent. Figure 3 shows a typical PMS mode of operation. CL is selected on the Thrust Rating Indicator and the autothrottle and autopilot are engaged on the Flight Guidance Control Panel.

(2) Pressing the PERF push-button on the Flight Guidance Control Panel, establishes the PMS mode of operation as seen on the Control Display Unit (CDU) located the pedestal. The CDU is displaying the commanded EPR and computed EPR limit. The PMS is operating in the CLB optimum mode, with a vertical speed of 2000 FPM at 300 knots. An altitude is armed for 30,000 feet with capture at 42 nautical miles in seven minutes. The optimum and maximum flight levels are also displayed.

(3) The Flight Mode Annunciators (FMA's) also display the PMS operating mode. The ATS and pitch mode annunciators display PERF CL for thrust control and pitch attitude. The arm mode annunciator displays ALT arm and the roll mode annunciator displays the selected heading.

(4) Fifteen seconds prior to the vertical leg change (armed altitude and nautical miles), the VERTICAL ALERT light located on the captain's and first officer's instrument panels will come on to advise the flight crew. The light will go off at the vertical leg change.

(5) Pressing the CR push-button on the Thrust Rating Indicator establishes the EPR cruise limit. The CDU displays the top of descent (TOD) at 213 nautical miles in 34 minutes. Cruise mach is displayed with 14,000 pounds of fuel remaining at TOD.

(6) The FMA's display the cruise operating modes. The airplane is tracking the VOR. The VOR and DME are used as inputs for PMS computations. During cruise the flight crew selects and arms the first cleared altitude below them, this brings up the descent page.

(7) Two minutes prior to TOD, the CDU displays SPD alternately flashing with SEL as a cue to the flight crew to select line select key 1. Pressing line select key 1 arms the system to initiate descent at the top of descent (TOD).

(8) During descent the throttles retard to idle EPR, and PERF DES is displayed in the FMA's. Altitude is armed for 8000 feet bottom of descent (BOD) at 85 nautical miles in 15 minutes. Pitch control is displaying a vertical speed of -2150 FPM.

(9) After the airplane reaches the BOD and levels off, the PERF CRZ mode is then again reestablished if preprogrammed in the flight plan. Selection of another DFGS operating mode will automatically override the PMS mode.

(10) Reference SUBJECT 34-63-00 for further details of Performance Management System.

E. VHF Omni-Range (Figure 4)

(1) The VHF Omni-Range (VOR) provides four modes of operation. The modes consist of arm, capture, track and course. Figure 4 illustrates a sequence of VOR operations from initial arming of the system to selecting an outbound VOR radial.

(2) The initial conditions illustrated in Figure 4, is arming the system for VOR. Tuning the VHF NAV receivers to a desired VOR frequency and course, and pressing the VOR LOC push-button on the Flight Guidance Control panel will automatically arm the system for VOR. VOR will appear in the arm mode annunciators. The VOR mode will not arm if the VOR signal is not valid. This is indicated by a NAV flag coming into view. The roll control responds to the selected heading, and with autopilot engaged, automatic capture of the VOR radial will occur.

(3) Automatic capture of the VOR is initiated when the airplane intercepts the VOR radial capture zone (approximately 2 dots depending upon capture rate) as shown on the HSI. VOR CAP will be displayed on the roll mode annunciators to verify capture has occurred. The flight director command bars will respond accordingly to autopilot control.

(4) When the airplane centers on the VOR radial, approximately 1/2 dot, as shown on the HSI, the roll mode annunciators will display VOR TRK, and the autopilot will maintain roll and pitch control, and provide crosswind correction as necessary to maintain beam center. The HSI will display any beam deviation during track on the VOR radial.

(5) During over-the-station (zone of confusion) passage, the roll mode annunciators will display VOR CRS, and a new VOR radial may be selected without disengaging the VOR mode. A NAV flag will appear if the signal received is invalid, and the TO FROM pointer will bias out of view in the HSI's. If the airplane is in the VOR CRS mode for more than 30 seconds, the roll mode annunciators will automatically switch to roll control basic mode HDG HLD.

(6) When the new VOR radial is captured, the NAV flag will bias out of view, and the TO FROM pointer will reappear on the HSI's. The roll command bars will come back in view when NAV valid is again reestablished. The roll mode annunciators will display VOR CAP initially, until the airplane settles on beam center, then VOR TRK will be displayed.

F. Turbulence Penetration (Figure 5)

(1) Turbulence penetration provides dampened pitch response and wings level hold during turbulent atmospheric conditions. The mode is established when the TURB push-button on the Flight Guidance Control panel is pressed.

(2) Figure 5 illustrates a typical turbulence mode of operation. The initial conditions, step 1, illustrates a normal flight guidance cruise operation. Autopilot is engaged maintaining altitude and heading, and the autothrottle is engaged in the selected speed mode.

(3) Step 2 illustrates the action of pressing the TURB push-button. The pitch mode annunciator displays TURB, and the roll mode annunciator displays WNG LVL. The pitch profile readout displays command attitude to the closest degree. The autothrottle disengages and THROTTLE off warning lights come on and flash red. During the TURB mode of operation, the attitude reference in the pitch profile readout can be adjusted as desired by use of the pitch wheel. Automatic pitch trim functions are inhibited during the TURB mode.

(4) Selecting another pitch control mode terminates the TURB mode of operation. Step 3, illustrates the action of pressing the ALT HOLD push-button. The pitch mode annunciator displays ALT HLD, and the roll mode annunciator displays the roll basic mode HDG HLD. The flight guidance system responds to the mode selection.

G. AP ILS Approach (Figure 6)

(1) The AP ILS Approach mode is usable for category I, or category II weather conditions. The mode is compatible with autopilot and both flight directors, autopilot only, or flight director(s) only. Figure 6 illustrates a typical AP ILS Approach mode of operation. The initial conditions, step 1, show both flight director switches are in FD position, autopilot engaged, and autothrottle engaged. The pitch mode annunciator displays ALT HLD, the roll mode annunciator displays HDG SEL, and the ATS mode annunciator displays selected speed.

(2) Pressing the ILS push-button (as shown in step 2) on the Flight Guidance Control panel after tuning the associated NAV receiver to the ILS frequency, and setting the CRS knob to the published inbound localizer heading, establishes the preliminary conditions for the AP ILS Approach mode. ILS appears in the arm mode annunciator. The pitch wheel may be used to arrive at approach entry altitude.

(3) When the localizer beam deviation reduces to the capture threshold, as seen on the Horizontal Situation Indicator (HSI), localizer capture occurs as shown in step 3. The airplane automatically turns as required to establish the localizer beam center. During localizer operation, the bank angle limiter is overridden, and bank is limited as a function of radio altitude up to 30 degrees maximum. The roll mode annunciator switches from HDG SEL to LOC CAP.

(4) As the airplane settles on beam center, the roll mode annunciator changes from LOC CAP to LOC TRK (Ref. step 4). While tracking the localizer, if a crosswind is present, the localizer track mode will establish a crab-angle into the wind so the airplane will maintain localizer beam center with no steady stand-off. The direction and amount of crab-angle will be displayed on the HSI as the angular difference between the airplane heading and the setting on the course select pointer. As wind conditions change while tracking the localizer, the crab-angle will change to maintain beam center. Approach speed may be selected by adjusting the SPD/MACH select knob.

(5) As the airplane approaches glideslope center, the pitch mode annunciator changes to G/S CAP as shown in step 5. The actual capture point is variable and is a function of rate of beam closure, plus beam deviation. Automatic capture commences and the airplane maneuvers as required to settle on beam center.

(6) When the airplane settles on beam center (Ref. step 6), the pitch mode annunciator changes from G/S CAP to G/S TRK. Pitch control then automatically controls the airplane to maintain beam center if radio altitude is less than 1500 feet. The duplex rudder servodrive comes on the line to provide the proper rudder authority. The RUDDER TRAVEL UNRESTRICTED light on the overhead panel should come on if airspeed is less than 145 knots. Gain programming within the DFGC, based on radio altitude, dampens the tendency for over correction maneuvers resulting from beam convergence as the radio source is approached.

(7) After glideslope track, with duplex rudder servo on the line, approach conditions satisfied, and radio altitude less than 1500 feet, the arm mode annunciator changes from ILS to AUT GA (Ref. step 7). This communicates to the flight crew that the system is armed for autopilot go-around in the event an automatic go-around maneuver must be performed.

(8) At the required decision height, pressing either control wheel autopilot disconnect button will disengage the autopilot (Ref. step 8). The AP off warning lights will come on red and flash. The duplex rudder servo will go off the line and the yaw damper system will again be in the series mode of operation. The arm mode annunciator will change from AUT GA to FD GA. When FD GA is annunciated the flight crew must manually follow pitch and roll steering commands in event a go-around maneuver is required. Pressing the autopilot disconnect button the second time on either control wheel will turn off the AP red lights.

(9) As the airplane arrives at approximately 50 feet radio altitude, the autothrottle retard mode is initiated (Ref. step 9). The ATS mode annunciators change from selected speed to RETD. The throttles will start driving to the aft mechanical stop.

(10) As the airplane touches down, and main gear wheel spin-up occurs, as shown in step 10, the throttles will be driven at an increased rate to the aft mechanical stop (idle stop position). The arm mode will go blank indicating to the flight crew that a flight director go-around maneuver is not available.

(11) After main gear wheel spin-up (Ref. step 11), actuating the reverse thrust levers automatically disengages the autothrottle. The THROTTLE off warning lights will not come on when autothrottle is disengaged using reverse thrust levers. Placing flight director switches to OFF (Ref. step 12), will place the mode annunciators in a blank condition.

(12) Figure 6, Sheet 2, step 1, shows the annunciation during an abnormal AP ILS APPROACH condition. If the autopilot remains engaged below the required decision height, approximately 100 feet radio altitude, NO FLR annunciates and flashes for approximately 3 seconds in the pitch mode annunciators, to alert the flight crew to the abnormal approach operating conditions.

(13) Step 2, shows the condition if go-around guidance is not available. If the arm mode annunciator previously has been displaying AUT GA or FD GA, and loss of go-around guidance occurs, i.e., loss slat transducer signals, etc., the arm mode annunciator will display MAN GA. This advises the flight crew that in event a go-around maneuver must be performed, the maneuver must be performed manually without the autopilot or flight director.

H. Automatic Go-Around (Figure 7)

(1) The autopilot go-around mode of operation is initiated during flight when the flaps are extended in land configuration (24 to 40 degrees), and either TO/GA switch on the throttle levers are pressed. The autopilot go-around mode provides pitch steering command displays and elevator control to provide a climb-out at the go-around airspeed, consistent with aircraft configuration. Roll control logic is provided to roll the aircraft to wings level and maintain existing heading, when the bank-angle is reduced to less than 3 degrees. The rudder parallel servo must be operational for the single engine automatic go-around mode.

(2) Figure 7 illustrates a typical autopilot go-around mode of operation. The initial conditions, step 1, illustrate the airplane in a landing configuration. Autopilot and autothrottle are engaged, and the flight mode annunciators display the Flight Guidance System configuration. With the -930 and later DFGC's, the preselected altitude displayed in the altitude window will be armed automatically when the go-around mode is engaged if the altitude is higher than the aircraft altitude existing at the time of go-around engagement.

(3) Step 2, shows the action of pressing either TO/GA switch. The pitch and roll mode annunciators display GO RND. The ATS mode annunciator displays EPR G/A, and GA is automatically selected and annunciated on the Thrust Rating Indicator. The ADI displays a pitch command and the autopilot responds to maintain the go-around speed reference and a roll command for wings level. With autothrottle engaged, the throttles will automatically adjust to the maximum go-around EPR LIM displayed on the Thrust Rating Indicator and the pitch profile window will follow existing vertical speed.

(4) Rotating the pitch wheel (or selecting another pitch mode), as shown in step 3 will automatically terminate the autopilot go-around mode of operation. Go-around mode will also terminate at time of altitude capture. With autothrottle engaged, selecting another EPR mode, or autothrottle operating mode, will automatically cause the throttles to adjust to seek and maintain the selected mode.

I. Autoland (Figure 8)

(1) The autoland mode of operation provides a Fail Passive automatic landing. Each Flight Mode and Instrument Warning Annunciator (captain's and first officer's instrument panels), contain a NO AUTOLAND legend. The NO AUTOLAND legend appears when the continuous built in test circuits within the selected DFGC detect a failure(s) that is critical to the autoland mode of operation. If the NO AUTOLAND legend appears, switching to the opposite DFGC may cause the legend to go off, in this case, the second system is usable for an automatic landing.

(2) Figure 8, illustrates a typical autoland mode of operation. The initial conditions, step 1, illustrate the airplane at a cruise altitude of 5000 feet, autopilot and flight directors engaged, and the pitch and roll mode annunciators displaying the FGS selected modes, HDG SEL and ALT HLD. The autothrottle is engaged in a selected speed mode.

(3) Tuning the associated NAV receiver to the ILS frequency, setting the CRS knob to the published inbound localizer heading, and pressing the AUTOLAND push-button on the Flight Guidance Control panel establishes the initial conditions for the autoland mode of operation (Ref. step 2). LND appears in the arm mode annunciators. The pitch wheel may be used to arrive at approach entry altitude.

(4) When the localizer beam deviation reduces to the capture threshold, as seen on the Horizontal Situation Indicator (HSI), localizer capture occurs as shown in step 3. The airplane automatically turns as required to establish the localizer beam center. During localizer operation, the bank angle limiter is overridden and the airplane can bank to a maximum of 30 degrees. This 30 degree maximum bank is decreased as radio altitude is decreased. The roll mode annunciator switches from HDG SEL to LOC CAP.

(5) As the airplane settles on beam center, the roll mode annunciator changes from LOC CAP to LOC TRK (Ref. step 4). While tracking the localizer, if a crosswind is present, the localizer track mode will establish a crab-angle into the wind so the airplane will maintain localizer beam center with no steady stand-off. The direction and amount of crab-angle will be displayed on the HSI as the angular difference between the airplane heading and the setting on the course select pointer. As wind conditions change while tracking the localizer, the crab-angle will change to maintain beam center.

(6) As the airplane approaches the glideslope beam, the pitch mode annunciator changes to G/S CAP as shown in step 5. The actual capture point is variable and is a function of rate of beam closure, plus beam deviation. Automatic capture commences and the airplane maneuvers as required to settle on beam center. The approach speed may be selected by adjusting the SPD/MACH select knob.

(7) When the airplane settles on beam center (Ref. step 6), the pitch mode annunciator changes from G/S CAP to G/S TRK. Pitch control then automatically controls the airplane to maintain beam center. Gain programming within the DFGC, based on radio altitude, dampens the tendency for over correction maneuvers resulting from beam convergence as the radio source is approached.

(8) When glideslope track is established, command signals to the series yaw damper actuator are removed. Command signals to the rudder is then provided by a duplex rudder servodrive, which is in parallel with the rudder pedals and provide the rudder authority required during the align mode of operation. The RUDDER TRAVEL UNRESTRICTED light on the overhead panel should come on. The parallel rudder engages when the airplane is less than 1500 feet radio altitude and the localizer and glideslope track modes are established.

(9) After glideslope track and radio altitude less than 1500 feet, AUT GA appears in the arm mode annunciators as shown in step 7. The annunciation is provided to alert the flight crew that the autopilot is armed and logic is available in the event an autopilot go-around maneuver must be performed. If automatic go-around logic is not available, FD GA will be annunciated. If flight director go-around logic is not available, then the arm mode annunciator will display MAN GA. This will have no affect on the automatic landing, but the flight crew is advised in event of a go-around maneuver, the maneuver must be performed manually.

(10) Also, after glideslope track mode (step 8), the DFGC verifies that all autoland control sensors are on the line to provide a complete Fail Passive autoland system. The pitch and roll mode annunciators display AUT LND alerting the flight crew that autoland conditions are satisfied.

NOTE: If the elevator, aileron or rudder position sensors are not nulled correctly, the system will not go into LND mode. LND arm will remain engaged until 300 feet radio altitude and the autopilot will disengage.

(11) When the airplane descends to approximately 150 feet radio altitude, the autopilot executes a runway alignment maneuver to remove any crab-angle that the autopilot may have been maintaining to oppose crosswinds. The roll mode annunciator will change from AUT LND to ALN as shown in step 9. The forward slip maneuver is performed primarily by yaw control (rudder). The course error signal (difference between existing and runway heading) provides guidance to the rudder. The turning moment generated by the rudder is opposed by a limited aileron cross control to afford a turn toward the centerline of the localizer. Beam center is maintained, but the aircraft is turned to cancel the course error signal.

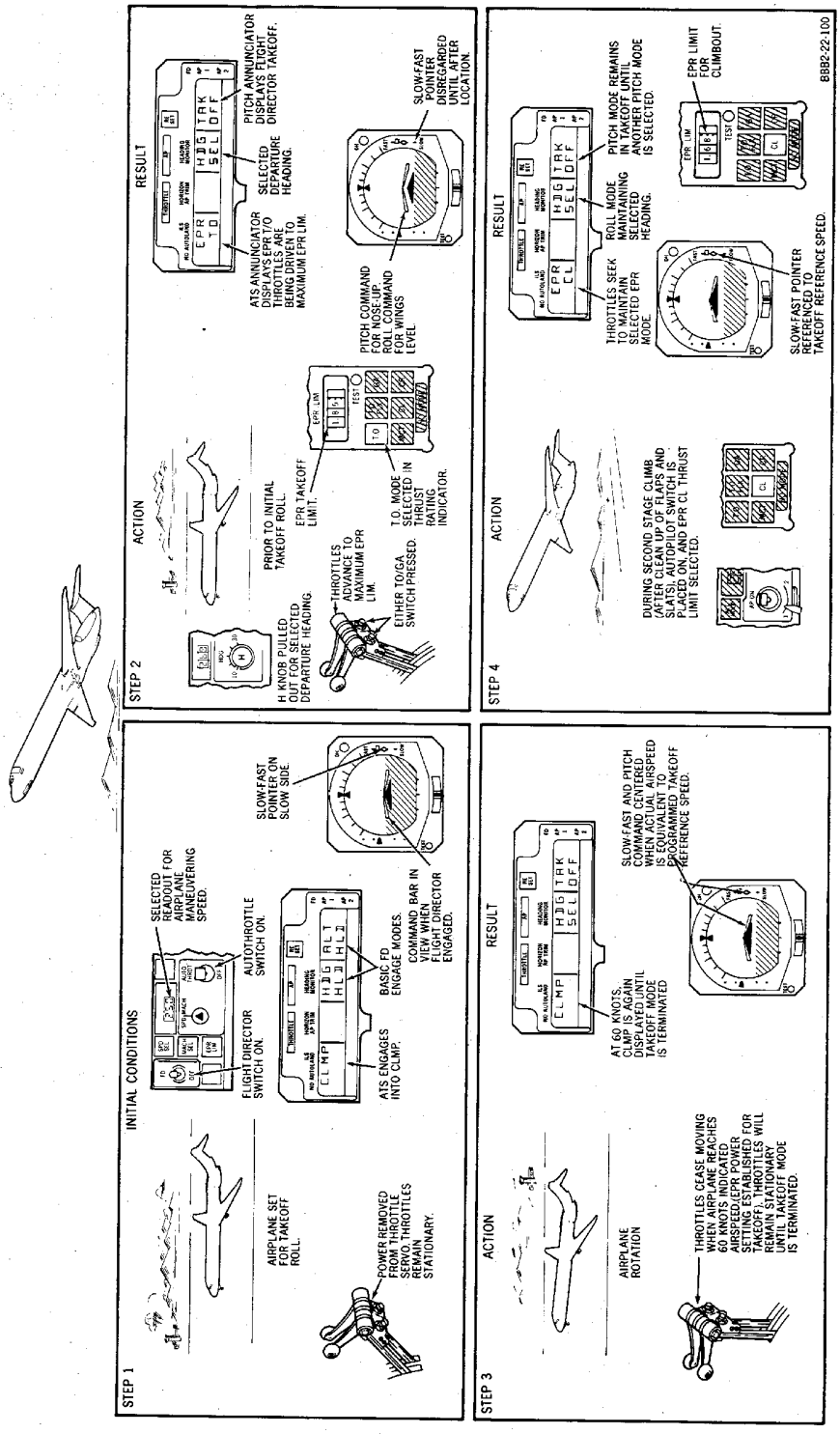
(12) As the aircraft arrives at the runway threshold (approximately 50 feet from touchdown), the autopilot flare and the autothrottle retard modes are initiated (Ref. step 10). The pitch mode annunciator will change from AUT LND to FLR, the ATS mode annunciator will display RETD, and the slow-fast pointers on the ADI's will be biased out of view. During the flare maneuver, the autopilot commands a slight nose-up attitude, and the aircraft is programmed for a smooth flare to set the aircraft down at a low sink rate. At the same time the throttles will be automatically driven aft toward the mechanical stops.

(13) As the aircraft makes the touchdown maneuver, and main gear spin-up occurs, the pitch and roll mode annunciators switch to ROL OUT (Ref. step 10). Localizer deviation signals then control the rudder and nose wheel steering to maintain localizer center. Also, at main gear wheel spin-up, the throttles will move rapidly to the aft idle stop position, and the arm mode annunciator will display FD GA indicating to the flight crew that a flight director go-around maneuver is available.

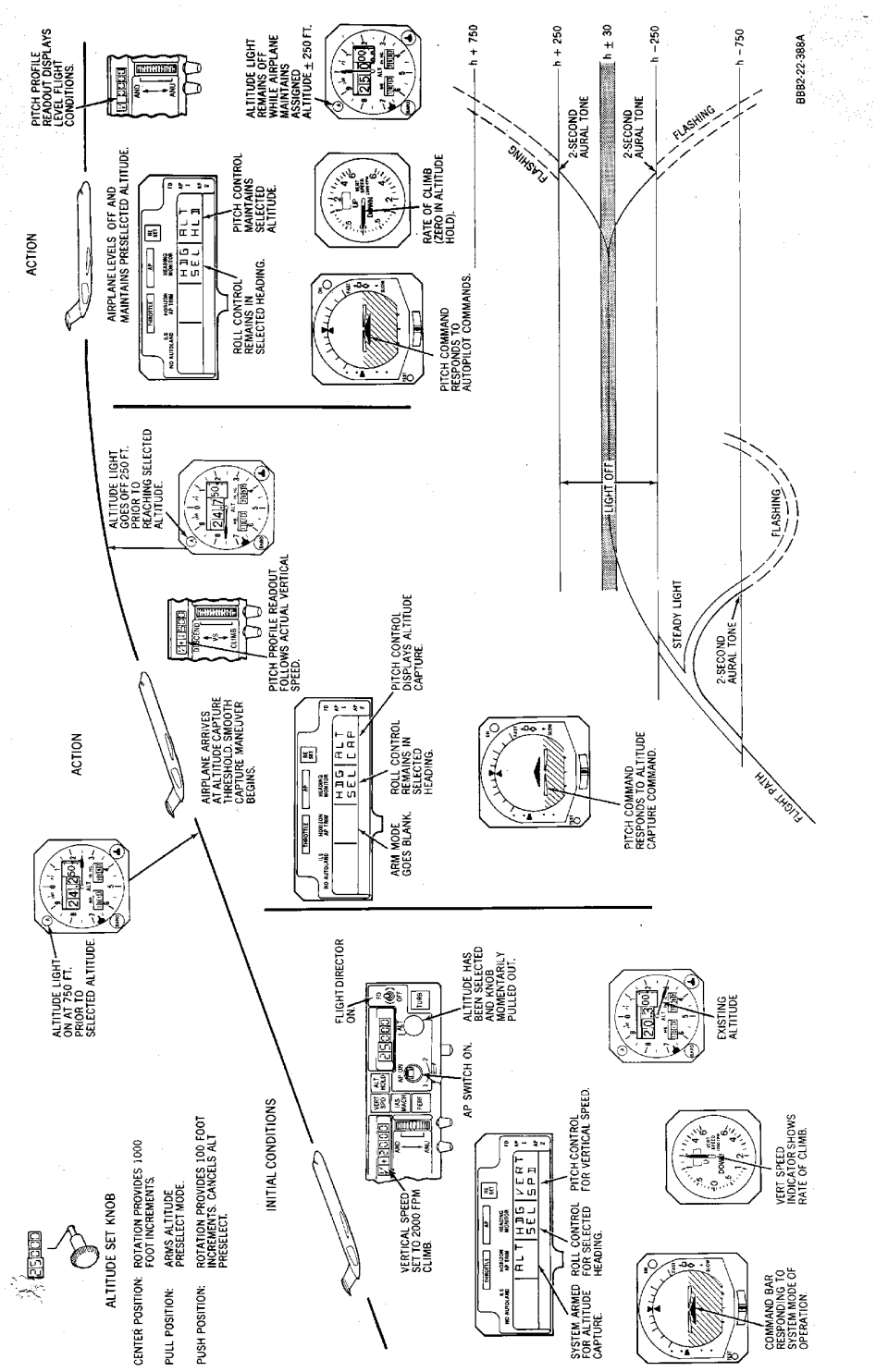
NOTE: With Service Bulletin 22-89 incorporated ground rollout will occur only when two main landing gears (MLG) wheels spin-up instead of one MLG wheel spinning up.

(14) 5 seconds after nose gear touchdown as shown in step 12, the pitch and roll mode annunciators go blank. The command bars bias out of view in both the captain's and first officer's ADI's. The autopilot disconnects, the AP off warning lights will come on red and flash, and aural warning tone will sound. The AP off warning and aural warning tone can be reset by pressing either control wheel disconnect button.

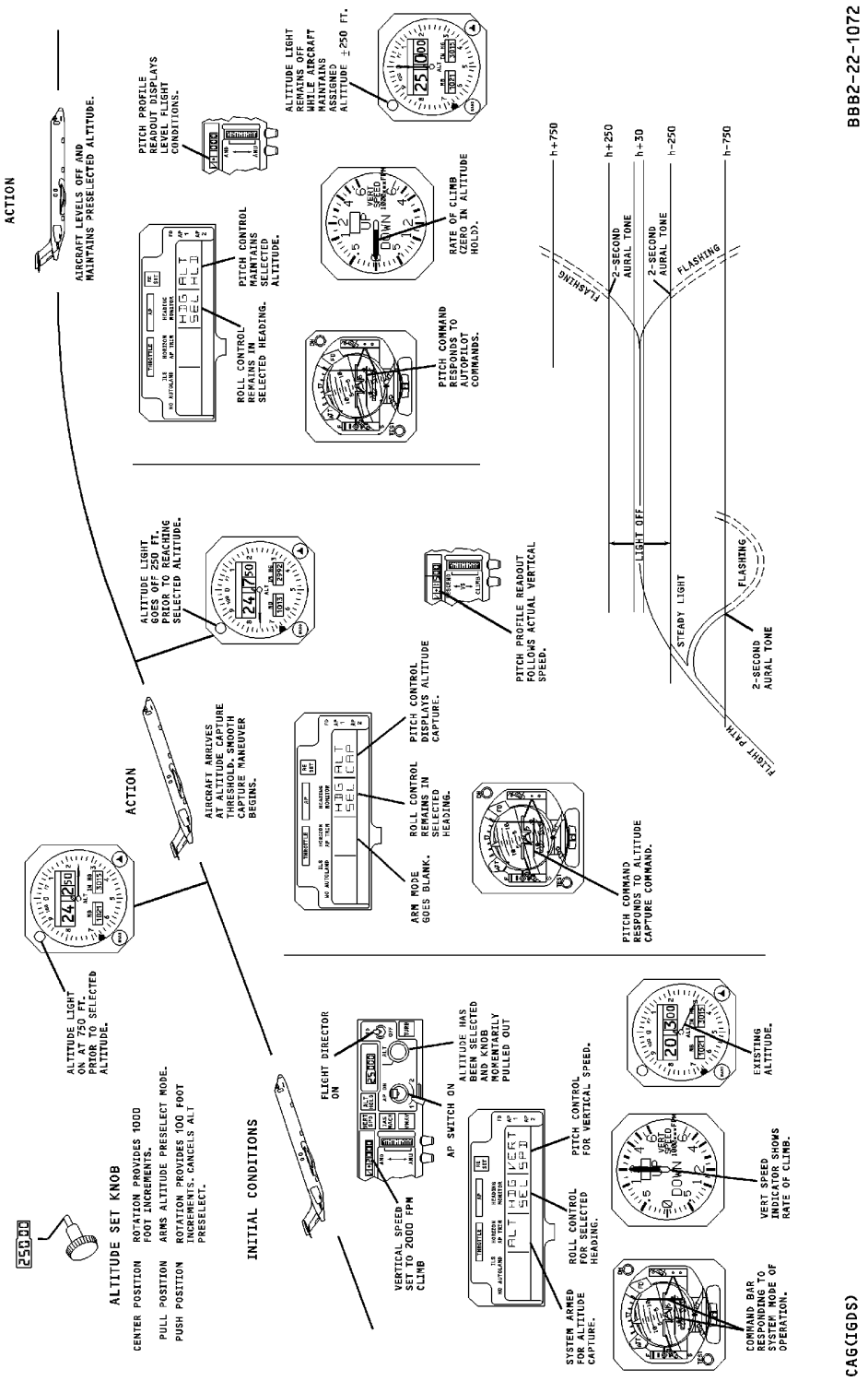
(15) When reverse thrust is initiated, the autothrottle engage switch will drop to the OFF position (Ref. step 13). The THROTTLE off warning lights will not come on, and the ATS mode annunciators will go blank.



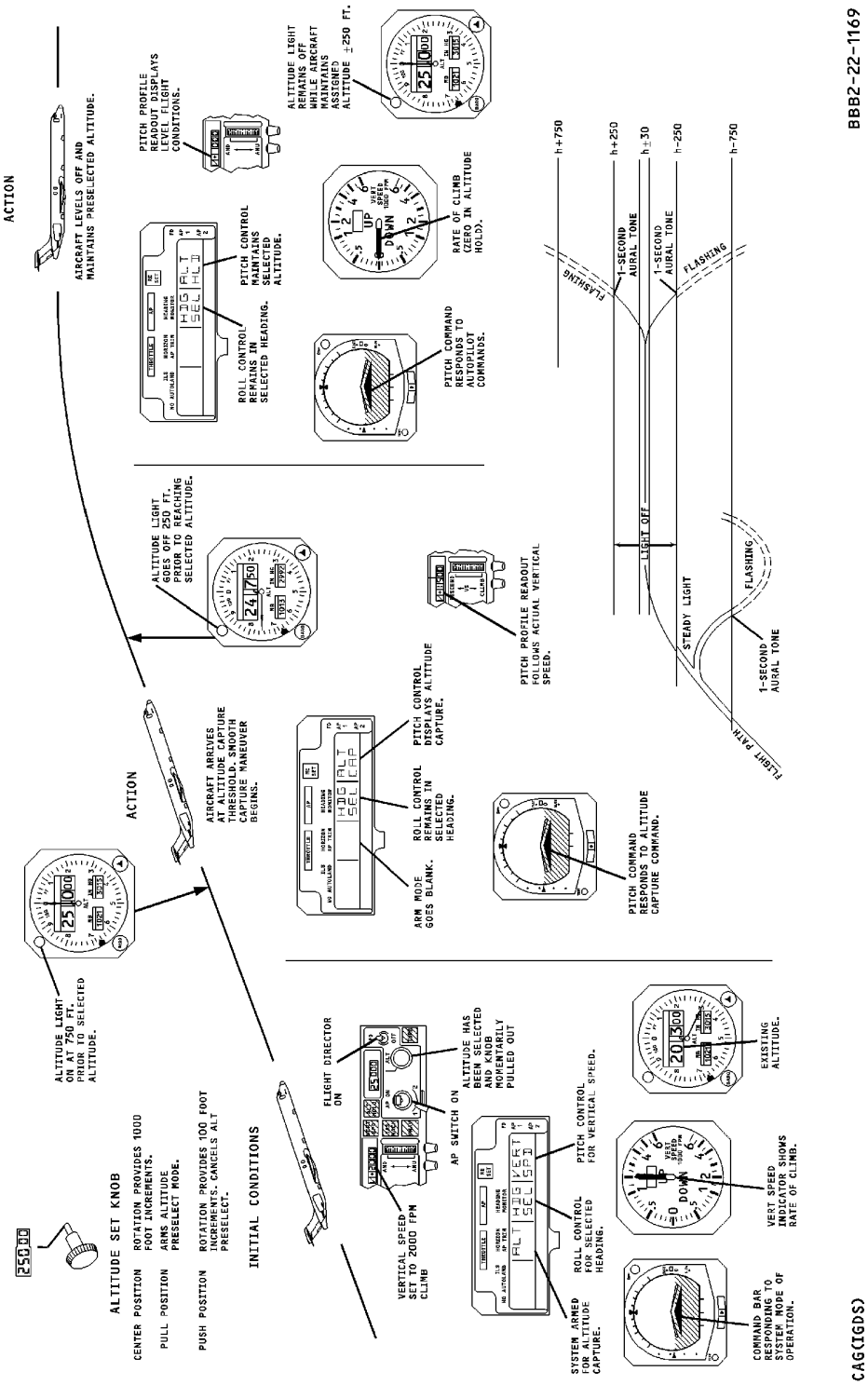
Takeoff - Mode of Operation
Figure 1/22-01-04-990-841



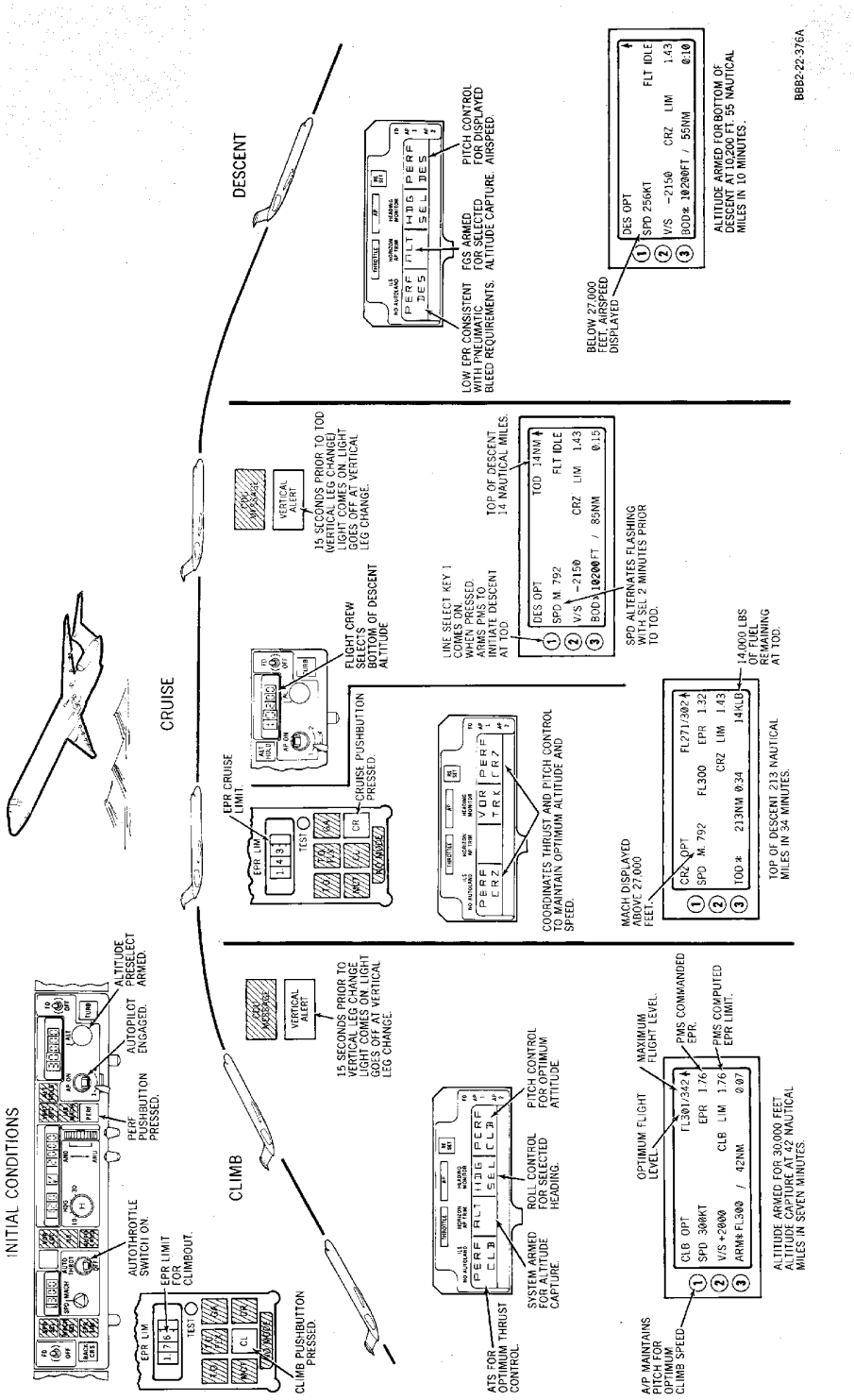
Altitude Preselect and Advisory - Mode of Operation
Figure 2/22-01-04-990-842 (Sheet 1 of 3)



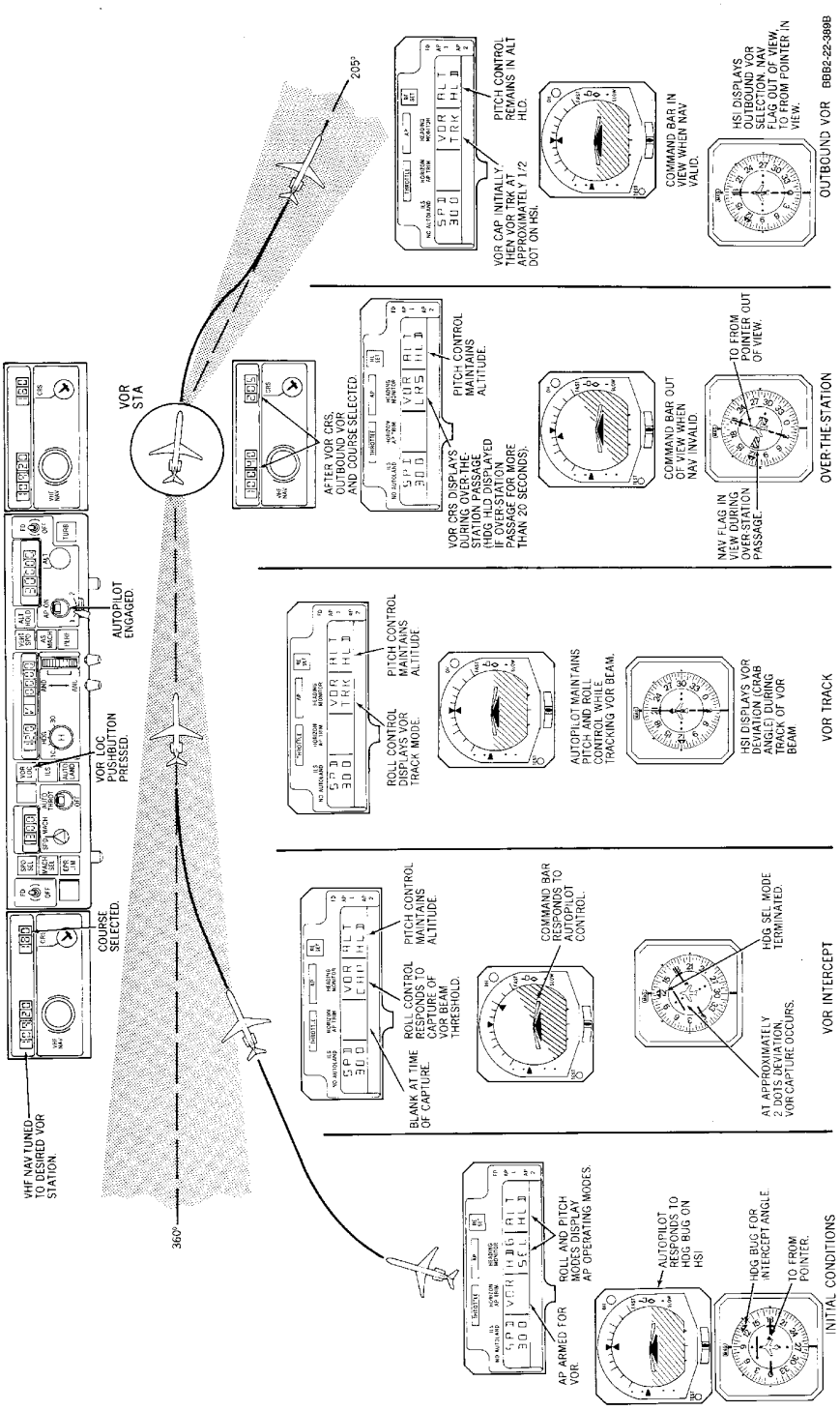
Altitude Preselect and Advisory - Mode of Operation
Figure 2/22-01-04-990-842 (Sheet 2 of 3)



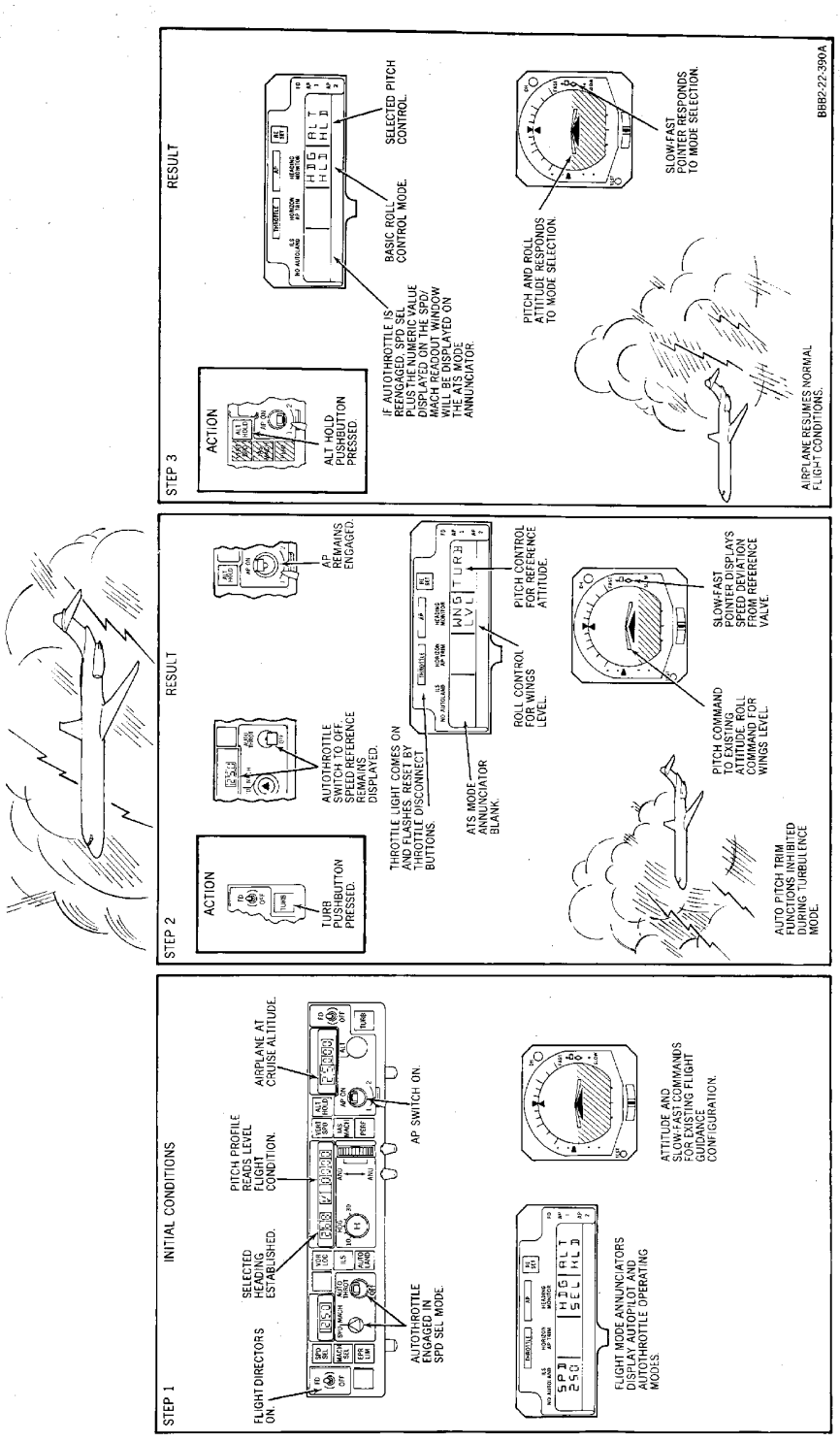
Altitude Preselect and Advisory - Mode of Operation
Figure 2/22-01-04-990-842 (Sheet 3 of 3)



PMS - Mode of Operation
Figure 3/22-01-04-990-843

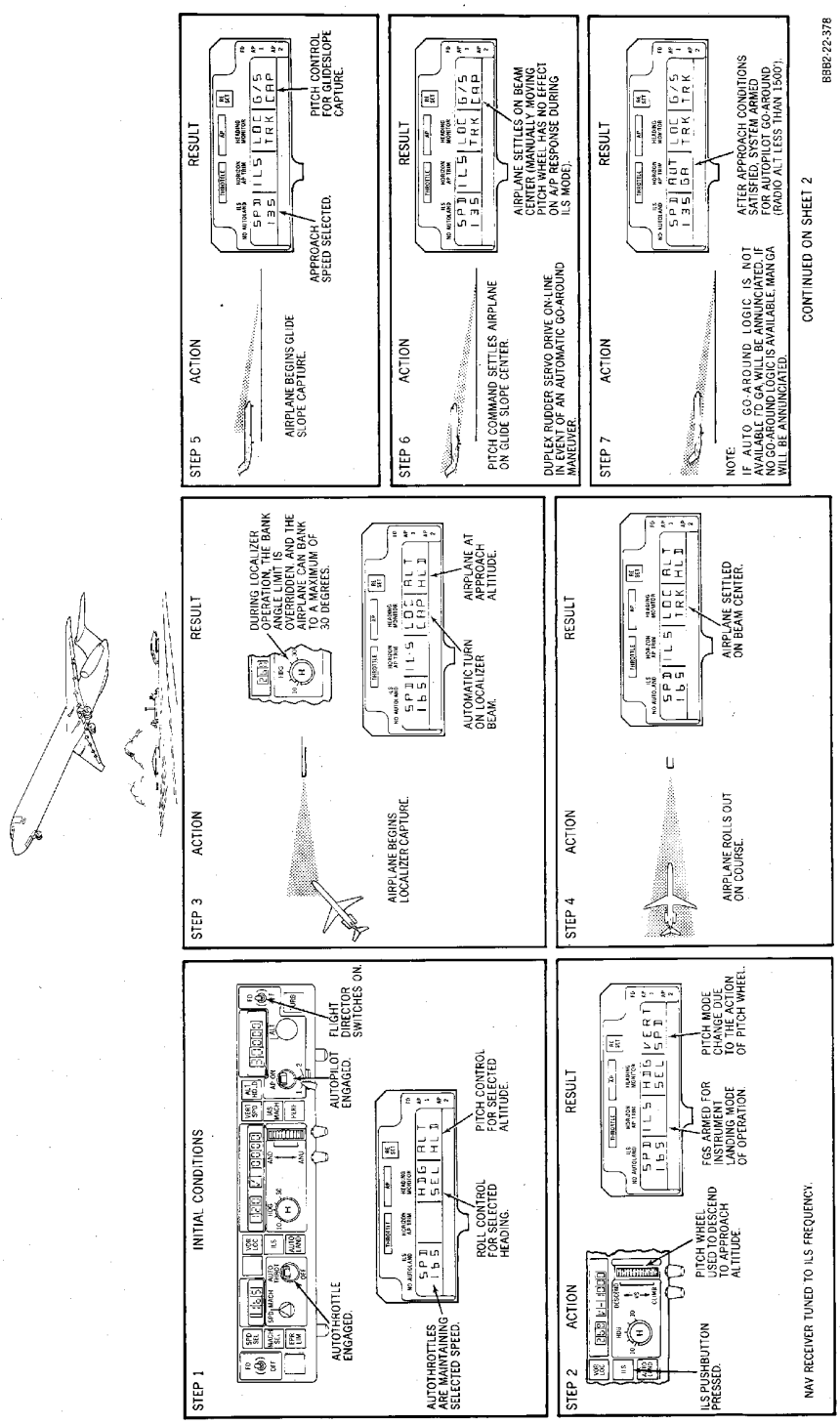


VHF Omni-Range - Mode Of Operation
Figure 4/22-01-04-990-844

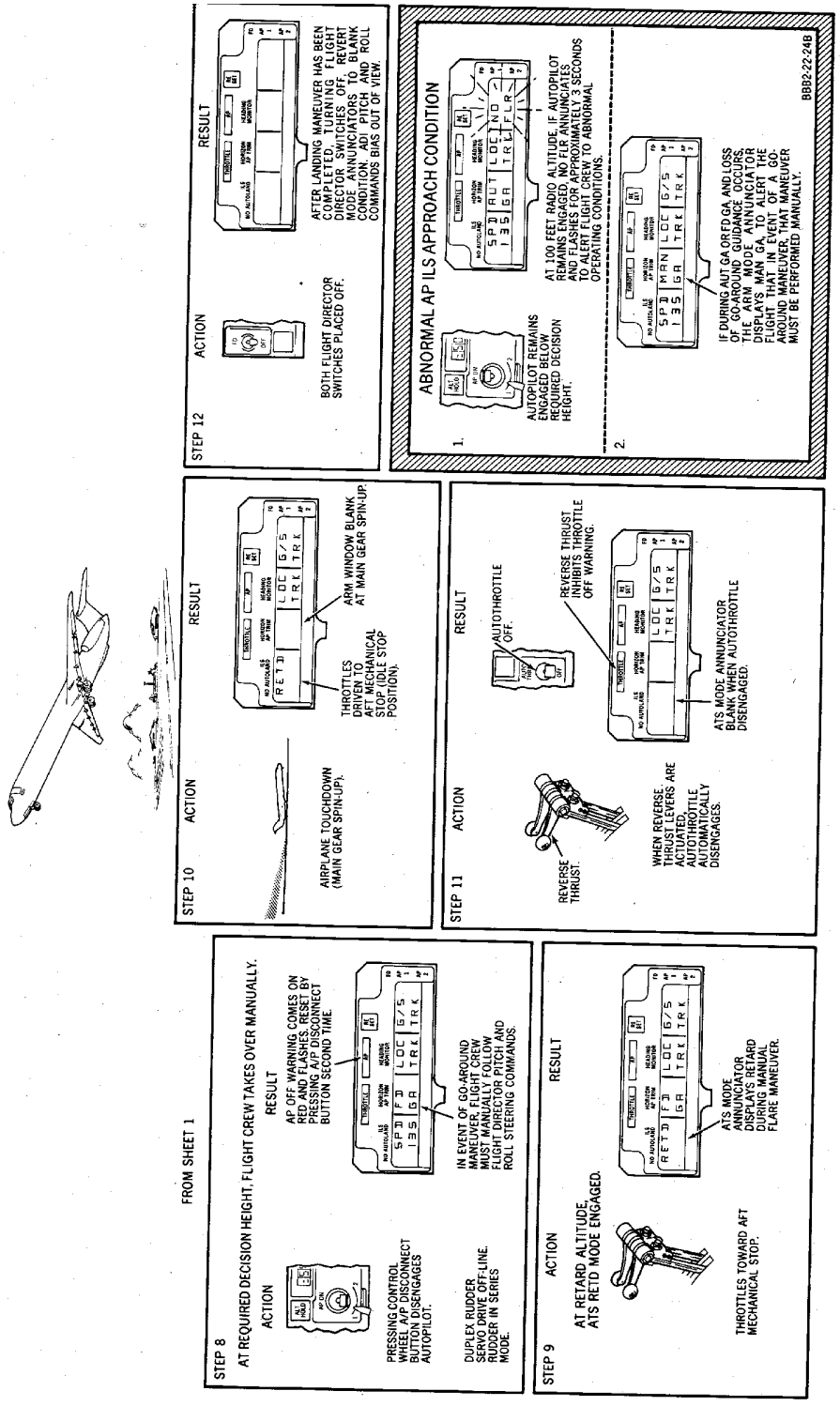


Turbulence Penetration - Mode Of Operation
Figure 5/22-01-04-990-845

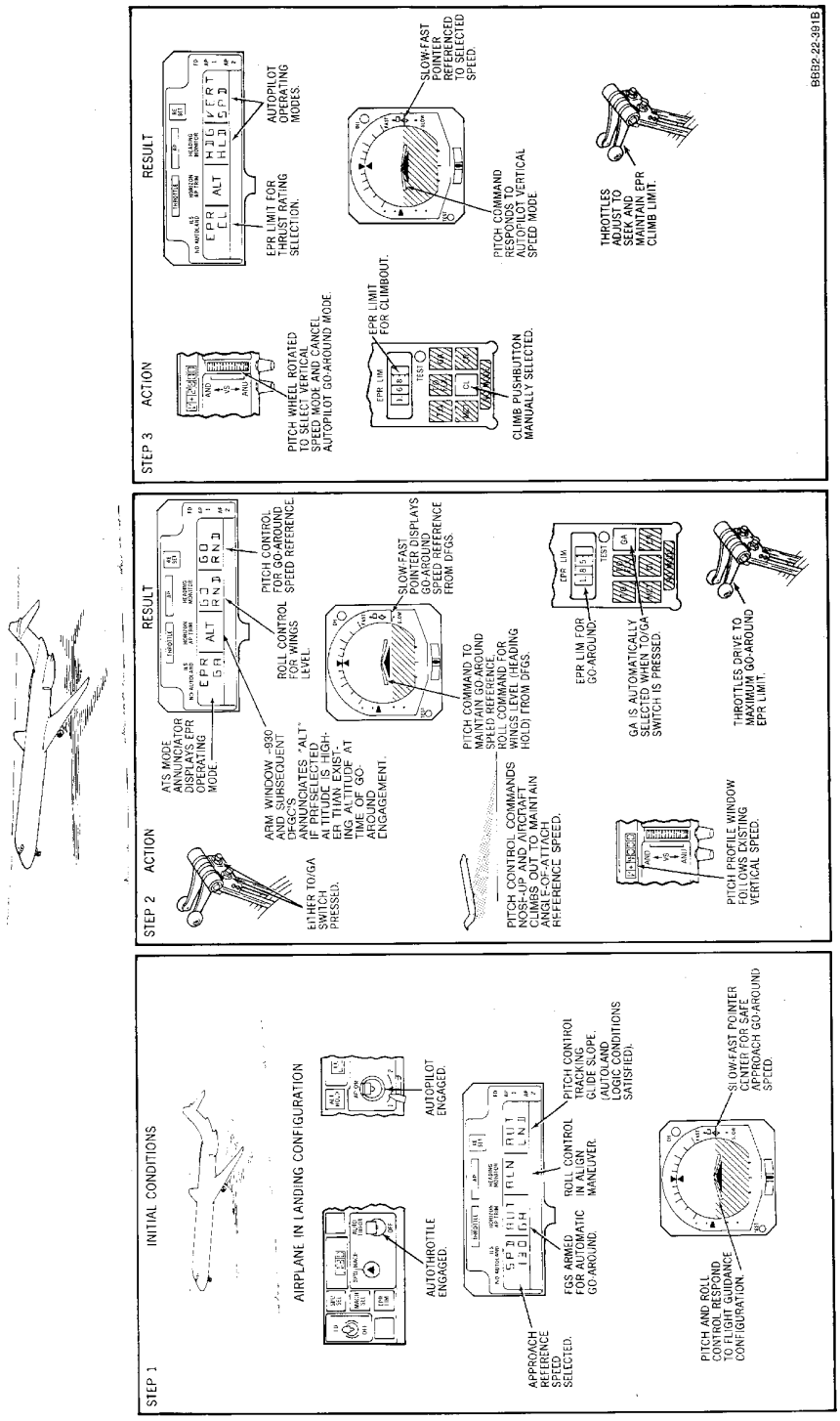
EFFECTIVITY
WJE 405, 409, 873, 874, 881, 883, 884, 886, 887, 892, 893



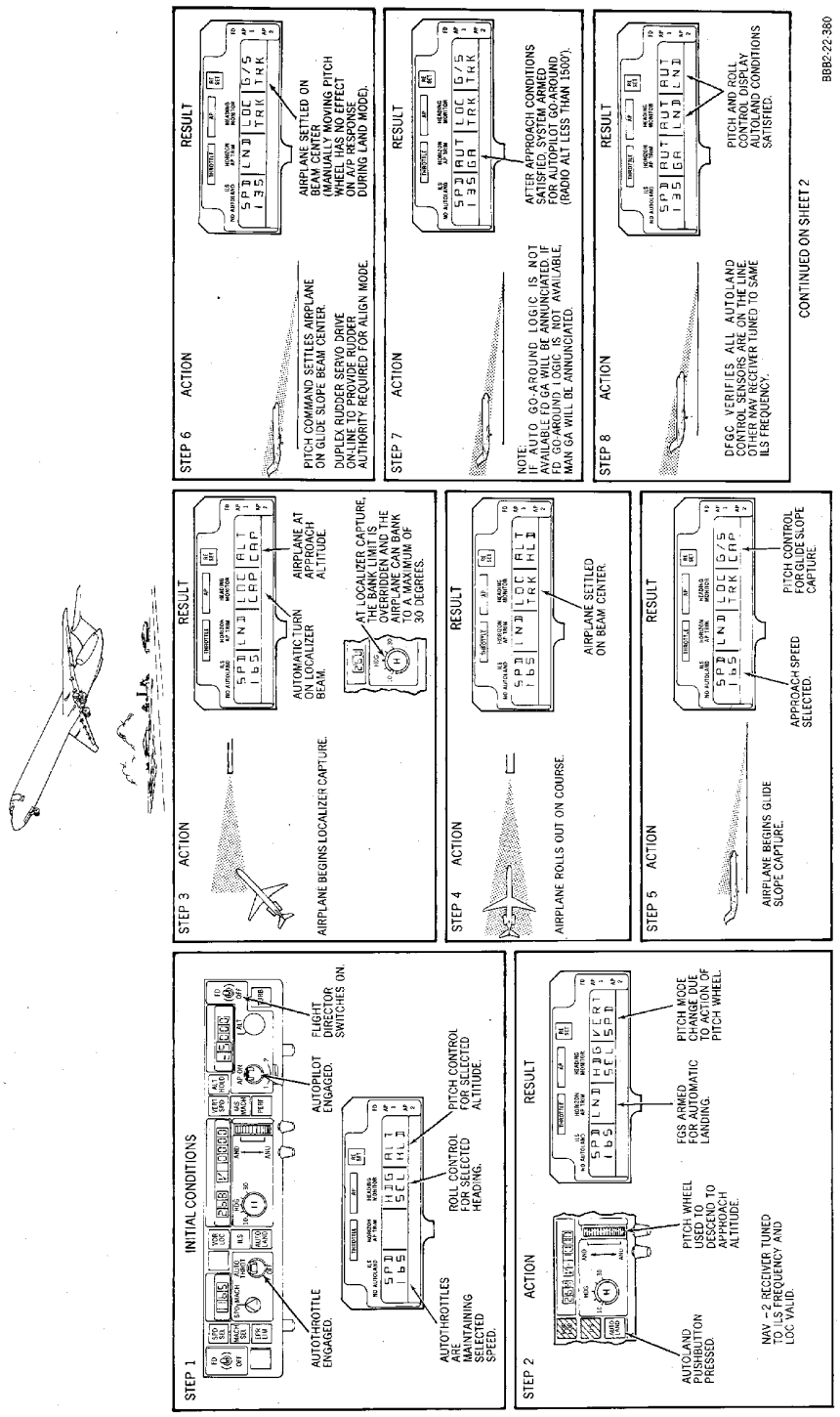
AP ILS Approach - Mode Of Operation
Figure 6/22-01-04-990-846 (Sheet 1 of 2)



AP ILS Approach - Mode Of Operation
Figure 6/22-01-04-990-846 (Sheet 2 of 2)

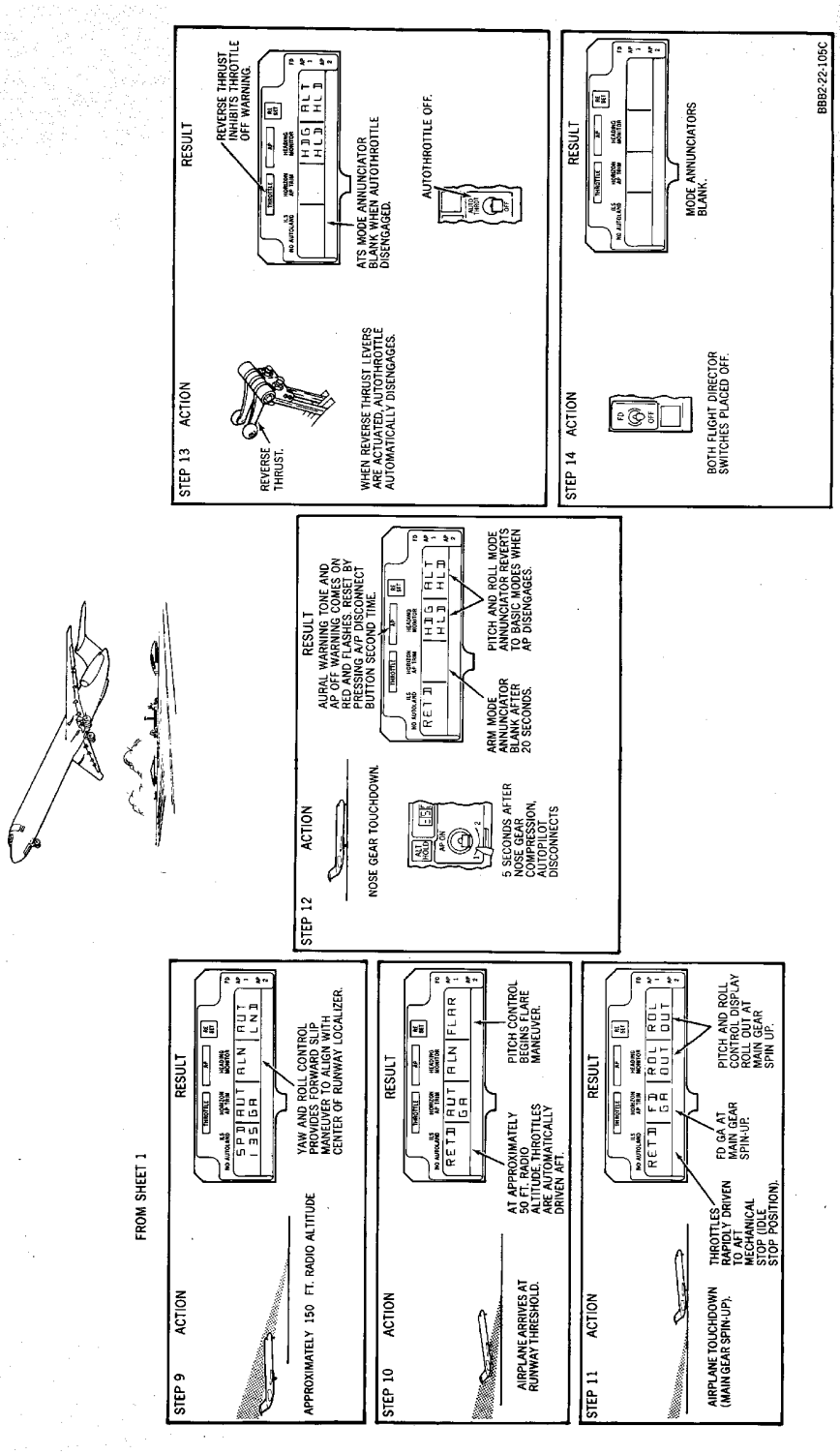


Go-Around - Mode Of Operation
Figure 7/22-01-04-990-847



Autoland - Mode Of Operation
Figure 8/22-01-04-990-848 (Sheet 1 of 2)

EFFECTIVITY
WJE 405, 409, 873, 874, 881, 883, 884, 886, 887, 892, 893



Autoland - Mode Of Operation
Figure 8/22-01-04-990-848 (Sheet 2 of 2)

DIGITAL FLIGHT GUIDANCE CONTROL - DESCRIPTION AND OPERATION

1. General

A. Digital Flight Guidance Control includes both autopilot and flight director functions. Autopilot engage, flight director FD - OFF, and mode selection is accomplished at the flight guidance control panel located on the flight compartment glareshield.

B. Autopilot computed pitch, roll and yaw channels are packaged into two identical Digital Flight Guidance Computers (DFGC's), and are controlled by the AP engage switch. A switch located below the AP engage switch, labeled 1, 2, provides the capability for selection of either DFGC-1 or DFGC-2.

C. Various autopilot roll and pitch modes of operation can be selected to provide aircraft in-flight guidance. These modes provide automatic control of ailerons, elevators, and rudder to establish and maintain aircraft attitude, altitude, heading, rate of climb or descent, and automatic capture and guidance to localizer, glideslope and omni-range beams.

D. Each flight director, when placed to FD position, displays steering command information from its respective DFGC (i.e. DFGC-1 to captain's PFD). However, a flight director switch, located on the overhead panel allows both flight directors to be controlled from a single DFGC.

E. Takeoff and go-around modes are initiated by pressing either TO/GA switch located on the throttle levers. The TO/GA switch programs flight director pitch control for pitch commands to maintain the takeoff or go-around safe reference. During go-around, with autopilot engaged, pitch control will automatically maintain go-around reference speed. Roll control provides wings level and heading hold when in flight.

F. Each control wheel contains an "AP quick disconnect" button to provide disengagement of the autopilot, and also turn off the AP off warning lights. The AP off warning lights are located in each Flight Mode Annunciator located on the captain's and first officer's instrument panels. Any time the AP is disconnected, an aural warning will sound and the AP off warning lights will come on red and flash. The AP off warning lights can be turned off by pressing either "AP quick disconnect" switch.

NOTE: If the DFGS should shut down (Flight Guidance Control Panel blank, Mach Trim and Yaw Damper OFF lights ON), momentarily pressing either "AP quick disconnect" button or cycling the DFGS circuit breakers may bring the system back on line.

2. Flight Guidance Operation

A. Following is the operating conditions associated with some of the functions provided by the Flight Guidance Control system.

Table 1

TITLE	PARAGRAPH
Takeoff	Paragraph 2.B.
Altitude Preselect and Advisory	Paragraph 2.C.
Flight Management System	Paragraph 2.D.
VHF Omni-Range	Paragraph 2.E.
Turbulence Penetration	Paragraph 2.F.
AP ILS Approach	Paragraph 2.G.
Automatic Go-Around	Paragraph 2.H.
Autoland	Paragraph 2.I.

B. Takeoff (Figure 1)

(1) During takeoff, after lift off, flight director pitch commands can be followed to adjust the pitch attitude of the aircraft, to maintain a safe margin above stall airspeed. The roll (steer) command bar provides commands to maintain wings level and heading hold.

(2) Figure 1, step 1, shows the initial conditions for takeoff with the aircraft in the ground mode. Placing the flight director to the FD position, establishes the basic flight director modes, HDG HLD, ALT HLD (VERT SPD). The pitch and roll steering command bars come into view and the slow-fast pointers remain in view on the slow side in both PFD's. If the autothrottle switch is placed to AUTO THROT position, the ATS mode annunciator will display CLMP, and power is removed from the autothrottle servo drive.

(3) Step 2 provides the action taken at or just prior to the initial takeoff roll. Selecting T.O. or (T.O. FLX) on the Thrust Rating Panel (TRP) and pressing either TO/GA switch on the throttle levers, will initiate the flight director takeoff mode of operation. The pitch and roll mode annunciators will display TAK OFF and with autothrottle engaged, the ATS mode annunciators will display EPR TO. The throttles will advance to the maximum takeoff EPR limit, the pitch command bar will display a nose-up attitude and the slow-fast pointer will be on the slow side (the slow-fast pointer is invalid until after aircraft rotation). The roll steering command is centered to the runway heading for climbout.

NOTE: Prior to the takeoff roll, a departure heading may be selected by use of the H knob on the flight guidance control panel. Momentarily pulling out the H knob will establish the selected heading (HDG SEL) mode of operation.

(4) Prior to aircraft rotation as shown in step 3, power is removed from the throttle servo at approximately 60 knots indicated airspeed. The ATS mode annunciators will again display CLMP and the throttles will remain stationary at the EPR power setting established for the takeoff mode. However, the throttles may be manually overpowered at any time. Slow-fast and pitch commands provide the takeoff speed reference consistent with aircraft configuration and gross weight conditions.

(5) Step 4 provides the takeoff conditions during climbout. Placing the autopilot switch on results in autopilot control of pitch attitude during the takeoff mode of operation, unless another pitch mode is selected (i.e. rotating pitch wheel etc.). Pressing the CL push-button on the Thrust Rating Panel will establish the EPR limit for climbout. With autothrottle engaged, the throttles will adjust to the established EPR limit, and the ATS mode annunciators will display EPR CL.

C. Altitude Preselect and Advisory (Figure 2)

(1) The altitude preselect function provides automatic capture of a preset barometric altitude, which is selected by an altitude set knob located on the Flight Guidance Control panel. The altitude set knob has three positions, spring-loaded to center. Rotating the knob in the center position provides 1000 foot increment altitude adjustments that are read on a selected altitude readout window directly above the altitude set knob. Prior to the -930 Digital Flight Guidance Computer (DFGC), the momentary pull-out position arms the system for a preselected altitude capture. The altitude preselect mode is armed automatically without the momentary pull-out of the set knob. This is true also when a new altitude is set in the altitude window or when go-around is engaged, but only if the preselected altitude is higher than the altitude existing at the time of the go-around mode engagement. Rotating the knob in the push-in position provides 100 foot increment adjustments, and cancels the altitude preselect mode.

(2) Altitude preselect operates only through autopilot or flight director guidance. The altitude advisory function is operational with or without autopilot or flight director. The advisory function only requires that the DFGC is receiving valid altitude signals from the CADC.

(3) The altitude advisory system provides two functions. To alert the flight crew when the aircraft is approaching a preselected altitude, and to alert the flight crew when the aircraft deviates from a selected altitude. Altitude advisory turns on a steady amber light in the upper left corner of the altimeters to alert the flight crew that the aircraft is approximately 750 feet from selected altitude. At approximately 250 feet prior to selected altitude the light goes off.

(4) If the aircraft deviates beyond the 750 foot band before it enters the 250 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. The advisory lights will stop flashing after reentering the 750 foot band and they will extinguish when the aircraft is within 250 feet of the selected altitude or when a new altitude has been selected. If the aircraft is maneuvered beyond the 250 foot band, the advisory lights flash, a two-second aural tone activates, and an altitude voice warning sounds. If the aircraft continues to deviate beyond the 750 foot band, the advisory lights will continue to flash. The advisory lights will extinguish when the aircraft is again within 250 feet of the selected altitude or when a new altitude has been selected.

NOTE: The voice warning "ALTITUDE" is activated only on aircraft which have the voice option included.

(5) Figure 2 illustrates a maneuver utilizing altitude preselect and advisory with autopilot in control. The initial conditions show the cockpit displays pertinent to the altitude preselect mode. The autopilot is engaged, either or both flight directors are on, and the system is armed for altitude capture. The aircraft is climbing through 20,300 feet, utilizing vertical speed of 2000 FPM to capture 25,000 feet preselected altitude. Roll control is maintaining a selected heading.

(6) The threshold for the altitude capture maneuver is variable with rate of climb or descent. As selected altitude is approached, an altitude for initiation of the level-off maneuver is computed within the DFGC. A command signal is developed that results in the autopilot making a smooth capture maneuver to the preselected altitude. At a 2000 FPM climb, as illustrated in Figure 2, altitude capture is initiated at approximately 500 feet from selected altitude, however, the altitude advisory light will have come on 750 feet prior to preselected altitude. The arm mode annunciator will go blank, and the pitch mode annunciator will display ALT CAP. The pitch profile readout will follow actual vertical speed. If the autothrottle was used in the EPR Limit mode to climb to selected altitude, SPD SEL (or MACH SEL, whichever was preselected) mode will be displayed at time of altitude capture.

(7) The DFGC shall enable automatic arming of the preselected altitude when the following occurs:

(a) The glideslope capture or track mode is exited by engaging the go-around mode and the preselected altitude is at least 90 feet greater than the altitude existing at the time of go-around mode engagement. If the glideslope capture or track mode is exited by engaging the go-around mode but the preselected altitude is less than 90 feet higher than the existing altitude at the time of go-around engagement, the preselected altitude will not arm automatically until another pitch mode is selected.

(b) The glideslope capture or track mode is exited by engaging any pitch mode other than the go-around mode.

(8) At approximately 250 feet prior to the level-off maneuver, the altitude advisory light will go off. During the level-off maneuver, the pitch profile readout is blank. After the level-off maneuver has been completed (pitch profile readout less than approximately 100 feet), the pitch mode annunciator will display ALT HLD, and the pitch profile readout displays zero vertical speed reference. At level flight, the altitude preselect function is terminated as an autopilot/flight director function. The altitude advisory system remains armed for possible aircraft deviation outside ±250 feet.

D. Flight Management System (Figure 3)

(1) The Flight Management System (FMS) option is a fully selectable mode of the Digital Flight Guidance System (DFGS). When engaged or commanded, FMS provides automatic navigation, horizontal and vertical guidance commands, speed commands, EFIS map and plan display information, and in-flight performance optimization. The FMS hardware consists of single Flight Management Computers (AFMC) and two Multipurpose Control and Display Units (MCDU). The FMS integrates information from the Central Air Data Computer (CADC), aircraft attitude system, VOR, DME, DFGC, engine and fuel sensors, GMT, FMS performance and navigation data bases, and crew-entered data to perform data display, navigation, performance optimization and lateral and vertical guidance for all flight modes.

(2) FMS performance function optimizes the entire flight profile during preflight and continuously updates the flight plan for changing flight conditions. Winds, gross weight, route modifications, remaining flight and flight plan advisory changes are displayed to the pilots via the MCDU with related savings or penalty information. The performance section also uses current aircraft conditions to maintain flight envelope protection for altitude and speed for all gross weights and altitudes. Also included is a hard speed restriction of 250 knots below 10,000 feet. Performance information such as Estimated Time of Arrival (ETA), Distance to Waypoint (DTW), and Gross Weight (GW) at waypoint are calculated continuously and are displayed for the active and provisional flight plan, or any modification to the flight plan.

(3) The FMS is integrated with the DFGS to command pitch, roll and thrust during climb, cruise and descent. Submodes available to climb are: ECON CLB, SEL SPD CLB, MAX ANGLE CLB, and E/O CLB. Submodes available in cruise are: ECON CRZ, SEL SPD CRZ, LRC CRZ, CRZ CLB, CRZ DES, and E/O CRZ. Descent submodes are: ECON DES, CRZ DES and SEL SPEED DES. The FMS guidance commands are limited by DFGS restrictions for roll angle, roll rate, pitch angle, pitch rate, EPR command, and throttle movement rate. While in climb, FMS will not climb higher than the FGCP clearance altitude. While in cruise FMS will not leave the current altitude until a new cruise altitude has been armed, entered and executed by the pilot. FMS will not descend lower than the clearance altitude while in descent. When FMS encounters a DFGCP clearance altitude restriction during a vertical maneuver, it will level off until the restriction has been removed by the pilot. Figure 3 depicts a typical NAV operation.

E. VHF Omni-Range (Figure 4)

(1) The VHF Omni-Range (VOR) provides four modes of operation. The modes consist of arm, capture, track and course. Figure 4 illustrates a sequence of VOR operations from initial arming of the system to selecting an outbound VOR radial.

(2) The initial conditions illustrated in Figure 4, is arming the system for VOR. Tuning the VHF NAV receivers to a desired VOR frequency and course, and pressing the VOR LOC push-button on the Flight Guidance Control panel will automatically arm the system for VOR. VOR will appear in the arm mode annunciators. The VOR mode will not arm if the VOR signal is not valid. This is indicated by a NAV flag coming into view. The roll control responds to the selected heading, and with autopilot engaged, automatic capture of the VOR radial will occur.

(3) Automatic capture of the VOR is initiated when the aircraft intercepts the VOR radial capture zone (approximately 2 dots depending upon capture rate) as shown on the ND. VOR CAP will be displayed on the roll mode annunciators to verify capture has occurred. The flight director command bars will respond accordingly to autopilot control.

(4) When the aircraft centers on the VOR radial, approximately 1/2 dot, as shown on the ND, the roll mode annunciators will display VOR TRK, and the autopilot will maintain roll and pitch control, and provide crosswind correction as necessary to maintain beam center. The ND will display any beam deviation during track on the VOR radial.

(5) During over-the-station (zone of confusion) passage, the roll mode annunciators will display VOR CRS, and a new VOR radial may be selected without disengaging the VOR mode. A NAV flag will appear if the signal received is not invalid, and the TO/FROM pointer will bias out of view in the ND's. If the aircraft is in the VOR CRS mode for more than 30 seconds, the roll mode annunciators will automatically switch to roll control basic mode HDG HLD.

(6) When the new VOR radial is captured, the NAV flag will bias out of view, and the TO FROM pointer will reappear on the HSI's. The roll command bars will come back in view when NAV valid is again reestablished. The roll mode annunciators will display VOR CAP initially, until the airplane settles on beam center, then VOR TRK will be displayed.

F. Turbulence Penetration (Figure 5)

(1) Turbulence penetration provides dampened pitch response and wings level hold during turbulent atmospheric conditions. The mode is established when the TURB push-button on the Flight Guidance Control panel is pressed.

(2) Figure 5 illustrates a typical turbulence mode of operation. The initial conditions, step 1, illustrates a normal flight guidance cruise operation. Autopilot is engaged maintaining altitude and heading, and the autothrottle is engaged in the selected speed mode.

(3) Step 2 illustrates the action of pressing the TURB push-button. The pitch mode annunciator displays TURB, and the roll mode annunciator displays WNG LVL. The pitch profile readout displays command attitude to the closest degree. The autothrottle disengages and THROTTLE off warning lights come on and flash red. During the TURB mode of operation, the attitude reference in the pitch profile readout can be adjusted as desired by use of the pitch wheel. Automatic pitch trim functions are inhibited during the TURB mode.

(4) Selecting another pitch control mode terminates the TURB mode of operation. Step 3, illustrates the action of pressing the ALT HOLD push-button. The pitch mode annunciator displays ALT HLD, and the roll mode annunciator displays the roll basic mode HDG HLD. The flight guidance system responds to the mode selection.

G. AP ILS Approach (Figure 6)

(1) The AP ILS Approach mode is usable for category I, or category II weather conditions. The mode is compatible with autopilot and both flight directors, autopilot only, or flight director(s) only. Figure 6 illustrates a typical AP ILS Approach mode of operation. The initial conditions, step 1, show both flight director switches are in FD position, autopilot engaged, and autothrottle engaged. The pitch mode annunciator displays ALT HLD, the roll mode annunciator displays HDG SEL, and the ATS mode annunciator displays selected speed.

(2) Pressing the ILS push-button (as shown in step 2) on the Flight Guidance Control panel after tuning the associated NAV receiver to the ILS frequency, and setting the CRS knob to the published inbound localizer heading, establishes the preliminary conditions for the AP ILS Approach mode. ILS appears in the arm mode annunciator. The pitch wheel may be used to arrive at approach entry altitude.

(3) When the localizer beam deviation reduces to the capture threshold, as seen on the Navigation Display (ND), localizer capture occurs as shown in step 3. The aircraft automatically turns as required to establish the localizer beam center. During localizer operation, the bank angle limiter is overridden, and bank is limited as a function of radio altitude up to a 30 degree maximum. The roll mode annunciator switches from HDG SEL to LOC CAP.

(4) As the aircraft settles on beam center, the roll mode annunciator changes from LOC CAP to LOC TRK (Ref. step 4). While tracking the localizer, if a crosswind is present, the localizer track mode will establish a crab-angle into the wind so the aircraft will maintain localizer beam center with no steady stand-off. The direction and amount of crab-angle will be displayed on the ND as the angular difference between the aircraft heading and the setting on the course select pointer. As wind conditions change while tracking the localizer, the crab-angle will change to maintain beam center. Approach speed may be selected by adjusting the SPD/MACH select knob.

(5) As the aircraft approaches glideslope center, the pitch mode annunciator changes to G/S CAP as shown in step 5. The actual capture point is variable and is a function of rate of beam closure, plus beam deviation. Automatic capture commences and the aircraft maneuvers as required to settle on beam center.

(6) When the aircraft settles on beam center (Ref. step 6), the pitch mode annunciator changes from G/S CAP to G/S TRK. Pitch control then automatically controls the aircraft to maintain beam center if radio altitude is less than 1500 feet. The RUDDER TRAVEL UNRESTRICTED light on the EOAP should come on if airspeed is less than 145 knots. The duplex rudder servodrive comes on the line to provide the proper rudder authority. Gain programming within the DFGC, based on radio altitude, dampens the tendency for over correction maneuvers resulting from beam convergence as the radio source is approached.

(7) After glideslope track, with duplex rudder servo on the line, approach conditions satisfied, and radio altitude less than 1500 feet, the arm mode annunciator changes from ILS to AUT GA (Ref. step 7). This communicates to the flight crew that the system is armed for autopilot go-around in the event an automatic go-around maneuver must be performed.

(8) At the required decision height, pressing either control wheel autopilot disconnect button will disengage the autopilot (Ref. step 8). The AP off warning lights will come on red and flash. The duplex rudder servo will go off the line and the yaw damper system will again be in the series mode of operation. The arm mode annunciator will change from AUT GA to FD GA. When FD GA is annunciated the flight crew must manually follow pitch and roll steering commands in event a go-around maneuver is required. Pressing the autopilot disconnect button the second time on either control wheel will turn off the AP red lights.

(9) As the aircraft arrives at approximately 50 feet radio altitude, the autothrottle retard mode is initiated (Ref. step 9). The ATS mode annunciators change from selected speed to RETD. The throttles will start driving to the aft mechanical stop.

(10) As the aircraft touches down, and main gear wheel spin-up occurs, as shown in step 10, the throttles will be driven at an increased rate to the aft mechanical stop (idle stop position). The arm mode will go blank indicating to the flight crew that a flight director go-around maneuver is not available.

(11) After main gear wheel spin-up (Ref. step 11), actuating the reverse thrust levers automatically disengages the autothrottle. The THROTTLE off warning lights will not come on when autothrottle is disengaged using reverse thrust levers. Placing flight director switches to OFF (Ref. step 12), will place the mode annunciators in a blank condition.

(12) Figure 6, Sheet 2, step 1, shows the annunciation during an abnormal AP ILS APPROACH condition. If the autopilot remains engaged below the required decision height, approximately 100 feet radio altitude, NO FLR annunciates and flashes for approximately 3 seconds in the pitch mode annunciators, to alert the flight crew to the abnormal approach operating conditions.

(13) Step 2, shows the condition if go-around guidance is not available. If the arm mode annunciator previously has been displaying AUT GA or FD GA, and loss of go-around guidance occurs, i.e., loss slat transducer signals, etc., the arm mode annunciator will display MAN GA. This advises the flight crew that in event a go-around maneuver must be performed, the maneuver must be performed manually without the autopilot or flight director.

H. Automatic Go-Around (Figure 7)

(1) The autopilot go-around mode of operation is initiated when the autopilot is engaged, the flaps are extended in land configuration (28 to 40 degrees), and either TO/GA switch on the throttle levers is pressed. The autopilot go-around mode provides pitch steering command displays and elevator control to provide a climb-out at the go-around airspeed, consistent with aircraft configuration. Roll control logic is provided to roll the aircraft to wings level and maintain existing heading, when the bank-angle is reduced to less than 3 degrees. The rudder parallel servo must be operational for the single engine automatic go-around mode.

(2) Figure 7 illustrates a typical autopilot go-around mode of operation. The initial conditions, step 1, illustrate the aircraft in a landing configuration. Autopilot and autothrottle are engaged, and the flight mode annunciators display the Flight Guidance System configuration. The preselected altitude displayed in the altitude window will be armed automatically when the go-around mode is engaged if it is higher than the aircraft altitude existing at the time of go-around engagement.

(3) Step 2, shows the action of pressing either TO/GA switch. The pitch and roll mode annunciators display GO RND. The ATS mode annunciator displays EPR G/A, and GA is automatically selected and annunciated on the TRP. The PFD displays a pitch command and the autopilot responds to maintain the go-around speed reference and a roll command for wings level. With autothrottle engaged, the throttles will automatically adjust to the maximum go-around EPR LIM displayed on the TRP and the pitch profile window will follow existing vertical speed.

(4) Rotating the pitch wheel (or selecting another pitch mode), as shown in step 3 will automatically terminate the autopilot go-around mode of operation. Go-around mode will also terminate at time of altitude capture. With autothrottle engaged, selecting another EPR mode, or autothrottle operating mode, will automatically cause the throttles to adjust to seek and maintain the selected mode.

I. Autoland (Figure 8)

(1) The autoland mode of operation provides a Fail Passive automatic landing. Each Flight Mode Annunciator contains a NO AUTOLAND legend. The NO AUTOLAND legend appears when the continuous built in test circuits within the selected DFGC detect a failure(s) that is critical to the autoland mode of operation. If the NO AUTOLAND legend appears, switching to the opposite DFGC may cause the legend to go off. In this case, the second system is usable for an automatic landing.

(2) Figure 8, illustrates a typical autoland mode of operation. The initial conditions, step 1, illustrate the aircraft at a cruise altitude of 5000 feet, autopilot and flight directors engaged, and the pitch and roll mode annunciators displaying the FGS selected modes, HDG SEL and ALT HLD. The autothrottle is engaged in a selected speed mode.

(3) Tuning the associated NAV receiver to the ILS frequency, setting the CRS knob to the published inbound localizer heading, and pressing the AUTOLAND push-button on the Flight Guidance Control panel establishes the initial conditions for the autoland mode of operation (Ref. step 2). LND appears in the arm mode annunciators. The pitch wheel may be used to arrive at approach entry altitude.

(4) When the localizer beam deviation reduces to the capture threshold, as seen on the ND, localizer capture occurs as shown in step 3. The aircraft automatically turns as required to establish the localizer beam center. During localizer operation, the bank angle limiter is overridden and the aircraft can bank to a maximum of 30 degrees. This maximum 30 degree bank decreases as radio altitude is decreased. The roll mode annunciator switches from HDG SEL to LOC CAP.

(5) As the aircraft settles on beam center, the roll mode annunciator changes from LOC CAP to LOC TRK (Ref. step 4). While tracking the localizer, if a crosswind is present, the localizer track mode will establish a crab-angle into the wind so the aircraft will maintain localizer beam center with no steady stand-off. The direction and amount of crab-angle will be displayed on the ND as the angular difference between the aircraft heading and the setting on the course select pointer. As wind conditions change while tracking the localizer, the crab-angle will change to maintain beam center.

(6) As the aircraft approaches the glideslope beam, the pitch mode annunciator changes to G/S CAP as shown in step 5. The actual capture point is variable and is a function of rate of beam closure, plus beam deviation. Automatic capture commences and the aircraft maneuvers as required to settle on beam center. The approach speed may be selected by adjusting the SPD/MACH select knob.

(7) When the aircraft settles on beam center (Ref. step 6), the pitch mode annunciator changes from G/S CAP to G/S TRK. Pitch control then automatically controls the aircraft to maintain beam center. Gain programming within the DFGC, based on radio altitude, dampens the tendency for over correction maneuvers resulting from beam convergence as the radio source is approached.

(8) When glideslope track is established, command signals to the series yaw damper actuator are removed. The RUDDER TRAVEL UNRESTRICTED light on the overhead panel should come on (rudder pedals begin to move). Command signals to the rudder is then provided by a duplex rudder servodrive, which is in parallel with the rudder pedals and provide the rudder authority required during the align mode of operation. The parallel rudder engages when the aircraft is less than 1500 feet radio altitude and the localizer and glideslope track modes are established.

(9) After glideslope track and radio altitude less than 1500 feet, AUT GA appears in the arm mode annunciators as shown in step 7. The annunciation is provided to alert the flight crew that the autopilot is armed and logic is available in the event an autopilot go-around maneuver must be performed. If automatic go-around logic is not available, FD GA will be annunciated. If flight director go-around logic is not available, then the arm mode annunciator will display MAN GA. This will have no affect on the automatic landing, but the flight crew is advised in event of a go-around maneuver, the maneuver must be performed manually.

(10) Also, after glideslope track mode (step 8), the DFGC verifies that all autoland control sensors are on the line to provide a complete Fail Passive autoland system. The pitch and roll mode annunciators display AUT LND alerting the flight crew that autoland conditions are satisfied.

NOTE: If the elevator, aileron or rudder position sensors are not nulled correctly, the system will not go into LND mode. LND arm will remain engaged until 300 feet radio altitude and the autopilot will disengage.

(11) When the aircraft descends to approximately 150 feet radio altitude, the autopilot executes a runway alignment maneuver to remove any crab-angle that the autopilot may have been maintaining to oppose crosswinds. The roll mode annunciator will change from AUT LND to ALN as shown in step 9. The forward slip maneuver is performed primarily by yaw control (rudder). The course error signal (difference between existing and runway heading) provides guidance to the rudder. The turning moment generated by the rudder is opposed by a limited aileron cross control to afford a turn toward the centerline of the localizer. Beam center is maintained, but the aircraft is turned to cancel the course error signal.

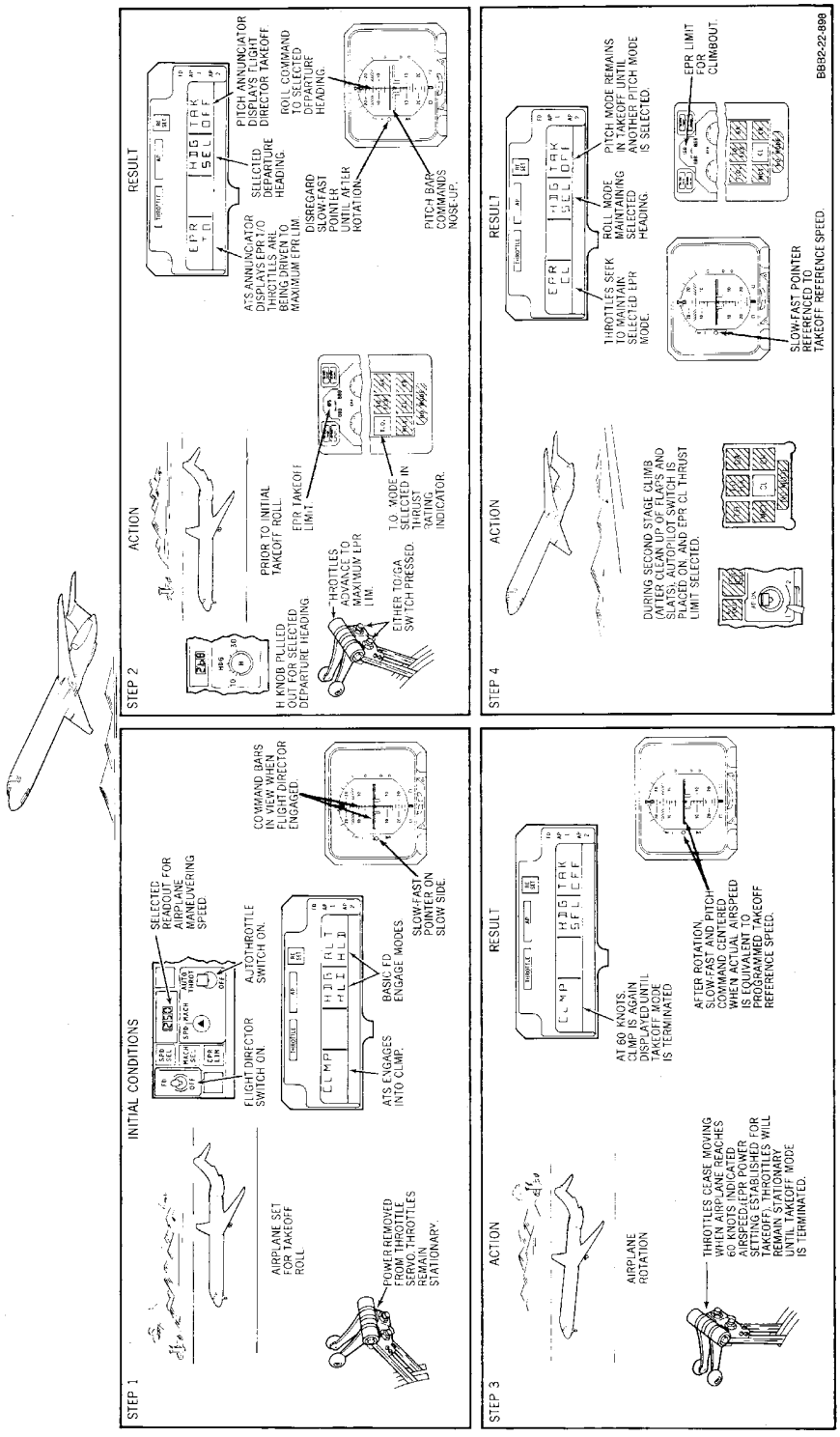
(12) As the aircraft arrives at the runway threshold (approximately 50 feet from touchdown), the autopilot flare and the autothrottle retard modes are initiated (Ref. step 10). The pitch mode annunciator will change from AUT LND to FLR, the ATS mode annunciator will display RETD, and the slow-fast pointers on the PFD's will be biased out of view. During the flare maneuver, the autopilot commands a slight nose-up attitude, and the aircraft is programmed for a smooth flare to set the aircraft down at a low sink rate. At the same time the throttles will be automatically driven aft toward the mechanical stops.

(13) As the aircraft makes the touchdown maneuver, and main gear spin-up occurs, the pitch and roll mode annunciators switch to ROL OUT (Ref. step 11). Localizer deviation signals then control the rudder and nose wheel steering to maintain localizer center. Also, at main gear wheel spin-up, the throttles will move rapidly to the aft idle stop position, and the arm mode annunciator will display FD GA indicating to the flight crew that a flight director go-around maneuver is available.

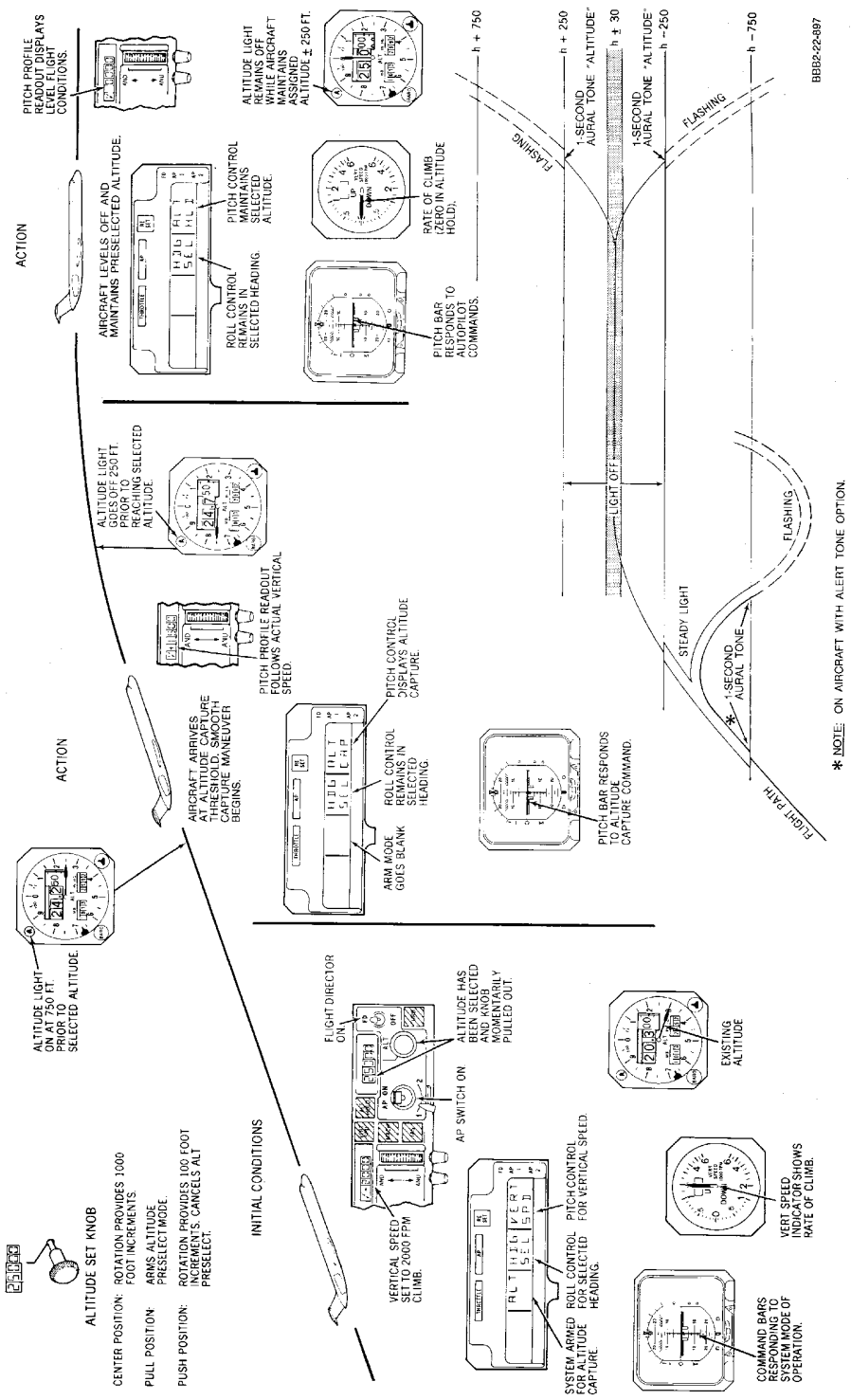
(14) At nose gear touchdown, step (12), the ground roll out is available. The pitch and roll mode annunciators continue to display ROL OUT and the PFD displays roll command for steering guidance and pitch command to zero degrees.

(15) When reverse thrust is initiated, the autothrottle engage switch will drop to the OFF position (Ref. step 13). The THROTTLE off warning lights will not come on, and the ATS mode annunciators will go blank.

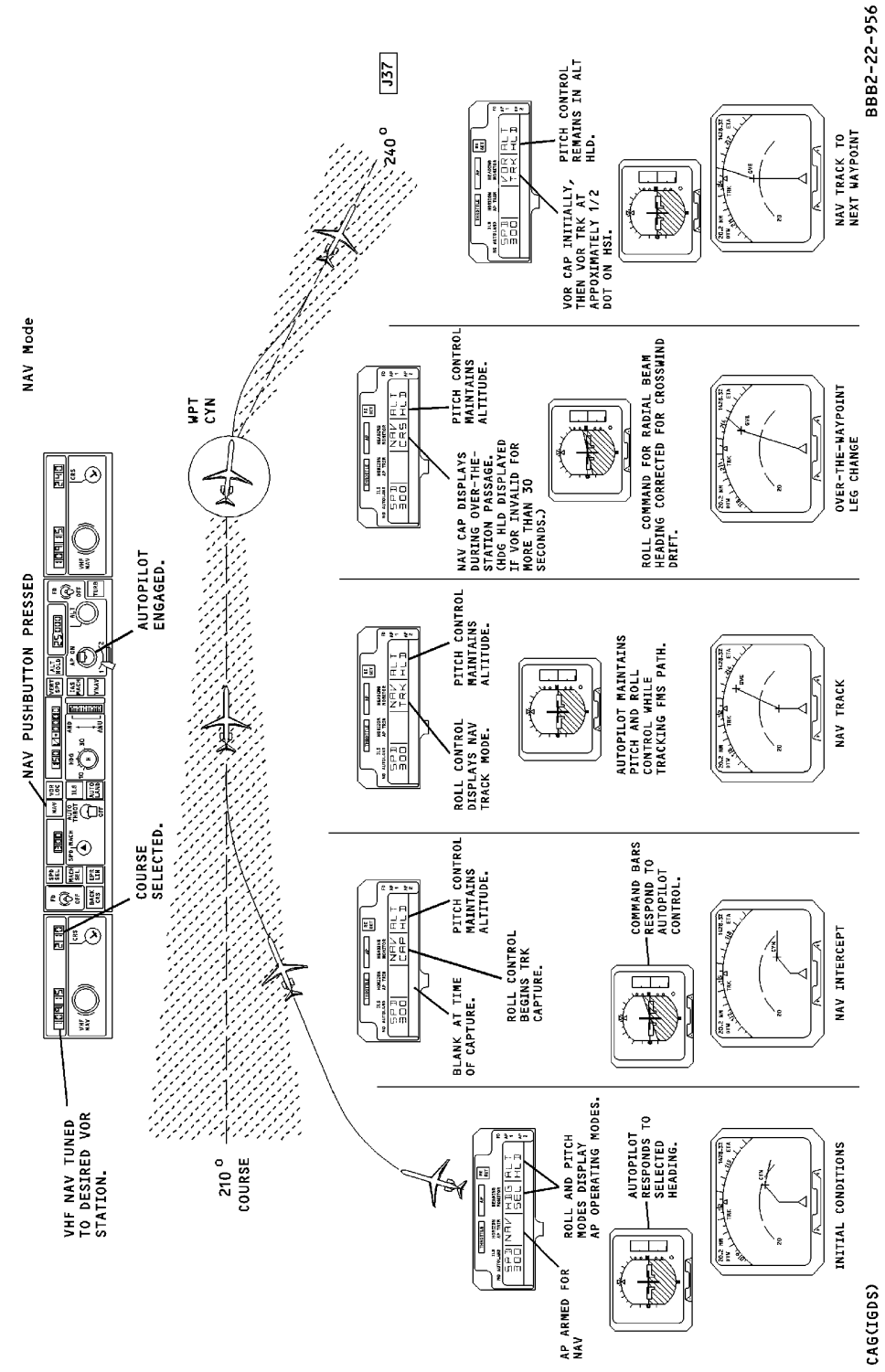
(16) Manually disengaging the autopilot as shown in step (14), the pitch and roll mode annunciators go blank. The pitch and roll command bars bias out of view in both the captain's and first officer's PFD's. The AP off warning lights come on red and flash, and aural warning tone will sound. The AP off warning and aural warning tone can be reset by pressing either control wheel disconnect button.



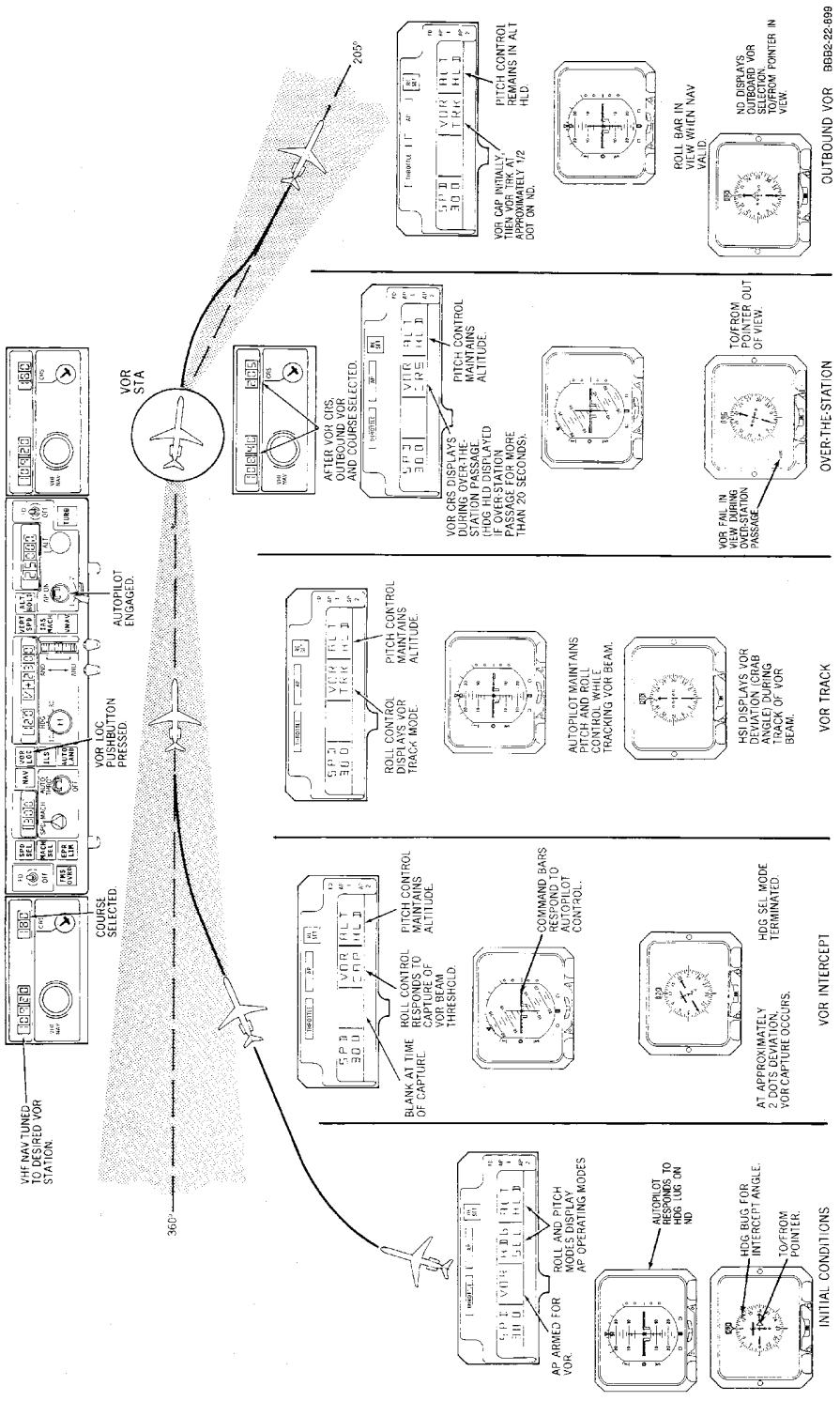
Takeoff - Mode of Operation
Figure 1/22-01-04-990-872



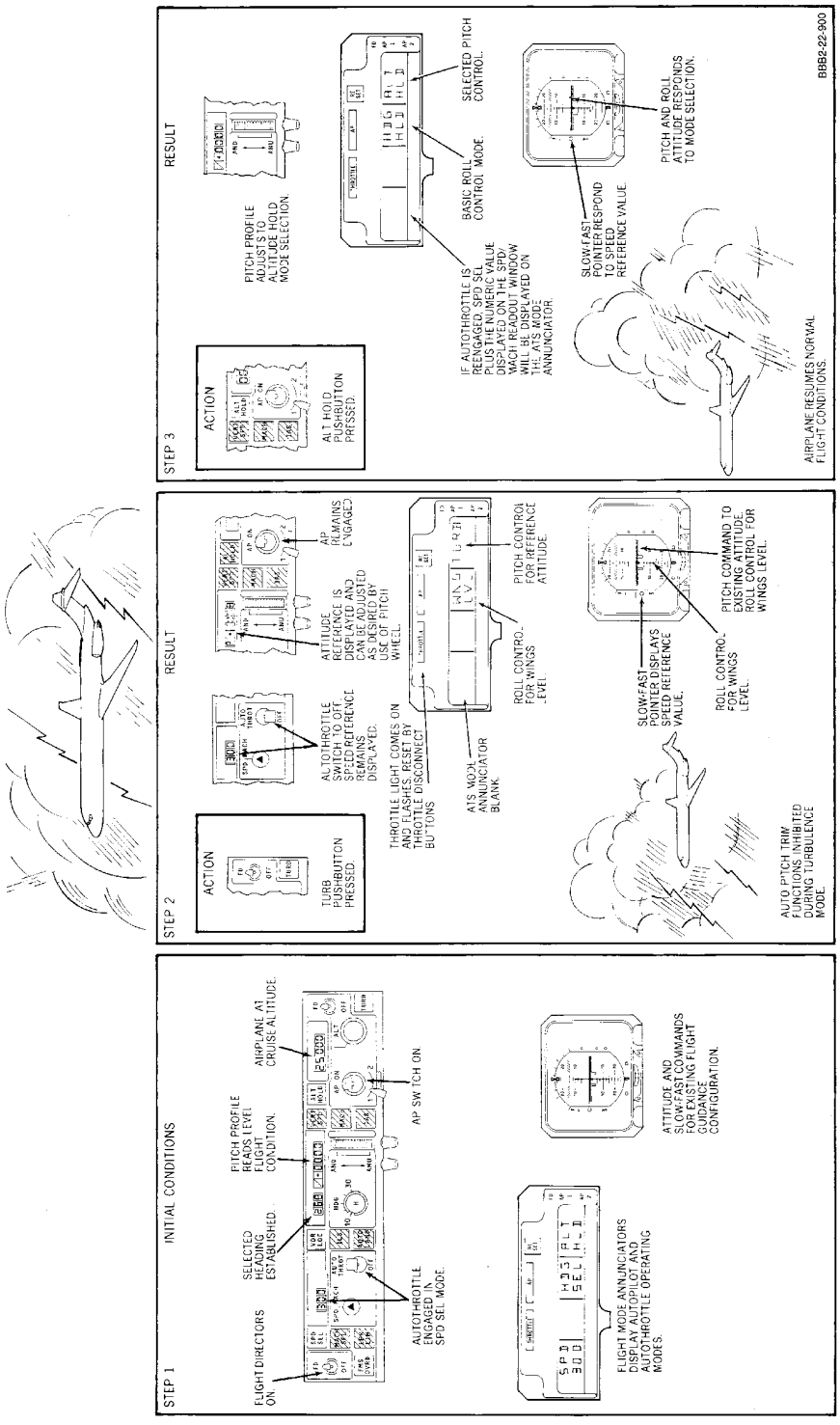
Altitude Preselect and Advisory - Mode of Operation
Figure 2/22-01-04-990-873



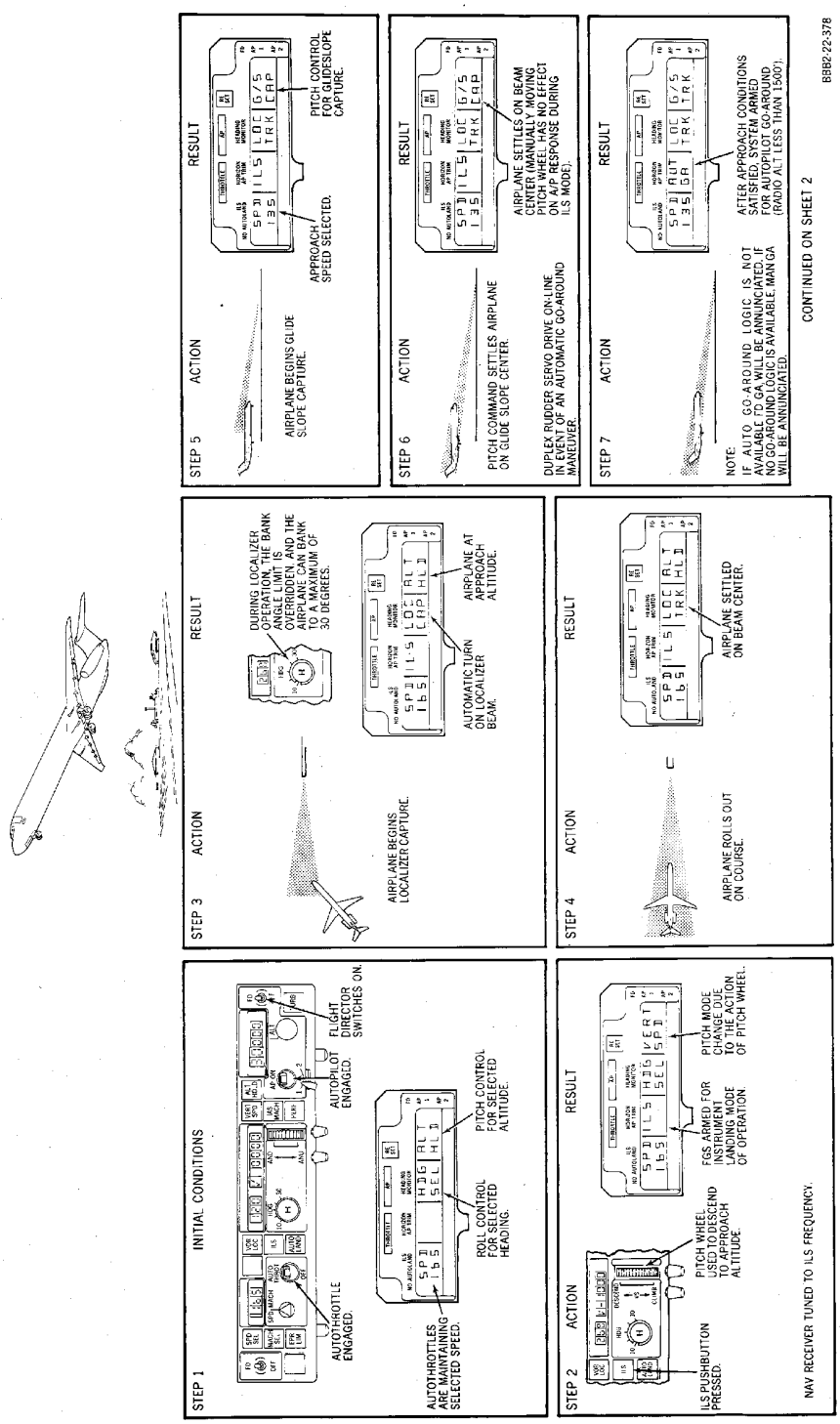
FMS - NAV Mode of Operation
Figure 3/22-01-04-990-874



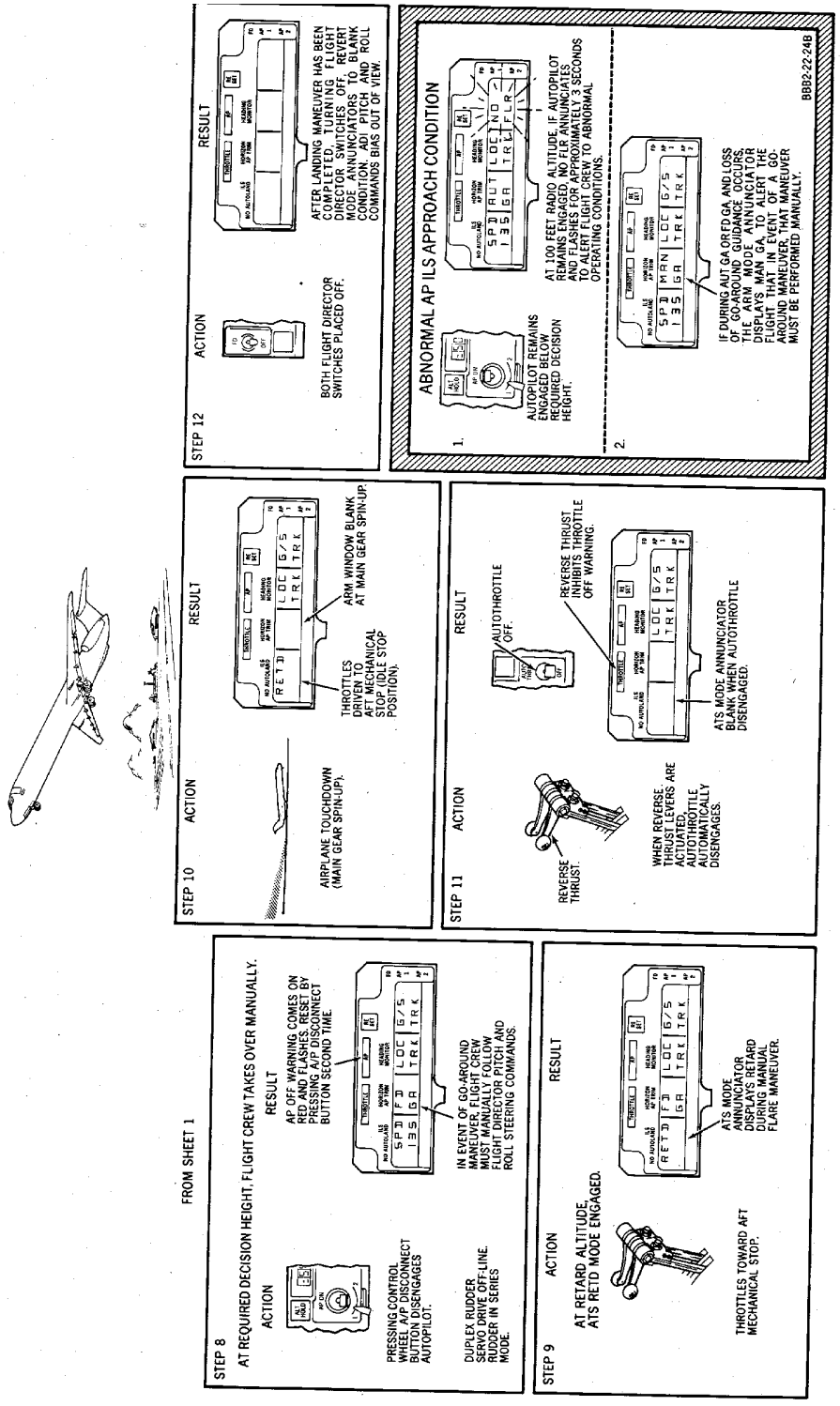
VHF Omni-Range - Mode Of Operation
Figure 4/22-01-04-990-875



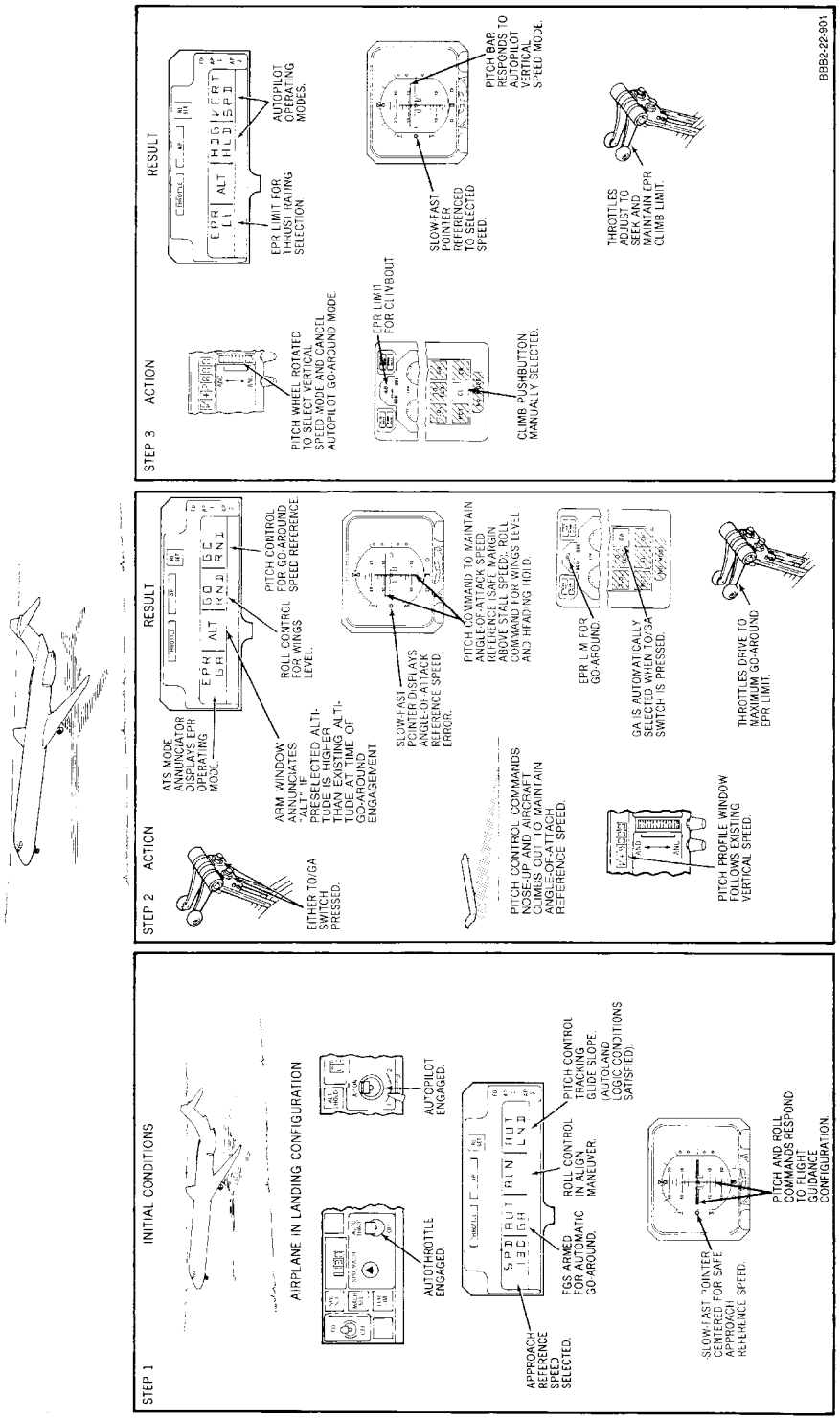
Turbulence Penetration - Mode Of Operation
Figure 5/22-01-04-990-876



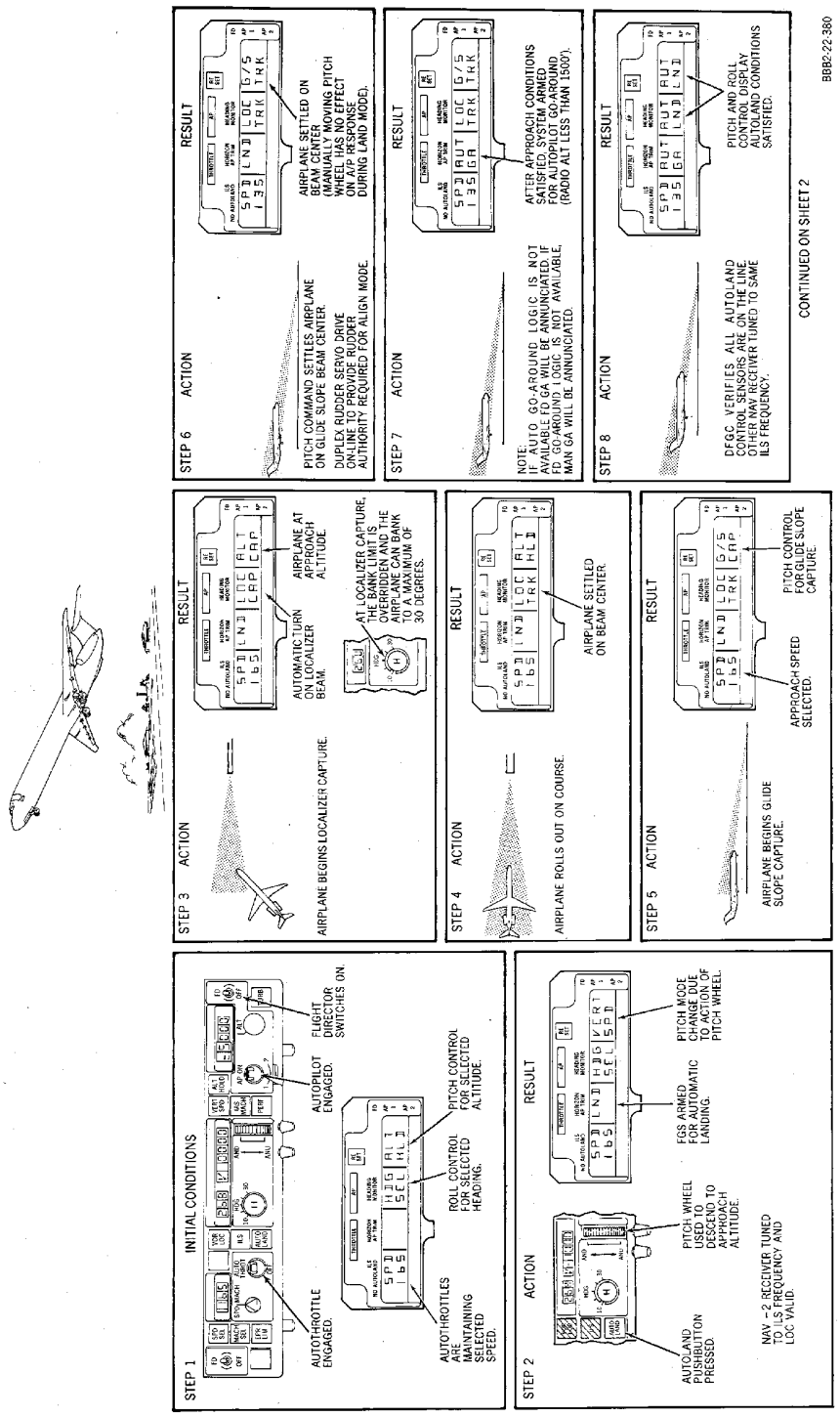
AP ILS Approach - Mode Of Operation
Figure 6/22-01-04-990-877 (Sheet 1 of 2)



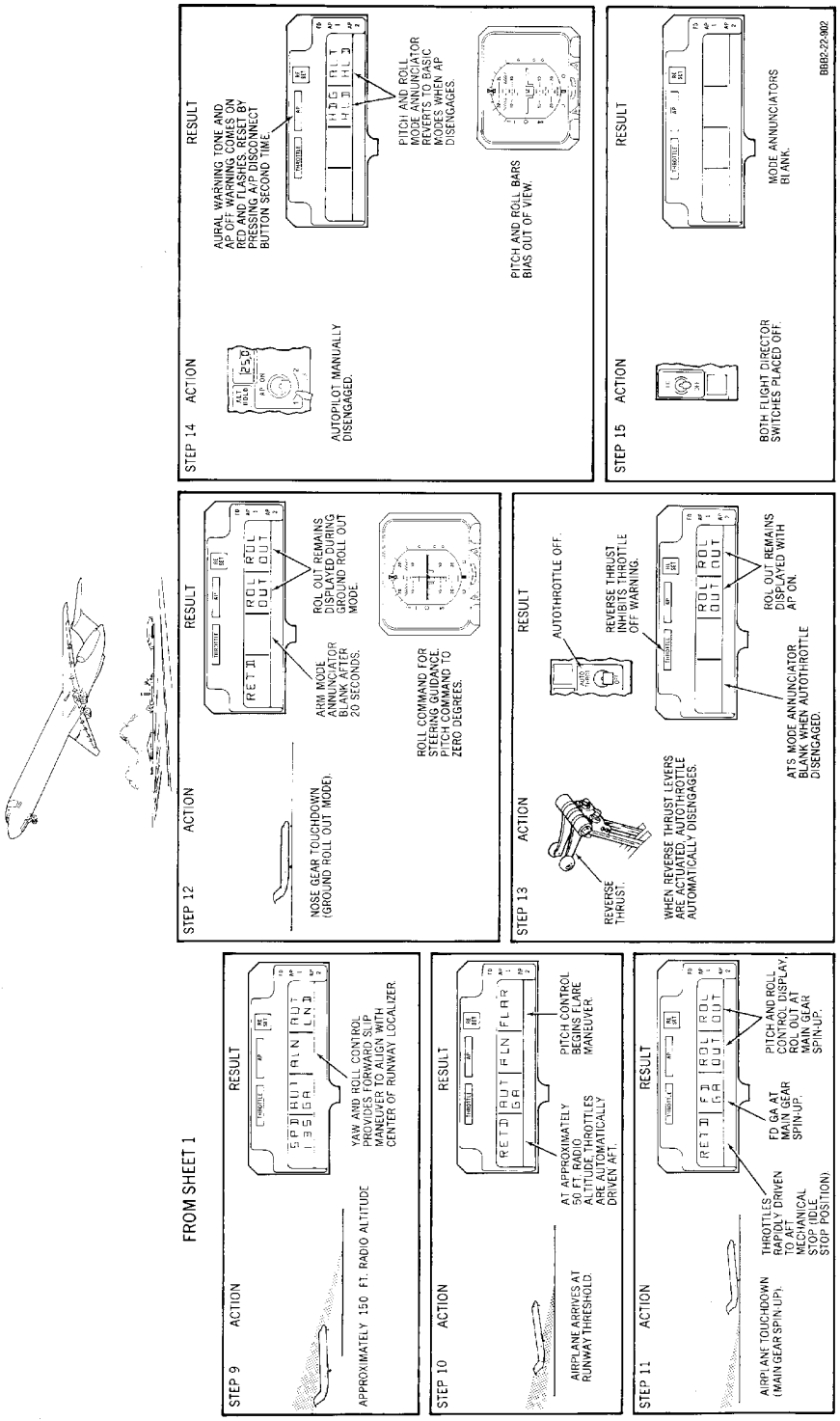
AP ILS Approach - Mode Of Operation
Figure 6/22-01-04-990-877 (Sheet 2 of 2)



Go-Around - Mode Of Operation
Figure 7/22-01-04-990-878



Autoland - Mode Of Operation
Figure 8/22-01-04-990-879 (Sheet 1 of 2)



Autoland - Mode Of Operation
Figure 8/22-01-04-990-879 (Sheet 2 of 2)

3. Windshear Alerting and Guidance System

A. General

The aircraft Windshear Alerting and Guidance System (WAGS) is designed to provide detection, alerting and guidance through hazardous windshear conditions. The system consists of a Windshear Computer (WSC) and associated interfacing systems. The windshear computer receives attitude, acceleration and other data from the Digital Flight Guidance Computers (DFGC). The WSC also receives air data from the Central Air Data Computers (CADC). The WSC uses this data from the DFGC's and CADC's to provide windshear alerting and guidance during windshear encounter.

When the CADC's and DFGC's provide data to the WSC, indicating an adverse wind condition, the WSC provides windshear guidance via DFGC to the Primary Flight Display (PFD). The WSC also interfaces with the Central Aural Warning System (CAWS) for windshear alerts and with the Digital Flight Data Acquisition Unit (DFDAU). In addition, under specified conditions, the WSC provides data that will inhibit the Ground Proximity Warning System (GPWS) and Post Stall Recovery System (PSRS).

(1) Indications and Guidance

When the WSC detects a windshear condition, it provides both audio and visual cockpit signals. A red windshear (decreasing performance windshear) warning or an amber windshear (increasing performance windshear) caution will be displayed on the glareshield and on the PFD when the WSC detects the appropriate windshear condition. The WSC also enables the CAWS to generate a warning tone and the windshear vocal message, TAILWIND SHEAR or HEADWIND SHEAR, as appropriate. The Flight Mode Annunciator (FMA) will display appropriate windshear annunciations.

The WSC provides pitch guidance commands for all windshear encounters during all takeoff and go around operations. Using data provided by both the DFGC's and CADC's, the WSC provides pitch guidance commands for the Flight Director (FD) and Auto Pilot (AP) through both DFGC's and will be displayed on the PFD.

A visual indication of the relationship between the aircraft angle of attack and the stick shaker angle of attack is provided by the Pitch Limit Indicator (PLI). The PLI will be displayed on the PFD whenever the WSC is operational and the IAS is 60 or greater and the aircraft is at or below 1500 feet AGL. If the slats are extended, the PLI will be displayed at any altitude. The PLI display intensity will increase when a windshear condition is detected.

During windshear guidance, the PFD slow/fast display is removed and will not reappear until the system reverts to DFGC operation.

The Post Stall Recovery System will be inhibited any time that the red warning windshear light on the glareshield is illuminated.

The WSC will also inhibit the GPWS indications whenever windshear encounter guidance is being provided and the aircraft is responding properly to the WSC commands. When the WSC commands are not being followed and ground proximity is detected by the GPWS, the warnings will be enabled.

(2) Windshear Encounter Guidance

The WSC provides guidance to achieve an energy conserving flight path which enhances the aerodynamic efficiency of the aircraft in a windshear encounter. When a decreasing performance windshear is detected and guidance is active and there is sufficient energy available, the WSC provides flight director and/or autopilot guidance to achieve and maintain an inertial flight path of plus 1.5 degrees. This fight path angle provides a near optimum energy conservation flight path through the windshear field while also providing a positive flight path through the air.

Above 450 feet radio altitude, this system will allow a zero or even slightly descending flight path in the presence of strong downdrafts in order to be more energy efficient when proximity to the ground is not a factor.

Below 450 feet radio altitude, when degraded energy no longer makes maintaining a positive flight path angle of plus 1.5 degrees possible, the windshear computer will guide to stick shaker angle of attack and loss of altitude will occur as necessary in order to prevent a stall.

When an increasing performance windshear is detected and guidance is active, the WSC provides energy absorbing flight director and/or autopilot guidance during takeoff and go-around. The WSC will command an inertial flight path angle of plus 1.5 degrees until the appropriate energy levels (airspeeds) are achieved. The WSC will then provide pitch guidance which maintains these enhanced energy levels.

For takeoff, this is a speed of V_2 + 30 KIAS. For a go-around, the speed is the go-around reference speed plus 20 KIAS. In the event of a microburst encounter, the greater the energy level of the aircraft when decreasing performance is encountered, the more survivable it is.

(3) Windshear Pop-Up Guidance

If the WSC detects a windshear and the flight directors are turned off, windshear guidance is still available. If the engine EPR is within 95 percent of the maximum go-around EPR limit, the flight directors will come into view and windshear guidance is automatic. If the EPR is not within 95 percent of the maximum go-around EPR limit, the pilot is required to press the TOGA button or manually advance the throttles to within 95 percent. Windshear pop-up guidance will continue until safe conditions are achieved (V_2 + 10 kts and 750 fpm climb for at least 30 seconds). Unless the Flight Director switch is placed to on after windshear encounter, the flight director commands will disappear.

(4) Windshear Guidance Reversion

During windshear guidance, the pilot may exit WSC commands by selecting a non-TOGA pitch mode on the Fight Guidance Control Panel (FGCP). WSC guidance may be re-selected by pressing the TOGA switches.

When the windshear condition no longer exists, all windshear detection annunciations cease. Windshear pitch and roll guidance will continue until safe conditions are achieved. Safe conditions are defined as a minimum of 750 fpm climb rate and attainment of the takeoff or go-around reference speeds minus 5 knots, for at least 15 seconds. At this time, the aircraft will revert to a normal takeoff (or whatever mode the system was in prior to the WSC action) mode automatically.

If, when windshear guidance occurred, the flight directors were turned off (windshear pop-up guidance), the FD commands will be displayed approximately 15 seconds after safe conditions have been met before disappearing.

B. Windshear System Operation

The windshear system provides detection and alerting information during the takeoff roll. The system provides detection, alerting, and guidance information during takeoff and go-around. The system may be checked for proper operation before takeoff.

(1) Windshear Test

When the aircraft is on the ground and airspeed is less than 30 KIAS, the windshear system and all of the associated aircraft components may be checked for proper response. The windshear eight second test is initiated by moving the switch to the momentary TEST position.

(2) Windshear Encounter During Takeoff Roll and Takeoff

Any time the aircraft is accelerated to 60 knots or more, the windshear system is enabled to detect and provide alerting to the presence of windshear. If a windshear is detected, the WSC will cause the alerts to be displayed on the glareshield, on the PFD's, in the Flight Mode Annunciator (FMA) pitch window and aurally through CAWS. Decreasing performance windshears always have annunciation priority over increasing performance windshears. (Figure 10) (Figure 11)

When either a decreasing or an increasing windshear is detected, the autothrottles will remain clamped and the EPR bugs and EPR limits move to maximum takeoff power and the Automatic Reserve Thrust (ART), if armed, will fire. For a flex takeoff, the autothrottles will unclamp, set maximum go-around thrust and reclamp.

NOTE: Autothrottle operation in windshear conditions is not compatible with ART operation. If the autothrottles are enabled to set maximum go-around thrust, the ART system must be disabled. If normal ART operation is desired, then the autothrottles must automatically disconnect when windshear guidance is initiated. This feature is available only if the "Automatic Autothrottle Disengage" option had been selected and is operational.

The FMA autothrottle, arm, roll and pitch windows will reflect the change in WAGS system modes. For a decreasing performance windshear, the roll and pitch mode windows will flash "HDG HLD" and "WIND SHR" simultaneously five times. For an increasing performance windshear, the roll window will remain unchanged and the pitch window will flash "WIND SHR" five times. The arm window blanks the altitude display during windshear conditions. After the roll and pitch window annunciations flash, the annunciations will remain steady.

If an EPR cutback has been made, transition to windshear guidance is automatic. If a takeoff is made without the FD in T/O mode, then either a TOGA press or advance of the throttles to at least 95 percent of go-around EPR is required to get windshear guidance.

If a windshear is detected, the windshear warning or caution annunciations will flash three times then remain steady. The CAWS activates an aural warning of three cycles of "TAILWIND SHEAR" or "HEADWIND SHEAR". If a windshear warning has been annunciated, a second warning will not be annunciated unless a caution had been annunciated since the warning. If the first annunciation was a caution, another caution will not be annunciated unless a warning occurs first.

If a windshear is detected prior to V_1, and a takeoff abort is initiated and the throttles are retarded to the aft stops, the windshear annunciation will be cancelled. If a windshear is detected after V_1, and the takeoff is continued, the WSC will provide windshear guidance after nose oleo extension. Prior to nose oleo extension, the flight director bars will be positioned at 12 degrees nose-up.

(3) Windshear Encounter on Approach or Go-around Upon windshear detection, the windshear aural and visual alerts are similar to takeoff. In addition, either "AUT W/S" or "F/D W/S" will be displayed in the FMA arm window. "F/D W/S" displayed in the arm window means that a sensor failure has been isolated by the WSC and only Flight Director guidance is available. When "AUT W/S" is displayed, autopilot guidance is available. (Figure 15)

The TRP (Thrust Rating Panel) will be switched to go-around (G/A) if not already in go-around. WND SHR will be displayed in the FMA throttle window indicating that the autothrottle approach speed reference has been changed to 1.3 Vs + 20 kts. This feature enhances the energy level of the aircraft during windshear conditions. When windshear conditions no longer exist this speed bias will revert to selected approach speed at a rate of one-half knot per second. During this revisionary mode, the autothrottle window displays "ALFA SPD".

WSC guidance is not activated during the approach mode unless the TOGA button is pressed or either engine EPR is within 95 percent of the go-around EPR limit.

Once WSC guidance is activated, the FMA will annunciate the pitch and roll mode changes similar to a windshear encounter during takeoff. The autothrottles will set go-around thrust. Windshear guidance continues until the windshear is no longer present and safe conditions have been met. The DGFC will then revert to normal go-around.

If a windshear is detected after a go-around has been initiated, the aural and visual alerts will be activated and WSC guidance will be initiated automatically the same as during takeoff. DGFC reversion is the same as during takeoff.

C. Windshear System Options

The following describes various windshear system options that, if incorporated, will effect the system operation.

(1) Takeoff Roll Windshear Detection Inhibit

This option inhibits all windshear detection during the takeoff roll. Windshear detection then becomes active only when the nose oleo strut extends or main gear liftoff is sensed.

(2) Takeoff Roll Increasing Performance Windshear Aural Annunciation Inhibit

This option inhibits the aural (tone and voice) caution alert caused by an increasing performance shear during the takeoff ground roll. The amber light caution alert annunciation will remain active. All detection annunciations (aural and visual) remain fully active for decreasing performance windshears.

(3) Takeoff/Go-Around Increasing Performance Windshear Aural Annunciation Inhibit

This option inhibits the aural (tone and voice) caution alert caused by an increasing performance shear during the takeoff/go-around (in flight). The amber light caution alert annunciation will remain active. All detection annunciations (aural and visual) remain fully active for decreasing performance windshears.

(4) Approach Increasing Performance Shear Aural Annunication Inhibit

This option inhibits the aural (tone and voice) caution alert caused by an increasing performance shear annunciation during the approach. The amber light increasing performance caution alert annunciation will remain active. All detection annunciations (aural and visual) remain fully active for decreasing performance windshears.

(5) Alternate Windshear Voice Detection Alert

This option provides for "WINDSHEAR" as the voice warning for both decreasing and increasing performance shears. This annunciation would be used instead of the "TAILWIND SHEAR" annunciation (decreasing performance windshear) and "HEADWIND SHEAR" (for increasing performance windshear).

(6) Slow/Fast Display During Windshear Guidance

Slow-fast information will be displayed on both the Captain's and First Officer's PFD during windshear guidance. The center mark of the PFD slow/fast indicator displays either the takeoff (normally, V_2 + 10 kts) or go-around reference speeds, as appropriate. The fast mark represents the center reference speed plus 20 KIAS. The slow mark represents the stick-shaker angle of attack.

The Pitch Limit Indicator (PLI) shaker margin symbol remains in view and provides the primary indication of angle of attack margin to stick shaker.

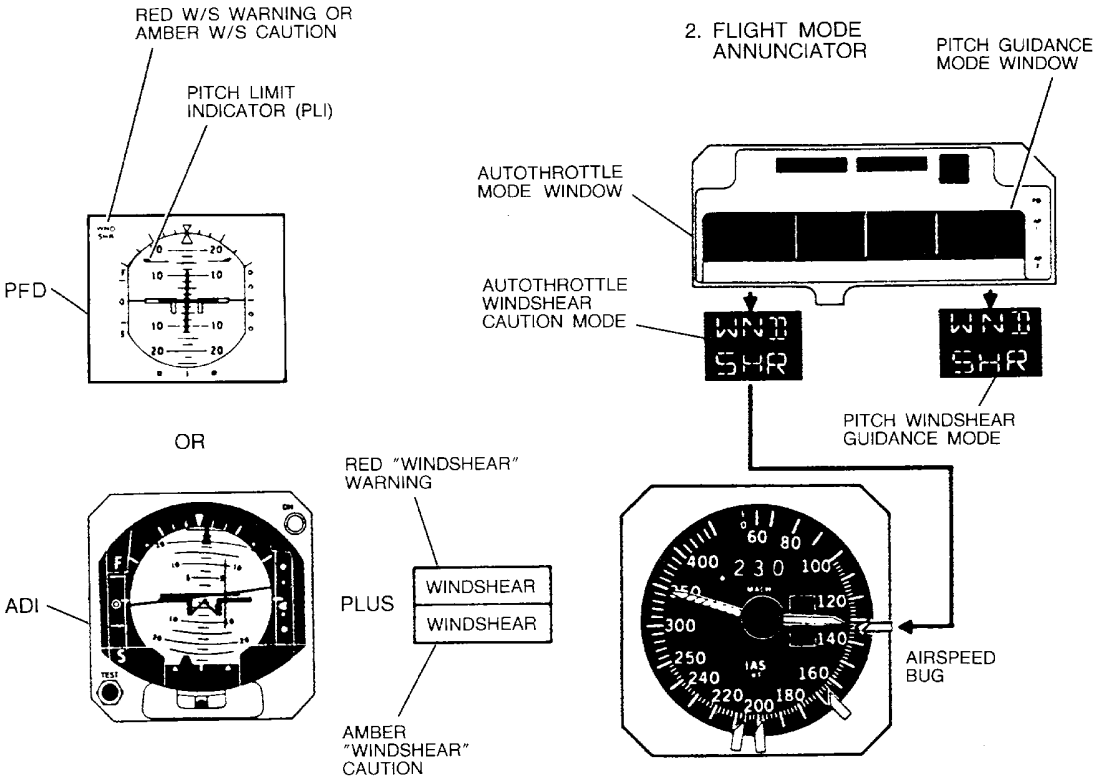
This option is applicable only to aircraft with EFIS displays.

(7) Automatic Autothrottle Disengage

This option provides for automatic autothrottle disconnect whenever windshear guidance is in effect.

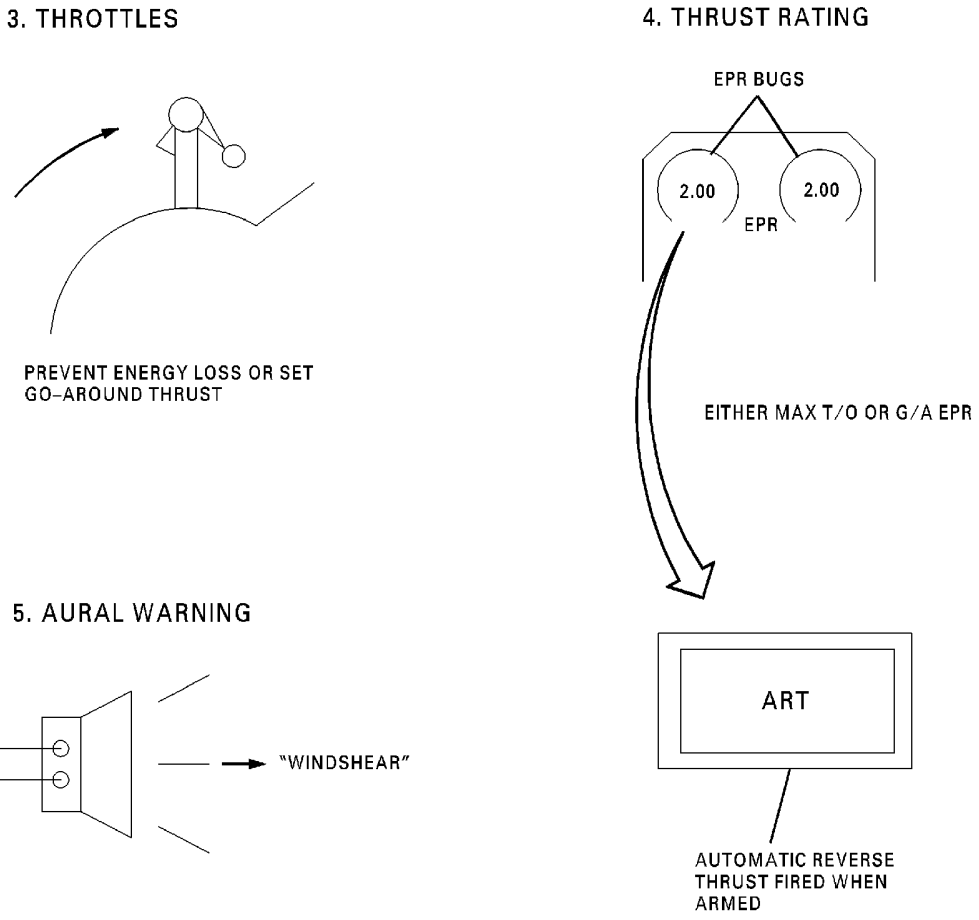
(8) Windshear Guidance Inhibit

This option provides for windshear detection and alerting only. All other windshear functions, such as flight director or autopilot guidance, autothrottle and thrust rating functions, PLI, etc., are disabled.

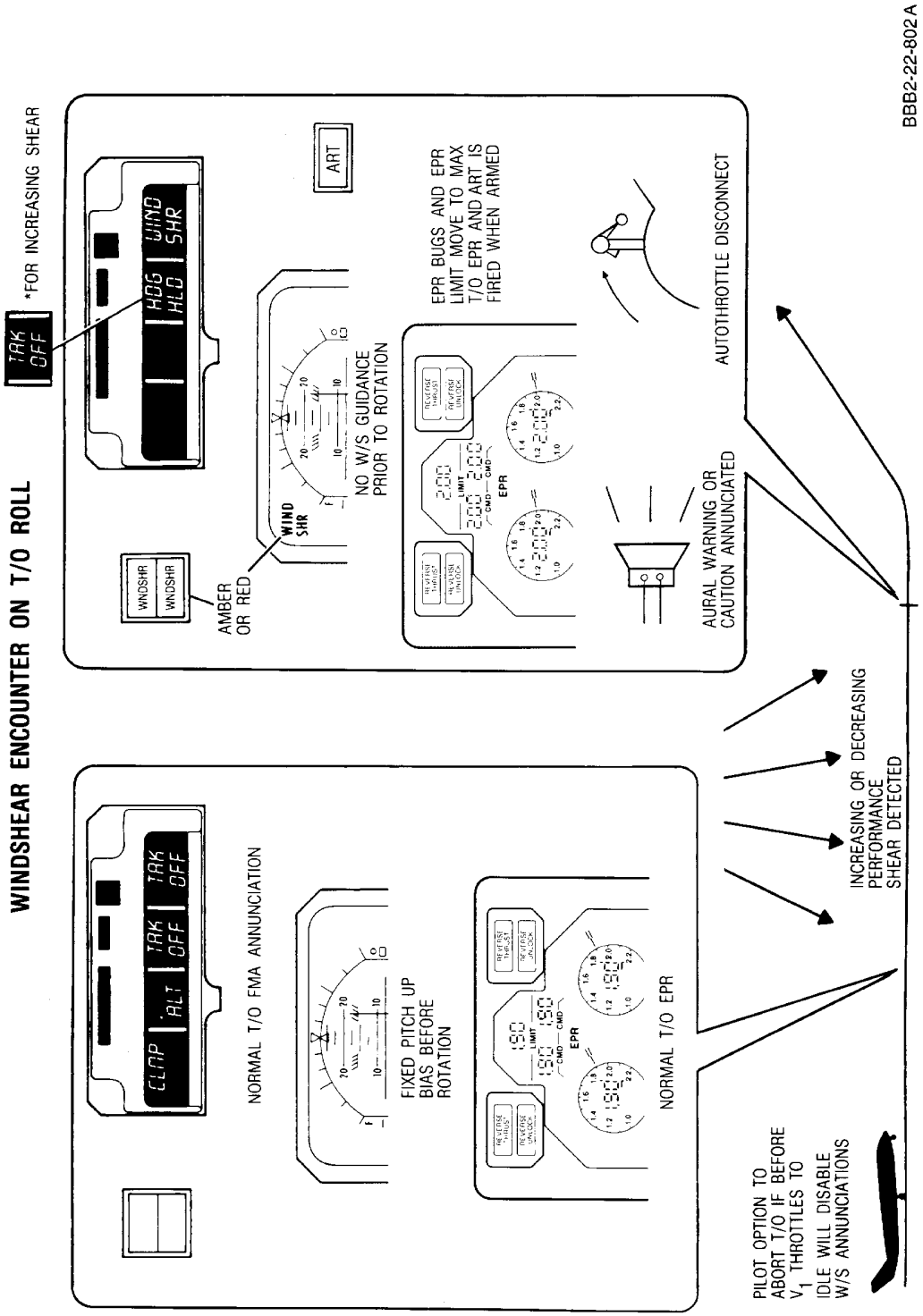


BBB2-22-800A

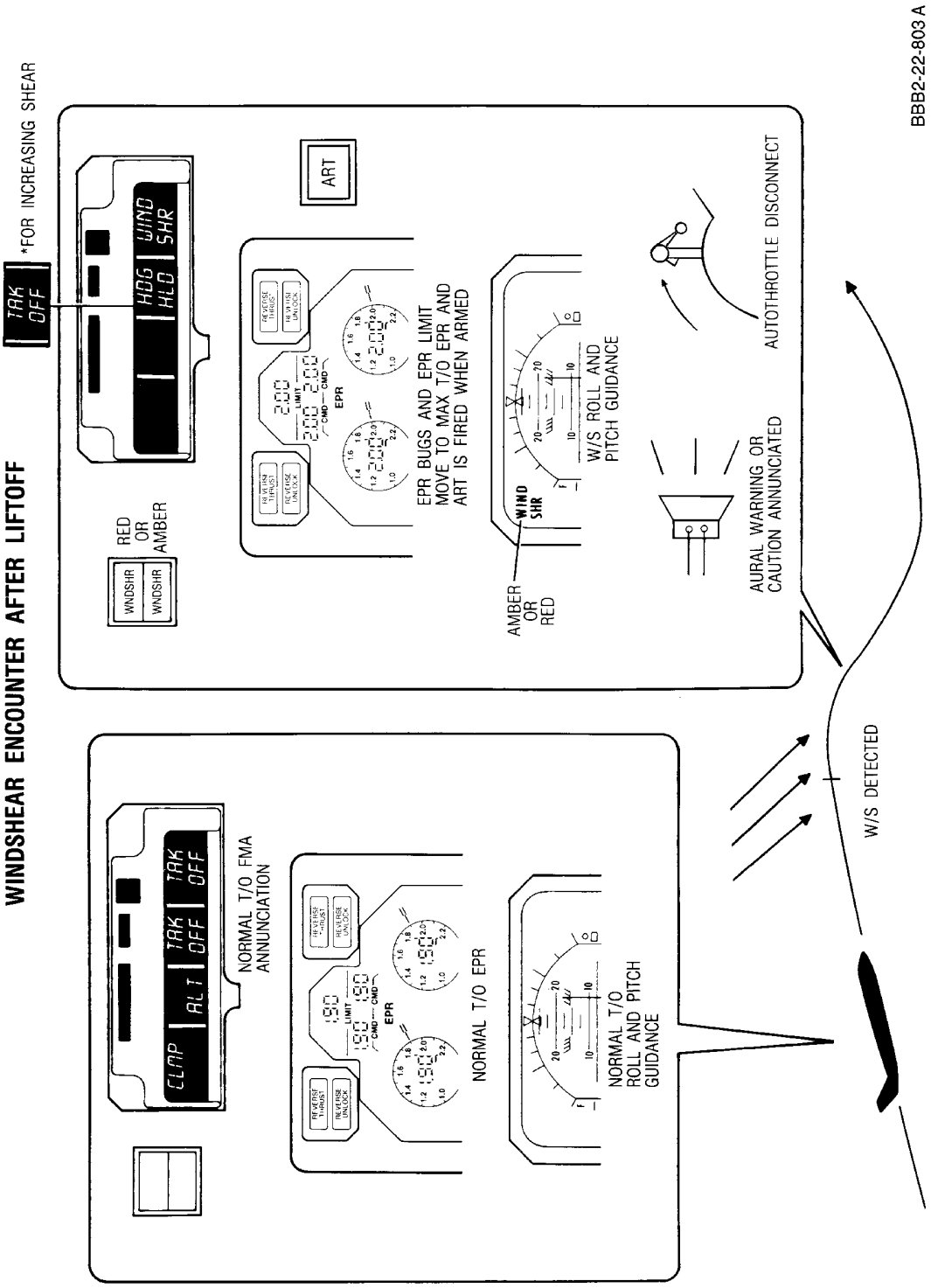
Flight Compartment Displays/Controls
Figure 9/22-01-04-990-880 (Sheet 1 of 2)



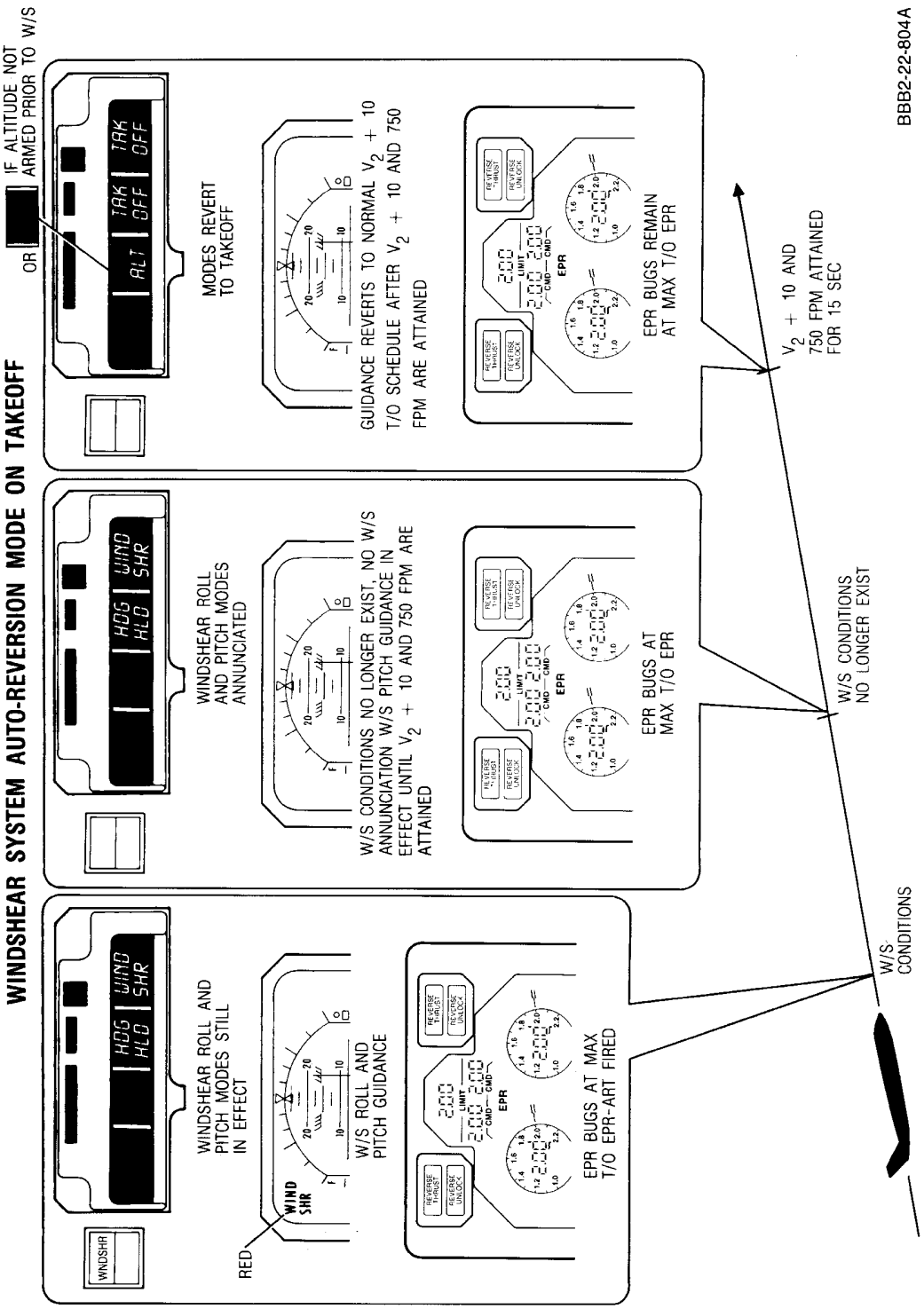
Flight Compartment Displays/Controls
Figure 9/22-01-04-990-880 (Sheet 2 of 2)



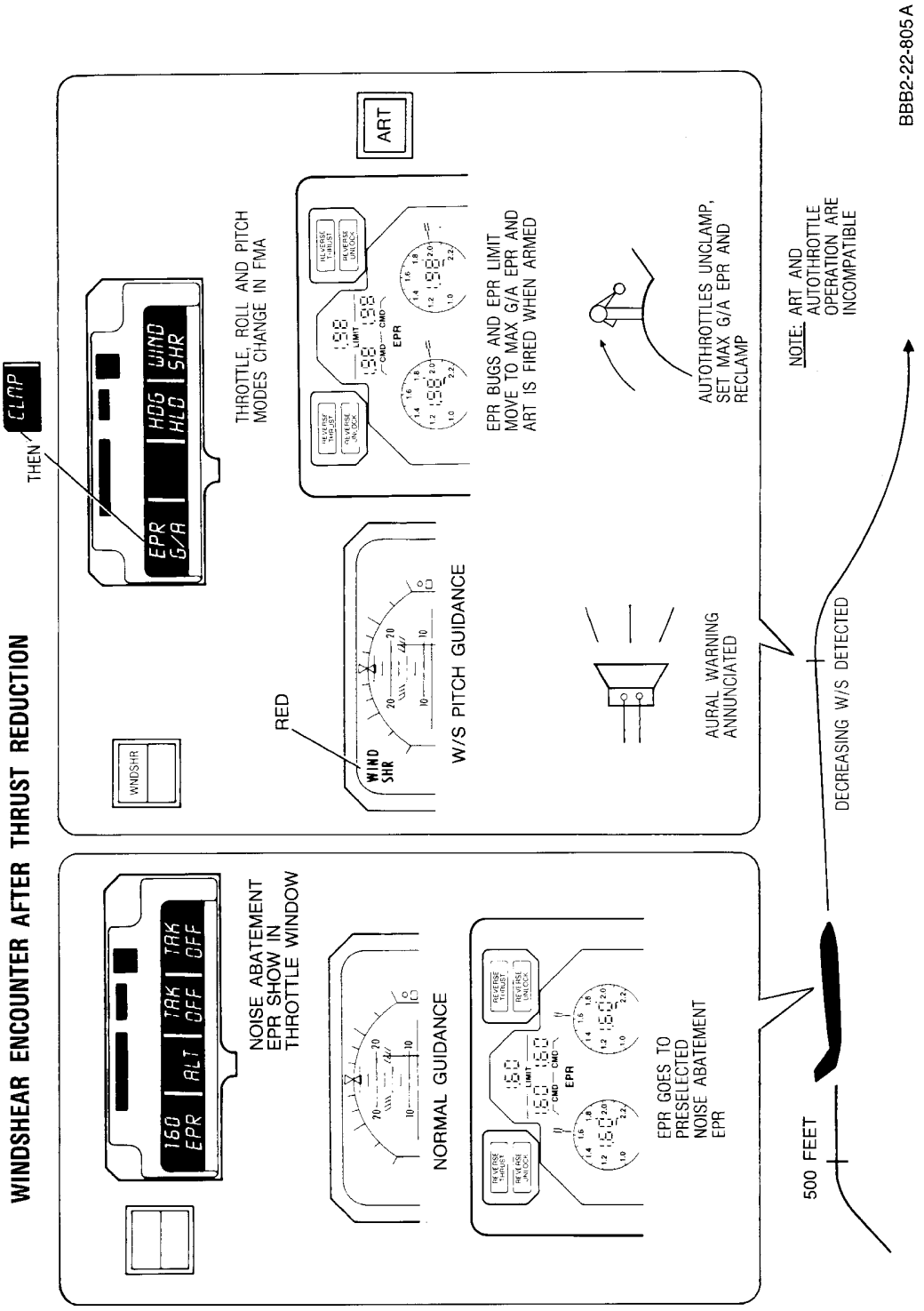
Windshear Encounter on Takeoff Roll
Figure 10/22-01-04-990-881



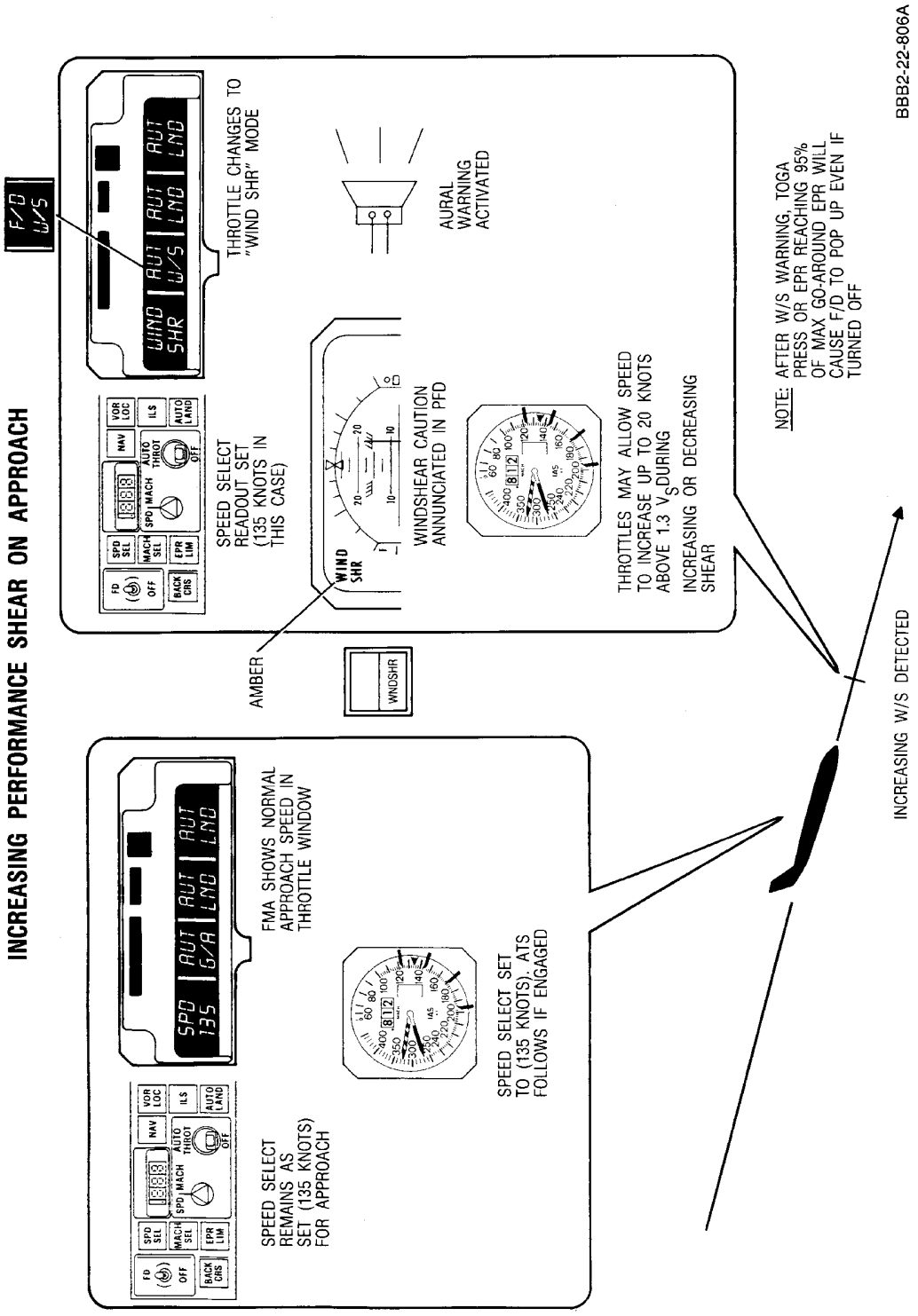
Windshear Encounter After Takeoff Roll
Figure 11/22-01-04-990-882



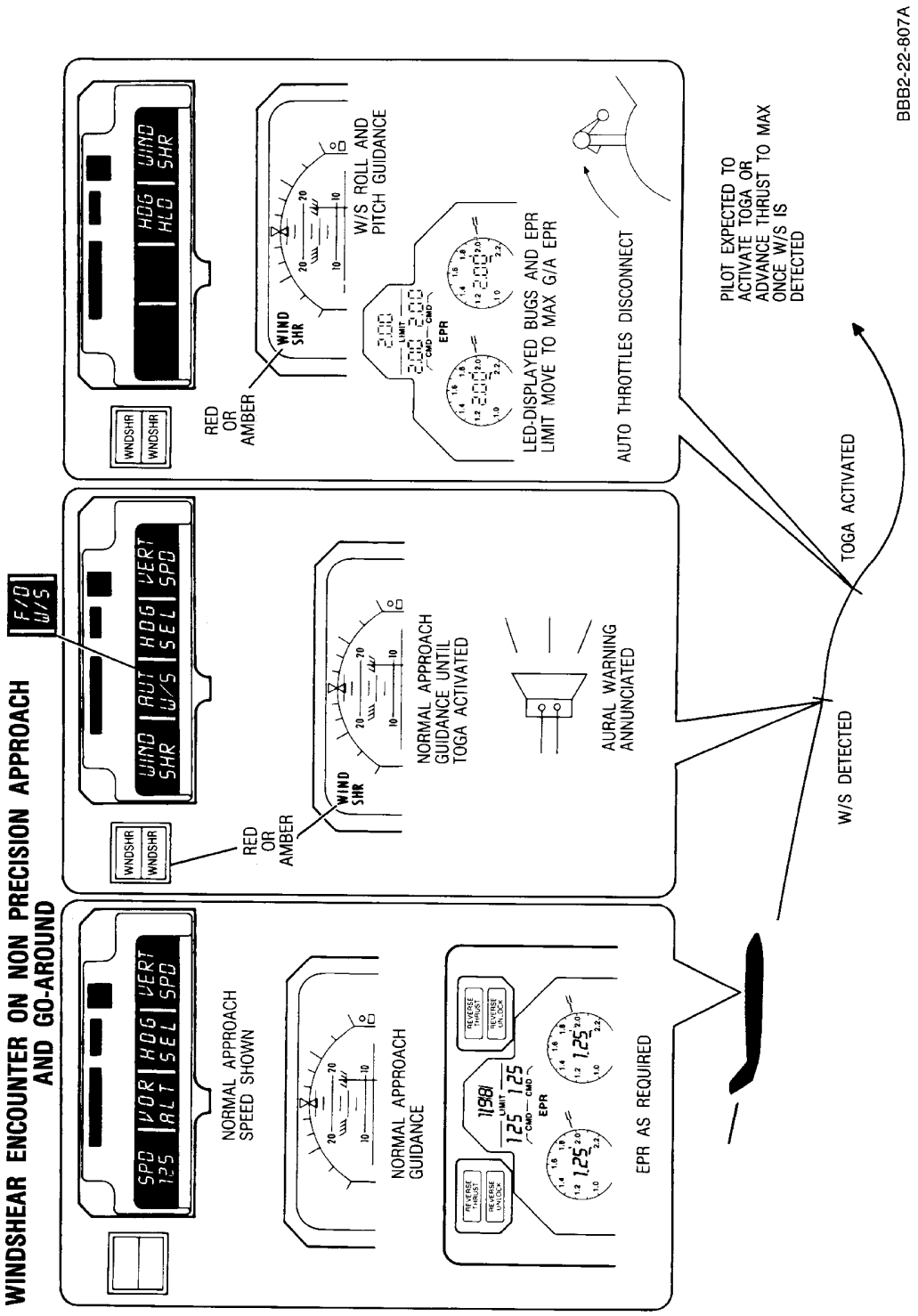
Windshear System Auto-Reversion Mode on Takeoff
Figure 12/22-01-04-990-883



Windshear Encounter After Thrust Reduction
Figure 13/22-01-04-990-884



Moderate Increasing Performance Shear On Approach
Figure 14/22-01-04-990-885



Windshear Encounter on Approach and Go-Around
Figure 15/22-01-04-990-886

DFGS STATUS/TEST (STP) PANEL - DESCRIPTION AND OPERATION

1. General

A. The DFGS Status/Test (STP) panel is located beneath the captain's briefcase compartment. The STP has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The STP provides the operator with a display of English language commands, questions, and failures.

B. The STP displays 32 alphanumeric characters. The message readout window allows two lines, each consisting of 16 characters. During use of the STP, standardized abbreviations are used in some cases due to the limited space available on the readout window. These abbreviations will be explained in the Maintenance Practices portion of this section.

C. BIT provides Three modes of testing available to the STP. Continuous BIT, System Maintenance BIT, and Return to Service (RTS) BIT.

D. The Autoland Preflight Test is also discussed in this section. The Autoland Preflight Test does not require the use of the STP, however, a failure during this test will be displayed on the STP.

E. Figure 1, illustrates the functional use of the STP. Personnel should be familiar with the operation of the STP, prior to performing any test procedures.

2. Description

A. BIT Modes

(1) Continuous BIT (Flight Fault Review)

(a) Continuous BIT automatically begins operation with application of power to the DFGC. Continuous BIT does not interfere with the normal operation of the DFGS, and does not require any operator participation. Continuous BIT provides failure detection capable of:

1) Detecting failures in DFGS components, as well as input power to the DFGC, sensor outputs associated with the DFGS, and electro-mechanical actuators.

2) Isolating failures to the greatest extent possible.

3) Providing failure information to the STP.

(b) Continuous BIT monitors DFGC operation, all input valids, all dual inputs, makes reasonableness checks on inputs, and end-around checks on outputs. The duplex servo drives are also being continuously monitored. During flight any faults detected by Continuous BIT affecting autoland capability, will illuminate the NO AUTOLAND annunciations on both FMA's.

(c) Faults will be logged into the BIT memory within the DFGC, only after the airplane is in the flight mode. This prevents nuisance fault logging when the airplane is in the terminal area or during taxi maneuvers. During flight, failures are logged in a non-volatile memory within the DFGC for subsequent recall on the STP, by ground maintenance personnel as "FLIGHT FAULT REVIEW?".

(2) System Maintenance BIT

(a) System Maintenance BIT is a command-response type test requiring operator participation to perform specific actions. System Maintenance BIT is the most comprehensive of the three tests. This test is normally used after major airplane maintenance action has been performed affecting the DFGS (i.e. wiring rework between any of the major LRU's) or performing specific tests when necessary. Each system (DFGC-1 or DFGC-2) test is run separately, and can only be performed when the airplane is in the "on ground" condition. Hydraulic power should be applied to the airplane to make the test complete as possible.

(b) System Maintenance BIT tests all DFGS display information in the flight compartment including lights, flags, and aural devices. Testing/or position of all flight crew selectable inputs including flaps, slats, pushbuttons, course selections, heading selections and switches. In addition, the operator will be able to check the values of input sensors and deviation comparisons on sensors. There are also automatic checks of system nulls, discretes, sensor response, servo response in the synchronized condition, and trim systems.

(3) Return to Service (RTS) BIT

(a) The Return to Service (RTS) BIT provides maximum possible assurance that after repair action (i.e. LRU replacement), the airplane can be put back into a non-restricted (including autoland) service. RTS requires minimal test set-up procedures and minimal operator action. RTS can only be performed when the airplane is in the "on ground" condition.

(b) RTS will automatically run to completion within approximately 5 minutes. If RTS is successful, "GO" will be displayed on the STP. If a failure occurs, "NO GO - SYSTEM AFFECTED?" will be displayed. Pressing the VERIFY pushbutton, will display one of the following conditions:

Table 1

"DFGC" -	Digital Flight Guidance Computer
"NO AUTOLAND"	
"AP/FD" -	Autopilot/Flight Director
"A/T" -	Autothrottle
"S/C" -	Speed Control
"ART" -	Automatic Reserve Thrust
"TRC" -	Thrust Rating Computations
"M/T" -	Mach Trim
"Y/D" -	Yaw Damper
NOTE: If a system is listed it does not necessarily mean the system is entirely inoperative, only that for some period the DFGC detected a problem within the system. FAILURE RECAP? should be checked to find out what exactly failed the RETURN TO SERVICE test. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)	
NOTE: During RTS test, verify nosewheel area is clear of personnel and equipment. Nosewheel may turn when the rudder is being tested.	

(4) Autoland Preflight Test

(a) The Autoland Preflight Test operates only when the airplane is in the "on ground" condition, both NAV receivers tuned to an ILS frequency, STP switched to OFF and the AUTO LAND pushbutton on the Flight Guidance Control panel has been pressed.

(b) The captain's and first officer's FMA's will display AUTO LND/PRE/FLT/TEST, when the test is initiated, and go blank when the test is completed. If a failure is detected, or Continuous BIT detects a failure, the NO AUTOLAND legend will appear on both FMA's. Failures in the Autoland Availability Preflight BIT can be duplicated on the STP in RTS or Maintenance Test by ground maintenance personnel.

(5) DFGC Automatic Post Flight Test

(a) An Automatic Post Flight Test is initiated approximately two minutes and twenty seconds after the transition from on air condition to on ground condition. The test shuts down the DFGC's for approximately 5 to 10 seconds. This is evidenced by the Flight Guidance Control Panel digital displays going blank, and associated command bars removed from view. PWR UP TST BOX1 or 2 will flash on flight mode annunciators and the status test panel CMPVLD light goes blank for associated DFGC under test.

(b) Failure of Post Flight Test will normally result in either the PWR UP TST BOX1 or BOX 2 message being permanently displayed on FMA's associated with DFGC that failed or an apparently dead (off-line) DFGC.

(c) On aircraft with -971 DFGCs installed, the failure message is FAIL PWR TST BOX1 or 2 with additional diagnostics to help determine the cause of the failure.

Table 2

Diagnostic	Failure
28 VDC	Left or Right 28VDC
26 VAC LEFT	26 VAC switched "A"
26 VAC RIGHT	26 VAC switched "B"
26 VAC REF	26 VAC Left Reference and 26 VAC Right Reference.

(d) The following conditions must be met before the Automatic DFGC Post Flight Test is initiated.

1) Airspeed less than 60 knots
2) Autopilot disengaged
3) Autothrottle disengaged
4) On ground for at least two minutes and 20 seconds
5) EPR below 1.1 EPR
6) Not in TAKEOFF mode
7) Not in Maintenance or Return to Service Test

NOTE: Post Flight Test may appear to initiate at different times because not all above conditions were met. For example, if aircraft taxis with more power (EPR above 1.1) than normal. Also, any time DFGC 115VAC power is interrupted or landing simulation by cycling the Ground Control Relay circuit breakers, will initialize Post Flight Test.

B. STP Message Generation

(1) The DFGC provides message generation to the STP. The output messages are designated as ASCII messages that are generated by a STP Drive Module (S/W) and a raw buffer (MSGCOD). There are 32 locations in the MSGCOD buffer to provide the 32 character positions on the STP (2 lines of 16 characters). Each location in the buffer contains data in one of the following forms.

Table 3

BIT	17	16	15	14	13	12	11	10	09
MSG	0	X	X	X	X	X	X	0	0
WORD	0	X	X	X	X	X	X	0	1

Table 3 (Continued)

CHAR	0	X	X	X	X	X	X	1	0
LINE	0	0	0	0	0	0	0	0	0
END	1	X	X	X	X	X	X	X	X
BIT	08	07	06	05	04	03	02	01	00
MSG	L	9 BIT CODE							G
WORD	L	9 BIT CODE							G
CHAR	X	X	X	L	6 BIT ASCII				G
LINE	1	1	1	1	1	1	1	1	1
END	X	X	X	X	X	X	X	X	X
* L means Less than									
** G means Greater than									

(2) The nine bit word codes are indices which refer to locations in ROM containing packed ASCII codes. The packed codes contain three letters/ROM location. The nine bit message codes are indices referring to ROM locations containing nine bit word codes packed two/ROM location. The character codes are ASCII codes. The word codes 0-077 are reserved for single letter ASCII words and differ from character codes as follows.

(3) Message buffer (MSGCOD) decoding into an ASCII output to the STP proceeds sequentially through the buffer input. Each code is translated as it is encountered. Message codes are translated to word codes then ASCII. The following rules also apply.

(a) Any combination of the above codes may be used to develop a message.

(b) A message requiring more than 32 characters is truncated.

(c) Words are not broken between two lines. If this causes more than 32 character positions, the extra characters will be truncated.

(d) Each word code results in an added space except at the end of a line.

(e) The first 077 (octal) word codes are taken as ASCII characters (with a following space).

(f) Stored ASCII text words do not contain spaces (spaces are ignored).

(g) This routine stores "END" codes in the MSGCOD buffer after is decoded.

(4) As indicated above, message generation terminates with the generation of the 32nd character or with an end of line code. The ASCII buffer is then serially shipped to the STP, resulting in message display.

C. STP Features

(1) The following features are provided to the operator for ease and simplicity while using the STP.

(a) All messages are completely spelled out whenever possible. Standardized abbreviations are used only when necessary.

(b) Operator instructions and all annunciations are as specific as possible.

(c) Operation of the STP is standardized, so that a given response has a consistent meaning throughout the testing sequence.

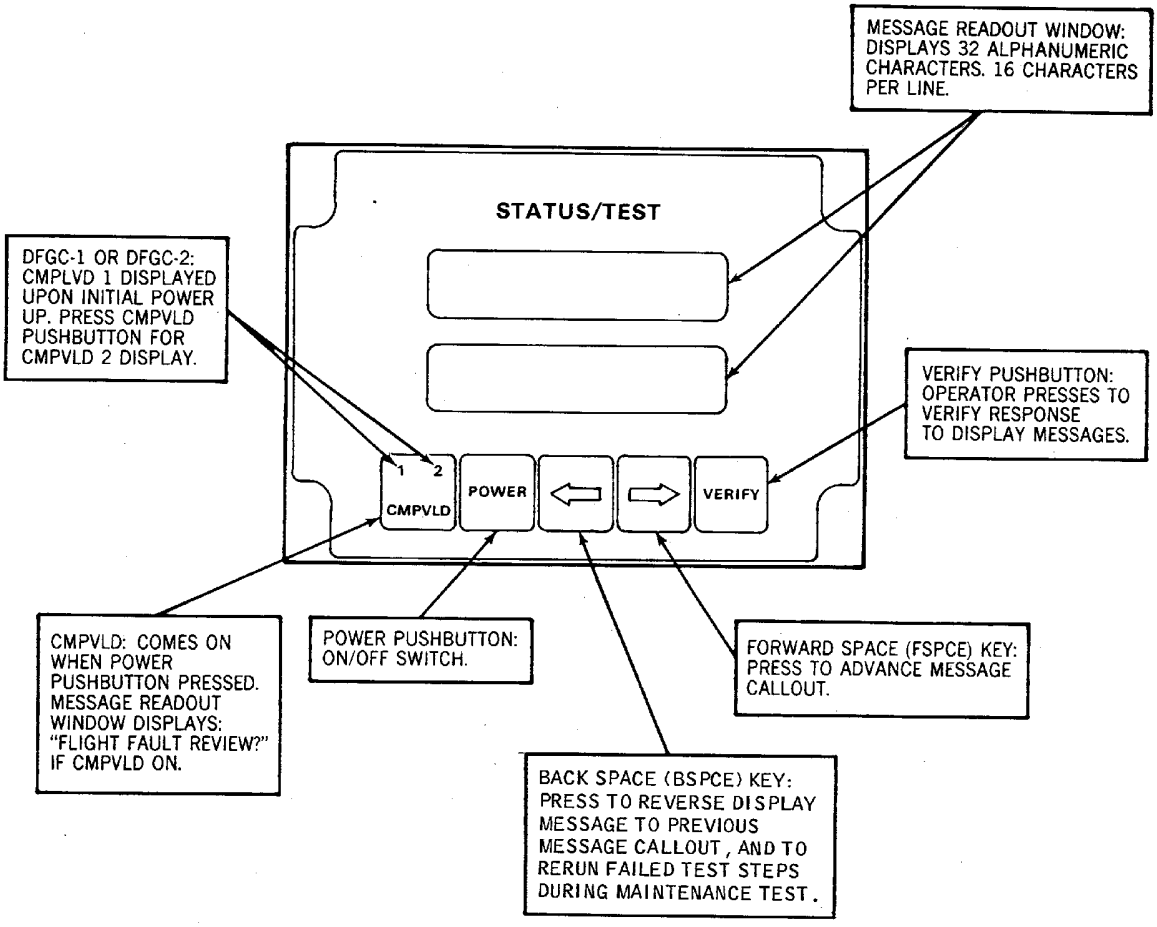
(d) Tests are organized into sections that may be bypassed in order to reduce access time for any specific test. (Mnt test only)

(e) Sequence and test repetition features are provided to improve testing flexability.

(f) A failure mode is easily distinguished from a test mode by the fact that the word FAILURE is always contained in English language message.

D. STP Self-Test

(1) The STP self-test is provided to assure the operator that the STP is functional prior to Maintenance test initiation. All keys are checked and appropriate message displays are verified. This test requires operators response to verify the various keys and display messages.



Status/Test (STP) Panel Figure 1
Figure 1/22-01-05-990-801

3. Operation

A. STP Operating Features

(1) Upon initial power up of the STP, a sequence query is issued, the operator may then proceed or bypass the group of tests. For example, if the STP message reads "FLIGHT FAULT REVIEW?", and the operator does not wish to run the tests, the operator would then press the Forward Space (FSPCE) key meaning NO. Otherwise pressing the VERIFY, meaning YES would be the response, and the operator would then proceed with Flight Fault Review.

(2) Failures are annunciated immediately upon detection of a failure during a System Maintenance BIT. During a Return to Service (RTS) BIT, an interruption does not occur. However, at the conclusion of both tests, the failures are displayed during "FAILURE RECAP?".

(3) During Maintenance Test the initial message upon entry into a Failure Mode is an English language message ending with the word "FAILURE". Pressing the VERIFY pushbutton will cause a diagnostic number to appear. Pressing the VERIFY pushbutton the second time will return the English language failure message to the STP.

(4) A diagnostic number is assigned to every test failure message issued to the STP. If a failure occurs, pressing the VERIFY pushbutton displays the diagnostic number. For example, the message display on the STP asked the operator to "ENGAGE A/P - VERIFY". The operator performs the requested action and the failure message "A/P ENGMNT FAILURE" appears (either the autopilot would not engage or a failure was detected). Then by cycling the verify push-button the message DIAGNOSTIC 312 will appear. The operator then refers to the appropriate test step in maintenance practices to obtain further trouble shooting information.

NOTE: A complete list of these diagnostic numbers and cross reference to message displays are incorporated into the Maintenance Practices portion of this section.

(5) Failure Modes may be exited in one of the three following manners:

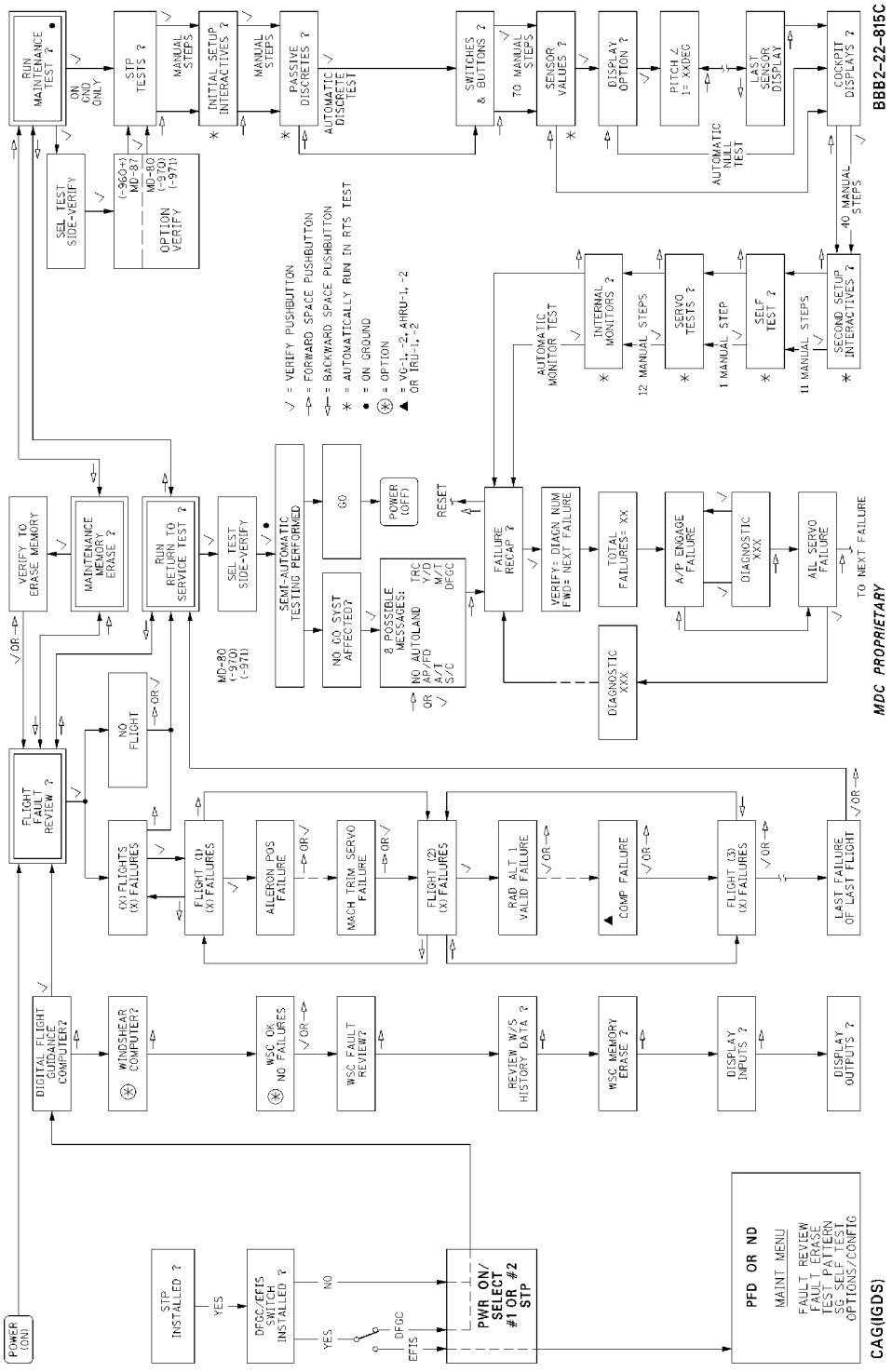
(a) Pressing the FSPCE key will store the failure in the failure stack within the DFGC for later recall. The control will then continue to the next test.

(b) Pressing the BSPCE key will suppress the failure logging and cause the test just failed, to be repeated.

(c) Pressing the BSPCE key twice within one second will cause message control to return to the point where the most recent sequence was initiated. The failure stack is then adjusted by removing all failures logged since the most recent sequence initiation.

NOTE: Paragraph 3.A.(5)(c) would normally be used if the operator failed to follow a test sequence, then later resulted in a failure (i.e. not tuning a NAV receiver as instructed).

(6) After completion of a System Maintenance BIT or RTS BIT, the STP will display "FAILURE RECAP?". Pressing the VERIFY pushbutton will provide the operator with a display of any failures encountered during the test.



STP -- Functional Operation
Figure 2/22-01-05-990-805

RETURN TO SERVICE TEST (RTS)

The RTS test is a fast, comprehensive system recheck which is to be run after performing line maintenance. The test requires about 20 operator interactions and takes less than 5 minutes to run. At the conclusion of the test, the message a "GO" or "NO GO — SYSTEMS AFFECTED?" appears. If a "GO" is received, then the system is capable of performing all of its functions, including fail-passive Category IIIb automatic landings. If "NO-GO — SYSTEMS AFFECTED?" appears, then one or more failures have been detected and the system affected by the detected failure will be displayed. A failure recall will appear after the NO GO to provide a list of all detected failures.

MAINTENANCE TEST

The Maintenance Test is an extensive system troubleshooting test. It is structured so that specific tests can be performed to isolate DFGS failures by selective use of the forward space, back space, and verify pushbuttons.

The flowchart on the left is to be used with the STP to operate the different levels described above. More detailed information on the STP is provided in the Maintenance Manual (C 22-01-05). See the troubleshooting section for a complete list of all failure definitions for those failures that can appear in the Flight Fault Review, the RTS, and the Maintenance Test.

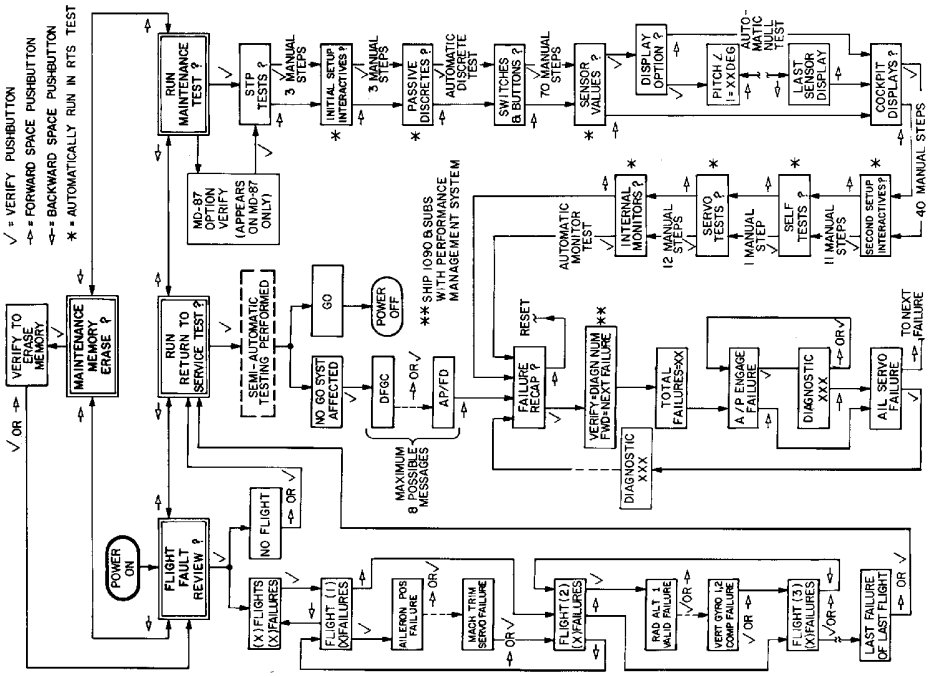
The Status Test Panel (STP) is the primary Digital Flight Guidance System (DFGS) troubleshooting tool. Familiarization with its operation and its capabilities is very important in rapidly isolating and solving DFGS problems.

There are three functions the STP provides: FLIGHT FAULT REVIEW, RETURN TO SERVICE TEST, and MAINTENANCE TEST.

The DFGC runs continuous internal self-tests and controls a valid light (CMPVLD) on the Status/Test Panel. Failures detected by these self-tests and other automatic tests are logged in FLIGHT FAULT REVIEW. The Maintenance/Return to Service Tests are to be used primarily to test DFGS sensors and inputs for correct operation.

FLIGHT FAULT REVIEW

This section is used to read failures which occur during flight. The DFGS continuously monitors the performance of itself and all of its sensors for proper operation. If a unit should fail at any time in flight, a corresponding failure will be logged by the DFGC. These failures can then be read out on the STP. Flights and failures are read out in a first-in/last-out method. Therefore, the most recent failure will be the first one in Flight 1. Flight Fault Review has enough memory to log about 350 failures. These failures can be erased by using the Maintenance Memory Erase Feature. Doing this will erase all failures logged in FLIGHT FAULT REVIEW. If the manual erase feature is not used, the DFGC will automatically erase all but the most recent 150 failures. This is performed automatically whenever the memory is over 80-percent full.

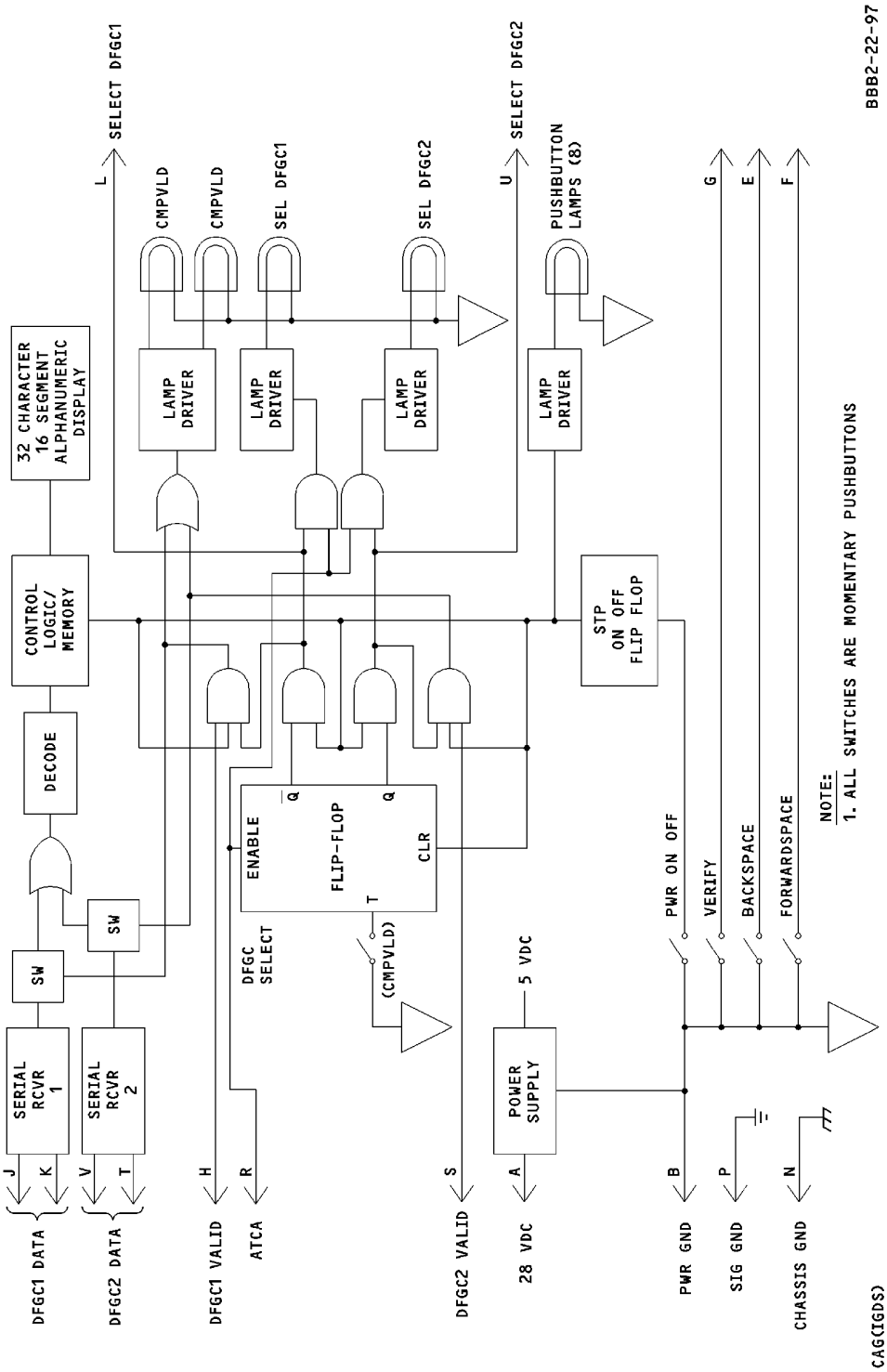


MDC PROPRIETARY

REFERENCED ATA NUMBERS ARE VALID TO THE THIRD DIGIT.

BBB2-22-741

Functions Flowchart
Figure 3/22-01-05-990-802



STP -- Block Diagram
Figure 4/22-01-05-990-813

DFGS STATUS/TEST (STP) PANEL - DESCRIPTION AND OPERATION

1. General

A. The DFGS Status/Test (STP) panel is located beneath the captain's briefcase compartment. The STP has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The STP provides the operator with a display of English language commands, questions, and failures.

B. The STP displays 32 alphanumeric characters. The message readout window allows two lines, each consisting of 16 characters. During use of the STP, standardized abbreviations are used in some cases due to the limited space available on the readout window. These abbreviations will be explained in the Maintenance Practices portion of this section.

C. BIT provides Three modes of testing available to the STP. Continuous BIT, System Maintenance BIT, and Return to Service (RTS) BIT.

D. The Autoland Preflight Test is also discussed in this section. The Autoland Preflight Test does not require the use of the STP, however, a failure during this test will be displayed on the STP.

E. Figure 1, illustrates the functional use of the STP. Personnel should be familiar with the operation of the STP, prior to performing any test procedures.

2. Description

A. BIT Modes

(1) Continuous BIT (Flight Fault Review)

(a) Continuous BIT automatically begins operation with application of power to the DFGC. Continuous BIT does not interfere with the normal operation of the DFGS, and does not require any operator participation. Continuous BIT provides failure detection capable of:

1) Detecting failures in DFGS components, as well as input power to the DFGC, sensor outputs associated with the DFGS, and electro-mechanical actuators.

2) Isolating failures to the greatest extent possible.

3) Providing failure information to the STP.

(b) Continuous BIT monitors DFGC operation, all input valids, all dual inputs, makes reasonableness checks on inputs, and end-around checks on outputs. The duplex servo drives are also being continuously monitored. During flight any faults detected by Continuous BIT affecting autoland capability, will illuminate the NO AUTOLAND annunciations on both FMA's.

(c) Faults will be logged into the BIT memory within the DFGC, only after the airplane is in the flight mode. This prevents nuisance fault logging when the airplane is in the terminal area or during taxi maneuvers. During flight, failures are logged in a non-volatile memory within the DFGC for subsequent recall on the STP, by ground maintenance personnel as "FLIGHT FAULT REVIEW?".

(2) System Maintenance BIT

(a) System Maintenance BIT is a command-response type test requiring operator participation to perform specific actions. System Maintenance BIT is the most comprehensive of the three tests. This test is normally used after major airplane maintenance action has been performed affecting the DFGS (i.e. wiring rework between any of the major LRU's) or performing specific tests when necessary. Each system (DFGC-1 or DFGC-2) test is run separately, and can only be performed when the airplane is in the "on ground" condition. Hydraulic power should be applied to the airplane to make the test complete as possible.

(b) System Maintenance BIT tests all DFGS display information in the flight compartment including lights, flags, and aural devices. Testing/or position of all flight crew selectable inputs including flaps, slats, pushbuttons, course selections, heading selections and switches. In addition, the operator will be able to check the values of input sensors and deviation comparisons on sensors. There are also automatic checks of system nulls, discretes, sensor response, servo response in the synchronized condition, and trim systems.

(3) Return to Service (RTS) BIT

(a) The Return to Service (RTS) BIT provides maximum possible assurance that after repair action (i.e. LRU replacement), the airplane can be put back into a non-restricted (including autoland) service. RTS requires minimal test set-up procedures and minimal operator action. RTS can only be performed when the airplane is in the "on ground" condition.

(b) RTS will automatically run to completion within approximately 5 minutes. If RTS is successful, "GO" will be displayed on the STP. If a failure occurs, "NO GO - SYSTEM AFFECTED?" will be displayed. Pressing the VERIFY pushbutton, will display one of the following conditions:

Table 1

"DFGC" -	Digital Flight Guidance Computer
"NO AUTOLAND"	
"AP/FD" -	Autopilot/Flight Director
"A/T" -	Autothrottle
"S/C" -	Speed Control
"ART" -	Automatic Reserve Thrust
"TRC" -	Thrust Rating Computations
"M/T" -	Mach Trim
"Y/D" -	Yaw Damper
NOTE: If a system is listed it does not necessarily mean the system is entirely inoperative, only that for some period the DFGC detected a problem within the system. FAILURE RECAP? should be checked to find out what exactly failed the RETURN TO SERVICE test. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 1)	
NOTE: During RTS test, verify nosewheel area is clear of personnel and equipment. Nosewheel may turn when the rudder is being tested.	

(4) Autoland Preflight Test

(a) The Autoland Preflight Test operates only when the airplane is in the "on ground" condition, both NAV receivers tuned to an ILS frequency, STP switched to OFF and the AUTO LAND pushbutton on the Flight Guidance Control panel has been pressed.

(b) The captain's and first officer's FMA's will display AUTO LND/PRE/FLT/TEST, when the test is initiated, and go blank when the test is completed. If a failure is detected, or Continuous BIT detects a failure, the NO AUTOLAND legend will appear on both FMA's. Failures in the Autoland Availability Preflight BIT can be duplicated on the STP in RTS or Maintenance Test by ground maintenance personnel.

(5) DFGC Automatic Post Flight Test

(a) An Automatic Post Flight Test is initiated approximately two minutes and twenty seconds after the transition from on air condition to on ground condition. The test shuts down the DFGC's for approximately 5 to 10 seconds. This is evidenced by the Flight Guidance Control Panel digital displays going blank, and associated command bars removed from view. PWR UP TST BOX1 or 2 will flash on flight mode annunciators and the status test panel CMPVLD light goes blank for associated DFGC under test.

(b) Failure of Post Flight Test will normally result in either the PWR UP TST BOX1 or BOX 2 message being permanently displayed on FMA's associated with DFGC that failed or an apparently dead (off-line) DFGC.

(c) On aircraft with -971 DFGCs installed, the failure message is FAIL PWR TST BOX1 or 2 with additional diagnostics to help determine the cause of the failure.

Table 2

Diagnostic	Failure
28 VDC	Left or Right 28VDC
26 VAC LEFT	26 VAC switched "A"
26 VAC RIGHT	26 VAC switched "B"
26 VAC REF	26 VAC Left Reference and 26 VAC Right Reference.

(d) The following conditions must be met before the Automatic DFGC Post Flight Test is initiated.

1) Airspeed less than 60 knots
2) Autopilot disengaged
3) Autothrottle disengaged
4) On ground for at least two minutes and 20 seconds
5) EPR below 1.1 EPR
6) Not in TAKEOFF mode
7) Not in Maintenance or Return to Service Test

NOTE: Post Flight Test may appear to initiate at different times because not all above conditions were met. For example, if aircraft taxis with more power (EPR above 1.1) than normal. Also, any time DFGC 115VAC power is interrupted or landing simulation by cycling the Ground Control Relay circuit breakers, will initialize Post Flight Test.

B. STP Message Generation

(1) The DFGC provides message generation to the STP. The output messages are designated as ASCII messages that are generated by a STP Drive Module (S/W) and a raw buffer (MSGCOD). There are 32 locations in the MSGCOD buffer to provide the 32 character positions on the STP (2 lines of 16 characters). Each location in the buffer contains data in one of the following forms.

Table 3

BIT	17	16	15	14	13	12	11	10	09
MSG	0	X	X	X	X	X	X	0	0
WORD	0	X	X	X	X	X	X	0	1

Table 3 (Continued)

CHAR	0	X	X	X	X	X	X	1	0
LINE	0	0	0	0	0	0	0	0	0
END	1	X	X	X	X	X	X	X	X
BIT	08	07	06	05	04	03	02	01	00
MSG	L	9 BIT CODE							G
WORD	L	9 BIT CODE							G
CHAR	X	X	X	L	6 BIT ASCII				G
LINE	1	1	1	1	1	1	1	1	1
END	X	X	X	X	X	X	X	X	X
* L means Less than									
** G means Greater than									

(2) The nine bit word codes are indices which refer to locations in ROM containing packed ASCII codes. The packed codes contain three letters/ROM location. The nine bit message codes are indices referring to ROM locations containing nine bit word codes packed two/ROM location. The character codes are ASCII codes. The word codes 0-077 are reserved for single letter ASCII words and differ from character codes as follows.

(3) Message buffer (MSGCOD) decoding into an ASCII output to the STP proceeds sequentially through the buffer input. Each code is translated as it is encountered. Message codes are translated to word codes then ASCII. The following rules also apply.

(a) Any combination of the above codes may be used to develop a message.

(b) A message requiring more than 32 characters is truncated.

(c) Words are not broken between two lines. If this causes more than 32 character positions, the extra characters will be truncated.

(d) Each word code results in an added space except at the end of a line.

(e) The first 077 (octal) word codes are taken as ASCII characters (with a following space).

(f) Stored ASCII text words do not contain spaces (spaces are ignored).

(g) This routine stores "END" codes in the MSGCOD buffer after is decoded.

(4) As indicated above, message generation terminates with the generation of the 32nd character or with an end of line code. The ASCII buffer is then serially shipped to the STP, resulting in message display.

C. STP Features

(1) The following features are provided to the operator for ease and simplicity while using the STP.

(a) All messages are completely spelled out whenever possible. Standardized abbreviations are used only when necessary.

(b) Operator instructions and all annunciations are as specific as possible.

(c) Operation of the STP is standardized, so that a given response has a consistent meaning throughout the testing sequence.

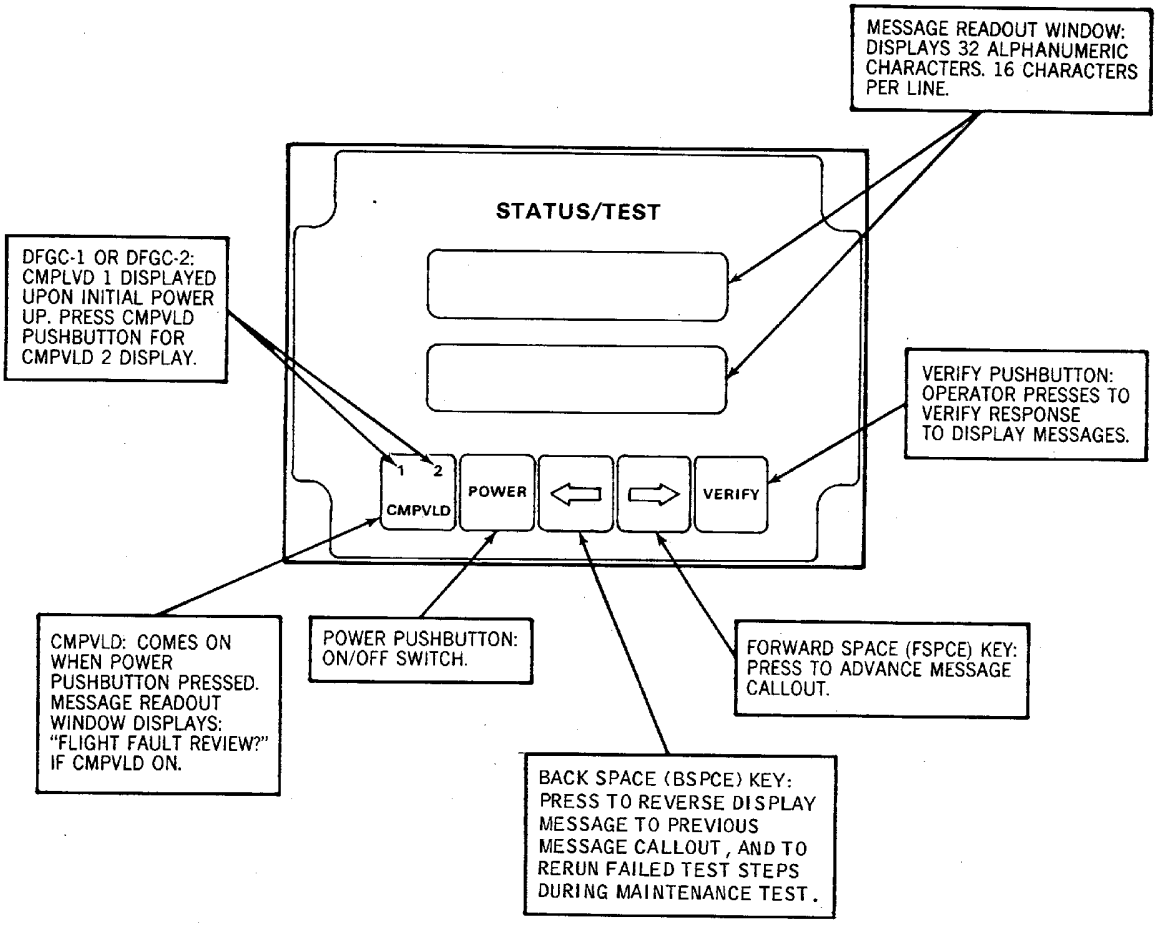
(d) Tests are organized into sections that may be bypassed in order to reduce access time for any specific test. (Mnt test only)

(e) Sequence and test repetition features are provided to improve testing flexibility.

(f) A failure mode is easily distinguished from a test mode by the fact that the word FAILURE is always contained in English language message.

D. STP Self-Test

(1) The STP self-test is provided to assure the operator that the STP is functional prior to Maintenance test initiation. All keys are checked and appropriate message displays are verified. This test requires operators response to verify the various keys and display messages.



Status/Test (STP) Panel
Figure 1/22-01-05-990-803

EFFECTIVITY
WJE 401-406, 409, 410, 412, 414, 873-879, 881, 883, 884, 886, 887, 892, 893

3. Operation

A. STP Operating Features

(1) Upon initial power up of the STP, a sequence query is issued, the operator may then proceed or bypass the group of tests. For example, if the STP message reads "FLIGHT FAULT REVIEW?", and the operator does not wish to run the tests, the operator would then press the Forward Space (FSPCE) key meaning NO. Otherwise pressing the VERIFY, meaning YES would be the response, and the operator would then proceed with Flight Fault Review.

(2) Failures are annunciated immediately upon detection of a failure during a System Maintenance BIT. During a Return to Service (RTS) BIT, an interruption does not occur. However, at the conclusion of both tests, the failures are displayed during "FAILURE RECAP?".

(3) During Maintenance Test the initial message upon entry into a Failure Mode is an English language message ending with the word "FAILURE". Pressing the VERIFY pushbutton will cause a diagnostic number to appear. Pressing the VERIFY pushbutton the second time will return the English language failure message to the STP.

(4) A diagnostic number is assigned to every test failure message issued to the STP. If a failure occurs, pressing the VERIFY pushbutton displays the diagnostic number. For example, the message display on the STP asked the operator to "ENGAGE A/P - VERIFY". The operator performs the requested action and the failure message "A/P ENGMNT FAILURE" appears (either the autopilot would not engage or a failure was detected). Then by cycling the verify push-button the message DIAGNOSTIC 312 will appear. The operator then refers to the appropriate test step in maintenance practices to obtain further trouble shooting information.

NOTE: A complete list of these diagnostic numbers and cross reference to message displays are incorporated into the Maintenance Practices portion of this section.

(5) Failure Modes may be exited in one of the three following manners:

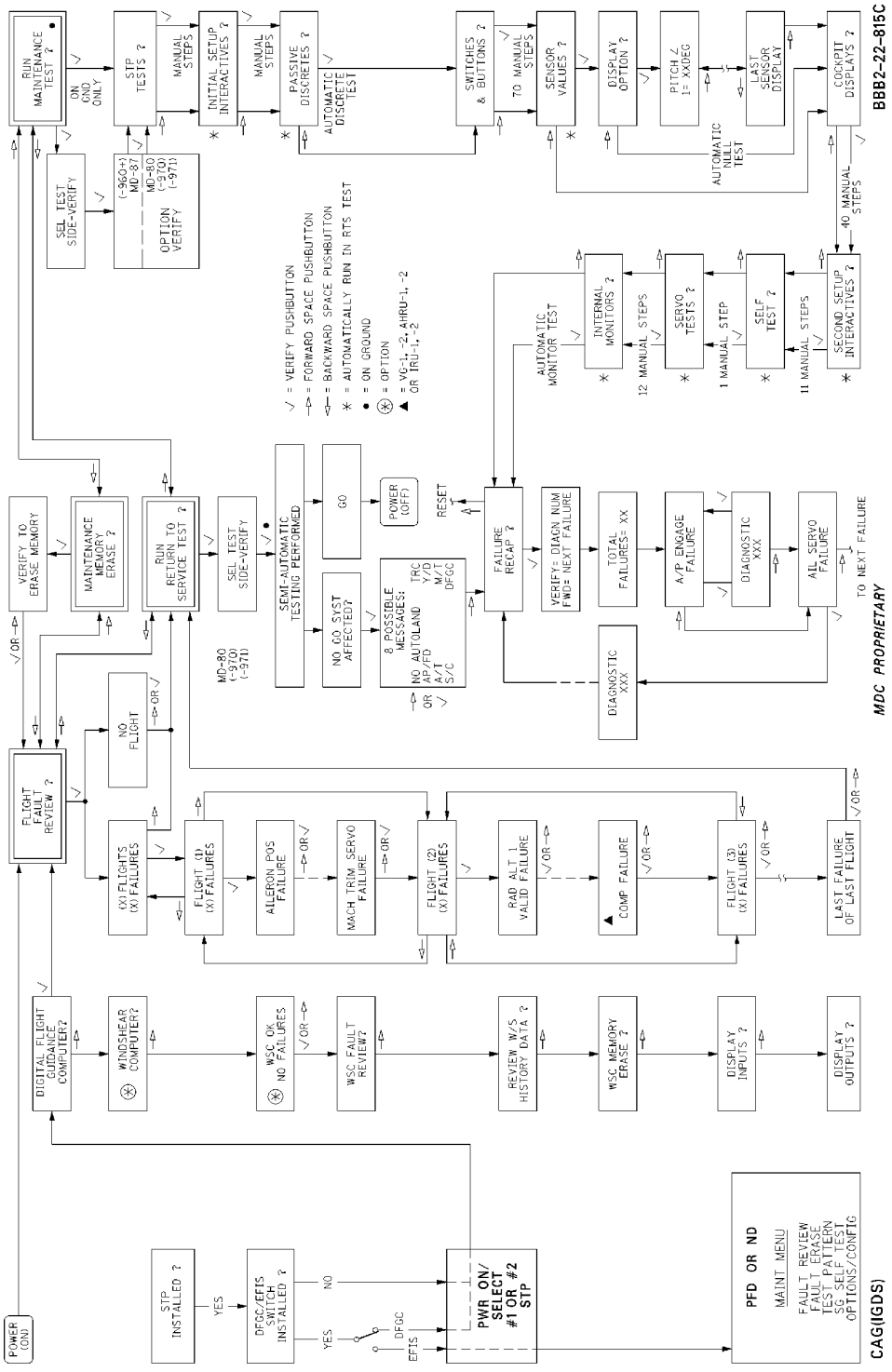
(a) Pressing the FSPCE key will store the failure in the failure stack within the DFGC for later recall. The control will then continue to the next test.

(b) Pressing the BSPCE key will suppress the failure logging and cause the test just failed, to be repeated.

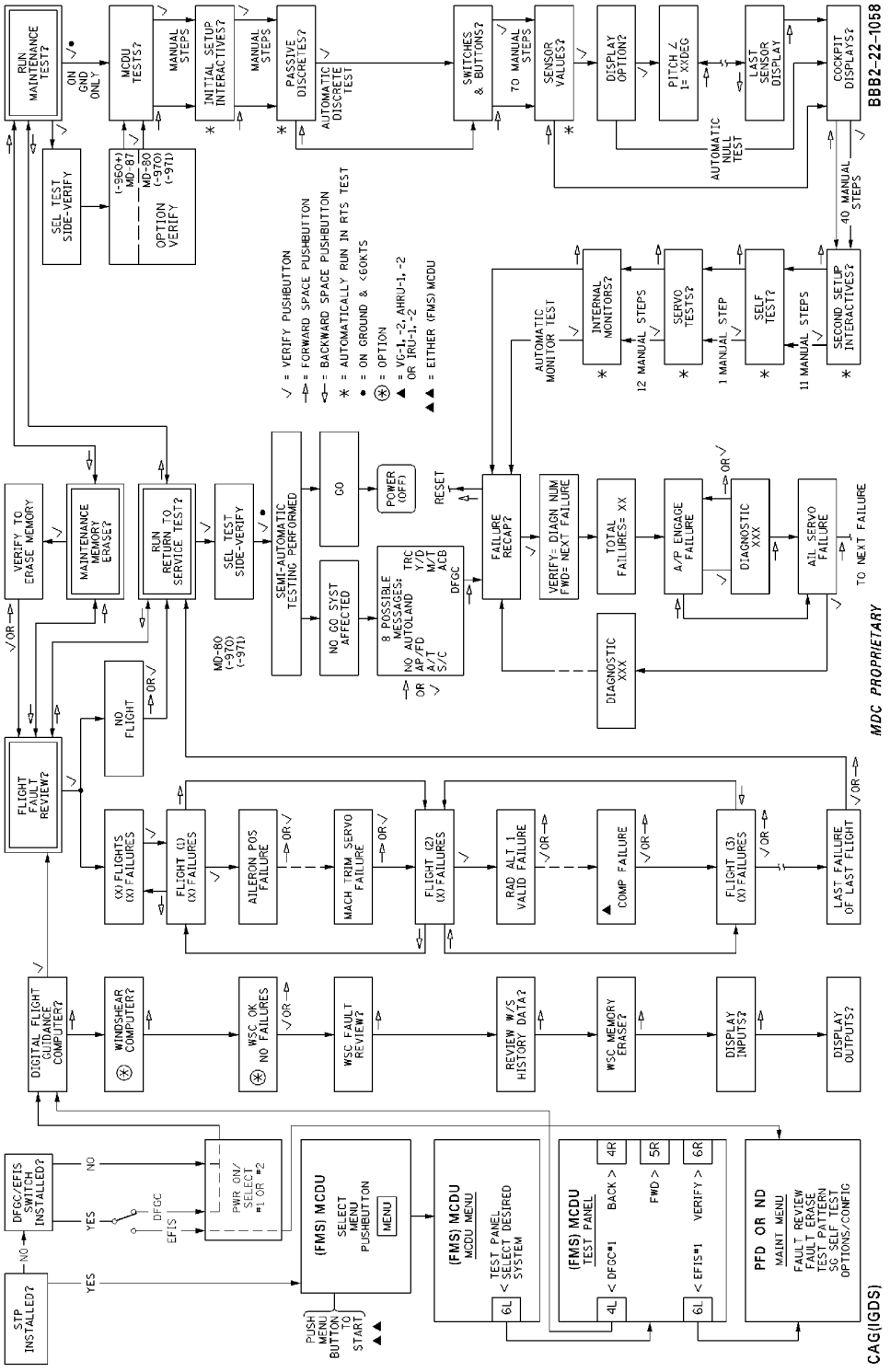
(c) Pressing the BSPCE key twice within one second will cause message control to return to the point where the most recent sequence was initiated. The failure stack is then adjusted by removing all failures logged since the most recent sequence initiation.

NOTE: Paragraph 3.A.(5)(c) would normally be used if the operator failed to follow a test sequence, then later resulted in a failure (i.e. not tuning a NAV receiver as instructed).

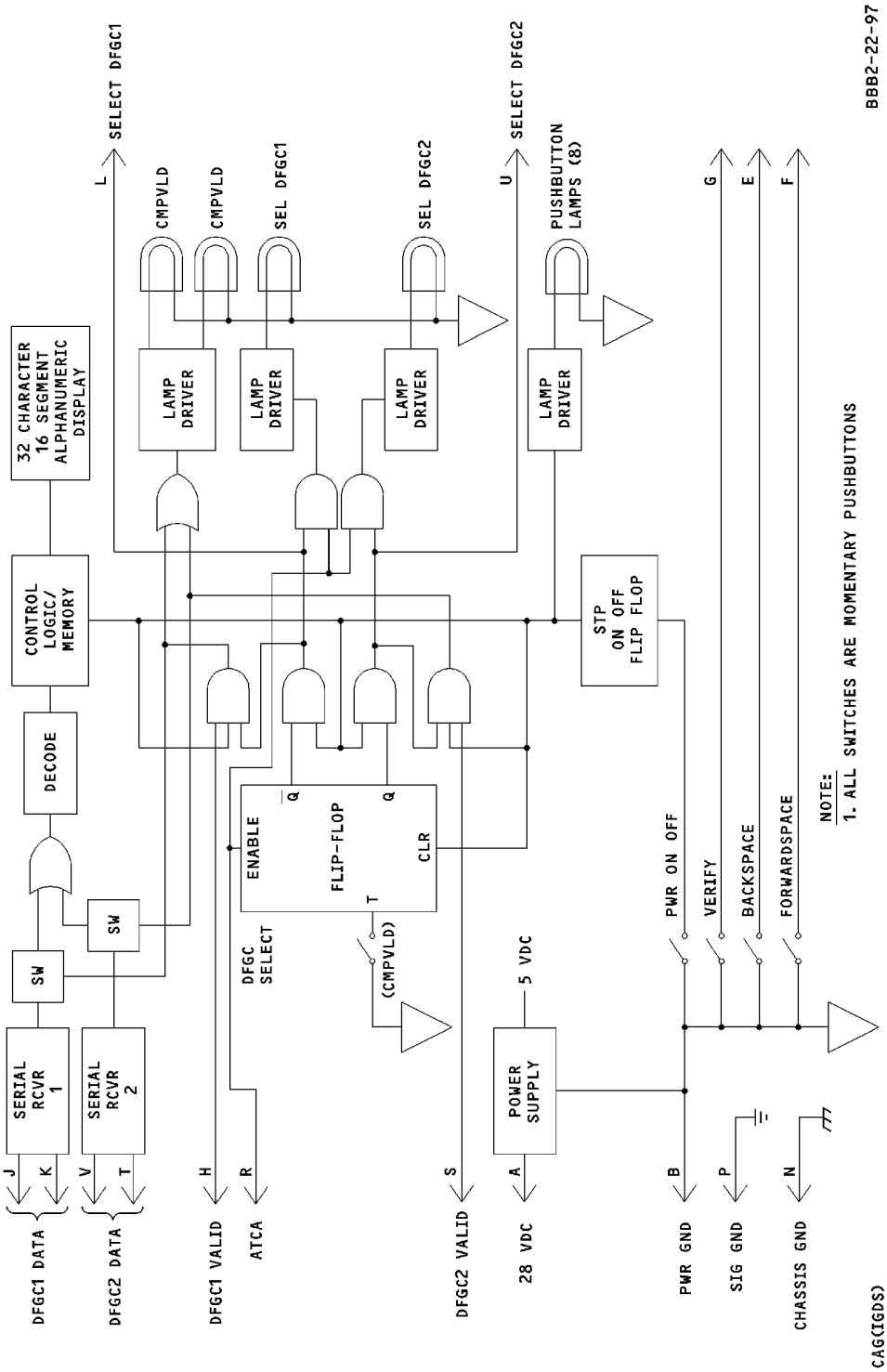
(6) After completion of a System Maintenance BIT or RTS BIT, the STP will display "FAILURE RECAP?". Pressing the VERIFY pushbutton will provide the operator with a display of any failures encountered during the test.



STP -- Functional Operation
Figure 2/22-01-05-990-810



STP -- Functional Operation
Figure 3/22-01-05-990-818



STP -- Block Diagram
Figure 4/22-01-05-990-822

DFGS STATUS/TEST (STP) PANEL - DESCRIPTION AND OPERATION

1. General

A. The DFGC Status/Test is performed on the Flight Management System Multipurpose Control Display Unit (MCDU) located on the forward pedestal. MCDU-1, on the left side of the pedestal is used for DFGC-1 and MCDU-2 on the right side of the pedestal is used for DFGC-2. The MCDU has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The MCDU provides the operator with a display of English language commands, questions, and failures. Figure 1 illustrates the use of the MCDU.

B. The MCDU displays 32 alphanumeric characters. The message readout window allows two lines, each consisting of 16 characters. During use of the MCDU, standardized abbreviations are used in some cases due to the limited space available on the readout window. These abbreviations will be explained in the Maintenance Practices portion of this section.

C. BIT provides three modes of testing available to the MCDU. Continuous BIT, System Maintenance BIT, and Return to Service (RTS) BIT.

D. The Autoland Preflight Test is also discussed in this section. The Autoland Preflight Test does not require the use of the MCDU, however, a failure during this test will be displayed on the MCDU.

E. Figure 1, illustrates the functional use of the MCDU. Personnel should be familiar with the operation of the MCDU, prior to performing any test procedures.

2. Description

A. BIT Modes

(1) Continuous BIT (Flight Fault Review)

(a) Continuous BIT automatically begins operation with application of power to the DFGC. Continuous BIT does not interfere with the normal operation of the DFGS, and does not require any operator participation. Continuous BIT provides failure detection capable of:

1) Detecting failures in DFGS components, as well as input power to the DFGC, sensor outputs associated with the DFGS, and electro-mechanical actuators.

2) Isolating failures to the greatest extent possible.

3) Providing failure information to the MCDU.

(b) Continuous BIT monitors DFGC operation, all input valids, all dual inputs, makes reasonableness checks on inputs, and end-around checks on outputs. The duplex servo drives are also being continuously monitored. During flight any faults detected by Continuous BIT affecting autoland capability, will illuminate the NO AUTOLAND annunciations on both FMA's.

(c) Faults will be logged into the BIT memory within the DFGC, only after the airplane is in the flight mode. This prevents nuisance fault logging when the airplane is in the terminal area or during taxi maneuvers. During flight, failures are logged in a non-volatile memory within the DFGC for subsequent recall on the MCDU, by ground maintenance personnel as "FLIGHT FAULT REVIEW?".

(2) System Maintenance BIT

(a) System Maintenance BIT is a command-response type test requiring operator participation to perform specific actions. System Maintenance BIT is the most comprehensive of the three tests. This test is normally used after major airplane maintenance action has been performed affecting the DFGS (i.e. wiring rework between any of the major LRU's) or performing specific tests when necessary. Each system (DFGC-1 or DFGC-2) test is run separately, and can only be performed when the airplane is in the "on ground" condition. Hydraulic power should be applied to the airplane to make the test complete as possible.

(b) System Maintenance BIT tests all DFGS display information in the flight compartment including lights, flags, and aural devices. Testing/or position of all flight crew selectable inputs including flaps, slats, pushbuttons, course selections, heading selections and switches. In addition, the operator will be able to check the values of input sensors and deviation comparisons on sensors. There are also automatic checks of system nulls, discretes, sensor response, servo response in the synchronized condition, and trim systems.

(3) Return to Service (RTS) BIT

(a) The Return to Service (RTS) BIT provides maximum possible assurance that after repair action (i.e. LRU replacement), the airplane can be put back into a non-restricted (including autoland) service. RTS requires minimal test set-up procedures and minimal operator action. RTS can only be performed when the airplane is in the "on ground" condition.

(b) RTS will automatically run to completion within approximately 5 minutes. If RTS is successful, "GO" will be displayed on the MCDU. If a failure occurs, "NO GO - SYSTEM AFFECTED?" will be displayed. Pressing the VERIFY pushbutton, will display one of the following conditions:

Table 1

"DFGC" -	Digital Flight Guidance Computer
"NO AUTOLAND"	
"AP/FD" -	Autopilot/Flight Director
"A/T" -	Autothrottle
"S/C" -	Speed Control
"ART" -	Automatic Reserve Thrust
"TRC" -	Thrust Rating Computations
"M/T" -	Mach Trim
"Y/D" -	Yaw Damper
NOTE: If a system is listed it does not necessarily mean the system is entirely inoperative, only that for some period the DFGC detected a problem within the system. FAILURE RECAP? should be checked to find out what exactly failed the RETURN TO SERVICE test DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201.	
NOTE: During RTS test, verify nosewheel area is clear of personnel and equipment. Nosewheel may turn when the rudder is being tested.	

(4) Autoland Preflight Test

(a) The Autoland Preflight Test operates only when the airplane is in the "on ground" condition, both NAV receivers tuned to an ILS frequency, and the AUTO LAND pushbutton on the Flight Guidance Control panel has been pressed.

(b) The captain's and first officer's FMA's will display AUTO LND/PRE/FLT/TEST, when the test is initiated, and go blank when the test is completed. If a failure is detected, or Continuous BIT detects a failure, the NO AUTOLAND legend will appear on both FMA's. Failures in the Autoland Availability Preflight BIT can be duplicated on the MCDU in RTS or Maintenance Test by ground maintenance personnel.

(5) DFGC Automatic Post Flight Test

(a) An Automatic Post Flight Test is initiated approximately two minutes and twenty seconds after the transition from on air condition to on ground condition. The test shuts down the DFGC's for approximately 5 to 10 seconds. This is evidenced by the Flight Guidance Control Panel digital displays going blank and associated command bars removed from view. PWR-UP TST BOX1 or 2 will flash on flight mode annunciators.

(b) Failure of Post Flight Test will normally result in either the PWR UP TST BOX1 or BOX 2 message being permanently displayed on FMA's associated with DFGC that failed or an apparently dead (off-line) DFGC.

(c) On aircraft with -971 DFGCs installed, the failure message is FAIL PWR TST BOX1 or 2 with additional diagnostics to help determine the cause of the failure.

Table 2

Diagnostic	Failure
28 VDC	Left or Right 28VDC
26 VAC LEFT	26 VAC switched "A"
26 VAC RIGHT	26 VAC switched "B"
26 VAC REF	26 VAC Left Reference and 26 VAC Right Reference.

(d) The following conditions must be met before the Automatic DFGC Post Flight Test is initiated.

1) Airspeed less than 60 knots
2) Autopilot disengaged
3) Autothrottle disengaged
4) On ground for at least two minutes and 20 seconds
5) EPR below 1.1 EPR
6) Not in TAKEOFF mode
7) Not in Maintenance or Return to Service Test

NOTE: Post Flight Test may appear to initiate at different times because not all above conditions were met. For example, if aircraft taxis with more power (EPR above 1.1) than normal. Also, any time DFGC 115VAC power is interrupted or landing simulation by cycling the Ground Control Relay circuit breakers, will initialize Post Flight Test.

B. MCDU Message Generation

(1) The DFGC provides message generation to the MCDU. The output messages are designated as ASCII messages that are generated by a MCDU Drive Module (S/W) and a raw buffer (MSGCOD). There are 32 locations in the MSGCOD buffer to provide the 32 character positions on the MCDU (2 lines of 16 characters). Each location in the buffer contains data in one of the following forms.

Table 3

BIT	17	16	15	14	13	12	11	10	09
MSG	0	X	X	X	X	X	X	0	0
WORD	0	X	X	X	X	X	X	0	1
CHAR	0	X	X	X	X	X	X	1	0
LINE	0	0	0	0	0	0	0	0	0
END	1	X	X	X	X	X	X	X	X
BIT	08	07	06	05	04	03	02	01	00
MSG	L	9 BIT CODE							G
WORD	L	9 BIT CODE							G
CHAR	X	X	X	L	6 BIT ASCII				G
LINE	1	1	1	1	1	1	1	1	1
END	X	X	X	X	X	X	X	X	X
* L means Less than									
** G means Greater than									

(2) The nine bit word codes are indices which refer to locations in ROM containing packed ASCII codes. The packed codes contain three letters/ROM location. The nine bit message codes are indices referring to ROM locations containing nine bit word codes packed two/ROM location. The character codes are ASCII codes. The word codes 0-077 are reserved for single letter ASCII words and differ from character codes as follows.

(3) Message buffer (MSGCOD) decoding into an ASCII output to the MCDU proceeds sequentially through the buffer input. Each code is translated as it is encountered. Message codes are translated to word codes then ASCII. The following rules also apply.

(a) Any combination of the above codes may be used to develop a message.

(b) A message requiring more than 32 characters is truncated.

(c) Words are not broken between two lines. If this causes more than 32 character positions, the extra characters will be truncated.

(d) Each word code results in an added space except at the end of a line.

(e) The first 077 (octal) word codes are taken as ASCII characters (with a following space).

(f) Stored ASCII text words do not contain spaces (spaces are ignored).

(g) This routine stores "END" codes in the MSGCOD buffer after is decoded.

(4) As indicated above, message generation terminates with the generation of the 32nd character or with an end of line code. The ASCII buffer is then serially shipped to the MCDU, resulting in message display.

C. MCDU Features

(1) The following features are provided to the operator for ease and simplicity while using the MCDU.

(a) All messages are completely spelled out whenever possible. Standardized abbreviations are used only when necessary.

(b) Operator instructions and all annunciations are as specific as possible.

(c) Operation of the MCDU is standardized, so that a given response has a consistent meaning throughout the testing sequence.

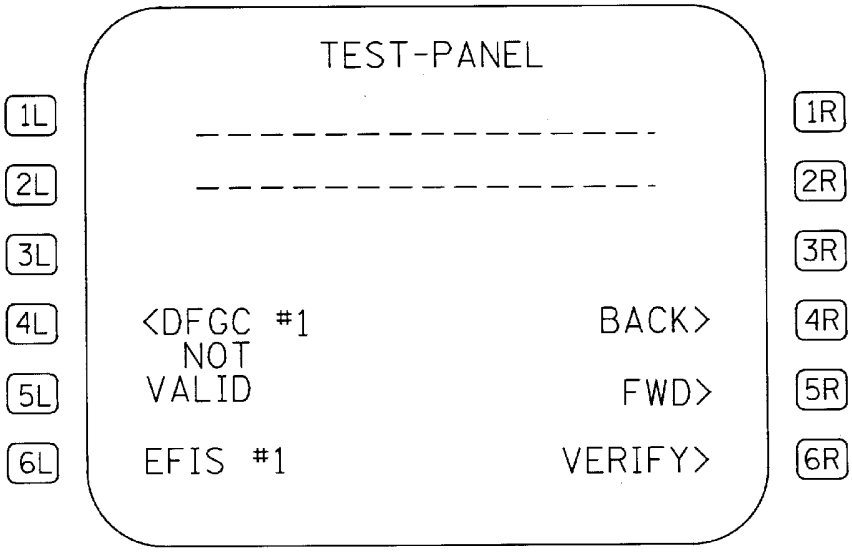
(d) Tests are organized into sections that may be bypassed in order to reduce access time for any specific test. (Mnt test only)

(e) Sequence and test repetition features are provided to improve testing flexibility.

(f) A failure mode is easily distinguished from a test mode by the fact that the word FAILURE is always contained in English language message.

D. MCDU Self-Test

(1) The MCDU self-test is provided to assure the operator that the MCDU is functional prior to Maintenance test initiation. All keys are checked and appropriate message displays are verified.



NOTE: THE DASHES SHOWN IN THIS ILLUSTRATION ARE ONLY PROVIDED AS AN INDICATION OF THE LOCATION OF DFGC FURNISHED DATA. IF THE DFGC IS NOT FURNISHING DATA, THE INDICATED FIELDS ON THE ACTUAL MCDU PAGE DISPLAY BLANKS.

NOTE: DEPRESSING LINE SELECT KEY 4L INFORMS THE MCDU THAT IT IS FUNCTIONING AS A DFGC STP AND SUPPLIES A SELECT SIGNAL TO THE ONSIDE DFGC.

CAG(IGDS)

BBB2-22-656

Test Panel Page
Figure 1/22-01-05-990-815

3. Operation

A. MCDU Operating Features

(1) Upon initial power up of the MCDU, a Return to Service self test is activated. If self test is satisfactory, MCDU MENU appears on title page at top line. Selecting TEST PANEL select key 6L will display the TEST PANEL page.

(2) The operator may bypass a test or group of tests by pressing the FSPCE key when test message is displayed. The tests are run when the VERIFY key is pressed.

(3) Failures are annunciated immediately upon detection of a failure during a System Maintenance BIT. During a Return to Service (RTS) BIT, an interruption does not occur. However, at the conclusion of both tests, the failures are displayed during "FAILURE RECAP?".

(4) During Maintenance Test the initial message upon entry into a Failure Mode is an English language message ending with the word "FAILURE". Pressing the VERIFY pushbutton will cause a diagnostic number to appear. Pressing the VERIFY pushbutton the second time will return the English language failure message to the MCDU.

(5) A diagnostic number is assigned to every test failure message issued to the MCDU. If a failure occurs, pressing the VERIFY pushbutton displays the diagnostic number. For example, the message display on the MCDU asked the operator to "ENGAGE A/P - VERIFY". The operator performs the requested action and the failure message "A/P ENGMNT FAILURE" appears (either the autopilot would not engage or a failure was detected). Then by cycling the verify push-button the message DIAGNOSTIC 312 will appear. The operator then refers to the appropriate test step in maintenance practices to obtain further trouble shooting information.

NOTE: A complete list of these diagnostic numbers and cross reference to message displays are incorporated into the Maintenance Practices portion of this section.

(6) Failure Modes may be exited in one of the three following manners:

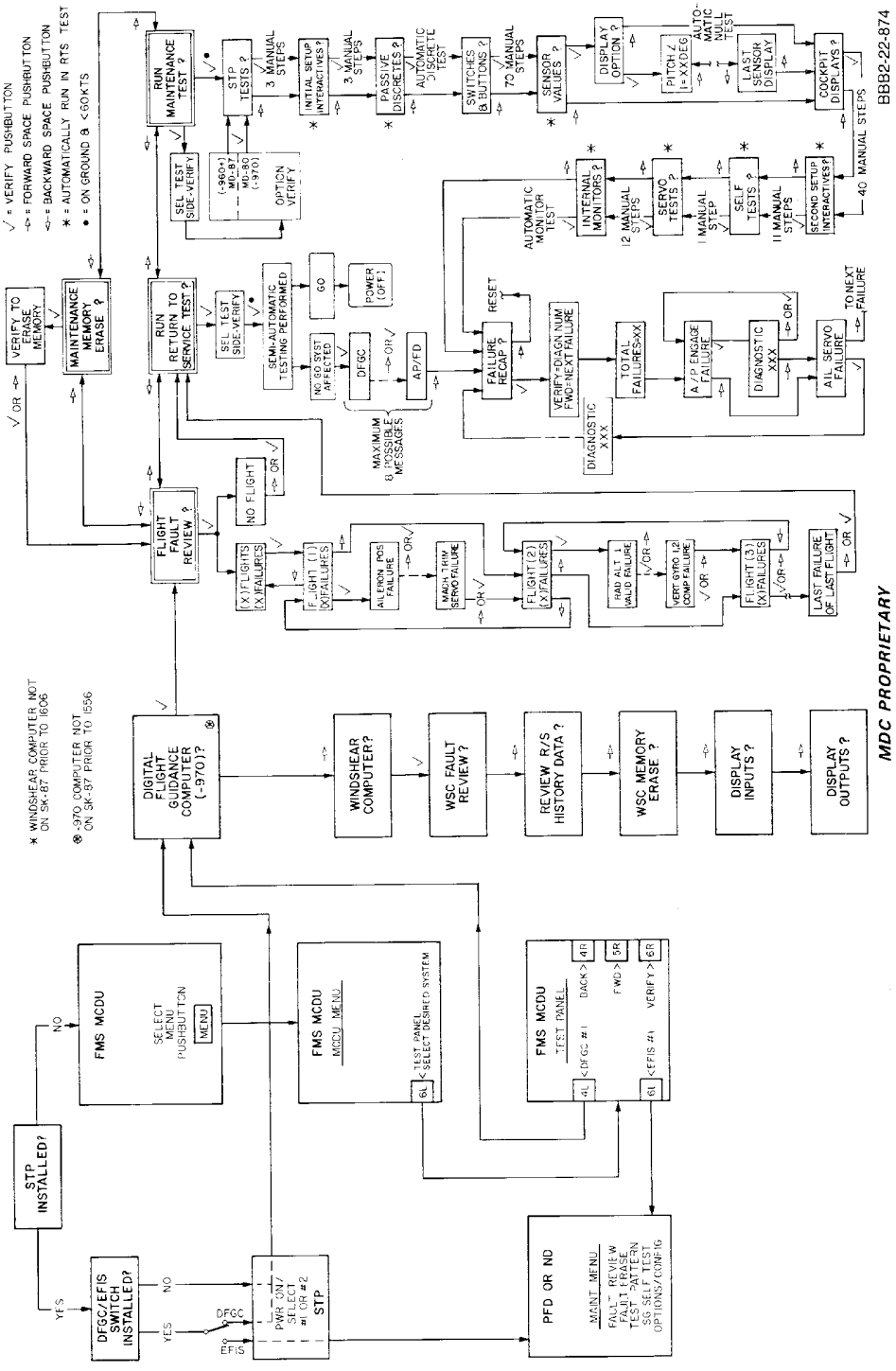
(a) Pressing the FSPCE key will store the failure in the failure stack within the DFGC for later recall. The control will then continue to the next test.

(b) Pressing the BSPCE key will suppress the failure logging and cause the test just failed, to be repeated.

(c) Pressing the BSPCE key twice within one second will cause message control to return to the point where the most recent sequence was initiated. The failure stack is then adjusted by removing all failures logged since the most recent sequence initiation.

NOTE: Paragraph 3.A.(6)(c) would normally be used if the operator failed to follow a test sequence, then later resulted in a failure (i.e. not tuning a NAV receiver as instructed).

(7) After completion of a System Maintenance BIT or RTS BIT, the MCDU will display "FAILURE RECAP?". Pressing the VERIFY pushbutton will provide the operator with a display of any failures encountered during the test.



MCDU Functions Flow Chart
Figure 2/22-01-05-990-819

DFGS STATUS/TEST (STP) PANEL - TROUBLE SHOOTING

1. General

A. Trouble shooting procedures consist primarily of faulty component replacement. A thorough knowledge of the inter-relationship of components that have a direct bearing on the Digital Flight Guidance System is essential for meaningful trouble shooting.

WJE 407, 408, 411, 412, 414, 873, 874, 880, 892, 893

B. There are two methods of trouble shooting provided within this section. One method is by use of Flight Faults as displayed on the STP after each landing, and the other is by use of Trouble Shooting Charts that are used in conjunction with the Return to Service Test or Maintenance Test.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

C. There are two methods of trouble shooting provided within this section. One method is by use of Flight Faults and the other is by use of Trouble Shooting Charts that are used in conjunction with the Return to Service Test or Maintenance Test. On aircraft 101-108, 151-158, 175-176 the flight faults are displayed after each landing on the Status Test Panel (STP) located under the captain's briefcase. On aircraft 109-137, 159, 161-165, 201-999 the STP is replaced with the FMS MCDU located on the forward pedestal. The test panel page of the MCDU is accessed through the MENU select key.

WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893

D. The first portion of the text contains the Flight Fault displays (Paragraph 3.). The Flight Fault displays are listed in alphabetical order. A Failure Message along with a Failure Description and Failure Symptom are provided. These tables should be used to collate written squawks to computer detected faults. Maintenance Test Diagnostic numbers are also provided along with the appropriate Maintenance Action that should be taken.

NOTE: The Maintenance Test Diagnostic numbers are given in the sequence of most probability of failure(s), i.e., Internal Monitors: Diag. 463-464, Sensor Values: Diag. 245-246, etc.

WJE 407, 408, 411, 412, 414, 873, 874, 880, 892, 893

E. The Trouble Shooting charts contained in this section correlate to all failures that are displayed on the STP during Maintenance or RTS test. The charts provide the normal Test Message that should be displayed along with its corresponding Failure Message and Diagnostic Number. A brief description of the test in conjunction with the Diagnostic (failure) that may have occurred is provided. By use of the Wiring Diagram Manual as called out, the Test Signal Connector Pin can be located and the proper Test Voltage (when applicable) may be taken. (Paragraph 4.)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

F. The Trouble Shooting charts contained in this section correlate to all failures that are displayed on the STP/MCDU during Maintenance or RTS test. The charts provide the normal Test Message that should be displayed along with its corresponding Failure Message and Diagnostic Number. A brief description of the test in conjunction with the Diagnostic (failure) that may have occurred is provided. By use of the Wiring Diagram Manual as called out, the Test Signal Connector Pin can be located and the proper Test Voltage (when applicable) may be taken. (Paragraph 4.)

WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893

G. When Test Voltage readings are taken, the readings should be at Mod Blocks and not at electrical connectors. Standard electrical test voltages are given in the procedures. A 10% voltage tolerance is permissible, unless otherwise shown.

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893

H. There are two separate wire bundles containing autoland critical wiring, system 1 and system 2. System 1 autoland wiring is normally routed on the left side of the aircraft with other existing wiring and secured with normal white type string ties. System 2 autoland wiring is routed on the right side and easily identifiable by yellow string ties and the wires have run letters beginning with the letter S.

WARNING: WHILE PERFORMING TROUBLE SHOOTING PROCEDURES, AUTOLAND CRITICAL WIRING MUST NEVER BE TAMPERED WITH UNLESS ABSOLUTELY NECESSARY TO PROVIDE WIRING REWORK. IF WIRING REWORK IS REQUIRED, ASSURE THAT ALL PROCEDURES OUTLINED IN CHAPTER 20-11-00, PAGE 201 OF WIRING DIAGRAM MANUAL ARE STRICTLY ADHERED TO.

I. Prior to replacement of a faulty component, or maintenance requirements to clear a fault (rigging, etc.), verify that the using components maintenance procedures are strictly adhered to. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201 for removal/ installation of the CADC)

WJE 407, 408, 411, 873, 874, 880, 892, 893

J. After trouble shooting procedures are completed, verify the proper STP test is initiated to verify and clear the displayed fault(s). If the fault(s) occurred in sequences 1,2,4,6,7,8 or 9 then a Return-To-Service Test may be initiated to clear and verify the displayed fault(s). If the fault(s) occurred in sequence 0,3 or 5 then a System Maintenance test of the failed sequence test step must be performed.

NOTE: The replacement of the Digital Flight Guidance Computer (DFGC) is not always required when the intermittent failure is reported during flight and no failure is found during Flight Fault Review (FFR) test and Return to Service (RTS) test using Status Test Panel (STP) at the ground check. However, if intermittent failures persist, further troubleshooting will be required.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

K. After trouble shooting procedures are completed, verify the proper STP/MCDU test is initiated to verify and clear the displayed fault(s). If the fault(s) occurred in sequences 1,2,4,6,7,8 or 9 then a Return-To-Service Test may be initiated to clear and verify the displayed fault(s). If the fault(s) occurred in sequence 0,3 or 5 then a System Maintenance test of the failed sequence test step must be performed.

NOTE: The replacement of the Digital Flight Guidance Computer (DFGC) is not always required when the intermittent failure is reported during flight and no failure is found during Flight Fault Review (FFR) test and Return to Service (RTS) test using Status Test Panel (STP) at the ground check. However, if intermittent failures persist, further troubleshooting will be required.

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893

L. In the event the following messages are recorded on the STP, refer to the servo test portion of the STP maintenance test. Perform the alternate trim motor servo test and, using an oscilloscope or memory voltmeter, verify the voltage transient measured across the up and down alternate trim relay coils are nominal (less than approximately 40 VDC) within relay tolerances. If voltage transients greater than 60 VDC are measured, on either alternate trim relay, this indicates the suppression circuitry has failed, therefore, remove and replace relay.

(1) The STP loggings thus far that have caused the DFGC to shut down due to faulty diode circuitry are:

(a) Control Store Failure - A RAM failure occurs during the BITE test portion of the Control Store Parity Checker:

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

1) A processor failure occurs during External Interrupt.

2) Bad parity is detected in a Control Store Word.

(b) RAM Failure - A value stored in a random access memory (RAM) location is not the same as the value read from the same RAM location.

(c) Ticket Check Failure - DFGC monitors detect an incomplete task.

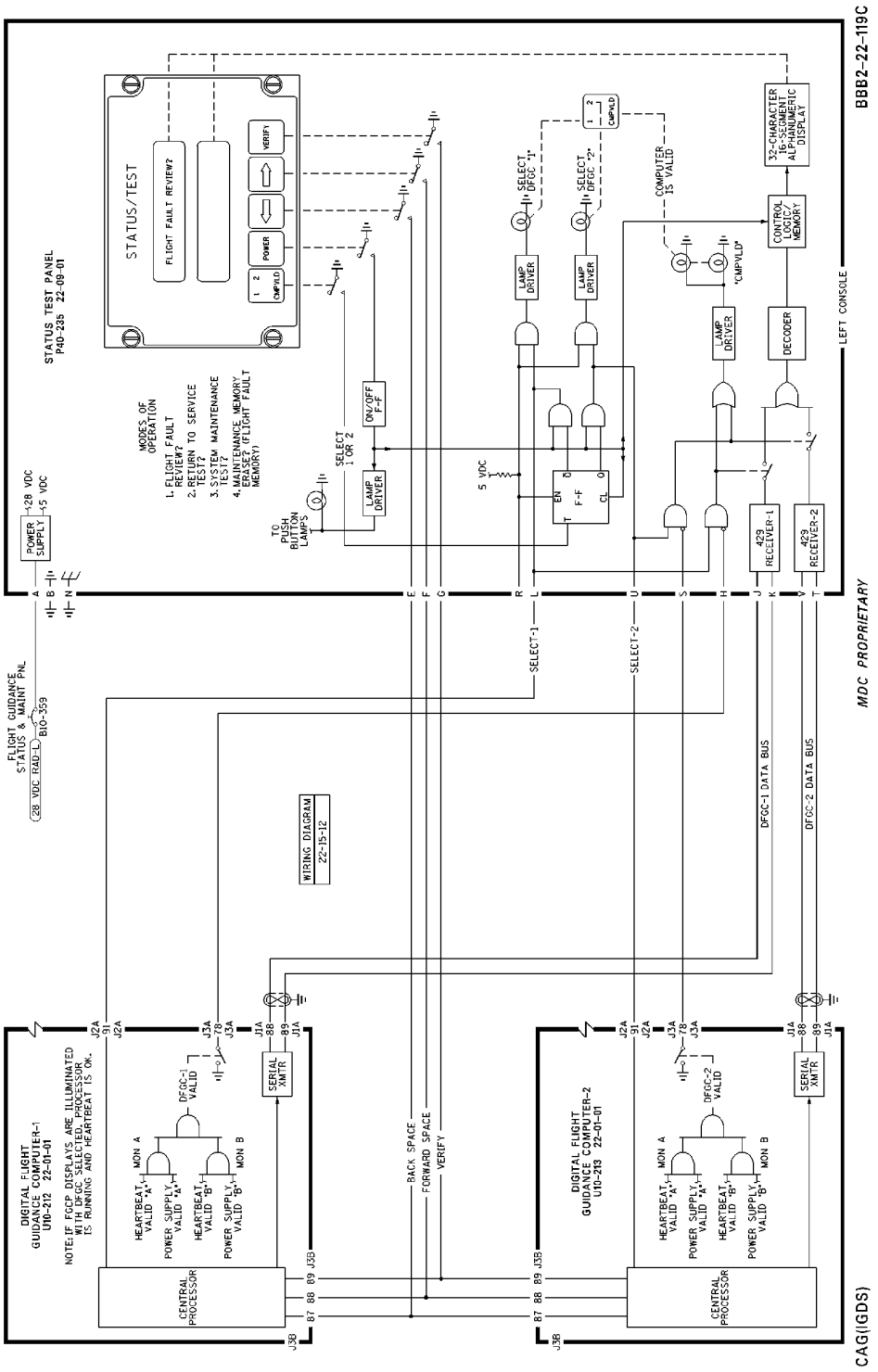
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following items.

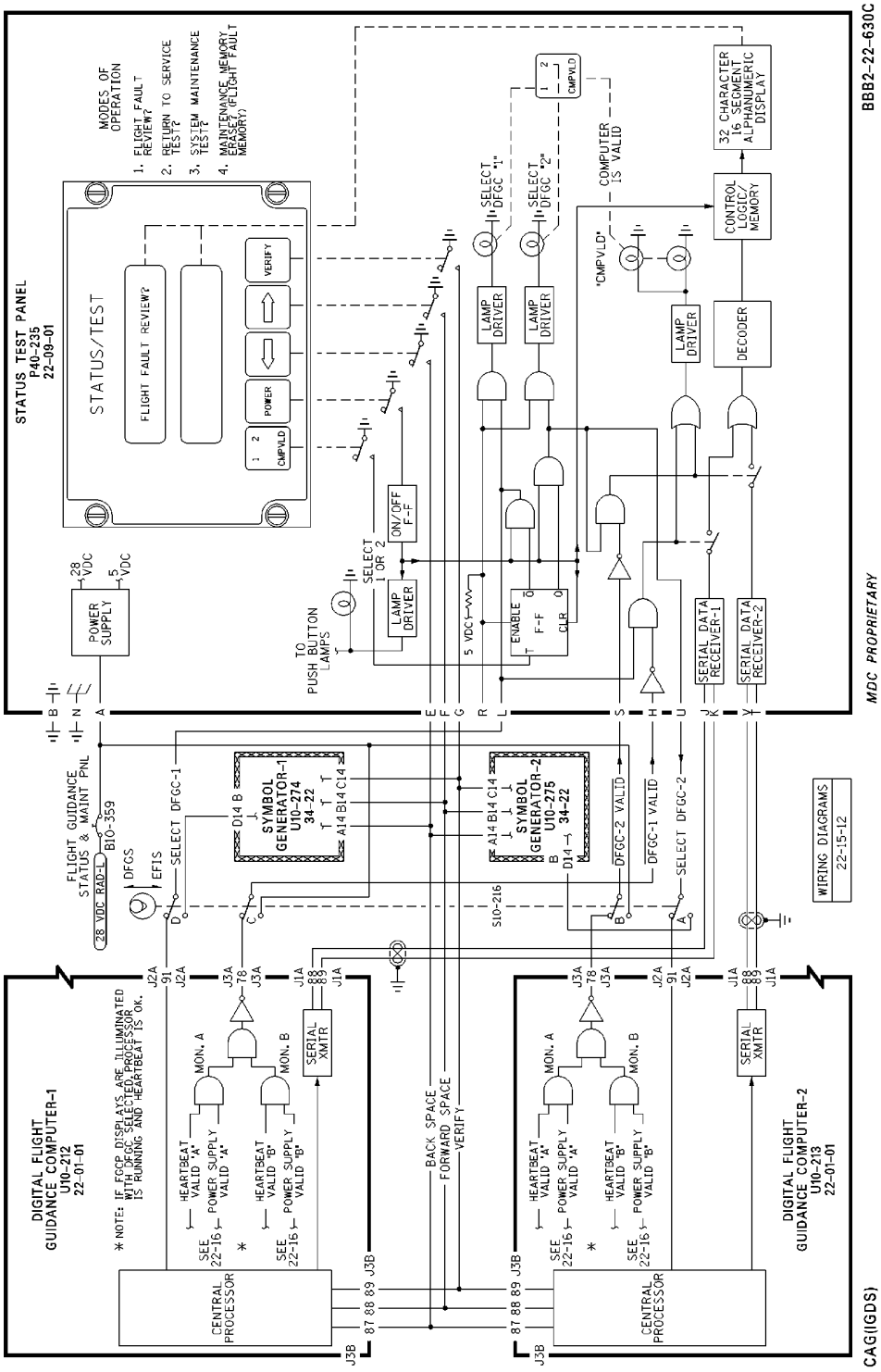
Table 101

Name and Number	Manufacturer
High impedence voltmeter capable of reading below 30 mv.	

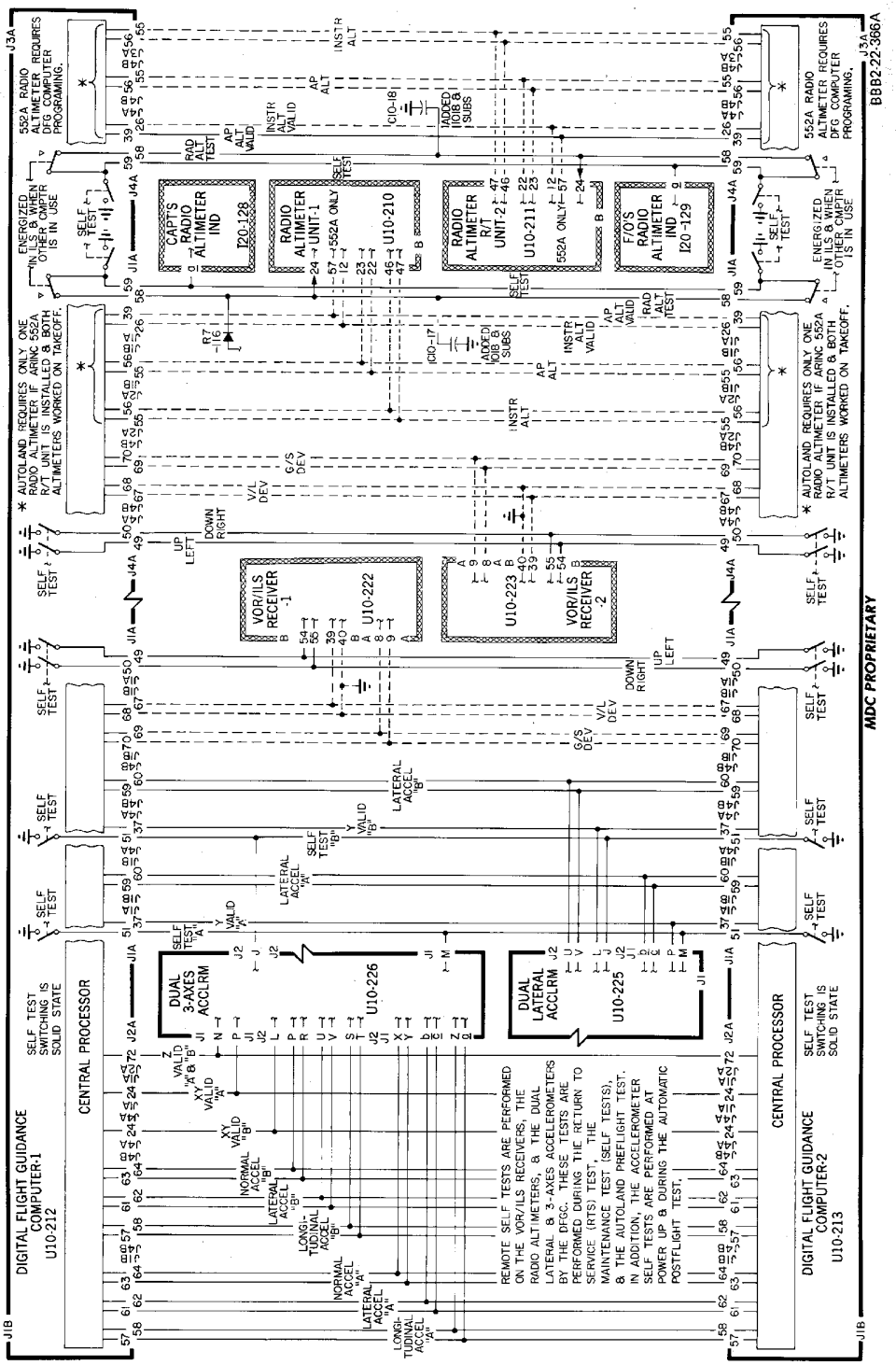


Status/Test Panel (STP)
Figure 101/22-01-05-990-883

EFFECTIVITY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 891-893

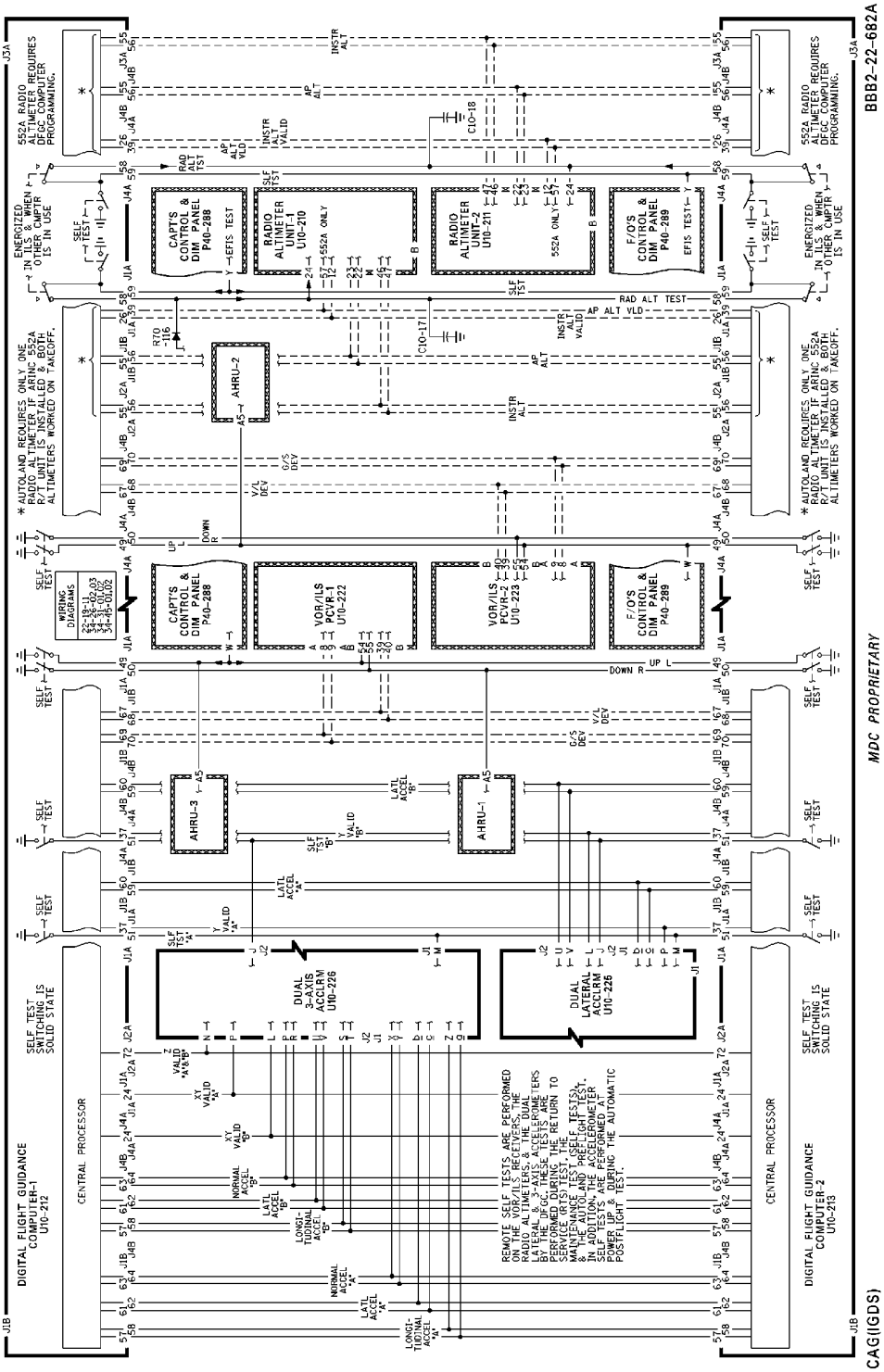


Status/Test Panel (STP)
Figure 102/22-01-05-990-884

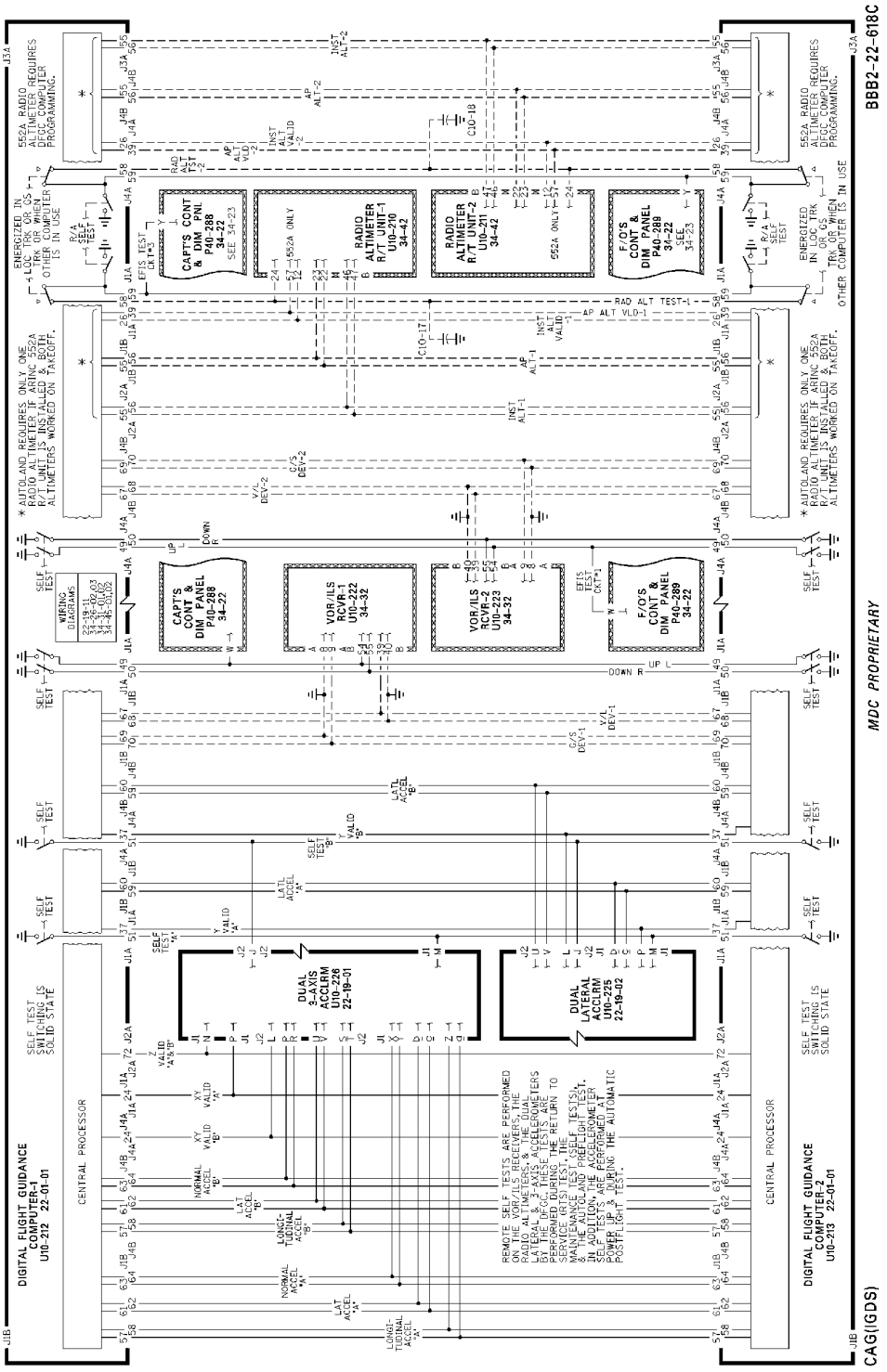


Remote Self-Test
Figure 103/22-01-05-990-885

EFFECTIVITY
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891-893



Remote Self-Test
Figure 104/22-01-05-990-889



Remote Self-Test
Figure 105/22-01-05-990-890

3. **Flight Fault Review**

A. The Digital Flight Guidance Computer (DFGC) has the capability of storing in-flight detected failures in a non-volitale memory. This feature is implemented within the DFGC by surveying the state of logic bits associated with valids and various monitors that provide in-flight information to the DFGC. The DFGC logic looks for this discrete logic information to be in a set condition or in a high condition. When this condition fails, then a corresponding failure will be logged within the DFGC for later recall (by use of the STP) as "FLIGHT FAULT REVIEW?".

B. Since the DFGC is looking for discrete logic information from associated DFGC LRU's or Sensors, the DFGC may log failures that appear only intermittently or for a short period of time (less than one second). These failures may not be visible to the flight crew and will only appear during "FLIGHT FAULT REVIEW?". Therefore, failure logging is not sufficient justification for removing and replacing a displayed LRU or Sensor. Ground test the item as called out in the following Flight Fault displays and use the Trouble Shooting Charts as called out in (Paragraph 4.) as necessary.

C. Prior to removing a displayed LRU or Sensor, verify the applicable ATA Chapter ground maintenance procedures are strictly adhered to. (i.e. CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201, for Removal/Installation of CADC's)

D. The following charts in this section alphabetically list the failure messages that may appear in the Flight Fault Review. Also shown is the flight compartment symptom that will be present if the failure occurs.

Table 102

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: With -974 DFGC expanded failure message Post S/B 22-133.				
A/P OVERPOWER MON DISCONNECT	PILOT COMMAND CAUSED OVERRIDE OF AUTOPILOT COMMAND. AUTOPILOT DISCONNECT.	NONE	NONE	NONE
ACCEL SELF TEST FAILURE	FAILED DUAL 3- AXIS AND/OR DUAL LATERAL ACCELEROMETER.	AUTOPILOT AND AUTO- THROTTLE WILL NOT ENGAGE AFTER POWER-UP.	SELF TESTS: DIAG. 358-373. SENSOR VALUES: DIAG. 209-216. PASSIVE DISCRETES: DIAG. 27-30.	REF T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201) OR DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ACCEL MISTRIM MON DISENGAGE (-960 DFGC)	MONITOR TRIPPED BECAUSE OF EXCESSIVE LONGITUDINAL ACCELERATION	AUTOPILOT DISCONNECT DURING ALTITUDE HOLD, ALTITUDE CAPTURE OR VERTICAL SPEED MODE	NONE	PERFORM ACCEL SELF- TEST OR NONE IF PILOT USED EPR LIM POWER IN ALT HOLD, ALT CAP OR USED SPD MODE.
AIL SERVO FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL: MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
AIL SERVO AMP FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477 SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR. (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
AILERON SERVO MODEL FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR. (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
NOTE: Prior to -920/-930 computers AIL read ELEV.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AIL MECH TORQ SWITCH FAILURE	FAILURE OF ONE OR BOTH AILERON MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES CLOSED. 2) FLAP POSITION 20° TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES OPEN.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF. T/S CHARTS.
NOTE: -971 computer and subs provide expanded failure messages.				
AIL MECH TORQ SWITCH FAILURE X	X=0 for a non-isolating failure			
	X=1 for switch 1 indicating unlimited when flaps <20 degrees			
	X=2 for switch 2 indicating unlimited when flaps <20 degrees			
	X=3 for both switches indicating unlimited when flaps <20 degrees			
	X=4 for switch 1 indicating limited when flaps >28 degrees			
	X=5 for switch 2 indicating limited when flaps >28 degrees			
	X=6 for both switches indicating limited when flaps >28 degrees			
	X=7 for switch 1 indicating limited during autoland			
	X=8 for switch 2 indicating limited during autoland			
	X=9 for both switches indicating limited during autoland			
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on the ground.				
AILERON POS FAILURE	FAILED AILERON SURFACE POSI- TION SYNCHRO.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. T/S CHARTS. REF. AIL POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AILERON SURFACE MONITOR FAILURE	FAILED AILERON SURFACE POSI- TION SYNCHRO OR AILERON RIG OR SURFACE PROBLEM.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTO- LAND" LIGHT ON, AND AUTOPILOT DISCON- NECTS.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. T/S CHARTS. REF. AIL POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201) REF. AIL RIGGING (AILERON AND TAB - ADJUSTMENT/TEST, PAGEBLOCK 27-10-00/501)
ALT SEL REF FAILURE	FAILED ALTITUDE PRESELECT SYNCHRO.	UNABLE TO CHANGE DISPLAY IN FGCP ALT WINDOW AND/ OR ARM ALT.	INTERNAL MONITORS: DIAG. 498. SWITCHES AND BUTTONS: DIAG. 164-165, 177.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
ANG OF ATT 1 SIGNAL FAILURE	FAILED LEFT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 490. SENSOR VALUES: DIAG. 226.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201)
ANG OF ATT 1, 2 COMP FAILURE	LEFT AND RIGHT ANGLE-OF- ATTACK VANE SPLIT (OUT OF TOLERANCE).	FD AND AP GO-AROUND UNAVAILABLE. SLOW-FAST INDICATOR BIAS OUT OF VIEW. SPD FLAG IN VIEW. BOTH PITCH COMMANDS OUT OF VIEW. AUTO-THROTTLE EPR ONLY. UNABLE TO STAY IN TAKEOFF MODE ABOVE 60 KNOTS.	SENSOR VALUES: DIAG. 226-227.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201)
ANG OF ATT 2 SIGNAL FAILURE	FAILED RIGHT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 491. SENSOR VALUES: DIAG. 227.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: When -971 computers and subs are installed.				
A/P DISCONNECT LIGHT X	X=1 for light "A" (J101A-60) X=2 for light "B" (J104A-60)			
NOTE: A failure will not be logged until both "A" (or "B") bulbs fail or if one bulb fails and the other FMA is removed.				
WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
-906 AND SUBSEQUENT COMPUTERS. ART FOLLOW-UP SWITCH RIGHT FAILURE ART FOLLOW-UP SWITCH LEFT FAILURE	RESPECTIVE FOLLOW-UP SWITCH CLOSED PRIOR TO ART SELF-TEST.	"ART INOP" LIGHT ON.	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (FUEL CONTROL, SUBJECT 73-20-01, page 201)
ART OPTION PIN FAILURE	ART GO-AROUND OPTION PINS IN OPPOSITE STATE DURING POWER-UP.	NONE.	PASSIVE DISCRETES: DIAG. 45.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
-906 AND SUBSEQUENT COMPUTERS ART SOLND LEFT FAILURE ART SOLND RIGHT FAILURE	RESPECTIVE ART FOLLOW-UP SWITCH NOT CLOSING DURING ART SELF-TEST (BOTH SWITCHES MUST CLOSE WITHIN 3 SECONDS AFTER SELF-TEST IS INITIATED).	"ART INOP" LIGHT ON (AFTER ART SELF-TEST).	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (FUEL CONTROL, SUBJECT 73-20-01, page 201)
WJE 880				
ASU CAPT ON AUX SWITCH FAILURE ASU F/O ON AUX SWITCH FAILURE -930 AND SUBSEQUENT DFGC.	AUX ATTITUDE SWITCHING UNIT INPUTS IN OPPOSITE STATES FOR MORE THAN 10 SECONDS.	A/P DISCONNECT AND DISABLED. "NO AUTO- LAND" LIGHT ON. A/T DIS- ABLED IN SPD AND MACH.	SWITCHES AND BUTTONS: DIAG. 73-84.	REF. T/S CHARTS. REF. ATTITUDE SW UNIT. (ATTITUDE SWITCHING UNIT, SUBJECT 34-23-04)

WJE 880 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
AUTO GA OPTION PIN FAILURE.	AUTO GO- AROUND OPTION PINS IN OPPOSITE STATE DURING POWER- UP.	N/A	PASSIVE DISCRETES: DIAG. 46.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
A/P ENGAGE DISCRETE FAILURE	A/P INDICATING ENGAGED AND OFF FOR TWO OR MORE SECONDS.	AP DISCONNECT. NO AUTOLAND LIGHT ON.	SECOND SET- UP INTER- ACTIVES: DIAG. 312-313. INITIAL SETUP INTER- ACTIVES: DIAG. 4-5.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201) .
A/P ENGAGE FAILURE	AUTPILOT INDICATES DISENGAGE WHEN SERVO CLUTCHES INDICATE ENGAGED.	DFGC SHUTDOWN ON ASSOCIATED SIDE.	SECOND SET- UP INTER- AVTIVES: DIAG. 312-319. INTIAL SET- UP INTER- ACTIVES: DIAG. 4-11.	REF. T/S CHARTS. REF. AS APPROPRI- ATE: AIL SERVO (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201), ELV SERVO (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201), YAW DAMP ACT. (YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201)
A/P HEARTBEAT TEST FAILURE	DFGC FAILS HEARTBEAT TEST AT POWER-UP.	AUTOPILOT WILL NOT ENGAGE IN ANY MODE.	RETEST DFGC BY GROUND POWER-UP.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
A/T ENGAGE LOGIC FAILURE	AUTOTHROTTLE INDICATES ENGAGED 1 SECOND AFTER DISCONNECT OR POWER-UP.	A/T DISCONNECTS AND WONT REENGAGE.	INTIAL SET- UP INTER- ACTIVES: DIAG. 14-15. SECOND SET- UP INTER- ACTIVES: DIAG. 322	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
A/T MODE CHECK FAILURE O-DFG A/T MODE CHECK FAILURE 1-DFGC A/T MODE CHECK FAILURE 2-DFGC	INCORRECT AUTOTHROTTLE MODE SEQUENCING WITHIN DFGC.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
A/T SERVO FAILURE	A/T SERVO MOTOR NOT OPERATING WITHIN SPECIFCATION.	A/T DISCONNECT.	SERVO TESTS: DIAG. 445-448.	REF. T/S CHARTS. REF. A/T SERVO MOTOR. (AUTO THROTTLE/SPEED CONTROL, SECTION 22-31)
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891-893				
NOTE: -920/-930 and subsequent computers; prior to these computers ATT display was VERT GYRO.				
ATT 1 SIGNAL FAILURE ATT 1 VALID FAILURE ATT 2 SIGNAL FAILURE ATT 2 VALID FAILURE	FAILED VERTICAL GYRO SIGNAL OR VALID FROM NUMBERED VERTICAL GYRO.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. VERT GYROS. (VERTICAL GYRO - MAINTENANCE PRACTICES, PAGEBLOCK 34-23-01/201)
ATT 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED VERTICAL GYROS WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED VG.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. VERT GYROS. (VERTICAL GYRO - MAINTENANCE PRACTICES, PAGEBLOCK 34-23-01/201)

WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 417, 419, 421, 423, 865, 869, 871, 872				
ATT 1 SIGNAL FAILURE ATT 1 VALID FAILURE ATT 2 SIGNAL FAILURE ATT 2 VALID FAILURE	FAILED ATTITUDE SIGNAL OR VALID FROM NUMBERED ATTITUDE SYSTEM.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. INERTIAL REFERENCE SYSTEM.
WJE 417, 419, 421, 423				
				(INERTIAL REFERENCE SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-43-00/201)
WJE 417, 419, 421, 423, 865, 869, 871, 872				
ATT 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED ATTITUDE SYSTEMS WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED SYSTEM.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. INERTIAL REFERENCE SYSTEM.
WJE 417, 419, 421, 423				
				(INERTIAL REFERENCE SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-43-00/201)
WJE 407, 408, 411, 880				
NOTE: -920/-930 and subsequent computers; prior to these computers ATT display was VERT GYRO.				

WJE 407, 408, 411, 880 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ATT 1 SIGNAL FAILURE ATT 1 VALID FAILURE ATT 2 SIGNAL FAILURE ATT 2 VALID FAILURE ATT 3 SIGNAL FAILURE ATT 3 VALID FAILURE	SINGLE ATTITUDE FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE. (ALTITUDE - MAINTENANCE PRACTICES, PAGEBLOCK 34-12-00/201 Config 1)
ATT 1, 2 COMP FAILURE ATT 1, 3 COMP FAILURE ATT 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE. (ATTITUDE SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-23-00/201 Config 6 or ATTITUDE - MAINTENANCE PRACTICES, PAGEBLOCK 34-23-00/201 Config 9)
WJE 407, 408, 411				
				REF. AHRS SW UNIT. (ATTITUDE/HEADING SWITCHING UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-21-11/201 Config 2)
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
BITE FAILURE XXXX-FAILURE	BUILT IN TEST FAILURE.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC ALT BCR 1 SIGNAL FAILURE CADC ALT BCR 1 VALID FAILURE CADC ALT BCR 2 SIGNAL FAILURE CADC ALT BCR 2 VALID FAILURE	FAILURE OF BARO-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 461-462.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC ALT NCR 1 SIGNAL FAILURE CADC ALT NCR 1 VALID FAILURE CADC ALT NCR 2 SIGNAL FAILURE CADC ALT NCR 2 VALID FAILURE	FAILURE OF NON-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 459-460. SENSOR VALUES: DIAG. 235-236	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC ALT NCR 1,2 COMP FAILURE	SPLIT BETWEEN NON-CORRECTED ALTITUDE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A NCR-1 AND NCR-2 VALID OR SIGNAL FAILURE.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 235-236.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC ALT RATE 1 SIGNAL FAILURE CADC ALT RATE 1 VALID FAILURE CADC ALT RATE 2 SIGNAL FAILURE CADC ALT RATE 2 VALID FAILURE	FAILURE OF ALTITUDE RATE SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 473-474. SENSOR VALUES: DIAG. 239-240.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC ALT RATE 1,2 COMP FAILURE	SPLIT BETWEEN ALT RATE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT AN ALT RATE-1 AND ALT RATE-2 VALID OR SIGNAL FAILURE. NOTE : PITOT STATIC SWITCHING MAY CAUSE THIS FAILURE TO BE LOGGED.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 239-240.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC CAS 1 SIGNAL FAILURE CADC CAS 1 VALID FAILURE CADC CAS 2 SIGNAL FAILURE CADC CAS 2 VALID FAILURE	FAILURE OF COMPUTED AIR-SPEED SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. UNABLE TO ARM FOR TAKEOFF.	INTERNAL MONITORS: DIAG. 465-466. SENSOR VALUES: DIAG. 243-244.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC CAS 1, 2 COMP FAILURE	SPLIT BETWEEN COMPUTED AIR-SPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT CAS-1 AND CAS-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD, TAKE- OFF, GO-AROUND, THRUST RATING, AND AUTO-THROTTLE OPERATION. (IF A/T IN SPD MODE SLOW-FAST INDICATOR BIASES AND SPD FLAG).	SENSOR VALUES: DIAG. 243-244.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC MACH 1 SIGNAL FAILURE CADC MACH 1 VALID FAILURE CADC MACH 2 SIGNAL FAILURE CADC MACH 2 VALID FAILURE	FAILURE OF MACH SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 463-464. SENSOR VALUES: DIAG. 245-246.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC MACH 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH MACH SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A MACH-1 OR MACH-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD MACH HOLD, GO-AROUND (BOTH FD AND AP), TAKEOFF (FD AND AP), AUTO-THROTTLE OPERATION IN EPR, SPD SEL, MACH SEL AND MACH TRIM COMP.	SENSOR VALUES: DIAG. 245-246.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SAT 1 SIGNAL FAILURE CADC SAT 1 VALID FAILURE CADC SAT 2 SIGNAL FAILURE CADC SAT 2 VALID FAILURE	FAILURE OF STATIC AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 475-476. SENSOR VALUES: DIAG. 241-242.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH STATIC AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A SAT SIGNAL OR VALID FAILURE.	N/A	SENSOR VALUES: DIAG. 241-242.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SWITCH DISCRETE FAILURE	DFGC DETECTS AIR DATA SWITCHING UNIT IN THE BOTH ON 1 AND BOTH ON 2 POSITION AT THE SAME TIME FOR MORE THAN 10 SECONDS.	ALL CADC VALIDS ARE LOST RESULTING IN A LOSS OF AP AND FD IN ALL MODES (EXCEPT TURB AND AUTOLAND). ALL AUTO- THROTTLE MODES, THRUST RATING, MACH TRIM COMP, AND ALTITUDE ALERT.	SWITCHES AND BUTTONS: DIAG. 85, 87, 89, 90.	REF. T/S CHARTS. REF. AIR DATA SWITCH UNIT. (AIR DATA SWITCHING UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-03/201)
CADC TAS 1 SIGNAL FAILURE CADC TAS 1 VALID FAILURE CADC TAS 2 SIGNAL FAILURE CADC TAS 2 VALID FAILURE	FAILURE OF TRUE AIRSPEED SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC TAS 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIRSPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A TAS OR VALID FAILURE.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC TAT 1 SIGNAL FAILURE CADC TAT 1 VALID FAILURE CADC TAT 2 SIGNAL FAILURE CADC TAT 2 VALID FAILURE	FAILURE OF TRUE AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 471-472. SENSOR VALUES: DIAG. 237-238.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC TAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A TAT SIGNAL OR VALID FAILURE.	LOSS OF THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 237-238.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CLOCK FAILURE -DFGC	REAL TIME CLOCK AND PROCESSOR CLOCK DIFFER BY ±0.3% DURING POWER UP.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CRITICAL STATE MONITOR FAILURE	A DYNAMIC FAILURE LOGGED ON SELECTED DFGC UNDER THE FOLLOWING CONDITIONS: 1) NORMAL ACCEL (Z AXIS) G -1.5g or L -.5g.. 2) PITCH ANGLE G 24.5° OR PITCH ANGLE L -18.0° 3) PITCH RATE G ±5 * deg/ sec. 4) ROLL ANGLE G ±35 deg. 5) ROLL RATE G ±10 * deg/ sec.	AUTOPILOT DISENGAGES UNTIL AIRPLANE BROUGHT WITHIN TOLERANCE.	SENSOR VALUES: NOTE: SINCE THIS IS A DYNAMIC FAILURE, AIRPLANE SENSORS (3-AXIS ACCEL. AND VERT GYROS) ARE PROBABLY NOT FAILED. HOWEVER, THESE SENSORS SHOULD BE VERIFIED NOT TO HAVE LARGE NULL VALUES IN STATIC CONDITION.	PERFORM RETURN-TO-SERVICE TEST. (DFGS STATUS/TEST, SUBJECT 22-01-05, page 201)

NOTE: -971 computers and subs provide expanded failure messages.

		Trip Threshold
CRITICAL STATE MONITOR FAILURE X	X=0 Normal Acceleration	±0.5 g
	X=1 Pitch Attitude >Max	+24.0 Deg
	X=2 Pitch Attitude <Max	-18.0 Deg
	X=3 Roll Attitude	±35.0 Deg
	X=4 Pitch Rate	±5.0 Deg/sec
	X=5 Roll Rate	±10.0 Deg/sec

NOTE: Failure codes 6 through 11 were added to enhance roll attitude. The column marked "Likely Failure" indicates which sensor may have had a slowover or a null which would result in the corresponding failure message.

		Likely Failure	
		Slowover Sensor	Null Sensor
	X=6 Sensor A	A	B
	X=7 Sensor A	A	C
	X=8 Sensor B	B	A
	X=9 Sensor B	B	C
	X=10 Sensor C	C	A
	X=11 Sensor C	C	B

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CRS ERROR 1 SIGNAL FAILURE CRS ERROR 1 VALID FAILURE CRS ERROR 2 SIGNAL FAILURE CRS ERROR 2 VALID FAILURE	FAILURE OF COURSE ERROR SIGNAL OR VALID FROM NUMBERED COURSE INPUT.	IF FAILURE OCCURS ON ASSOC. DFGC, THEN VOR, LOC, ILS AND AUTOLAND (AP AND FD) ARE INHIBITED. FOR FAILURE ON NON-ASSOC. SIDE THEN AUTOLAND IS INHIBITED. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 504-505.	REF. T/S CHARTS. REF. VHF/ NAV CONTROL PANEL. (VHF NAV CONTROL PANEL, SUBJECT 34-32-03, page 201)
CRS ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH COURSE INPUTS WITHOUT A SIGNAL OR VALID FAILURE WHILE IN ILS OR AUTOLAND.	DISABLES AUTOLAND. A/P DIS-ENGAGE IF IN AUTO-LAND.	VERIFY COURSE DISPLAY ON VHF/NAV CONTROL PANEL AGREES WITH COURSE POINTER ON RDI.	REF. T/S CHARTS. REF. VHF/ NAV CONTROL PANEL. (VHF NAV CONTROL PANEL, SUBJECT 34-32-03, page 201)
CHECKSUM FAILURE 0-DFGC CHECKSUM FAILURE 0001-DFGC CHECKSUM FAILURE 1-DFGC CHECKSUM FAILURE 2-DFGC CHECKSUM FAILURE 3-DFGC CHECKSUM FAILURE 4-DFGC CHECKSUM FAILURE 5-DFGC CHECKSUM FAILURE 6-DFGC CHECKSUM FAILURE 7-DFGC CHECKSUM FAILURE 0071-DFGC CHECKSUM FAILURE 0073-DFGC CHECKSUM FAILURE 0075-DFGC CHECKSUM FAILURE 0077-DFGC	BITE DETECTS PROCESSOR FAILURE.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CONTROL STORE FAILURE (-960 DFGC AND SUBSEQUENT) *	PARITY CHECK HARDWARE ERROR IN INTERNAL PROCESSOR EPROM MEMORY CHECK	DFGC SHUTDOWN	NONE	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for CONTROL STORE FAILURE.				
DLA-Y ACCEL 1 SIGNAL FAILURE DLA-Y ACCEL 1 VALID FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE	FAILED LATERAL ACCEL. SIDE A (1) OR SIDE B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 27-28. SELF TESTS: DIAG. 364-365,372-373 SENSOR VALUES: DIAG. 215-216	REF. T/S CHARTS. REF. DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)
DLA-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B LATERAL ACCEL. SIGNALS WITH- OUT CHANNEL A OR CHANNEL B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN. AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 364-365. SENSOR VALUES: DIAG. 215-216. PASSIVE DISCRETES: DIAG. 27-28.	REF. T/S CHARTS. REF. DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)
DUAL COMP FAILURE -DFGC	SIDE A COMPUTATION DISAGREES WITH SIDE B COMPUTATION.	COMPUTER SHUTDOWN. ALL FUNC- TIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
DUAL COMP FAIL XXXX-DFGC	XXXX=least significant 10 bits of failure address			
NOTE: Only the first failed address is logged when the DFGC is shut down even though more variables may actually miscompare. This failure indicates an internal problem within the DFGC.				
D3A-X ACCEL 1 SIGNAL FAILURE D3A-X ACCEL 1 VALID FAILURE D3A-X ACCEL 2 SIGNAL FAILURE D3A-X ACCEL 2 VALID FAILURE	FAILED CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCEL. LONGITUDINAL (X) AXIS.	UNABLE TO ARM FOR TAKEOFF. A/P DISENGAGE IF IN AUTO- LAND. AUTO G/A UNAVAILABLE.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D3A-X ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) ACCELERO METER X AXIS SIGNALS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AP AND FD IAS HOLD, MACH HOLD, GO- AROUND AND TAKEOFF. DISABLES AUTOLAND. DISENGAGES AUTOPILOT AND BIASES FD PITCH BAR. ALSO, LOSS OF AUTO- THROTTLE OPERATION IN EPR, TAKEOFF, SPD SEL, MACH SEL.	SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210. PASSIVE DISCRETES: DIAG. 29-30.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Y ACCEL 1 SIGNAL FAILURE D3A-Y ACCEL 1 VALID FAILURE D3A-Y ACCEL 2 SIGNAL FAILURE D3A-Y ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER LATERAL (Y) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 360-361, 368-369. SENSOR VALUES: DIAG. 211-212.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B 3-AXIS ACCELEROMETER SIGNALS IN THE LATERAL (Y) AXIS WITHOUT A CHANNEL A (1) OR B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 360-361, 368-369. PASSIVE DISCRETES: DIAG. 29-30. SENSOR VALUES:	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Z ACCEL 1 SIGNAL FAILURE D3A-Z ACCEL 1 VALID FAILURE D3A-Z ACCEL 2 SIGNAL FAILURE D3A-Z ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER NORMAL (Z) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISABLES GO-AROUND. DISENGAGES AP IF ENGAGED IN AUTOLAND OR AUTO GO- AROUND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: 213-214.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D3A-Z ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) 3-AXIS ACCELEROMETER SIGNALS IN THE NORMAL (Z) AXIS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. ALL AP AND FD PITCH MODES DISABLED, EXCEPT TURB (AP DISCONNECT AND/OR FLIGHT DIRECTOR PITCH COMMAND BIASES OUT OF VIEW). ALSO, DISABLES AUTO-THROTTLE RETARD MODE.	SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: DIAG. 213-214. PASSIVE DISCRETES: DIAG. 29-30.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D/A-A/D FAILURE -DFGC	BITE DETECTED A/D-D/A FAILURE.	AP DIS- CONNECT, AT DISCONNECT, FD INVALID (ASSOC. FD BARS BIAS OUT OF VIEW), FAST-SLOW INVALID (POINTER OUT OF VIEW), HUD VALID CLEARED, YAW DAMP INVALID ("YAW DAMP OFF" LIGHT ON), MACH TRIM DISABLED ("MACH TRIM INOP" LIGHT ON), "NO AUTOLAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
ELEV MECH TORQ SWITCH FAILURE(-920 DFGC AND SUBSEQUENT, ELEV IS AIL)	FAILURE OF ONE OR BOTH ELEVATOR MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES OPEN. 2) FLAP POSITION 20° TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES CLOSED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF. T/S CHARTS.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ELEVATOR POS 1 SIGNAL FAILURE ELEVATOR POS 2 SIGNAL FAILURE	FAILURE OF LEFT (1) OR RIGHT (2) ELEVATOR POSITION SENSOR.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	INTERNAL MONITORS: DIAG. 457-458. SENSOR VALUES: DIAG. 221-222.	REF. T/S CHARTS. REF. ELEV. POS SENSOR (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
ELEV POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT ELEV. SURFACE POS. SENSORS WITHOUT AN INDIVIDUAL 1 OR 2 SIGNAL FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222.	REF. T/S CHARTS. REF. ELEV. POS SENSOR (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
NOTE: LOGGING OF THIS FAILURE IS IN- HIBITED BELOW 60 KNOTS.				
ELEVATOR SURFACE MONITOR FAILURE	FAILED LEFT OR RIGHT ELEVATOR SURFACE POSITION SIGNAL OR DETERIORATED ELEVATOR PERFORMANCE DURING AUTO- LAND. ONLY LOGGED ON SELECTED DFGC WHILE IN AUTOLAND.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222. INTERNAL MONITORS: DIAG. 457-458.	REF. T/S CHARTS. REF. ELEV. POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
ELV SERVO FAILURE	FAILED ELEVATOR SERVO.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. T/S CHARTS. REF. ELEV. SERVO MOTOR. (DUPLEX ELEVATOR SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-12-01/201)
ELV SERVO AMP FAILURE	FAILED ELEVATOR SERVO AMPLIFIER IN DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ELV SERVO MODEL FAILURE	ELEVATOR SERVO FAILS TO PERFORM WITHIN THE LIMITATIONS OF ITS MODEL.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201.	REF. T/S CHARTS. REF. ELEV. SERVO MOTOR. (DUPLEX ELEVATOR SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-12-01/201)
WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
EL/AIL CLUTCH FAILURE	EITHER OR BOTH ELEVATOR OR AILERON CLUTCHES INDICATING ENGAGED WHEN AP DISENGAGED OR DISENGAGED WHEN AP ENGAGED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 6-9. SECOND SETUP INTER- ACTIVES: DIAG. 314-317.	REF. T/S CHARTS.
NOTE: -971 computers and subs provide expanded failure messages.				
EL/AIL CLUTCH FAILURE X	X=0 for a non-isolatable failure			
	X=1 for an elevator clutch failure			
	X=2 for an aileron clutch failure			
	X=3 for both elevator and aileron clutch failure			
END AROUND FAILURE 0-DFGC END AROUND FAILURE 1-DFGC	D/A-A/D END AROUND MONITOR FAILURE.	NONE.	NONE.	MONITOR OCCURANCE, IF FAILURE PERSISTS, REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 2-DFGC END AROUND FAILURE 3-DFGC END AROUND FAILURE 4-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: More END AROUND failures may occur than shown. All require same maintenance action.				

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 5-DFGC	YAW DAMPER COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	YAW DAMP INVALID. "YAW DAMP INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 6-DFGC END AROUND FAILURE 7-DFGC END AROUND FAILURE 8-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 9-DFGC	AUTOTHROTTLE COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AUTO- THROTTLE DISENGAGE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 10-DFGC END AROUND FAILURE 11-DFGC END AROUND FAILURE 12-DFGC END AROUND FAILURE 13-DFGC	FLIGHT DIRECTOR END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FD COMMAND BARS BIAS OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 14-DFGC END AROUND FAILURE 15-DFGC	FAST/SLOW END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FAST/SLOW POINTER BIASES OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC
END AROUND FAILURE 16-DFGC END AROUND FAILURE 17-DFGC	EPR INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 18-DFGC	MACH TRIM END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	DISABLED MACH TRIM COMP. "MACH TRIM INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 19-DFGC END AROUND FAILURE 20-DFGC	IAS INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 21-DFGC END AROUND FAILURE 22-DFGC	AILERON TORQUE LIMIT COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 23-DFGC END AROUND FAILURE 24-DFGC	EPR LIMIT END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 25-DFGC	HUD COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	HUD VALID CLEARED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 26-DFGC. -906 COMPUTER.	QNH REFERENCE VOLTAGE END AROUND FAILURE.	ALT PRE- SELECT DISPLAY BLANK ALT CANNOT BE ARMED.	NONE.	REMOVE AND REPLACE ASSOCIATED DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
ENGINE OPTION PIN FAILURE	ENGINE OPTION PINS NOT IN ALLOWABLE CONFIGURATION.	TRI DIS- PLAYS 2.00 WITH FLAG AND "NO MODE" DISPLAYED. THRUST RATING AND AUTO- THROTTLE DISABLED.	VERIFY PROPER GROUND OF ENGINE OPTION PINS (TRC A, B, C, D,).	REF. W/D. (WDM 22-16-15)
EPR LEFT FAILURE EPR RIGHT FAILURE EPR SENSOR FAILURE	FAILED EPR TRANSMITTER.	AUTO- THROTTLE DISENGAGE.	INTERNAL MONITORS: DIAG. 494-495. SENSOR VALUES: DIAG. 228-229.	REF. T/S CHARTS. REF. EPR TRANSMITTER. (ENGINE PRESSURE RATIO (EPR) TRANSMITTERS, SUBJECT 77-11-02, page 201)
FLAG FAILURE -DFGC	INTERNAL HARD- WARE FLAG FAILURE.	DFGC SHUTDOWN. ALL FUNCTIONS DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAG FAILURE XX-DFGC	XX=decimal number of failed flag			
NOTE: A flag failure is an internal failure within the DFGC.				
FLAP HANDLE FAILURE	FAILED FLAP POSITION INPUT FROM FLAP HANDLE.	NONE.	INTERNAL MONITORS: DIAG. 500. SECOND SETUP INTER- ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG. 234.	REF. T/S CHARTS.
NOTE: POSSIBLE FAILURE MAY BE LOGGED WHEN FLAP/ SLAT HANDLE MOVED FROM LAND/EXT TO 0 DEGREES RAPIDLY.				

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
FLAP POS 1 SIGNAL FAILURE FLAP POS 1 VALID FAILURE	FAILED FLAP POSITION INPUT FROM LEFT (1) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG: 232.	REF. T/S CHARTS. REF. L FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)
FLAP POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT FLAP POSITION SYNCHROS WITHOUT A LEFT OR RIGHT SIGNAL OR VALID FAILURE.	AP AND FD TAKEOFF AND GO-AROUND DISABLED. AUTO-THROTTLE INHIBITED. SPD FLAG IN VIEW.	SENSOR VALUES: DIAG. 232-233.	REF. T/S CHARTS. REF. L OR R FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)
FLAP POS 2 SIGNAL FAILURE FLAP POS 2 VALID FAILURE	FAILED FLAP POSITION INPUT FROM RIGHT (2) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 330, 339, 344. SENSOR VALUES: DIAG. 233.	REF. T/S CHARTS. REF. R FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAP POS 3 SIGNAL FAILURE	If flaps are less than 24 degrees, autoland engagement is disallowed and the A/P will disconnect at 300 feet if autoland is armed. If flaps become less than 24 degrees after autoland is engaged, the A/P will disengage immediately. This failure message is logged into maintenance memory when an A/P disconnect occurs for either of these cases.			
GEN LOG ILLEGAL INST -DFGC	INTERNAL MONITORING DETECTS AN ILLEGAL OR UNDEFINED GENERAL LOGIC INSTRUCTION.	DFGC SHUTDOWN. ALL DFGC FUNCTIONS FROM AFFECTED DFGC UNUSEABLE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
G/S DEV 1 SIGNAL FAILURE G/S DEV 1 VALID FAILURE G/S DEV 2 SIGNAL FAILURE G/S DEV 2 VALID FAILURE	FAILED GLIDE-SLOPE DEVIATION SIGNAL OR VALID FROM NUMBERED RECEIVER.	LOSS OF ASSOC. INPUT (i.e. G/S DEV 1 WITH DFGC 1 SELECTED) RESULTS IN A/P DISENGAGE IN ILS AND NON-ASSOC. PITCH CMD BIAS. LOSS OF NON-ASSOC. INPUT AFTER G/S TRACK RESULTS IN A/P DISENGAGE AND NON-ASSOC. FD CMD BAR BIAS. A/P IS REENGAGEABLE INTO ILS. LOSS OF EITHER DISABLES AUTOLAND. THIS FAILURE CAN ONLY BE LOGGED IF IN G/S CAPTURE OR TRACK ABOVE 50 FEET RADIO ALTITUDE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, page 201)
NOTE: When -971 computers and subs are installed, G/S DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891				
GND SENSOR FAILURE	AT LEAST ONE GROUND SENSOR DISAGREES WITH THE OTHERS FOR MORE THAN 40 SECONDS (THERE ARE FOUR GROUND SENSORS: 2 GROUND CONTROL RELAYS, AND 2 MAIN GEAR WEIGHT ON WHEELS SENSORS.	AUTOLAND INHIBITED. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG. 31-32. SWITCHES AND BUTTONS: DIAG. 123-124, 141-142.	REF. T/S CHARTS.
NOTE: -971 computers and subs provide expanded failure messages.				
GND SENSOR FAILURE X	X=0 for non-isolatable failure			
	X=1 for Ground control relay 1 (left) failed			
	X=2 for Ground control relay 2 (right) failed			
	X=3 for Left main gear WOW sensor failed			
	X=4 for Right main gear WOW sensor failed			

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 412, 414				
GND SENSOR FAILURE	AT LEAST ONE GROUND SENSOR DISAGREES WITH THE OTHERS FOR MORE THAN 40 SECONDS (THERE ARE FOUR GROUND SENSORS: 2 GROUND CONTROL RELAYS, AND 2 MAIN GEAR WEIGHT ON WHEELS SENSORS.	AUTOLAND INHIBITED. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG. 31-32. SWITCHES AND BUTTONS: DIAG. 123-124, 141-142.	REF. T/S CHARTS.
NOTE: -971 computers and subs provide expanded failure messages.				
GND SENSOR FAILURE X	X=0 for non-isolatable failure			
	X=1 for Ground control relay 1 (left) failed			
	X=2 for Ground control relay 2 (right) failed			
	X=3 for Left main gear WOW sensor failed			
	X=4 for Right main gear WOW sensor failed			
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
G/S DEV 1,2 COMP FAILURE	SPLIT BETWEEN GLIDESLOPE DEVIATION SIGNALS WITHOUT CORRESPONDING G/S DEV 1 OR G/S DEV 2 SIGNAL OR VALID FAILURE. CAN ONLY BE LOGGED IN G/S CAPTURE OR TRACK AND RADIO ALTITUDE ABOVE 50 FEET.	DISABLES AUTOLAND. A/P DIS-ENGAGE IF IN ILS OR AUTOLAND.	SELF TESTS: DIAG. 350-357.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, page 201)
HDG ERROR 1 SIGNAL FAILURE HDG ERROR 1 VALID FAILURE HDG ERROR 2 SIGNAL FAILURE HDG ERROR 2 VALID FAILURE.	FAILED HEADING ERROR SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUT-NO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. INTERNAL MONITORS: DIAG. 506-507.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (HEADING SYSTEM, SUBJECT 34-21-00, page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
HDG ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN HEADING ERROR SIGNAL WITHOUT A CORRESPONDING HDG ERROR 1 OR HDG ERROR 2 SIGNAL OR VALID	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE FD COMMAND BAR BIAS IN HDG HLD, HDG SEL AND VOR.	INTERNAL MONITORS: DIAG. 506-507.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
HEADING 1 SIGNAL FAILURE HEADING 1 VALID FAILURE HEADING 2 SIGNAL FAILURE HEADING 2 VALID FAILURE	FAILED HEADING SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUT-NO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231. INTERNAL MONITORS: DIAG. 455-456.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (HEADING SYSTEM, SUBJECT 34-21-00, page 201)
HEADING 1,2 COMP FAILURE	SPLIT (APPROX 5°) BETWEEN THE TWO HEADING SIGNALS WITHOUT A CORRESPONDING HEADING 1 OR HEADING 2 SIGNAL OR VALID FAILURE.	A/P DISENGAGE. FD ROLL CMD BIAS IN HDG HLD, HDG SEL, VOR. "HEADING" MONITOR LIGHT ON.	SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231. NOTE: 0 TO 180° CARD = 0 TO 180° ON STP. 181° TO 359° = -179° TO -1° ON STP.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (HEADING SYSTEM, SUBJECT 34-21-00, page 201)
HOR STAB FAILURE	FAILED HORI-ZONTAL STAB. POSITION SENSOR.	TAKOFF MODE INHIBITED. SLOW/FAST BIAS. SPD FLAG IN VIEW. IF FAILURE OCCURS BEFORE G/S CAP, A/P AND FD GA INHIBITED.	SENSOR VALUES: (DISPLAY OPTION). DIAG. 225. INTERNAL MONITORS: DIAG. 497. SERVO TESTS: DIAG. 440-441.	REF. T/S CHARTS. REF. SURFACE POS SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
ILLEGAL A/T MODE 0-DFGC ILLEGAL A/T MODE 1-DFGC ILLEGAL A/T MODE 2-DFGC ILLEGAL PITCH MODE 0-DFGC ILLEGAL PITCH MODE 1-DFGC ILLEGAL PITCH MODE 2-DFGC ILLEGAL ROLL MODE 0-DFGC ILLEGAL ROLL MODE 1-DFGC ILLEGAL ROLL MODE 2-DFGC ILLEGAL YAW MODE 1-DFGC ILLEGAL YAW MODE 2-DFGC ILLEGAL PITCH MODE 3-DFGC ILLEGAL PITCH MODE 4-DFGC ILLEGAL ROLL MODE 3-DFGC ILLEGAL ROLL MODE 4-DFGC ILLEGAL YAW MODE 0-DFGC ILLEGAL YAW MODE 3-DFGC	COMPUTER MONITORS DETECT AN ILLEGALLY SEQUENCED MODE.	COMPUTER SHUTDOWN. FGCP BLANK. ASSOC. SPD AND FD FLAGS IN VIEW. ALL FUNCTIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
LAND INHIBIT DISCRETE FAILURE	LAND INHIBIT INPUTS IN DIFFERENT STATES FOR MORE THAN 10 SECONDS.	A/P DIS- ENGAGE. "NO AUTOLAND" LIGHT ON.	NONE.	REF. COMPASS SWITCHING (COMPASS, SECTION 34-21, page 201), REF. VHF/ NAV SWITCHING (INSTRUMENT LANDING SYSTEM (ILS), SECTION 34-32).

WJE 407, 408, 411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 891-893 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
LOC DEV 1 SIGNAL FAILURE LOC DEV 1 VALID FAILURE LOC DEV 2 SIGNAL FAILURE LOC DEV 2 VALID FAILURE	FAILED LOCALIZER DEVIATION SIGNAL OR VALID FROM NUMBERED RECEIVER. FAILURE LOGGED ON SELECTED DFGC WHEN A/P IS ENGAGED IN LOC, ILS, OR AUTOLAND (ALIGN AND ROLLOUT).	LOSS OF ASSOC. SIGNAL OR VALID (i.e. LOC DEV 1 SIGNAL FAILURE WITH DFGC-1 SELECTED) INHIBITS LOC, ILS AND AUTO- LAND. A/P DISENGAGES, FD CMD BAR BIAS. LOSS OF NON ASSOC INPUT AFTER LOC TRK RESULTS IN AP DISENGAGE AND FD CMD BAR BIAS. A/P CAN BE REENGAGED IN ILS OR LOC MODE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, page 201)
NOTE: When -971 computers and subs are installed, LOC DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				
LOC DEV 1,2 COMP FAILURE	SPLIT BETWEEN LOCALIZER DEVIATION SIGNAL WITHOUT A CORRE-SPONDING LOC DEV 1 OR LOC DEV 2 SIGNAL OR VALID FAILURE. FAILURE LOGGED ON SELECTED DFGC ONLY WHEN A/P ENGAGED IN LOC, ILS OR AUTOLAND (ALIGN OR ROLLOUT).	IF ENGAGED IN LOC, ILS OR AUTO- LAND, NON- ASSOC FD CMD BAR BIASES OUT OF VIEW.	SELF TESTS: DIAG. 350-357. SENSOR VALUES: (DISPLAY OPTION) DIAG. 219-220.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, page 201)
NOTE: USE SIG. GEN. TO VERIFY LOC DEV.FROM EACH ILS RCVR.				
MACH TRIM POWER FAILURE	LOSS OF MACH TRIM SERVO AMPLIFIER POWER. LOGGED ONLY ON SELECTED DFGC.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. T/S CHARTS. REF. MACH TRIM ACT. (MACH TRIM ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-22-01/201)
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
MACH TRIM SERVO FAILURE	FAILED MACH TRIM SERVO.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. T/S CHARTS. REF. MACH TRIM ACT. (MACH TRIM ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-22-01/201)
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				
MAINT MEMORY FAILURE -DFGC	FAILURE DETECTED IN MAINTENANCE MEMORY USED TO STORE FLIGHT FAULTS.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
N1 LEFT FAILURE N1 RIGHT FAILURE	N1 VALID DATA FROM INDICATED N1 TRANSMITTER GONE FOR MORE THAN .6 SECONDS OR N1 COUNT NOT IN ALLOWABLE LIMITS WHEN VALID IS PRESENT.	EPR SYNCH DISABLED. IF FAILURE OCCURS WHEN ART IS ARMED THEN ART WILL FIRE, OTHERWISE "ART INOP" LIGHT ON. LOGGED IF AIRPLANE IS IN FLIGHT MODE (WEIGHT ON WHEEL SENSORS AND GND CONT RELAYS OPEN AND ENGINES RUNNING).	NONE.	VERIFY N1 INDICATORS DURING NEXT ENGINE RUNUP (POWER, SUBJECT 77-10-00, page 501), IF PROPER, VERIFY WIRING TO DFGC. REF. W/D (WDM 77-12-00).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
OPTION PIN FAILURE	FAILED EVEN PARITY CHECK. NINE DFGC OPTION PINS ARE CHECKED FOR GROUNDS. AFTER CHECK THERE SHOULD BE AN EVEN NUMBER OF GROUNDS. THE OPTION PINS ARE: (a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) PARITY PIN	A/P AND FD DISABLED. A/P DISENGAGE AND FD CMD BIAS.	PASSIVE DISCRETES: DIAG. 48.	REF. T/S CHARTS.
NOTE: FOR AIRPLANES WITH -906 AND SUBSEQUENT COMPUTERS, TEN DFGC OPTION PINS.				
	(a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) QNH CORRECT (g) BOX 2-A BOX 2-B (h) PARITY PIN (i) MD-87			
NOTE: -971 computers and subs provide expanded failure messages.				
OPTION PIN FAILURE X	X=0 for option pin parity failure based on the input discretes alone			
	X=1 for Box 2A vs. Box 2B option pin disagreement			
	X=2 for VG3 flag vs. VG3 option pin disagreement			
	X=3 for parity failure of critical option input discretes vs. their corresponding hardware flags.			
PAR RUD CLUTCH FAILURE	PARALLEL RUDDER SERVO CLUTCH INDICATES ENGAGED WHEN A/P DISENGAGED, OR DISENGAGED WHEN A/P ENGAGED DURING AUTOLAND, ILS OR AUTO GO-AROUND.	A/P DISENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 10-11. SECOND SETUP INTER- ACTIVES: DIAG. 318-319. SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
PAR RUD SERVO AMP FAILURE	FAILED PARALLEL RUDDER SERVO AMPLIFIER.	PAR RUDDER INHIBITED. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)
PAR RUD SERVO MODEL FAILURE PARALLEL RUD SERVO FAILURE	FAILED PARALLEL RUDDER SERVO.	PAR RUDDER INHIBITED. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438. INTERNAL MONITORS: DIAG. 479. SENSOR VALUES: DIAG. 196-197, 204-205.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)
PAR RUD SURFACE MONITOR FAILURE	PARALLEL RUDDER SERVO FAILS TO MOVE RUDDER WITHIN MODEL LIMITS AS SEEN BY RUDDER SURFACE POSITION SENSOR.	A/P DIS- ENGAGE IF IN AUTO- LAND. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DAIG. 479, 499. SENSOR VALUES: DIAG. 224. SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. SURFACE POSITION SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
PITCH MODE CHECK FAILURE 0-DFGC PITCH MODE CHECK FAILURE 1-DFGC PITCH MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL PITCH MODE.	DFGC SHUTDOWN. ALL SYSTEM FUNCTIONS LOST. SPD AND FD FLAG ON ASSOC. SIDE. A/P AND A/T DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
PMS DATA FAILURE	DFGC RECEIVED NO DATA ON PMS DATA BUS	PERF MODE INOP	DIAG. 508	REFERENCE WIRING DIAG 34-63-0.
PMS/FMS DATA FAILURE (-970 DFGC)	DFGC RECEIVED NO DATA ON PMS/FMS DATA BUS	PERF MODE OR FMS VNAV MODE INOP	DIAG. 508	REFERENCE WIRING DIAG 34-63-0.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
QNH INPUT FAILURE. -906 COMPUTER.	QNH ANALOG INPUT UNREASONABLE. OPEN, SHORT TO GND OR SHORTED TO THE QFE REFERENCE.	APPLICABLE ONLY IF QNH CORRECT OPTION IS SELECTED. LOSS OF ALT. REF. ALT ARMING AND ALT. ALTERING INHIBITED.	SENSOR VALUES: DIAG. 247.	REMOVE AND REPLACE ASSOC. DFGC(DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201) OR 34-11. FAILED BARO SET IN STANDBY ALTIMETER.
RAD ALT 1 SIGNAL FAILURE RAD ALT 1 VALID FAILURE RAD ALT 2 SIGNAL FAILURE RAD ALT 2 VALID FAILURE	FAILED RADIO ALTIMETER -1 OR -2 SIGNAL OR VALID. MONITORED ONLY BELOW 2300 FEET RADIO ALTITUDE.	DEPENDS ON TYPE OF R/A INSTALLED. (a) 552 R/A- AUTO-LAND DISABLED. NO AUTOLAND LITE ON (i.e. NO GROUND AT J102B/94 AND J103B/94 REF. W/D (WDM 22-16-18). (b) 552A R/A- NO AFFECT (GROUND AT J102B/94 AND J103B/94).	SELF TESTS: DIAG. 374-381 PASSIVE DISCRETES: DIAG. 41-44.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (RADIO ALTIMETER SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-42-00/201, page 201)
WJE 407, 408, 411, 412, 414, 415, 418, 420, 422, 424-427, 429, 863, 864, 866, 891				
RAD ALT 1,2 COMP FAILURE	SPLIT BETWEEN BOTH RADIO ALTIMETER SIGNALS WITHOUT A CORRESPONDING RAD ALT 1 OR RAD 2 SIGNAL OR VALID FAILURE.	LOSS OF ILS, AUTO-LAND, TAKE- OFF AND A/T RETARD. A/P DISCONNECT. "NO AUTO- LAND" LIGHT ON.	SELF TESTS: DIAG. 374-381. PASSIVE DISCRETES: DIAG. 41-44.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (RADIO ALTIMETER SYSTEM, SUBJECT 34-42-00, Page 201)
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
R/A OPTION PIN FAILURE	RADIO ALTIMETER OPTION PIN DIS-AGREEMENT.	NONE. 552A R/A- CHECK J102A/94 AND J103A/94 FOR GROUND. 552 R/A - CHECK J102A/94 AND J103A/94 FOR OPEN.	PASSIVE DISCRETES: DIAG. 47.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (RADIO ALTIMETER SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-42-00/201, page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
RAM FAILURE -DFGC *	VALUE STORED IN RANDOM ACCESS MEMORY (RAM) LOCATION NOT THE SAME AS VALUE READ FROM THE SAME RAM LOCATION.	DFGC SHUT- DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for RAM FAILURE.				
ROLL MODE CHECK FAILURE 0-DFGC ROLL MODE CHECK FAILURE 1-DFGC ROLL MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL ROLL MODE.	DFGC SHUTDOWN ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
RUD UNRESTRICTED SWITCH FAILURE	TWO SEPERATE FAILURES: (a) EITHER RUDDER UNRESTRICTED SWITCH INDICATING UNRE- STRICTED ABOVE 195 KNOTS. (b) EITHER RUDDER UNRESTRICTED SWITCH INDICATING RESTRICTED BELOW 145 KNOTS.	(a) NONE. (b) A/P DISENGAGE "NO AUTO- LAND" LIGHT ON.	(a) CHECK OPERATION OF SWITCH REF. RUDDER. (RUDDER THROW-LIMITER - MAINTENANCE PRACTICES, PAGEBLOCK 27-20-06/201). (b) PASSIVE DISCRETES: DIAG. 37-38.	REF. T/S CHARTS. REF. RUDDER. (RUDDER AND TAB - TROUBLE SHOOTING, PAGEBLOCK 27-20-00/101)
NOTE: -971 computers and subs provide expanded failure messages.				
RUD UNRESTRICTED SWITCH FAIL X	X=0 for a non-isolatable failure			
	X=1 for switch 1 indicating restricted below 145 kts			
	X=2 for switch 2 indicating restricted below 145 kts			
	X=3 for both switches indicating restricted below 145 kts			
	X=4 for switch 1 indicating unrestricted above 205 kts			
	X=5 for switch 2 indicating unrestricted above 205 kts			
	X=6 for both switches indicating unrestricted above 205 kts			
	X=7 for switch 1 indicating restricted during autoland			
	X=8 for switch 2 indicating restricted during autoland			
	X=9 for both switches indicating restricted during autoland			

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on ground.				
RUDDER POS FAILURE	FAILED RUDDER SURFACE POSITION SYNCHRO.	AUTOLAND INHIBIT. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN AUTO- LAND. FD REVERTS TO ILS.	INTERNAL MONITORS: DIAG. 499. SENSOR VALUES: DIAG. 224.	REF. T/S CHARTS. REF. SURFACE POSITION SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
SLAT POS 1, 2 COMP FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS WITH-OUT LOSING EITHER SLAT VALID.	LOSS OF A/P AND FD TAKEOFF AND GO-AROUND. LOSS OF ALL AUTO-THROTTLE MODES EXCEPT EPR. SLOW-FAST BIAS, SPD FLAG IN VIEW. "ART INOP" LIGHT ON.	PASSIVE DISCRETES: DIAG. 33-34. SECOND SETUP INTER-ACTIVES: DIAG. 334-335, 341-342, 348-349.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. (SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201)
SLAT POS 1 VALID FAILURE SLAT POS 2 VALID FAILURE	FAILED SLAT VALID 1 OR SLAT VALID 2 FROM PROXIMITY SWITCH ELEC-TRONICS UNIT.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING, SLATS OUT OF RETRACT) THEN "ART INOP" LIGHT ON. OTHER- WISE, NO AFFECT. AUTO G/A NOT AVAILABLE.	PASSIVE DISCRETES: DIAG. 33-34.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201
SLAT POS 1 SIGNAL FAILURE SLAT POS 2 SIGNAL FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS BUT LESS THAN SIXTEEN SECONDS WITHOUT LOSING EITHER SLAT VALID.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING AND SLATS NOT RETRACTED) THEN "ART INOP" LIGHT ON OTHER- WISE "NO EFFECT" G/A NOT AVAILABLE	PASSIVE DISCRETES DIAG. 33-34.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
SPEED REF FAILURE	FAILED SPD/ MACH SELECT SYNCHRO IN FGCP.	LOSS OF A/T OPERATION IN SPEED AND MACH MODES. SPD/MACH DISPLAY INOP.	COCKPIT DISPLAYS: DIAG. 170. INTERNAL MONITORS: DIAG. 480.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
SPOILER POS 1 FAILURE SPOILER POS 2 FAILURE	FAILED LEFT (1) OR RIGHT (2) SPOILER POSITION SYNCHRO.	NO AFFECT.	INTERNAL MONITORS: DIAG. 492-493. SENSOR VALUES: DIAG. 186-187.	REF. T/S CHARTS. REF. SURFACE POS SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
STAB TRIM MOTION MONITOR FAILURE	STAB MOTION POLARITY IS OPPOSITE CMD POLARITY.	A/P DISCONNECT	N/A	FAILED TRIM BRAKE SW S10-8 FAILED UP TRIM RELAY R20-12 FAILED DWN TRIM RELAY R20-13 ASSOCIATED WIRING FAILED DFGC
TEMP SELECT PANEL FAILURE 0 TEMP SELECT PANEL FAILURE 1	TEMPERATURE SELECT PANEL FAILED TO AN ILLEGAL INPUT.	"NO MODE" DISPLAY ON TRI WHEN T.O. FLX IS PRESSED.	COCKPIT DISPLAYS: DIAG. 93-108.	REF. T/S CHARTS. REF. THRUST RATING INDICATOR. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
TICKET CHECK FAILURE 0-DFGC TICKET CHECK FAILURE 1-DFGC TICKET CHECK FAILURE 2-DFGC TICKET CHECK FAILURE 3-DFGC TICKET CHECK FAILURE 4-DFGC TICKET CHECK FAILURE 5-DFGC TICKET CHECK FAILURE 6-DFGC TICKET CHECK FAILURE 7-DFGC	COMPUTER MONITORS DETECT AN INCOMPLETE TASK.	DFGC SHUTDOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: There may be more ticket check failures than those listed. All will cause the same problems as shown.				
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for TICKET CHECK FAILURE.				
TRI VALID FAILURE	THRUST RATING INDICATOR VALID CLEAR FOR GREATER THAN 3 SECONDS. LOGGED ONLY ON SELECTED DFGC.	"NO MODE" DISPLAY ON TRI WITH EPR LIM FLAG IN VIEW. A/T DISCONNECT IN EPR LIM MODE.	PASSIVE DISCRETES: DIAG. 40. COCKPIT DISPLAYS: DIAG. 255-256.	REF. T/S CHARTS. REF. THRUST RATING INDICATOR. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891-893				
NOTE: -920 and subsequent DFGC's will display ATT for VERT GYRO.				
VERT GYRO 1 SIGNAL FAILURE VERT GYRO 1 VALID FAILURE VERT GYRO 2 SIGNAL FAILURE VERT GYRO 2 VALID FAILURE	FAILED VERTICAL GYRO SIGNAL OR VALID FROM NUMBERED VERTICAL GYRO.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. VERT GYROS. (VERTICAL GYRO - MAINTENANCE PRACTICES, PAGEBLOCK 34-23-01/201)
VERT GYRO 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED VERTICAL GYROS WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED VG.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. VERT GYROS. (VERTICAL GYRO - MAINTENANCE PRACTICES, PAGEBLOCK 34-23-01/201)
WJE 417, 419, 421, 423, 865, 869, 871, 872				
ATTITUDE 1 SIGNAL FAILURE ATTITUDE 1 VALID FAILURE ATTITUDE 1 SIGNAL FAILURE ATTITUDE 2 VALID FAILURE	FAILED ATTITUDE SIGNAL OR VALID FROM NUMBERED ATTITUDE SYSTEM.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. INERTIAL REFERENCE SYSTEM.

WJE 417, 419, 421, 423, 865, 869, 871, 872 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 417, 419, 421, 423				
				(INERTIAL REFERENCE SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-43-00/201)
WJE 417, 419, 421, 423, 865, 869, 871, 872				
ATTITUDE 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED ATTITUDE SYSTEM WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED SYSTEM.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. INERTIAL REFERENCE SYSTEM.
WJE 417, 419, 421, 423				
				(INERTIAL REFERENCE SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-43-00/201)
WJE 407, 408, 411, 880				
NOTE: -920 and subsequent DFGC's will display ATT for VERT GYRO.				
ATTITUDE 1 SIGNAL FAILURE ATTITUDE 1 VALID FAILURE ATTITUDE 2 SIGNAL FAILURE ATTITUDE 2 VALID FAILURE ATTITUDE 3 SIGNAL FAILURE ATTITUDE 3 VALID FAILURE	SINGLE ATTITUDE FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE. (ALTITUDE - MAINTENANCE PRACTICES, PAGEBLOCK 34-12-00/201 Config 1) REF. HEADING SYSTEM. (HEADING SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-21-00/201 Config 5 or HEADING SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-21-00/201 Config 10 or HEADING SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-21-00/201 Config 15)

WJE 407, 408, 411, 880 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 407, 408, 411				
				REF. AHRU. (ATTITUDE AND HEADING REFERENCE UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-21-10/201 Config 2) REF. AHRS SW UNIT. (ATTITUDE/HEADING SWITCHING UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-21-11/201 Config 2)
WJE 407, 408, 411, 880				
ATTITUDE 1, 2 COMP FAILURE ATTITUDE 1, 3 COMP FAILURE ATTITUDE 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE. (ALTITUDE - MAINTENANCE PRACTICES, PAGEBLOCK 34-12-00/201 Config 1)
WJE 407, 408, 411				
				REF. AHRS SW UNIT. (ATTITUDE/HEADING SWITCHING UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-21-11/201 Config 2)
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
VERT SPD REF FAILURE (-904 DFGC)	FAILED PITCH SELECT WHEEL ON FGCP.	DISPLAYED VALUE FROZEN ON FGCP. VARYING OF PITCH WHEEL INHIBITED.	INTERNAL MONITORS: DIAG. 503. COCKPIT DISPLAYS: DIAG. 263. SWITCHES AND BUTTONS: DIAG. 176.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 880				
VGSU CAPT ON AUX SWITCH FAILURE VGSU F/O ON AUX SWITCH FAILURE (IF INSTALLED)	AUX VERT GYRO SWITCHING UNIT INPUTS IN OPPOSITE STATES FOR MORE THAN 10 SECONDS.	A/P DISCONNECT AND DISABLED. "NO AUTOLAND" LIGHT ON. A/T DIS- ABLED IN SPD AND MACH.	SWITCHES AND BUTTONS: DIAG. 73-84.	REF. T/S CHARTS. REF. ATTTITUDE SW UNIT. (ATTITUDE SWITCHING UNIT, SUBJECT 34-23-04)
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
VREF FIXED LEFT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC. CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 1 SIGNAL FAILURE. (b) ANGLE OF ATTACK 1 SIGNAL FAILURE. (c) HEADING 1 SIGNAL FAILURE. (d) CRS ERROR 1 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. REF. W/D (WDM 22-16-11).
VREF FIXED RIGHT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 2 SIGNAL FAILURE. (b) ANGLE OF ATTACK 2 SIGNAL FAILURE. (c) HEADING 2 SIGNAL FAILURE. (d) CRS ERROR 2 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VREF SWITCHED LEFT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) VERT SPD REF FAILURE. (b) SPD SEL FAILURE. (c) ALT SEL FAILURE. (d) AILERON POSITION FAILURE. (e) EPR LEFT FAILURE. (f) SPOILER POS 1 FAILURE. (g) ELEV POS 1 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
VREF SWITCHED RIGHT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP HANDLE FAILURE. (b) RUDDER POS FAILURE. (c) HOR STAB FAILURE. (d) EPR RIGHT FAILURE. (e) SPOILER POS 2 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
-906 AND SUBSEQUENT COMPUTERS. WHEEL SPINUP-1 SIGNAL FAILURE WHEEL SPINUP-2 SIGNAL FAILURE	DISCRETE FAILED SPIN STATE AT IAS >195 KTS.	NONE.	PASSIVE DISCRETES: DIAG. 49-50	REF T/S CHARTS. (27-61-11)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 407, 408, 411, 412, 414, 417, 419, 421, 423, 864, 865, 869, 871-874, 892, 893				
WIND SHEAR DATA FAILURE	FAILED WIND SHEAR COMPUTER (WSC) OR DFGC DOES NOT RECEIVE DATA FROM WSC.	"W/S INOP" LIGHT ON.	INTERNAL MONITORS: DIAG. 509.	REF. WIND SHEAR SELF-TEST. (WINDSHEAR ALERT AND GUIDANCE SYSTEM, SUBJECT 34-47-00, page 201)
WJE 407, 408, 411, 412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 891-893				
YAW DAMP SERVO FAILURE	FAILED YAW DAMPER ACTUATOR.	"YAW DAMP OFF" LIGHT ON.	SERVO TESTS: DIAG. 442-443. SENSOR VALUES: DIAG. 198, 208.	REF. T/S CHARTS. REF. YAW DAMPER ACTUATOR. (YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201)
YAW DAMPER POWER FAILURE	FAILURE OF 28 VDC YAW DAMPER POWER.	"YAW DAMP OFF" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 323-324. SERVO TESTS: DIAG. 442-443. INITIAL SETUP INTER-ACTIVES: DIAG. 16-17.	REF. T/S CHARTS. REF. YAW DAMPER ACTUATOR. YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201
YAW MODE CHECK FAILURE 1-DFGC YAW MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL YAW MODE.	DFGC SHUTDOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

4. Trouble Shooting Charts Index

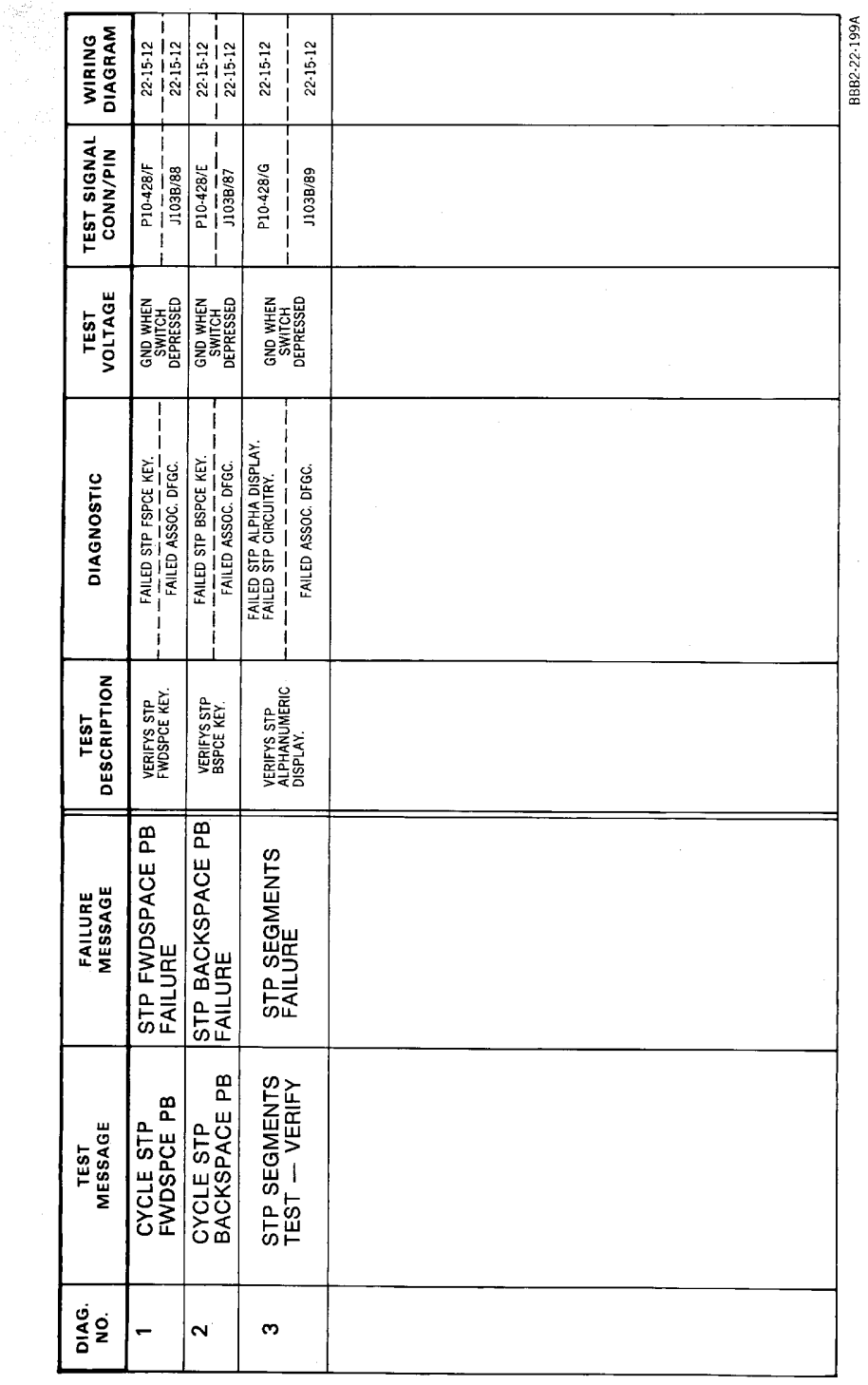
A. These trouble shooting charts are to be used in conjunction with the diagnostic numbers that appear when a failure is displayed on the STP in the Return to Service or the Maintenance test.

Table 103

Sequence	Figure
0 - STP Tests	Figure 106
1 - Initial Setup Interactives	Figure 107
2 - Passive Discretes	Figure 108
3 - Switches and Buttons	Figure 109
4 - Sensor Values	Figure 110
5 - Cockpit Displays	Figure 111

Table 103 (Continued)

Sequence	Figure
6 - Second Setup Interactives	Figure 112
7 - Self-Tests	Figure 113
8 - Servo Tests	Figure 114
9 - Internal Monitors	Figure 115



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
1	CYCLE STP FWDSPCE PB	STP FWDSPACE PB FAILURE	VERIFYS STP FWDSPCE KEY.	FAILED STP FSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/F J103B/88	22-15-12 22-15-12
2	CYCLE STP BACKSPACE PB	STP BACKSPACE PB FAILURE	VERIFYS STP BSPCE KEY.	FAILED STP BSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/E J103B/87	22-15-12 22-15-12
3	STP SEGMENTS TEST — VERIFY	STP SEGMENTS FAILURE	VERIFYS STP ALPHANUMERIC DISPLAY.	FAILED STP ALPHA DISPLAY. FAILED STP CIRCUITRY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/G J103B/89	22-15-12 22-15-12

BBB2-22-199A

Sequence Zero - STP Tests
Figure 106/22-01-05-990-891

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
4	DISENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. J102A/100	22-14-11 22-14-11
5		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/K SEL 1, J103/K SEL 2. J102A/104	22-14-11 22-14-11
6		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-419/G J102A/96	22-14-11 22-12-12 22-12-12
7		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
8		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J013/H SEL 2. P10-421/G J102A/95	22-14-11 22-11-12 22-11-12
9		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P:10-422/G J103A/95	22-14-11 22-11-12 22-11-12
10		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-423/G J103B/77	22-14-11 22-13-12 22-13-12

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Sequence One - Initial Setup Interactives
Figure 107/22-01-05-990-892 (Sheet 1 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
11		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12
12	FMA-1 A/P LITE OFF — VERIFY	FMA-1 A/P LITE OFF FAILURE	DRIVES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-1.	28 VDC	J101/N P1-644/16 J102B/24	22-17-11 22-17-11 22-17-11
13	FMA-2 A/P LITE OFF — VERIFY	FMA-2 A/P LITE OFF FAILURE	DRIVES FMA A/P-2 ANNUNCIATOR	FAILED FMA A/P-2 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-2.	28 VDC	J101/P P1-644/20 J102B/24	22-17-11 22-17-11 22-17-11
14	DISENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2. J103B/26	22-31-12 22-31-12
15		A/T CLAMP FAILURE	VERIFIES A/T ENGAGE SWITCH AND CLAMP LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AUTOTHROTTLE CLAMP RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2. R50-329/X1, X2 J103B/36	22-31-12 22-31-14 22-31-14
16	DISENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-194 J103B/8	22-13-12 22-13-12
17	YAW DAMP OFF LITE ON — VERIFY	YAW DAMP OFF LITE ON FAILURE	DRIVES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE. FAILED ASSOC. DFGC.	GND	P1-119/C J103B/53	22-13-12 33-12-00 22-13-12

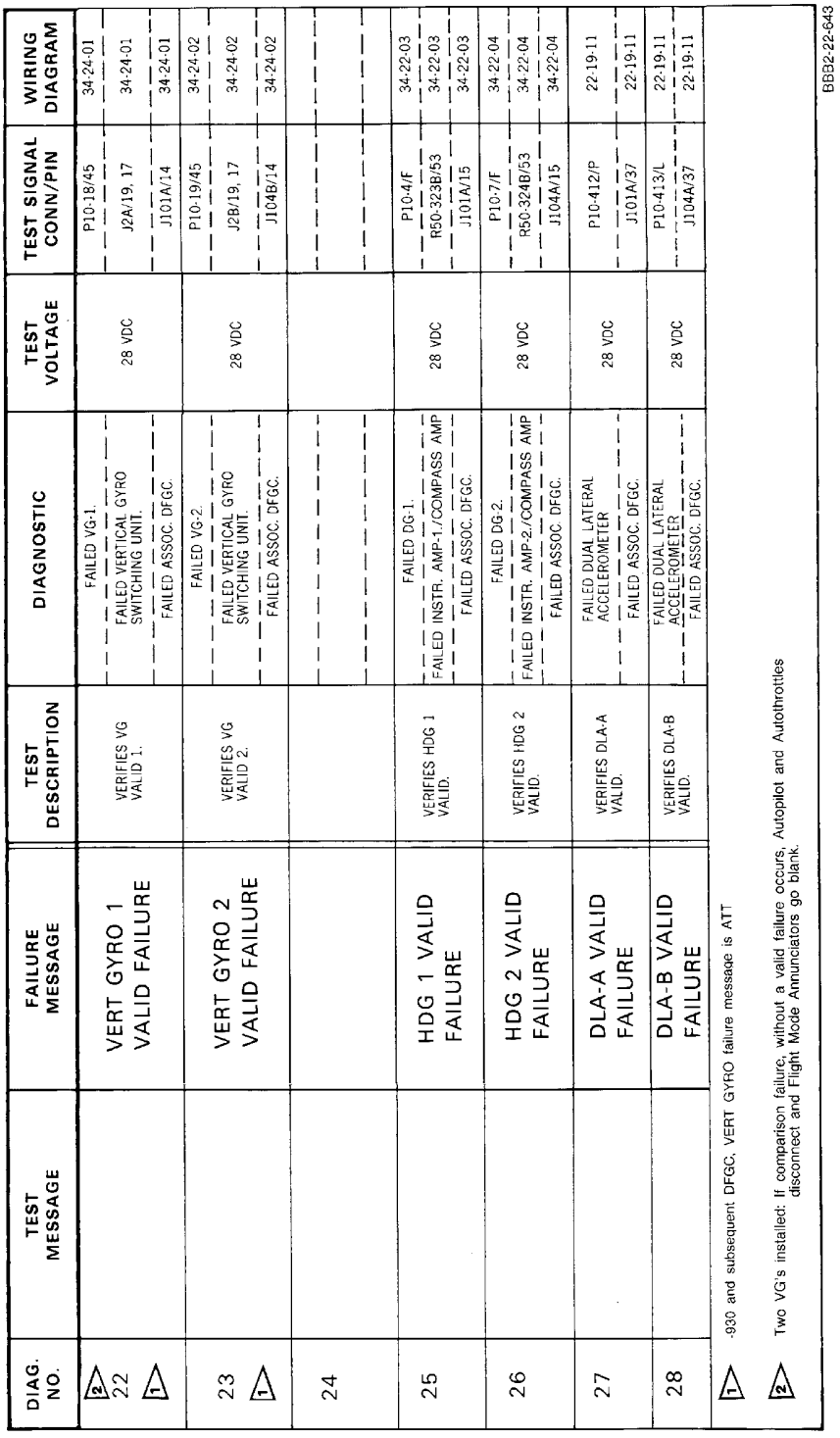
BBB2-22-211B

Sequence One - Initial Setup Interactives
Figure 107/22-01-05-990-892 (Sheet 2 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
18	RCVRS NOT ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 NOT TUNED TO ILS FREQ.	FAILED NAV 1 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-319B/38 J101A/17	34-26-02 34-26-02
19		NAV 2 TUNING FAILURE	VERIFIES NAV 2 NOT TUNED TO ILS FREQ.	FAILED NAV 2 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-320B/38 J104A/17	34-26-02 34-26-02
20	ADVANCE THROTTLE — VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED LEFT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-196 J101A/43	22-31-11 22-31-11
21		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED RIGHT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-198 J104A/43	22-31-11 22-31-11

BBB2-22-213

Sequence One - Initial Setup Interactives
Figure 107/22-01-05-990-892 (Sheet 3 of 3)



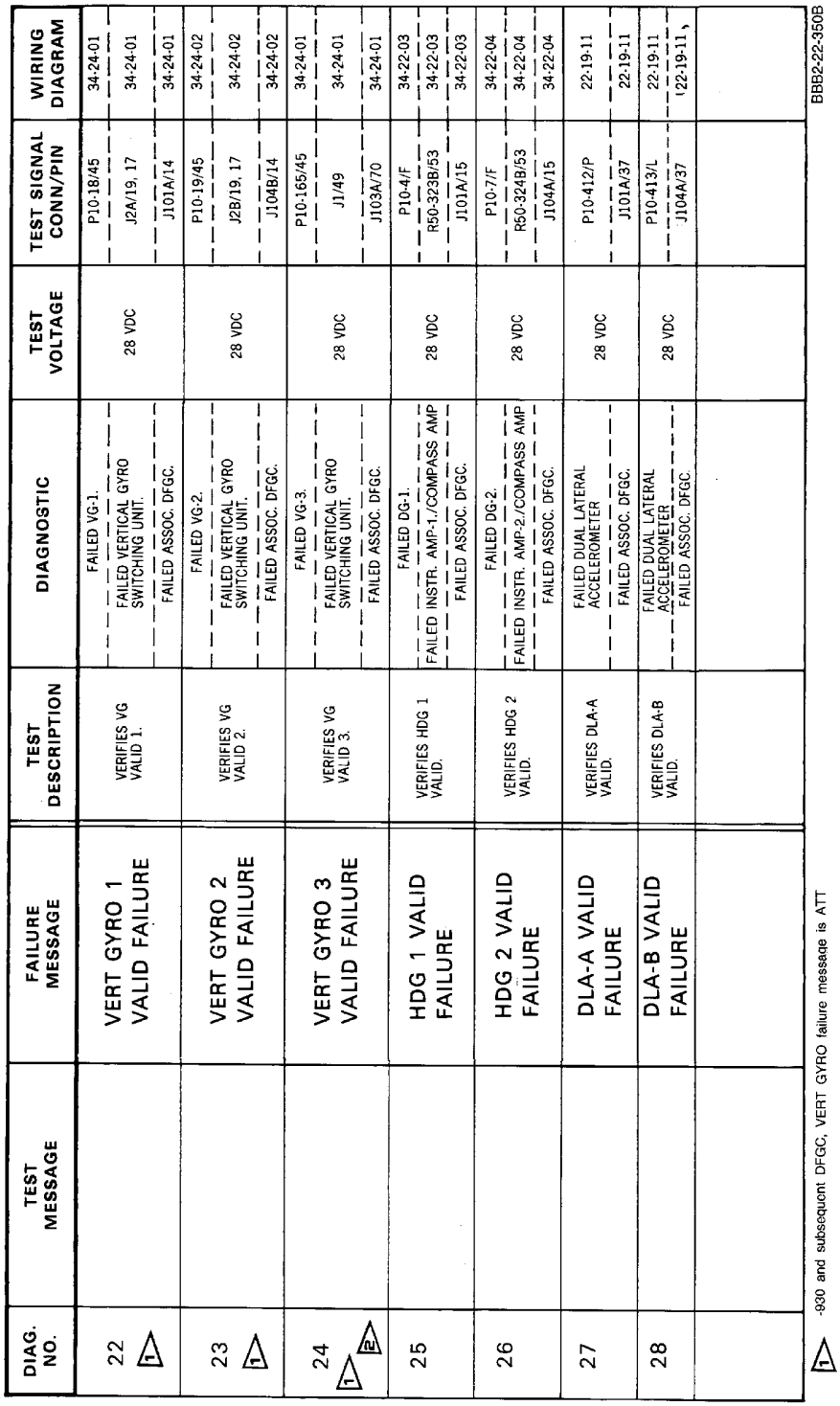
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
22 [2] [1]		VERT GYRO 1 VALID FAILURE	VERIFIES VG VALID 1.	FAILED VG-1. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-18/45 J2A/19, 17 J101A/14	34-24-01 34-24-01 34-24-01
23 [1]		VERT GYRO 2 VALID FAILURE	VERIFIES VG VALID 2.	FAILED VG-2. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-19/45 J2B/19, 17 J104B/14	34-24-02 34-24-02 34-24-02
24							
25		HDG 1 VALID FAILURE	VERIFIES HDG 1 VALID.	FAILED DG-1. FAILED INSTR. AMP-1./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-4/F R50-323B/53 J101A/15	34-22-03 34-22-03 34-22-03
26		HDG 2 VALID FAILURE	VERIFIES HDG 2 VALID.	FAILED DG-2. FAILED INSTR. AMP-2./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-7/F R50-324B/53 J104A/15	34-22-04 34-22-04 34-22-04
27		DLA-A VALID FAILURE	VERIFIES DLA-A VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-412/P J101A/37	22-19-11 22-19-11
28		DLA-B VALID FAILURE	VERIFIES DLA-B VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-413/L J104A/37	22-19-11 22-19-11

[1] -930 and subsequent DFGC. VERT GYRO failure message is ATT

[2] Two VG's installed: If comparison failure, without a valid failure occurs, Autopilot and Autothrottles disconnect and Flight Mode Annunciators go blank.

BB32-22-643

Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 1 of 8)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
22 △1		VERT GYRO 1 VALID FAILURE	VERIFIES VG VALID 1.	FAILED VG-1. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-18/45 J2A/19, 17 J101A/14	34-24-01 34-24-01 34-24-01
23 △1		VERT GYRO 2 VALID FAILURE	VERIFIES VG VALID 2.	FAILED VG-2. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-19/45 J2B/19, 17 J104B/14	34-24-02 34-24-02 34-24-02
24 △1 △2		VERT GYRO 3 VALID FAILURE	VERIFIES VG VALID 3.	FAILED VG-3. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-165/45 J1/49 J103A/70	34-24-01 34-24-01 34-24-01
25		HDG 1 VALID FAILURE	VERIFIES HDG 1 VALID.	FAILED DG-1. FAILED INSTR. AMP-1./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-4/F R50-323B/53 J101A/15	34-22-03 34-22-03 34-22-03
26		HDG 2 VALID FAILURE	VERIFIES HDG 2 VALID.	FAILED DG-2. FAILED INSTR. AMP-2./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-7/F R50-324B/53 J104A/15	34-22-04 34-22-04 34-22-04
27		DLA-A VALID FAILURE	VERIFIES DLA-A VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-412/P J101A/37	22-19-11 22-19-11
28		DLA-B VALID FAILURE	VERIFIES DLA-B VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-413/L J104A/37	22-19-11 22-19-11

△1 -930 and subsequent DFGC, VERT GYRO failure message is ATT
△2 (if installed)

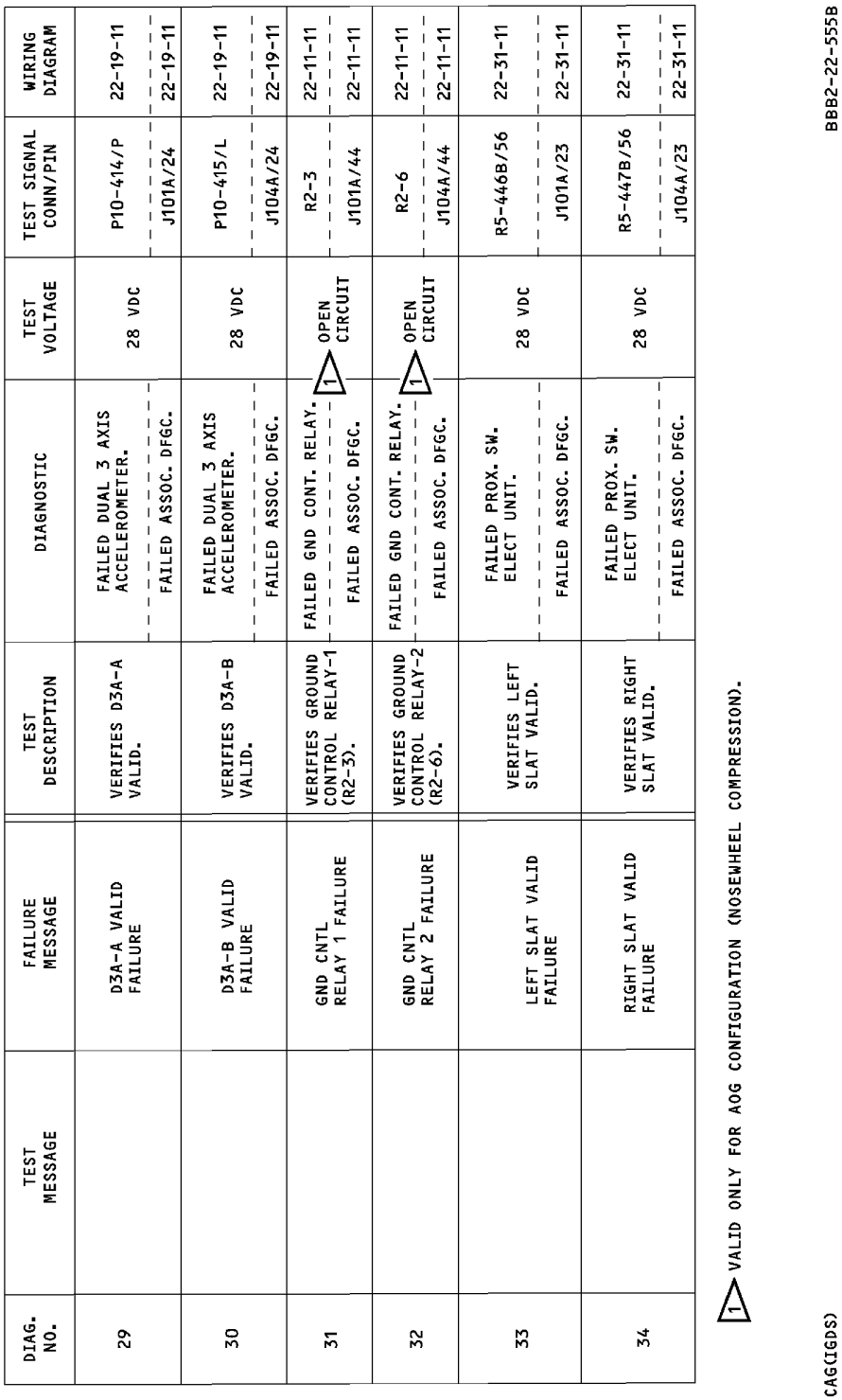
BBB2-22-350B

Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 2 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
22		ATTITUDE 1 VALID FAILURE	VERIFIES ATT VALID 1	FAILED ATT-1 FAILED ASSOC. DFGC.	28 VDC	P10-18/45 J2A/19, 17 J101A/14	34-24-01 34-24-01 34-24-01
23		ATTITUDE 2 VALID FAILURE	VERIFIES ATT VALID 2	FAILED ATT-2 FAILED ASSOC. DFGC.	28 VDC	P10-19/45 J2B/19, 17 J104B/14	34-24-02 34-24-02 34-24-02
24							
25		HDG 1 VALID FAILURE	VERIFIES HDG 1 VALID	FAILED DG-1. FAILED INSTR. AMP-1./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-4/F R50-323B/53 J101A/15	34-22-03 34-22-03 34-22-03
26		HDG 2 VALID FAILURE	VERIFIES HDG 2 VALID	FAILED DG-2. FAILED INSTR. AMP-2./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-7/F R50-324B/53 J104A/15	34-22-04 34-22-04 34-22-04
27		DLA-A VALID FAILURE	VERIFIES DLA-A VALID	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-412/P J101A/37	22-19-11 22-19-11
28		DLA-B VALID FAILURE	VERIFIES DLA-B VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-413/L J104A/37	22-19-11 22-19-11

BBB2-22-634

Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 3 of 8)



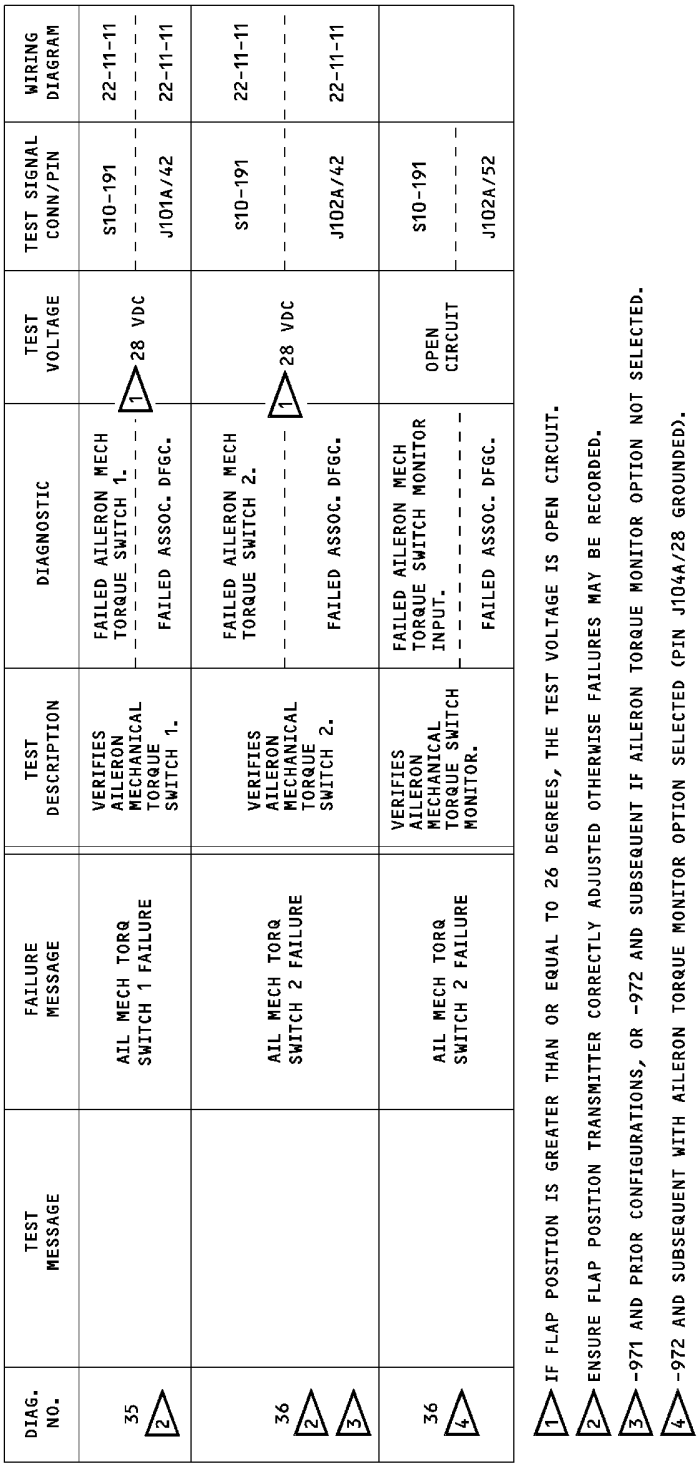
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
29		D3A-A VALID FAILURE	VERIFIES D3A-A VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-414/P J101A/24	22-19-11 22-19-11
30		D3A-B VALID FAILURE	VERIFIES D3A-B VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-415/L J104A/24	22-19-11 22-19-11
31		GND CNTL RELAY 1 FAILURE	VERIFIES GROUND CONTROL RELAY-1 (R2-3).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3 J101A/44	22-11-11 22-11-11
32		GND CNTL RELAY 2 FAILURE	VERIFIES GROUND CONTROL RELAY-2 (R2-6).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-6 J104A/44	22-11-11 22-11-11
33		LEFT SLAT VALID FAILURE	VERIFIES LEFT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-446B/56 J101A/23	22-31-11 22-31-11
34		RIGHT SLAT VALID FAILURE	VERIFIES RIGHT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-447B/56 J104A/23	22-31-11 22-31-11

1 VALID ONLY FOR AOG CONFIGURATION (NOSEWHEEL COMPRESSION).

CAG(IGDS)

BBB2-22-555B

Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 4 of 8)



Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 5 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
37		RUD UNRESTRICTED SWITCH 1 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-33 R5-446B/61 J101A/47	27-22-11 27-22-11 27-22-11
38		RUD UNRESTRICTED SWITCH 2 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-34 R5-467B/61 J104A/47	27-22-11 27-22-11 27-22-11
39		D3A NORM ACCEL VALID FAILURE	VERIFIES D3A NORM ACCEL VALID.	FAILED 3 AXIS ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-414/P J102A/72	22-19-11 22-19-11
40		TR-EPR DISPLAY VALID FAILURE	VERIFIES TR-EPR DISPLAY VALID.	FAILED THRUST RATING INDICATOR FAILED ASSOC. DFGC.	28 VDC	P1-627/M J102A/92	34-18-12 34-18-12
41		RAD DSP 1 VALID FAILURE	VERIFIES RAD ALT 1 INDICATOR VALID.	FAILED CAPT R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-66/M J101A/26	34-45-01 34-45-01
42		RAD DSP 2 VALID FAILURE	VERIFIES RAD ALT 2 INDICATOR VALID.	FAILED F/O R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-67/M J104A/26	34-45-02 34-45-02
43		RAD ALT-1 VALID FAILURE	VERIFIES RAD ALT-1 VALID.	FAILED RADIO ALTIMETER-1 FAILED ASSOC. DFGC.	28 VDC	R5-321B/57 J101A/39	34-45-01 34-45-01
44		RAD ALT-2 VALID FAILURE	VERIFIES RAD ALT-2 VALID.	FAILED RADIO ALTIMETER-2 FAILED ASSOC. DFGC.	28 VDC	R5-322B/57 J104A/39	34-45-02 34-45-02
45 1		ART OPTION PIN FAILURE	VERIFIES ART OPTION PINS FOR AGREEMENT.	FAILED ART G/A OPTION PIN A. FAILED ART G/A OPTION PIN B. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J102A/70 AND J103B/104	22-16-12

1 TEST DELETED FOR -972 AND SUBSEQUENT.

CAG(IGDS)

BBB2-22-215B

Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 6 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
46		AUTO G/A OPTION PIN FAILURE	VERIFIES AUTO G/A OPTION PINS FOR AGREEMENT.	FAILED AUTO G/A OPTION PIN A. FAILED AUTO G/A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/102 AND J103B/102	22-16-14
47		R/A OPTION PIN FAILURE	VERIFIES R/A OPTION PINS FOR AGREEMENT.	FAILED RA552A OPTION PIN A. FAILED RA552A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/94 AND J103B/94	22-16-18
48		OPTION PIN PARITY FAILURE	VERIFIES EVEN PARITY FOR OPTION PINS. (1)	FAILED OPTION PINS. FAILED ASSOC. DFGC.	OPEN OR GND	J103B/96 (1)	22-16-17
49		WHEEL SPIN-UP FAILURE	VERIFIES LEFT INBOARD, RIGHT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/C J102A/8	27-61-11 27-61-11
50		WHEEL SPIN-UP FAILURE	VERIFIES RIGHT INBOARD, LEFT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/E J103A/8	27-61-11 27-61-11
51 (2)	TRC OPTION PIN ABCDE= XXXXX VRFY	TRC OPTION PIN FAILURE	VERIFIES INSTALLED ENGINE AGREES WITH OPTION PIN CONFIGURATION.	PROPER PROGRAM FOR COMPUTER OPTION PIN SELECTION.	- = OPEN G = GROUND	J102B-97, 98, 99, 100	22-16-15

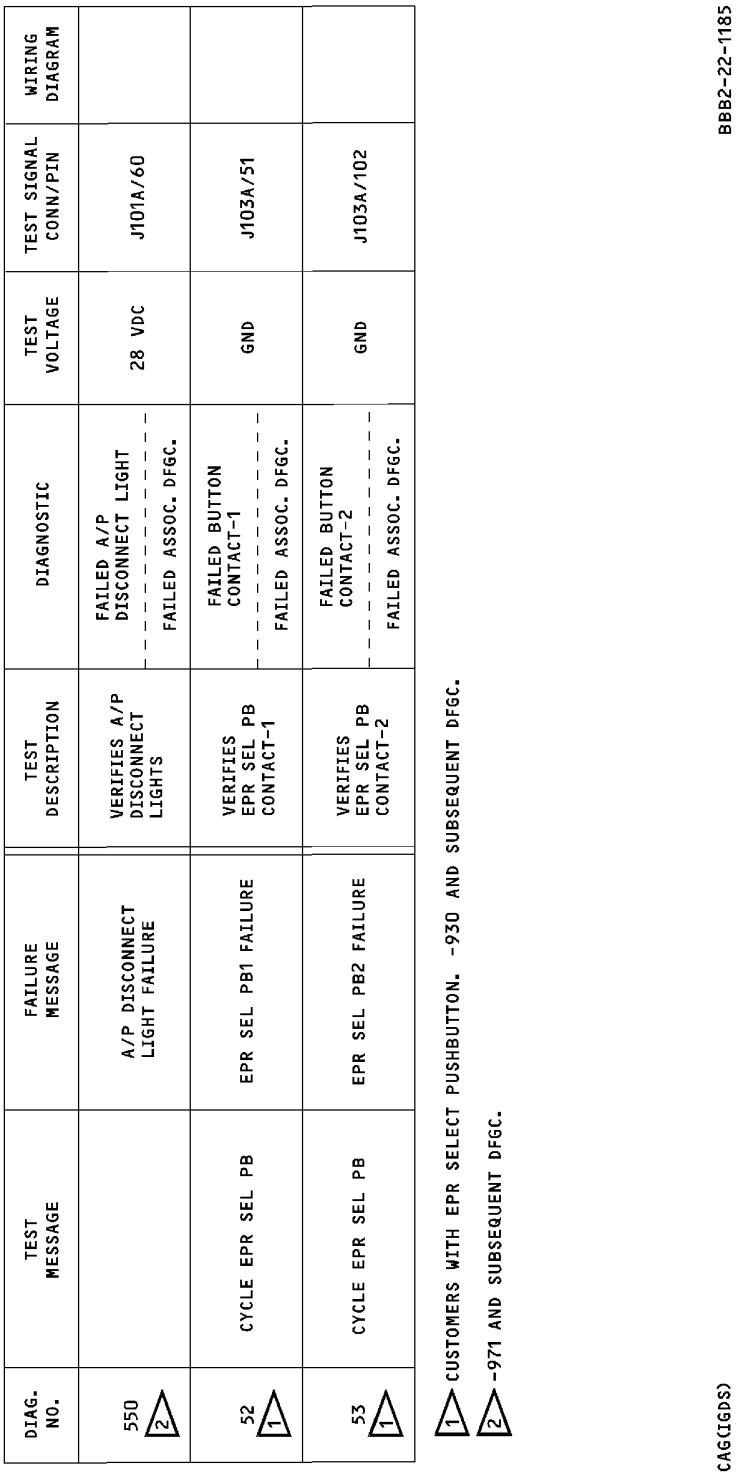
(1) THE FOLLOWING OPTION ARE TESTED:
(a) PEDESTAL CONTROLLER
(b) F/D OPTION
(c) AD 300C
(d) HDG SEL CX
(e) PITCH REF SEL
(f) QNH CORRECT
(g) BOX 1
(h) BOX 2
(i) PARITY PIN

(2) DISPLAY FOR DIFFERENT ENGINE CONFIGURATIONS:

-209 ENGINE	ABCD = -GGG
-217 ENGINE	ABCD = GG-G
-217A ENGINE	ABCD = --G-
-217A+ ENGINE	ABCD = -G--
-219 ENGINE	ABCDE = -GG-G

BBB2-22-271K
S0006528159V2

Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 7 of 8)



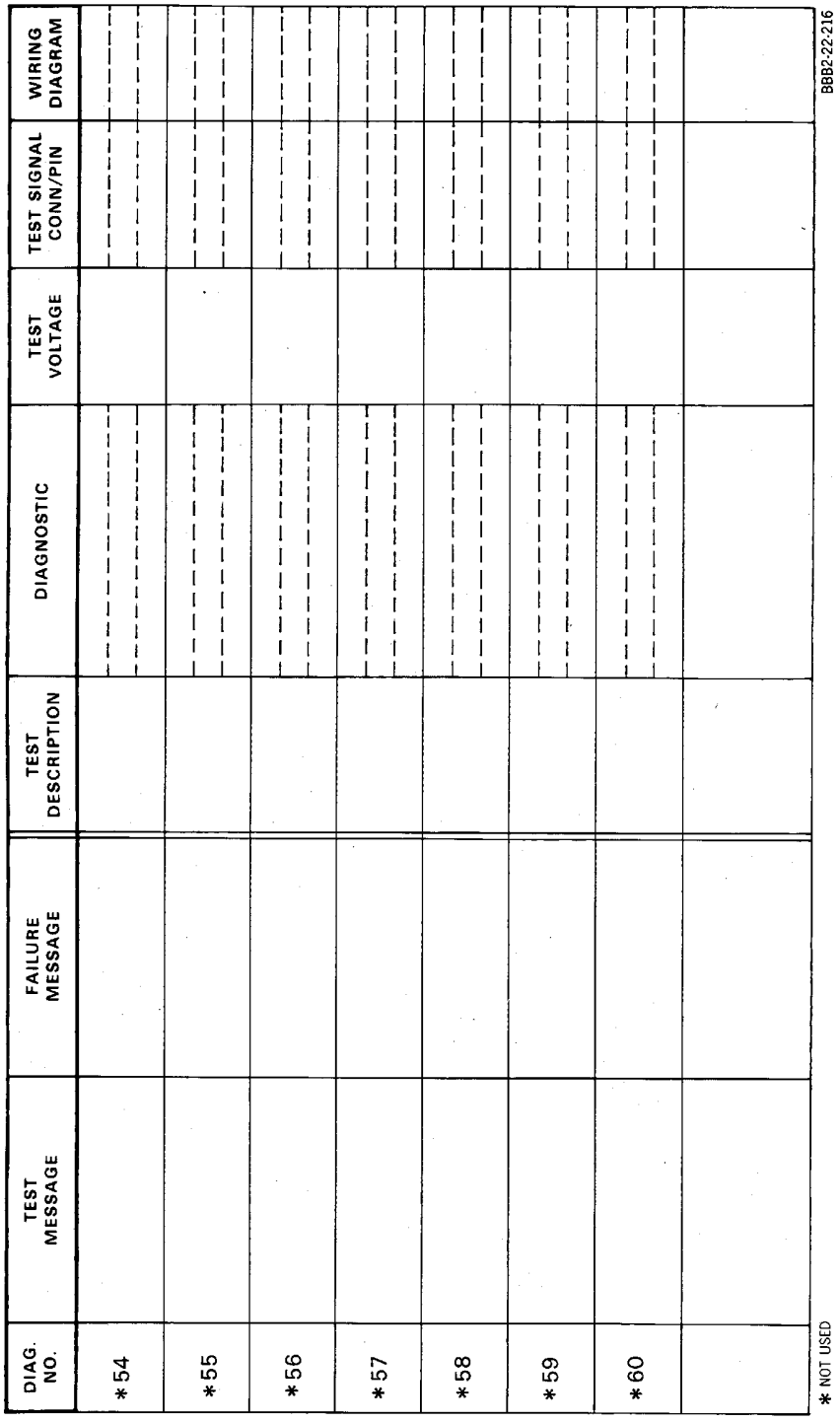
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
550 (2)		A/P DISCONNECT LIGHT FAILURE	VERIFIES A/P DISCONNECT LIGHTS	FAILED A/P DISCONNECT LIGHT FAILED ASSOC. DFGC.	28 VDC	J101A/60	
52 (1)	CYCLE EPR SEL PB	EPR SEL PB1 FAILURE	VERIFIES EPR SEL PB CONTACT-1	FAILED BUTTON CONTACT-1 FAILED ASSOC. DFGC.	GND	J103A/51	
53 (1)	CYCLE EPR SEL PB	EPR SEL PB2 FAILURE	VERIFIES EPR SEL PB CONTACT-2	FAILED BUTTON CONTACT-2 FAILED ASSOC. DFGC.	GND	J103A/102	

(1) CUSTOMERS WITH EPR SELECT PUSHBUTTON. -930 AND SUBSEQUENT DFGC.
(2) -971 AND SUBSEQUENT DFGC.

BBB2-22-1185

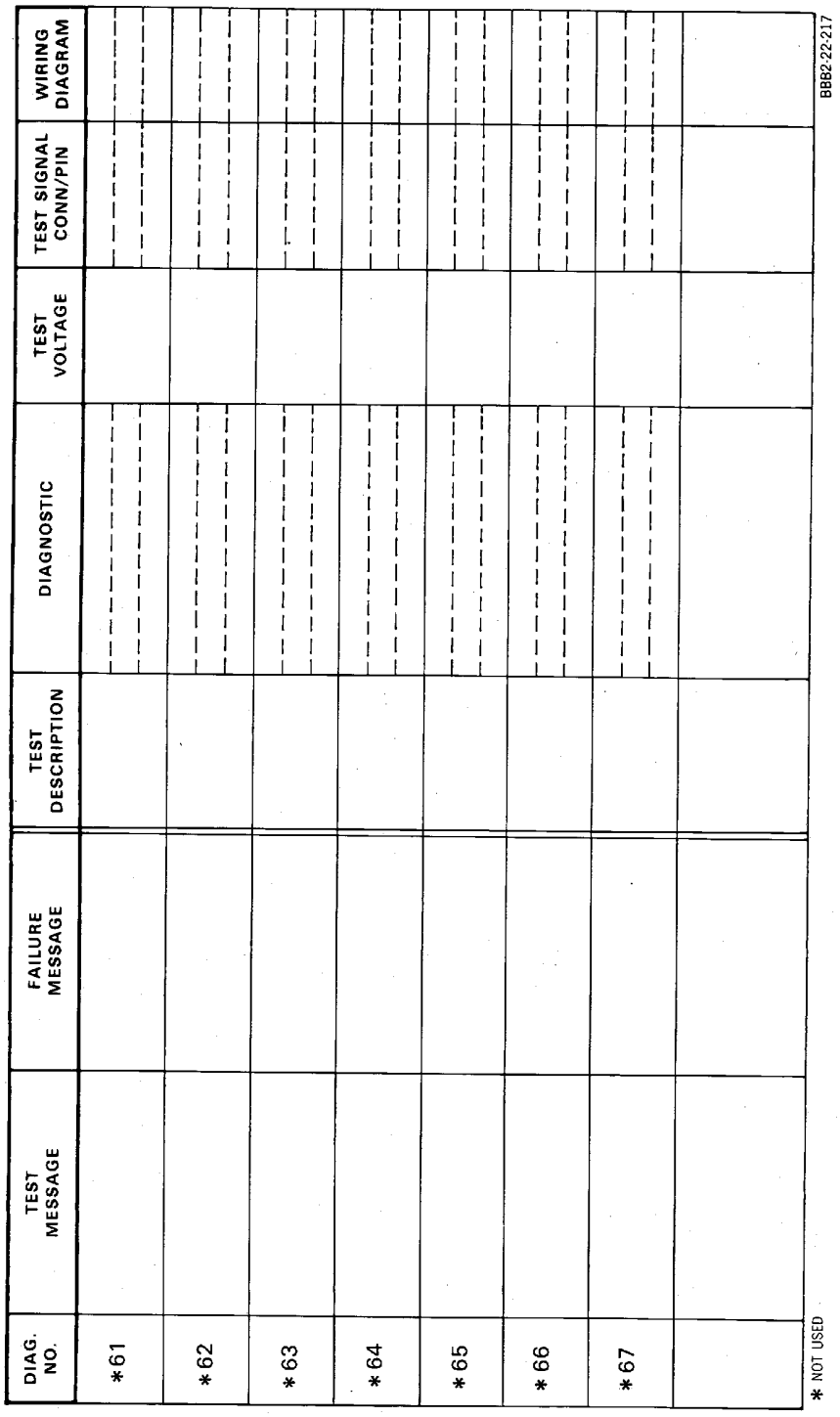
CAG(IGDS)

Sequence Two - Passive Discretes
Figure 108/22-01-05-990-893 (Sheet 8 of 8)

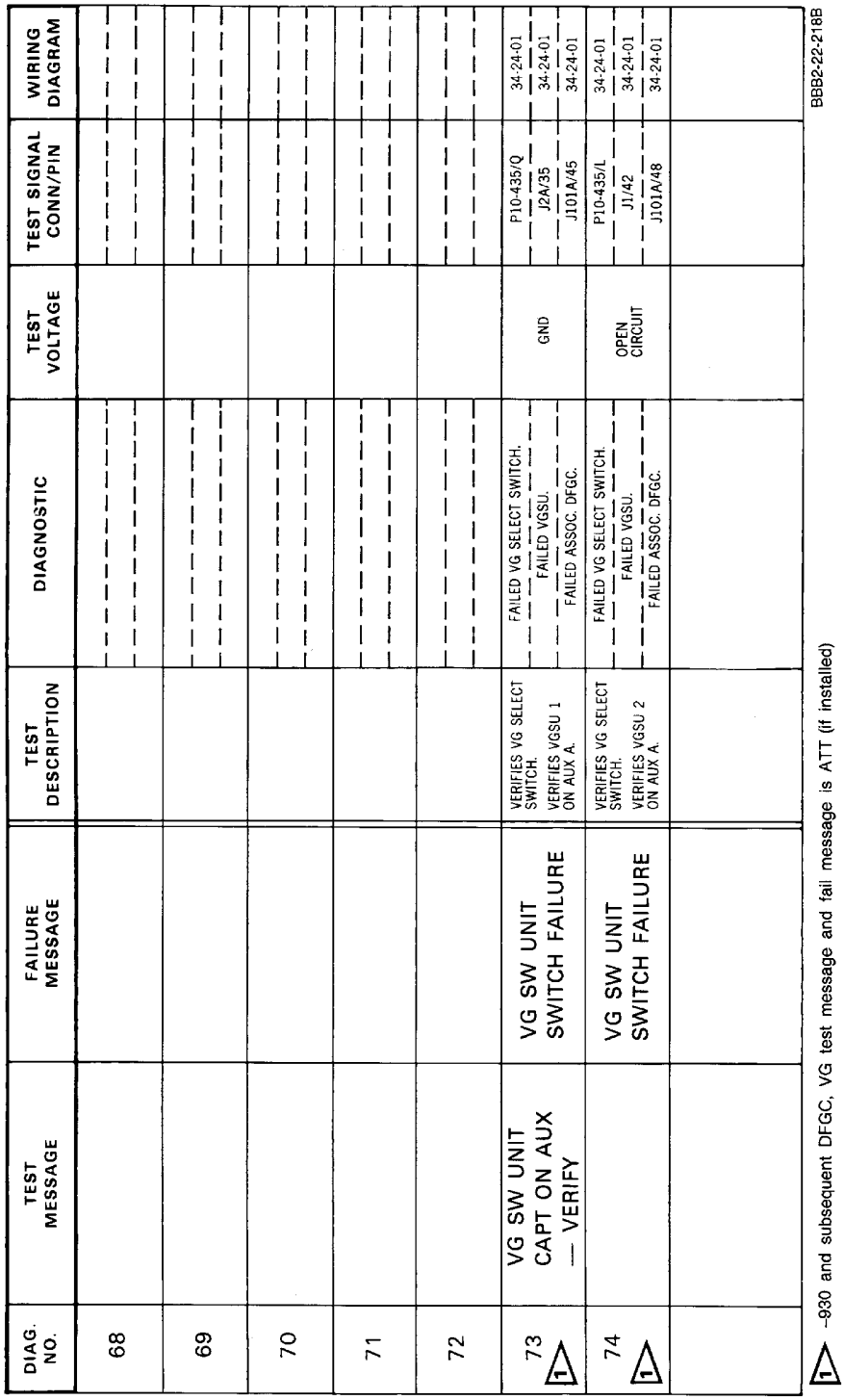


DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
* 54							
* 55							
* 56							
* 57							
* 58							
* 59							
* 60							
* NOT USED							

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 1 of 20)



Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 2 of 20)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
68							
69							
70							
71							
72							
73 (1)	VG SW UNIT CAPT ON AUX — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
74 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01

(1) -930 and subsequent DFGC, VG test message and fail message is ATT (if installed)

BBB2-22-218B

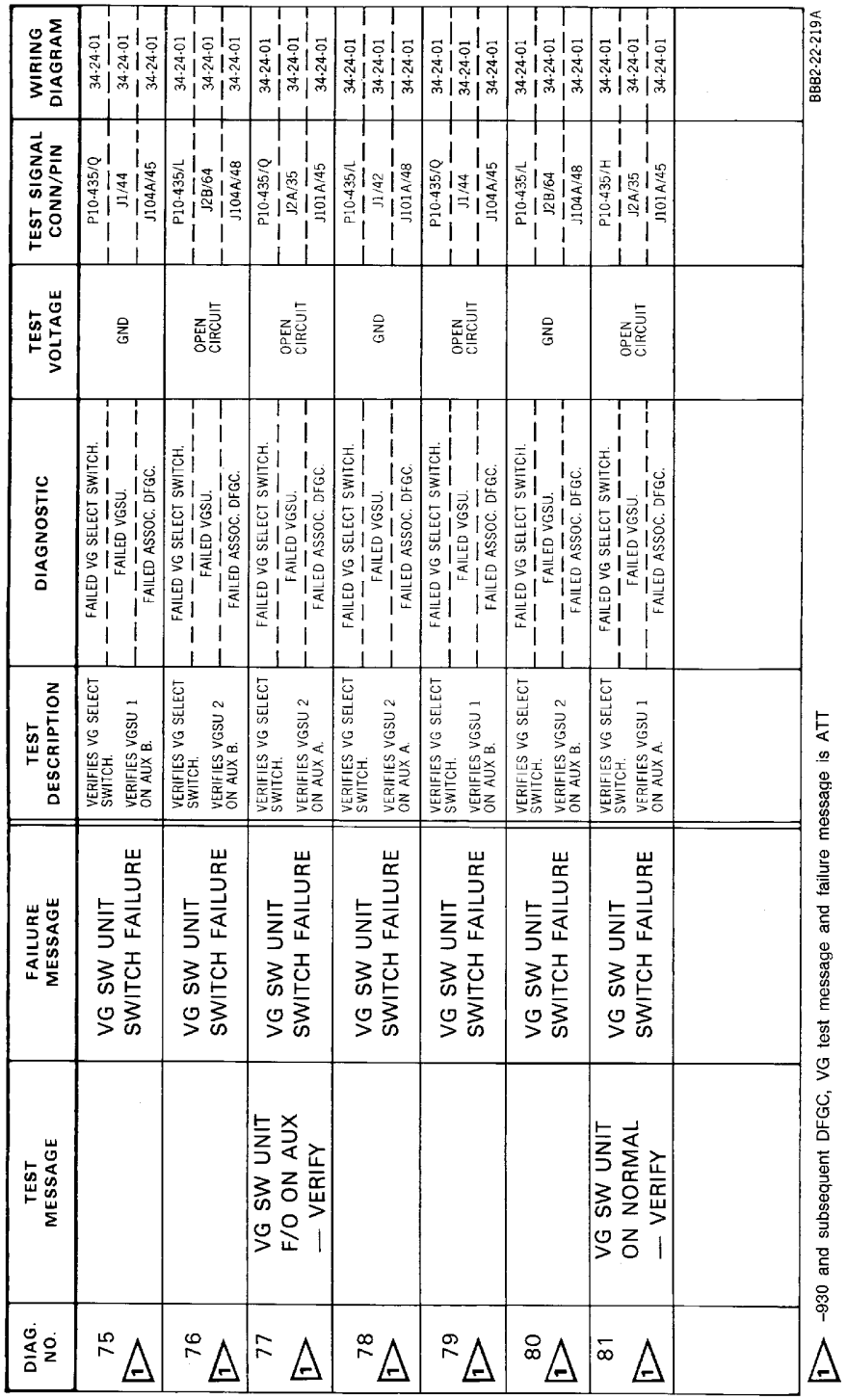
Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 3 of 20)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
*68							
*69							
*70							
*71							
*72							
*73							
*74							

BBB2-22-333

*NOT USED

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 4 of 20)

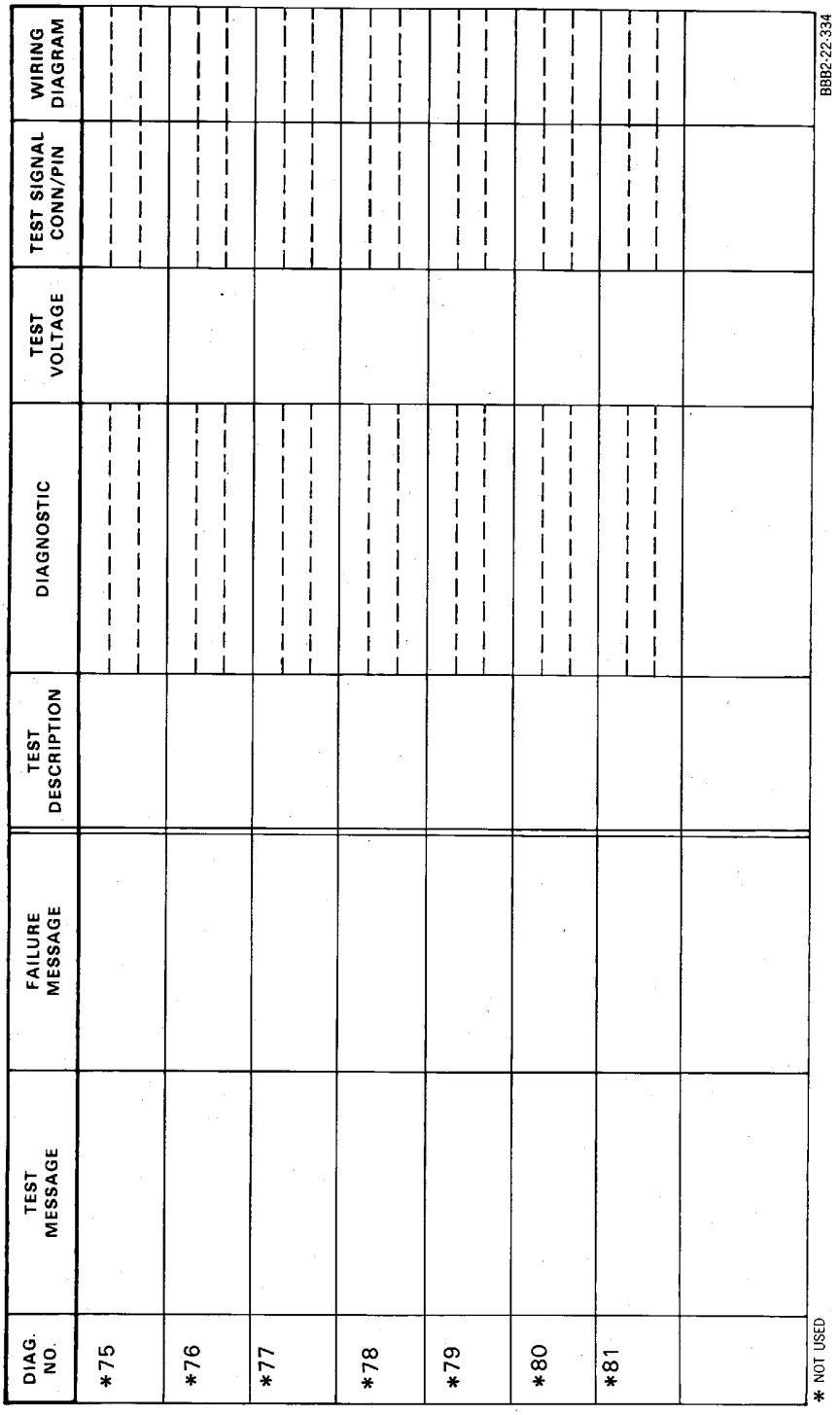


DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
75 1		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
76 1		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
77 1	VG SW UNIT F/O ON AUX — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
78 1		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01
79 1		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
80 1		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
81 1	VG SW UNIT ON NORMAL — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2A/35 J101A/45	34-24-01 34-24-01 34-24-01

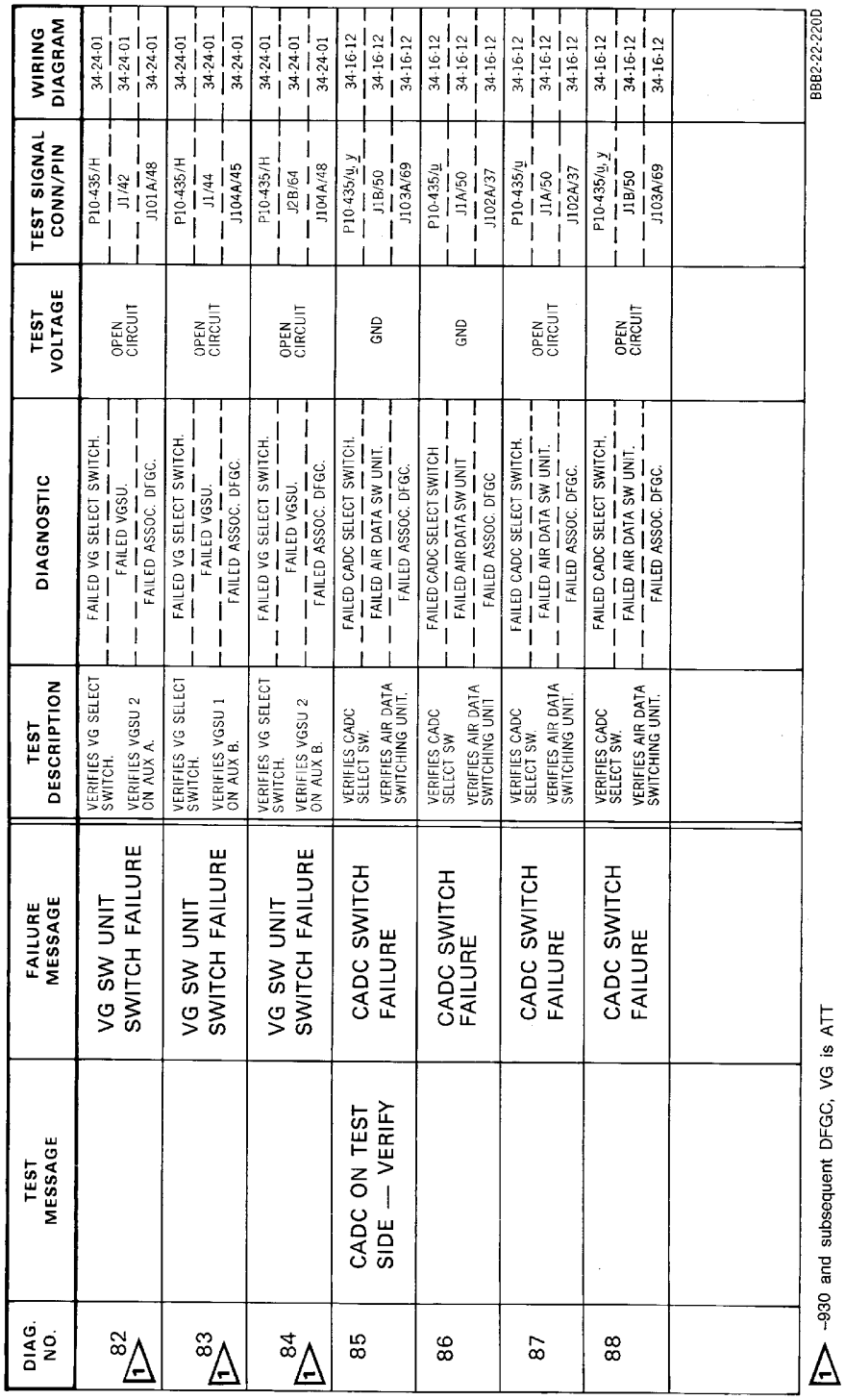
1 –930 and subsequent DFGC, VG test message and failure message is ATT

BBB2-22-219A

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 5 of 20)



Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 6 of 20)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
82 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/42 J101A/48	34-24-01 34-24-01 34-24-01
83 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/44 J104A/45	34-24-01 34-24-01 34-24-01
84 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
85	CADC ON TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/u, y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
86		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW VERIFIES AIR DATA SWITCHING UNIT	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	GND	P10-435/u J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
87		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/u J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
88		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/u, y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12

(1) -930 and subsequent DFGC, VG is ATT

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Sequence Three - Switches and Buttons
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DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
89		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	OPEN CIRCUIT	P10-435/u J1A/50 J103A/69	34-16-12 34-16-12 34-16-12
90	CADC ON NON-TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/u J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
91	CADC ON NORM-VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
92		CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
93 ⚠1	TEMP SELECT 48 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/H J103B/69	34-18-12 34-18-12
94		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/J J103B/70	34-18-12 34-18-12
95		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/K J103B/71	34-18-12 34-18-12
96		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/L J103B/72	34-18-12 34-18-12
97		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/N J103B/73	34-18-12 34-18-12

⚠1 Customers with EPR select option. -930 and subsequent TEMP SELECT is 78

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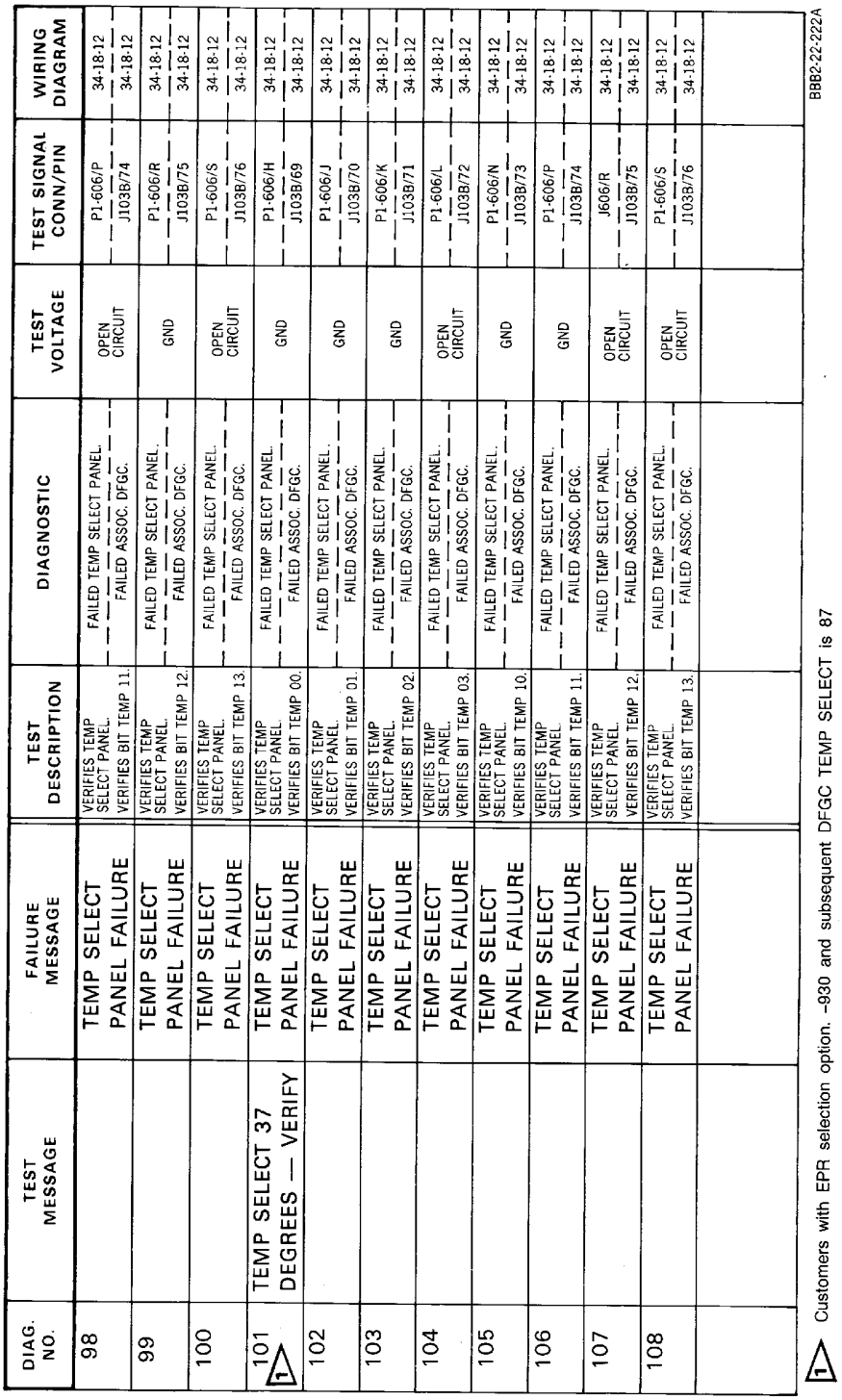
Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 8 of 20)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
98		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/P J103B/74	34-18-12 34-18-12
99		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/R J103B/75	34-18-12 34-18-12
100		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12
101 [1]	TEMP SELECT 37 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/H J103B/69	34-18-12 34-18-12
102		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/J J103B/70	34-18-12 34-18-12
103		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/K J103B/71	34-18-12 34-18-12
104		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/L J103B/72	34-18-12 34-18-12
105		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/N J103B/73	34-18-12 34-18-12
106		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/P J103B/74	34-18-12 34-18-12
107		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J606/R J103B/75	34-18-12 34-18-12
108		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12

[1] Customers with EPR selection option. -930 and subsequent DFGC TEMP SELECT is 87

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Sequence Three - Switches and Buttons
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DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
109	TR MODE T/O — VERIFY	TR MODE T/O FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, T, U J102A/73	34-18-12 34-18-12
110	TR MODE T/O FLX — VERIFY	TR MODE T/O FLX FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O FLX MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/U J102A/73, 74, 75	34-18-12 34-18-12
111	TR MODE G/A — VERIFY	TR MODE GA FAILURE	VERIFIES TRI OPERATION OF GA MODE.	FAILED TRI GA MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/T, U J102A/73, 74	34-18-12 34-18-12
112	TR MODE MCT — VERIFY	TR MODE MCT FAILURE	VERIFIES TRI OPERATION OF MCT MODE.	FAILED TRI MCT MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, S, U J102A/75	34-18-12 34-18-12
113	TR MODE CL — VERIFY	TR MODE CL FAILURE	VERIFIES TRI OPERATION OF CL MODE.	FAILED TRI CL MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, U J102A/73, 75	34-18-12 34-18-12
114	TR MODE CR — VERIFY	TR MODE CR FAILURE	VERIFIES TRI OPERATION OF CR MODE.	FAILED TR CR MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, U J102A/74, 75	34-18-12 34-18-12
115							
116							

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Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 10 of 20)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
117	CYCLE TO/GA SWITCH 1	TO/GA SWITCH 1 FAILURE	VERIFIES TO/GA 1 (LEFT) SWITCH.	FAILED TO/GA-1 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-197 J101A/41, J104A/41	22-31-11 22-31-11
118	CYCLE TO/GA SWITCH 2	TO/GA SWITCH 2 FAILURE	VERIFIES TO/GA 2 (RIGHT) SWITCH.	FAILED TO/GA-2 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-198 J101A/41, J104A/41	22-31-11 22-31-11
119	CYCLE A/P 1 DISCONENCT	A/P 1 DISCONENCT FAILURE	VERIFIES CAPTAIN'S A/P DISC. PB.	FAILED CAPTAIN'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-13 J102A/36, J103A/36	22-14-11 22-14-11
120	CYCLE A/P 2 DISCONNECT	A/P 2 DISCONNECT FAILURE	VERIFIES FIRST OFFICER'S A/P DISC. PB.	FAILED FIRST OFFICER'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-14 J102A/36, J103A/36	22-14-11 22-14-11
121	CYCLE CAPT FMA RESET PB	CAPT FMA RESET PB FAILURE	VERIFIES CAPTAIN'S FMA RESET PB.	FAILED CAPTAIN'S FMA RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
122	CYCLE F/O FMA RESET PB	F/O FMA RESET PB FAILURE	VERIFIES FIRST OFFICER'S FMA RESET PB.	FAILED FIRST OFFICER'S RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
123	PULL GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1 IS CLOSED (R2-3).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-3 J101A/44	22-11-11 22-11-11
124		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2 IS CLOSED (R2-6).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-6 J104A/44	22-11-11 22-11-11
125	LEFT PNEU X FEED OPEN — VERIFY	LEFT PNEU X FEED OPEN FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN OPEN POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-369 J101A/31	34-18-12 34-18-12

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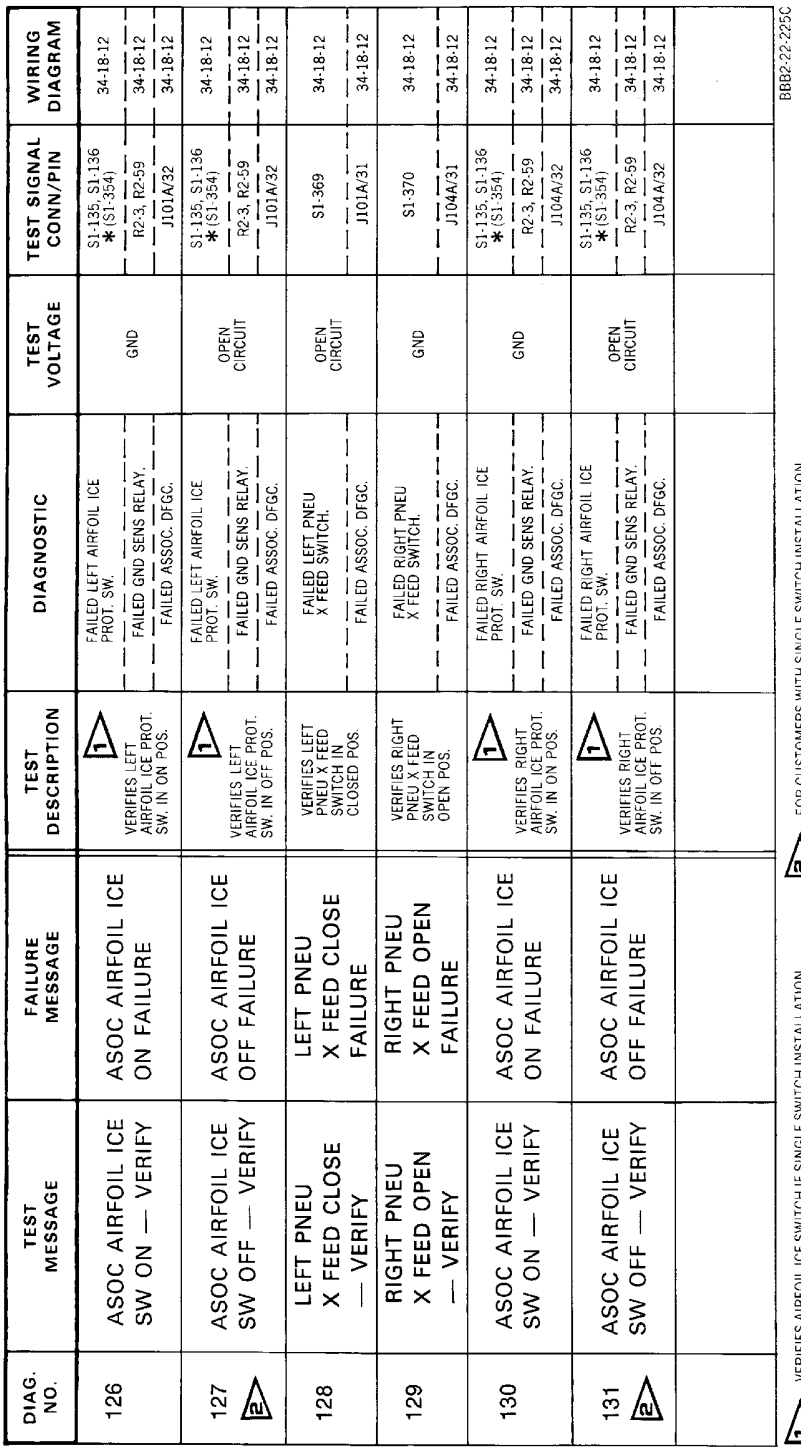
Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 11 of 20)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
126	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	(1) VERIFIES LEFT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 *(S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
127 (2)	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	(1) VERIFIES LEFT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 *(S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
128	LEFT PNEU X FEED CLOSE — VERIFY	LEFT PNEU X FEED CLOSE FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN CLOSED POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-369 J101A/31	34-18-12 34-18-12
129	RIGHT PNEU X FEED OPEN — VERIFY	RIGHT PNEU X FEED OPEN FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN OPEN POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-370 J104A/31	34-18-12 34-18-12
130	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	(1) VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 *(S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12
131 (2)	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	(1) VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 *(S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12

(1) VERIFIES AIRFOIL ICE SWITCH IF SINGLE SWITCH INSTALLATION.

* FOR SINGLE SWITCH INSTALLATION.

(2) FOR CUSTOMERS WITH SINGLE SWITCH INSTALLATION.
OPEN TAIL DE-ICE TIMER CIRCUIT BREAKER OR A FAILURE MAY BE LOGGED DUE TO A 2.5 MINUTE TIME WITHIN THE TAIL DE-ICING TIMER (R2-189).

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Sequence Three - Switches and Buttons
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DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
132	RIGHT PNEU X FEED CLOSE — VERIFY	RIGHT PNEU X FEED CLOSE FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN CLOSED POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-370 J104A/31	34-18-12 34-18-12
133	L ENG ANTI-ICE SW ON — VERIFY	L ENG ANTI-ICE SW ON FAILURE	VERIFIES LEFT ANTI-ICE SW. IN ON POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-28 J101A/34	34-18-12 34-18-12
134	L ENG ANTI-ICE SW OFF — VERIFY	L ENG ANTI-ICE SW OFF FAILURE	VERIFIES LEFT ANTI-ICE SW. IN OFF POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-28 J101A/34	34-18-12 34-18-12
135	R ENG ANTI-ICE SW ON — VERIFY	R ENG ANTI-ICE SW ON FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN ON POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-29 J104A/34	34-18-12 34-18-12
136	R ENG ANTI-ICE SW OFF — VERIFY	R ENG ANTI-ICE SW OFF FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN OFF POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-29 J104A/34	34-18-12 34-18-12
137	LEFT A/C SUPPLY SWITCH AUTO — VERIFY	LEFT A/C SUPPLY SW AUTO FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN AUTO POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-255 J101A/33	34-18-12 34-18-12
138	LEFT A/C SUPPLY SWITCH OFF — VERIFY	LEFT A/C SUPPLY SWITCH OFF FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN OFF POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-255 J101A/33	34-18-12 34-18-12

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Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 13 of 20)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
139	RIGHT A/C SUPPLY SWITCH AUTO — VERIFY	RIGHT A/C SUPPLY SWITCH AUTO FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN AUTO POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-256 J104A/33	34-18-12 34-18-12
140	RIGHT A/C SUPPLY SWITCH OFF — VERIFY	RIGHT A/C SUPPLY SWITCH OFF — FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN OFF POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-256 J104A/33	34-18-12 34-18-12
141 △1	CLOSE GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/D1, D2, D3 J101A/44	22-11-11 22-11-11
142 △1		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/C1, C2, C3 J104A/44	22-11-11 22-11-11
143	SEL DFGC NON-TEST SIDE — VERIFY	SEL DFGC NON-TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN NON-TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
144	SEL DFGC TEST SIDE — VERIFY	SEL DFGC TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	28 VDC	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
145 *	CYCLE BACKCOURSE PB	BACKCOURSE PB FAILURE	VERIFIES BACKCOURSE PB.	FAILED BACKCOURSE PUSHBUTTON FAILED ASSOC. DFGC	SHORTED TO GND WHEN SWITCH DEPRESSED. J102A/27, J103A/85	P10-411/B, F J102A/27, J103A/85	22-15-11 22-15-11
145 **	CYCLE FMS OVRD PB	FMS OVRD PB FAILURE	VERIFIES FMS OVRD PB.	FAILED FMS OVRD PUSH BUTTON FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED J102A/31, J103A/84	P10-411/B, F J102A/31, J103A/84	22-15-11 22-15-11
146	CYCLE SPEED SELECT PB	SPEED SELECT PB FAILURE	VERIFIES SPD SEL P.B.	FAILED SPD SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED. J102A/27, J103A/84	P10-411/A, F J102A/27, J103A/84	22-15-11 22-15-11
147	CYCLE MACH SELECT PB	MACH SELECT PB FAILURE	VERIFIES MACH SEL P.B.	FAILED MACH SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED. J102A/29, J103A/87	P10-411/D, H J102A/29, J103A/87	22-15-11 22-15-11

△1 AFTER CLOSING GND SENS BRKRS, SYSTEM WILL DISPLAY "FLIGHT FAULT REVIEW", FWD SPACE TO MAINTENANCE TEST IF FURTHER DIAGNOSTICS ARE DESIRED.

* USED FOR CUSTOMERS WITH BACKCOURSE OPTION
** USED FOR CUSTOMERS WITH FMS AND -970 DFGC AND SUBS

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Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 14 of 20)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
148	CYCLE EPR LIMIT PB	EPR LIMIT PB FAILURE	VERIFIES EPR LIM PB	FAILED EPR LIM PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, J J102A/30, J103A/87	22-15-11 22-15-11
*149	CYCLE NAV PB	NAV PB FAILURE	VERIFIES NAV PB	FAILED NAV PB FAILED ASSOC. DFGC.			
150	CYCLE VOR/LOC PB	VOR/LOC PB FAILURE	VERIFIES VOR/LOC PB	FAILED VOR/LOC PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, H J102A/29, J103A/86	22-15-11 22-15-11
151	CYCLE ILS PB	ILS PB FAILURE	VERIFIES ILS PB	FAILED ILS PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, J J102A/30, J103A/86	22-15-11 22-15-11
152	CYCLE AUTOLAND PB	AUTOLAND PB FAILURE	VERIFIES AUTOLAND PB	FAILED AUTOLAND PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, G J102A/28, J103A/86	22-15-11 22-15-11
153	CYCLE VERT SPD PB	VERT SPD PB FAILURE	VERIFIES VERT SPD PB	FAILED VERT SPD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
154	CYCLE MACH HOLD PB	MACH HOLD PB FAILURE	VERIFIES MACH HOLD PB	FAILED MACH HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, J J102A/30, J103A/85	22-15-11 22-15-11
155	CYCLE IAS/MACH PB	IAS/MACH PB FAILURE	VERIFIES IAS/MACH PB	FAILED IAS/MACH PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/28, J103A/84	22-15-11 22-15-11

*CUSTOMERS WITH NAV OPTION.

CAG(IGDS)

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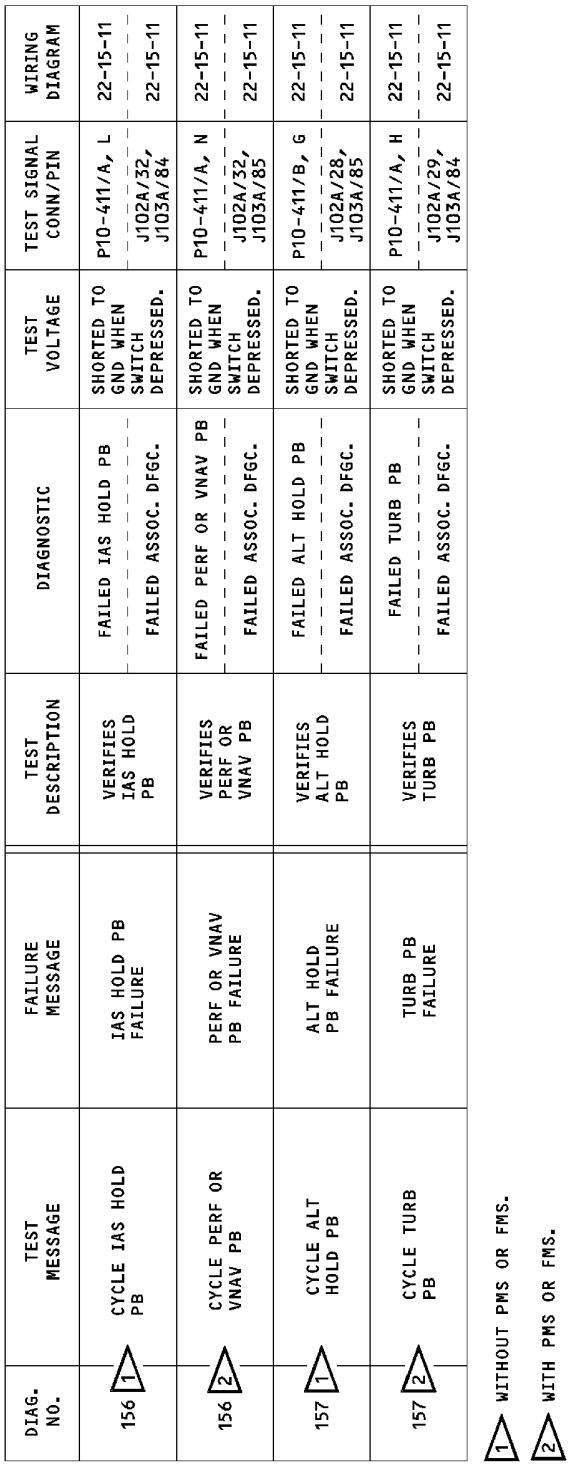
Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 15 of 20)



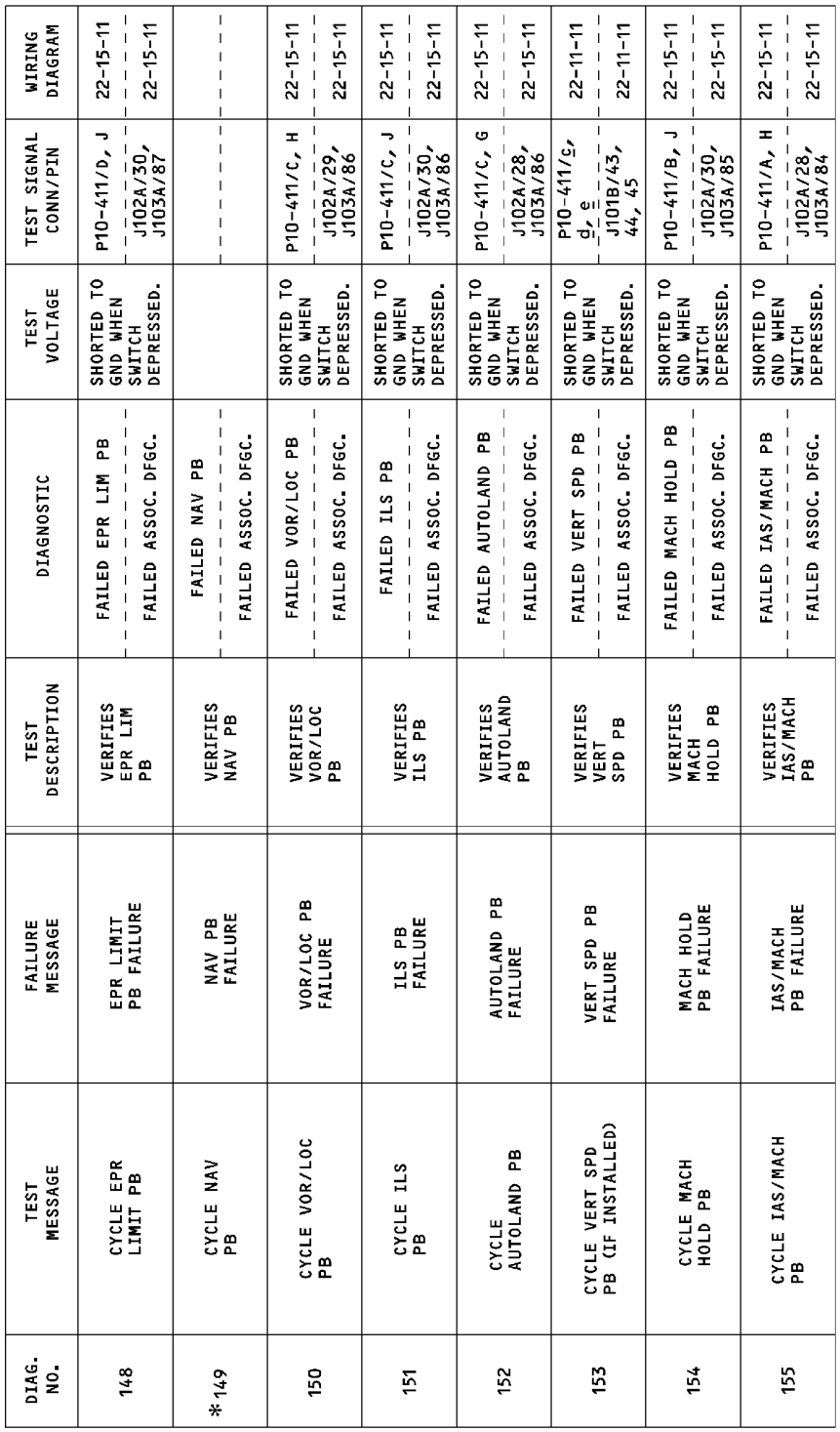
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
156 1	CYCLE IAS HOLD PB	IAS HOLD PB FAILURE	VERIFIES IAS HOLD PB	FAILED IAS HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, L J102A/32, J103A/84	22-15-11 22-15-11
156 2	CYCLE PERF OR VNAV PB	PERF OR VNAV PB FAILURE	VERIFIES PERF OR VNAV PB	FAILED PERF OR VNAV PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, N J102A/32, J103A/85	22-15-11 22-15-11
157 1	CYCLE ALT HOLD PB	ALT HOLD PB FAILURE	VERIFIES ALT HOLD PB	FAILED ALT HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, G J102A/28, J103A/85	22-15-11 22-15-11
157 2	CYCLE TURB PB	TURB PB FAILURE	VERIFIES TURB PB	FAILED TURB PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/29, J103A/84	22-15-11 22-15-11

1 WITHOUT PMS OR FMS.
2 WITH PMS OR FMS.

BBB2-22-1186

CAG(IGDS)

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 16 of 20)



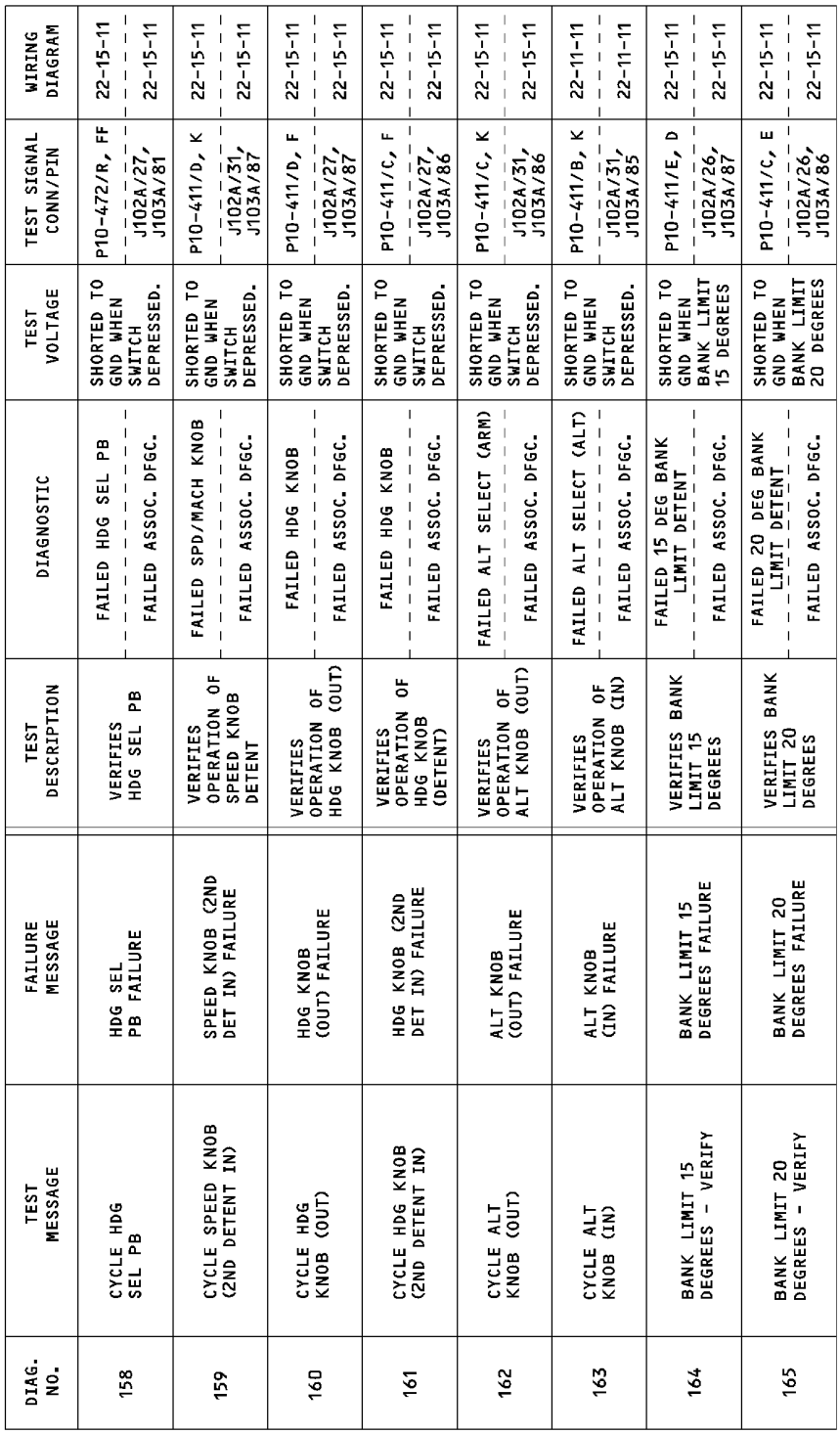
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
148	CYCLE EPR LIMIT PB	EPR LIMIT PB FAILURE	VERIFIES EPR LIM PB	FAILED EPR LIM PB	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, J	22-15-11
				FAILED ASSOC. DFGC.		J102A/30, J103A/87	22-15-11
*149	CYCLE NAV PB	NAV PB FAILURE	VERIFIES NAV PB	FAILED NAV PB			
				FAILED ASSOC. DFGC.			
150	CYCLE VOR/LOC PB	VOR/LOC PB FAILURE	VERIFIES VOR/LOC PB	FAILED VOR/LOC PB	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, H	22-15-11
				FAILED ASSOC. DFGC.		J102A/29, J103A/86	22-15-11
151	CYCLE ILS PB	ILS PB FAILURE	VERIFIES ILS PB	FAILED ILS PB	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, J	22-15-11
				FAILED ASSOC. DFGC.		J102A/30, J103A/86	22-15-11
152	CYCLE AUTOLAND PB	AUTOLAND PB FAILURE	VERIFIES AUTOLAND PB	FAILED AUTOLAND PB	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, G	22-15-11
				FAILED ASSOC. DFGC.		J102A/28, J103A/86	22-15-11
153	CYCLE VERT SPD PB (IF INSTALLED)	VERT SPD PB FAILURE	VERIFIES VERT SPD PB	FAILED VERT SPD PB	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/G, d, e	22-11-11
				FAILED ASSOC. DFGC.		J101B/43, 44, 45	22-11-11
154	CYCLE MACH HOLD PB	MACH HOLD PB FAILURE	VERIFIES MACH HOLD PB	FAILED MACH HOLD PB	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, J	22-15-11
				FAILED ASSOC. DFGC.		J102A/30, J103A/85	22-15-11
155	CYCLE IAS/MACH PB	IAS/MACH PB FAILURE	VERIFIES IAS/MACH PB	FAILED IAS/MACH PB	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H	22-15-11
				FAILED ASSOC. DFGC.		J102A/28, J103A/84	22-15-11

*CUSTOMERS WITH NAV OPTION.

CAG(IGDS)

BBB2-22-339B

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 17 of 20)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
158	CYCLE HDG SEL PB	HDG SEL PB FAILURE	VERIFIES HDG SEL PB	FAILED HDG SEL PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-472/R, FF J102A/27, J103A/81	22-15-11 22-15-11
159	CYCLE SPEED KNOB (2ND DETENT IN)	SPEED KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF SPEED KNOB DETENT	FAILED SPD/MACH KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, K J102A/31, J103A/87	22-15-11 22-15-11
160	CYCLE HDG KNOB (OUT)	HDG KNOB (OUT) FAILURE	VERIFIES OPERATION OF HDG KNOB (OUT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, F J102A/27, J103A/87	22-15-11 22-15-11
161	CYCLE HDG KNOB (2ND DETENT IN)	HDG KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF HDG KNOB (DETENT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, F J102A/27, J103A/86	22-15-11 22-15-11
162	CYCLE ALT KNOB (OUT)	ALT KNOB (OUT) FAILURE	VERIFIES OPERATION OF ALT KNOB (OUT)	FAILED ALT SELECT (ARM) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, K J102A/31, J103A/86	22-15-11 22-15-11
163	CYCLE ALT KNOB (IN)	ALT KNOB (IN) FAILURE	VERIFIES OPERATION OF ALT KNOB (IN)	FAILED ALT SELECT (ALT) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, K J102A/31, J103A/85	22-11-11 22-11-11
164	BANK LIMIT 15 DEGREES - VERIFY	BANK LIMIT 15 DEGREES FAILURE	VERIFIES BANK LIMIT 15 DEGREES	FAILED 15 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 15 DEGREES	P10-411/E, D J102A/26, J103A/87	22-15-11 22-15-11
165	BANK LIMIT 20 DEGREES - VERIFY	BANK LIMIT 20 DEGREES FAILURE	VERIFIES BANK LIMIT 20 DEGREES	FAILED 20 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 20 DEGREES	P10-411/C, E J102A/26, J103A/86	22-15-11 22-15-11

CAG(IGDS)

BBB2-22-229B

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 18 of 20)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
166	BANK LIMIT 25 DEGREES — VERIFY	BANK LIMIT 25 DEGREES FAILURE	VERIFIES BANK LIMIT 25 DEGREES.	FAILED 25 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 25 DEGREES.	P10-411/B, E J102A/26, J103A/85	22-15-11 22-15-11
167	BANK LIMIT 30 DEGREES — VERIFY	BANK LIMIT 30 DEGREES FAILURE	VERIFIES BANK LIMIT 30 DEGREES.	FAILED 30 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 30 DEGREES.	P10-411/A, E J012A/26, J103A/84	22-15-11 22-15-11
168	SPEED REF. OPER. — VERIFY	SPEED REF. OPER FAILURE	VERIFIES SPEED REF. CHANGES VISUALLY.	FAILED SPEED/MACH REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/Z, a, b J101B/46, 47, 48	22-31-11 22-31-11
169	HEADING REF OPER. — VERIFY	HEADING REF. OPER FAILURE	VERIFIES HDG REF. CHANGES VISUALLY.	FAILED HEADING REF. FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20 J104B/18, 19, 20	34-22-03 34-22-03 34-22-04
*170							
*171							
*172							
173	CAPT HDG SEL REF — VERIFY	CAPT HDG SEL REF FAILURE	VERIFIES HDG SEL VISUAL REFERENCE CHANGES.	FAILED HDG SEL KNOB/SYNCHRO . FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20	34-22-03 34-22-03
174	VERT SPD REF OPER. — VERIFY	VERT SPD REF OPER FAILURE	VERIFIES VERT SPD (PITCH WHEEL) REF. CHANGES VISUALLY.	FAILED VERT SPEED REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
175	ALT REF OPER — VERIFY	ALT REF OPER FAILURE	VERIFIES ALT REF. CHANGES VISUALLY.	FAILED ALT. REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/W, X, Y J101B/40, 41, 42	22-11-11 22-11-11

BBB2-22-230A

*NOT USED

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 19 of 20)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
176	CRS-1 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-1 REF. CHANGES VISUALLY.	FAILED CAPT'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-406/f, s, u J101B/5, 6, 7	34-22-03 34-22-03
177	CRS-2 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-2 REF. CHANGES VISUALLY.	FAILED F/O'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-408/f, s, u J104B/5, 6, 7	34-22-04 34-22-04
* 178							
* 179							

* NOT USED

BBB2-22-231B

Sequence Three - Switches and Buttons
Figure 109/22-01-05-990-894 (Sheet 20 of 20)

DIAG. NO	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
180	PITCH ANGLE 1 = XX.XX DEGREES	PITCH ANGLE 1 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-18/34, 35 J101B/71, 72	34-24-01
181	PITCH ANGLE 2 = XX.XX DEGREES	PITCH ANGLE 2 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-19/34, 35 J104B/71, 72	34-24-02
182	PITCH ANGLE 3 = XX.XX DEGREES	PITCH ANGLE 3 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-165/34, 35 J103B/71, 72	34-24-01
183	BANK ANGLE 1 = XX.XX DEGREES	BANK ANGLE 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-18/30, 31 J101B/74, 75	34-24-01
184	BANK ANGLE 2 = XX.XX DEGREES	BANK ANGLE 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-19/30, 31 J104B/74, 75	34-24-02
185	BANK ANGLE 3 = XX.XX DEGREES	BANK ANGLE 3 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-165/34, 35 J103A/74, 75	34-24-01
186	SPOILER POS 1 = XX.XX DEGREES	SPOILER POS 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-1 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-397/3, 4, 5 J101B/35, 36, 37	22-12-11
187	SPOILER POS 2 = XX.XX DEGREES	SPOILER POS 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-2 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-398/3, 4, 5 J104B/35, 36, 37	22-12-11
188	CRS RAD ALT 1 = XXXX. FEET	CRS RAD ALT 1 FAILURE	NULL TESTED TO BE <±10 FT.	FAILED RAD ALT-1 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/22, 23 J101B/55, 56	34-45-01
189	CRS RAD ALT 2 = XXXX. FEET	CRS RAD ALT 2 FAILURE	NULL TESTED TO BE <±10 FT.	FAILED RAD ALT-2 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/22, 23 J104B/55, 56	34-45-02
190	FINE RAD ALT 1 = XXXX. FEET	FINE RAD ALT 1 FAILURE	NULL TESTED TO BE <±10 FT.	FAILED RAD ALT-1 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/46, 47 J102A/55, 56	34-45-01

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Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 1 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
180	PITCH ANGLE 1 = XX.XX DEGREES	PITCH ANGLE 1 FAILURE	NULL TESTED TO BE < ± 3°	FAILED PITCH ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-18/34, 35 J101B/71, 72	34-24-01 34-24-01
181	PITCH ANGLE 2 = XX.XX DEGREES	PITCH ANGLE 2 FAILURE	NULL TESTED TO BE < ± 3°	FAILED PITCH ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-19/34, 35 J104B/71, 72	34-24-02 34-24-02
*182							
183	BANK ANGLE 1 = XX.XX DEGREES	BANK ANGLE 1 FAILURE	NULL TESTED TO BE < ± 2°	FAILED BANK ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-18/30, 31 J101B/74, 75	34-24-01 34-24-01
184	BANK ANGLE 2 = XX.XX DEGREES	BANK ANGLE 2 FAILURE	NULL TESTED TO BE < ± 2°	FAILED BANK ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-19/30, 31 J104B/74, 75	34-24-02 34-24-02
*185							
186	SPOILER POS 1 = XX.XX DEGREES	SPOILER POS 1 FAILURE	NULL TESTED TO BE < ± 2°	FAILED SPOILER-1 POSITION. FAILED ASSOC. DFGC.	< 0.41 VAC	P10-397/3, 4, 5 J101B/35, 36, 37	22-12-11 22-12-11
187	SPOILER POS 2 = XX.XX DEGREES	SPOILER POS 2 FAILURE	NULL TESTED TO BE < ± 2°	FAILED SPOILER-2 POSITION. FAILED ASSOC. DFGC.	< 0.41 VAC	P10-398/3, 4, 5 J104B/35, 36, 37	22-12-11 22-12-11
188	CRS RAD ALT 1 XXXX. FEET	CRS RAD ALT 1 FAILURE	NULL TESTED TO BE < ± 10 FT	FAILED RAD ALT-1 COARSE DATA. FAILED ASSOC. DFGC.	> 0.2 < 0.7 VAC	R50-321B/22, 23 J101B/55, 56	34-45-01 34-45-01
189	CRS RAD ALT 2 XXXX. FEET	CRS RAD ALT 2 FAILURE	NULL TESTED TO BE < ± 10 FT	FAILED RAD ALT-2 COARSE DATA. FAILED ASSOC. DFGC.	> 0.2 < 0.7 VAC	R50-322B/22, 23 J104B/55, 56	34-45-02 34-45-02
190	FINE RAD ALT 1 XXXX. FEET	FINE RAD ALT 1 FAILURE	NULL TESTED TO BE < ± 10 FT	FAILED RAD ALT-1 FINE DATA. FAILED ASSOC. DFGC.	> 0.2 < 0.7 VAC	R50-321B/46, 47 J102A/55, 56	34-45-01 34-45-01

* NOT USED

BBB2-22-340B

Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 2 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
191	FINE RAD ALT 2 = XXXX. FEET	FINE RAD ALT 2 FAILURE	NULL TESTED TO BE <±10 FT.	FAILED RAD ALT-2 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/46, 47 J103A/55, 56	34-45-02 34-45-02
192	ELEV SYNC A = XX.XX DEGREES	ELEV SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
193	ELEV SYNC B = XX.XX DEGREES	ELEV SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
194	AIL SYNC A = XX.XX DEGREES	AIL SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED AIL SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
195	AIL SYNC B = XX.XX DEGREES	AIL SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED AIL SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
196	RUD SYNC A = XX.XX DEGREES	RUD SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED RUD SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
197	RUD SYNC B = XX.XX DEGREES	RUD SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED RUD SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-424/J, S J104B/86, 86	22-13-12 22-13-12
198	YAW DAMP POS = XX.XX DEGREES	YAW DAMP POS FAILURE	NULL TESTED TO BE < ±1°.	FAILED YAW DAMP ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	<0.21 VAC	P10-46/V, W J103B/45, 46	22-13-12 22-13-12
199	MACH TRIM POS = XX.XX INCH	MACH TRIM POS FAILURE	NULL TESTED TO BE < ±.1 INCH.	1 FAILED MACH TRIM ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	>5.0 <6.8 VAC	P10-44/V, W J103B/58, 59	22-21-11 22-21-11
200	ELEV TACH A = XX.XX DEG/SEC	ELEV TACH A FAILURE	NULL TESTED TO BE < ±2%/SEC.	FAILED ELEV TACH A. FAILED ASSOC. DFGC.	<0.53 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

1 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

BBB2-22-233A

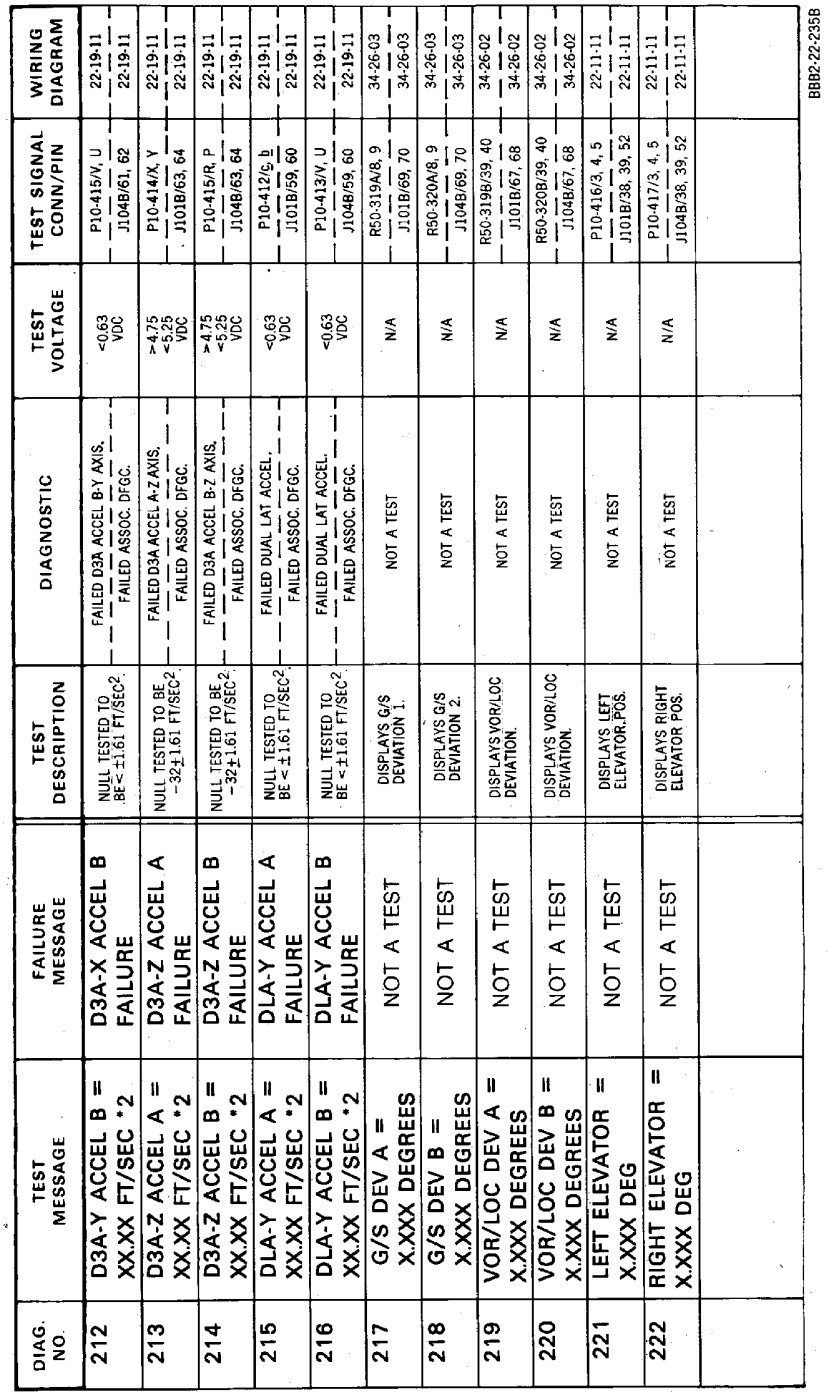
Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 3 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
201	ELEV TACH B = XX.XX DEG/SEC	ELEV TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED ELEV TACH B. FAILED ASSOC. DFGC.	<0.53 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
202	AIL TACH A = XX.XX DEG/SEC	AIL TACH A FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED A/L TACH A. FAILED ASSOC. DFGC.	<0.68 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
203	AIL TACH B = XX.XX DEG/SEC	AIL TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED AIL TACH B. FAILED ASSOC. DFGC.	<0.68 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
204	RUD TACH A = XX.XX DEG/SEC	RUD TACH A FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED RUD TACH A. FAILED ASSOC. DFGC.	<0.65 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
205	RUD TACH B = XX.XX DEG/SEC	RUD TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED RUD TACH B. FAILED ASSOC. DFGC.	<0.65 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
206	A/T TACH = XX.XX DEG/SEC	A/T TACH FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED A/T TACH. FAILED ASSOC. DFGC.	<3.2 VAC	P10-430/M, N J103B/33, 34	22-31-14 22-31-14
207	MACH TRIM TACH = XX.XX IN/SEC	MACH TRIM TACH FAILURE	NULL TESTED TO BE < ±.1 INCH/SEC.	FAILED MACH TRIM TACH. 1 FAILED ASSOC. DFGC.	<0.54 VAC	P10-44/T, U J103B/56, 57	22-21-11 22-21-11
208	YAW DAMP TACH = XX.XX DEG/SEC	YAW DAMP TACH FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED YAW DAMP TACH. FAILED ASSOC. DFGC.	<0.28 VAC	P10-46/T, U J103B/43, 44	22-13-12 22-13-12
209	D3A-X ACCEL A = XX.XX FT/SEC *2	D3A-X ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.2	FAILED D3A ACCEL A-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/a, Z J101B/57, 58	22-19-11 22-19-11
210	D3A-X ACCEL B = XX.XX FT/SEC *2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.2	FAILED D3A ACCEL B-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
211	D3A-Y ACCEL A = XX.XX FT/SEC *2	D3A-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.2	FAILED D3A ACCEL A-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/b, b J101B/61, 62	22-19-11 22-19-11

1 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED, SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

BBB2-22-234A

Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 4 of 8)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
212	D3A-Y ACCEL B = XX.XX FT/SEC **2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/V, U J104B/61, 62	22-19-11 22-19-11
213	D3A-Z ACCEL A = XX.XX FT/SEC **2	D3A-Z ACCEL A FAILURE	NULL TESTED TO BE −32±1.61 FT/SEC**2.	FAILED D3A ACCEL A-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
214	D3A-Z ACCEL B = XX.XX FT/SEC **2	D3A-Z ACCEL B FAILURE	NULL TESTED TO BE −32±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
215	DLA-Y ACCEL A = XX.XX FT/SEC **2	DLA-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-412/c, b J101B/59, 60	22-19-11 22-19-11
216	DLA-Y ACCEL B = XX.XX FT/SEC **2	DLA-Y ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-413/V, U J104B/59, 60	22-19-11 22-19-11
217	G/S DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 1.	NOT A TEST	N/A	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
218	G/S DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 2.	NOT A TEST	N/A	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
219	VOR/LOC DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
220	VOR/LOC DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
221	LEFT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS LEFT ELEVATOR POS.	NOT A TEST	N/A	P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
222	RIGHT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS RIGHT ELEVATOR POS.	NOT A TEST	N/A	P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11

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Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 5 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
223	LEFT AILERON XX.XX DEG	NOT A TEST	DISPLAYS LEFT AILERON POS.	NOT A TEST	N/A	P10-396/3, 4, 5 J101B/49,50, 51	22-12-11 22-12-11
224	RUDDER POS = XX.XX DEG	NOT A TEST	DISPLAYS RUDDER POS.	NOT A TEST	N/A	P10-429/3, 4, 5 J104B/46, 47,48	22-13-11 22-13-11
225	HOR STAB = XX.XX DEG	NOT A TEST	DISPLAYS HOR STAB POS.	NOT A TEST	N/A	P10-418/3, 4, 5 J104B/43, 44, 45	22-11-11 22-11-11
226	ANGLE OF ATT -1 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-1.	NOT A TEST	N/A	P1-648/M, N, P J101B/26, 27, 28	22-31-11 22-31-11
227	ANGLE OF ATT -2 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-2.	NOT A TEST	N/A	P1-649/M, N, P J104B/26, 27, 28	22-31-11 22-31-11
228	EPR LEFT = X.XXX EPR	NOT A TEST	DISPLAYS LEFT EPR TRANSMITTER.	NOT A TEST	N/A	P1-613/D, E, F J101B/32, 33, 34	34-18-12 34-18-12
229	EPR RIGHT = X.XXX EPR	NOT A TEST	DISPLAYS RIGHT EPR TRANSMITTER.	NOT A TEST	N/A	P1-614/D, E, F J104B/32, 33, 34	34-18-12 34-18-12
230	HEADING 1 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-1 DATA.	NOT A TEST	N/A	P10-432/q, r, w J101B/15, 16, 17	34-22-03 34-22-03
231	HEADING 2 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-2 DATA.	NOT A TEST	N/A	P10-410/q, r, s J104B/15, 16, 17	34-22-04 34-22-04
232	LEFT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS LEFT FLAP POSITION.	NOT A TEST	N/A	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
233	RIGHT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS RIGHT FLAP POSITION.	NOT A TEST	N/A	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 6 of 8)

DIAG NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
234	FLAP HANDLE = XX.XX DEGREES	NOT A TEST	DISPLAYS FLAP HANDLE POSITION.	NOT A TEST	N/A	T2-10/1,2,3 J104B/40, 41, 42	22-31-11 22-31-11
235	CADC-T ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
236	CADC-N ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS NON-ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
237	CADC-T TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS ASSOC. CADC TAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
238	CADC-N TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS NON-ASSOC. TAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
239	CADC-T ALT RATE= XX.XX FT/SEC	NOT A TEST	DISPLAYS ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
240	CADC-N ALT RATE = XX.XX FT/SEC	NOT A TEST	DISPLAYS NON-ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
241	CADC-T SAT = XX.XX DEGREES	NOT A TEST	VERIFIES ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
242	CADC-N SAT = XX.XX DEGREES	NOT A TEST	VERIFIES NON-ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
243	CADC-T CAS = XXX.X KNOT	NOT A TEST	VERIFIES ASSOC. CADC CAS.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
244	CADC-N CAS = XXX.X KNOT	NOT A TEST	VERIFIES NON-ASSOC. CAS.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J101A/92, 93	34-16-12 34-16-12

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

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Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 7 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
245	CADC-T MACH= X.XXXX MACH	NOT A TEST	DISPLAYS ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40	34-16-12
						J101A/92, 93	34-16-12
246	CADC-N MACH= X.XXXX MACH	NOT A TEST	DISPLAYS NON-ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/61, 62, R50-283B/61,62	34-16-12
						J104A/92, 93	34-16-12
551 (-)	CAPT PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -1	NOT A TEST	N/A	N/A	
552 (-)	F/O PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -2	NOT A TEST	N/A	N/A	
*247	SET BAROMETER TO 26.00-VERIFY	ALT CORRECTION FAILURE	CHECKS BARO SET TO 26.00	BARO POT FAILURE	9.8 V	J102B/75, 79	
				ASSOC. DFGC. FAILURE	5.12 V	J102B/79	

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

(-) -973 AND SUBSEQUENT IF MABH OPTION SELECTED.

*IF DISPLAY OPTION SELECTED, TEST MESSAGE IS "ALT CORRECTION = ± XXXX.X FEET"
TEST DESCRIPTION IS: DISPLAYS QNH CORRECTED ALTITUDE.

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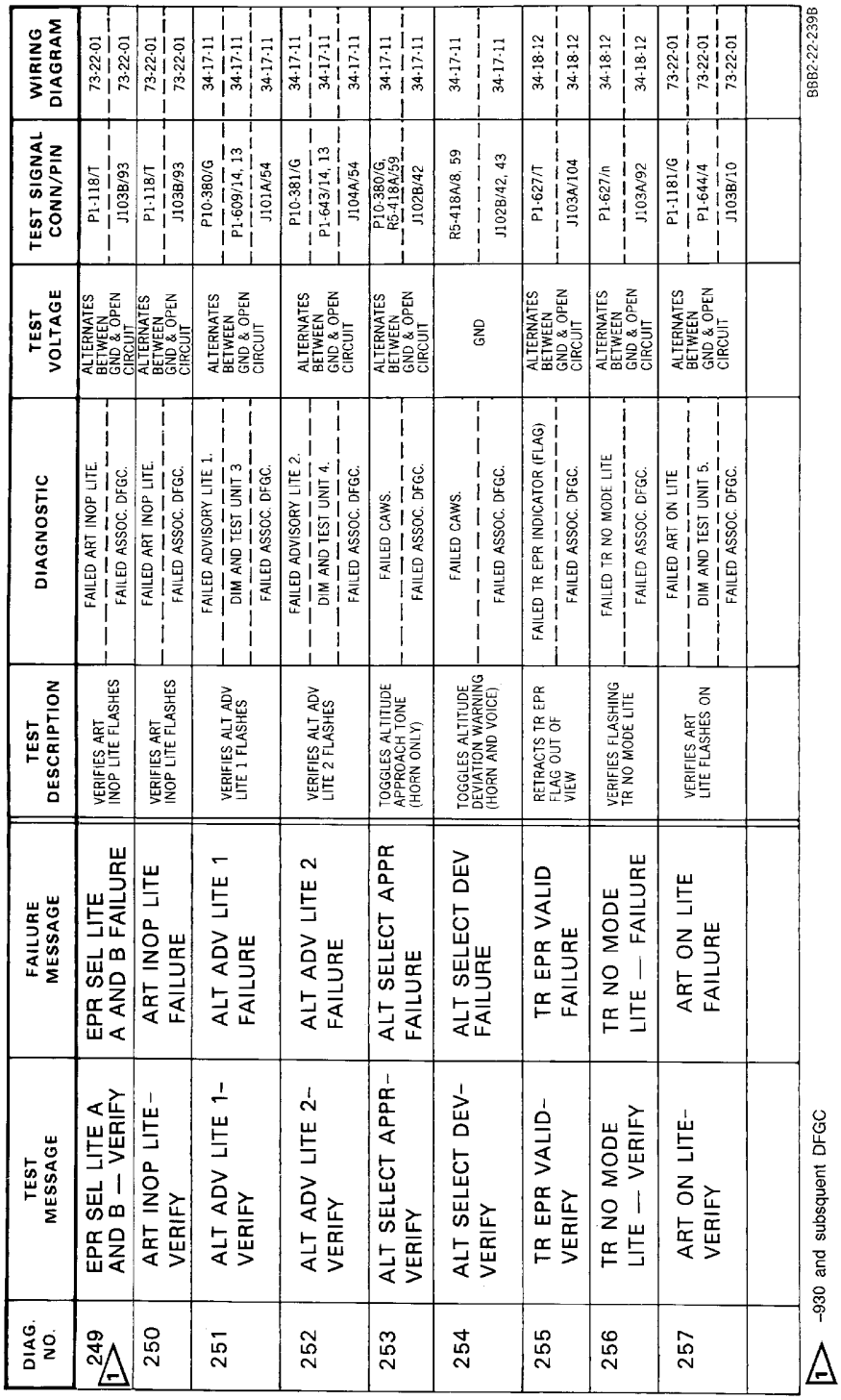
Sequence Four - Sensor Values
Figure 110/22-01-05-990-895 (Sheet 8 of 8)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
249 (1)	EPR SEL LITE A AND B — VERIFY	EPR SEL LITE A AND B FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
250	ART INOP LITE-VERIFY	ART INOP LITE FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
251	ALT ADV LITE 1-VERIFY	ALT ADV LITE 1 FAILURE	VERIFIES ALT ADV LITE 1 FLASHES	FAILED ADVISORY LITE 1. DIM AND TEST UNIT 3 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G P1-609/14, 13 J101A/54	34-17-11 34-17-11 34-17-11
252	ALT ADV LITE 2-VERIFY	ALT ADV LITE 2 FAILURE	VERIFIES ALT ADV LITE 2 FLASHES	FAILED ADVISORY LITE 2. DIM AND TEST UNIT 4. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-381/G P1-643/14, 13 J104A/54	34-17-11 34-17-11 34-17-11
253	ALT SELECT APPR-VERIFY	ALT SELECT APPR FAILURE	TOGGLES ALTITUDE APPROACH TONE (HORN ONLY)	FAILED CAWS. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G, R5-418A/59 J102B/42	34-17-11 34-17-11 34-17-11
254	ALT SELECT DEV-VERIFY	ALT SELECT DEV FAILURE	TOGGLES ALTITUDE DEVIATION WARNING (HORN AND VOICE)	FAILED CAWS. FAILED ASSOC. DFGC.	GND	R5-418A/8, 59 J102B/42, 43	34-17-11 34-17-11
255	TR EPR VALID-VERIFY	TR EPR VALID FAILURE	RETRACTS TR EPR FLAG OUT OF VIEW	FAILED TR EPR INDICATOR (FLAG) FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/T J103A/104	34-18-12 34-18-12
256	TR NO MODE LITE — VERIFY	TR NO MODE LITE — FAILURE	VERIFIES FLASHING TR NO MODE LITE	FAILED TR NO MODE LITE FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/n J103A/92	34-18-12 34-18-12
257	ART ON LITE-VERIFY	ART ON LITE FAILURE	VERIFIES ART LITE FLASHES ON	FAILED ART ON LITE DIM AND TEST UNIT 5. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-1181/G P1-644/4 J103B/10	73-22-01 73-22-01 73-22-01

(1) –930 and subsequent DFGC

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Sequence Five - Cockpit Displays
Figure 111/22-01-05-990-896 (Sheet 1 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
258	ART READY LITE–VERIFY	ART READY LITE FAILURE	VERIFIES ART READY LITE FLASHES.	FAILED ART READY LITE DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P1-1181/14 P1-607/22 J103B/66	73-22-01 73-22-01 73-22-01
259	NO AUTOLAND LITE A — VERIFY	NO AUTOLAND LITE A FAILURE	VERIFIES NO AUTOLAND LITE A (CAPT'S, FMA).	FAILED CAPT'S FMA (NO AUTOLAND LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/K P1-607/15 J101A/61	22-18-11 22-18-11 22-18-11
260	NO AUTOLAND LITE B — VERIFY	NO AUTOLAND LITE B FAILURE	VERIFIES NO AUTOLAND LITE B (F/O'S FMA).	FAILED F/O'S FMA (NO AUTOLAND LITE B). DIM AND TEST UNIT 2 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-402/K/P10-403/P P1-608/15 J104A/61	22-18-11 22-18-11 22-18-11
261	A/P TRIM LITE A — VERIFY	A/P TRIM LITE A FAILURE	VERIFIES A/P TRIM LITE A (CAPT'S FMA).	FAILED CAPT'S FMA (A/P TRIM LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/L P1-607/18 J101A/62	22-18-11 22-18-11 22-18-11
262	A/P TRIM LITE B — VERIFY	A/P TRIM LITE B FAILURE	VERIFIES A/P TRIM LITE B (F/O'S FMA).	FAILED F/O'S FMA (A/P TRIM LITE B). DIM AND TEST UNIT 2. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28VDC	P10-402/L P1-608/18 J104A/62	22-18-11 22-18-11 22-18-11
263	VERT SPD DETENT–VERIFY	VERT SPD DETENT FAILURE	VERIFIES VERT SPD DETENT	FAILED DFGCP (PITCH WHEEL CLUTCH) FAILED ASSOC. DFGC.	28 VDC	P10-411/f J103A/77	22-11-11 22-11-11
264	IAS BUG 1 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 1 TO 250 KIAS	FAILED CAPT'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-382/a, Y J102A/43, 44	22-31-14 22-31-14
265	IAS BUG 2 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 2 TO 250 KIAS	FAILED F/O'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-383/a, Y J103A/43, 44	22-31-14 22-31-14

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Sequence Five - Cockpit Displays
Figure 111/22-01-05-990-896 (Sheet 2 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
266	EPR BUG LEFT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES LEFT EPR BUG TO EPR = 1.8	FAILED LEFT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-611/P, N J102A/46, 47	34-18-12 34-18-12
267	EPR BUG RIGHT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES RIGHT EPR BUG TO EPR = 1.8	FAILED RIGHT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-612/P, N J103A/46, 47	34-18-12 34-18-12
268	EPR LIMIT CMD 1.8 EPR — VERIFY	EPR LIMIT CMD FAILURE	DRIVES EPR LIMIT CMD TO EPR = 1.8	FAILED EPR LIMIT DISPLAY ON TRI FAILED ASSOC. DFGC.	12.97 VDC	P1-627/g, r J102A/49, 50	34-18-12 34-18-12
269	CAPT F/D SW ON — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN ON POSITION.	FAILED CAPT'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
270	CAPT F/D LITE ON — VERIFY 1	CAPT F/D LITE ON FAILURE	VERIFIES CAPT'S FMA FD ANNUNCIATOR.	FAILED CAPT'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/M P1-607/19, 25 J102B/25	22-17-11 22-17-11 22-17-11
271	CAPT PITCH FD CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO CENTER.	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
272	CAPT PITCH FD NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO NOSE UP.	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
273	CAPT ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S ROLL COMMAND TO CENTER.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
274	CAPT ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S TO ROLL COMMAND RIGHT.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
275	CAPT F/D SW OFF — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN OFF POSITION.	FAILED CAPT'S FD SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
276	F/O F/D SW ON — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN ON POSITION.	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11

1 IF F/D BLUE LIGHT OBLITERATED PRESS VERIFY AND CONTINUE.

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Sequence Five - Cockpit Displays
Figure 111/22-01-05-990-896 (Sheet 3 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
277	F/O F/D LITE ON — VERIFY [2]	F/O F/D LITE ON FAILURE	VERIFIES F/O'S FMA FD ANNUNCIATOR.	FAILED F/O'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATE BETWEEN GND & 28VDC	P10-402/M P1-6441/19,25 J103A/25	22-17-11 22-17-11 22-17-11
278	F/O PITCH F/D CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
279	F/O PITCH F/D NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO NOSE UP.	FAILED F/O'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
280	F/O ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
281	F/O ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND RIGHT.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
282	F/O F/D SW OFF — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN OFF POSITION	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11
283	FAST/SLOW 1 VALID — VERIFY	FAST/SLOW 1 VALID FAILURE	TOGGLES FAST/SLOW VALID ON CAPT'S ADI.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-257/A J101A/55	22-31-13 22-31-13
284	FAST/SLOW 2 VALID — VERIFY	FAST/SLOW 2 VALID FAILURE	TOGGLES FAST/SLOW VALID ON F/O'S ADI.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-262/A J104A/55	22-31-13 22-31-13
285	BOTH SPEED CMDS CENTER — VERIFY	F/S CMD FAILURE	COMMANDS CAPT'S AND F/O'S SPD CMD BUG TO CENTER.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT [1]	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62	22-31-13 22-31-13
286	BOTH SPEED CMDS UP — VERIFY	F/S CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG UP.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	+1.18 VDC [1]	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62	22-31-13 22-31-13

[1] J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW-FAST-2S.

[2] IF F/D BLUE LIGHT OBLITERATED PRESS VERIFY AND CONTINUE.

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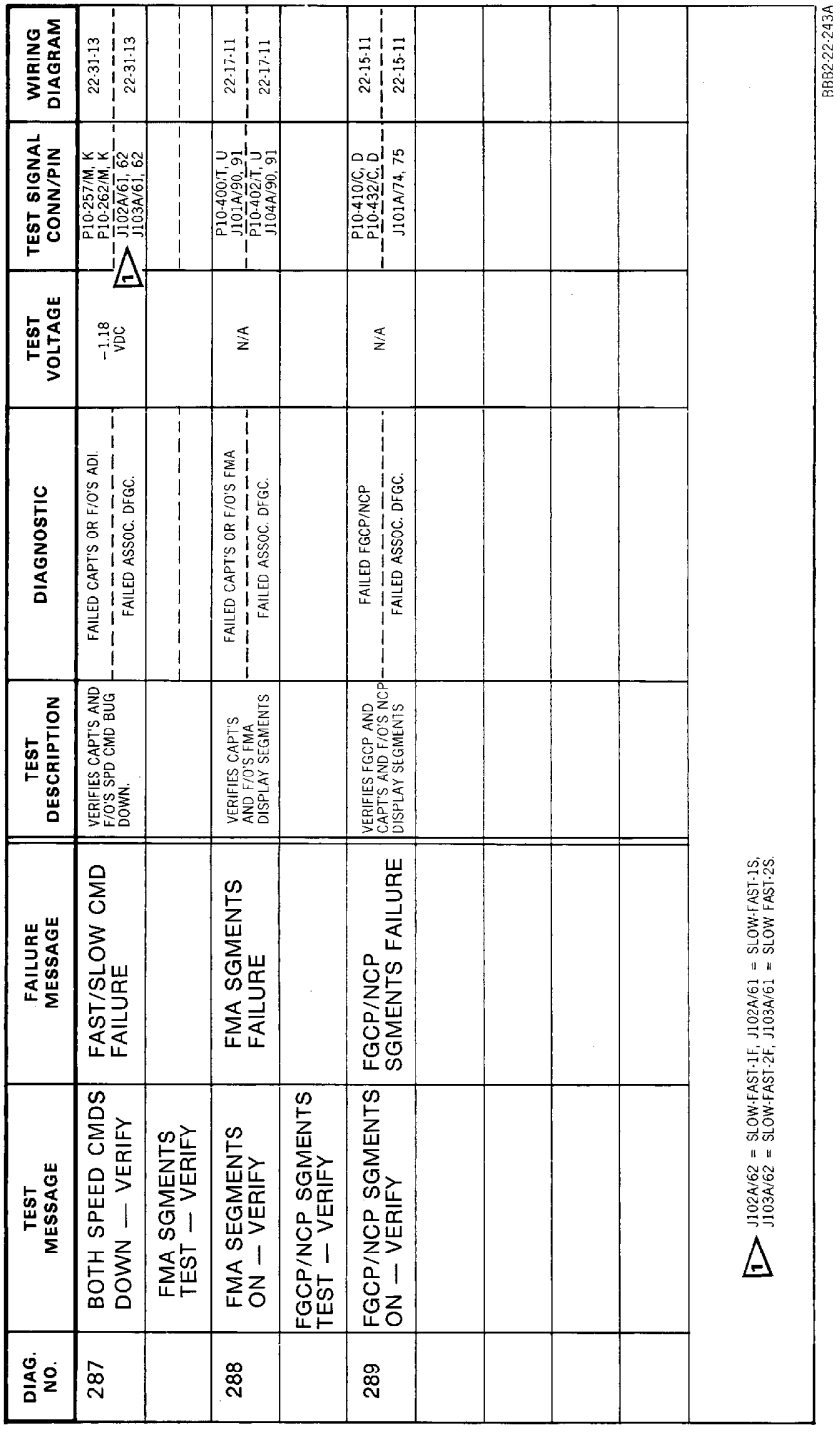
Sequence Five - Cockpit Displays
Figure 111/22-01-05-990-896 (Sheet 4 of 5)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
287	BOTH SPEED CMDS DOWN — VERIFY	FAST/SLOW CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG DOWN.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	−1.18 VDC	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62	22-31-13 22-31-13
	FMA SGMENTS TEST — VERIFY						
288	FMA SEGMENTS ON — VERIFY	FMA SGMENTS FAILURE	VERIFIES CAPT'S AND F/O'S FMA DISPLAY SEGMENTS	FAILED CAPT'S OR F/O'S FMA FAILED ASSOC. DFGC.	N/A	P10-400/T, U J101A/90, 91 P10-402/T, U J104A/90, 91	22-17-11 22-17-11
	FGCP/NCP SGMENTS TEST — VERIFY						
289	FGCP/NCP SGMENTS ON — VERIFY	FGCP/NCP SGMENTS FAILURE	VERIFIES FGCP AND CAPT'S AND F/O'S NCP DISPLAY SEGMENTS	FAILED FGCP/NCP FAILED ASSOC. DFGC.	N/A	P10-410/C, D P10-432/C, D J101A/74, 75	22-15-11 22-15-11

1. J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
   J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW FAST-2S.

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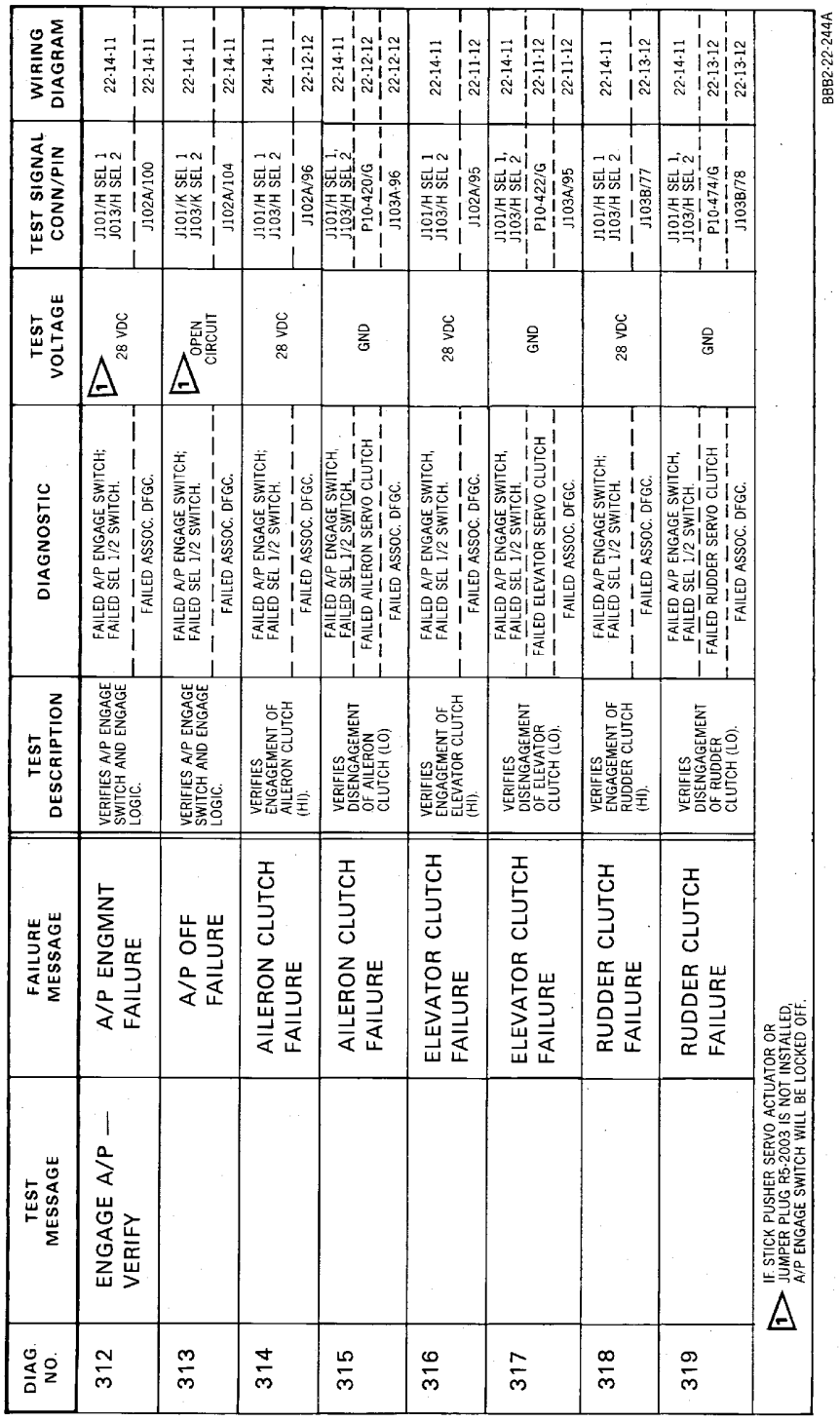
Sequence Five - Cockpit Displays
Figure 111/22-01-05-990-896 (Sheet 5 of 5)



DIAG NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
312	ENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 28 VDC	J101/H SEL 1 J013/H SEL 2 J102A/100	22-14-11 22-14-11
313		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 OPEN CIRCUIT	J101/K SEL 1 J103/K SEL 2 J102A/104	22-14-11 22-14-11
314		AILERON CLUTCH FAILURE	VERIFIES ENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/96	24-14-11 22-12-12
315		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO)	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
316		ELEVATOR CLUTCH FAILURE	VERIFIES ENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/95	22-14-11 22-11-12
317		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-422/G J103A/95	22-14-11 22-11-12 22-11-12
318		RUDDER CLUTCH FAILURE	VERIFIES ENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J103B/77	22-14-11 22-13-12
319		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12

1 IF STICK PUSHER SERVO ACTUATOR OR JUMPER PLUG R5-2003 IS NOT INSTALLED, A/P ENGAGE SWITCH WILL BE LOCKED OFF.

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Sequence Six - Second Setup Interactives
Figure 112/22-01-05-990-897 (Sheet 1 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
320	FMA-1 A/P LITE ON FAILURE	FMA-1 A/P LITE OFF FAILURE	VERIFIES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR; FAILED FMA SELECT LOGIC.	GND	J101/N	22-17-11
				FAILED DIM AND TEST UNIT.		P1-644/16	22-17-11
				FAILED DFGC-1.		J102B/24	22-17-11
321	FMA-2 A/P LITE ON FAILURE	FMA-2 A/P LITE OFF FAILURE	VERIFIES FMA A/P-2 ANNUNCIATOR.	FAILED FMA A/P-2 ANNUNCIATOR; FAILED FMA SELECT LOGIC.	GND	J101/P	22-17-11
				FAILED DIM AND TEST UNIT.		P1-644/20	22-17-11
				FAILED DFGC-2.		J102B/24	22-17-11
322	ENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE AND ENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH; FAILED SEL 1/2 SWITCH.	28 VDC	P10-432/P	22-31-12
				FAILED ASSOC. DFGC.		J103B/26	22-31-12
323	ENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH.	GND	S10-194	22-13-12
				FAILED ASSOC. DFGC.		J103B/8	22-13-12
324	Y/D OFF LITE OFF — VERIFY	Y/D OFF LITE OFF FAILURE	VERIFIES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE.	28 VDC	P1-119/c	22-13-12 33-12-00
				FAILED ASSOC. DFGC.		J103B/B	22-13-12
325	RCVRS TO ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 TUNING TO ILS FREQUENCY.	FAILED NAV 1 RCVR.	28 VDC	R50-319B/38	34-26-02
				FAILED CAPT'S NCP.		P10-407/f	34-31-01
				FAILED ASSOC. DFGC.		J101A/17	34-26-02
326		NAV 2 TUNING FAILURE	VERIFIES NAV 2 TUNING TO ILS FREQUENCY.	FAILED NAV 2 RCVR.	28 VDC	R50-320B/38	34-26-02
				FAILED F/O'S NCP.		P10-409/f	34-31-02
				FAILED ASSOC. DFGC.		J104A/17	34-26-02

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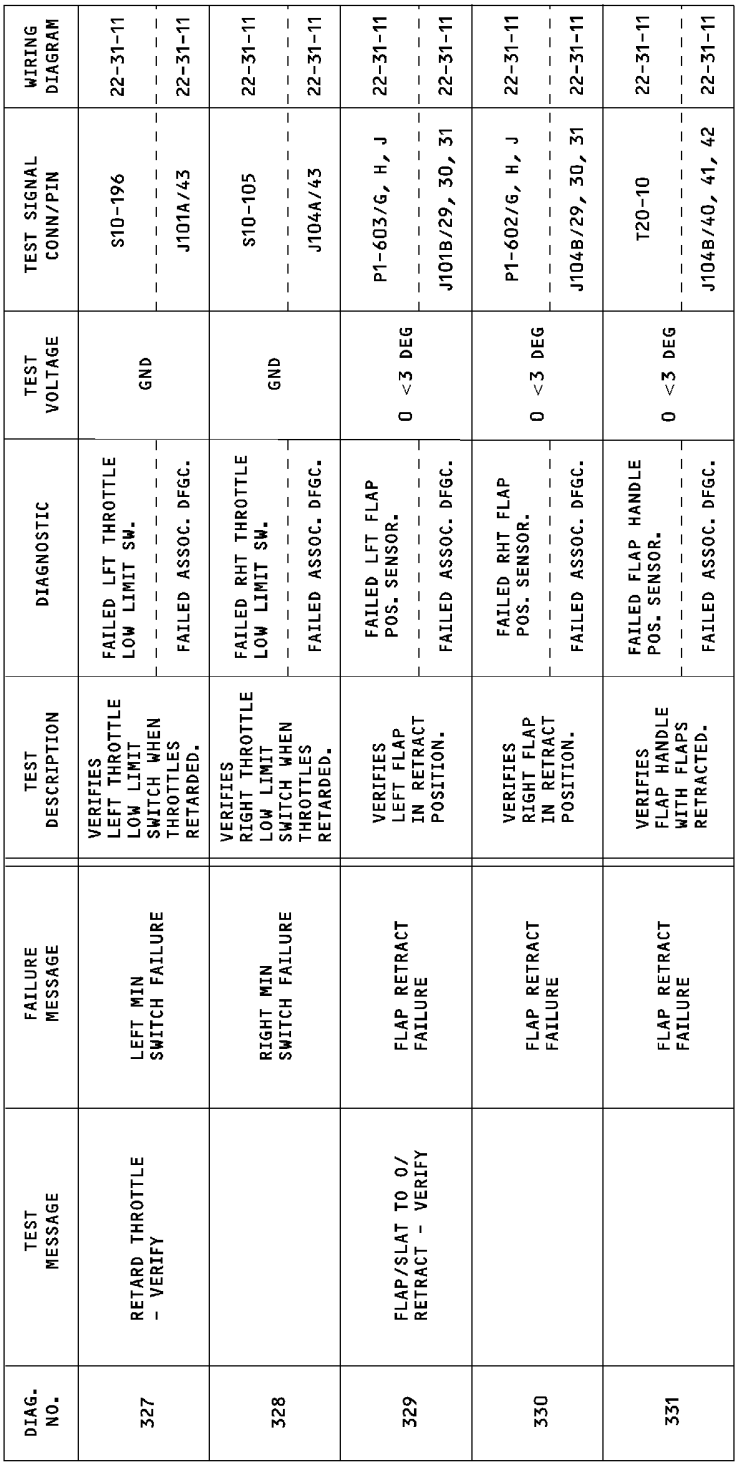
Sequence Six - Second Setup Interactives
Figure 112/22-01-05-990-897 (Sheet 2 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
327	RETARD THROTTLE - VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED LFT THROTTLE LOW LIMIT SW.	GND	S10-196	22-31-11
				FAILED ASSOC. DFGC.		J101A/43	22-31-11
328		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED RHT THROTTLE LOW LIMIT SW.	GND	S10-105	22-31-11
				FAILED ASSOC. DFGC.		J104A/43	22-31-11
329	FLAP/SLAT TO 0/ RETRACT - VERIFY	FLAP RETRACT FAILURE	VERIFIES LEFT FLAP IN RETRACT POSITION.	FAILED LFT FLAP POS. SENSOR.	0 <3 DEG	P1-603/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J101B/29, 30, 31	22-31-11
330		FLAP RETRACT FAILURE	VERIFIES RIGHT FLAP IN RETRACT POSITION.	FAILED RHT FLAP POS. SENSOR.	0 <3 DEG	P1-602/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J104B/29, 30, 31	22-31-11
331		FLAP RETRACT FAILURE	VERIFIES FLAP HANDLE WITH FLAPS RETRACTED.	FAILED FLAP HANDLE POS. SENSOR.	0 <3 DEG	T20-10	22-31-11
				FAILED ASSOC. DFGC.		J104B/40, 41, 42	22-31-11

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Sequence Six - Second Setup Interactives
Figure 112/22-01-05-990-897 (Sheet 3 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
332 1		ELEV MECH TORQ SWITCH 1 FAILURE	VERIFIES ELEV MECH TORQ SWITCH-1 AT FLAPS = 0 DEGREES.	FAILED ELEV MECH TORQ SW-1. FAILED ASSOC. DFGC.	28 VDC	S10-191 J101A/42	22-11-11 22-11-11
333 1		ELEV MECH TORQ SWITCH 2 FAILURE	VERIFIES ELEV MECH TORQ SWITCH-2 AT FLAPS = 0 DEGREES.	FAILED ELEV MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J104A/42	22-11-11 22-11-11
333 2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SWITCH-2 AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J104A/42	22-11-11 22-11-11
333 3		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SWITCH MONITOR AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SWITCH MONITOR INPUT. FAILED ASSOC. DFGC.	28 VDC	S10-191 J102A/52	
334		SLATS RETRACT FAILURE	VERIFIES LEFT SLAT IN RETRACT POSITION.	FAILED LEFT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 J1B/43 J101A/21	27-81-00 22-31-11 22-31-11
335		SLATS RETRACT FAILURE	VERIFIES RIGHT SLAT IN RETRACT POSITION.	FAILED RIGHT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 J2B/44 J104A/21	27-81-00 22-31-11 22-31-11

1 -930 AND SUBSEQUENT DFGC, ELEV MECH TORQUE IS AILERON MECH TORQUE.
2 -971 AND PRIOR CONFIGURATIONS, OR -972 AND SUBSEQUENT IF AILERON TORQUE MONITOR OPTION NOT SELECTED.
3 -972 AND SUBSEQUENT WITH AILERON TORQUE MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

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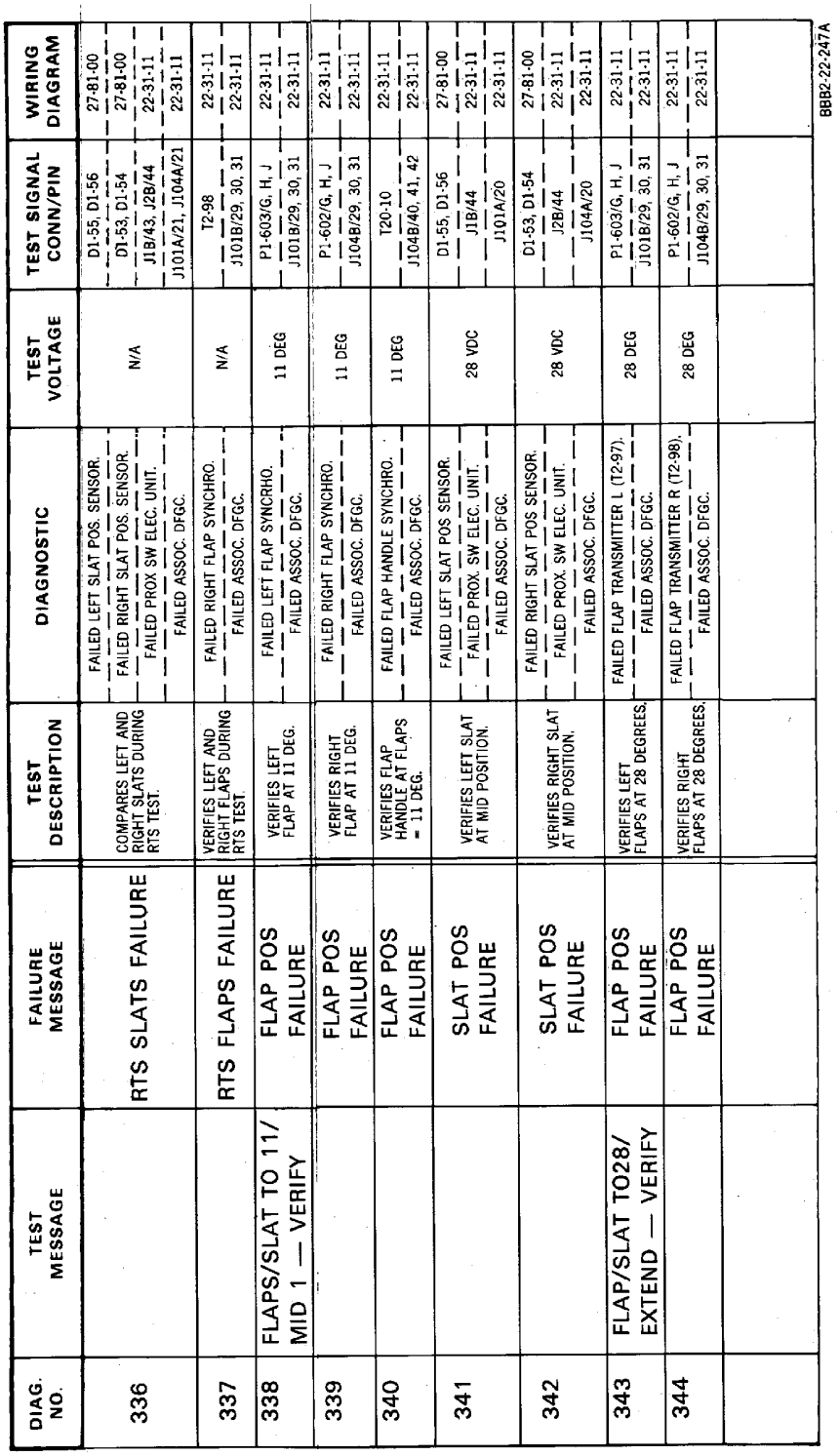
Sequence Six - Second Setup Interactives
Figure 112/22-01-05-990-897 (Sheet 4 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
336		RTS SLATS FAILURE	COMPARES LEFT AND RIGHT SLATS DURING RTS TEST.	FAILED LEFT SLAT POS. SENSOR. FAILED RIGHT SLAT POS. SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	N/A	D1-55, D1-56 D1-53, D1-54 J1B/43, J2B/44 J101A/21, J104A/21	27-81-00 27-81-00 22-31-11 22-31-11
337		RTS FLAPS FAILURE	VERIFIES LEFT AND RIGHT FLAPS DURING RTS TEST.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	N/A	T2-98 J101B/29, 30, 31	22-31-11 22-31-11
338	FLAPS/SLAT TO 11/ MID 1 — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAP AT 11 DEG.	FAILED LEFT FLAP SYNCRHO. FAILED ASSOC. DFGC.	11 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
339		FLAP POS FAILURE	VERIFIES RIGHT FLAP AT 11 DEG.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11
340		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 11 DEG.	FAILED FLAP HANDLE SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	T20-10 J104B/40, 41, 42	22-31-11 22-31-11
341		SLAT POS FAILURE	VERIFIES LEFT SLAT AT MID POSITION.	FAILED LEFT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 J1B/44 J101A/20	27-81-00 22-31-11 22-31-11
342		SLAT POS FAILURE	VERIFIES RIGHT SLAT AT MID POSITION.	FAILED RIGHT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 J2B/44 J104A/20	27-81-00 22-31-11 22-31-11
343	FLAP/SLAT TO28/ EXTEND — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER L (T2-97). FAILED ASSOC. DFGC.	28 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
344		FLAP POS FAILURE	VERIFIES RIGHT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER R (T2-98). FAILED ASSOC. DFGC.	28 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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Sequence Six - Second Setup Interactives
Figure 112/22-01-05-990-897 (Sheet 5 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
345		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 28°.	FAILED FLAP HANDLE POSITION SENSOR. FAILED ASSOC. DFGC.	28 DEG	T20-10 J104B/40,41,42	22-31-11 22-31-11
346 1		ELEV MECH TORQ SWITCH 1 FAILURE	VERIFIES ELEV MECH TORQ SW-1 AT FLAPS = 28°.	FAILED ELEV MECH TORQ SW-1. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
346 2		AIL MECH TORQ SWITCH 1 FAILURE	VERIFIES AIL MECH TORQ SW-1 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-1. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 1		ELEV MECH TORQ SWITCH 2 FAILURE	VERIFIES ELEV MECH TORQ SW-2 AT FLAPS = 28°.	FAILED ELEV MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW-2 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 3		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW MONITOR AT 28° FLAPS.	FAILED AIL MECH TORQ SW MONITOR INPUT. FAILED ASSOC. DFGC.	28 VDC	S10-191 J101A/52	
348		SLAT POS FAILURE	VERIFIES LEFT SLAT EXTEND DESCRETE.	FAILED LEFT SLAT POS. SENSOR. FAILED PROX. SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 R5-466B/55 J101A/22	27-81-00 22-31-11 22-31-11
349		SLAT POS FAILURE	VERIFIES RIGHT SLAT EXTEND DESCRETE.	FAILED RIGHT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 R5-447B/55 J104A/22	27-81-00 22-31-11 22-31-11

1 -930 AND SUBSEQUENT DFGC, ELEV MECH TORQUE IS AILERON MECH TORQUE.

2 RUN DURING MAINTENANCE TEST ONLY, FOR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

3 -971 AND PRIOR CONFIGURATION, OR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION NOT SELECTED (PIN J104A/28 OPEN).

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Sequence Six - Second Setup Interactives
Figure 112/22-01-05-990-897 (Sheet 6 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
350	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
351	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
352	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
353	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
354	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
355	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
356	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
357	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320B/39, 40 J014B/67, 68	34-26-02 34-26-02
358	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID A IS CLEARED AT SELF-TEST.	SHORTED D3A-A ACCEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P, Z J101A/24	22-19-11 22-19-11
359	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-X ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-114/Z, a J101B/57, 58	22-19-11 22-19-11

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Sequence Seven - Self Tests
Figure 113/22-01-05-990-898 (Sheet 1 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
360	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
361	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B/61, 62	22-19-11 22-19-11
362	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P J101A/24	22-19-11 22-19-11
363	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-414/X, Y J104B/61, 62	22-19-11 22-19-11
364	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA VALID A IS CLEARED AT SELF-TEST.	SHORTED DLA-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-412/P J101A/37	22-19-11 22-19-11
365	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA ACCEL A BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED DLA-A ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B59, 60	22-11-19 22-11-19
366	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
367	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-BX VALID. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
368	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	34-45-02 34-45-02

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Sequence Seven - Self Tests
Figure 113/22-01-05-990-898 (Sheet 2 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
369	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/U, V J104B/61, 62	22-19-11 22-19-11
370	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
371	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
372	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA VALID B IS CLEARED AT SELF-TEST.	SHORTED DLA-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-413/L J104A/37	22-19-11 22-19-11
373	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA ACCEL B BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED DLA-B ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-413/U, V J104B/59, 60	22-19-11 22-19-11
374	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-1 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/12 J101A/26	34-45-01 34-45-01
375	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/22, 23 J101B/55, 56	34-45-01 34-45-01
376	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-1 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/57 J101A/39	34-45-01 34-45-01
377	TEST IN PROGESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/46, 47 J102A/55, 56	34-45-01 34-45-01

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Sequence Seven - Self Tests
Figure 113/22-01-05-990-898 (Sheet 3 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
378	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-2 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322B/12 J104A/26	34-45-02 34-45-02
379	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-322B/22, 23 J104B/55, 56	34-45-02 34-45-02
380	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-2 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322/57 J104A/39	34-45-02 34-45-02
381	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-322/46, 47 J103A/55, 56	34-45-02 34-45-02

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Sequence Seven - Self Tests
Figure 113/22-01-05-990-898 (Sheet 4 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
385	A/P ENGAGED — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH.	[1] 28 VDC	J101/H SEL. 1 J103/H SEL. 2	22-14-11
				FAILED ASSOC. DFGC.		J102A/100	22-14-11
386 [3]	WHEEL TURNS RWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A.	[2] +15°±2.5° = +2.45±.51 VAC	P10-419/J, S	22-12-12
				FAILED ASSOC. DFGC.		J101B/83, 84	22-12-12
387		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO. TACH A.	> 1.71 VAC	P10-419/N, P	22-12-12
				FAILED ASSOC. DFGC.		J101B/98, 99	22-12-12
388		AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B.	[2] +15°± 2.5° = +2.45±.51 VAC	P10-420/J, S	22-12-12
				FAILED ASSOC. DFGC.		J104B/83, 84	22-12-12
389		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B.	> 1.71 VAC	P10-420/N, P	22-12-12
				FAILED ASSOC. DFGC.		J104B/98, 99	22-12-12
390	WHEEL TURNS RWD — VERIFY	WHEEL RWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO RWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
391		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A.	−5°±1° ≈ −1.03±.2 VAC	P10-419/J, S	22-12-12
				FAILED ASSOC. DFGC.		J101B/83, 84	22-12-12
392		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A.	> 1.71 VAC	P10-419/N, P	22-12-12
				FAILED ASSOC. DFGC.		J101B/98, 99	22-12-12

[1] AN INOPERATIVE TORQUE LIMIT RHEOSTAT MAY PREVENT A/P ENGAGEMENT AND CAN CAUSE AN "AIL SERVO FAILURE" MESSAGE TO BE LOGGED IF FLAPS ARE LESS THAN 26 DEGREES. WITH FLAPS MORE THAN 26 DEGREES, THE TORQUE LIMIT RHEOSTAT WILL NOT PREVENT A/P ENGAGEMENT. PLACE FLAPS MORE THAN 26 DEGREES TO VERIFY.

[2] IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE +1.5 ± .25 VAC.

[3] WHEN FLAPS ARE LESS THAN 26 DEGREES AILERON SERVO POWER IS SUPPLIED THROUGH THE AILERON SERVO TORQUE LIMITER RHEOSTAT. FAILURE OF THE RHEOSTAT MAY CAUSE THE CONTROL WHEEL TO OSCILLATE AND THE AUTOPILOT TO DISCONNECT. THE MESSAGE STORED IN FLIGHT FAULTS WILL READ, "AILERON SERVO MODEL FAILURE".

DURING RETURN TO SERVICE OR MAINTENANCE TEST THE AILERON PORTION OF THE TEST WILL CAUSE THE CONTROL WHEEL TO OSCILLATE.

IF THESE SYMPTOMS OCCUR PLACE THE FLAPS TO 28 DEGREES AND REPEAT THE SERVO TESTS. IF THE SYMPTOMS HAVE BEEN CORRECTED, CHECK THE RHEOSTAT.

BBB2-22-253D

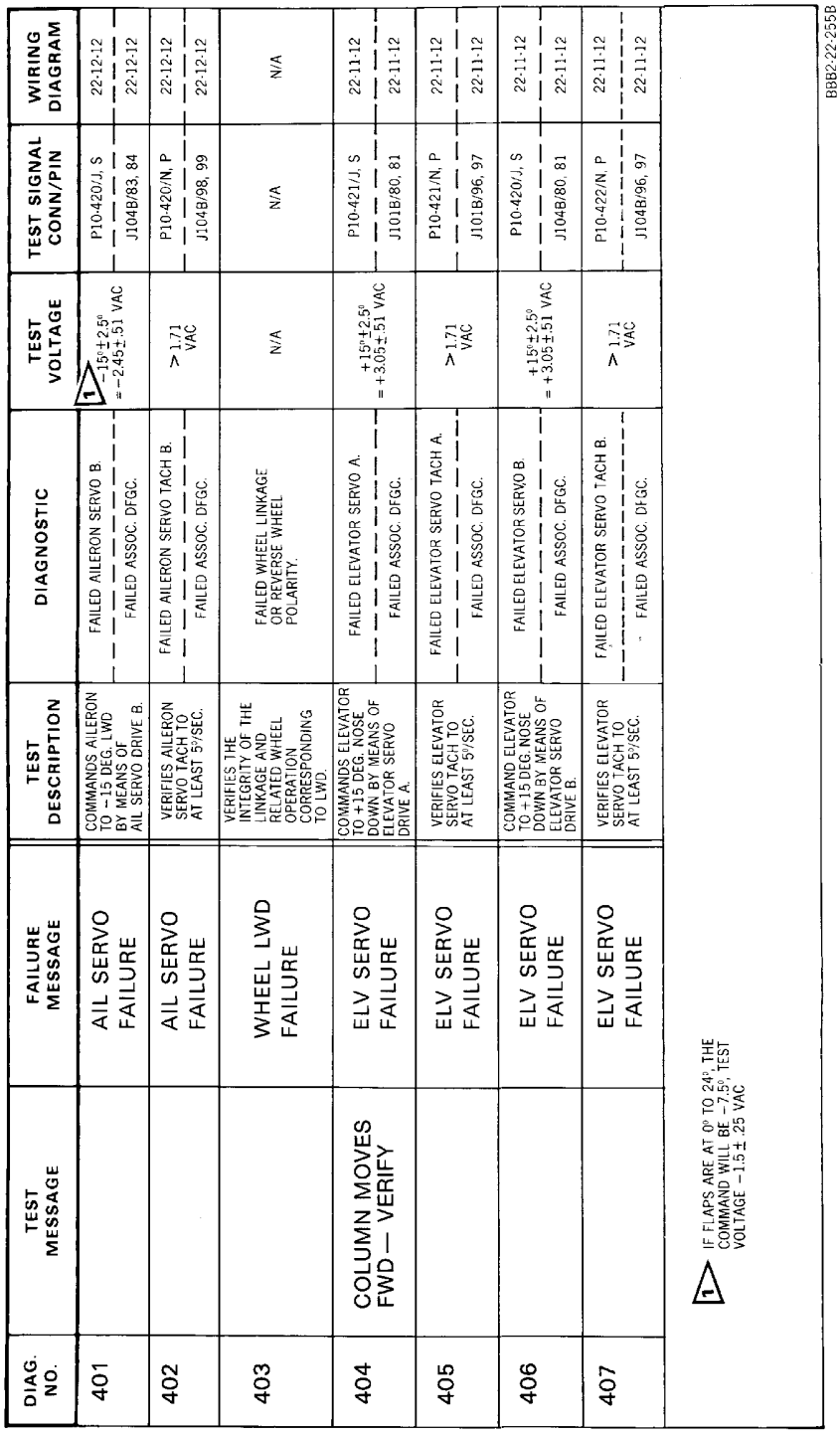
Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 1 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
393		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-420/J, S P104B/83, 84	22-12-12 22-12-12
394		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
395		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
396		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
397		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
398		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
399	WHEEL TURNS LWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	1 −15°±2.5° = −2.45±.51 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
400		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE −1.5±.25 VAC

BBB2-22-254C

Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 2 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
401		AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	1 −15°±2.5° = −2.45±.51 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
402		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
403		WHEEL LWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO LWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
404	COLUMN MOVES FWD — VERIFY	ELV SERVO FAILURE	COMMANDS ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
405		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
406		ELV SERVO FAILURE	COMMAND ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-420/J, S J104B/80, 81	22-11-12 22-11-12
407		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE −1.5±.25 VAC

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Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 3 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
408		COLUMN FWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE DOWN.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A
409		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$-5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
410		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
411		ELV SERVO FAILURE	COMMAND ELEVATOR TO −5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	$-5\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
412		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
413		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$+5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
414		ELV SERVO FAILURE	VERIFIES SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

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Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 4 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
415		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03± .2 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
416		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
417	COLUMN MOVES AFT — VERIFY	ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	-15°±2.5° = -3.05± .51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
418		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
419		ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	-15°± 2.5° = -3.05± .51 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
420		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
421		COLUMN AFT FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE UP.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A

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Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 5 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
422	RHT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMANDS RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	−15°±2.5 = −3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
423		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
424		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	−15°±2.5° = −3.05±.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
425		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
426		RHT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A RIGHT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
427		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
428		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J104B/89, 90	22-13-12 22-13-12

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Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 6 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
429		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
430		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
431		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO −5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
432		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
433		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO -5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
434		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
435	LEFT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
436		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12

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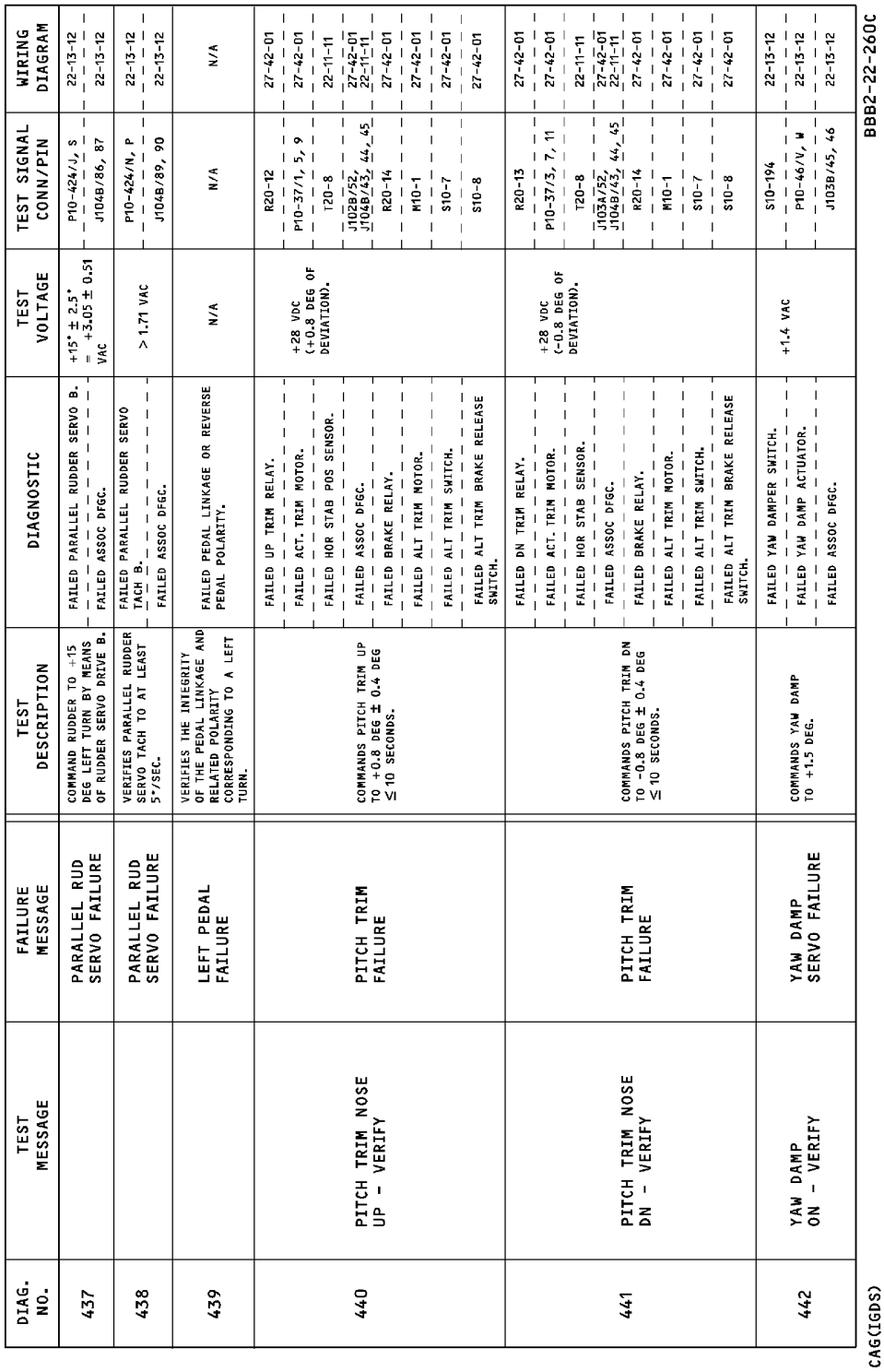
Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 7 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
437		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC DFGC.	+15° ± 2.5° = +3.05 ± 0.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
438		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
439		LEFT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A LEFT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
440	PITCH TRIM NOSE UP - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM UP TO +0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED UP TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB POS SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (+0.8 DEG OF DEVIATION).	R20-12 P10-37/1, 5, 9 T20-8 J102B/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01 27-42-01
441	PITCH TRIM NOSE DN - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM DN TO -0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED DN TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (-0.8 DEG OF DEVIATION).	R20-13 P10-37/3, 7, 11 T20-8 J103A/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01 27-42-01
442	YAW DAMP ON - VERIFY	YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO +1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC DFGC.	+1.4 VAC	S10-194 P10-46/V, W J103B/45, 46	22-13-12 22-13-12 22-13-12

CAG(IGDS)

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Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 8 of 10)

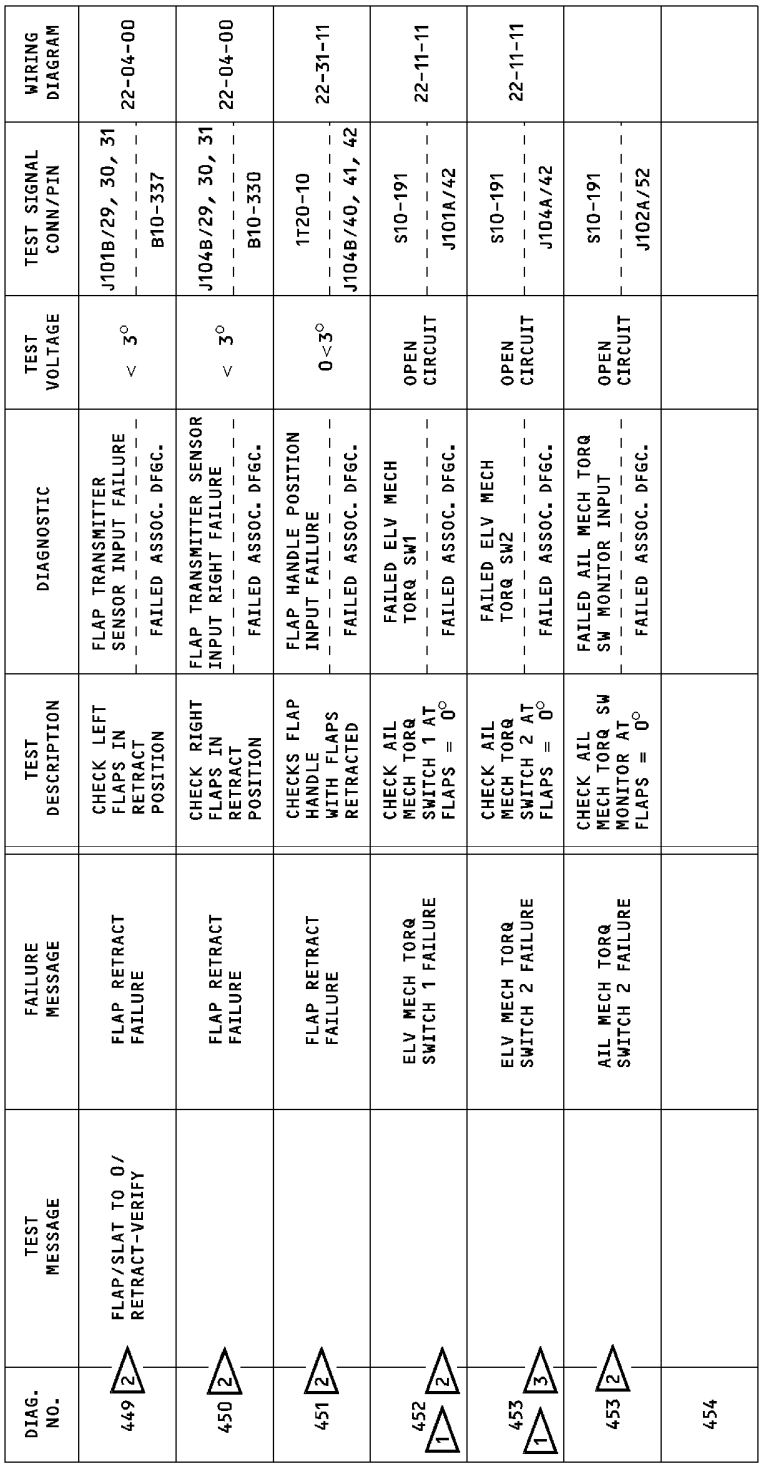
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
443		YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO -1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC. DFGC.	-1.4 VAC	S10-194 P10-46/V, W J103B/45, 46	22-13-12 22-13-12 22-13-12
444 ⚠1	MACH TRIM NORM — VERIFY	MACH TRIM SERVO FAILURE	COMMANDS MACH TRIM TO +0.9 INCHES.	FAILED MTC SWITCH. FAILED MACH TRIM ACTUATOR. ⚠2 FAILED ASSOC. DFGC.	+9.6 VAC	S10-188 P10-44/V, W J103B/58, 59	22-21-11 22-21-11 22-21-11
445	A/T ENGAGED — VERIFY	A/T FAILURE	RETARDS THROTTLES BY COMMANDING -6°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-9.5 VAC ±1.6 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
446		A/T FAILURE	ADVANCES THROTTLES BY COMMANDING +2°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+3.2 VAC ± .65 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
447		A/T FAILURE	RETARD THROTTLES BY COMMANDING -1½°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-1.6 VAC ± .33 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
448		A/T FAILURE	ADVANCE THROTTLES BY COMMANDING +8°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+12.6 VAC ±2.0 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14

⚠1 A FAILURE IN MACH TRIM MAY BE CAUSED BY INADEQUATE GROUND POWER.

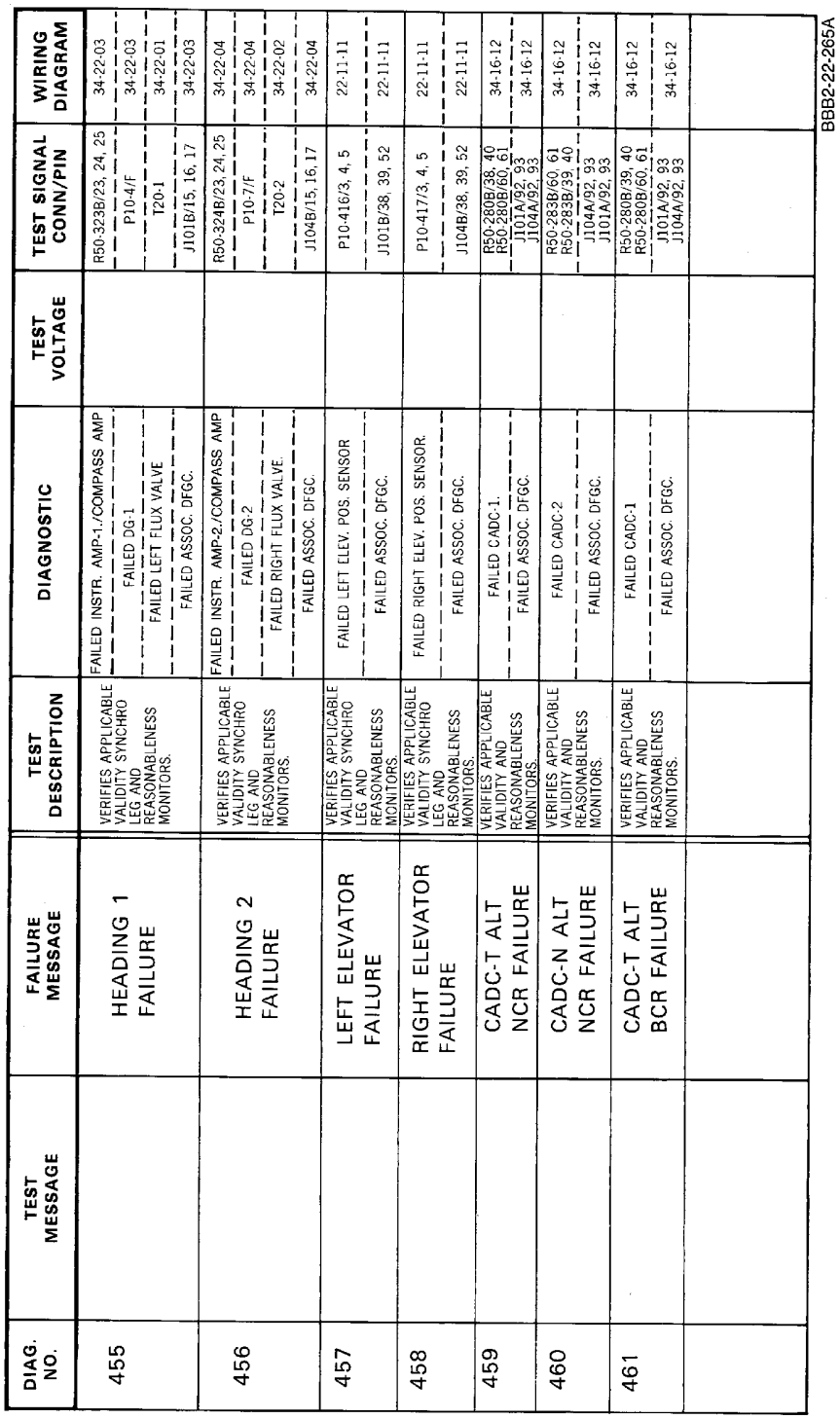
⚠2 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATOR FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

BBB2-22-345B

Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 9 of 10)



Sequence Eight - Servo Tests
Figure 114/22-01-05-990-899 (Sheet 10 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
455		HEADING 1 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED INSTR. AMP-1./COMPASS AMP FAILED DG-1 FAILED LEFT FLUX VALVE FAILED ASSOC. DFGC.		R50-323B/23, 24, 25 P10-4/F T20-1 J101B/15, 16, 17	34-22-03 34-22-03 34-22-01 34-22-03
456		HEADING 2 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED INSTR. AMP-2./COMPASS AMP FAILED DG-2 FAILED RIGHT FLUX VALVE. FAILED ASSOC. DFGC.		R50-324B/23, 24, 25 P10-7/F T20-2 J104B/15, 16, 17	34-22-04 34-22-04 34-22-02 34-22-04
457		LEFT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED LEFT ELEV. POS. SENSOR FAILED ASSOC. DFGC.		P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
458		RIGHT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED RIGHT ELEV. POS. SENSOR. FAILED ASSOC. DFGC.		P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11
459		CADC-T ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1. FAILED ASSOC. DFGC.		R50-280B/38, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
460		CADC-N ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
461		CADC-T ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

BBB2-22-265A

Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 1 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
462		CADC-N ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
463		CADC-T MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
464		CADC-N MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
465		CADC-T CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
466		CADC-N CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
467		CADC-T VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
468		CADC-N VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
469		CADC-T TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 2 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
470		CADC-N TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
471		CADC-T TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
472		CADC-N TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
473		CADC-T ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITOR	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
474		CADC-N ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
475		CADC-T SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
476		CADC-N SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS. MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
477		AIL TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED AILERON TACH A FAILED AILERON TACH B FAILED ASSOC. DFGC.		P10-419/N, P P10-420/N, P J101A/98, 99 J104A/98,99	22-12-12 22-12-12 22-12-12

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Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 3 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
478		ELEV TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED ELEV TACH A FAILED ELEV TACH B FAILED ASSOC. DFGC.		P10-421/N, P P10-422/N, P J101A/96, 97 J104A/96, 97	22-11-12 22-11-12 22-11-12
479		RUD TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED RUD TACH A FAILED RUD TACH B FAILED ASSOC. DFGC.		P10-423/N, P P10-424/N, P J101B/89, 90 J104B/89, 90	22-13-12 22-13-12 22-13-12
480		SPD REF KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR	FAILED FGCP FAILED ASSOC. DFGC.		P10-411/2ab J101B/46, 47, 48	22-31-11 22-31-11
481 1		VERT GYRO-1 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-1 FAILED ASSOC. DFGC.		P10-18/30, 31, 34, 35 J101B/71, 72, 74, 75 J101A/14	34-24-01 34-24-01
482 1		VERT GYRO-2 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-2 FAILED ASSOC. DFGC.		P10-19/30, 31, 34, 35 J104B/71, 72, 74, 75 J104A/14	34-24-02 34-24-02
483 1		VERT GYRO-3 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED VG-2 FAILED ASSOC. DFGC.		P10-165/30, 31, 34, 35 J103A/71, 72, 74, 75	34-24-01 34-24-01
484		PITCH RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-1. FAILED ASSOC. DFGC.		P10-18/30, 31 J101B/71, 72	34-24-01 34-24-01
485		PITCH RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-2. FAILED ASSOC. DFGC.		P10-19/30, 31 J104B/71,72	34-24-02 34-24-02
486		PITCH RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-3. FAILED ASSOC. DFGC.		P10-165/30, 31 J103A/71, 72	34-24-01 34-24-01

1 --930 and subsequent DFGC. VERT GYRO failure message is ATTITUDE

BBB2-22-269B

Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 4 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
478		ELEV TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED ELEV TACH A FAILED ELEV TACH B FAILED ASSOC. DFGC.		P10-421/N, P P10-422/N, P J101A/96, 97 J104A/96, 97	22-11-12 22-11-12 22-11-12
479		RUD TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED RUD TACH A FAILED RUD TACH B FAILED ASSOC. DFGC.		P10-423/N, P P10-424/N, P J101B/89, 90 J104B/89, 90	22-13-12 22-13-12 22-13-12
480		SPD REF KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR	FAILED FGCP FAILED ASSOC. DFGC.		P10-411/2ab J101B/46, 47, 48	22-31-11 22-31-11
481 [1]		VERT GYRO-1 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-1 FAILED ASSOC. DFGC.		P10-18/30, 31, 34, 35 J101B/71, 72, 74, 75 J101A/14	34-24-01 34-24-01
482 [1]		VERT GYRO-2 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-2 FAILED ASSOC. DFGC.		P10-19/30, 31, 34, 35 J104B/71, 72, 74, 75 J104A/14	34-24-02 34-24-02
483							
484		PITCH RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-1. FAILED ASSOC. DFGC.		P10-18/30, 31 J101B/71, 72	34-24-01 34-24-01
485		PITCH RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-2. FAILED ASSOC. DFGC.		P10-19/30, 31 J104B/71, 72	34-24-02 34-24-02
486							

[1] –930 and subsequent DFGC, VERT GYRO failure message is ATTITUDE

BBB2-22-341 B

Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 5 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
487		ROLL RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-1. FAILED ASSOC. DFGC.		P10-18/34, 35 J101B/74, 75	34-24-01 34-24-01
488		ROLL RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-2. FAILED ASSOC. DFGC.		P10-19/34, 35 J104B/74, 75	34-24-02 34-24-02
489		ROLL RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-3. FAILED ASSOC. DFGC.		P10-165/34, 35 J103B/74, 75	34-24-01 34-24-01
490		ANGLE OF ATT 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-1 SENSOR FAILED ASSOC. DFGC.		P1-648/M, N, P J101B/26, 27, 28	22-31-11 22-31-11
491		ANGLE OF ATT 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-2 SENSOR FAILED ASSOC. DFGC.		P1-649/M, N, P J104B/26, 27, 28	22-31-11 22-31-11
492		SPOILER POS 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-397/3,4, 5 J101B/35, 36, 37	22-12-11 22-12-11
493		SPOILER POS 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-398/3,4,5 J104B/35,36, 37	22-12-11 22-12-11
494		EPR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT EPR XMTTER FAILED ASSOC. DFGC.		R50-303B/32, 33, 34 J101B/32, 33,34	34-18-12 34-18-12
495		EPR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT EPR XMTTR FAILED ASSOC. DFGC.		R50-309B/32, 33, 34 J104B/32, 33, 34	34-18-12 34-18-12
496		LEFT AILERON FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED AILERON POSITION SENSOR FAILED ASSOC. DFGC.		P10-396/3, 4, 5 (T20-3) J101B/49, 50, 51	22-12-11 22-12-11

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Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 6 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
497		HOR STAB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED HOR STAB POSITION SENSOR FAILED ASSOC. DFGC.		P10-418/3, 4, 5 J104B/43, 44, 45	22-11-11 22-11-11
498		ALT SEL KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP. FAILED ASSOC.DFGC.		P10-411/W, X, Y J101B/40, 41, 42	22-11-11 22-11-11
499		RUDDER POS FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RUDDER POSITION SENSOR FAILED ASSOC. DFGC.		P10-429/3, 4, 5 J104B/46, 47, 48	22-13-11 22-13-11
500		FLAP HANDLE FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FLAP HANDLE POSITION SENSOR FAILED ASSOC. DFGC.		T20-10 J104B/40, 41, 42	22-31-11 22-31-11
501		FLAP POS FAILURE	VERIFIES LEFT FLAP POS SYNCHRO LEG MONITOR.	FAILED LFT FLAP POS SYNCHRO FAILED ASSOC. DFGC.		P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
502		FLAP POS FAILURE	VERIFIES RIGHT FLAP POS SYNCHRO LEG MONITOR.	FAILED RHT FLAP POS SYNCHRO. FAILED ASSOC. DFGC.		P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11
503		VERT SPD SEL FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP FAILED ASSOC. DFGC.		P10-411/g, d, e J101B/43, 44,45	22-11-11 22-11-11
504		CRS ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-1. FAILED INSTR AMP-1. FAILED DG-1. FAILED ASSOC. DFGC.		P10-408/s, t, u R50-324B/54 P10-7/F J104B/5, 6, 7	34-22-04 34-22-04 34-22-04 34-22-04

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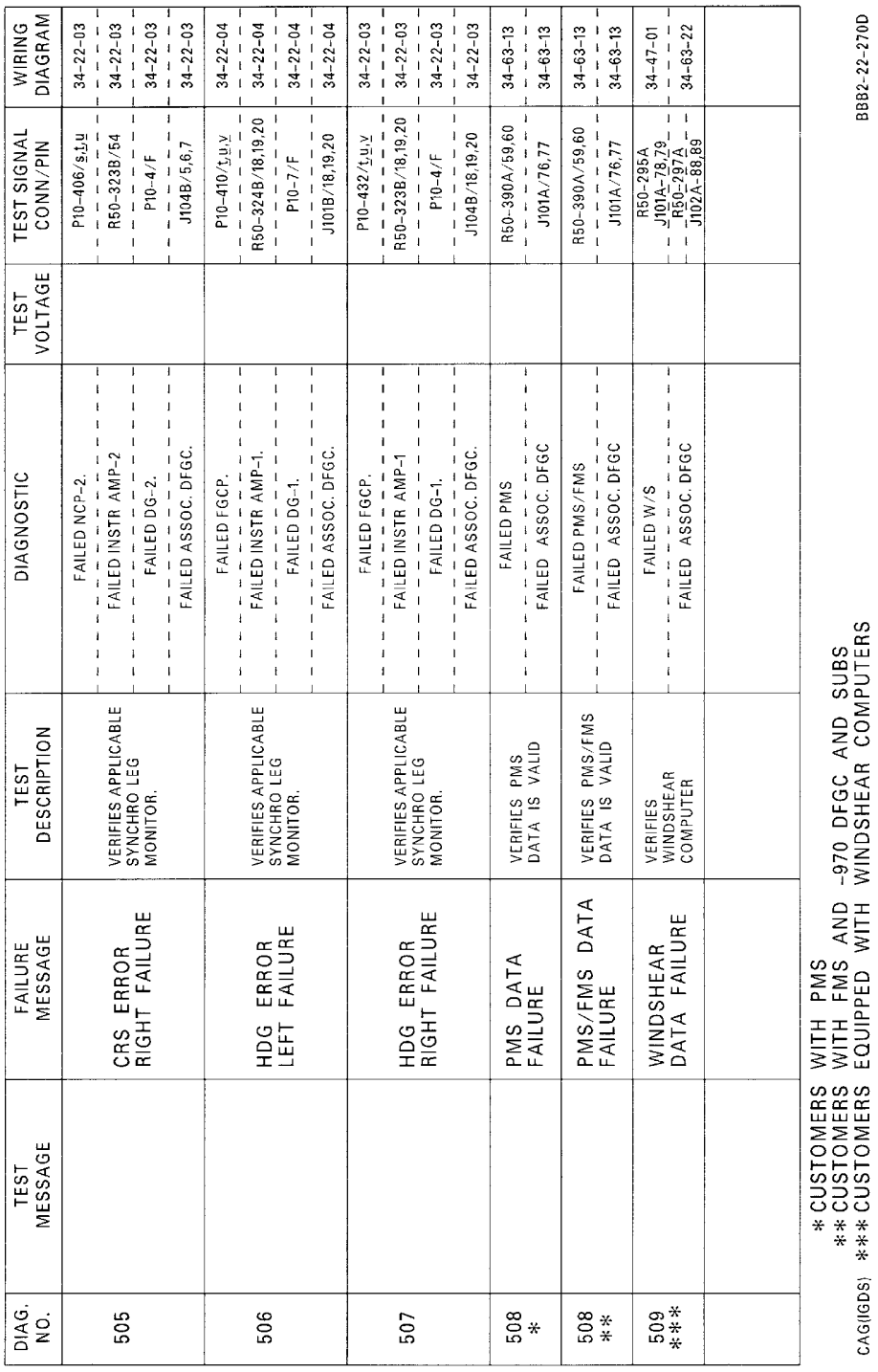
Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 7 of 9)

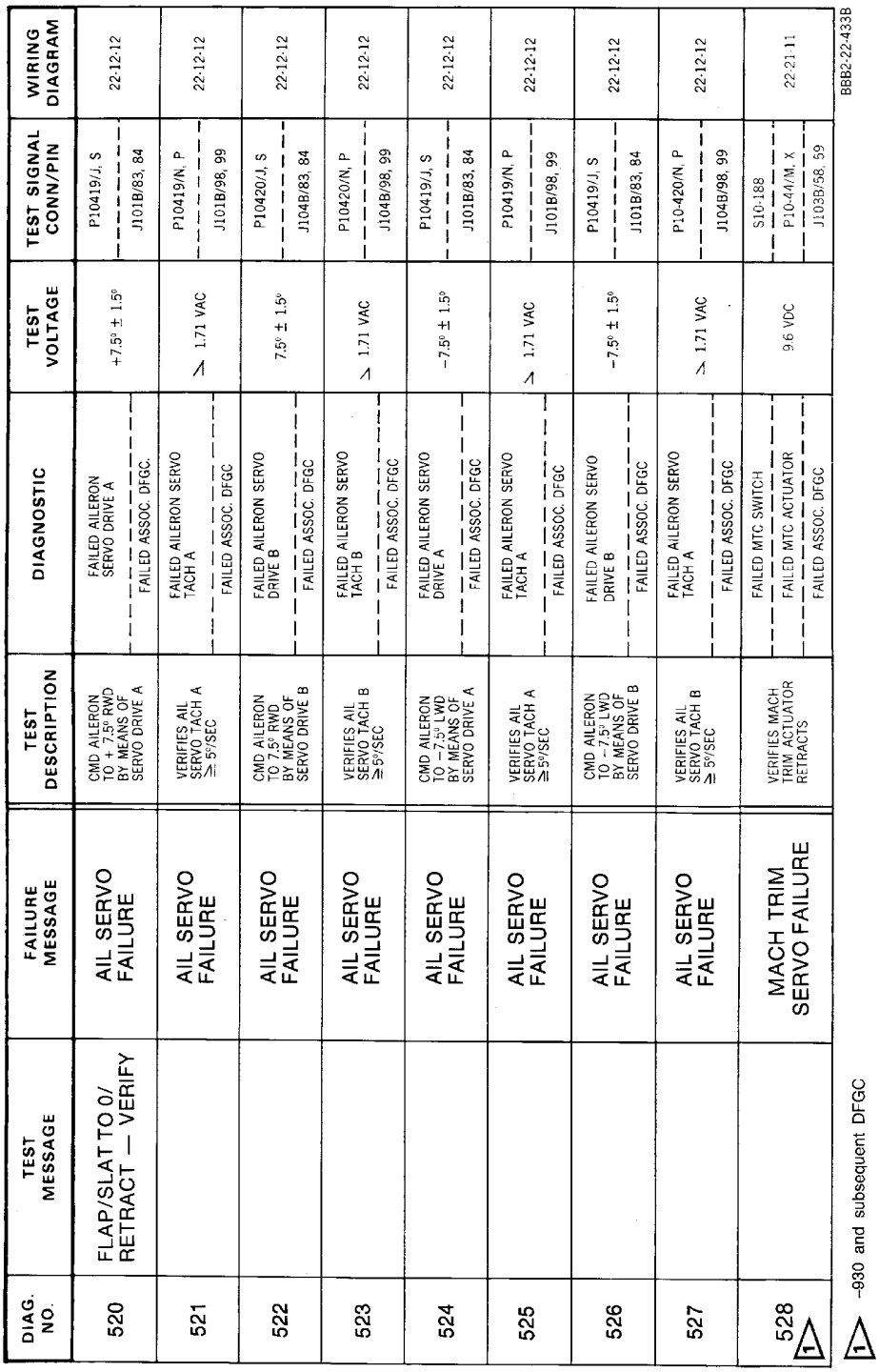


DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
505		CRS ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-2.		P10-406/s,t,u	34-22-03
				FAILED INSTR AMP-2		R50-323B/54	34-22-03
				FAILED DG-2.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/5,6,7	34-22-03
506		HDG ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-410/t,u,v	34-22-04
				FAILED INSTR AMP-1.		R50-324B/18,19,20	34-22-04
				FAILED DG-1.		P10-7/F	34-22-04
				FAILED ASSOC. DFGC.		J101B/18,19,20	34-22-04
507		HDG ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-432/t,u,v	34-22-03
				FAILED INSTR AMP-1		R50-323B/18,19,20	34-22-03
				FAILED DG-1.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/18,19,20	34-22-03
508 *		PMS DATA FAILURE	VERIFIES PMS DATA IS VALID	FAILED PMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
508 **		PMS/FMS DATA FAILURE	VERIFIES PMS/FMS DATA IS VALID	FAILED PMS/FMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
509 ***		WINDSHEAR DATA FAILURE	VERIFIES WINDSHEAR COMPUTER	FAILED W/S		R50-295A J101A-78,79 R50-297A J102A-88,89	34-47-01
				FAILED ASSOC. DFGC			34-63-22

* CUSTOMERS WITH PMS
** CUSTOMERS WITH FMS AND -970 DFGC AND SUBS
*** CUSTOMERS EQUIPPED WITH WINDSHEAR COMPUTERS

CAG(IGDS) BBB2-22-270D

Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 8 of 9)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
520	FLAP/SLAT TO 0/ RETRACT — VERIFY	AIL SERVO FAILURE	CMD AILERON TO + 7.5° RWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC.	+7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
521		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
522		AIL SERVO FAILURE	CMD AILERON TO 7.5° RWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	7.5° ± 1.5°	P10420/J, S J104B/83, 84	22-12-12
523		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧ 5°/SEC	FAILED AILERON SERVO TACH B FAILED ASSOC. DFGC	≯ 1.71 VAC	P10420/N, P J104B/98, 99	22-12-12
524		AIL SERVO FAILURE	CMD AILERON TO −7.5° LWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC	−7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
525		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
526		AIL SERVO FAILURE	CMD AILERON TO −7.5° LWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	−7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
527		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10420/N, P J104B/98, 99	22-12-12
528 1		MACH TRIM SERVO FAILURE	VERIFIES MACH TRIM ACTUATOR RETRACTS	FAILED MTC SWITCH FAILED MTC ACTUATOR FAILED ASSOC. DFGC	9.6 VDC	S10-188 P10-44/M, X J103B/58, 59	22-21-11

1 -930 and subsequent DFGC

BBB2:22-433B

Sequence Nine - Internal Monitors
Figure 115/22-01-05-990-900 (Sheet 9 of 9)

DFGS STATUS/TEST (STP) PANEL - TROUBLE SHOOTING

1. General

A. Trouble shooting procedures consist primarily of faulty component replacement. A thorough knowledge of the inter-relationship of components that have a direct bearing on the Digital Flight Guidance System is essential for meaningful trouble shooting.

B. There are two methods of trouble shooting provided within this section. One method is by use of Flight Faults as displayed on the STP after each landing, and the other is by use of Trouble Shooting Charts that are used in conjunction with the Return to Service Test or Maintenance Test.

C. The first portion of the text contains the Flight Fault displays . The Flight Fault displays are listed in alphabetical order. A Failure Message along with a Failure Description and Failure Symptom are provided. These tables should be used to collate written squawks to computer detected faults. Maintenance Test Diagnostic numbers are also provided along with the appropriate Maintenance Action that should be taken. (Paragraph 3.)

NOTE: The Maintenance Test Diagnostic numbers are given in the sequence of most probability of failure(s), i.e., Internal Monitors: Diag. 463-464, Sensor Values: Diag. 245-246, etc.

D. The Trouble Shooting charts contained in this section correlate to all failures that are displayed on the STP during Maintenance or RTS test. The charts provide the normal Test Message that should be displayed along with its corresponding Failure Message and Diagnostic Number. A brief description of the test in conjunction with the Diagnostic (failure) that may have occurred is provided. By use of the Wiring Diagram Manual as called out, the Test Signal Connector Pin can be located and the proper Test Voltage (when applicable) may be taken. (Paragraph 4.)

E. When Test Voltage readings are taken, the readings should be at Mod Blocks and not at electrical connectors. Standard electrical test voltages are given in the procedures. A 10% voltage tolerance is permissible, unless otherwise shown.

F. There are two separate wire bundles containing autoland critical wiring, system 1 and system 2. System 1 autoland wiring is normally routed on the left side of the aircraft with other existing wiring and secured with normal white type string ties. System 2 autoland wiring is routed on the right side and easily identifiable by yellow string ties and the wires have run letters beginning with the letter S.

WARNING: WHILE PERFORMING TROUBLE SHOOTING PROCEDURES, AUTOLAND CRITICAL WIRING MUST NEVER BE TAMPERED WITH UNLESS ABSOLUTELY NECESSARY TO PROVIDE WIRING REWORK. IF WIRING REWORK IS REQUIRED, ASSURE THAT ALL PROCEDURES OUTLINED IN CHAPTER 20-11-00, PAGE 201 OF WIRING DIAGRAM MANUAL ARE STRICTLY ADHERED TO.

G. Prior to replacement of a faulty component, or maintenance requirements to clear a fault (rigging, etc.), verify that the using components maintenance procedures are strictly adhered to. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201 for removal/ installation of the CADC)

H. After trouble shooting procedures are completed, verify the proper STP test is initiated to verify and clear the displayed fault(s). If the fault(s) occurred in sequences 1,2,4,6,7,8 or 9 then a Return-To-Service Test may be initiated to clear and verify the displayed fault(s). If the fault(s) occurred in sequence 0,3 or 5 then a System Maintenance test of the failed sequence test step must be performed.

NOTE: The replacement of the Digital Flight Guidance Computer (DFGC) is not always required when the intermittent failure is reported during flight and no failure is found during Flight Fault Review (FFR) test and Return to Service (RTS) test using Status Test Panel (STP) at the ground check. However, if intermittent failures persist, further troubleshooting will be required.

I. In the event the following messages are recorded on the STP, refer to the servo test portion of the STP maintenance test. Perform the alternate trim motor servo test and, using an oscilloscope or memory voltmeter, verify the voltage transient measured across the up and down alternate trim relay coils are nominal (less than approximately 40 VDC) within relay tolerances. If voltage transients greater than 60 VDC are measured, on either alternate trim relay, this indicates the suppression circuitry has failed, therefore, remove and replace relay.

(1) The STP loggings thus far that have caused the DFGC to shut down due to faulty diode circuitry are:

(a) Control Store Failure - A RAM failure occurs during the BITE test portion of the Control Store Parity Checker:

1) A processor failure occurs during External Interrupt.

2) Bad parity is detected in a Control Store Word.

(b) RAM Failure - A value stored in a random access memory (RAM) location is not the same as the value read from the same RAM location.

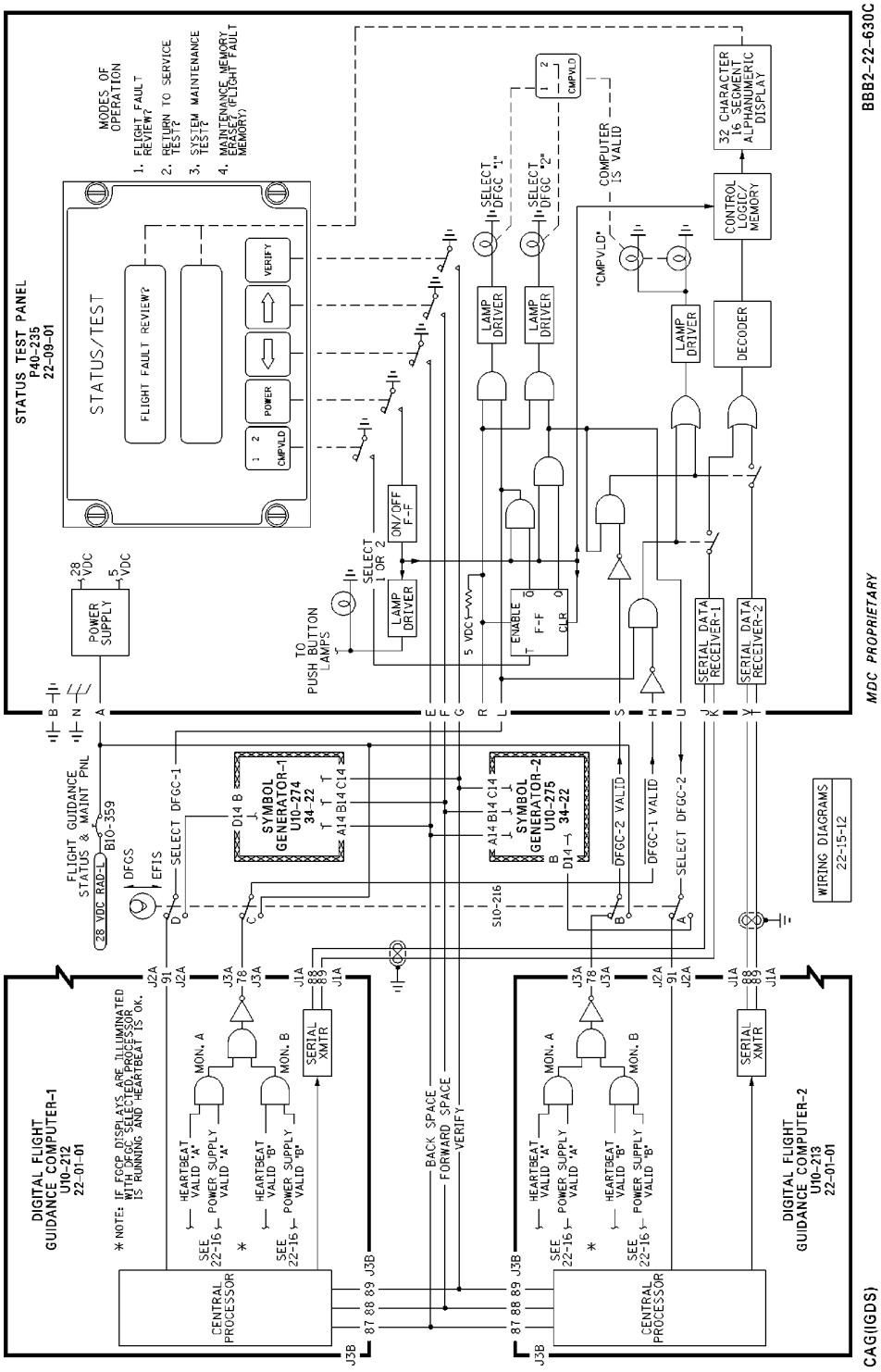
(c) Ticket Check Failure - DFGC monitors detect an incomplete task.

2. Equipment and Materials

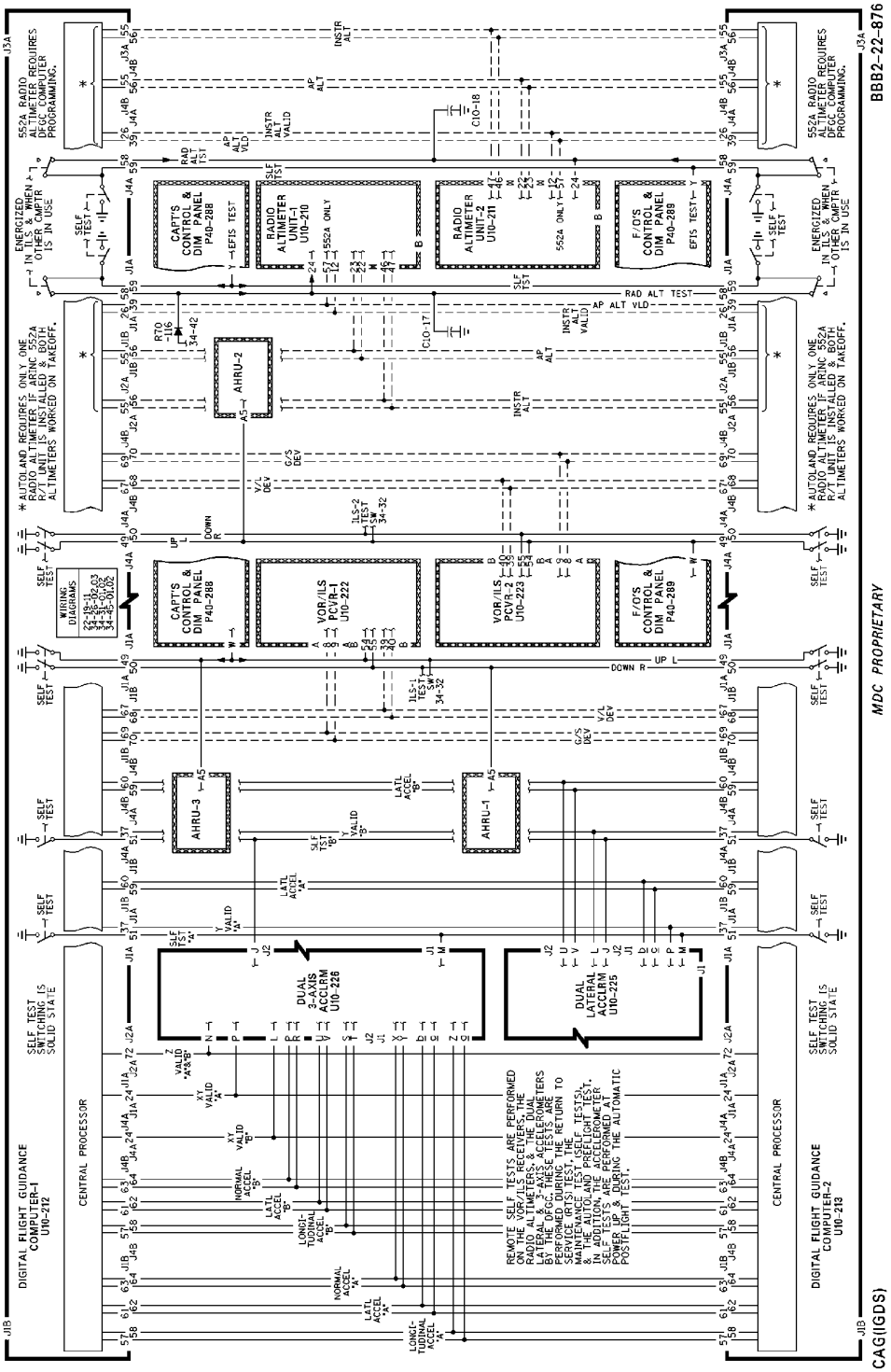
NOTE: Equivalent substitutes may be used instead of the following listed items.

Table 101

Name and Number	Manufacturer
High impedence voltmeter capable of reading below 30 mv.	



Status/Test Panel (STP)
Figure 101/22-01-05-990-869



Remote Self-Test
Figure 102/22-01-05-990-871

3. **Flight Fault Review**

A. The Digital Flight Guidance Computer (DFGC) has the capability of storing in-flight detected failures in a non-volitale memory. This feature is implemented within the DFGC by surveying the state of logic bits associated with valids and various monitors that provide in-flight information to the DFGC. The DFGC logic looks for this discrete logic information to be in a set condition or in a high condition. When this condition fails, then a corresponding failure will be logged within the DFGC for later recall (by use of the STP) as "FLIGHT FAULT REVIEW?".

B. Since the DFGC is looking for discrete logic information from associated DFGC LRU's or Sensors, the DFGC may log failures that appear only intermittently or for a short period of time (less than one second). These failures may not be visible to the flight crew and will only appear during "FLIGHT FAULT REVIEW?". Therefore, failure logging is not sufficient justification for removing and replacing a displayed LRU or Sensor. Ground test the item as called out in the following Flight Fault displays and use the Trouble Shooting Charts as called out in Paragraph 4. as necessary.

C. Prior to removing a displayed LRU or Sensor, verify the applicable ATA Chapter ground maintenance procedures are strictly adhered to. (i.e. CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201 for Removal/Installation of CADC's)

D. The following charts in this section alphabetically list the failure messages that may appear in the Flight Fault Review. Also shown is the flight compartment symptom that will be present if the failure occurs.

Table 102

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: With -974 DFGC expanded failure message Post S/B 22-133.				
A/P OVERPOWER MON DISCONNECT	PILOT COMMAND CAUSED OVERRIDE OF AUTOPILOT COMMAND. AUTOPILOT DISCONNECT.	NONE	NONE	NONE
ACCEL SELF TEST FAILURE	FAILED DUAL 3- AXIS AND/OR DUAL LATERAL ACCELEROMETER.	AUTOPILOT AND AUTO- THROTTLE WILL NOT ENGAGE AFTER POWER-UP.	SELF TESTS: DIAG. 358-373. SENSOR VALUES: DIAG. 209-216. PASSIVE DISCRETES: DIAG. 27-30.	REF T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201) OR DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ACCEL MISTRIM MON DISENGAGE (-960 DFGC)	MONITOR TRIPPED BECAUSE OF EXCESSIVE LONGITUDINAL ACCELERATION	AUTOPILOT DISCONNECT DURING ALTITUDE HOLD, ALTITUDE CAPTURE, OR VERTICAL SPEED MODE.	NONE	PERFORM ACCEL SELF- TEST OR NONE IF PILOT USED EPR LIM POWER IN ALT HOLD, ALT CAP, OR USED SPD MODE.
AIL MECH TORQ SWITCH FAILURE	FAILURE OF ONE OR BOTH AILERON MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES CLOSED. 2) FLAP POSITION 20 TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES OPEN.	AP DISENGAGE "NO AUTO- LAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF. T/S CHARTS.
NOTE: -971 computerand subs provide expanded failure messages.				
AIL MECH TORQ SWITCH FAILURE X	X=0 for a non-isolating failure X=1 for switch 1 indicating unlimited when flaps <20 degrees			
	X=2 for switch 2 indicating unlimited when flaps <20 degrees			
	X=3 for both switches indicating unlimited when flaps <20 degrees			
	X=4 for switch 1 indicating limited when flaps > 28 degrees			
	X=5 for switch 2 indicating limited when flaps >28 degrees			
	X=6 for both switches indicating limited when flaps >28 degrees			
	X=7 for switch 1 indicating limited during autoland			
	X=8 for switch 2 indicating limited during autoland			
	X=9 for both switches indicating limited during autoland			
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on the ground.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AIL SERVO FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO-LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL: MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
AIL SERVO AMP FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO-LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477 SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR. (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
AILERON SERVO MODEL FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO-LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR. (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
AILERON POS FAILURE	FAILED AILERON SURFACE POSITION SYNCHRO.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. T/S CHARTS. REF. AIL POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AILERON SURFACE MONITOR FAILURE	FAILED AILERON SURFACE POSITION SYNCHRO OR AILERON RIG OR SURFACE PROBLEM.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTO- LAND" LIGHT ON, AND AUTOPILOT DISCON- NECTS.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. T/S CHARTS. REF. AIL POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201) REF. AIL RIGGING (AILERON AND TAB - ADJUSTMENT/TEST, PAGEBLOCK 27-10-00/501)
ALT SEL REF FAILURE	FAILED ALTI- TUDE PRESELECT SYNCHRO.	UNABLE TO CHANGE DISPLAY IN FGCP ALT WINDOW AND/ OR ARM ALT.	INTERNAL MONITORS: DIAG. 498. SWITCHES AND BUTTONS: DIAG. 164-165, 177.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
ANG OF ATT 1 SIGNAL FAILURE	FAILED LEFT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 490. SENSOR VALUES: DIAG. 226.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201)
ANG OF ATT 1, 2 COMP FAILURE	LEFT AND RIGHT ANGLE-OF- ATTACK VANE SPLIT (OUT OF TOLERANCE).	FD AND AP GO-AROUND UNAVAILABLE. SLOW-FAST INDICATOR BIAS OUT OF VIEW. SPD FLAG IN VIEW. BOTH PITCH COMMANDS OUT OF VIEW. AUTO-THROTTLE EPR ONLY. UNABLE TO STAY IN TAKEOFF MODE ABOVE 60 KNOTS.	SENSOR VALUES: DIAG. 226-227.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201)
ANG OF ATT 2 SIGNAL FAILURE	FAILED RIGHT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 491. SENSOR VALUES: DIAG. 227.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: When -971 computers and subs are installed:				
A/P DISCONNECT LIGHT X	X=1 for light "A" (J101A-60) X=2 for light "B" (J104A-60)			
NOTE: A failure will not be logged until both "A" (or "B") bulbs fail or if one bulb fails and the other FMA is removed.				
-906 AND SUBSE-QUENT COMPUTERS. ART FOLLOW-UP SWITCH RIGHT FAILURE ART FOLLOW-UP SWITCH LEFT FAILURE	RESPECTIVE FOLLOW-UP SWITCH CLOSED PRIOR TO ART SELF-TEST.	"ART INOP" LIGHT ON.	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (FUEL CONTROL, SUBJECT 73-20-01, page 201)
ART OPTION PIN FAILURE	ART GO-AROUND OPTION PINS IN OPPOSITE STATE DURING POWER-UP.	NONE.	PASSIVE DISCRETES: DIAG. 45.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
-906 AND SUBSE-QUENT COMPUTERS ART SOLND LEFT FAILURE ART SOLND RIGHT FAILURE	RESPECTIVE ART FOLLOW-UP SWITCH NOT CLOSING DURING ART SELF-TEST (BOTH SWITCHES MUST CLOSE WITHIN 3 SECONDS AFTER SELF-TEST IS INITIATED).	"ART INOP" LIGHT ON (AFTER ART SELF-TEST).	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (FUEL CONTROL, SUBJECT 73-20-01, page 201)
WJE 410				
ASU CAPT ON AUX SWITCH FAILURE ASU F/O ON AUX SWITCH FAILURE	AUX ATTITUDE SWITCHING UNIT INPUTS IN OPPOSITE STATES FOR MORE THAN 10 SECONDS.	A/P DISCONNECT AND DISABLED. "NO AUTO- LAND" LIGHT ON. A/T DIS- ABLED IN SPD AND MACH.	SWITCHES AND BUTTONS: DIAG. 73-84.	REF. T/S CHARTS. REF. ATTITUDE SW UNIT. (ATTITUDE SWITCHING UNIT, SUBJECT 34-23-04, Page 201)

WJE 410 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 406, 410				
AUTO GA OPTION PIN FAILURE.	AUTO GO- AROUND OPTION PINS IN OPPOSITE STATE DURING POWER- UP.	N/A	PASSIVE DISCRETES: DIAG. 46.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
A/P ENGAGE DISCRETE FAILURE	A/P INDICATING ENGAGED AND OFF FOR TWO OR MORE SECONDS.	AP DISCONNECT. NO AUTOLAND LIGHT ON.	SECOND SET- UP INTER- ACTIVES: DIAG. 312-313. INITIAL SETUP INTER- ACTIVES: DIAG. 4-5.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
A/P ENGAGE FAILURE	AUTPILOT INDICATES DISENGAGE WHEN SERVO CLUTCHES INDICATE ENGAGED.	DFGC SHUTDOWN ON ASSOCIATED SIDE.	SECOND SET- UP INTER- AVTIVES: DIAG. 312-319. INTIAL SET- UP INTER- ACTIVES: DIAG. 4-11.	REF. T/S CHARTS. REF. AS APPROPRI- ATE: AIL SERVO (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201), ELV SERVO (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201), YAW DAMP ACT. (YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201)
A/P HEARTBEAT TEST FAILURE	DFGC FAILS HEARTBEAT TEST AT POWER-UP.	AUTOPILOT WILL NOT ENGAGE IN ANY MODE.	RETEST DFGC BY GROUND POWER-UP.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
A/T ENGAGE LOGIC FAILURE	AUTOTHROTTLE INDICATES ENGAGED 1 SECOND AFTER DISCONNECT OR POWER-UP.	A/T DISCONNECTS AND WONT REENGAGE.	INTIAL SET- UP INTER- ACTIVES: DIAG. 14-15. SECOND SET- UP INTER- ACTIVES: DIAG. 322	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
A/T MODE CHECK FAILURE O-DFGC A/T MODE CHECK FAILURE 1-DFGC A/T MODE CHECK FAILURE 2-DFGC	INCORRECT AUTOTHROTTLE MODE SEQUENCING WITHIN DFGC.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
A/T SERVO FAILURE	A/T SERVO MOTOR NOT OPERATING WITHIN SPECIFICATION.	A/T DISCONNECT.	SERVO TESTS: DIAG. 445-448.	REF. T/S CHARTS. REF. A/T SERVO MOTOR. (AUTOTHROTTLE/RETARD MODE - MAINTENANCE PRACTICES, PAGEBLOCK 22-31-02/201)
ATTITUDE 1 SIGNAL FAILURE ATTITUDE 1 VALID FAILURE ATTITUDE 2 SIGNAL FAILURE ATTITUDE 2 VALID FAILURE ATTITUDE 3 SIGNAL FAILURE ATTITUDE 3 VALID FAILURE	SINGLE ATTITUDE FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE. (34-23-00, page 201)
ATTITUDE 1, 2 COMP FAILURE ATTITUDE 1, 3 COMP FAILURE ATTITUDE 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE. (34-23-00, page 201) ,
WJE 410				
				REF. ATTITUDE SW UNIT. (ATTITUDE SWITCHING UNIT, SUBJECT 34-23-04, Page 201)

WJE 410 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 406, 410				
BITE FAILURE XXXX-FAILURE	BUILT IN TEST FAILURE.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
CADC ALT BCR 1 SIGNAL FAILURE CADC ALT BCR 1 VALID FAILURE CADC ALT BCR 2 SIGNAL FAILURE CADC ALT BCR 2 VALID FAILURE	FAILURE OF BARO-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 461-462.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201).
CADC ALT NCR 1 SIGNAL FAILURE CADC ALT NCR 1 VALID FAILURE CADC ALT NCR 2 SIGNAL FAILURE CADC ALT NCR 2 VALID FAILURE	FAILURE OF NON-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 459-460. SENSOR VALUES: DIAG. 235-236	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201).
CADC ALT NCR 1,2 COMP FAILURE	SPLIT BETWEEN NON-CORRECTED ALTITUDE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A NCR-1 AND NCR-2 VALID OR SIGNAL FAILURE.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO- THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 235-236.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC ALT RATE 1 SIGNAL FAILURE CADC ALT RATE 1 VALID FAILURE CADC ALT RATE 2 SIGNAL FAILURE CADC ALT RATE 2 VALID FAILURE	FAILURE OF ALTITUDE RATE SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 473-474. SENSOR VALUES: DIAG. 239-240.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC ALT RATE 1,2 COMP FAILURE	SPLIT BETWEEN ALT RATE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT AN ALT RATE-1 AND ALT RATE-2 VALID OR SIGNAL FAILURE. NOTE : PITOT STATIC SWITCHING MAY CAUSE THIS FAILURE TO BE LOGGED.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO- THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 239-240.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC CAS 1 SIGNAL FAILURE CADC CAS 1 VALID FAILURE CADC CAS 2 SIGNAL FAILURE CADC CAS 2 VALID FAILURE	FAILURE OF COMPUTED AIR-SPEED SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. UNABLE TO ARM FOR TAKEOFF.	INTERNAL MONITORS: DIAG. 465-466. SENSOR VALUES: DIAG. 243-244.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC CAS 1, 2 COMP FAILURE	SPLIT BETWEEN COMPUTED AIR-SPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT CAS-1 AND CAS-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD, TAKE- OFF, GO-AROUND, THRUST RATING, AND AUTO-THROTTLE OPERATION. (IF A/T IN SPD MODE SLOW-FAST INDICATOR BIASES AND SPD FLAG).	SENSOR VALUES: DIAG. 243-244.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC MACH 1 SIGNAL FAILURE CADC MACH 1 VALID FAILURE CADC MACH 2 SIGNAL FAILURE CADC MACH 2 VALID FAILURE	FAILURE OF MACH SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 463-464. SENSOR VALUES: DIAG. 245-246.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC MACH 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH MACH SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A MACH-1 OR MACH-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD MACH HOLD, GO-AROUND (BOTH FD AND AP), TAKEOFF (FD AND AP), AUTO-THROTTLE OPERATION IN EPR, SPD SEL, MACH SEL AND MACH TRIM COMP.	SENSOR VALUES: DIAG. 245-246.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SAT 1 SIGNAL FAILURE CADC SAT 1 VALID FAILURE CADC SAT 2 SIGNAL FAILURE CADC SAT 2 VALID FAILURE	FAILURE OF STATIC AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 475-476. SENSOR VALUES: DIAG. 241-242.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH STATIC AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A SAT SIGNAL OR VALID FAILURE.	N/A	SENSOR VALUES: DIAG. 241-242.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SWITCH DISCRETE FAILURE	DFGC DETECTS AIR DATA SWITCHING UNIT IN THE BOTH ON 1 AND BOTH ON 2 POSITION AT THE SAME TIME FOR MORE THAN 10 SECONDS.	ALL CADC VALIDS ARE LOST RESULTING IN A LOSS OF AP AND FD IN ALL MODES (EXCEPT TURB AND AUTOLAND). ALL AUTO- THROTTLE MODES, THRUST RATING, MACH TRIM COMP, AND ALTITUDE ALERT.	SWITCHES AND BUTTONS: DIAG. 85, 87, 89, 90.	REF. T/S CHARTS. REF. AIR DATA SWITCH UNIT. (AIR DATA SWITCHING UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-03/201)
CADC TAS 1 SIGNAL FAILURE CADC TAS 1 VALID FAILURE CADC TAS 2 SIGNAL FAILURE CADC TAS 2 VALID FAILURE	FAILURE OF TRUE AIRSPEED SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC TAS 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIR-SPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A TAS OR VALID FAILURE.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC TAT 1 SIGNAL FAILURE CADC TAT 1 VALID FAILURE CADC TAT 2 SIGNAL FAILURE CADC TAT 2 VALID FAILURE	FAILURE OF TRUE AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 471-472. SENSOR VALUES: DIAG. 237-238.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC TAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A TAT SIGNAL OR VALID FAILURE.	LOSS OF THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 237-238.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CLOCK FAILURE -DFGC	REAL TIME CLOCK AND PROCESSOR CLOCK DIFFER BY ±0.3% DURING POWER UP.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CRITICAL STATE MONITOR FAILURE	A DYNAMIC FAILURE LOGGED ON SELECTED DFGC UNDER THE FOLLOWING CONDITIONS: 1) NORMAL ACCEL (Z AXIS) G -1.5g or L -.5g.. 2) PITCH ANGLE G 24.5° OR PITCH ANGLE L -18.0° 3) PITCH RATE G ±5 * deg/ sec. 4) ROLL ANGLE G ±35 deg. 5) ROLL RATE G ±10 * deg/ sec.	AUTOPILOT DISENGAGES UNTIL AIRPLANE BROUGHT WITHIN TOLERANCE.	SENSOR VALUES: NOTE: SINCE THIS IS A DYNAMIC FAILURE, AIRPLANE SENSORS (3-AXIS ACCEL. AND VERT GYROS) ARE PROBABLY NOT FAILED. HOWEVER, THESE SENSORS SHOULD BE VERIFIED NOT TO HAVE LARGE NULL VALUES IN STATIC CONDITION.	PERFORM RETURN-TO-SERVICE TEST. (DFGS STATUS/TEST, SUBJECT 22-01-05, page 201)

NOTE: -971 computers and subs provide expanded failure messages.

		Trip Threshold
CRITICAL STATE MONITOR FAILURE X	X=0 Normal Acceleration	±0.5 g
	X=1 Pitch Attitude >Max	+24.0 Deg
	X=2 Pitch Attitude <Max	-18.0 Deg
	X=3 Roll Attitude	±35.0 Deg
	X=4 Pitch Rate	±5.0 Deg/sec
	X=5 Roll Rate	±10.0 Deg/sec

NOTE: Failure codes 6 through 11 were added to enhance roll attitude. The column marked "Likely Failure" indicates which sensor may have had a slowover or a null which would result in the corresponding failure message.

	Likely Failure	
	Slowover Sensor	Null Sensor
X=6 Sensor A	A	B
X=7 Sensor A	A	C
X=8 Sensor B	B	A
X=9 Sensor B	B	C
X=10 Sensor C	C	A
X=11 Sensor C	C	B

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CRS ERROR 1 SIGNAL FAILURE CRS ERROR 1 VALID FAILURE CRS ERROR 2 SIGNAL FAILURE CRS ERROR 2 VALID FAILURE	FAILURE OF COURSE ERROR SIGNAL OR VALID FROM NUMBERED COURSE INPUT.	IF FAILURE OCCURS ON ASSOC. DFGC, THEN VOR, LOC, ILS AND AUTOLAND (AP AND FD) ARE INHIBITED. FOR FAILURE ON NON-ASSOC. SIDE THEN AUTOLAND IS INHIBITED. "NO AUTO-LAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 504-505.	REF. T/S CHARTS. REF. VHF/ NAV CONTROL PANEL. (VHF NAV CONTROL PANEL, SUBJECT 34-32-03, page 201)
CRS ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH COURSE INPUTS WITHOUT A SIGNAL OR VALID FAILURE WHILE IN ILS OR AUTOLAND.	DISABLES AUTOLAND. A/P DIS-ENGAGE IF IN AUTO-LAND.	VERIFY COURSE DISPLAY ON VHF/NAV CONTROL PANEL AGREES WITH COURSE POINTER ON RDI.	REF. T/S CHARTS. REF. VHF/ NAV CONTROL PANEL. (VHF NAV CONTROL PANEL, SUBJECT 34-32-03, page 201)
CHECKSUM FAILURE 0-DFGC CHECKSUM FAILURE 0001-DFGC CHECKSUM FAILURE 1-DFGC CHECKSUM FAILURE 2-DFGC CHECKSUM FAILURE 3-DFGC CHECKSUM FAILURE 4-DFGC CHECKSUM FAILURE 5-DFGC CHECKSUM FAILURE 6-DFGC CHECKSUM FAILURE 7-DFGC CHECKSUM FAILURE 0071-DFGC CHECKSUM FAILURE 0073-DFGC CHECKSUM FAILURE 0075-DFGC CHECKSUM FAILURE 0077-DFGC	BITE DETECTS PROCESSOR FAILURE.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CONTROL STORE FAILURE (-960 DFGC AND SUBSEQUENT) *	PARITY CHECK HARDWARE ERROR IN INTERNAL PROCESSOR EPROM MEMORY CHECK	DFGC SHUTDOWN	NONE	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for CONTROL STORE FAILURE. (Paragraph 1.I.)				
DLA-Y ACCEL 1 SIGNAL FAILURE DLA-Y ACCEL 1 VALID FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE	FAILED LATERAL ACCEL. SIDE A (1) OR SIDE B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 27-28. SELF TESTS: DIAG. 364-365 372-373. SENSOR VALUES: DIAG. 215-216.	REF. T/S CHARTS. REF. DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)
DLA-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B LATERAL ACCEL. SIGNALS WITHOUT CHANNEL A OR CHANNEL B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 364-365. SENSOR VALUES: DIAG. 215-216. PASSIVE DISCRETES: DIAG. 27-28.	REF. T/S CHARTS. REF. DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)
DUAL COMP FAILURE -DFGC	SIDE A COMPUTATION DISAGREES WITH SIDE B COMPUTATION.	COMPUTER SHUTDOWN. ALL FUNCTIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
DUAL COMP FAIL XXXX-DFGC	XXXX=least significant 10 bits of failure address			
NOTE: Only the first failed address is logged when the DFGC is shut down even though more variables may actually miscompare. This failure indicates an internal problem within the DFGC.				
D3A-X ACCEL 1 SIGNAL FAILURE D3A-X ACCEL 1 VALID FAILURE D3A-X ACCEL 2 SIGNAL FAILURE D3A-X ACCEL 2 VALID FAILURE	FAILED CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCEL. LONGITUDINAL (X) AXIS.	UNABLE TO ARM FOR TAKEOFF. A/P DISENGAGE IF IN AUTO- LAND. AUTO G/A UNAVAILABLE.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D3A-X ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) ACCELERO METER X AXIS SIGNALS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AP AND FD IAS HOLD, MACH HOLD, GO- AROUND AND TAKEOFF. DISABLES AUTOLAND. DISENGAGES AUTOPILOT AND BIASES FD PITCH BAR. ALSO, LOSS OF AUTO- THROTTLE OPERATION IN EPR, TAKEOFF, SPD SEL, MACH SEL.	SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210. PASSIVE DISCRETES: DIAG. 29-30.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Y ACCEL 1 SIGNAL FAILURE D3A-Y ACCEL 1 VALID FAILURE D3A-Y ACCEL 2 SIGNAL FAILURE D3A-Y ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER LATERAL (Y) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 360-361, 368-369. SENSOR VALUES: DIAG. 211-212.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B 3-AXIS ACCELEROMETER SIGNALS IN THE LATERAL (Y) AXIS WITHOUT A CHANNEL A (1) OR B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 360-361, 368-369. PASSIVE DISCRETES: DIAG. 29-30. SENSOR VALUES:	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Z ACCEL 1 SIGNAL FAILURE D3A-Z ACCEL 1 VALID FAILURE D3A-Z ACCEL 2 SIGNAL FAILURE D3A-Z ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER NORMAL (Z) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISABLES GO-AROUND. DISENGAGES AP IF ENGAGED IN AUTOLAND OR AUTO GO- AROUND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: 213-214.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D3A-Z ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) 3-AXIS ACCELEROMETER SIGNALS IN THE NORMAL (Z) AXIS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. ALL AP AND FD PITCH MODES DISABLED, EXCEPT TURB (AP DISCONNECT AND/OR FLIGHT DIRECTOR PITCH COMMAND BIASES OUT OF VIEW). ALSO, DISABLES AUTO-THROTTLE RETARD MODE.	SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: DIAG. 213-214. PASSIVE DISCRETES: DIAG. 29-30.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D/A-A/D FAILURE -DFGC	BITE DETECTED A/D-D/A FAILURE.	AP DISCONNECT, AT DISCONNECT, FD INVALID (ASSOC. FD BARS BIAS OUT OF VIEW), FAST-SLOW INVALID (POINTER OUT OF VIEW), HUD VALID CLEARED, YAW DAMP INVALID ("YAW DAMP OFF" LIGHT ON), MACH TRIM DISABLED ("MACH TRIM INOP" LIGHT ON), "NO AUTOLAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
AIL MECH TORQ SWITCH FAILURE	FAILURE OF ONE OR BOTH ELEVATOR MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES OPEN. 2) FLAP POSITION 20° TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES CLOSED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF. T/S CHARTS.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ELEVATOR POS 1 SIGNAL FAILURE ELEVATOR POS 2 SIGNAL FAILURE	FAILURE OF LEFT (1) OR RIGHT (2) ELEVATOR POSITION SENSOR.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	INTERNAL MONITORS: DIAG. 457-458. SENSOR VALUES: DIAG. 221-222.	REF. T/S CHARTS. REF. ELEV. POS SENSOR(SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
ELEV POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT ELEV. SURFACE POS. SENSORS WITHOUT AN INDIVIDUAL 1 OR 2 SIGNAL FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222.	REF. T/S CHARTS. REF. ELEV. POS SENSOR (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
NOTE: LOGGING OF THIS FAILURE IS IN- HIBITED BELOW 60 KNOTS.				
ELEVATOR SURFACE MONITOR FAILURE	FAILED LEFT OR RIGHT ELEVATOR SURFACE POSITION SIGNAL OR DETERIORATED ELEVATOR PERFORMANCE DURING AUTO- LAND. ONLY LOGGED ON SELECTED DFGC WHILE IN AUTOLAND.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222. INTERNAL MONITORS: DIAG. 457-458.	REF. T/S CHARTS. REF. ELEV. POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
ELV SERVO FAILURE	FAILED ELEVATOR SERVO.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. T/S CHARTS. REF. ELEV. SERVO MOTOR. (DUPLEX ELEVATOR SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-12-01/201)
ELV SERVO AMP FAILURE	FAILED ELEVATOR SERVO AMPLIFIER IN DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ELV SERVO MODEL FAILURE	ELEVATOR SERVO FAILS TO PERFORM WITHIN THE LIMITATIONS OF ITS MODEL.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201.	REF. T/S CHARTS. REF. ELEV. SERVO MOTOR. (DUPLEX ELEVATOR SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-12-01/201)
EL/AIL CLUTCH FAILURE	EITHER OR BOTH ELEVATOR OR AILERON CLUTCHES INDI- CATING ENGAGED WHEN AP DISENGAGED OR DISENGAGED WHEN AP ENGAGED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 6-9. SECOND SETUP INTER- ACTIVES: DIAG. 314-317.	REF. T/S CHARTS.
NOTE: -971 computers and subs provide expanded failure messages.				
EL/AIL CLUTCH FAILURE X	X=0 for a non-isolatable failure			
	X=1 for an elevator clutch failure			
	X=2 for an aileron clutch failure			
	X=3 for both elevator and aileron clutch failure			
END AROUND FAILURE 0-DFGC END AROUND FAILURE 1-DFGC	D/A-A/D END AROUND MONITOR FAILURE.	NONE.	NONE.	MONITOR OCCURANCE, IF FAILURE PERSISTS, REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 2-DFGC END AROUND FAILURE 3-DFGC END AROUND FAILURE 4-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: More END AROUND failures may occur than shown. All require same maintenance action.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 5-DFGC	YAW DAMPER COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	YAW DAMP INVALID. "YAW DAMP INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 6-DFGC END AROUND FAILURE 7-DFGC END AROUND FAILURE 8-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 9-DFGC	AUTOTHROTTLE COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AUTO- THROTTLE DISENGAGE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 10-DFGC END AROUND FAILURE 11-DFGC END AROUND FAILURE 12-DFGC END AROUND FAILURE 13-DFGC	FLIGHT DIRECTOR END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FD COMMAND BARS BIAS OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 14-DFGC END AROUND FAILURE 15-DFGC	FAST/SLOW END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FAST/SLOW POINTER BIASES OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC
END AROUND FAILURE 16-DFGC END AROUND FAILURE 17-DFGC	EPR INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 18-DFGC	MACH TRIM END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	DISABLED MACH TRIM COMP. "MACH TRIM INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 19-DFGC END AROUND FAILURE 20-DFGC	IAS INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 21-DFGC END AROUND FAILURE 22-DFGC	AILERON TORQUE LIMIT COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 23-DFGC END AROUND FAILURE 24-DFGC	EPR LIMIT END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 25-DFGC	HUD COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	HUD VALID CLEARED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 26-DFGC. -906 COMPUTER.	QNH REFERENCE VOLTAGE END AROUND FAILURE.	ALT PRE- SELECT DISPLAY BLANK ALT CANNOT BE ARMED.	NONE.	REMOVE AND REPLACE ASSOCIATED DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ENGINE OPTION PIN FAILURE	ENGINE OPTION PINS NOT IN ALLOWABLE CONFIGURATION.	TRI DISPLAYS 2.00 WITH FLAG AND "NO MODE" DISPLAYED. THRUST RATING AND AUTO- THROTTLE DISABLED.	VERIFY PROPER GROUND OF ENGINE OPTION PINS (TRC A, B, C, D,).	REF. W/D. (WDM 22-16-15)
EPR LEFT FAILURE EPR RIGHT FAILURE EPR SENSOR FAILURE	FAILED EPR TRANSMITTER.	AUTO- THROTTLE DISENGAGE.	INTERNAL MONITORS: DIAG. 494-495. SENSOR VALUES: DIAG. 228-229.	REF. T/S CHARTS. REF. EPR TRANSMITTER. (ENGINE PRESSURE RATIO (EPR) TRANSMITTERS, SUBJECT 77-11-02, page 201)
FLAG FAILURE -DFGC	INTERNAL HARDWARE FLAG FAILURE.	DFGC SHUT- DOWN. ALL FUNCTIONS DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAG FAILURE XX-DFGC	XX=decimal number of failed flag			
NOTE: A flag failure is an internal failure within the DFGC.				
FLAP HANDLE FAILURE	FAILED FLAP POSITION INPUT FROM FLAP HANDLE.	NONE.	INTERNAL MONITORS: DIAG. 500. SECOND SETUP INTER-ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG. 234.	REF. T/S CHARTS.
NOTE: POSSIBLE FAILURE MAY BE LOGGED WHEN FLAP/ SLAT HANDLE MOVED FROM LAND/EXT TO 0 DEGREES RAPIDLY.				
FLAP POS 1 SIGNAL FAILURE FLAP POS 1 VALID FAILURE	FAILED FLAP POSITION INPUT FROM LEFT (1) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG: 232.	REF. T/S CHARTS. REF. L FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
FLAP POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT FLAP POSITION SYNCHROS WITHOUT A LEFT OR RIGHT SIGNAL OR VALID FAILURE.	AP AND FD TAKEOFF AND GO-AROUND DISABLED. AUTO-THROTTLE INHIBITED. SPD FLAG IN VIEW.	SENSOR VALUES: DIAG. 232-233.	REF. T/S CHARTS. REF. L OR R FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)
FLAP POS 2 SIGNAL FAILURE FLAP POS 2 VALID FAILURE	FAILED FLAP POSITION INPUT FROM RIGHT (2) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 330, 339, 344. SENSOR VALUES: DIAG. 233.	REF. T/S CHARTS. REF. R FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAP POS 3 SIGNAL FAILURE	If flaps are less than 24 degrees, autoland engagement is disallowed and the A/P will disconnect at 300 feet if autoland is armed. If flaps become less than 24 degrees after autoland is engaged, the A/P will disengage immediately. This failure message is logged into maintenance memory when an A/P disconnect occurs for either of these cases.			
GEN LOG ILLEGAL INST -DFGC	INTERNAL MONITORING DETECTS AN ILLEGAL OR UNDEFINED GENERAL LOGIC INSTRUCTION.	DFGC SHUTDOWN. ALL DFGC FUNCTIONS FROM AFFECTED DFGC UNUSEABLE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
GND SENSOR FAILURE	AT LEAST ONE GROUND SENSOR DISAGREES WITH THE OTHERS FOR MORE THAN 40 SECONDS (THERE ARE FOUR GROUND SENSORS: 2 GROUND CONTROL RELAYS, AND 2 MAIN GEAR WEIGHT ON WHEELS SENSORS.	AUTOLAND INHIBITED. "NO AUTO-LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG. 31-32. SWITCHES AND BUTTONS: DIAG. 123-124, 141-142.	REF. T/S CHARTS.
NOTE: -971 computers and subs provide expanded failure messages.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
GND SENSOR FAILURE X	X=0 for non-isolatable failure			
	X=1 for Ground control relay 1 (left) failed			
	X=2 for Ground control relay 2 (right) failed			
	X=3 for Left main gear WOW sensor failed			
	X=4 for Right main gear WOW sensor failed			
G/S DEV 1 SIGNAL FAILURE G/S DEV 1 VALID FAILURE G/S DEV 2 SIGNAL FAILURE G/S DEV 2 VALID FAILURE	FAILED GLIDESLOPE DEVIATION SIGNAL OR VALID FROM NUMBERED RECEIVER.	LOSS OF ASSOC. INPUT (i.e. G/S DEV 1 WITH DFGC 1 SELECTED) RESULTS IN A/P DISENGAGE IN ILS AND NON-ASSOC. PITCH CMD BIAS. LOSS OF NON-ASSOC. INPUT AFTER G/S TRACK RESULTS IN A/P DISENGAGE AND NON-ASSOC. FD CMD BAR BIAS. A/P IS REENGAGEABLE INTO ILS. LOSS OF EITHER DISABLES AUTOLAND. THIS FAILURE CAN ONLY BE LOGGED IF IN G/S CAPTURE OR TRACK ABOVE 50 FEET RADIO ALTITUDE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. T/S CHARTS. REF. ILS RECEIVER. (Instrument Landing System, 34-32-00, Page 201)
NOTE: When -971 computers and subs are installed, G/S DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				
G/S DEV 1,2 COMP FAILURE	SPLIT BETWEEN GLIDESLOPE DEVIATION SIGNALS WITHOUT CORRESPONDING G/S DEV 1 OR G/S DEV 2 SIGNAL OR VALID FAILURE. CAN ONLY BE LOGGED IN G/S CAPTURE OR TRACK AND RADIO ALTITUDE ABOVE 50 FEET.	DISABLES AUTOLAND. A/P DIS-ENGAGE IF IN ILS OR AUTOLAND.	SELF TESTS: DIAG. 350-357.	REF. T/S CHARTS. REF. ILS RECEIVER. (Instrument Landing System, 34-32-00, Page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
HDG ERROR 1 SIGNAL FAILURE HDG ERROR 1 VALID FAILURE HDG ERROR 2 SIGNAL FAILURE HDG ERROR 2 VALID FAILURE.	FAILED HEADING ERROR SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUT-NO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. INTERNAL MONITORS: DIAG. 506-507.	REF. T/S CHARTS. REF. COMPASS SYSTEM. HEADING SYSTEM, SUBJECT 34-21-00, page 201)
HDG ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN HEADING ERROR SIGNAL WITHOUT A CORRE- SPONDING HDG ERROR 1 OR HDG ERROR 2 SIGNAL OR VALID	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE FD COMMAND BAR BIAS IN HDG HLD, HDG SEL AND VOR.	INTERNAL MONITORS: DIAG. 506-507.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
HEADING 1 SIGNAL FAILURE HEADING 1 VALID FAILURE HEADING 2 SIGNAL FAILURE HEADING 2 VALID FAILURE	FAILED HEADING SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUT-NO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231. INTERNAL MONITORS: DIAG. 455-456.	REF. T/S CHARTS. REF. COMPASS SYSTEM. HEADING SYSTEM, SUBJECT 34-21-00, page 201)
HEADING 1,2 COMP FAILURE	SPLIT (APPROX 5°) BETWEEN THE TWO HEADING SIGNALS WITHOUT A CORRESPONDING HEADING 1 OR HEADING 2 SIGNAL OR VALID FAILURE.	A/P DISENGAGE. FD ROLL CMD BIAS IN HDG HLD, HDG SEL, VOR. "HEADING" MONITOR LIGHT ON.	SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231.	REF. T/S CHARTS. REF. COMPASS SYSTEM. HEADING SYSTEM, SUBJECT 34-21-00, page 201)
NOTE: 0 TO 180° CARD = 0 TO 180° ON STP. 181° TO 359° = -179° TO -1° ON STP.				
HOR STAB FAILURE	FAILED HORI- ZONTAL STAB. POSITION SENSOR.	TAKOFF MODE INHIBITED. SLOW/FAST BIAS. SPD FLAG IN VIEW. IF FAILURE OCCURS BEFORE G/S CAP, A/P AND FD GA INHIBITED.	SENSOR VALUES: (DISPLAY OPTION). DIAG. 225. INTERNAL MONITORS: DIAG. 497. SERVO TESTS: DIAG. 440-441.	REF. T/S CHARTS. REF. SURFACE POS SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ILLEGAL A/T MODE 0-DFGC ILLEGAL A/T MODE 1-DFGC ILLEGAL A/T MODE 2-DFGC ILLEGAL PITCH MODE 0-DFGC ILLEGAL PITCH MODE 1-DFGC ILLEGAL PITCH MODE 2-DFGC ILLEGAL ROLL MODE 0-DFGC ILLEGAL ROLL MODE 1-DFGC ILLEGAL ROLL MODE 2-DFGC ILLEGAL YAW MODE 1-DFGC ILLEGAL YAW MODE 2-DFGC ILLEGAL PITCH MODE 3-DFGC ILLEGAL PITCH MODE 4-DFGC ILLEGAL ROLL MODE 3-DFGC ILLEGAL ROLL MODE 4-DFGC ILLEGAL YAW MODE 0-DFGC ILLEGAL YAW MODE 3-DFGC	COMPUTER MONITORS DETECT AN ILLEGALLY SEQUENCED MODE.	COMPUTER SHUTDOWN. FGCP BLANK. ASSOC. SPD AND FD FLAGS IN VIEW. ALL FUNCTIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
LAND INHIBIT DISCRETE FAILURE	LAND INHIBIT INPUTS IN DIFFERENT STATES FOR MORE THAN 10 SECONDS.	A/P DISENGAGE. "NO AUTOLAND" LIGHT ON.	NONE.	REF. COMPASS SWITCHING (34-21-08, page 201), REF. VHF/ NAV SWITCHING (34-32-04, Page 201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
LOC DEV 1 SIGNAL FAILURE LOC DEV 1 VALID FAILURE LOC DEV 2 SIGNAL FAILURE LOC DEV 2 VALID FAILURE	FAILED LOCALIZER DEVIATION SIGNAL OR VALID FROM NUMBERED RECEIVER. FAILURE LOGGED ON SELECTED DFGC WHEN A/P IS ENGAGED IN LOC, ILS, OR AUTOLAND (ALIGN AND ROLLOUT).	LOSS OF ASSOC. SIGNAL OR VALID (i.e. LOC DEV 1 SIGNAL FAILURE WITH DFGC-1 SELECTED) INHIBITS LOC, ILS AND AUTO- LAND. A/P DISENGAGES, FD CMD BAR BIAS. LOSS OF NON ASSOC INPUT AFTER LOC TRK RESULTS IN AP DISENGAGE AND FD CMD BAR BIAS. A/P CAN BE REENGAGED IN ILS OR LOC MODE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. T/S CHARTS. REF. ILS RECEIVER. (Instrument Landing System, 34-32-00, Page 201)
NOTE: When -971 computers and subs are installed, LOC DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				
LOC DEV 1,2 COMP FAILURE	SPLIT BETWEEN LOCALIZER DEVIATION SIGNAL WITHOUT A CORRE-SPONDING LOC DEV 1 OR LOC DEV 2 SIGNAL OR VALID FAILURE. FAILURE LOGGED ON SELECTED DFGC ONLY WHEN A/P ENGAGED IN LOC, ILS OR AUTOLAND (ALIGN OR ROLLOUT).	IF ENGAGED IN LOC, ILS OR AUTO- LAND, NON- ASSOC FD CMD BAR BIASES OUT OF VIEW.	SELF TESTS: DIAG. 350-357. SENSOR VALUES: (DISPLAY OPTION) DIAG. 219-220.	REF. T/S CHARTS. REF. ILS RECEIVER. (Instrument Landing System, 34-32-00, Page 201)
NOTE: USE SIG. GEN. TO VERIFY LOC DEV.FROM EACH ILS RCVR.				
MACH TRIM POWER FAILURE	LOSS OF MACH TRIM SERVO AMPLIFIER POWER. LOGGED ONLY ON SELECTED DFGC.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. T/S CHARTS. REF. MACH TRIM ACT. (MACH TRIM ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-22-01/201)
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
MACH TRIM SERVO FAILURE	FAILED MACH TRIM SERVO.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. T/S CHARTS. REF. MACH TRIM ACT. (MACH TRIM ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-22-01/201)
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				
MAINT MEMORY FAILURE -DFGC	FAILURE DETECTED IN MAINTENANCE MEMORY USED TO STORE FLIGHT FAULTS.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
N1 LEFT FAILURE N1 RIGHT FAILURE	N1 VALID DATA FROM INDICATED N1 TRANSMITTER GONE FOR MORE THAN .6 SECONDS OR N1 COUNT NOT IN ALLOWABLE LIMITS WHEN VALID IS PRESENT.	EPR SYNCH DISABLED. IF FAILURE OCCURS WHEN ART IS ARMED THEN ART WILL FIRE, OTHERWISE "ART INOP" LIGHT ON. LOGGED IF AIRPLANE IS IN FLIGHT MODE (WEIGHT ON WHEEL SENSORS AND GND CONT RELAYS OPEN AND ENGINES RUNNING).	NONE.	VERIFY N1 INDICATORS DURING NEXT ENGINE RUNUP (POWER, SUBJECT 77-10-00, page 501), IF PROPER, VERIFY WIRING TO DFGC. REF. W/D (WDM 77-12-00).
OPTION PIN FAILURE	FAILED EVEN PARITY CHECK. NINE DFGC OPTION PINS ARE CHECKED FOR GROUNDS. AFTER CHECK THERE SHOULD BE AN EVEN NUMBER OF GROUNDS. THE OPTION PINS ARE: (a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) PARITY PIN	A/P AND FD DISABLED. A/P DISENGAGE AND FD CMD BIAS.	PASSIVE DISCRETES: DIAG. 48.	REF. T/S CHARTS.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: FOR AIRPLANES WITH -906 AND SUBSEQUENT COMPUTERS, TEN DFGC OPTION PINS.				
	(a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) QNH CORRECT (g) BOX 2-A BOX 2-B (h) PARITY PIN (i) MD-87			
NOTE: -971 computers and subs provide expanded failure messages.				
OPTION PIN FAILURE X	X=0 for option pin parity failure based on the input discretes alone			
	X=1 for Box 2A vs. Box 2B option pin disagreement			
	X=2 for VG3 flag vs. VG3 option pin disagreement			
	X=3 for parity failure of critical option input discretes vs. their corresponding hardware flags.			
PAR RUD CLUTCH FAILURE	PARALLEL RUDDER SERVO CLUTCH INDICATES ENGAGED WHEN A/P DISENGAGED, OR DISENGAGED WHEN A/P ENGAGED DURING AUTOLAND, ILS OR AUTO GO-AROUND.	A/P DIS- ENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 10-11. SECOND SETUP INTER- ACTIVES: DIAG. 318-319. SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)
PAR RUD SERVO AMP FAILURE	FAILED PARALLEL RUDDER SERVO AMPLIFIER.	PAR RUDDER INHIBITED. "NO AUTO-LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)
PAR RUD SERVO MODEL FAILURE PARALLEL RUD SERVO FAILURE	FAILED PARALLEL RUDDER SERVO.	PAR RUDDER INHIBITED. "NO AUTO-LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438. INTERNAL MONITORS: DIAG. 479. SENSOR VALUES: DIAG. 196-197, 204-205.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
PAR RUD SURFACE MONITOR FAILURE	PARALLEL RUDDER SERVO FAILS TO MOVE RUDDER WITHIN MODEL LIMITS AS SEEN BY RUDDER SURFACE POSITION SENSOR.	A/P DISENGAGE IF IN AUTO- LAND. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DAIG. 479, 499. SENSOR VALUES: DIAG. 224. SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. SURFACE POSITION SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
PITCH MODE CHECK FAILURE 0-DFGC PITCH MODE CHECK FAILURE 1-DFGC PITCH MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL PITCH MODE.	DFGC SHUTDOWN. ALL SYSTEM FUNCTIONS LOST. SPD AND FD FLAG ON ASSOC. SIDE. A/P AND A/T DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
PMS DATA FAILURE	DFGC RECEIVED NO DATA ON PMS DATA BUS	PERF MODE INOP	DIAG. 508	REFERENCE WIRING DIAG 34-63-0.
PMS/FMS DATA FAILURE (970 DFGC)	DFGC RECEIVED NO DATA ON PMS/FMS DATA BUS	PERF MODE OR FMS VNAV MODE INOP	DIAG. 508	REFERENCE WIRING DIAG 34-63-0
QNH INPUT FAILURE. -906 COMPUTER.	QNH ANALOG INPUT UNREASONABLE. OPEN, SHORT TO GND OR SHORTED TO THE QFE REFERENCE.	APPLICABLE ONLY IF QNH CORRECT OPTION IS SELECTED. LOSS OF ALT. REF. ALT ARMING AND ALT. ALTERING INHIBITED.	SENSOR VALUES: DIAG. 247.	REMOVE AND REPLACE ASSOC. DFGC (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201) OR 34-11. FAILED BARO SET IN STANDBY ALTIMETER.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
RAD ALT 1 SIGNAL FAILURE RAD ALT 1 VALID FAILURE RAD ALT 2 SIGNAL FAILURE RAD ALT 2 VALID FAILURE	FAILED RADIO ALTIMETER -1 OR -2 SIGNAL OR VALID. MONITORED ONLY BELOW 2300 FEET RADIO ALTITUDE.	DEPENDS ON TYPE OF R/A INSTALLED. (a) 552 R/A- AUTO-LAND DISABLED. NO AUTOLAND LITE ON (i.e. NO GROUND AT J102B/94 AND J103B/94 REF. W/D (WDM 22-16-18). (b) 552A R/A- NO AFFECT (GROUND AT J102B/94 AND J103B/94).	SELF TESTS: DIAG. 374-381 PASSIVE DISCRETES: DIAG. 41-44.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (ENGINE PRESSURE RATIO (EPR) TRANSMITTERS, SUBJECT 77-11-02, page 201)
RAD ALT 1,2 COMP FAILURE	SPLIT BETWEEN BOTH RADIO ALTIMETER SIGNALS WITHOUT A CORRESPONDING RAD ALT 1 OR RAD 2 SIGNAL OR VALID FAILURE.	LOSS OF ILS, AUTO-LAND, TAKE- OFF AND A/T RETARD. A/P DISCONNECT. "NO AUTO- LAND" LIGHT ON.	SELF TESTS: DIAG. 374-381. PASSIVE DISCRETES: DIAG. 41-44.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (RADIO ALTIMETER SYSTEM, SUBJECT 34-42-00, Page 201)
R/A OPTION PIN FAILURE	RADIO ALTI- METER OPTION PIN DIS-AGREEMENT.	NONE. 552A R/A- CHECK J102A/94 AND J103A/94 FOR GROUND. 552 R/A - CHECK J102A/94 AND J103A/94 FOR OPEN.	PASSIVE DISCRETES: DIAG. 47.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (ENGINE PRESSURE RATIO (EPR) TRANSMITTERS, SUBJECT 77-11-02, page 201)
RAM FAILURE -DFGC *	VALUE STORED IN RANDOM ACCESS MEMORY (RAM) LOCATION NOT THE SAME AS VALUE READ FROM THE SAME RAM LOCATION.	DFGC SHUT- DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for RAM failure. (Paragraph 1.I.)				
ROLL MODE CHECK FAILURE 0-DFGC ROLL MODE CHECK FAILURE 1-DFGC ROLL MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL ROLL MODE.	DFGC SHUT- DOWN ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
RUD UNRESTRICTED SWITCH FAILURE	TWO SEPERATE FAILURES: (a) EITHER RUDDER UNRE- STRICTED SWITCH INDICATING UNRESTRICTED ABOVE 195 KNOTS. (b) EITHER RUDDER UNRESTRICTED SWITCH INDICATING RESTRICTED BELOW 145 KNOTS.	(a) NONE. (b) A/P DISENGAGE "NO AUTO- LAND" LIGHT ON.	(a) CHECK OPERATION OF SWITCH REF. RUDDER (RUDDER THROW-LIMITER - MAINTENANCE PRACTICES, PAGEBLOCK 27-20-06/201). (b) PASSIVE DISCRETES: DIAG. 37-38.	REF. T/S CHARTS. REF. RUDDER. (RUDDER AND TAB - TROUBLE SHOOTING, PAGEBLOCK 27-20-00/101)
NOTE: -971 computers and subs provide expanded failure messages.				
RUD UNRESTRICTED SWITCH FAIL X	X=0 for a non-isolatable failure			
	X=1 for switch 1 indicating restricted below 145 ktX=2 for switch 2 indicating restricted below 145 ktss			
	X=3 for both switches indicating restricted below 145 kts			
	X=4 for switch 1 indicating unrestricted above 205 kts			
	X=5 for switch 2 indicating unrestricted above 205 kts			
	X=6 for both switches indicating unrestricted above 205 kts			
	X=7 for switch 1 indicating restricted during autoland			
	X=8 for switch 2 indicating restricted during autoland			
	X=9 for both switches indicating restricted during autoland			
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on the ground.				
RUDDER POS FAILURE	FAILED RUDDER SURFACE POSITION SYNCHRO.	AUTOLAND INHIBIT. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN AUTO- LAND. FD REVERTS TO ILS.	INTERNAL MONITORS: DIAG. 499. SENSOR VALUES: DIAG. 224.	REF. T/S CHARTS. REF. SURFACE POSITION SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
SLAT POS 1, 2 COMP FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS WITHOUT LOSING EITHER SLAT VALID.	LOSS OF A/P AND FD TAKEOFF AND GO-AROUND. LOSS OF ALL AUTO-THROTTLE MODES EXCEPT EPR. SLOW-FAST BIAS, SPD FLAG IN VIEW. "ART INOP" LIGHT ON.	PASSIVE DISCRETES: DIAG. 33-34. SECOND SETUP INTER-ACTIVES: DIAG. 334-335, 341-342, 348-349.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. (SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
SLAT POS 1 VALID FAILURE SLAT POS 2 VALID FAILURE	FAILED SLAT VALID 1 OR SLAT VALID 2 FROM PROXIMITY SWITCH ELECTRONICS UNIT.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING, SLATS OUT OF RETRACT) THEN "ART INOP" LIGHT ON. OTHERWISE, NO AFFECT. AUTO G/A NOT AVAILABLE.	PASSIVE DISCRETES: DIAG. 33-34.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201
SLAT POS 1 SIGNAL FAILURE SLAT POS 2 SIGNAL FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS BUT LESS THAN SIXTEEN SECONDS WITHOUT LOSING EITHER SLAT VALID.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING AND SLATS NOT RETRACTED) THEN "ART INOP" LIGHT ON OTHERWISE "NO EFFECT" G/A NOT AVAILABLE	PASSIVE DISCRETES DIAG. 33-34.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201
SPEED REF FAILURE	FAILED SPD/ MACH SELECT SYNCHRO IN FGCP.	LOSS OF A/T OPERATION IN SPEED AND MACH MODES. SPD/MACH DISPLAY INOP.	COCKPIT DISPLAYS: DIAG. 170. INTERNAL MONITORS: DIAG. 480.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
SPOILER POS 1 FAILURE SPOILER POS 2 FAILURE	FAILED LEFT (1) OR RIGHT (2) SPOILER POSITION SYNCHRO.	NO AFFECT.	INTERNAL MONITORS: DIAG. 492-493. SENSOR VALUES: DIAG. 186-187.	REF. T/S CHARTS. REF. SURFACE POS SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
STAB TRIM MOTION MONITOR FAILURE	STAB MOTION POLARITY IS OPPOSITE CMD POLARITY.	A/P DISCONNECT	N/A	FAILED TRIM BRAKE SW S10-8 FAILED UP TRIM RELAY R20-12 FAILED DWN TRIM RELAY R20-13 ASSOCIATED WIRING FAILED DFGC

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
TEMP SELECT PANEL FAILURE 0 TEMP SELECT PANEL FAILURE 1	TEMPERATURE SELECT PANEL FAILED TO AN ILLEGAL INPUT.	"NO MODE" DISPLAY ON TRI WHEN T.O. FLX IS PRESSED.	COCKPIT DISPLAYS: DIAG. 93-108.	REF. T/S CHARTS. REF. THRUST RATING INDICATOR. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
TICKET CHECK FAILURE 0-DFGC TICKET CHECK FAILURE 1-DFGC TICKET CHECK FAILURE 2-DFGC TICKET CHECK FAILURE 3-DFGC TICKET CHECK FAILURE 4-DFGC TICKET CHECK FAILURE 5-DFGC TICKET CHECK FAILURE 6-DFGC TICKET CHECK FAILURE 7-DFGC	COMPUTER MONITORS DETECT AN INCOMPLETE TASK.	DFGC SHUTDOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: There may be more ticket check failures than those listed. All will cause the same problems as shown.				
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for TICKET CHECK FAILURE. (Paragraph 1.I.)				
TRI VALID FAILURE	THRUST RATING INDICATOR VALID CLEAR FOR GREATER THAN 3 SECONDS. LOGGED ONLY ON SELECTED DFGC.	"NO MODE" DISPLAY ON TRI WITH EPR LIM FLAG IN VIEW. A/T DISCONNECT IN EPR LIM MODE.	PASSIVE DISCRETES: DIAG. 40. COCKPIT DISPLAYS: DIAG. 255-256.	REF. T/S CHARTS. REF. THRUST RATING INDICATOR. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
WJE 410				
NOTE: -920 and subsequent DFGC's will display ATT FOR VERT GYRO.				

WJE 410 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VERT GYRO 1 SIGNAL FAILURE VERT GYRO 1 VALID FAILURE VERT GYRO 2 SIGNAL FAILURE VERT GYRO 2 VALID FAILURE VERT GYRO 3 SIGNAL FAILURE VERT GYRO 3 VALID FAILURE	SINGLE VERTICAL GYRO FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. VERT GYROS. (VERTICAL GYRO, SUBJECT 34-23-01, Page 201)
VERT GYRO 1, 2 COMP FAILURE VERT GYRO 1, 3 COMP FAILURE VERT GYRO 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. VERT GYROS (VERTICAL GYRO, SUBJECT 34-23-01, Page 201), REF. ATTITUDE SW UNIT (ATTITUDE SWITCHING UNIT, SUBJECT 34-23-04, Page 201).
WJE 406				
NOTE: -920 and subsequent DFGC's will display ATT for VERT GYRO.				
ATTITUDE 1 SIGNAL FAILURE ATTITUDE 1 VALID FAILURE ATTITUDE 2 SIGNAL FAILURE ATTITUDE 2 VALID FAILURE ATTITUDE 3 SIGNAL FAILURE ATTITUDE 3 VALID FAILURE	SINGLE ATTITUDE FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE (ATTITUDE SYSTEM, SUBJECT 34-23-00, Page 201), REF. AHRU (ATTITUDE/HEADING REFERENCE UNIT, SUBJECT 34-21-10, page 201), REF. HEADING SYSTEM (HEADING SYSTEM, SUBJECT 34-21-00, page 201).

WJE 406 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ATTITUDE 1, 2 COMP FAILURE ATTITUDE 1, 3 COMP FAILURE ATTITUDE 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE ATTITUDE. (34-23-00, page 201) , REF. AHRS SW UNIT ATTITUDE/HEADING SWITCHING UNIT, SUBJECT 34-21-11, page 201).
WJE 406, 410				
VERT SPD REF FAILURE	FAILED PITCH SELECT WHEEL.	DISPLAYED VALUE FROZEN ON FGCP. VARYING OF PITCH WHEEL INHIBITED.	INTERNAL MONITORS: DIAG. 503. COCKPIT DISPLAYS: DIAG. 263. SWITCHES AND BUTTONS: DIAG. 176.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
VREF FIXED LEFT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC. CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 1 SIGNAL FAILURE. (b) ANGLE OF ATTACK 1 SIGNAL FAILURE. (c) HEADING 1 SIGNAL FAILURE. (d) CRS ERROR 1 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VREF FIXED RIGHT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 2 SIGNAL FAILURE. (b) ANGLE OF ATTACK 2 SIGNAL FAILURE. (c) HEADING 2 SIGNAL FAILURE. (d) CRS ERROR 2 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
VREF SWITCHED LEFT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) VERT SPD REF FAILURE. (b) SPD SEL FAILURE. (c) ALT SEL FAILURE. (d) AILERON POSITION FAILURE. (e) EPR LEFT FAILURE. (f) SPOILER POS 1 FAILURE. (g) ELEV POS 1 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VREF SWITCHED RIGHT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP HANDLE FAILURE. (b) RUDDER POS FAILURE. (c) HOR STAB FAILURE. (d) EPR RIGHT FAILURE. (e) SPOILER POS 2 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
-906 AND SUBSEQUENT COMPUTERS. WHEEL SPINUP-1 SIGNAL FAILURE WHEEL SPINUP-2 SIGNAL FAILURE	DISCRETE FAILED SPIN STATE AT IAS >195 KTS.	NONE.	PASSIVE DISCRETES: DIAG. 49-50	REF T/S CHARTS.
WINDSHEAR DATA FAILURE	FAILED WINDSHEAR COMPUTER (WSC) OR DFGC DOES NOT RECEIVE DATA FROM WSC.	"W/S INOP" LIGHT ON.	INTERNAL MONITORS: DIAG. 509.	REF. WINDSHEAR SELF-TEST. (Windshear Alert and Guidance System (WAGS) 34-47-00, Page 201)
YAW DAMP SERVO FAILURE	FAILED YAW DAMPER ACTUATOR.	"YAW DAMP OFF" LIGHT ON.	SERVO TESTS: DIAG. 442-443. SENSOR VALUES: DIAG. 198, 208.	REF. T/S CHARTS. REF. YAW DAMPER ACTUATOR. (YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201)
YAW DAMPER POWER FAILURE	FAILURE OF 28 VDC YAW DAMPER POWER.	"YAW DAMP OFF" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 323-324. SERVO TESTS: DIAG. 442-443. INITIAL SETUP INTER- ACTIVES: DIAG. 16-17.	REF. T/S CHARTS. REF. YAW DAMPER ACTUATOR. (YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
YAW MODE CHECK FAILURE 1-DFGC YAW MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL YAW MODE.	DFGC SHUTDOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

4. Trouble Shooting Charts Index

A. These trouble shooting charts are to be used in conjunction with the diagnostic numbers that appear when a failure is displayed on the STP in the Return to Service or the Maintenance test.

Table 103

Sequence	Figure
0 - STP Tests	Figure 103
1 - Initial Setup Interactives	Figure 104
2 - Passive Discretes	Figure 105
3 - Switches and Buttons	Figure 106
4 - Sensor Values	Figure 107
5 - Cockpit Displays	Figure 108
6 - Second Setup Interactives	Figure 109
7 - Self-Tests	Figure 110
8 - Servo Tests	Figure 111
9 - Internal Monitors	Figure 112

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
1	CYCLE STP FWDSPCE PB	STP FWDSPACE PB FAILURE	VERIFYS STP FWDSPCE KEY.	FAILED STP FSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/F J103B/88	22-15-12 22-15-12
2	CYCLE STP BACKSPACE PB	STP BACKSPACE PB FAILURE	VERIFYS STP BSPCE KEY.	FAILED STP BSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/E J103B/87	22-15-12 22-15-12
3	STP SEGMENTS TEST — VERIFY	STP SEGMENTS FAILURE	VERIFYS STP ALPHANUMERIC DISPLAY.	FAILED STP ALPHA DISPLAY. FAILED STP CIRCUITRY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/G J103B/89	22-15-12 22-15-12

BBB2-22-199A

Sequence Zero - STP Tests
Figure 103/22-01-05-990-873

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
4	DISENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. J102A/100	22-14-11 22-14-11
5		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/K SEL 1, J103/K SEL 2. J102A/104	22-14-11 22-14-11
6		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-419/G J102A/96	22-14-11 22-12-12 22-12-12
7		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
8		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J013/H SEL 2. P10-421/G J102A/95	22-14-11 22-11-12 22-11-12
9		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P1-0422/G J103A/95	22-14-11 22-11-12 22-11-12
10		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-423/G J103B/77	22-14-11 22-13-12 22-13-12

BBB2-22-210A

Sequence One - Initial Setup Interactives
Figure 104/22-01-05-990-874 (Sheet 1 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
11		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12
12	FMA-1 A/P LITE OFF — VERIFY	FMA-1 A/P LITE OFF FAILURE	DRIVES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-1.	28 VDC	J101/N P1-644/16 J102B/24	22-17-11 22-17-11 22-17-11
13	FMA-2 A/P LITE OFF — VERIFY	FMA-2 A/P LITE OFF FAILURE	DRIVES FMA A/P-2 ANNUNCIATOR	FAILED FMA A/P-2 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-2.	28 VDC	J101/P P1-644/20 J102B/24	22-17-11 22-17-11 22-17-11
14	DISENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2, J103B/26	22-31-12 22-31-12
15		A/T CLAMP FAILURE	VERIFIES A/T ENGAGE SWITCH AND CLAMP LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AUTOTHROTTLE CLAMP RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2, R50-329/X1, X2 J103B/36	22-31-12 22-31-14 22-31-14
16	DISENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-194 J103B/8	22-13-12 22-13-12
17	YAW DAMP OFF LITE ON — VERIFY	YAW DAMP OFF LITE ON FAILURE	DRIVES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE. FAILED ASSOC. DFGC.	GND	P1-119/C J103B/53	22-13-12 33-12-00 22-13-12

BBB2-22-211B

Sequence One - Initial Setup Interactives
Figure 104/22-01-05-990-874 (Sheet 2 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
18	RCVRS NOT ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 NOT TUNED TO ILS FREQ.	FAILED NAV 1 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-319B/38 J101A/17	34-26-02 34-26-02
19		NAV 2 TUNING FAILURE	VERIFIES NAV 2 NOT TUNED TO ILS FREQ.	FAILED NAV 2 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-320B/38 J104A/17	34-26-02 34-26-02
20	ADVANCE THROTTLE — VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED LEFT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-196 J101A/43	22-31-11 22-31-11
21		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED RIGHT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-198 J104A/43	22-31-11 22-31-11

BBB2-22-213

Sequence One - Initial Setup Interactives
Figure 104/22-01-05-990-874 (Sheet 3 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
22		ATTITUDE 1 VALID FAILURE	VERIFIES ATT VALID 1	FAILED ATT-1 FAILED ATTITUDE SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-18/45 J2A/19, 17 J101A/14	34-24-01 34-24-01 34-24-01
23		ATTITUDE 2 VALID FAILURE	VERIFIES ATT VALID 2	FAILED ATT-2 FAILED ATTITUDE SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-19/45 J2B/19, 17 J104B/14	34-24-02 34-24-02 34-24-02
24		ATTITUDE 3 VALID FAILURE	VERIFIES ATT VALID 3	FAILED ATT-3 FAILED ATTITUDE SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-165/45 J1/49 J103A/70	34-24-01 34-24-01 34-24-01
25		HDG 1 VALID FAILURE	VERIFIES HDG 1 VALID.	FAILED DG-1. FAILED INSTR. AMP-1./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-4/F R50-323B/53 J101A/15	34-22-03 34-22-03 34-22-03
26		HDG 2 VALID FAILURE	VERIFIES HDG 2 VALID.	FAILED DG-2. FAILED INSTR. AMP-2./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-7/F R50-324B/53 J104A/15	34-22-04 34-22-04 34-22-04
27		DLA-A VALID FAILURE	VERIFIES DLA-A VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-412/P J101A/37	22-19-11 22-19-11
28		DLA-B VALID FAILURE	VERIFIES DLA-B VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-413/L J104A/37	22-19-11 22-19-11

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Sequence Two - Passive Discretes
Figure 105/22-01-05-990-875 (Sheet 1 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
29		D3A-A VALID FAILURE	VERIFIES D3A-A VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-414/P J101A/24	22-19-11 22-19-11
30		D3A-B VALID FAILURE	VERIFIES D3A-B VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-415/L J104A/24	22-19-11 22-19-11
31		GND CNTL RELAY 1 FAILURE	VERIFIES GROUND CONTROL RELAY-1 (R2-3).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	1 OPEN CIRCUIT	R2-3 J101A/44	22-11-11 22-11-11
32		GND CNTL RELAY 2 FAILURE	VERIFIES GROUND CONTROL RELAY-2 (R2-6).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	1 OPEN CIRCUIT	R2-6 J104A/44	22-11-11 22-11-11
33		LEFT SLAT VALID FAILURE	VERIFIES LEFT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-446B/56 J101A/23	22-31-11 22-31-11
34		RIGHT SLAT VALID FAILURE	VERIFIES RIGHT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-447B/56 J104A/23	22-31-11 22-31-11

1 VALID ONLY FOR AOG CONFIGURATION (NOSEWHEEL COMPRESSION).

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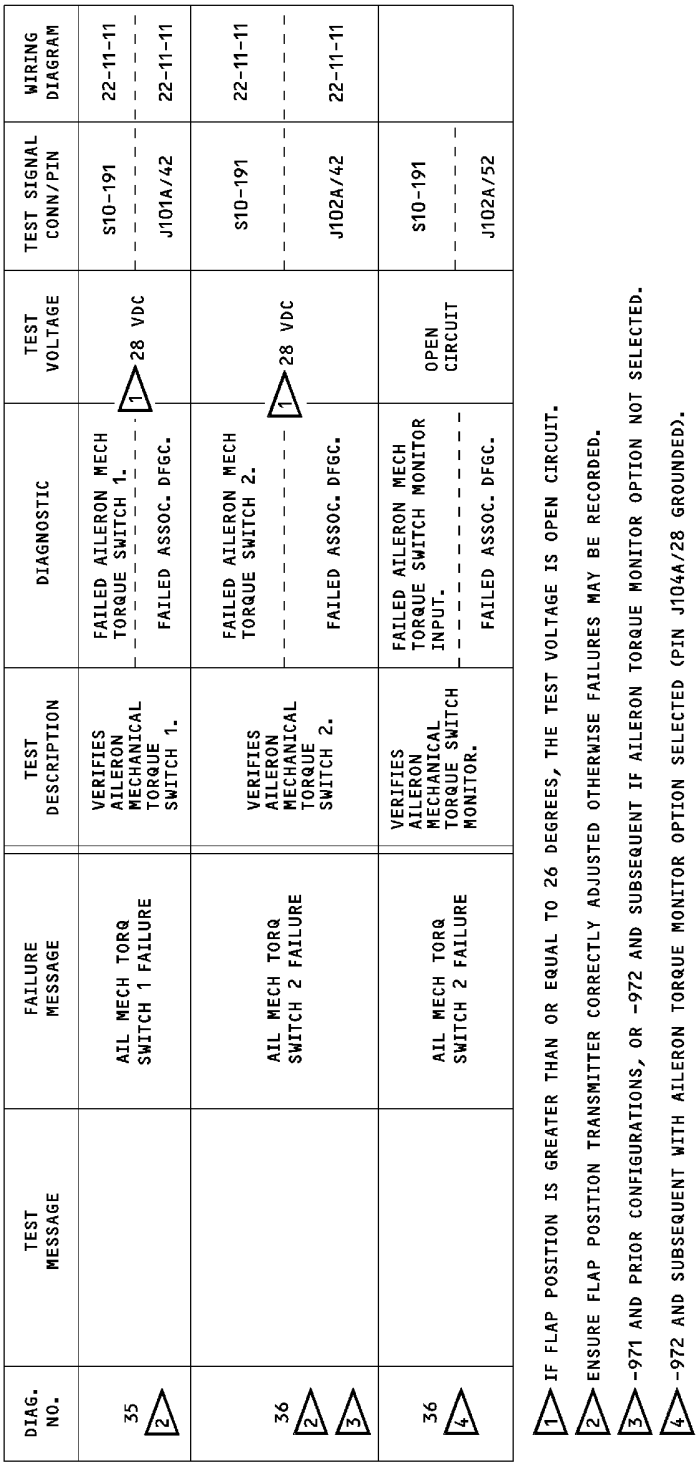
BBB2-22-555B

Sequence Two - Passive Discretes
Figure 105/22-01-05-990-875 (Sheet 2 of 6)



Sequence Two - Passive Discretes
Figure 105/22-01-05-990-875 (Sheet 3 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
37		RUD UNRESTRICTED SWITCH 1 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-33 R5-446B/61 J101A/47	27-22-11 27-22-11 27-22-11
38		RUD UNRESTRICTED SWITCH 2 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-34 R5-467B/61 J104A/47	27-22-11 27-22-11 27-22-11
39		D3A NORM ACCEL VALID FAILURE	VERIFIES D3A NORM ACCEL VALID.	FAILED 3 AXIS ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-414/P J102A/72	22-19-11 22-19-11
40		TR-EPR DISPLAY VALID FAILURE	VERIFIES TR-EPR DISPLAY VALID.	FAILED THRUST RATING INDICATOR FAILED ASSOC. DFGC.	28 VDC	P1-627/M J102A/92	34-18-12 34-18-12
41		RAD DSP 1 VALID FAILURE	VERIFIES RAD ALT 1 INDICATOR VALID.	FAILED CAPT R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-66/M J101A/26	34-45-01 34-45-01
42		RAD DSP 2 VALID FAILURE	VERIFIES RAD ALT 2 INDICATOR VALID.	FAILED F/O R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-67/M J104A/26	34-45-02 34-45-02
43		RAD ALT-1 VALID FAILURE	VERIFIES RAD ALT-1 VALID.	FAILED RADIO ALTIMETER-1 FAILED ASSOC. DFGC.	28 VDC	R5-321B/57 J101A/39	34-45-01 34-45-01
44		RAD ALT-2 VALID FAILURE	VERIFIES RAD ALT-2 VALID.	FAILED RADIO ALTIMETER-2 FAILED ASSOC. DFGC.	28 VDC	R5-322B/57 J104A/39	34-45-02 34-45-02
45 1		ART OPTION PIN FAILURE	VERIFIES ART OPTION PINS FOR AGREEMENT.	FAILED ART G/A OPTION PIN A. FAILED ART G/A OPTION PIN B. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J102A/70 AND J103B/104	22-16-12

1 TEST DELETED FOR -972 AND SUBSEQUENT.

CAG(IGDS)

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Sequence Two - Passive Discretes
Figure 105/22-01-05-990-875 (Sheet 4 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
46		AUTO G/A OPTION PIN FAILURE	VERIFIES AUTO G/A OPTION PINS FOR AGREEMENT.	FAILED AUTO G/A OPTION PIN A. FAILED AUTO G/A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/102 AND J103B/102	22-16-14
47		R/A OPTION PIN FAILURE	VERIFIES R/A OPTION PINS FOR AGREEMENT.	FAILED RA552A OPTION PIN A. FAILED RA552A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/94 AND J103B/94	22-16-18
48		OPTION PIN PARITY FAILURE	VERIFIES EVEN PARITY FOR OPTION PINS. (1)	FAILED OPTION PINS. FAILED ASSOC. DFGC.	OPEN OR GND	J103B/96 (1)	22-16-12
49		WHEEL SPIN-UP FAILURE	VERIFIES LEFT INBOARD, RIGHT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/C J1-102A/8	27-61-11 27-61-11
50		WHEEL SPIN-UP FAILURE	VERIFIES RIGHT INBOARD, LEFT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/E J103A/8	27-61-11 27-61-11
51 (2)	TRC OPTION PIN ABCDE =XXXXX VRFY	TRC OPTION PIN FAILURE	VERIFIES INSTALLED ENGINE AGREES WITH OPTION PIN CONFIGURATION.	FAILED TRC OPTION PIN. FAILED ASSOC. DFGC.	- = OPEN G = GROUND	J102B-97, 98, 99, 100	22-16-15

(1) THE FOLLOWING OPTION ARE TESTED:
(a) PEDESTAL CONTROLLER (f) QNH CORRECT
(b) F/D OPTION (g) BOX 1
(c) AD 300C (h) BOX 2
(d) HDG SEL CX (i) PARITY PIN
(e) PITCH REF SEL

(2) DISPLAY FOR DIFFERENT ENGINE CONFIGURATIONS:
-209 ENGINE ABCDE = -GGG-
-217 ENGINE ABCDE = GG-G-
-217A ENGINE ABCDE = --G--
-217A+ ENGINE ABCDE = -G---
-219 ENGINE ABCDE = -GG-G

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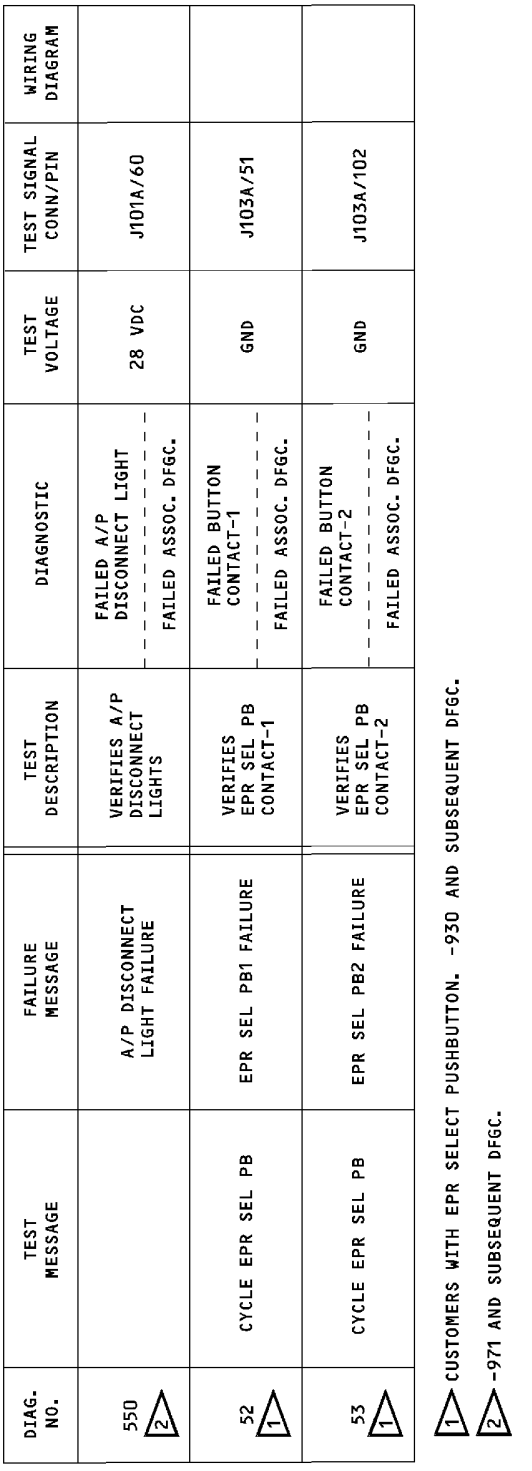
S0006528160V2

Sequence Two - Passive Discretes
Figure 105/22-01-05-990-875 (Sheet 5 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
550 (2)		A/P DISCONNECT LIGHT FAILURE	VERIFIES A/P DISCONNECT LIGHTS	FAILED A/P DISCONNECT LIGHT FAILED ASSOC. DFGC.	28 VDC	J101A/60	
52 (1)	CYCLE EPR SEL PB	EPR SEL PB1 FAILURE	VERIFIES EPR SEL PB CONTACT-1	FAILED BUTTON CONTACT-1 FAILED ASSOC. DFGC.	GND	J103A/51	
53 (1)	CYCLE EPR SEL PB	EPR SEL PB2 FAILURE	VERIFIES EPR SEL PB CONTACT-2	FAILED BUTTON CONTACT-2 FAILED ASSOC. DFGC.	GND	J103A/102	

(1) CUSTOMERS WITH EPR SELECT PUSHBUTTON. -930 AND SUBSEQUENT DFGC.
(2) -971 AND SUBSEQUENT DFGC.

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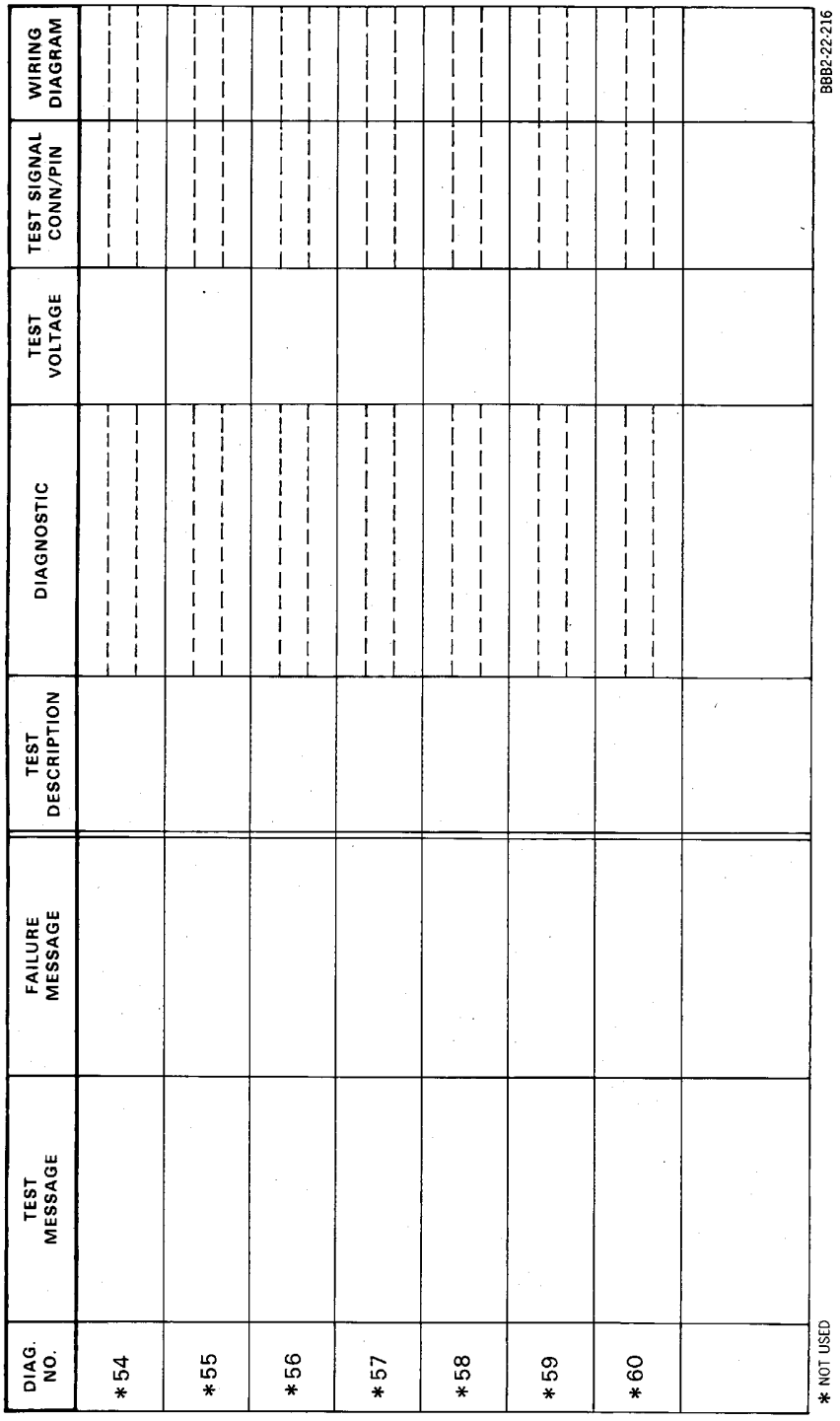
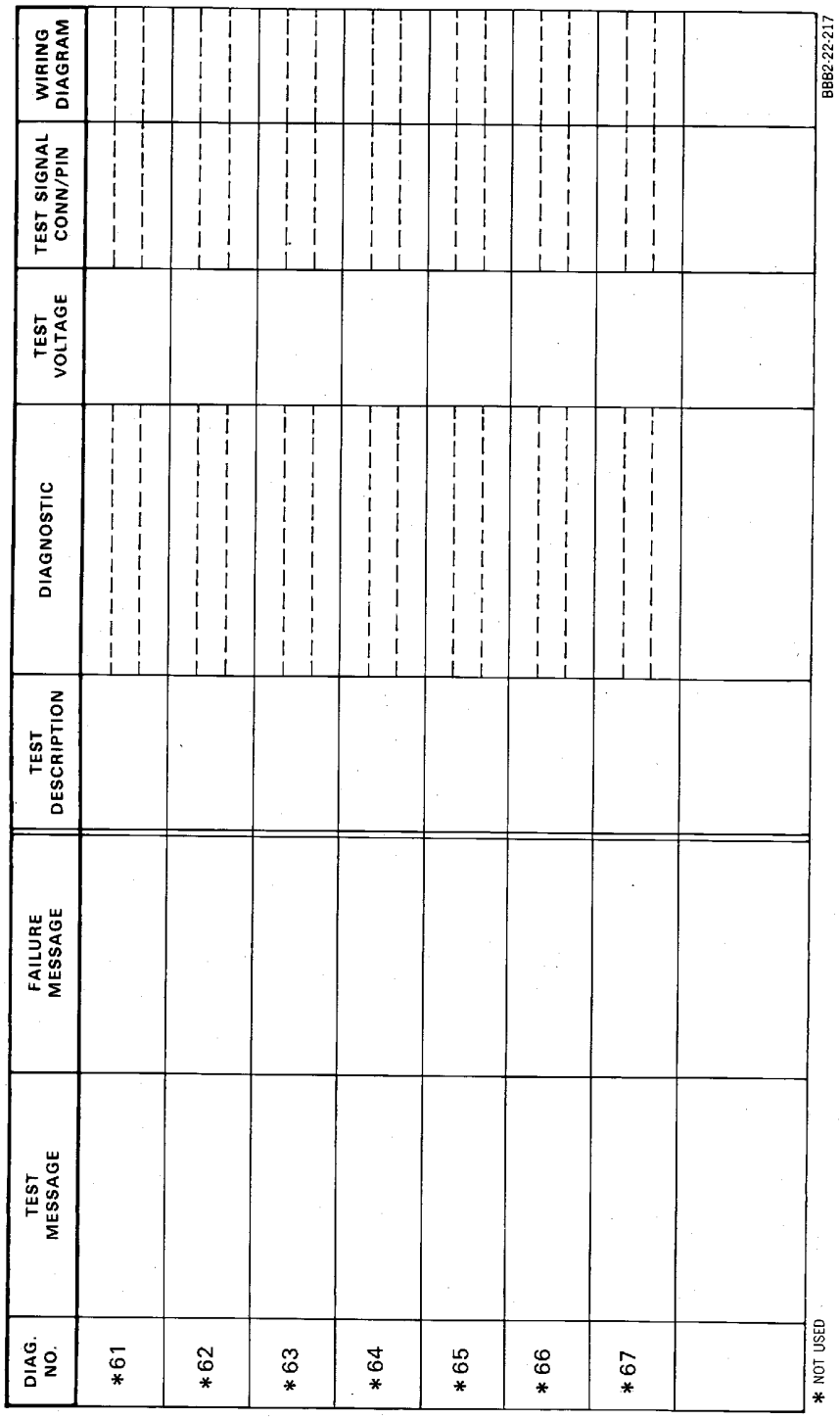
CAG(IGDS)

Sequence Two - Passive Discretes
Figure 105/22-01-05-990-875 (Sheet 6 of 6)



Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 1 of 17)



Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 2 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
* 68							
* 69							
* 70							
* 71							
* 72							
73	ATT SW UNIT CAPT ON AUX — VERIFY	ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 1 ONA UX A.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	GND	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
74		ATT SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES ASU 2 ON AUX A.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01

BBB2-22-557

* NOT USED

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 3 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
75		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 1 ON AUX B.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	GND	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
76		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 2 ON AUX B.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
77		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 2 ON AUX A.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
78	ATT SW UNIT F/O ON AUX — VERIFY	ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 2 ON AUX A.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	GND	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01
79		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 1 ON AUX B.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
80		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 2 ON AUX B.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	GND	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
81	ATT SW UNIT ON NORMAL — VERIFY	ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 1 ON AUX A.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2A/35 J101A/45	34-24-01 34-24-01 34-24-01

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 4 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
82		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 2 ON AUX A.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/42 J101A/48	34-24-01 34-24-01 34-24-01
83		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 1 ON AUX B.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/44 J104A/45	34-24-01 34-24-01 34-24-01
84		ATT SW UNIT SWITCH FAILURE	VERIFIES ATT SELECT SWITCH VERIFIES ASU 2 ON AUX B.	FAILED ATT SELECT SWITCH FAILED ASU FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
85	CADC ON TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/u, y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
86		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW VERIFIES AIR DATA SWITCHING UNIT	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	GND	P10-435/u J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
87		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/u J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
88		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/u, y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 5 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
89		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	OPEN CIRCUIT	P10-435/g J1A/50 J103A/69	34-16-12 34-16-12 34-16-12
90	CADC ON NON-TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/g J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
91	CADC ON NORM-VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
92		CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
* 93	TEMP SELECT 78 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/H J103B/69	34-18-12 34-18-12
94		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/J J103B/70	34-18-12 34-18-12
95		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/K J103B/71	34-18-12 34-18-12
96		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/L J103B/72	34-18-12 34-18-12
97		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/N J103B/73	34-18-12 34-18-12

* USED FOR CUSTOMERS WITH EPR SELECT OPTION

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 6 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
98		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/P J103B/74	34-18-12 34-18-12
99		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/R J103B/75	34-18-12 34-18-12
100		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12
*101	TEMP SELECT 87 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/H J103B/69	34-18-12 34-18-12
102		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/J J103B/70	34-18-12 34-18-12
103		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/K J103B/71	34-18-12 34-18-12
104		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/L J103B/72	34-18-12 34-18-12
105		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/N J103B/73	34-18-12 34-18-12
106		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/P J103B/74	34-18-12 34-18-12
107		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J606/R J103B/75	34-18-12 34-18-12
108		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12

* USED FOR CUSTOMERS WITH EPR SELECT OPTION

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 7 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
109	TR MODE T/O — VERIFY	TR MODE T/O FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, T, U J102A/73	34-18-12 34-18-12
110	TR MODE T/O FLX — VERIFY	TR MODE T/O FLX FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O FLX MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/U J102A/73, 74, 75	34-18-12 34-18-12
111	TR MODE G/A — VERIFY	TR MODE GA FAILURE	VERIFIES TRI OPERATION OF GA MODE.	FAILED TRI GA MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/T, U J102A/73, 74	34-18-12 34-18-12
112	TR MODE MCT — VERIFY	TR MODE MCT FAILURE	VERIFIES TRI OPERATION OF MCT MODE.	FAILED TRI MCT MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, S, U J102A/75	34-18-12 34-18-12
113	TR MODE CL — VERIFY	TR MODE CL FAILURE	VERIFIES TRI OPERATION OF CL MODE.	FAILED TRI CL MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, U J102A/73, 75	34-18-12 34-18-12
114	TR MODE CR — VERIFY	TR MODE CR FAILURE	VERIFIES TRI OPERATION OF CR MODE.	FAILED TR CR MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, U J102A/74, 75	34-18-12 34-18-12
115							
116							

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 8 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
117	CYCLE TO/GA SWITCH 1	TO/GA SWITCH 1 FAILURE	VERIFIES TO/GA 1 (LEFT) SWITCH.	FAILED TO/GA-1 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-197 J101A/41, J104A/41	22-31-11 22-31-11
118	CYCLE TO/GA SWITCH 2	TO/GA SWITCH 2 FAILURE	VERIFIES TO/GA 2 (RIGHT) SWITCH.	FAILED TO/GA-2 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-198 J101A/41, J104A/41	22-31-11 22-31-11
119	CYCLE A/P 1 DISCONNECT	A/P 1 DISCONENCT FAILURE	VERIFIES CAPTAIN'S A/P DISC. PB.	FAILED CAPTAIN'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-13 J102A/36, J103A/36	22-14-11 22-14-11
120	CYCLE A/P 2 DISCONNECT	A/P 2 DISCONNECT FAILURE	VERIFIES FIRST OFFICER'S A/P DISC. PB.	FAILED FIRST OFFICER'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-14 J102A/36, J103A/36	22-14-11 22-14-11
121	CYCLE CAPT FMA RESET PB	CAPT FMA RESET PB FAILURE	VERIFIES CAPTAIN'S FMA RESET PB.	FAILED CAPTAIN'S FMA RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
122	CYCLE F/O FMA RESET PB	F/O FMA RESET PB FAILURE	VERIFIES FIRST OFFICER'S FMA RESET PB.	FAILED FIRST OFFICER'S RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
123	PULL GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1 IS CLOSED (R2-3).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-3 J101A/44	22-11-11 22-11-11
124		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2 IS CLOSED (R2-6).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-6 J104A/44	22-11-11 22-11-11
125	LEFT PNEU X FEED OPEN — VERIFY	LEFT PNEU X FEED OPEN FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN OPEN POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-369 J101A/31	34-18-12 34-18-12

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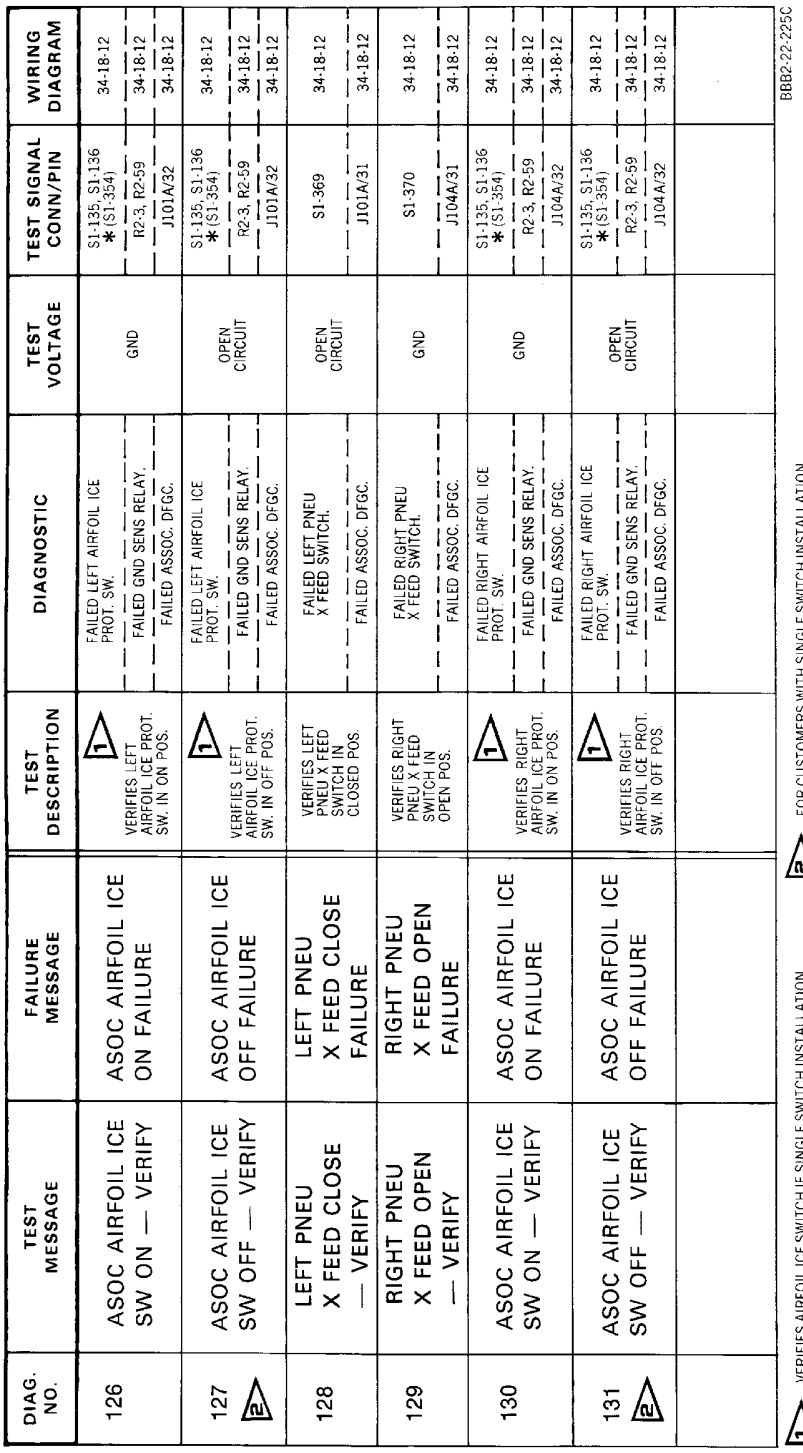
Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 9 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
126	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	1 VERIFIES LEFT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 * (S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
127 2	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	1 VERIFIES LEFT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 * (S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
128	LEFT PNEU X FEED CLOSE — VERIFY	LEFT PNEU X FEED CLOSE FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN CLOSED POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-369 J101A/31	34-18-12 34-18-12
129	RIGHT PNEU X FEED OPEN — VERIFY	RIGHT PNEU X FEED OPEN FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN OPEN POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-370 J104A/31	34-18-12 34-18-12
130	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	1 VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 * (S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12
131 2	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	1 VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 * (S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12

BBB2-22-225C

1 VERIFIES AIRFOIL ICE SWITCH IF SINGLE SWITCH INSTALLATION.

* FOR SINGLE SWITCH INSTALLATION.

2 FOR CUSTOMERS WITH SINGLE SWITCH INSTALLATION. OPEN TAIL DE-ICE TIMER CIRCUIT BREAKER OR A FAILURE MAY BE LOGGED DUE TO A 2.5 MINUTE TIME WITHIN THE TAIL DE-ICING TIMER (R2-189).

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 10 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
132	RIGHT PNEU X FEED CLOSE — VERIFY	RIGHT PNEU X FEED CLOSE FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN CLOSED POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-370 J104A/31	34-18-12 34-18-12
133	L ENG ANTI-ICE SW ON — VERIFY	L ENG ANTI-ICE SW ON FAILURE	VERIFIES LEFT ANTI-ICE SW. IN ON POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-28 J101A/34	34-18-12 34-18-12
134	L ENG ANTI-ICE SW OFF — VERIFY	L ENG ANTI-ICE SW OFF FAILURE	VERIFIES LEFT ANTI-ICE SW. IN OFF POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-28 J101A/34	34-18-12 34-18-12
135	R ENG ANTI-ICE SW ON — VERIFY	R ENG ANTI-ICE SW ON FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN ON POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-29 J104A/34	34-18-12 34-18-12
136	R ENG ANTI-ICE SW OFF — VERIFY	R ENG ANTI-ICE SW OFF FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN OFF POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-29 J104A/34	34-18-12 34-18-12
137	LEFT A/C SUPPLY SWITCH AUTO — VERIFY	LEFT A/C SUPPLY SW AUTO FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN AUTO POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-255 J101A/33	34-18-12 34-18-12
138	LEFT A/C SUPPLY SWITCH OFF — VERIFY	LEFT A/C SUPPLY SWITCH OFF FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN OFF POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-255 J101A/33	34-18-12 34-18-12

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 11 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
139	RIGHT A/C SUPPLY SWITCH AUTO — VERIFY	RIGHT A/C SUPPLY SWITCH AUTO FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN AUTO POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-256 J104A/33	34-18-12 34-18-12
140	RIGHT A/C SUPPLY SWITCH OFF — VERIFY	RIGHT A/C SUPPLY SWITCH OFF — FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN OFF POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-256 J104A/33	34-18-12 34-18-12
141 △E	CLOSE GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/D1, D2, D3 J101A/44	22-11-11 22-11-11
142 △E		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/C1, C2, C3 J104A/44	22-11-11 22-11-11
143	SEL DFGC NON-TEST SIDE — VERIFY	SEL DFGC NON-TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN NON-TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
144	SEL DFGC TEST SIDE — VERIFY	SEL DFGC TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	28 VDC	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
145 *	CYCLE BACKCOURSE PB	BACKCOURSE PB FAILURE	VERIFIES BACKCOURSE PB.	FAILED BACKCOURSE PUSHBUTTON FAILED ASSOC. DFGC	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, F J102A/27, J103A/85	22-15-11 22-15-11
145 **	CYCLE FMS OVRD PB	FMS OVRD PB FAILURE	VERIFIES FMS OVRD PB.	FAILED FMS OVRD PUSH BUTTON FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED	P10-411/B, F J102A/31, J103A/84	22-15-11 22-15-11
146	CYCLE SPEED SELECT PB	SPEED SELECT PB FAILURE	VERIFIES SPD SEL P.B.	FAILED SPD SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, F J102A/27, J103A/84	22-15-11 22-15-11
147	CYCLE MACH SELECT PB	MACH SELECT PB FAILURE	VERIFIES MACH SEL P.B.	FAILED MACH SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, H J102A/29, J103A/87	22-15-11 22-15-11

△E AFTER CLOSING GND SENS BRKRS, SYSTEM WILL DISPLAY "FLIGHT FAULT REVIEW", FWD SPACE TO MAINTENANCE TEST IF FURTHER DIAGNOSTICS ARE DESIRED.

* USED FOR CUSTOMERS WITH BACKCOURSE OPTION
** USED FOR CUSTOMERS WITH FMS AND -970 DFGC AND SUBS

BBB2-22-227F

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 12 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
148	CYCLE EPR LIMIT PB	EPR LIMIT PB FAILURE	VERIFIES EPR LIM PB	FAILED EPR LIM PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, J J102A/30, J103A/87	22-15-11 22-15-11
*149	CYCLE NAV PB	NAV PB FAILURE	VERIFIES NAV PB	FAILED NAV PB FAILED ASSOC. DFGC.			
150	CYCLE VOR/LOC PB	VOR/LOC PB FAILURE	VERIFIES VOR/LOC PB	FAILED VOR/LOC PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, H J102A/29, J103A/86	22-15-11 22-15-11
151	CYCLE ILS PB	ILS PB FAILURE	VERIFIES ILS PB	FAILED ILS PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, J J102A/30, J103A/86	22-15-11 22-15-11
152	CYCLE AUTOLAND PB	AUTOLAND PB FAILURE	VERIFIES AUTOLAND PB	FAILED AUTOLAND PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, G J102A/28, J103A/86	22-15-11 22-15-11
153	CYCLE VERT SPD PB	VERT SPD PB FAILURE	VERIFIES VERT SPD PB	FAILED VERT SPD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
154	CYCLE MACH HOLD PB	MACH HOLD PB FAILURE	VERIFIES MACH HOLD PB	FAILED MACH HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, J J102A/30, J103A/85	22-15-11 22-15-11
155	CYCLE IAS/MACH PB	IAS/MACH PB FAILURE	VERIFIES IAS/MACH PB	FAILED IAS/MACH PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/28, J103A/84	22-15-11 22-15-11

*CUSTOMERS WITH NAV OPTION.

CAG(IGDS)

BBB2-22-435D

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 13 of 17)

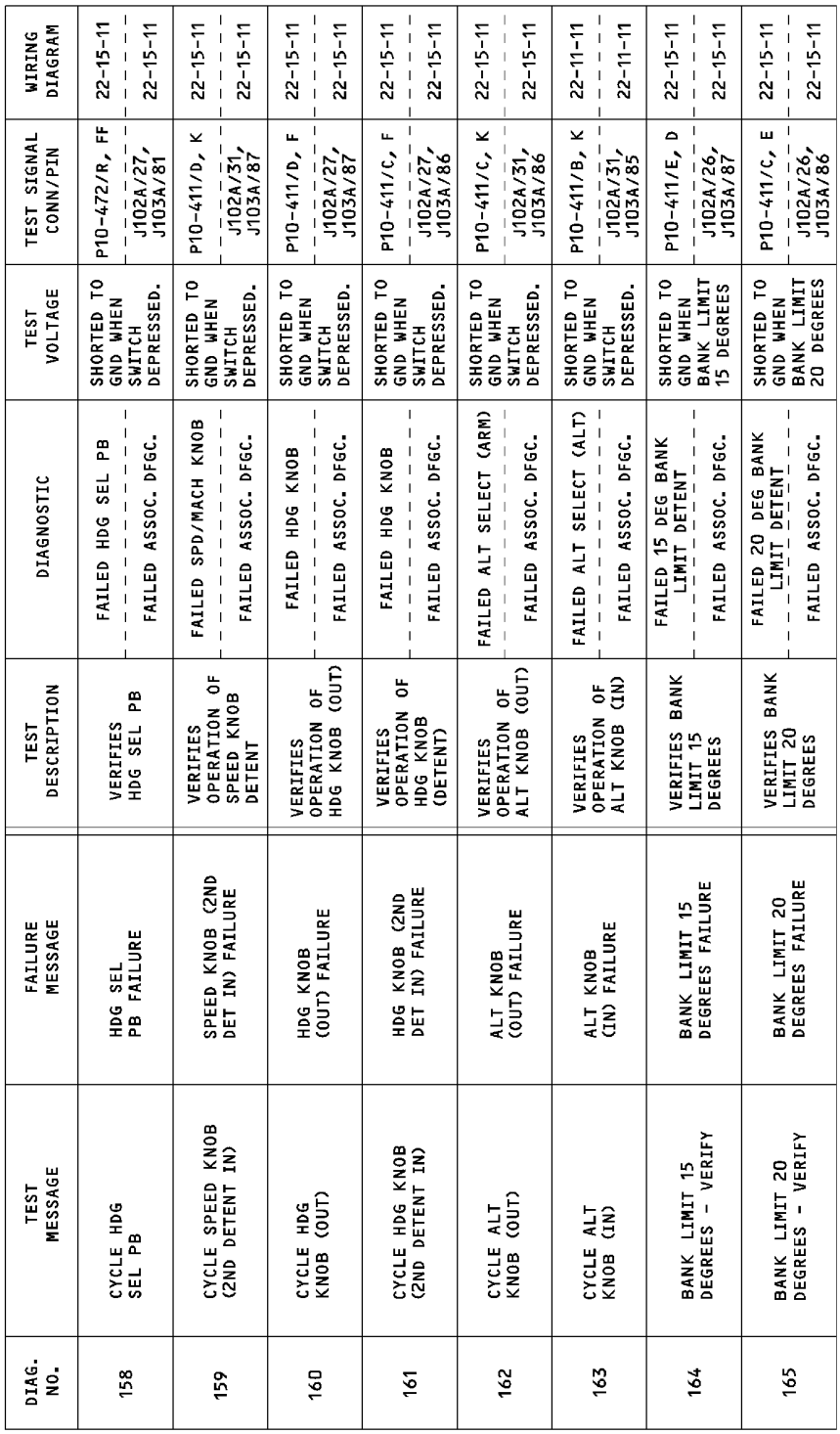
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
156 1	CYCLE IAS HOLD PB	IAS HOLD PB FAILURE	VERIFIES IAS HOLD PB	FAILED IAS HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, L J102A/32, J103A/84	22-15-11 22-15-11
156 2	CYCLE PERF OR VNAV PB	PERF OR VNAV PB FAILURE	VERIFIES PERF OR VNAV PB	FAILED PERF OR VNAV PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, N J102A/32, J103A/85	22-15-11 22-15-11
157 1	CYCLE ALT HOLD PB	ALT HOLD PB FAILURE	VERIFIES ALT HOLD PB	FAILED ALT HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, G J102A/28, J103A/85	22-15-11 22-15-11
157 2	CYCLE TURB PB	TURB PB FAILURE	VERIFIES TURB PB	FAILED TURB PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/29, J103A/84	22-15-11 22-15-11

1 WITHOUT PMS OR FMS.
2 WITH PMS OR FMS.

BBB2-22-1186

CAG(IGDS)

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 14 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
158	CYCLE HDG SEL PB	HDG SEL PB FAILURE	VERIFIES HDG SEL PB	FAILED HDG SEL PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-472/R, FF J102A/27, J103A/81	22-15-11 22-15-11
159	CYCLE SPEED KNOB (2ND DETENT IN)	SPEED KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF SPEED KNOB DETENT	FAILED SPD/MACH KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, K J102A/31, J103A/87	22-15-11 22-15-11
160	CYCLE HDG KNOB (OUT)	HDG KNOB (OUT) FAILURE	VERIFIES OPERATION OF HDG KNOB (OUT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, F J102A/27, J103A/87	22-15-11 22-15-11
161	CYCLE HDG KNOB (2ND DETENT IN)	HDG KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF HDG KNOB (DETENT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, F J102A/27, J103A/86	22-15-11 22-15-11
162	CYCLE ALT KNOB (OUT)	ALT KNOB (OUT) FAILURE	VERIFIES OPERATION OF ALT KNOB (OUT)	FAILED ALT SELECT (ARM) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, K J102A/31, J103A/86	22-15-11 22-15-11
163	CYCLE ALT KNOB (IN)	ALT KNOB (IN) FAILURE	VERIFIES OPERATION OF ALT KNOB (IN)	FAILED ALT SELECT (ALT) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, K J102A/31, J103A/85	22-11-11 22-11-11
164	BANK LIMIT 15 DEGREES - VERIFY	BANK LIMIT 15 DEGREES FAILURE	VERIFIES BANK LIMIT 15 DEGREES	FAILED 15 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 15 DEGREES	P10-411/E, D J102A/26, J103A/87	22-15-11 22-15-11
165	BANK LIMIT 20 DEGREES - VERIFY	BANK LIMIT 20 DEGREES FAILURE	VERIFIES BANK LIMIT 20 DEGREES	FAILED 20 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 20 DEGREES	P10-411/C, E J102A/26, J103A/86	22-15-11 22-15-11

CAG(IGDS)

BBB2-22-229B

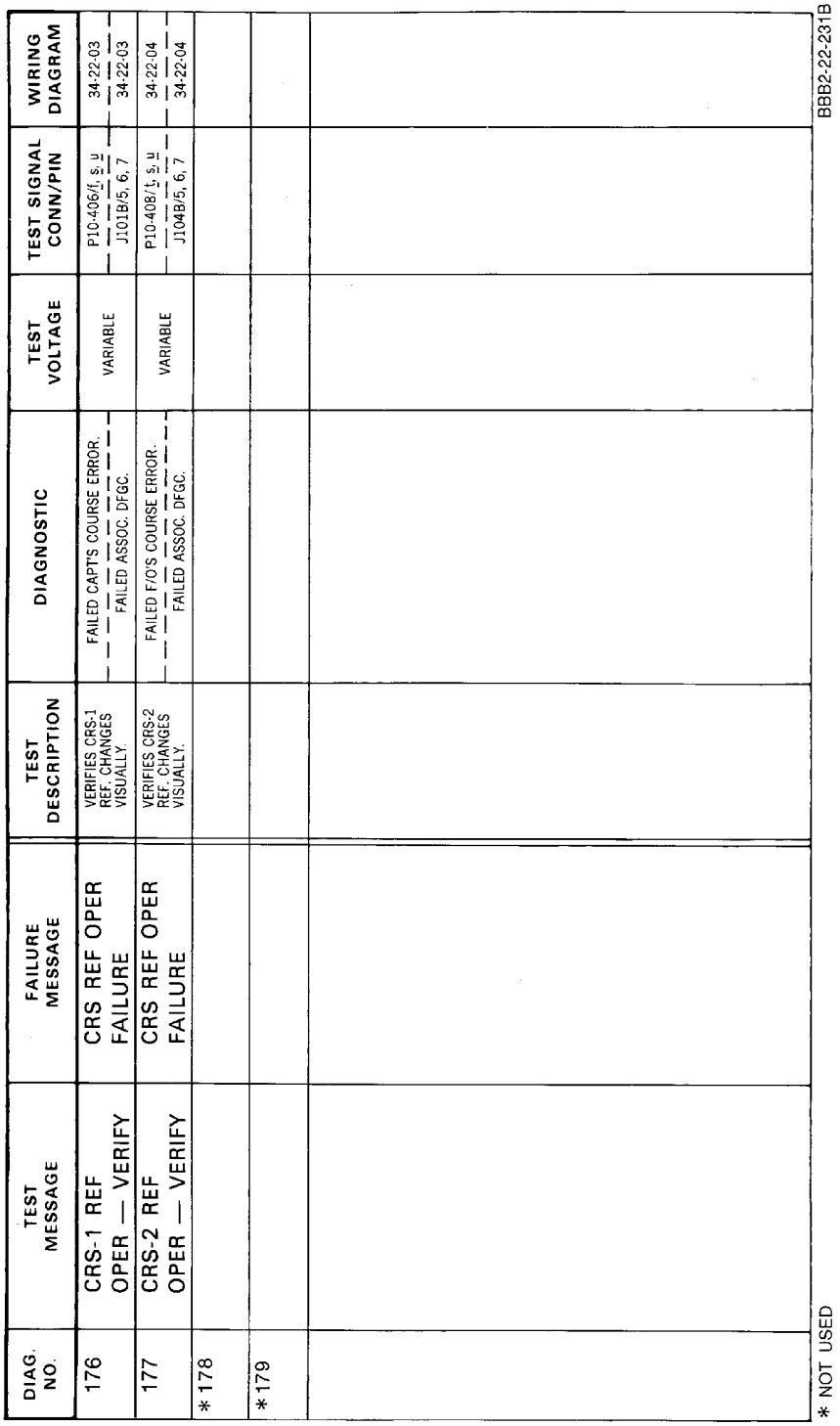
Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 15 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
166	BANK LIMIT 25 DEGREES — VERIFY	BANK LIMIT 25 DEGREES FAILURE	VERIFIES BANK LIMIT 25 DEGREES.	FAILED 25 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 25 DEGREES.	P10-411/B, E J102A/26, J103A/85	22-15-11 22-15-11
167	BANK LIMIT 30 DEGREES — VERIFY	BANK LIMIT 30 DEGREES FAILURE	VERIFIES BANK LIMIT 30 DEGREES.	FAILED 30 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 30 DEGREES.	P10-411/A, E J012A/26, J103A/84	22-15-11 22-15-11
168	SPEED REF. OPER. — VERIFY	SPEED REF. OPER FAILURE	VERIFIES SPEED REF. CHANGES VISUALLY.	FAILED SPEED/MACH REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/Z, a, b J101B/46, 47, 48	22-31-11 22-31-11
169	HEADING REF OPER. — VERIFY	HEADING REF. OPER FAILURE	VERIFIES HDG REF. CHANGES VISUALLY.	FAILED HEADING REF. FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20 J104B/18, 19, 20	34-22-03 34-22-03 34-22-04
*170							
*171							
*172							
173	CAPT HDG SEL REF — VERIFY	CAPT HDG SEL REF FAILURE	VERIFIES HDG SEL VISUAL REFERENCE CHANGES.	FAILED HDG SEL KNOB/SYNCHRO . FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20	34-22-03 34-22-03
174	VERT SPD REF OPER. — VERIFY	VERT SPD REF OPER FAILURE	VERIFIES VERT SPD (PITCH WHEEL) REF. CHANGES VISUALLY.	FAILED VERT SPEED REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
175	ALT REF OPER — VERIFY	ALT REF OPER FAILURE	VERIFIES ALT REF. CHANGES VISUALLY.	FAILED ALT. REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/W, X, Y J101B/40, 41, 42	22-11-11 22-11-11

* NOT USED

BBB2-22-230A

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 16 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
176	CRS-1 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-1 REF. CHANGES VISUALLY.	FAILED CAPT'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-406/f, s, u J101B/5, 6, 7	34-22-03 34-22-03
177	CRS-2 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-2 REF. CHANGES VISUALLY.	FAILED F/O'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-408/f, s, u J104B/5, 6, 7	34-22-04 34-22-04
* 178							
* 179							

BBB2-22-231B

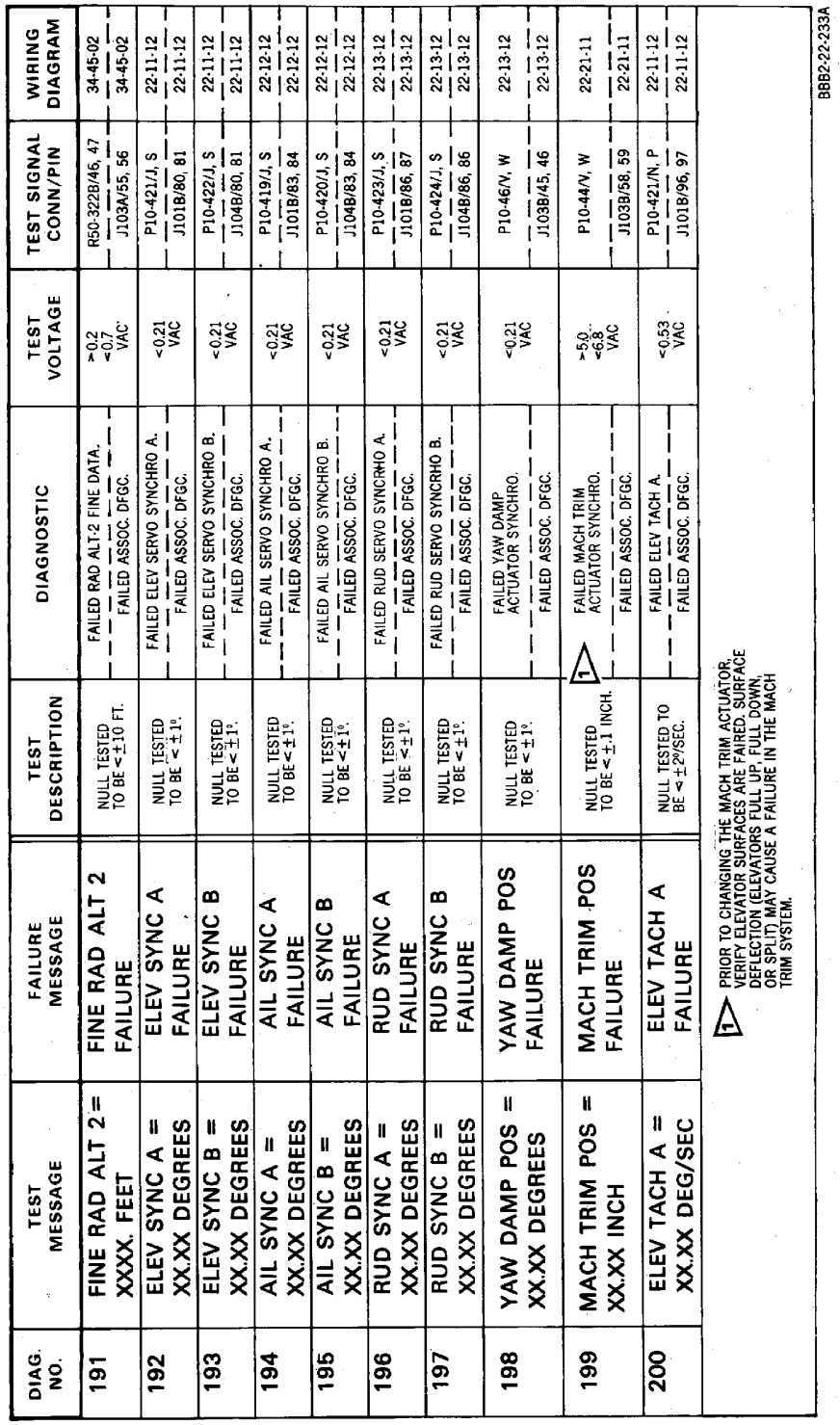
* NOT USED

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-876 (Sheet 17 of 17)

DIAG. NO	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
180	PITCH ANGLE 1 = XX.XX DEGREES	PITCH ANGLE 1 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-18/34, 35 J101B/71, 72	34-24-01
181	PITCH ANGLE 2 = XX.XX DEGREES	PITCH ANGLE 2 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-19/34, 35 J104B/71, 72	34-24-02
182	PITCH ANGLE 3 = XX.XX DEGREES	PITCH ANGLE 3 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-165/34, 35 J103B/71, 72	34-24-01
183	BANK ANGLE 1 = XX.XX DEGREES	BANK ANGLE 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-18/30, 31 J101B/74, 75	34-24-01
184	BANK ANGLE 2 = XX.XX DEGREES	BANK ANGLE 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-19/30, 31 J104B/74, 75	34-24-02
185	BANK ANGLE 3 = XX.XX DEGREES	BANK ANGLE 3 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-165/34, 35 J103A/74, 75	34-24-01
186	SPOILER POS 1 = XX.XX DEGREES	SPOILER POS 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-1 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-397/3, 4, 5 J101B/35, 36, 37	22-12-11
187	SPOILER POS 2 = XX.XX DEGREES	SPOILER POS 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-2 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-398/3, 4, 5 J104B/35, 36, 37	22-12-11
188	CRS RAD ALT 1 = XXXX. FEET	CRS RAD ALT 1 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-1 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/22, 23 J101B/55, 56	34-45-01
189	CRS RAD ALT 2 = XXXX. FEET	CRS RAD ALT 2 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-2 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/22, 23 J104B/55, 56	34-45-02
190	FINE RAD ALT 1 = XXXX. FEET	FINE RAD ALT 1 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-1 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/46, 47 J102A/55, 56	34-45-01

BBB2-22-232A

Sequence Four - Sensor Values
Figure 107/22-01-05-990-877 (Sheet 1 of 7)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
191	FINE RAD ALT 2 = XXXX. FEET	FINE RAD ALT 2 FAILURE	NULL TESTED TO BE <±10 FT.	FAILED RAD ALT-2 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/46, 47 J103A/55, 56	34-45-02 34-45-02
192	ELEV SYNC A = XX.XX DEGREES	ELEV SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
193	ELEV SYNC B = XX.XX DEGREES	ELEV SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
194	AIL SYNC A = XX.XX DEGREES	AIL SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED AIL SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
195	AIL SYNC B = XX.XX DEGREES	AIL SYNC B FAILURE	NULL TESTED TO BE <±1°.	FAILED AIL SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
196	RUD SYNC A = XX.XX DEGREES	RUD SYNC A FAILURE	NULL TESTED TO BE <±1°.	FAILED RUD SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
197	RUD SYNC B = XX.XX DEGREES	RUD SYNC B FAILURE	NULL TESTED TO BE <±1°.	FAILED RUD SERVO SYNCRHO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-424/J, S J104B/86, 86	22-13-12 22-13-12
198	YAW DAMP POS = XX.XX DEGREES	YAW DAMP POS FAILURE	NULL TESTED TO BE < ±1°.	FAILED YAW DAMP ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	<0.21 VAC	P10-46/V, W J103B/45, 46	22-13-12 22-13-12
199	MACH TRIM POS = XX.XX INCH	MACH TRIM POS FAILURE	NULL TESTED TO BE < ±.1 INCH.	1 FAILED MACH TRIM ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	>5.0 <6.8 VAC	P10-44/V, W J103B/58, 59	22-21-11 22-21-11
200	ELEV TACH A = XX.XX DEG/SEC	ELEV TACH A FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED ELEV TACH A. FAILED ASSOC. DFGC.	<0.53 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

1 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

BBB2-22-233A

Sequence Four - Sensor Values
Figure 107/22-01-05-990-877 (Sheet 2 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
201	ELEV TACH B = XX.XX DEG/SEC	ELEV TACH B FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED ELEV TACH B. FAILED ASSOC. DFGC.	<0.53 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
202	AIL TACH A = XX.XX DEG/SEC	AIL TACH A FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED A/L TACH A. FAILED ASSOC. DFGC.	<0.68 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
203	AIL TACH B = XX.XX DEG/SEC	AIL TACH B FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED AIL TACH B. FAILED ASSOC. DFGC.	<0.68 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
204	RUD TACH A = XX.XX DEG/SEC	RUD TACH A FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED RUD TACH A. FAILED ASSOC. DFGC.	<0.65 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
205	RUD TACH B = XX.XX DEG/SEC	RUD TACH B FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED RUD TACH B. FAILED ASSOC. DFGC.	<0.65 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
206	A/T TACH = XX.XX DEG/SEC	A/T TACH FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED A/T TACH. FAILED ASSOC. DFGC.	<3.2 VAC	P10-430/M, N J103B/33, 34	22-31-14 22-31-14
207	MACH TRIM TACH = XX.XX IN/SEC	MACH TRIM TACH FAILURE	NULL TESTED TO BE < ±.1 INCH/SEC.	[1] FAILED MACH TRIM TACH. FAILED ASSOC. DFGC.	<0.54 VAC	P10-44/T, U J103B/56, 57	22-21-11 22-21-11
208	YAW DAMP TACH = XX.XX DEG/SEC	YAW DAMP TACH FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED YAW DAMP TACH. FAILED ASSOC. DFGC.	<0.28 VAC	P10-46/T, U J103B/43, 44	22-13-12 22-13-12
209	D3A-X ACCEL A = XX.XX FT/SEC *2	D3A-X ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.[2]	FAILED D3A ACCEL A-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/a, Z J101B/57, 58	22-19-11 22-19-11
210	D3A-X ACCEL B = XX.XX FT/SEC *2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.[2]	FAILED D3A ACCEL B-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
211	D3A-Y ACCEL A = XX.XX FT/SEC *2	D3A-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.[2]	FAILED D3A ACCEL A-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/c, b J101B/61, 62	22-19-11 22-19-11

[1] PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-877 (Sheet 3 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
212	D3A-Y ACCEL B = XX.XX FT/SEC **2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/V, U J104B/61, 62	22-19-11 22-19-11
213	D3A-Z ACCEL A = XX.XX FT/SEC **2	D3A-Z ACCEL A FAILURE	NULL TESTED TO BE −32 ±1.61 FT/SEC**2.	FAILED D3A ACCEL A-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
214	D3A-Z ACCEL B = XX.XX FT/SEC **2	D3A-Z ACCEL B FAILURE	NULL TESTED TO BE −32 ±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
215	DLA-Y ACCEL A = XX.XX FT/SEC **2	DLA-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-412/S, b J101B/59, 60	22-19-11 22-19-11
216	DLA-Y ACCEL B = XX.XX FT/SEC **2	DLA-Y ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-413/V, U J104B/59, 60	22-19-11 22-19-11
217	G/S DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 1.	NOT A TEST	N/A	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
218	G/S DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 2.	NOT A TEST	N/A	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
219	VOR/LOC DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
220	VOR/LOC DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
221	LEFT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS LEFT ELEVATOR POS.	NOT A TEST	N/A	P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
222	RIGHT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS RIGHT ELEVATOR POS.	NOT A TEST	N/A	P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-877 (Sheet 4 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
223	LEFT AILERON XX.XX DEG	NOT A TEST	DISPLAYS LEFT AILERON POS.	NOT A TEST	N/A	P10-396/3, 4, 5 J101B/49,50, 51	22-12-11 22-12-11
224	RUDDER POS = XX.XX DEG	NOT A TEST	DISPLAYS RUDDER POS.	NOT A TEST	N/A	P10-429/3, 4, 5 J104B/46, 47,48	22-13-11 22-13-11
225	HOR STAB = XX.XX DEG	NOT A TEST	DISPLAYS HOR STAB POS.	NOT A TEST	N/A	P10-418/3, 4, 5 J104B/43, 44, 45	22-11-11 22-11-11
226	ANGLE OF ATT -1 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-1.	NOT A TEST	N/A	P1-648/M, N, P J101B/26, 27, 28	22-31-11 22-31-11
227	ANGLE OF ATT -2 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-2.	NOT A TEST	N/A	P1-649/M, N, P J104B/26, 27, 28	22-31-11 22-31-11
228	EPR LEFT = X.XXX EPR	NOT A TEST	DISPLAYS LEFT EPR TRANSMITTER.	NOT A TEST	N/A	P1-613/D, E, F J101B/32, 33, 34	34-18-12 34-18-12
229	EPR RIGHT = X.XXX EPR	NOT A TEST	DISPLAYS RIGHT EPR TRANSMITTER.	NOT A TEST	N/A	P1-614/D, E, F J104B/32, 33, 34	34-18-12 34-18-12
230	HEADING 1 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-1 DATA.	NOT A TEST	N/A	P10-432/q, r, w J101B/15, 16, 17	34-22-03 34-22-03
231	HEADING 2 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-2 DATA.	NOT A TEST	N/A	P10-410/q, r, s J104B/15, 16, 17	34-22-04 34-22-04
232	LEFT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS LEFT FLAP POSITION.	NOT A TEST	N/A	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
233	RIGHT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS RIGHT FLAP POSITION.	NOT A TEST	N/A	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-877 (Sheet 5 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
234	FLAP HANDLE = XX.XX DEGREES	NOT A TEST	DISPLAYS FLAP HANDLE POSITION.	NOT A TEST	N/A	T2-10/1,2,3 J104B/40, 41, 42	22-31-11 22-31-11
235	CADC-T ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
236	CADC-N ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS NON-ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
237	CADC-T TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS ASSOC. CADC TAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
238	CADC-N TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS NON-ASSOC. TAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
239	CADC-T ALT RATE= XX.XX FT/SEC	NOT A TEST	DISPLAYS ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
240	CADC-N ALT RATE= XX.XX FT/SEC	NOT A TEST	DISPLAYS NON-ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
241	CADC-T SAT = XX.XX DEGREES	NOT A TEST	VERIFIES ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
242	CADC-N SAT = XX.XX DEGREES	NOT A TEST	VERIFIES NON-ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
243	CADC-T CAS = XXX.X KNOT	NOT A TEST	VERIFIES ASSOC. CADC CAS.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
244	CADC-N CAS = XXX.X KNOT	NOT A TEST	VERIFIES NON-ASSOC. CAS.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J101A/92, 93	34-16-12 34-16-12

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

BBB2-22-237A

Sequence Four - Sensor Values
Figure 107/22-01-05-990-877 (Sheet 6 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
245	CADC-T MACH= X.XXXX MACH	NOT A TEST	DISPLAYS ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40 J101A/92, 93	34-16-12 34-16-12
246	CADC-N MACH= X.XXXX MACH	NOT A TEST	DISPLAYS NON-ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/61, 62, R50-283B/61,62 J104A/92, 93	34-16-12 34-16-12
551 (1)	CAPT PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -1	NOT A TEST	N/A	N/A	
552 (1)	F/O PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -2	NOT A TEST	N/A	N/A	
*247	SET BAROMETER TO 26.00-VERIFY	ALT CORRECTION FAILURE	CHECKS BARO SET TO 26.00	BARO POT FAILURE ASSOC. DFGC. FAILURE	9.8 V 5.12 V	J102B/75, 79 J102B/79	

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

(1) -973 AND SUBSEQUENT IF MABH OPTION SELECTED.

*IF DISPLAY OPTION SELECTED, TEST MESSAGE IS "ALT CORRECTION = ± XXXX.X FEET"
TEST DESCRIPTION IS: DISPLAYS QNH CORRECTED ALTITUDE.

CAG(IGDS)

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-877 (Sheet 7 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
249	EPR SEL LITE A AND B — VERIFY	EPR SEL LITE A AND B FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
250	ART INOP LITE - VERIFY	ART INOP LITE FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
251	ALT ADV LITE 1 - VERIFY	ALT ADV LITE 1 FAILURE	VERIFIES ALT ADV LITE 1 FLASHES	FAILED ADVISORY LITE 1. DIM AND TEST UNIT 3 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G P1-609/14, 13 J101A/54	34-17-11 34-17-11 34-17-11
252	ALT ADV LITE 2 - VERIFY	ALT ADV LITE 2 FAILURE	VERIFIES ALT ADV LITE 2 FLASHES	FAILED ADVISORY LITE 2. DIM AND TEST UNIT 4. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-381/G P1-643/14, 13 J104A/54	34-17-11 34-17-11 34-17-11
253	ALT SELECT APPR - VERIFY	ALT SELECT APPR FAILURE	TOGGLES ALTITUDE APPROACH TONE (HORN ONLY)	FAILED CAWS. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G, R5-418A/59 J102B/42	34-17-11 34-17-11
254	ALT SELECT DEV - VERIFY	ALT SELECT DEV FAILURE	TOGGLES ALTITUDE DEVIATION WARNING (HORN AND VOICE)	FAILED CAWS. FAILED ASSOC. DFGC.	GND	R5-418A/8, 59 J102B/42, 43	34-17-11 34-17-11
255	TR EPR VALID - VERIFY	TR EPR VALID FAILURE	RETRACTS TR EPR FLAG OUT OF VIEW	FAILED TR EPR INDICATOR (FLAG) FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/T J103A/104	34-18-12 34-18-12
256	TR NO MODE LITE — VERIFY	TR NO MODE LITE — FAILURE	VERIFIES FLASHING TR NO MODE LITE	FAILED TR NO MODE LITE FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/n J103A/92	34-18-12 34-18-12
257	ART ON LITE - VERIFY	ART ON LITE FAILURE	VERIFIES ART LITE FLASHES ON	FAILED ART ON LITE DIM AND TEST UNIT 5. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-1181/G P1-644/4 J103B/10	73-22-01 73-22-01 73-22-01

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Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-878 (Sheet 1 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
258	ART READY LITE-VERIFY	ART READY LITE FAILURE	VERIFIES ART READY LITE FLASHES.	FAILED ART READY LITE DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P1-1181/14 P1-607/22 J103B/66	73-22-01 73-22-01 73-22-01
259	NO AUTOLAND LITE A — VERIFY	NO AUTOLAND LITE A FAILURE	VERIFIES NO AUTOLAND LITE A (CAPT'S, FMA).	FAILED CAPT'S FMA (NO AUTOLAND LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/K P1-607/15 J101A/61	22-18-11 22-18-11 22-18-11
260	NO AUTOLAND LITE B — VERIFY	NO AUTOLAND LITE B FAILURE	VERIFIES NO AUTOLAND LITE B (F/O'S FMA).	FAILED F/O'S FMA (NO AUTOLAND LITE B). DIM AND TEST UNIT 2 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-402/K/P10-403/P P1-608/15 J104A/61	22-18-11 22-18-11 22-18-11
261	A/P TRIM LITE A — VERIFY	A/P TRIM LITE A FAILURE	VERIFIES A/P TRIM LITE A (CAPT'S FMA).	FAILED CAPT'S FMA (A/P TRIM LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/L P1-607/18 J101A/62	22-18-11 22-18-11 22-18-11
262	A/P TRIM LITE B — VERIFY	A/P TRIM LITE B FAILURE	VERIFIES A/P TRIM LITE B (F/O'S FMA).	FAILED F/O'S FMA (A/P TRIM LITE B). DIM AND TEST UNIT 2. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28VDC	P10-402/L P1-608/18 J104A/62	22-18-11 22-18-11 22-18-11
263	VERT SPD DETENT-VERIFY	VERT SPD DETENT FAILURE	VERIFIES VERT SPD DETENT	FAILED DFGCP (PITCH WHEEL CLUTCH) FAILED ASSOC. DFGC.	28 VDC	P10-411/f J103A/77	22-11-11 22-11-11
264	IAS BUG 1 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 1 TO 250 KIAS	FAILED CAPT'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-382/a, Y J102A/43, 44	22-31-14 22-31-14
265	IAS BUG 2 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 2 TO 250 KIAS	FAILED F/O'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-383/a, Y J103A/43, 44	22-31-14 22-31-14

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Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-878 (Sheet 2 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
266	EPR BUG LEFT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES LEFT EPR BUG TO EPR = 1.8	FAILED LEFT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-611/P, N J102A/46, 47	34-18-12 34-18-12
267	EPR BUG RIGHT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES RIGHT EPR BUG TO EPR = 1.8	FAILED RIGHT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-612/P, N J103A/46, 47	34-18-12 34-18-12
268	EPR LIMIT CMD 1.8 EPR — VERIFY	EPR LIMIT CMD FAILURE	DRIVES EPR LIMIT CMD TO EPR = 1.8	FAILED EPR LIMIT DISPLAY ON TRI FAILED ASSOC. DFGC.	12.97 VDC	P1-627/B, r J102A/49, 50	34-18-12 34-18-12
269	CAPT F/D SW ON — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN ON POSITION.	FAILED CAPT'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
270	CAPT F/D LITE ON — VERIFY ⚠1	CAPT F/D LITE ON FAILURE	VERIFIES CAPT'S FMA FD ANNUNCIATOR.	FAILED CAPT'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/M P1-607/19, 25 J102B/25	22-17-11 22-17-11 22-17-11
271	CAPT PITCH FD CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO CENTER	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
272	CAPT PITCH FD NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO NOSE UP.	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
273	CAPT ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S ROLL COMMAND TO CENTER.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
274	CAPT ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S TO ROLL COMMAND RIGHT.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
275	CAPT F/D SW OFF — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN OFF POSITION.	FAILED CAPT'S FD SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
276	F/O F/D SW ON — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN ON POSITION.	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11

⚠1 IF F/D BLUE LIGHT OBLITERATED PRESS VERIFY AND CONTINUE.

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Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-878 (Sheet 3 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
277	F/O F/D LITE ON — VERIFY [2]	F/O F/D LITE ON FAILURE	VERIFIES F/O'S FMA FD ANNUNCIATOR.	FAILED F/O'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATE BETWEEN GND & 28VDC	P10-402/M P1-6441/19,25 J103A/25	22-17-11 22-17-11 22-17-11
278	F/O PITCH F/D CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
279	F/O PITCH F/D NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO NOSE UP.	FAILED F/O'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
280	F/O ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
281	F/O ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND RIGHT.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
282	F/O F/D SW OFF — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN OFF POSITION	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11
283	FAST/SLOW 1 VALID — VERIFY	FAST/SLOW 1 VALID FAILURE	TOGGLES FAST/SLOW VALID ON CAPT'S ADI.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-257/A J101A/55	22-31-13 22-31-13
284	FAST/SLOW 2 VALID — VERIFY	FAST/SLOW 2 VALID FAILURE	TOGGLES FAST/SLOW VALID ON F/O'S ADI.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-262/A J104A/55	22-31-13 22-31-13
285	BOTH SPEED CMDS CENTER — VERIFY	F/S CMD FAILURE	COMMANDS CAPT'S AND F/O'S SPD CMD BUG TO CENTER.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62 [1]	22-31-13 22-31-13
286	BOTH SPEED CMDS UP — VERIFY	F/S CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG UP.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	+1.18 VDC	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62 [1]	22-31-13 22-31-13

[1] J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW-FAST-2S.

[2] IF F/D BLUE LIGHT OBLITERATED PRESS VERIFY AND CONTINUE.

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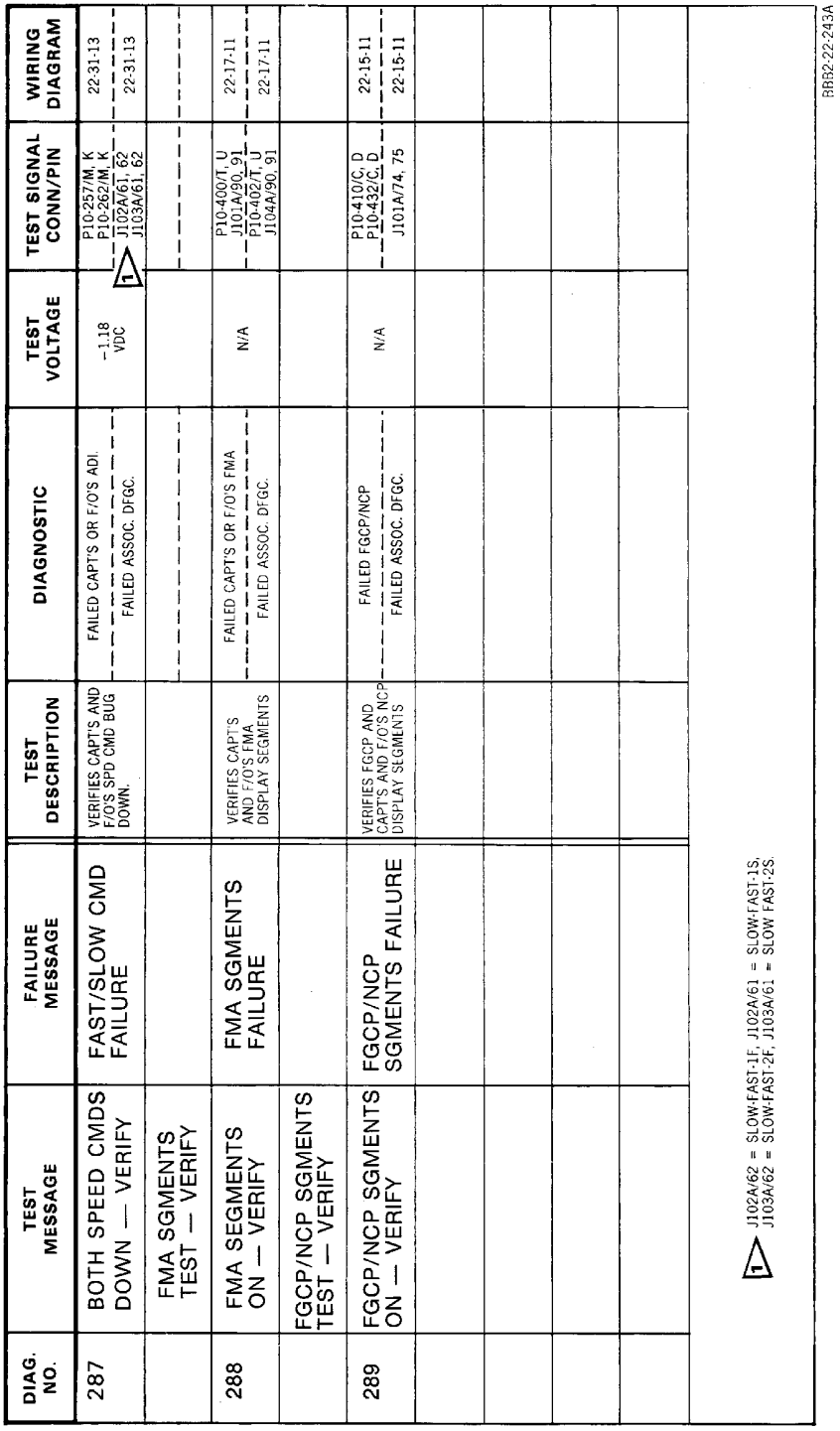
Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-878 (Sheet 4 of 5)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
287	BOTH SPEED CMDS DOWN — VERIFY	FAST/SLOW CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG DOWN.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	−1.18 VDC	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62	22-31-13 22-31-13
	FMA SGMENTS TEST — VERIFY						
288	FMA SEGMENTS ON — VERIFY	FMA SGMENTS FAILURE	VERIFIES CAPT'S AND F/O'S FMA DISPLAY SEGMENTS	FAILED CAPT'S OR F/O'S FMA FAILED ASSOC. DFGC.	N/A	P10-400/T, U J101A/90, 91 P10-402/T, U J104A/90, 91	22-17-11 22-17-11
	FGCP/NCP SGMENTS TEST — VERIFY						
289	FGCP/NCP SGMENTS ON — VERIFY	FGCP/NCP SGMENTS FAILURE	VERIFIES FGCP AND CAPT'S AND F/O'S NCP DISPLAY SEGMENTS	FAILED FGCP/NCP FAILED ASSOC. DFGC.	N/A	P10-410/C, D P10-432/C, D J101A/74, 75	22-15-11 22-15-11

1. J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
   J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW FAST-2S.

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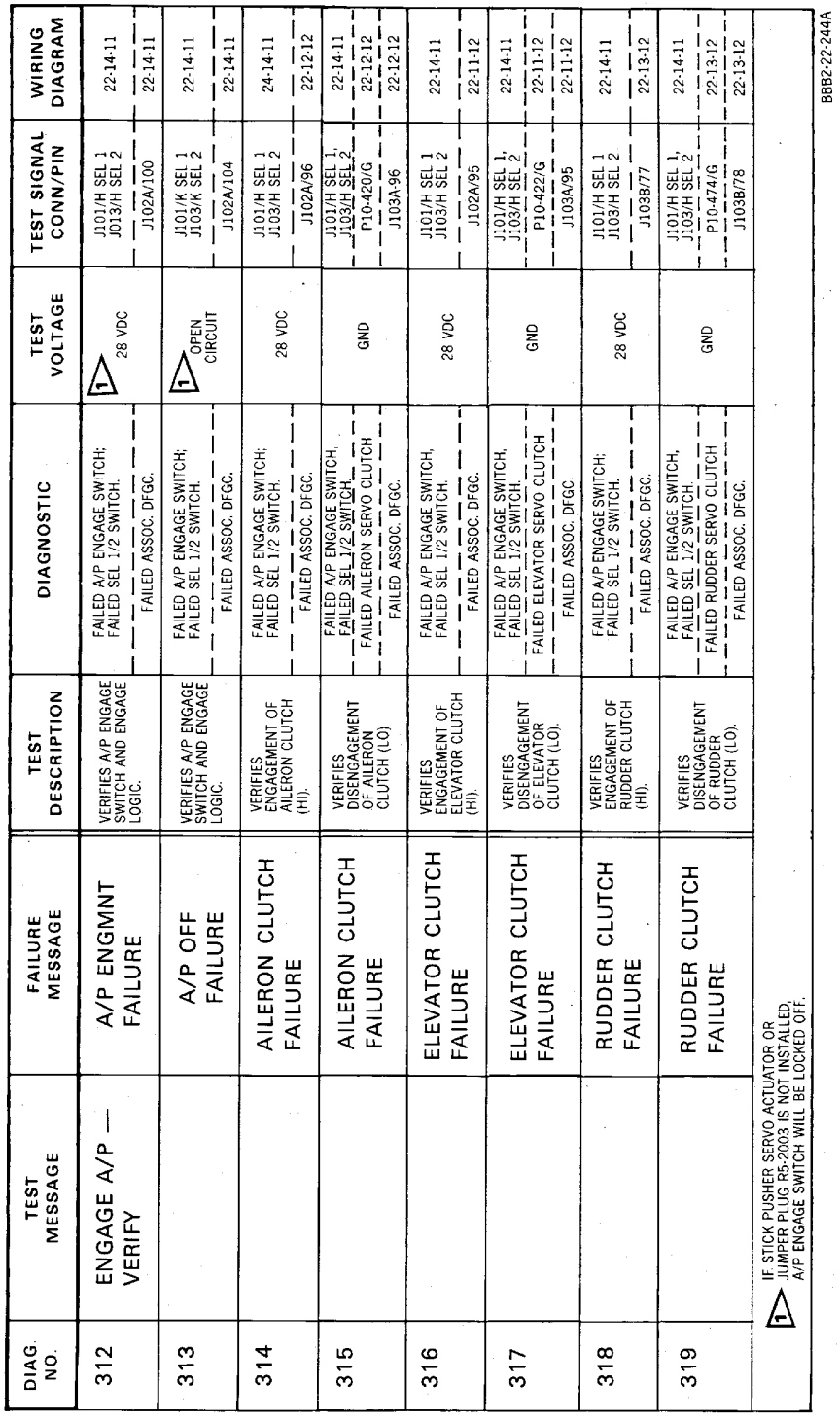
Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-878 (Sheet 5 of 5)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
312	ENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 28 VDC	J101/H SEL 1 J013/H SEL 2 J102A/100	22-14-11 22-14-11
313		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 OPEN CIRCUIT	J101/K SEL 1 J103/K SEL 2 J102A/104	22-14-11 22-14-11
314		AILERON CLUTCH FAILURE	VERIFIES ENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/96	24-14-11 22-12-12
315		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO)	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
316		ELEVATOR CLUTCH FAILURE	VERIFIES ENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/95	22-14-11 22-11-12
317		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-422/G J103A/95	22-14-11 22-11-12 22-11-12
318		RUDDER CLUTCH FAILURE	VERIFIES ENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J103B/77	22-14-11 22-13-12
319		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12

1 IF STICK PUSHER SERVO ACTUATOR OR JUMPER PLUG R5-2003 IS NOT INSTALLED, A/P ENGAGE SWITCH WILL BE LOCKED OFF.

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Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-879 (Sheet 1 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
320	FMA-1 A/P LITE ON FAILURE	FMA-1 A/P LITE OFF FAILURE	VERIFIES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR; FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-1.	GND	J101/N P1-644/16 J102B/24	22-17-11 22-17-11 22-17-11
321	FMA-2 A/P LITE ON FAILURE	FMA-2 A/P LITE OFF FAILURE	VERIFIES FMA A/P-2 ANNUNCIATOR.	FAILED FMA A/P-2 ANNUNCIATOR; FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-2.	GND	J101/P P1-644/20 J102B/24	22-17-11 22-17-11 22-17-11
322	ENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE AND ENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	P10-432/P J103B/26	22-31-12 22-31-12
323	ENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH. FAILED ASSOC. DFGC.	GND	S10-194 J103B/8	22-13-12 22-13-12
324	Y/D OFF LITE OFF — VERIFY	Y/D OFF LITE OFF FAILURE	VERIFIES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE. FAILED ASSOC. DFGC.	28 VDC	P1-119/c J103B/B	22-13-12 33-12-00 22-13-12
325	RCVRS TO ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 TUNING TO ILS FREQUENCY.	FAILED NAV 1 RCVR. FAILED CAPT'S NCP. FAILED ASSOC. DFGC.	28 VDC	R50-319B/38 P10-407/f J101A/17	34-26-02 34-31-01 34-26-02
326		NAV 2 TUNING FAILURE	VERIFIES NAV 2 TUNING TO ILS FREQUENCY.	FAILED NAV 2 RCVR. FAILED F/O'S NCP. FAILED ASSOC. DFGC.	28 VDC	R50-320B/38 P10-409/f J104A/17	34-26-02 34-31-02 34-26-02

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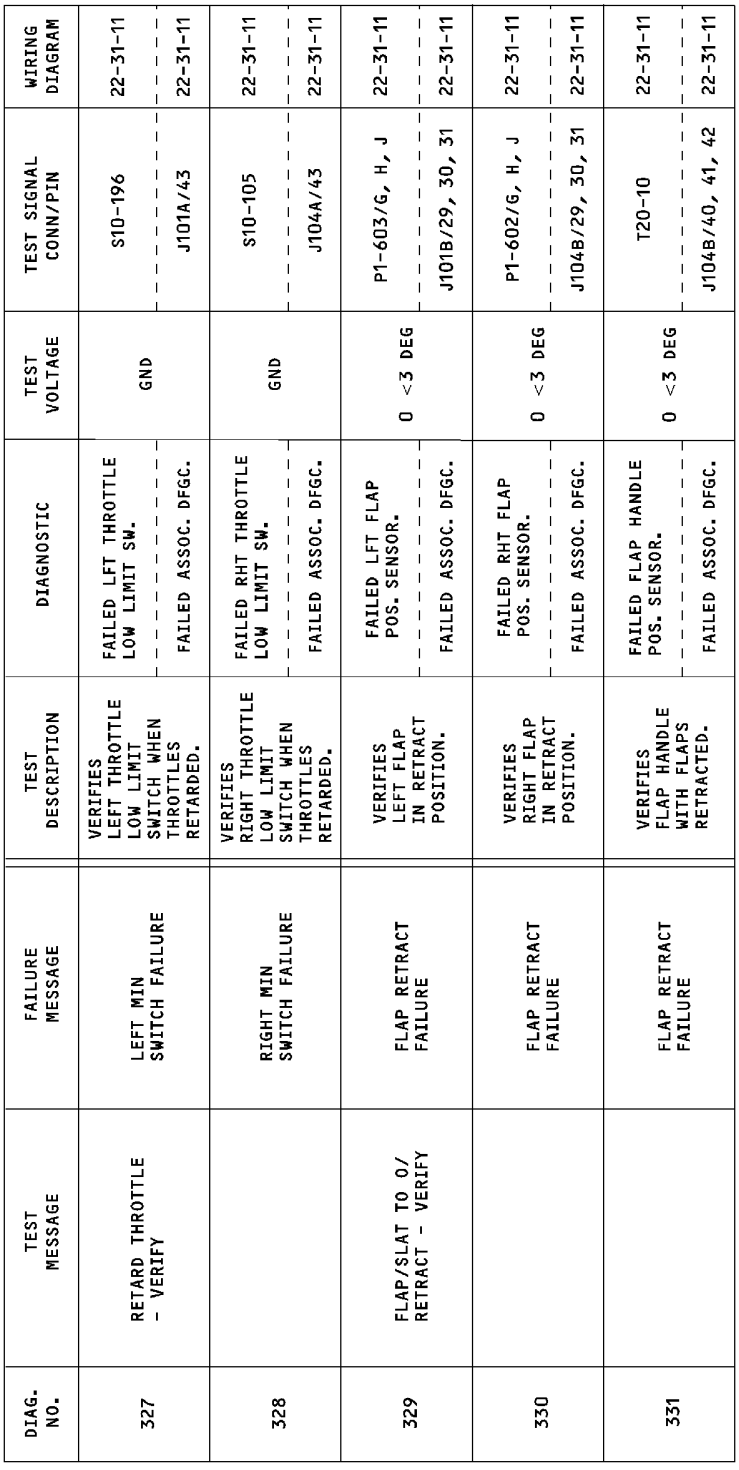
Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-879 (Sheet 2 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
327	RETARD THROTTLE - VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED LFT THROTTLE LOW LIMIT SW.	GND	S10-196	22-31-11
				FAILED ASSOC. DFGC.		J101A/43	22-31-11
328		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED RHT THROTTLE LOW LIMIT SW.	GND	S10-105	22-31-11
				FAILED ASSOC. DFGC.		J104A/43	22-31-11
329	FLAP/SLAT TO 0/ RETRACT - VERIFY	FLAP RETRACT FAILURE	VERIFIES LEFT FLAP IN RETRACT POSITION.	FAILED LFT FLAP POS. SENSOR.	0 <3 DEG	P1-603/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J101B/29, 30, 31	22-31-11
330		FLAP RETRACT FAILURE	VERIFIES RIGHT FLAP IN RETRACT POSITION.	FAILED RHT FLAP POS. SENSOR.	0 <3 DEG	P1-602/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J104B/29, 30, 31	22-31-11
331		FLAP RETRACT FAILURE	VERIFIES FLAP HANDLE WITH FLAPS RETRACTED.	FAILED FLAP HANDLE POS. SENSOR.	0 <3 DEG	T20-10	22-31-11
				FAILED ASSOC. DFGC.		J104B/40, 41, 42	22-31-11

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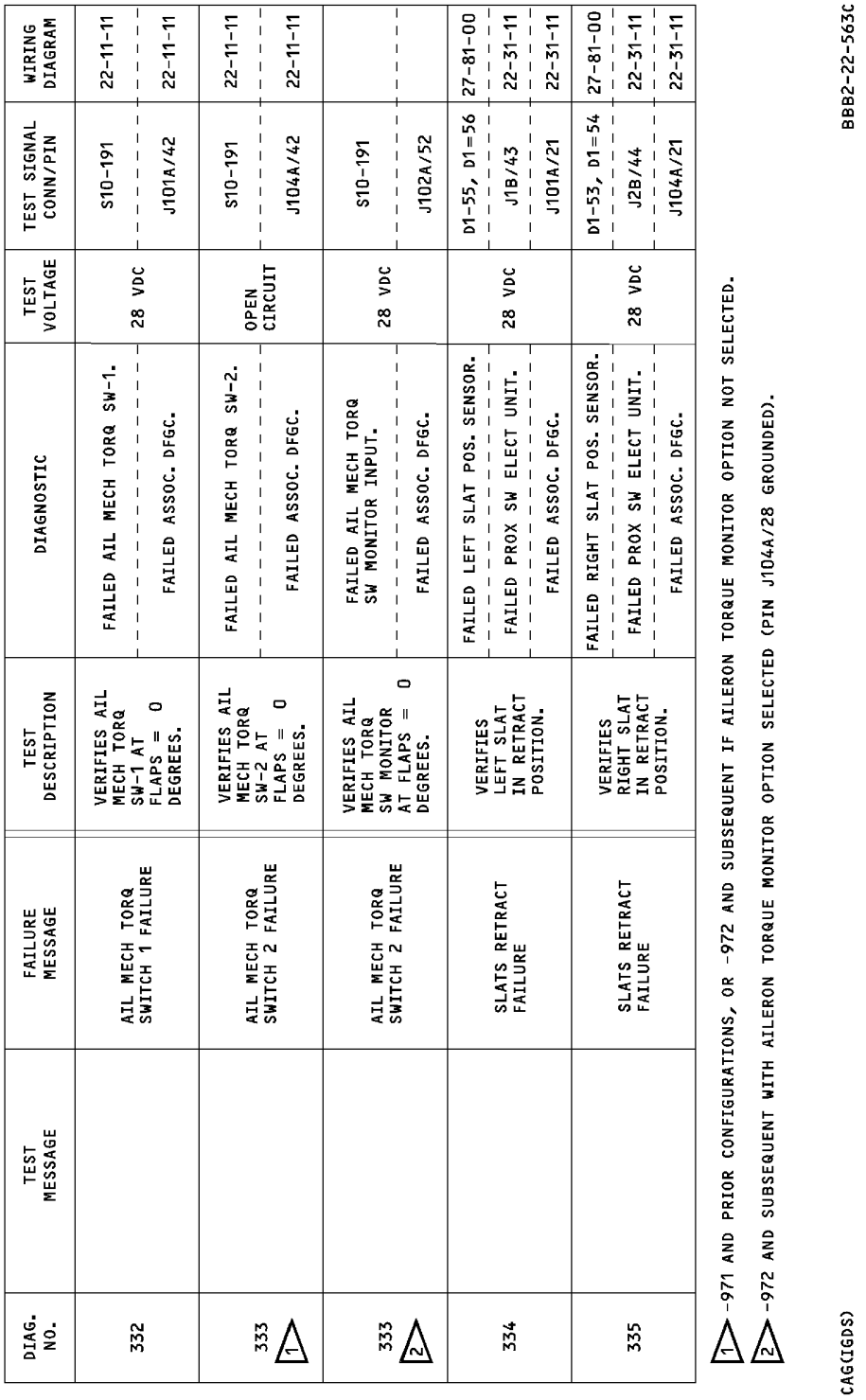
Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-879 (Sheet 3 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
332		AIL MECH TORQ SWITCH 1 FAILURE	VERIFIES AIL MECH TORQ SW-1 AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SW-1.	28 VDC	S10-191	22-11-11
				FAILED ASSOC. DFGC.		J101A/42	22-11-11
333 1		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW-2 AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SW-2.	OPEN CIRCUIT	S10-191	22-11-11
				FAILED ASSOC. DFGC.		J104A/42	22-11-11
333 2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW MONITOR AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SW MONITOR INPUT.	28 VDC	S10-191	
				FAILED ASSOC. DFGC.		J102A/52	
334		SLATS RETRACT FAILURE	VERIFIES LEFT SLAT IN RETRACT POSITION.	FAILED LEFT SLAT POS. SENSOR.	28 VDC	D1-55, D1=56	27-81-00
				FAILED PROX SW ELECT UNIT.		J1B/43	22-31-11
				FAILED ASSOC. DFGC.		J101A/21	22-31-11
335		SLATS RETRACT FAILURE	VERIFIES RIGHT SLAT IN RETRACT POSITION.	FAILED RIGHT SLAT POS. SENSOR.	28 VDC	D1-53, D1=54	27-81-00
				FAILED PROX SW ELECT UNIT.		J2B/44	22-31-11
				FAILED ASSOC. DFGC.		J104A/21	22-31-11

1 -971 AND PRIOR CONFIGURATIONS, OR -972 AND SUBSEQUENT IF AILERON TORQUE MONITOR OPTION NOT SELECTED.
2 -972 AND SUBSEQUENT WITH AILERON TORQUE MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

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Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-879 (Sheet 4 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
336		RTS SLATS FAILURE	COMPARES LEFT AND RIGHT SLATS DURING RTS TEST.	FAILED LEFT SLAT POS. SENSOR. FAILED RIGHT SLAT POS. SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	N/A	D1-55, D1-56 D1-53, D1-54 J1B/43, J2B/44 J101A/21, J104A/21	27-81-00 27-81-00 22-31-11 22-31-11
337		RTS FLAPS FAILURE	VERIFIES LEFT AND RIGHT FLAPS DURING RTS TEST.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	N/A	T2-98 J101B/29, 30, 31	22-31-11 22-31-11
338	FLAPS/SLAT TO 11/ MID 1 — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAP AT 11 DEG.	FAILED LEFT FLAP SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
339		FLAP POS FAILURE	VERIFIES RIGHT FLAP AT 11 DEG.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11
340		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 11 DEG.	FAILED FLAP HANDLE SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	T20-10 J104B/40, 41, 42	22-31-11 22-31-11
341		SLAT POS FAILURE	VERIFIES LEFT SLAT AT MID POSITION.	FAILED LEFT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 J1B/44 J101A/20	27-81-00 22-31-11 22-31-11
342		SLAT POS FAILURE	VERIFIES RIGHT SLAT AT MID POSITION.	FAILED RIGHT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 J2B/44 J104A/20	27-81-00 22-31-11 22-31-11
343	FLAP/SLAT TO28/ EXTEND — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER L (T2-97). FAILED ASSOC. DFGC.	28 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
344		FLAP POS FAILURE	VERIFIES RIGHT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER R (T2-98). FAILED ASSOC. DFGC.	28 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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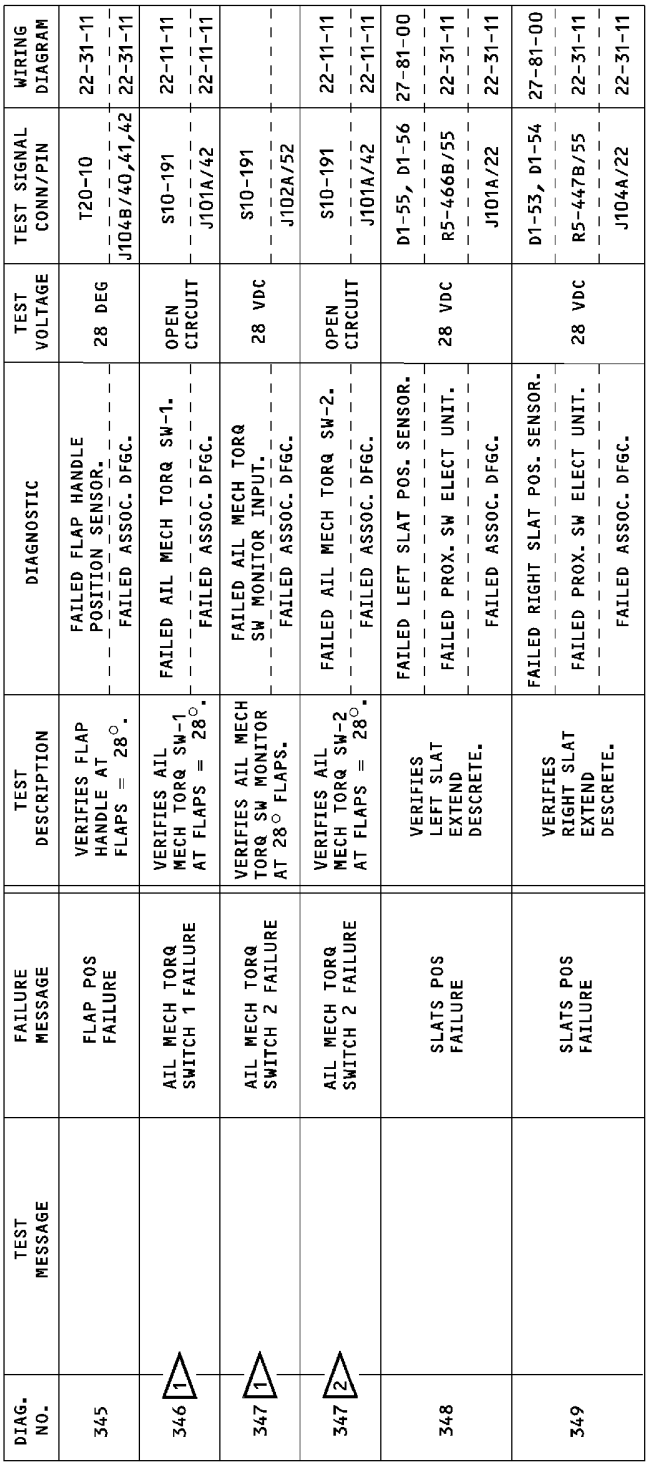
Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-879 (Sheet 5 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
345		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 28°.	FAILED FLAP HANDLE POSITION SENSOR. FAILED ASSOC. DFGC.	28 DEG	T20-10 J104B/40,41,42	22-31-11 22-31-11
346 △1		AIL MECH TORQ SWITCH 1 FAILURE	VERIFIES AIL MECH TORQ SW-1 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-1. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 △1		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW MONITOR AT 28° FLAPS.	FAILED AIL MECH TORQ SW MONITOR INPUT. FAILED ASSOC. DFGC.	28 VDC	S10-191 J102A/52	
347 △2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW-2 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
348		SLATS POS FAILURE	VERIFIES LEFT SLAT EXTEND DESCRETE.	FAILED LEFT SLAT POS. SENSOR. FAILED PROX. SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 R5-466B/55 J101A/22	27-81-00 22-31-11 22-31-11
349		SLATS POS FAILURE	VERIFIES RIGHT SLAT EXTEND DESCRETE.	FAILED RIGHT SLAT POS. SENSOR. FAILED PROX. SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 R5-447B/55 J104A/22	27-81-00 22-31-11 22-31-11

△1 RUN DURING MAINTENANCE TEST ONLY, FOR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

△2 -971 AND PRIOR CONFIGURATIONS, OR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION NOT SELECTED (PIN J104A/28 OPEN).

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Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-879 (Sheet 6 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
350	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
351	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
352	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
353	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
354	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
355	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
356	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
357	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320B/39, 40 J014B/67, 68	34-26-02 34-26-02
358	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID A IS CLEARED AT SELF-TEST.	SHORTED D3A-A ACCEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P, Z J101A/24	22-19-11 22-19-11
359	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-X ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-114/Z, a J101B/57, 58	22-19-11 22-19-11

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Sequence Seven - Self Tests
Figure 110/22-01-05-990-880 (Sheet 1 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
360	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
361	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B/61, 62	22-19-11 22-19-11
362	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P J101A/24	22-19-11 22-19-11
363	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-414/X, Y J104B/61, 62	22-19-11 22-19-11
364	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA VALID A IS CLEARED AT SELF-TEST.	SHORTED DLA-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-412/P J101A/37	22-19-11 22-19-11
365	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA ACCEL A BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED DLA-A ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B59, 60	22-11-19 22-11-19
366	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
367	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-BX VALID. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
368	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	34-45-02 34-45-02

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Sequence Seven - Self Tests
Figure 110/22-01-05-990-880 (Sheet 2 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
369	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/U, V J104B/61, 62	22-19-11 22-19-11
370	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
371	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
372	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA VALID B IS CLEARED AT SELF-TEST.	SHORTED DLA-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-413/L J104A/37	22-19-11 22-19-11
373	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA ACCEL B BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED DLA-B ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-413/U, V J104B/59, 60	22-19-11 22-19-11
374	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-1 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/12 J101A/26	34-45-01 34-45-01
375	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/22, 23 J101B/55, 56	34-45-01 34-45-01
376	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-1 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/57 J101A/39	34-45-01 34-45-01
377	TEST IN PROGESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/46, 47 J102A/55, 56	34-45-01 34-45-01

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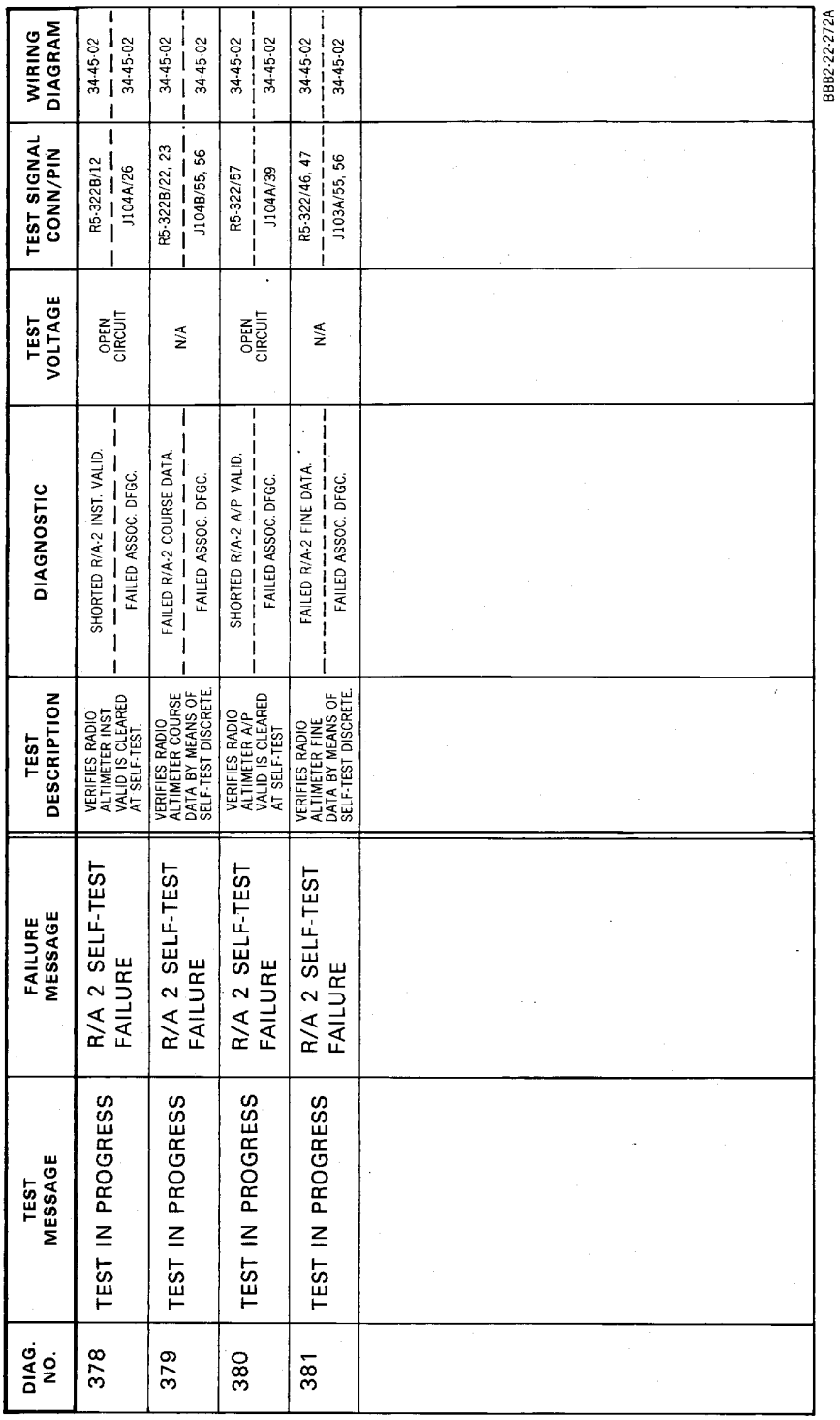
Sequence Seven - Self Tests
Figure 110/22-01-05-990-880 (Sheet 3 of 4)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
378	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-2 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322B/12 J104A/26	34-45-02 34-45-02
379	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-322B/22, 23 J104B/55, 56	34-45-02 34-45-02
380	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-2 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322/57 J104A/39	34-45-02 34-45-02
381	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-322/46, 47 J103A/55, 56	34-45-02 34-45-02

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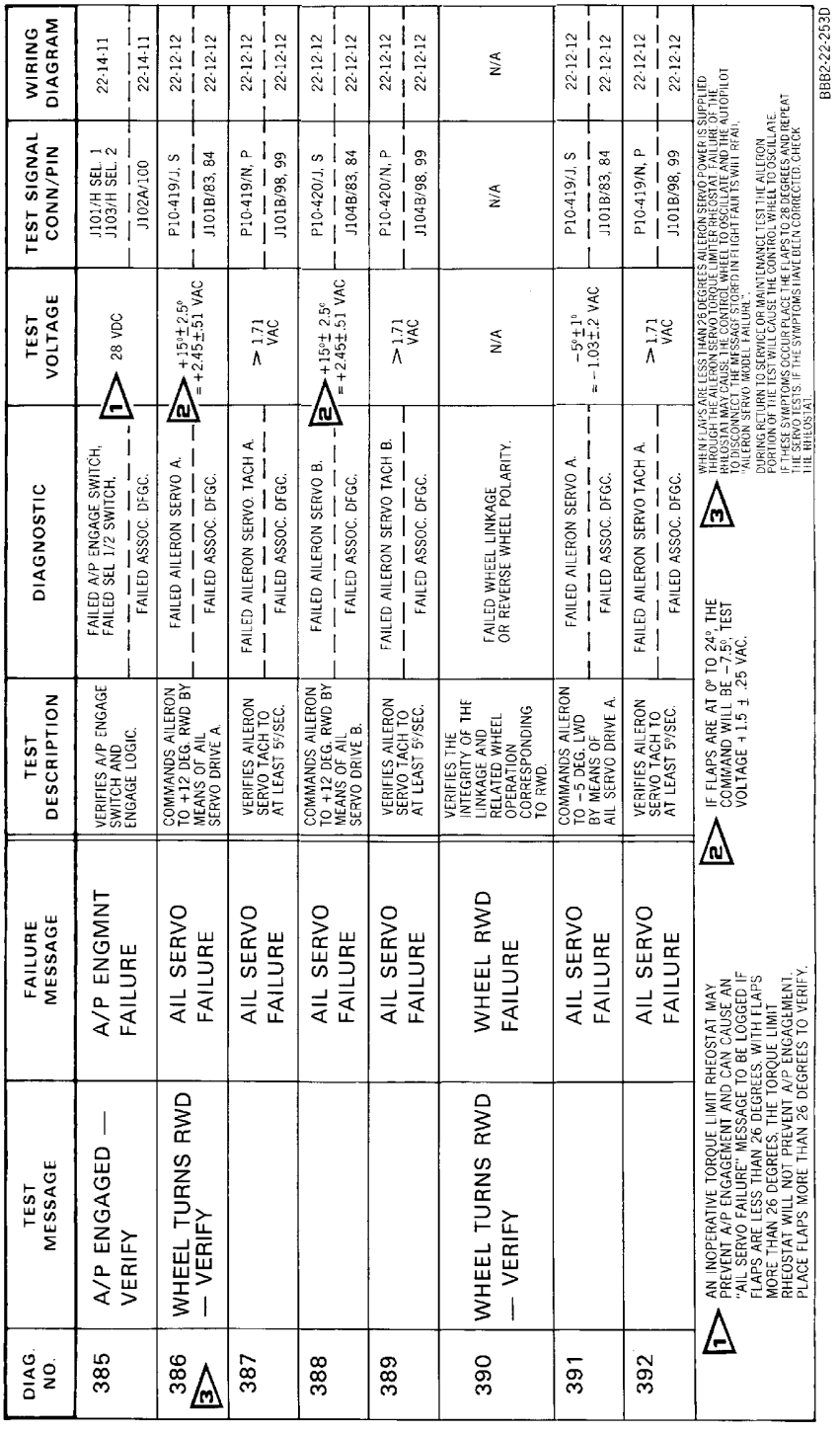
Sequence Seven - Self Tests
Figure 110/22-01-05-990-880 (Sheet 4 of 4)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
385	A/P ENGAGED — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC (1)	J101/H SEL. 1 J103/H SEL. 2 J102A/100	22-14-11 22-14-11
386 (3)	WHEEL TURNS RWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +2.45±.51 VAC (2)	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
387		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
388		AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	+15°± 2.5° = +2.45±.51 VAC (2)	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
389		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
390	WHEEL TURNS RWD — VERIFY	WHEEL RWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO RWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
391		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
392		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12

(1) AN INOPERATIVE TORQUE LIMIT RHEOSTAT MAY PREVENT A/P ENGAGEMENT AND CAN CAUSE AN "AIL SERVO FAILURE" MESSAGE TO BE LOGGED IF FLAPS ARE LESS THAN 26 DEGREES. WITH FLAPS MORE THAN 26 DEGREES, THE TORQUE LIMIT RHEOSTAT WILL NOT PREVENT A/P ENGAGEMENT. PLACE FLAPS MORE THAN 26 DEGREES TO VERIFY.

(2) IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5° TEST VOLTAGE + 1.5 ± .25 VAC.

(3) WHEN FLAPS ARE LESS THAN 26 DEGREES AILERON SERVO POWER IS SUPPLIED THROUGH THE AILERON SERVO TORQUE LIMITER RHEOSTAT. FAILURE OF THE RHEOSTAT MAY CAUSE THE CONTROL WHEEL TO OSCILLATE AND THE AUTOPILOT TO DISCONNECT. THE MESSAGE STORED IN FLIGHT FAULTS WILL REAL AILERON SERVO MODEL FAILURE.
DURING RETURN TO SERVICE OR MAINTENANCE TEST, THE AILERON POWER MAY BE TURNED OFF TO ISOLATE THE CONTROL WHEEL OSCILLATE. IF THESE SYMPTOMS OCCUR PLACE THE FLAPS TO 26 DEGREES AND REPEAT THE SERVO TESTS. IF THE SYMPTOMS HAVE BEEN CORRECTED, CHECK THE RHEOSTAT.

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Sequence Eight - Servo Tests
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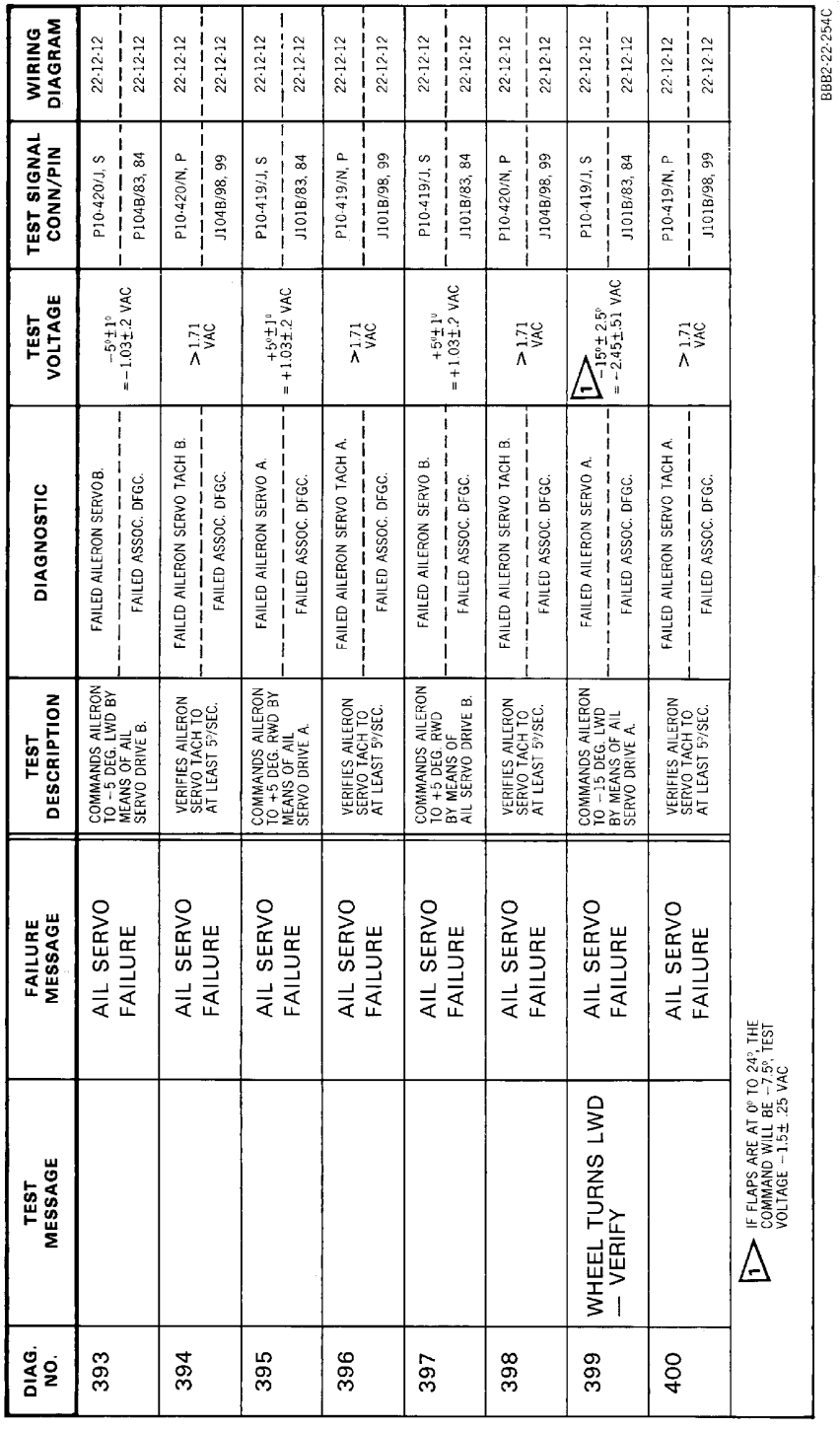

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
393		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-420/J, S P104B/83, 84	22-12-12 22-12-12
394		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
395		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
396		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
397		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
398		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
399	WHEEL TURNS LWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	1 −15°± 2.5° = −2.45±.51 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
400		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE −1.5± .25 VAC

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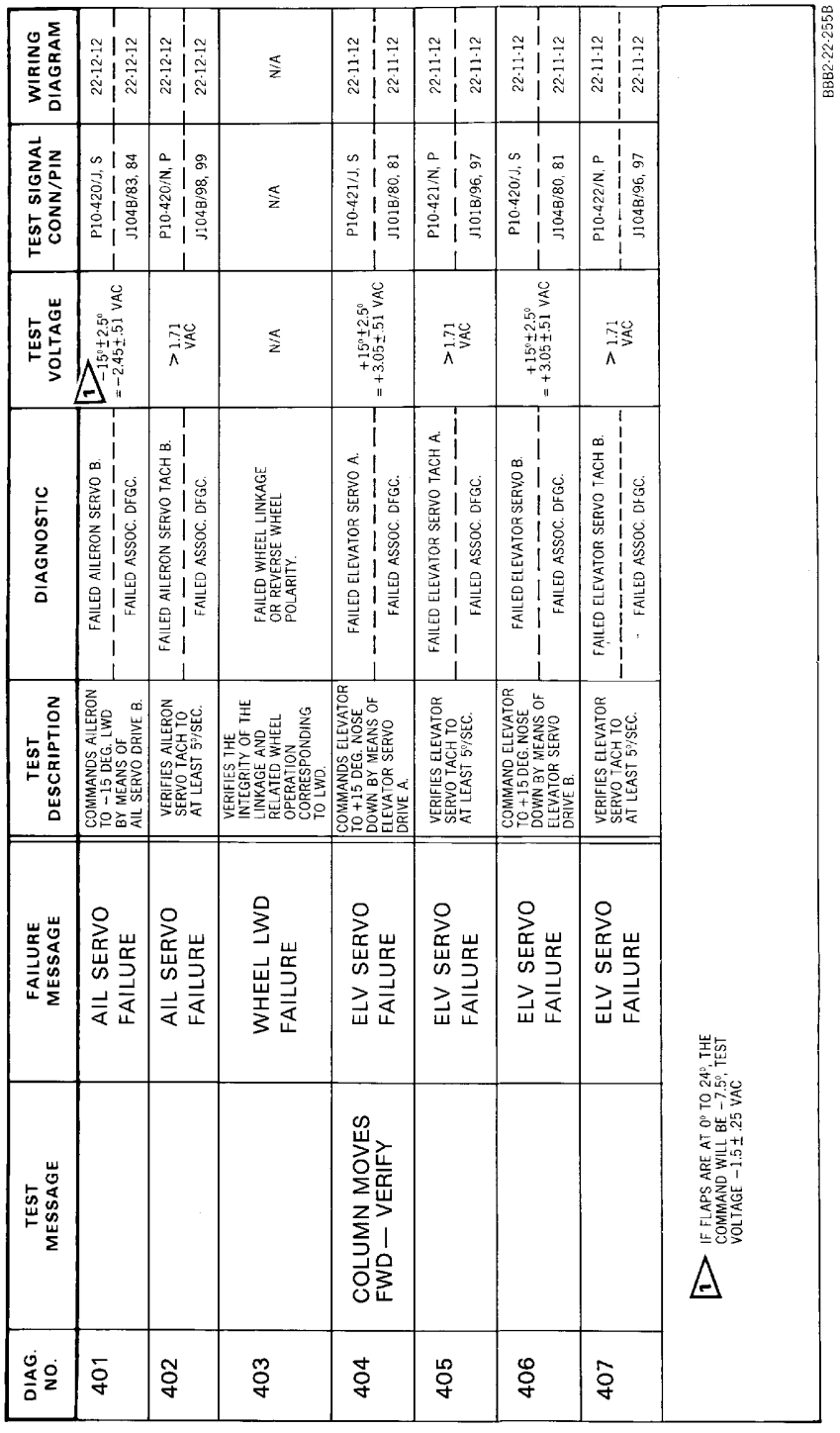
Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 2 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
401		AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	1 −15°±2.5° = −2.45±.51 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
402		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
403		WHEEL LWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO LWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
404	COLUMN MOVES FWD — VERIFY	ELV SERVO FAILURE	COMMANDS ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
405		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
406		ELV SERVO FAILURE	COMMAND ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-420/J, S J104B/80, 81	22-11-12 22-11-12
407		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°; TEST VOLTAGE −1.5 ± .25 VAC

BBB2-22-255B

Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 3 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
408		COLUMN FWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE DOWN.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A
409		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$-5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
410		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
411		ELV SERVO FAILURE	COMMAND ELEVATOR TO -5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	$-5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
412		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
413		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$+5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
414		ELV SERVO FAILURE	VERIFIES SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 4 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
415		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
416		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
417	COLUMN MOVES AFT — VERIFY	ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	-15°±2.5° = -3.05±.51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
418		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
419		ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	-15°±2.5° = -3.05±.51 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
420		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
421		COLUMN AFT FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE UP.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 5 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
422	RHT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMANDS RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	−15°±2.5 = −3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
423		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
424		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	−15°±2.5° = −3.05±.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
425		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
426		RHT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A RIGHT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
427		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
428		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J104B/89, 90	22-13-12 22-13-12

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 6 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
429		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
430		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
431		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO -5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	-5°±1° = -1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
432		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
433		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO -5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	-5°±1° = -1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
434		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
435	LEFT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
436		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 7 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
437		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC DFGC.	+15° ± 2.5° = +3.05 ± 0.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
438		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
439		LEFT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A LEFT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
440	PITCH TRIM NOSE UP - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM UP TO +0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED UP TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB POS SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (+0.8 DEG OF DEVIATION).	R20-12 P10-37/1, 5, 9 T20-8 J102B/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01 27-42-01
441	PITCH TRIM NOSE DN - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM DN TO -0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED DN TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (-0.8 DEG OF DEVIATION).	R20-13 P10-37/3, 7, 11 T20-8 J103A/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01 27-42-01
442	YAW DAMP ON - VERIFY	YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO +1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC DFGC.	+1.4 VAC	S10-194 P10-46/N, W J103B/45, 46	22-13-12 22-13-12 22-13-12

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 8 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
443		YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO -1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC. DFGC.	-1.4 VAC	S10-194 P10-46/V, W J103B/45, 46	22-13-12 22-13-12 22-13-12
444 ⚠1	MACH TRIM NORM — VERIFY	MACH TRIM SERVO FAILURE	COMMANDS MACH TRIM TO +0.9 INCHES.	FAILED MTC SWITCH. ⚠2 FAILED MACH TRIM ACTUATOR. FAILED ASSOC. DFGC.	+9.6 VAC	S10-188 P10-44/V, W J103B/58, 59	22-21-11 22-21-11 22-21-11
445	A/T ENGAGED — VERIFY	A/T FAILURE	RETARDS THROTTLES BY COMMANDING -6°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-9.5 VAC ±1.6 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
446		A/T FAILURE	ADVANCES THROTTLES BY COMMANDING +2°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+3.2 VAC ±.65 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
447		A/T FAILURE	RETARD THROTTLES BY COMMANDING -1°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-1.6 VAC ±.33 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
448		A/T FAILURE	ADVANCE THROTTLES BY COMMANDING +8°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+12.6 VAC ±2.0 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14

⚠1 A FAILURE IN MACH TRIM MAY BE CAUSED BY INADEQUATE GROUND POWER.

⚠2 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATOR FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

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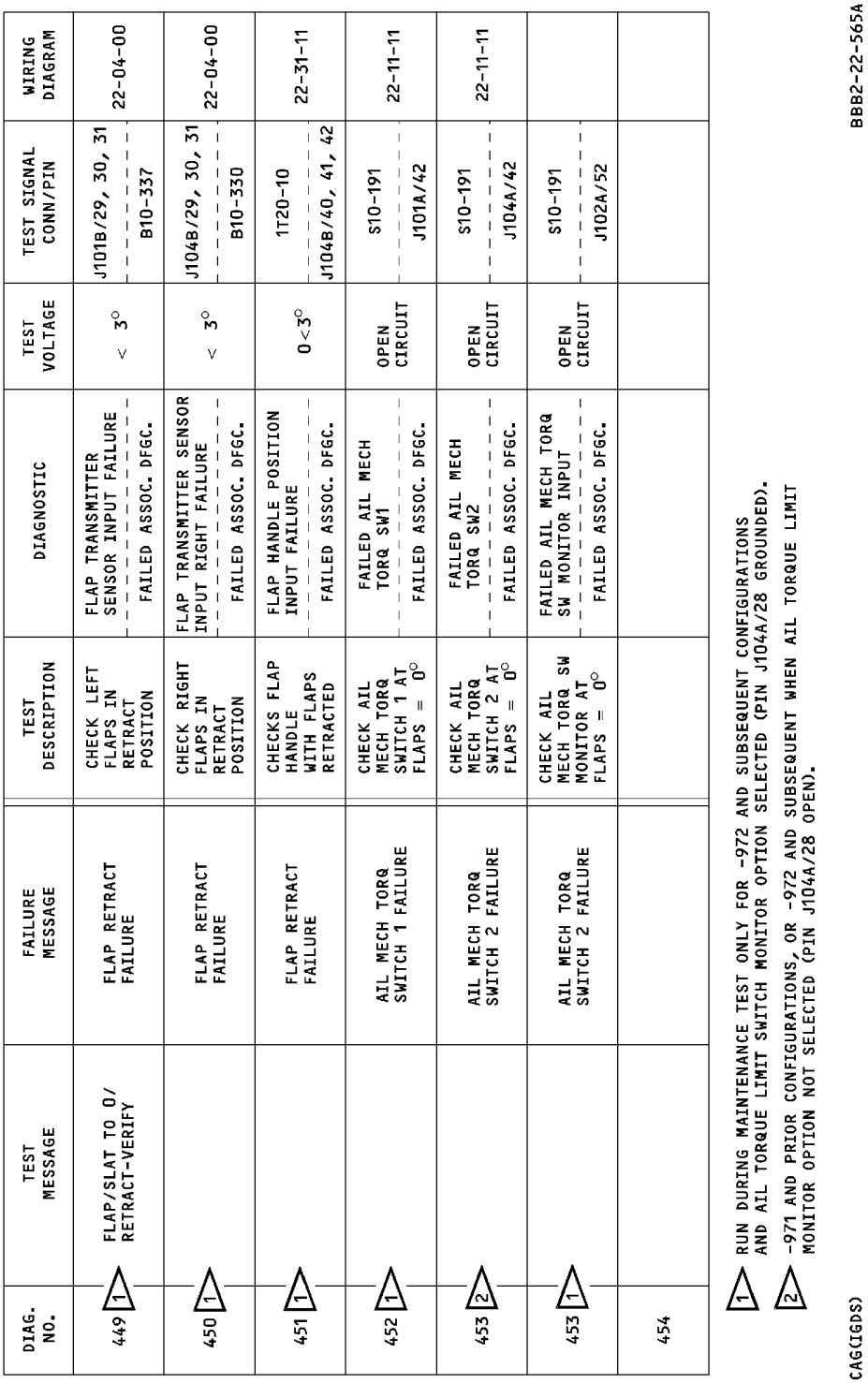
Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 9 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
449 (1)	FLAP/SLAT TO 0/ RETRACT-VERIFY	FLAP RETRACT FAILURE	CHECK LEFT FLAPS IN RETRACT POSITION	FLAP TRANSMITTER SENSOR INPUT FAILURE FAILED ASSOC. DFGC.	< 3°	J101B/29, 30, 31 B10-337	22-04-00
450 (1)		FLAP RETRACT FAILURE	CHECK RIGHT FLAPS IN RETRACT POSITION	FLAP TRANSMITTER SENSOR INPUT RIGHT FAILURE FAILED ASSOC. DFGC.	< 3°	J104B/29, 30, 31 B10-330	22-04-00
451 (1)		FLAP RETRACT FAILURE	CHECKS FLAP HANDLE WITH FLAPS RETRACTED	FLAP HANDLE POSITION INPUT FAILURE FAILED ASSOC. DFGC.	0<3°	1T20-10 J104B/40, 41, 42	22-31-11
452 (1)		AIL MECH TORQ SWITCH 1 FAILURE	CHECK AIL MECH TORQ SWITCH 1 AT FLAPS = 0°	FAILED AIL MECH TORQ SW1 FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11
453 (2)		AIL MECH TORQ SWITCH 2 FAILURE	CHECK AIL MECH TORQ SWITCH 2 AT FLAPS = 0°	FAILED AIL MECH TORQ SW2 FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J104A/42	22-11-11
453 (1)		AIL MECH TORQ SWITCH 2 FAILURE	CHECK AIL MECH TORQ SW MONITOR AT FLAPS = 0°	FAILED AIL MECH TORQ SW MONITOR INPUT FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J102A/52	
454							

(1) RUN DURING MAINTENANCE TEST ONLY FOR -972 AND SUBSEQUENT CONFIGURATIONS AND AIL TORQUE LIMIT SWITCH MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

(2) -971 AND PRIOR CONFIGURATIONS, OR -972 AND SUBSEQUENT WHEN AIL TORQUE LIMIT MONITOR OPTION NOT SELECTED (PIN J104A/28 OPEN).

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-881 (Sheet 10 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
455		HEADING 1 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED INSTR. AMP-1./COMPASS AMP FAILED DG-1 FAILED LEFT FLUX VALVE FAILED ASSOC. DFGC.		R50-323B/23, 24, 25 P10-4/F T20-1 J101B/15, 16, 17	34-22-03 34-22-03 34-22-01 34-22-03
456		HEADING 2 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED INSTR. AMP-2./COMPASS AMP FAILED DG-2 FAILED RIGHT FLUX VALVE FAILED ASSOC. DFGC.		R50-324B/23, 24, 25 P10-7/F T20-2 J104B/15, 16, 17	34-22-04 34-22-04 34-22-02 34-22-04
457		LEFT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED LEFT ELEV. POS. SENSOR FAILED ASSOC. DFGC.		P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
458		RIGHT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED RIGHT ELEV. POS. SENSOR. FAILED ASSOC. DFGC.		P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11
459		CADC-T ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/38, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
460		CADC-N ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
461		CADC-T ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 1 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
455		HEADING 1 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED AHRS-1 FAILED LEFT FLUX VALVE FAILED ASSOC. DFGC.		P10-4/F T20-1 J101B/15, 16, 17	34-24-10 34-22-01 34-22-03
456		HEADING 2 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED AHRS-2 FAILED RIGHT FLUX VALVE FAILED ASSOC. DFGC.		P10-7/F T20-2 J104B/15, 16, 17	34-24-10 34-22-02 34-22-04
457		LEFT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED LEFT ELEV. POS. SENSOR FAILED ASSOC. DFGC.		P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
458		RIGHT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED RIGHT ELEV. POS. SENSOR. FAILED ASSOC. DFGC.		P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11
459		CADC-T ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1. FAILED ASSOC. DFGC.		R50-280B/38, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
460		CADC-N ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93.	34-16-12 34-16-12
461		CADC-T ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 2 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
462		CADC-N ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
463		CADC-T MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
464		CADC-N MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
465		CADC-T CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
466		CADC-N CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
467		CADC-T VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
468		CADC-N VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
469		CADC-T TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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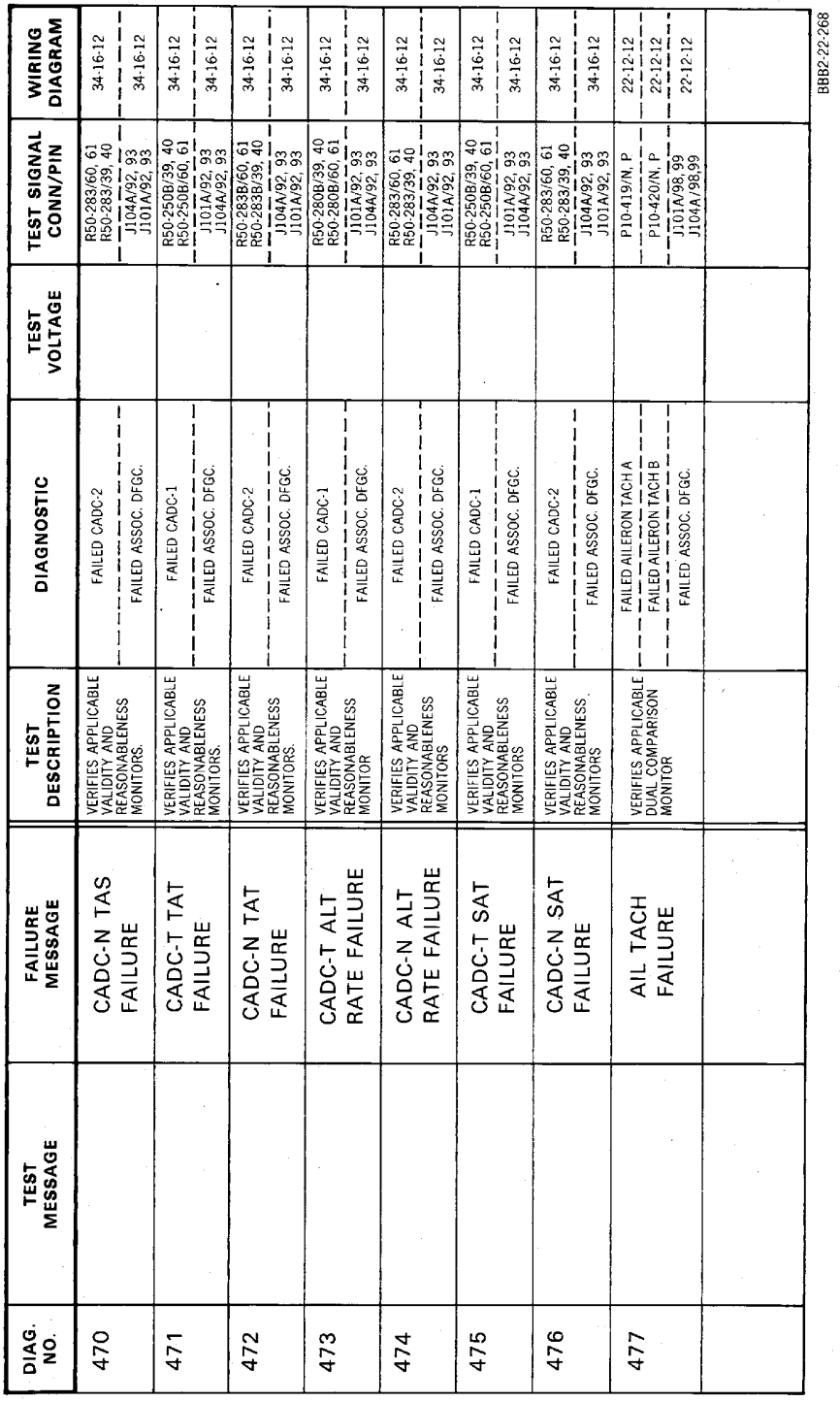
Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 3 of 9)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
470		CADC-N TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
471		CADC-T TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
472		CADC-N TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
473		CADC-T ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITOR	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
474		CADC-N ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
475		CADC-T SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
476		CADC-N SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS. MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
477		AIL TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED AILERON TACH A FAILED AILERON TACH B FAILED ASSOC. DFGC.		P10-419/N, P P10-420/N, P J101A/98, 99 J104A/98,99	22-12-12 22-12-12 22-12-12

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 4 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
478		ELEV TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED ELEV TACH A FAILED ELEV TACH B FAILED ASSOC. DFGC.		P10-421/N, P P10-422/N, P J101A/96, 97 J104A/96, 97	22-11-12 22-11-12 22-11-12
479		RUD TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED RUD TACH A FAILED RUD TACH B FAILED ASSOC. DFGC.		P10-423/N, P P10-424/N, P J101B/89, 90 J104B/89, 90	22-13-12 22-13-12 22-13-12
480		SPD REF KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR	FAILED FGCP FAILED ASSOC. DFGC.		P10-411/Zab J101B/46, 47, 48	22-31-11 22-31-11
481		ATTITUDE-1 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-1 FAILED ASSOC. DFGC.		P10-18/30, 31, 34, 35 J101B/71, 72, 74, 75 J101A/14	34-24-01 34-24-01
482		ATTITUDE-2 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-2 FAILED ASSOC. DFGC.		P10-19/30, 31, 34, 35 J104B/71, 72, 74, 75 J104A/14	34-24-02 34-24-02
483		ATTITUDE-3 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED VG-2 FAILED ASSOC. DFGC.		P10-165/30, 31, 34, 35 J103A/71, 72, 74, 75	34-24-01 34-24-01
484		PITCH RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-1. FAILED ASSOC. DFGC.		P10-18/30, 31 J101B/71, 72	34-24-01 34-24-01
485		PITCH RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-2. FAILED ASSOC. DFGC.		P10-19/30, 31 J104B/71,72	34-24-02 34-24-02
486		PITCH RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-3. FAILED ASSOC. DFGC.		P10-165/30, 31 J103A/71, 72	34-24-01 34-24-01

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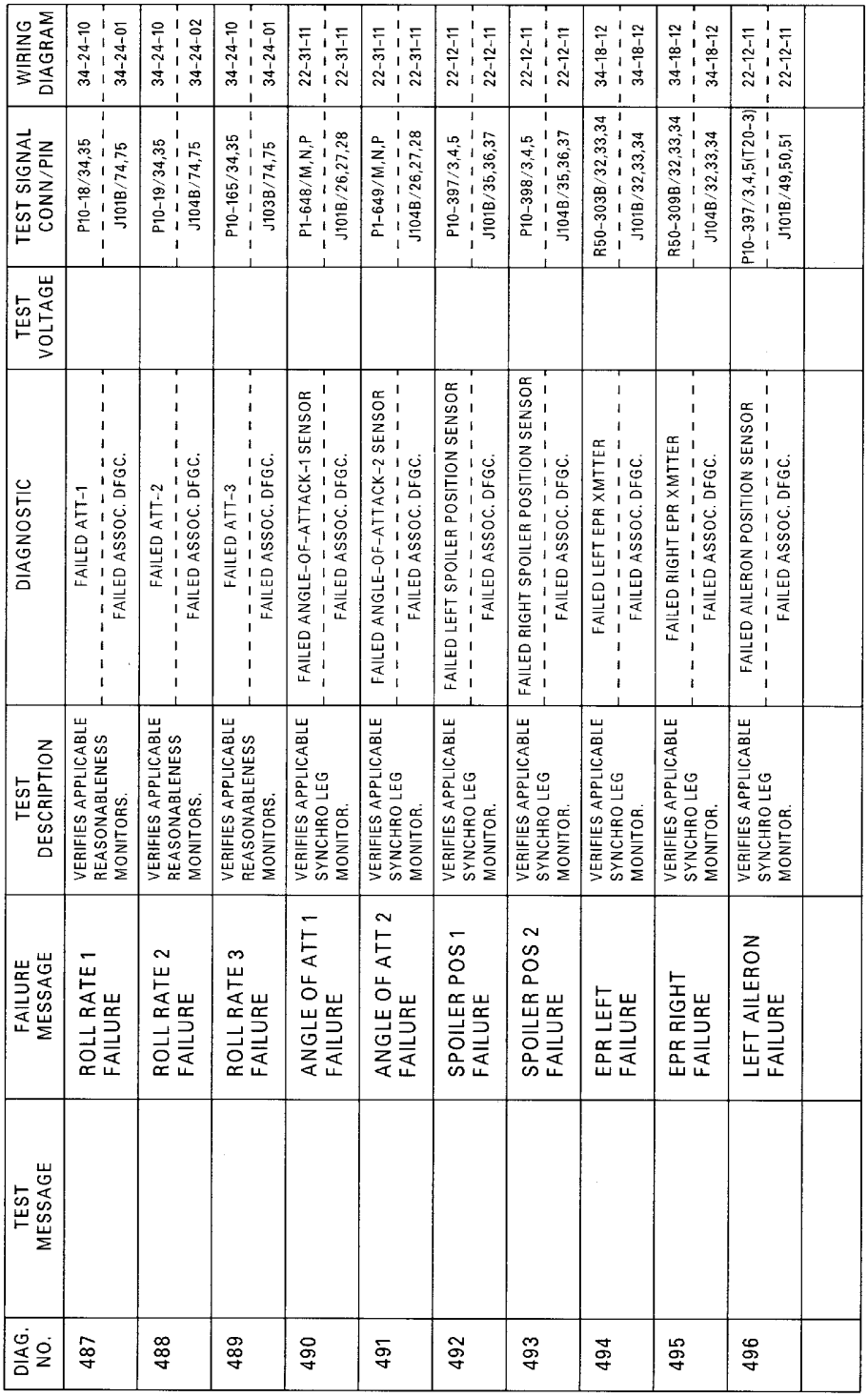
Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 5 of 9)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
487		ROLL RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS.	FAILED ATT-1 FAILED ASSOC. DFGC.		P10-18/34,35 J101B/74,75	34-24-10 34-24-01
488		ROLL RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS.	FAILED ATT-2 FAILED ASSOC. DFGC.		P10-19/34,35 J104B/74,75	34-24-10 34-24-02
489		ROLL RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS.	FAILED ATT-3 FAILED ASSOC. DFGC.		P10-165/34,35 J103B/74,75	34-24-10 34-24-01
490		ANGLE OF ATT 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-1 SENSOR FAILED ASSOC. DFGC.		P1-648/M,N,P J101B/26,27,28	22-31-11 22-31-11
491		ANGLE OF ATT 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-2 SENSOR FAILED ASSOC. DFGC.		P1-649/M,N,P J104B/26,27,28	22-31-11 22-31-11
492		SPOILER POS 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-397/3,4,5 J101B/35,36,37	22-12-11 22-12-11
493		SPOILER POS 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-398/3,4,5 J104B/35,36,37	22-12-11 22-12-11
494		EPR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT EPR XMTTER FAILED ASSOC. DFGC.		R50-303B/32,33,34 J101B/32,33,34	34-18-12 34-18-12
495		EPR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT EPR XMTTER FAILED ASSOC. DFGC.		R50-309B/32,33,34 J104B/32,33,34	34-18-12 34-18-12
496		LEFT AILERON FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED AILERON POSITION SENSOR FAILED ASSOC. DFGC.		P10-397/3,4,5(T20-3) J101B/49,50,51	22-12-11 22-12-11

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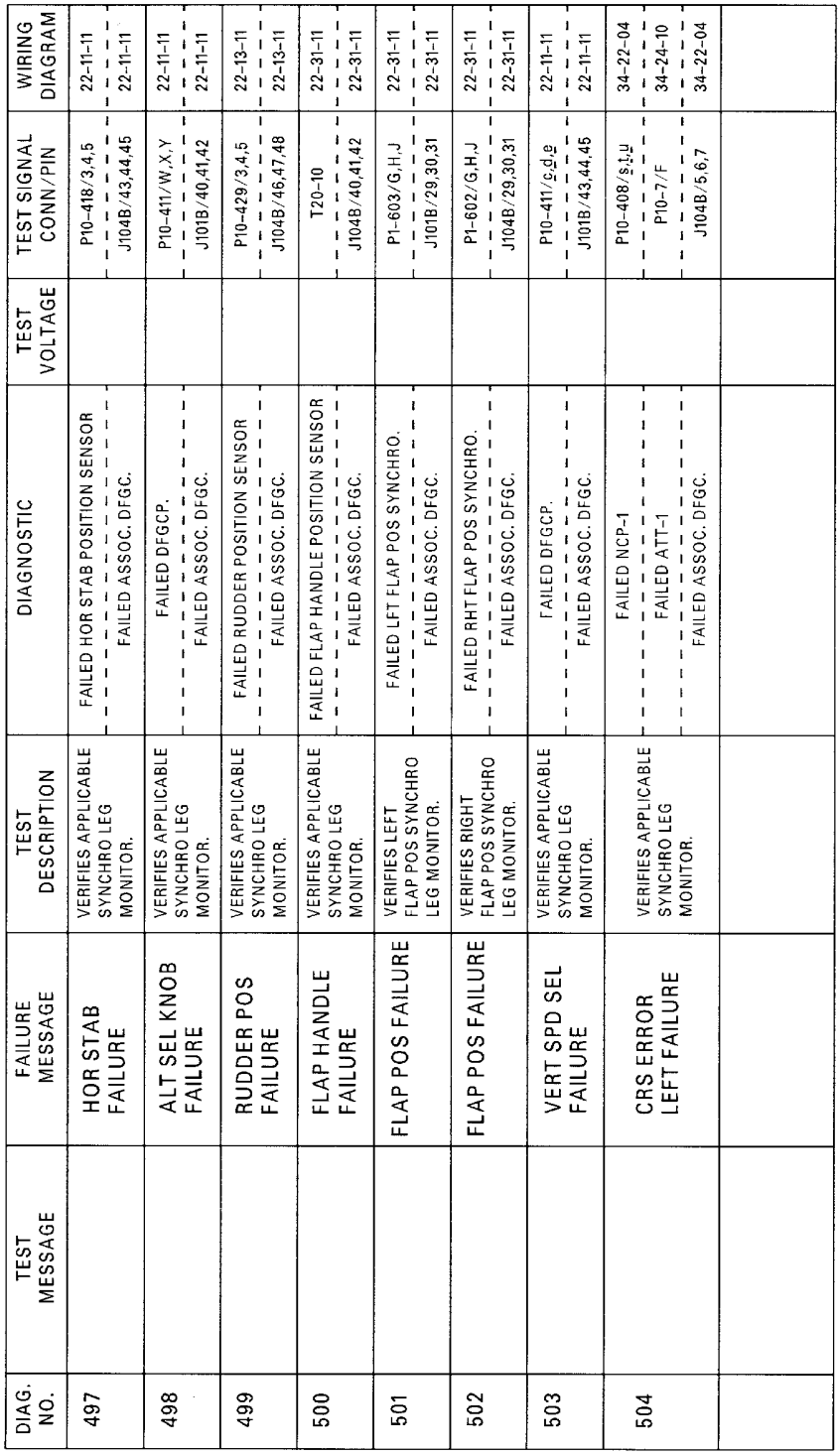
Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 6 of 9)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN./PIN	WIRING DIAGRAM
497		HOR STAB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED HOR STAB POSITION SENSOR FAILED ASSOC. DFGC.		P10-418/3,4,5 J104B/43,44,45	22-11-11 22-11-11
498		ALT SEL KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP. FAILED ASSOC. DFGC.		P10-411/W,X,Y J101B/40,41,42	22-11-11 22-11-11
499		RUDDER POS FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RUDDER POSITION SENSOR FAILED ASSOC. DFGC.		P10-429/3,4,5 J104B/46,47,48	22-13-11 22-13-11
500		FLAP HANDLE FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FLAP HANDLE POSITION SENSOR FAILED ASSOC. DFGC.		T20-10 J104B/40,41,42	22-31-11 22-31-11
501		FLAP POS FAILURE	VERIFIES LEFT FLAP POS SYNCHRO LEG MONITOR.	FAILED LFT FLAP POS SYNCHRO. FAILED ASSOC. DFGC.		P1-603/G,H,J J101B/29,30,31	22-31-11 22-31-11
502		FLAP POS FAILURE	VERIFIES RIGHT FLAP POS SYNCHRO LEG MONITOR.	FAILED RHT FLAP POS SYNCHRO. FAILED ASSOC. DFGC.		P1-602/G,H,J J104B/29,30,31	22-31-11 22-31-11
503		VERT SPD SEL FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP. FAILED ASSOC. DFGC.		P10-411/c,d,e J101B/43,44,45	22-11-11 22-11-11
504		CRS ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-1 FAILED ATT-1 FAILED ASSOC. DFGC.		P10-408/s,t,u P10-7/F J104B/5,6,7	34-22-04 34-24-10 34-22-04

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 7 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
505		CRS ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-2.		P10-406/s,t,u	34-22-03
				FAILED INSTR AMP-2		R50-323B/54	34-22-03
				FAILED DG-2.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/5,6,7	34-22-03
506		HDG ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-410/t,u,v	34-22-04
				FAILED INSTR AMP-1.		R50-324B/18,19,20	34-22-04
				FAILED DG-1.		P10-7/F	34-22-04
				FAILED ASSOC. DFGC.		J101B/18,19,20	34-22-04
507		HDG ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-432/t,u,v	34-22-03
				FAILED INSTR AMP-1		R50-323B/18,19,20	34-22-03
				FAILED DG-1.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/18,19,20	34-22-03
508 *		PMS DATA FAILURE	VERIFIES PMS DATA IS VALID	FAILED PMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
508 **		PMS/FMS DATA FAILURE	VERIFIES PMS/FMS DATA IS VALID	FAILED PMS/FMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
509 ***		WINDSHEAR DATA FAILURE	VERIFIES WINDSHEAR COMPUTER	FAILED W/S		R50-295A J101A-78,79 R50-297A J102A-88,89	34-47-01
				FAILED ASSOC. DFGC			34-63-22

* CUSTOMERS WITH PMS
** CUSTOMERS WITH FMS AND -970 DFGC AND SUBS
*** CUSTOMERS EQUIPPED WITH WINDSHEAR COMPUTERS

CAG(IGDS)

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 8 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
520	FLAP/SLAT TO 0/ RETRACT — VERIFY	AIL SERVO FAILURE	CMD AILERON TO + 7.5° RWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC	+7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
521		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
522		AIL SERVO FAILURE	CMD AILERON TO 7.5° RWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	7.5° ± 1.5°	P10420/J, S J104B/83, 84	22-12-12
523		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧5°/SEC	FAILED AILERON SERVO TACH B FAILED ASSOC. DFGC	≯ 1.71 VAC	P10420/N, P J104B/98, 99	22-12-12
524		AIL SERVO FAILURE	CMD AILERON TO – 7.5° LWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC	–7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
525		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
526		AIL SERVO FAILURE	CMD AILERON TO – 7.5° LWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	–7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
527		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12
528		MACH TRIM SERVO FAILURE	VERIFIES MACH TRIM ACTUATOR RETRACTS	FAILED MTC SWITCH FAILED MTC ACTUATOR FAILED ASSOC. DFGC	9.6 VDC	S10-188 P10-44/M, X J103B/58, 59	22-21-11

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-882 (Sheet 9 of 9)

DFGS STATUS/TEST (STP) PANEL - TROUBLE SHOOTING

1. General

A. Trouble shooting procedures consist primarily of faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on the Digital Flight Guidance System is essential for meaningful trouble shooting.

B. There are two methods of trouble shooting provided within this section. One method is by use of Flight Faults as displayed on the STP after each landing, and the other is by use of Trouble Shooting Charts that are used in conjunction with the Return to Service Test or Maintenance Test.

C. The first portion of the text contains the Flight Fault displays (Paragraph 3.). The Flight Fault displays are listed in alphabetical order. A Failure Message along with a Failure Description and Failure Symptom are provided. These tables should be used to collate written squawks to computer detected faults. Maintenance Test Diagnostic numbers are also provided along with the appropriate Maintenance Action that should be taken.

NOTE: The Maintenance Test Diagnostic numbers are given in the sequence of most probability of failure(s), i.e., Internal Monitors: Diag. 463-464, Sensor Values: Diag. 245-246, etc.

D. The Trouble Shooting charts (Paragraph 4.) contained in this section correlate to all failures that are displayed on the STP during Maintenance or RTS test. The charts provide the normal Test Message that should be displayed along with its corresponding Failure Message and Diagnostic Number. A brief description of the test in conjunction with the Diagnostic (failure) that may have occurred is provided. By use of the Wiring Diagram Manual as called out, the Test Signal Connector Pin can be located and the proper Test Voltage (when applicable) may be taken.

E. When Test Voltage readings are taken, the readings should be at Mod Blocks and not at electrical connectors. Standard electrical test voltages are given in the procedures. A 10% voltage tolerance is permissible, unless otherwise shown.

F. There are two separate wire bundles containing autoland critical wiring, system 1 and system 2. System 1 autoland wiring is normally routed on the left side of the aircraft with other existing wiring and secured with normal white type string ties. System 2 autoland wiring is routed on the right side and easily identifiable by yellow string ties and the wires have run letters beginning with the letter S.

WARNING: WHILE PERFORMING TROUBLE SHOOTING PROCEDURES, AUTOLAND CRITICAL WIRING MUST NEVER BE TAMPERED WITH UNLESS ABSOLUTELY NECESSARY TO PROVIDE WIRING REWORK. IF WIRING REWORK IS REQUIRED, ASSURE THAT ALL PROCEDURES OUTLINED IN CHAPTER 20-11-00, PAGE 201 OF WIRING DIAGRAM MANUAL ARE STRICTLY ADHERED TO.

G. Prior to replacement of a faulty component, or maintenance requirements to clear a fault (rigging, etc.), verify that the using components maintenance procedures are strictly adhered to. See PAGEBLOCK 34-16-01/201 for removal/installation of the CADC.

H. After trouble shooting procedures are completed, verify the proper STP test is initiated to verify and clear the displayed fault(s). If the fault(s) occurred in sequences 1,2,4,6,7,8 or 9 then a Return-To-Service Test may be initiated to clear and verify the displayed fault(s). If the fault(s) occurred in sequence 0,3 or 5 then a System Maintenance test of the failed sequence test step must be performed.

NOTE: The replacement of the Digital Flight Guidance Computer (DFGC) is not always required when the intermittent failure is reported during flight and no failure is found during Flight Fault Review (FFR) test and Return to Service (RTS) test using Status Test Panel (STP) at the ground check. However, if intermittent failures persist, further troubleshooting will be required.

I. In the event the following messages are recorded on the STP, refer to the servo test portion of the STP maintenance test. Perform the alternate trim motor servo test and, using an oscilloscope or memory voltmeter, verify the voltage transient measured across the up and down alternate trim relay coils are nominal (less than approximately 40 VDC) within relay tolerances. If voltage transients greater than 60 VDC are measured, on either alternate trim relay, this indicates the suppression circuitry has failed, therefore, remove and replace relay.

(1) The STP loggings thus far that have caused the DFGC to shut down due to faulty diode circuitry are:

(a) Control Store Failure - A RAM failure occurs during the BITE test portion of the Control Store Parity Checker:

1) A processor failure occurs during External Interrupt.

2) Bad parity is detected in a Control Store Word.

(b) RAM Failure - A value stored in a random access memory (RAM) location is not the same as the value read from the same RAM location.

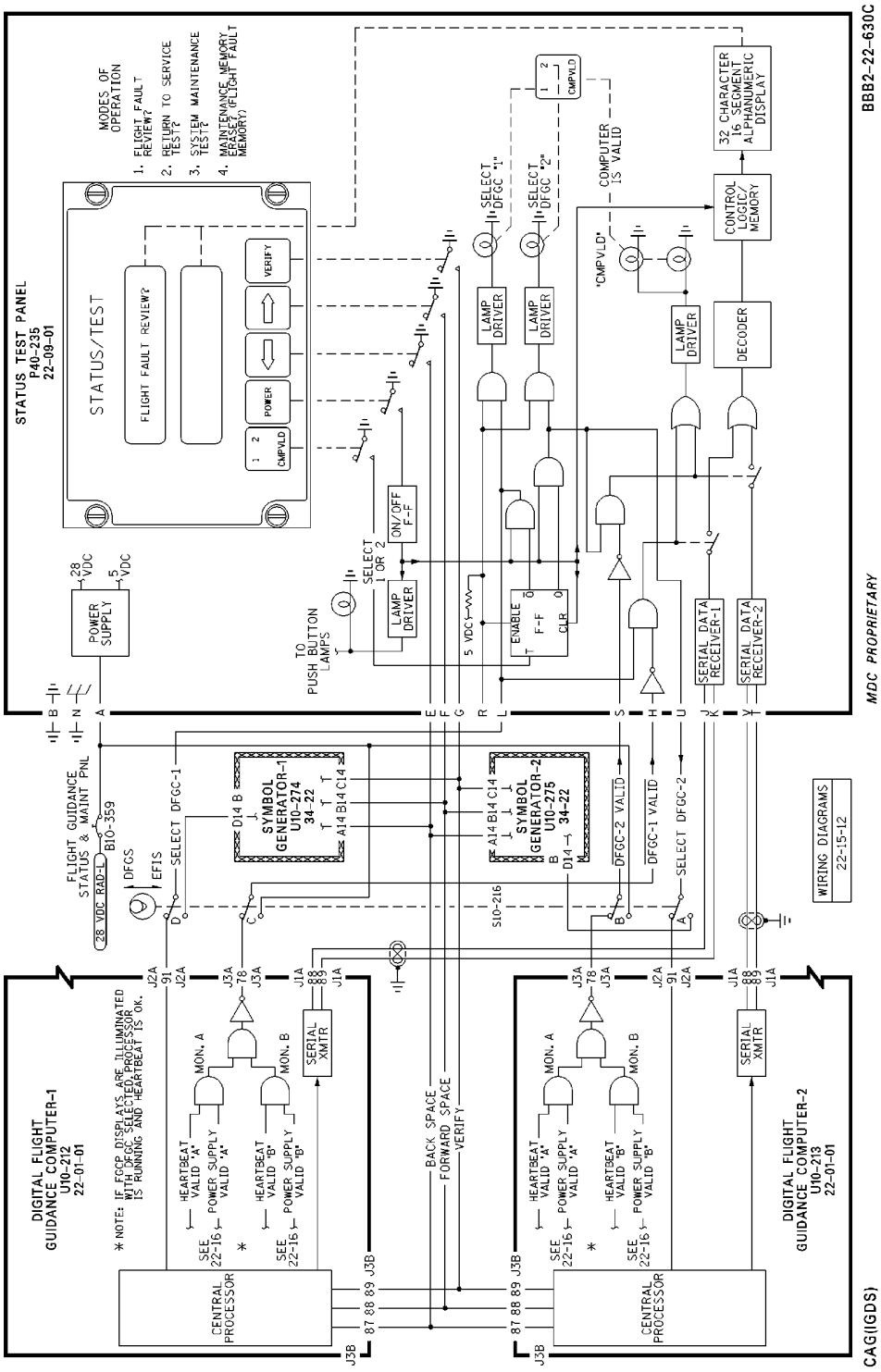
(c) Ticket Check Failure - DFGC monitors detect an incomplete task.

2. Equipment and Materials

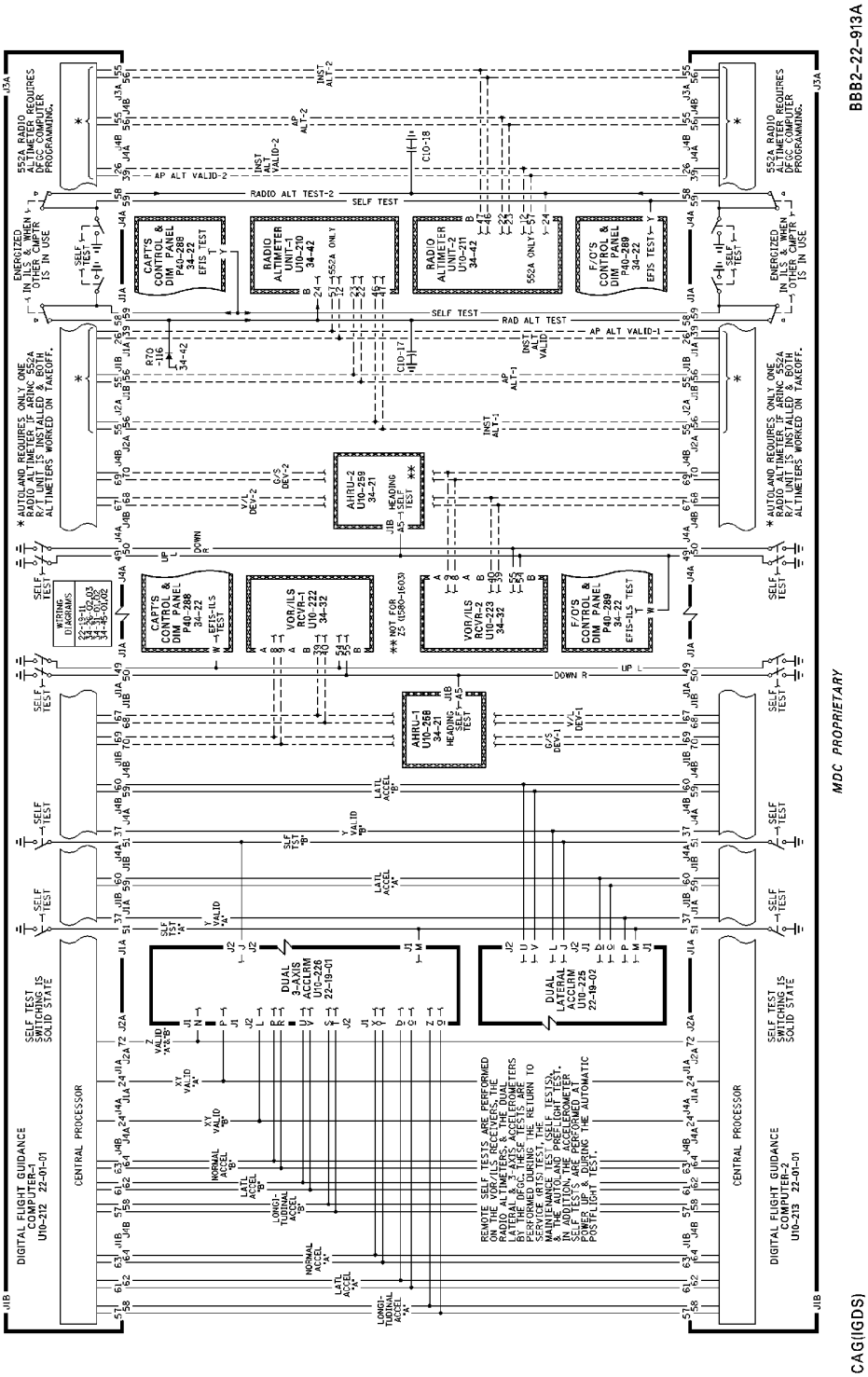
NOTE: Equivalent substitutes may be used instead of the following items.

Table 101

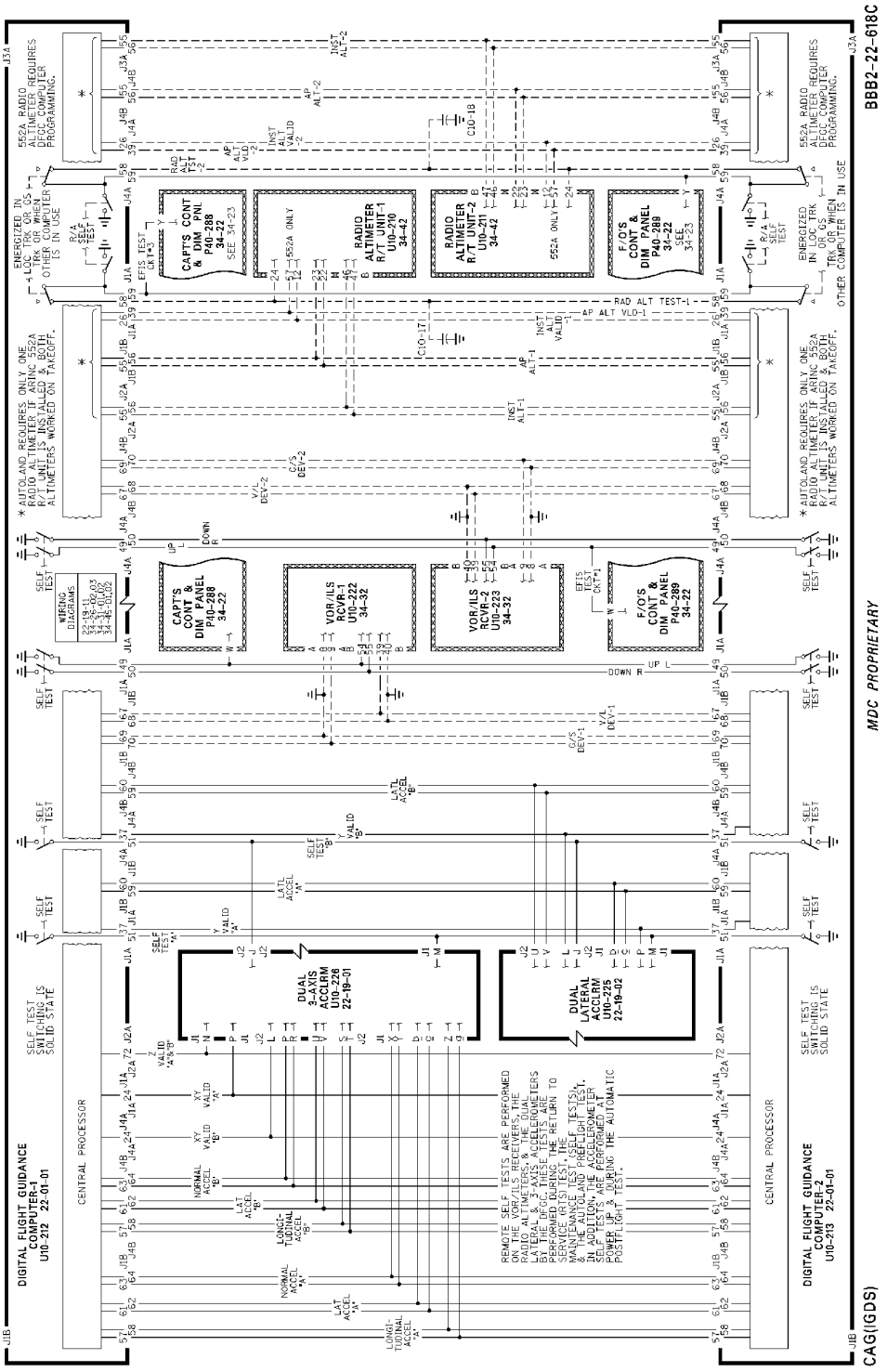
Name and Number	Manufacturer
High impedance voltmeter capable of reading below 30 mv.	



Status/Test Panel (STP)
Figure 101/22-01-05-990-852



Remote Self-Test
Figure 102/22-01-05-990-855



Remote Self-Test
Figure 103/22-01-05-990-856

3. **Flight Fault Review**

A. The Digital Flight Guidance Computer (DFGC) has the capability of storing in-flight detected failures in a non-volitale memory. This feature is implemented within the DFGC by surveying the state of logic bits associated with valids and various monitors that provide in-flight information to the DFGC. The DFGC logic looks for this discrete logic information to be in a set condition or in a high condition. When this condition fails, then a corresponding failure will be logged within the DFGC for later recall (by use of the STP) as "FLIGHT FAULT REVIEW?".

B. Since the DFGC is looking for discrete logic information from associated DFGC LRU's or Sensors, the DFGC may log failures that appear only intermittently or for a short period of time (less than one second). These failures may not be visible to the flight crew and will only appear during "FLIGHT FAULT REVIEW?". Therefore, failure logging is not sufficient justification for removing and replacing a displayed LRU or Sensor. Ground test the item as called out in the following Flight Fault displays and use the Trouble Shooting Charts as called out in Paragraph 4. as necessary.

C. Prior to removing a displayed LRU or Sensor, verify the applicable ATA Chapter ground maintenance procedures are strictly adhered to. (i.e. PAGEBLOCK 34-16-01/201 for Removal/Installation of CADC's)

D. The following charts in this section alphabetically list the failure messages that may appear in the Flight Fault Review. Also shown is the flight compartment symptom that will be present if the failure occurs.

Table 102

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: With -974 DFGC expanded failure message Post S/B 22-133.				
A/P OVERPOWER MON DISCONNECT	PILOT COMMAND CAUSED OVERRIDE OF AUTOPILOT COMMAND. AUTOPILOT DISCONNECT.	NONE	NONE	NONE
ACCEL SELF TEST FAILURE	FAILED DUAL 3- AXIS AND/OR DUAL LATERAL ACCELEROMETER.	AUTOPILOT AND AUTO- THROTTLE WILL NOT ENGAGE AFTER POWER-UP.	SELF TESTS: DIAG. 358-373. SENSOR VALUES: DIAG. 209-216. PASSIVE DISCRETES: DIAG. 27-30.	REF Paragraph 4.. REF. DUAL 3-AXIS ACCEL. (PAGEBLOCK 22-19-01/201) OR DUAL LATERAL ACCEL. (PAGEBLOCK 22-19-02/201)
ACCEL MISTRIM MON DISENGAGE (-960 DFGC)	MONITOR TRIPPED BECAUSE OF EXCESSIVE LONGITUDINAL ACCELERATION	AUTOPILOT DISCONNECT DURING ALTITUDE HOLD, ALTITUDE CAPTURE OR VERTICAL SPEED MODE	NONE	PERFORM ACCEL SELF- TEST OR NONE IF PILOT USED EPR LIM POWER IN ALT HOLD, ALT CAP OR USED SPD MODE.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AIL SERVO FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL: MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. Paragraph 4.. REF. AIL SERVO MOTOR (PAGEBLOCK 22-11-01/201)
AIL SERVO AMP FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477 SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. Paragraph 4.. REF. AIL SERVO MOTOR. (PAGEBLOCK 22-11-01/201)
AILERON SERVO MODEL FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. Paragraph 4.. REF. AIL SERVO MOTOR. (PAGEBLOCK 22-11-01/201)
NOTE: Prior to -920/-930 computers AIL read ELEV.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AIL MECH TORQ SWITCH FAILURE	FAILURE OF ONE OR BOTH AILERON MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES CLOSED. 2) FLAP POSITION 20° TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES OPEN.	AP DISENGAGE. "NO AUTOLAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF.Paragraph 4..
NOTE: -971 computer and subs provide expanded failure messages.				
AIL MECH TORQ SWITCH FAILURE X	X=0 for a non-isolating failure			
	X=1 for switch 1 indicating unlimited when flaps <20 degrees			
	X=2 for switch 2 indicating unlimited when flaps <20 degrees			
	X=3 for both switches indicating unlimited when flaps <20 degrees			
	X=4 for switch 1 indicating limited when flaps >28 degrees			
	X=5 for switch 2 indicating limited when flaps >28 degrees			
	X=6 for both switches indicating limited when flaps >28 degrees			
	X=7 for switch 1 indicating limited during autoland			
	X=8 for switch 2 indicating limited during autoland			
	X=9 for both switches indicating limited during autoland			
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on the ground.				
AILERON POS FAILURE	FAILED AILERON SURFACE POSITION SYNCHRO.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTOLAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. Paragraph 4.. REF. AIL POS SENSOR. (PAGEBLOCK 22-01-03/201)
AILERON SURFACE MONITOR FAILURE	FAILED AILERON SURFACE POSITION SYNCHRO OR AILERON RIG OR SURFACE PROBLEM.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTOLAND" LIGHT ON, AND AUTOPILOT DISCONNECTS.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. Paragraph 4.. REF. AIL POS SENSOR. (PAGEBLOCK 22-01-03/201) REF. AIL RIGGING (PAGEBLOCK 27-10-00/501)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ALT SEL REF FAILURE	FAILED ALTITUDE PRESELECT SYNCHRO.	UNABLE TO CHANGE DISPLAY IN FGCP ALT WINDOW AND/OR ARM ALT.	INTERNAL MONITORS: DIAG. 498. SWITCHES AND BUTTONS: DIAG. 164-165, 177.	REF. Paragraph 4.. REF. FGCP. (PAGEBLOCK 22-01-02/201)
ANG OF ATT 1 SIGNAL FAILURE	FAILED LEFT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 490. SENSOR VALUES: DIAG. 226.	REF. Paragraph 4.. REF. ANG OF ATT SENSOR. (PAGEBLOCK 34-19-01/201)
ANG OF ATT 1, 2 COMP FAILURE	LEFT AND RIGHT ANGLE-OF- ATTACK VANE SPLIT (OUT OF TOLERANCE).	FD AND AP GO-AROUND UNAVAILABLE. SLOW-FAST INDICATOR BIAS OUT OF VIEW. SPD FLAG IN VIEW. BOTH PITCH COMMANDS OUT OF VIEW. AUTO-THROTTLE EPR ONLY. UNABLE TO STAY IN TAKEOFF MODE ABOVE 60 KNOTS.	SENSOR VALUES: DIAG. 226-227.	REF. Paragraph 4.. REF. ANG OF ATT SENSOR. (PAGEBLOCK 34-19-01/201)
ANG OF ATT 2 SIGNAL FAILURE	FAILED RIGHT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 491. SENSOR VALUES: DIAG. 227.	REF. Paragraph 4.. REF. ANG OF ATT SENSOR. (PAGEBLOCK 34-19-01/201)
NOTE: When -971 computers and subs are installed:				
A/P DISCONNECT LIGHT X	X=1 for light "A" (J101A-60) X=2 for light "B" (J104A-60)			
NOTE: A failure will not be logged until both "A" (or "B") bulbs fail or if one bulb fails and the other FMA is removed.				
A/P ENGAGE DISCRETE FAILURE	A/P INDICATING ENGAGED AND OFF FOR TWO OR MORE SECONDS.	AP DISCONNECT. NO AUTOLAND LIGHT ON.	SECOND SET- UP INTER- ACTIVES: DIAG. 312-313. INITIAL SETUP INTER- ACTIVES: DIAG. 4-5.	REF. Paragraph 4.. REF. DFGC. (PAGEBLOCK 22-01-01/201)
A/P ENGAGE FAILURE	AUTOPILOT INDICATES DISENGAGE WHEN SERVO CLUTCHES INDICATE ENGAGED.	DFGC SHUT- DOWN ON ASSOCIATED SIDE.	SECOND SET-UP INTER- AVTIVES: DIAG. 312-319. INTIAL SET- UP INTER- ACTIVES: DIAG. 4-11.	REF. Paragraph 4.. REF. AS APPROPRI-ATE: AIL SERVO (PAGEBLOCK 22-11-01/201), ELV SERVO (PAGEBLOCK 22-12-01/201), YAW DAMP ACT (PAGEBLOCK 22-13-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
A/P HEARTBEAT TEST FAILURE	DFGC FAILS HEARTBEAT TEST AT POWER-UP.	AUTOPILOT WILL NOT ENGAGE IN ANY MODE.	RETEST DFGC BY GROUND POWER-UP.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
-906 AND SUBSEQUENT COMPUTERS. ART FOLLOW-UP SWITCH RIGHT FAILURE ART FOLLOW-UP SWITCH LEFT FAILURE	RESPECTIVE FOLLOW-UP SWITCH CLOSED PRIOR TO ART SELF-TEST.	"ART INOP" LIGHT ON.	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (SUBJECT 73-20-01, Page 201)
ART OPTION PIN FAILURE	ART GO-AROUND OPTION PINS IN OPPOSITE STATE DURING POWER-UP.	NONE.	PASSIVE DISCRETES: DIAG. 45.	REF. Paragraph 4.. REF. DFGC. (PAGEBLOCK 22-01-01/201)
-906 AND SUBSEQUENT COMPUTERS ART SOLND LEFT FAILURE ART SOLND RIGHT FAILURE	RESPECTIVE ART FOLLOW-UP SWITCH NOT CLOSING DURING ART SELF-TEST (BOTH SWITCHES MUST CLOSE WITHIN 3 SECONDS AFTER SELF-TEST IS INITIATED).	"ART INOP" LIGHT ON (AFTER ART SELF-TEST).	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (SUBJECT 73-20-01, Page 201)
A/T ENGAGE LOGIC FAILURE	AUTOTHROTTLE INDICATES ENGAGED 1 SECOND AFTER DISCONNECT OR POWER-UP.	A/T DISCONNECTS AND WONT REENGAGE.	INTIAL SET- UP INTER- ACTIVES: DIAG. 14-15. SECOND SET- UP INTER- ACTIVES: DIAG. 322	REF. Paragraph 4.. REF. FGCP. (PAGEBLOCK 22-01-02/201)
A/T MODE CHECK FAILURE O-DFGC A/T MODE CHECK FAILURE 1-DFGC A/T MODE CHECK FAILURE 2-DFGC	INCORRECT AUTO-THROTTLE MODE SEQUENCING WITHIN DFGC.	DFGC SHUT-DOWN.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
A/T SERVO FAILURE	A/T SERVO MOTOR NOT OPERATING WITHIN SPECIFICATION.	A/T DISCONNECT.	SERVO TESTS: DIAG. 445-448	REF. Paragraph 4.. REF. A/T SERVO MOTOR. (PAGEBLOCK 22-31-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 401-404, 412, 414, 875-879				
ATT 1 SIGNAL FAILURE ATT 1 VALID FAILURE ATT 2 SIGNAL FAILURE ATT 2 VALID FAILURE	FAILED ATTITUDE SIGNAL OR VALID FROM NUMBERED ATTITUDE SYSTEM.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. INERTIAL REFERENCE SYSTEM. (34-43-00, Page 201)
ATT 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED ATTITUDE SYSTEMS WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED SYSTEM.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. INERTIAL REFERENCE SYSTEM. (34-43-00, Page 201)
WJE 886, 887				
NOTE: -920/-930 and subsequent computers; prior to these computers ATT display was VERT GYRO.				
ATT 1 SIGNAL FAILURE ATT 1 VALID FAILURE ATT 2 SIGNAL FAILURE ATT 2 VALID FAILURE	FAILED ATTITUDE SIGNAL OR VALID FROM NUMBERED ATTITUDE SYSTEM.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. ATTITUDE. (SUBJECT 34-23-00)
ATT 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED VERTICAL GYROS WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED VG.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. ATTITUDE. (SUBJECT 34-23-00)
WJE 401-404, 412, 414, 875-879, 886, 887				
AUTO GA OPTION PIN FAILURE.	AUTO GO- AROUND OPTION PINS IN OPPOSITE STATE DURING POWER-UP.	N/A	PASSIVE DISCRETES: DIAG. 46.	REF. Paragraph 4.. REF. DFGC. (PAGEBLOCK 22-01-01/201)
BITE FAILURE XXXX-FAILURE	BUILT IN TEST FAILURE.	DFGC SHUT-DOWN.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC ALT BCR 1 SIGNAL FAILURE CADC ALT BCR 1 VALID FAILURE CADC ALT BCR 2 SIGNAL FAILURE CADC ALT BCR 2 VALID FAILURE	FAILURE OF BARO-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO- AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 461-462.	REF. Paragraph 4.. REF. CADC. PAGEBLOCK 34-16-01/201)
CADC ALT NCR 1 SIGNAL FAILURE CADC ALT NCR 1 VALID FAILURE CADC ALT NCR 2 SIGNAL FAILURE CADC ALT NCR 2 VALID FAILURE	FAILURE OF NON-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 459-460. SENSOR VALUES: DIAG. 235-236	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC ALT NCR 1,2 COMP FAILURE	SPLIT BETWEEN NON- CORRECTED ALTITUDE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A NCR-1 AND NCR-2 VALID OR SIGNAL FAILURE.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 235-236.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC ALT RATE 1 SIGNAL FAILURE CADC ALT RATE 1 VALID FAILURE CADC ALT RATE 2 SIGNAL FAILURE CADC ALT RATE 2 VALID FAILURE	FAILURE OF ALTITUDE RATE SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO- AROUND. TAKEOFF MODE UN- AVAILABLE.	INTERNAL MONITORS: DIAG. 473-474. SENSOR VALUES: DIAG. 239-240.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC ALT RATE 1,2 COMP FAILURE	SPLIT BETWEEN ALT RATE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT AN ALT RATE-1 AND ALT RATE-2 VALID OR SIGNAL FAILURE.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 239-240.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
NOTE: PITOT STATIC SWITCHING MAY CAUSE THIS FAILURE TO BE LOGGED.				
CADC CAS 1 SIGNAL FAILURE CADC CAS 1 VALID FAILURE CADC CAS 2 SIGNAL FAILURE CADC CAS 2 VALID FAILURE	FAILURE OF COMPUTED AIR-SPEED SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. UNABLE TO ARM FOR TAKEOFF.	INTERNAL MONITORS: DIAG. 465-466. SENSOR VALUES: DIAG. 243-244.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC CAS 1, 2 COMP FAILURE	SPLIT BETWEEN COMPUTED AIR-SPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT CAS-1 AND CAS-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD, TAKE- OFF, GO-AROUND, THRUST RATING, AND AUTO-THROTTLE OPERATION. (IF A/T IN SPD MODE SLOW-FAST INDICATOR BIASES AND SPD FLAG).	SENSOR VALUES: DIAG. 243-244.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC MACH 1 SIGNAL FAILURE CADC MACH 1 VALID FAILURE CADC MACH 2 SIGNAL FAILURE CADC MACH 2 VALID FAILURE	FAILURE OF MACH SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 463-464. SENSOR VALUES: DIAG. 245-246.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC MACH 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH MACH SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A MACH-1 OR MACH-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD MACH HOLD, GO-AROUND (BOTH FD AND AP), TAKEOFF (FD AND AP), AUTO-THROTTLE OPERATION IN EPR, SPD SEL, MACH SEL AND MACH TRIM COMP.	SENSOR VALUES: DIAG. 245-246.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC SAT 1 SIGNAL FAILURE CADC SAT 1 VALID FAILURE CADC SAT 2 SIGNAL FAILURE CADC SAT 2 VALID FAILURE	FAILURE OF STATIC AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 475-476. SENSOR VALUES: DIAG. 241-242.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC SAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH STATIC AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A SAT SIGNAL OR VALID FAILURE.	N/A	SENSOR VALUES: DIAG. 241-242.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC SWITCH DISCRETE FAILURE	DFGC DETECTS AIR DATA SWITCHING UNIT IN THE BOTH ON 1 AND BOTH ON 2 POSITION AT THE SAME TIME FOR MORE THAN 10 SECONDS.	ALL CADC VALIDS ARE LOST RESULTING IN A LOSS OF AP AND FD IN ALL MODES (EXCEPT TURB AND AUTOLAND). ALL AUTO- THROTTLE MODES, THRUST RATING, MACH TRIM COMP, AND ALTITUDE ALERT.	SWITCHES AND BUTTONS: DIAG. 85, 87, 89, 90.	REF. Paragraph 4.. REF. AIR DATA SWITCH UNIT. (PAGEBLOCK 34-16-03/201)
CADC TAS 1 SIGNAL FAILURE CADC TAS 1 VALID FAILURE CADC TAS 2 SIGNAL FAILURE CADC TAS 2 VALID FAILURE	FAILURE OF TRUE AIRSPEED SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC TAS 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIR-SPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A TAS OR VALID FAILURE.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC TAT 1 SIGNAL FAILURE CADC TAT 1 VALID FAILURE CADC TAT 2 SIGNAL FAILURE CADC TAT 2 VALID FAILURE	FAILURE OF TRUE AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 471-472. SENSOR VALUES: DIAG. 237-238.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CADC TAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A TAT SIGNAL OR VALID FAILURE.	LOSS OF THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 237-238.	REF. Paragraph 4.. REF. CADC. (PAGEBLOCK 34-16-01/201)
CLOCK FAILURE -DFGC	REAL TIME CLOCK AND PROCESSOR CLOCK DIFFER BY ±0.3% DURING POWER UP.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
CRITICAL STATE MONITOR FAILURE	A DYNAMIC FAILURE LOGGED ON SELECTED DFGC UNDER THE FOLLOWING CONDITIONS: 1) NORMAL ACCEL (Z AXIS) G -1.5g or L -.5g.. 2) PITCH ANGLE G 24.5° OR PITCH ANGLE L -18.0° 3) PITCH RATE G ±5 * deg/sec. 4) ROLL ANGLE G ±35 deg. 5) ROLL RATE G ±10 * deg/sec.	AUTOPILOT DISENGAGES UNTIL AIRPLANE BROUGHT WITHIN TOLERANCE.	SENSOR VALUES: NOTE : SINCE THIS IS A DYNAMIC FAILURE, AIRPLANE SENSORS (3-AXIS ACCEL. AND ATTITUDE) ARE PROBABLY NOT FAILED. HOWEVER, THESE SENSORS SHOULD BE VERIFIED NOT TO HAVE LARGE NULL VALUES IN STATIC CONDITION.	PERFORM RETURN-TO-SERVICE TEST. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)
NOTE: -971 computers and subs provide expanded failure messages.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
			Trip Threshold	
CRITICAL STATE MONITOR FAILURE X	X=0 Normal Acceleration		±0.5 g	
	X=1 Pitch Attitude >Max		+24.0 Deg	
	X=2 Pitch Attitude <Max		-18.0 Deg	
	X=3 Roll Attitude		±35.0 Deg	
	X=4 Pitch Rate		±5.0 Deg/sec	
	X=5 Roll Rate		±10.0 Deg/sec	
NOTE: Failure codes 6 through 11 were added to enhance roll attitude. The column marked "Likely Failure" indicates which sensor may have had a slowover or a null which would result in the corresponding failure message.				
			Likely Failure	
			Slowover Sensor	Null Sensor
	X=6 Sensor A		A	B
	X=7 Sensor A		A	C
	X=8 Sensor B		B	A
	X=9 Sensor B		B	C
	X=10 Sensor C		C	A
	X=11 Sensor C		C	B
CRS ERROR 1 SIGNAL FAILURE CRS ERROR 1 VALID FAILURE CRS ERROR 2 SIGNAL FAILURE CRS ERROR 2 VALID FAILURE	FAILURE OF COURSE ERROR SIGNAL OR VALID FROM NUMBERED COURSE INPUT.	IF FAILURE OCCURS ON ASSOC. DFGC, THEN VOR, LOC, ILS AND AUTOLAND (AP AND FD) ARE INHIBITED. FOR FAILURE ON NON-ASSOC. SIDE THEN AUTOLAND IS INHIBITED. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 504-505.	REF. Paragraph 4.. REF. VHF NAV CONTROL PANEL. (SUBJECT 34-32-03, Page 201)
CRS ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH COURSE INPUTS WITHOUT A SIGNAL OR VALID FAILURE WHILE IN ILS OR AUTOLAND.	DISABLES AUTOLAND. A/P DIS- ENGAGE IF IN AUTO- LAND.	VERIFY COURSE DISPLAY ON VHF/NAV CONTROL PANEL AGREES WITH COURSE POINTER ON RDI.	REF. Paragraph 4.. REF. VHF NAV CONTROL PANEL. (SUBJECT 34-32-03, Page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CHECKSUM FAILURE 0-DFGC CHECKSUM FAILURE 0001-DFGC CHECKSUM FAILURE 1-DFGC CHECKSUM FAILURE 2-DFGC CHECKSUM FAILURE 3-DFGC CHECKSUM FAILURE 4-DFGC CHECKSUM FAILURE 5-DFGC CHECKSUM FAILURE 6-DFGC CHECKSUM FAILURE 7-DFGC CHECKSUM FAILURE 0071-DFGC CHECKSUM FAILURE 0073-DFGC CHECKSUM FAILURE 0075-DFGC CHECKSUM FAILURE 0077-DFGC	BITE DETECTS PROCESSOR FAILURE.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
CONTROL STORE FAILURE (-960 DFGC AND SUBSEQUENT) *	PARITY CHECK HARDWARE ERROR IN INTERNAL PROCESSOR EPROM MEMORY CHECK	DFGC SHUTDOWN	NONE	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for CONTROL STORE FAILURE. (Paragraph 1.I.)				
DLA-Y ACCEL 1 SIGNAL FAILURE DLA-Y ACCEL 1 VALID FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE	FAILED LATERAL ACCEL. SIDE A (1) OR SIDE B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 27-28. SELF TESTS: DIAG. 364-365,372-373 SENSOR VALUES: DIAG. 215-216	REF. Paragraph 4. REF. DUAL LATERAL ACCEL. (PAGEBLOCK 22-19-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
DLA-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B LATERAL ACCEL. SIGNALS WITHOUT CHANNEL A OR CHANNEL B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN. AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 364-365. SENSOR VALUES: DIAG. 215-216. PASSIVE DISCRETES: DIAG. 27-28.	REF. Paragraph 4.. REF. DUAL LATERAL ACCEL. (PAGEBLOCK 22-19-02/201)
DUAL COMP FAILURE -DFGC	SIDE A COMPUTATION DISAGREES WITH SIDE B COMPUTATION.	COMPUTER SHUTDOWN. ALL FUNCTIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
DUAL COMP FAIL XXXX-DFGC	XXXX=least significant 10 bits of failure address			
NOTE: Only the first failed address is logged when the DFGC is shut down even though more variables may actually miscompare. This failure indicates an internal problem within the DFGC.				
D3A-X ACCEL 1 SIGNAL FAILURE D3A-X ACCEL 1 VALID FAILURE D3A-X ACCEL 2 SIGNAL FAILURE D3A-X ACCEL 2 VALID FAILURE	FAILED CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCEL. LONGITUDINAL (X) AXIS.	UNABLE TO ARM FOR TAKEOFF. A/P DISENGAGE IF IN AUTO- LAND. AUTO G/A UNAVAILABLE.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210.	REF. Paragraph 4.. REF. DUAL 3-AXIS ACCEL. (PAGEBLOCK 22-19-01/201)
D3A-X ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) ACCELERO METER X AXIS SIGNALS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AP AND FD IAS HOLD, MACH HOLD, GO-AROUND AND TAKEOFF. DISABLES AUTOLAND. DISENGAGES AUTOPILOT AND BIASES FD PITCH BAR. ALSO, LOSS OF AUTO-THROTTLE OPERATION IN EPR, TAKEOFF, SPD SEL, MACH SEL.	SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210. PASSIVE DISCRETES: DIAG. 29-30.	REF. Paragraph 4.. REF. DUAL 3-AXIS ACCEL. (PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D3A-Y ACCEL 1 SIGNAL FAILURE D3A-Y ACCEL 1 VALID FAILURE D3A-Y ACCEL 2 SIGNAL FAILURE D3A-Y ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER LATERAL (Y) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 360-361, 368-369. SENSOR VALUES: DIAG. 211-212.	REF. Paragraph 4.. REF. DUAL 3-AXIS ACCEL. (PAGEBLOCK 22-19-01/201)
D3A-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B 3-AXIS ACCELEROMETER SIGNALS IN THE LATERAL (Y) AXIS WITHOUT A CHANNEL A (1) OR B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 360-361, 368-369. PASSIVE DISCRETES: DIAG. 29-30. SENSOR VALUES:	REF. Paragraph 4.. REF. DUAL 3-AXIS ACCEL. (PAGEBLOCK 22-19-01/201)
D3A-Z ACCEL 1 SIGNAL FAILURE D3A-Z ACCEL 1 VALID FAILURE D3A-Z ACCEL 2 SIGNAL FAILURE D3A-Z ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER NORMAL (Z) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISABLES GO-AROUND. DISENGAGES AP IF ENGAGED IN AUTOLAND OR AUTO GO-AROUND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: 213-214.	REF. Paragraph 4.. REF. DUAL 3-AXIS ACCEL. (PAGEBLOCK 22-19-01/201)
D3A-Z ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) 3-AXIS ACCELEROMETER SIGNALS IN THE NORMAL (Z) AXIS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. ALL AP AND FD PITCH MODES DISABLED, EXCEPT TURB (AP DISCONNECT AND/OR FLIGHT DIRECTOR PITCH COMMAND BIASES OUT OF VIEW). ALSO, DISABLES AUTO- THROTTLE RETARD MODE.	SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: DIAG. 213-214. PASSIVE DISCRETES: DIAG. 29-30.	REF. Paragraph 4.. REF. DUAL 3-AXIS ACCEL. (PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D/A-A/D FAILURE -DFGC	BITE DETECTED A/D-D/A FAILURE.	AP DISCONNECT, AT DISCONNECT, FD INVALID (ASSOC. FD BARS BIAS OUT OF VIEW), FAST-SLOW INVALID (POINTER OUT OF VIEW), HUD VALID CLEARED, YAW DAMP INVALID ("YAW DAMP OFF" LIGHT ON), MACH TRIM DISABLED ("MACH TRIM INOP" LIGHT ON), "NO AUTOLAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
ELEV MECH TORQ SWITCH FAILURE (-920 DFGC AND SUBSEQUENT, ELEV IS AIL)	FAILURE OF ONE OR BOTH ELEVATOR MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES OPEN. 2) FLAP POSITION 20° TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES CLOSED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF. Paragraph 4..
ELEVATOR POS 1 SIGNAL FAILURE ELEVATOR POS 2 SIGNAL FAILURE	FAILURE OF LEFT (1) OR RIGHT (2) ELEVATOR POSITION SENSOR.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	INTERNAL MONITORS: DIAG. 457-458. SENSOR VALUES: DIAG. 221-222.	REF. Paragraph 4.. REF. ELEV. POS SENSOR (PAGEBLOCK 22-01-03/201)
ELEV POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT ELEV. SURFACE POS. SENSORS WITHOUT AN INDIVIDUAL 1 OR 2 SIGNAL FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222.	REF. Paragraph 4.. REF. ELEV. POS SENSOR (PAGEBLOCK 22-01-03/201)
NOTE: LOGGING OF THIS FAILURE IS INHIBITED BELOW 60 KNOTS.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ELEVATOR SURFACE MONITOR FAILURE	FAILED LEFT OR RIGHT ELEVATOR SURFACE POSITION SIGNAL OR DETERIORATED ELEVATOR PERFORMANCE DURING AUTO- LAND. ONLY LOGGED ON SELECTED DFGC WHILE IN AUTOLAND.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222. INTERNAL MONITORS: DIAG. 457-458.	REF. Paragraph 4.. REF. ELEV. POS SENSOR. (PAGEBLOCK 22-01-03/201)
ELV SERVO FAILURE	FAILED ELEVATOR SERVO.	AP DISENGAGE. "NO AUTOLAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. Paragraph 4.. REF. ELEV. SERVO MOTOR. (PAGEBLOCK 22-12-01/201)
ELV SERVO AMP FAILURE	FAILED ELEVATOR SERVO AMPLIFIER IN DFGC.	AP DISENGAGE. "NO AUTOLAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. Paragraph 4.. REF. DFGC. (PAGEBLOCK 22-01-01/201).
ELV SERVO MODEL FAILURE	ELEVATOR SERVO FAILS TO PERFORM WITHIN THE LIMITATIONS OF ITS MODEL.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201.	REF. Paragraph 4.. REF. ELEV. SERVO MOTOR. (PAGEBLOCK 22-12-01/201)
EL/AIL CLUTCH FAILURE	EITHER OR BOTH ELEVATOR OR AILERON CLUTCHES INDICATING ENGAGED WHEN AP DISENGAGED OR DISENGAGED WHEN AP ENGAGED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 6-9. SECOND SETUP INTER- ACTIVES: DIAG. 314-317.	REF. Paragraph 4..
NOTE: -971 computers and subs provide expanded failure messages.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
EL/AIL CLUTCH FAILURE X	X=0 for a non-isolatable failure			
	X=1 for an elevator clutch failure			
	X=2 for an aileron clutch failure			
	X=3 for both elevator and aileron clutch failure			
END AROUND FAILURE 0-DFGC END AROUND FAILURE 1-DFGC	D/A-A/D END AROUND MONITOR FAILURE.	NONE.	NONE.	MONITOR OCCURANCE, IF FAILURE PERSISTS, REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 2-DFGC END AROUND FAILURE 3-DFGC END AROUND FAILURE 4-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201).
NOTE: More END AROUND failures may occur than shown. All require same maintenance action.				
END AROUND FAILURE 5-DFGC	YAW DAMPER COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	YAW DAMP INVALID. "YAW DAMP INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 6-DFGC END AROUND FAILURE 7-DFGC END AROUND FAILURE 8-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 9-DFGC	AUTOTHROTTLE COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AUTO- THROTTLE DISENGAGE.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 10-DFGC END AROUND FAILURE 11-DFGC END AROUND FAILURE 12-DFGC END AROUND FAILURE 13-DFGC	FLIGHT DIRECTOR END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FD COMMAND BARS BIAS OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 14-DFGC END AROUND FAILURE 15-DFGC	FAST/SLOW END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FAST/SLOW POINTER BIASES OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 16-DFGC END AROUND FAILURE 17-DFGC	EPR INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 18-DFGC	MACH TRIM END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	DISABLED MACH TRIM COMP. "MACH TRIM INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 19-DFGC END AROUND FAILURE 20-DFGC	IAS INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 21-DFGC END AROUND FAILURE 22-DFGC	AILERON TORQUE LIMIT COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 23-DFGC END AROUND FAILURE 24-DFGC	EPR LIMIT END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 25-DFGC	HUD COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	HUD VALID CLEARED.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 26-DFGC. -906 COMPUTER.	QNH REFERENCE VOLTAGE END AROUND FAILURE.	ALT PRE- SELECT DISPLAY BLANK ALT CANNOT BE ARMED.	NONE.	REMOVE AND REPLACE ASSOCIATED DFGC. (PAGEBLOCK 22-01-01/201)
ENGINE OPTION PIN FAILURE	ENGINE OPTION PINS NOT IN ALLOWABLE CONFIGURATION.	TRI DIS- PLAYS 2.00 WITH FLAG AND "NO MODE" DISPLAYED. THRUST RATING AND AUTO-THROTTLE DISABLED.	VERIFY PROPER GROUND OF ENGINE OPTION PINS (TRC A, B, C, D,).	REF. (WDM 22-16-15)
EPR LEFT FAILURE EPR RIGHT FAILURE EPR SENSOR FAILURE	FAILED EPR TRANSMITTER.	AUTO- THROTTLE DISENGAGE.	INTERNAL MONITORS: DIAG. 494-495. SENSOR VALUES: DIAG. 228-229.	REF. Paragraph 4.. REF. EPR TRANSMITTER. (SUBJECT 77-11-02, Page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
FLAG FAILURE -DFGC	INTERNAL HARDWARE FLAG FAILURE.	DFGC SHUT-DOWN. ALL FUNCTIONS DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAG FAILURE XX-DFGC	XX=decimal number of failed flag			
NOTE: A flag failure is an internal failure within the DFGC.				
FLAP HANDLE FAILURE	FAILED FLAP POSITION INPUT FROM FLAP HANDLE.	NONE.	INTERNAL MONITORS: DIAG. 500. SECOND SETUP INTER- ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG. 234.	REF. Paragraph 4..
NOTE: POSSIBLE FAILURE MAY BE LOGGED WHEN FLAP/SLAT HANDLE MOVED FROM LAND/EXT TO 0 DEGREES RAPIDLY.				
FLAP POS 1 SIGNAL FAILURE FLAP POS 1 VALID FAILURE	FAILED FLAP POSITION INPUT FROM LEFT (1) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG: 232.	REF. Paragraph 4.. REF. L FLAP POSITION TRANSMITTER. (PAGEBLOCK 27-54-01/201)
FLAP POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT FLAP POSITION SYNCHROS WITHOUT A LEFT OR RIGHT SIGNAL OR VALID FAILURE.	AP AND FD TAKEOFF AND GO-AROUND DISABLED. AUTO-THROTTLE INHIBITED. SPD FLAG IN VIEW.	SENSOR VALUES: DIAG. 232-233.	REF. Paragraph 4.. REF. L OR R FLAP POSITION TRANSMITTER. (PAGEBLOCK 27-54-01/201)
FLAP POS 2 SIGNAL FAILURE FLAP POS 2 VALID FAILURE	FAILED FLAP POSITION INPUT FROM RIGHT (2) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 330, 339, 344. SENSOR VALUES: DIAG. 233.	REF. Paragraph 4.. REF. R FLAP POSITION TRANSMITTER. (PAGEBLOCK 27-54-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAP POS 3 SIGNAL FAILURE	If flaps are less than 24 degrees, autoland engagement is disallowed and the A/P will disconnect at 300 feet if autoland is armed. If flaps become less than 24 degrees after autoland is engaged, the A/P will disengage immediately. This failure message is logged into maintenance memory when an A/P disconnect occurs for either of these cases.			
GEN LOG ILLEGAL INST -DFGC	INTERNAL MONITORING DETECTS AN ILLEGAL OR UNDEFINED GENERAL LOGIC INSTRUCTION.	DFGC SHUT-DOWN. ALL DFGC FUNCTIONS FROM AFFECTED DFGC UNUSEABLE.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
GND SENSOR FAILURE	AT LEAST ONE GROUND SENSOR DISAGREES WITH THE OTHERS FOR MORE THAN 40 SECONDS (THERE ARE FOUR GROUND SENSORS: 2 GROUND CONTROL RELAYS, AND 2 MAIN GEAR WEIGHT ON WHEELS SENSORS.	AUTOLAND INHIBITED. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG. 31-32. SWITCHES AND BUTTONS: DIAG. 123-124, 141-142.	REF. Paragraph 4..
NOTE: -971 computers and subs provide expanded failure messages.				
GND SENSOR FAILURE X	X=0 for non-isolatable failure			
	X=1 for Ground control relay 1 (left) failed			
	X=2 for Ground control relay 2 (right) failed			
	X=3 for Left main gear WOW sensor failed			
	X=4 for Right main gear WOW sensor failed			
G/S DEV 1 SIGNAL FAILURE G/S DEV 1 VALID FAILURE G/S DEV 2 SIGNAL FAILURE G/S DEV 2 VALID FAILURE	FAILED GLIDE- SLOPE DEVIATION SIGNAL OR VALID FROM NUMBERED RECEIVER.	LOSS OF ASSOC. INPUT (i.e. G/S DEV 1 WITH DFGC 1 SELECTED) RESULTS IN A/P DISENGAGE IN ILS AND NON-ASSOC. PITCH CMD BIAS. LOSS OF NON-ASSOC. INPUT AFTER G/S TRACK RESULTS IN A/P DISENGAGE AND NON-ASSOC. FD CMD BAR BIAS. A/P IS REENGAGEABLE INTO ILS. LOSS OF EITHER DISABLES AUTOLAND. THIS FAILURE CAN ONLY BE LOGGED IF IN G/S CAPTURE OR TRACK ABOVE 50 FEET RADIO ALTITUDE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. Paragraph 4.. REF. ILS RECEIVER. (SUBJECT 34-32-00, Page 201)
NOTE: When -971 computers and subs are installed, G/S DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
G/S DEV 1,2 COMP FAILURE	SPLIT BETWEEN GLIDESLOPE DEVIATION SIGNALS WITHOUT CORRESPONDING G/S DEV 1 OR G/S DEV 2 SIGNAL OR VALID FAILURE. CAN ONLY BE LOGGED IN G/S CAPTURE OR TRACK AND RADIO ALTITUDE ABOVE 50 FEET.	DISABLES AUTOLAND. A/P DISENGAGE IF IN ILS OR AUTOLAND.	SELF TESTS: DIAG. 350-357.	REF. Paragraph 4.. REF. ILS RECEIVER. (SUBJECT 34-32-00, Page 201)
HDG ERROR 1 SIGNAL FAILURE HDG ERROR 1 VALID FAILURE HDG ERROR 2 SIGNAL FAILURE HDG ERROR 2 VALID FAILURE.	FAILED HEADING ERROR SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUTNO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. INTERNAL MONITORS: DIAG. 506-507.	REF. Paragraph 4.. REF. COMPASS SYSTEM. (SUBJECT 34-21-00, Page 201)
HDG ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN HEADING ERROR SIGNAL WITHOUT A CORRESPONDING HDG ERROR 1 OR HDG ERROR 2 SIGNAL OR VALID	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE FD COMMAND BAR BIAS IN HDG HLD, HDG SEL AND VOR.	INTERNAL MONITORS: DIAG. 506-507.	REF. Paragraph 4.. REF. COMPASS SYSTEM. (PAGEBLOCK 34-18-02/201)
HEADING 1 SIGNAL FAILURE HEADING 1 VALID FAILURE HEADING 2 SIGNAL FAILURE HEADING 2 VALID FAILURE	FAILED HEADING SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUT-NO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231. INTERNAL MONITORS: DIAG. 455-456.	REF. Paragraph 4.. REF. COMPASS SYSTEM. (SUBJECT 34-21-00, Page 201)
HEADING 1,2 COMP FAILURE	SPLIT (APPROX 5°) BETWEEN THE TWO HEADING SIGNALS WITH- OUT A CORRESPONDING HEADING 1 OR HEADING 2 SIGNAL OR VALID FAILURE.	A/P DIS- ENGAGE. FD ROLL CMD BIAS IN HDG HLD, HDG SEL, VOR. "HEADING" MONITOR LIGHT ON.	SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231. NOTE: 0 TO 180° CARD = 0 TO 180° ON STP. 181° TO 359° = -179° TO -1° ON STP.	REF. Paragraph 4.. REF. COMPASS SYSTEM. (SUBJECT 34-21-00, Page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
HOR STAB FAILURE	FAILED HORI- ZONTAL STAB. POSITION SENSOR.	TAKOFF MODE INHIBITED. SLOW/FAST BIAS. SPD FLAG IN VIEW. IF FAILURE OCCURS BEFORE G/S CAP, A/P AND FD GA INHIBITED.	SENSOR VALUES: (DISPLAY OPTION). DIAG. 225. INTERNAL MONITORS: DIAG. 497. SERVO TESTS: DIAG. 440-441.	REF. Paragraph 4.. REF. SURFACE POS SENSORS. (PAGEBLOCK 22-01-03/201)
ILLEGAL A/T MODE 0-DFGC ILLEGAL A/T MODE 1-DFGC ILLEGAL A/T MODE 2-DFGC ILLEGAL PITCH MODE 0-DFGC ILLEGAL PITCH MODE 1-DFGC ILLEGAL PITCH MODE 2-DFGC ILLEGAL ROLL MODE 0-DFGC ILLEGAL ROLL MODE 1-DFGC ILLEGAL ROLL MODE 2-DFGC ILLEGAL YAW MODE 1-DFGC ILLEGAL YAW MODE 2-DFGC ILLEGAL PITCH MODE 3-DFGC ILLEGAL PITCH MODE 4-DFGC ILLEGAL ROLL MODE 3-DFGC ILLEGAL ROLL MODE 4-DFGC ILLEGAL YAW MODE 0-DFGC ILLEGAL YAW MODE 3-DFGC	COMPUTER MONITORS DETECT AN ILLEGALLY SEQUENCED MODE.	COMPUTER SHUTDOWN. FGCP BLANK. ASSOC. SPD AND FD FLAGS IN VIEW. ALL FUNCTIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
LAND INHIBIT DISCRETE FAILURE	LAND INHIBIT INPUTS IN DIFFERENT STATES FOR MORE THAN 10 SECONDS.	A/P DISENGAGE. "NO AUTOLAND" LIGHT ON.	NONE.	REF. AHRS SWITCHING (IF INSTALLED)REF. VHF NAV SWITCHING (IF INSTALLED)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
LOC DEV 1 SIGNAL FAILURE LOC DEV 1 VALID FAILURE LOC DEV 2 SIGNAL FAILURE LOC DEV 2 VALID FAILURE	FAILED LOCALIZER DEVIATION SIGNAL OR VALID FROM NUMBERED RECEIVER. FAILURE LOGGED ON SELECTED DFGC WHEN A/P IS ENGAGED IN LOC, ILS, OR AUTOLAND (ALIGN AND ROLLOUT).	LOSS OF ASSOC. SIGNAL OR VALID (i.e. LOC DEV 1 SIGNAL FAILURE WITH DFGC-1 SELECTED) INHIBITS LOC, ILS AND AUTO- LAND. A/P DISENGAGES, FD CMD BAR BIAS. LOSS OF NON ASSOC INPUT AFTER LOC TRK RESULTS IN AP DISENGAGE AND FD CMD BAR BIAS. A/P CAN BE REENGAGED IN ILS OR LOC MODE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. Paragraph 4.. REF. ILS RECEIVER. (SUBJECT 34-32-00, Page 201)
NOTE: When -971 computers and subs are installed, LOC DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				
LOC DEV 1,2 COMP FAILURE	SPLIT BETWEEN LOCALIZER DEVIATION SIGNAL WITHOUT A CORRES-PONDING LOC DEV 1 OR LOC DEV 2 SIGNAL OR VALID FAILURE. FAILURE LOGGED ON SELECTED DFGC ONLY WHEN A/P ENGAGED IN LOC, ILS OR AUTOLAND (ALIGN OR ROLLOUT).	IF ENGAGED IN LOC, ILS OR AUTO-LAND, NON- ASSOC FD CMD BAR BIASES OUT OF VIEW.	SELF TESTS: DIAG. 350-357. SENSOR VALUES: (DISPLAY OPTION) DIAG. 219-220.	REF. Paragraph 4.. REF. ILS RECEIVER. (SUBJECT 34-32-00, Page 201)
NOTE: USE SIG. GEN. TO VERIFY LOC DEV. FROM EACH ILS RCVR.				
MACH TRIM POWER FAILURE	LOSS OF MACH TRIM SERVO AMPLIFIER POWER. LOGGED ONLY ON SELECTED DFGC.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. Paragraph 4.. REF. MACH TRIM ACT. (PAGEBLOCK 22-22-01/201)
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				
MACH TRIM SERVO FAILURE	FAILED MACH TRIM SERVO.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. Paragraph 4.. REF. MACH TRIM ACT. (PAGEBLOCK 22-22-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				
MAINT MEMORY FAILURE -DFGC	FAILURE DETECTED IN MAINTENANCE MEMORY USED TO STORE FLIGHT FAULTS.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
N1 LEFT FAILURE N1 RIGHT FAILURE	N1 VALID DATA FROM INDICATED N1 TRANSMITTER GONE FOR MORE THAN .6 SECONDS OR N1 COUNT NOT IN ALLOWABLE LIMITS WHEN VALID IS PRESENT.	EPR SYNCH DISABLED. IF FAILURE OCCURS WHEN ART IS ARMED THEN ART WILL FIRE, OTHERWISE "ART INOP" LIGHT ON. LOGGED IF AIRPLANE IS IN FLIGHT MODE (WEIGHT ON WHEEL SENSORS AND GND CONT RELAYS OPEN AND ENGINES RUNNING).	NONE.	VERIFY N1 INDICATORS DURING NEXT ENGINE RUNUP (SUBJECT 77-10-00, Page 501), IF PROPER, VERIFY WIRING TO DFGC. REF. (WDM 77-12-00).
OPTION PIN FAILURE	FAILED EVEN PARITY CHECK. NINE DFGC OPTION PINS ARE CHECKED FOR GROUNDS. AFTER CHECK THERE SHOULD BE AN EVEN NUMBER OF GROUNDS. THE OPTION PINS ARE: (a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) PARITY PIN	A/P AND FD DISABLED. A/P DISENGAGE AND FD CMD BIAS.	PASSIVE DISCRETES: DIAG. 48.	REF. Paragraph 4..
NOTE: FOR AIRPLANES WITH -906 AND SUBSEQUENT COMPUTERS, TEN DFGC OPTION PINS.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
	(a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) QNH CORRECT (g) BOX 2-A BOX 2-B (h) PARITY PIN (i) MD-87			
NOTE: -971 computers and subs provide expanded failure messages.				
OPTION PIN FAILURE X	X=0 for option pin parity failure based on the input discretes alone			
	X=1 for Box 2A vs. Box 2B option pin disagreement			
	X=2 for VG3 flag vs. VG3 option pin disagreement			
	X=3 for parity failure of critical option input discretes vs. their corresponding hardware flags.			
PAR RUD CLUTCH FAILURE	PARALLEL RUDDER SERVO CLUTCH INDICATES ENGAGED WHEN A/P DISENGAGED, OR DISENGAGED WHEN A/P ENGAGED DURING AUTOLAND, ILS OR AUTO GO-AROUND.	A/P DIS- ENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 10-11. SECOND SETUP INTER- ACTIVES: DIAG. 318-319. SERVO TESTS: DIAG. 422-438.	REF. Paragraph 4.. REF. DUPLEX RUDDER SERVO DRIVE. (PAGEBLOCK 22-13-02/201)
PAR RUD SERVO AMP FAILURE	FAILED PARALLEL RUDDER SERVO AMPLIFIER.	PAR RUDDER INHIBITED. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438.	REF. Paragraph 4.. REF. DUPLEX RUDDER SERVO DRIVE. (PAGEBLOCK 22-13-02/201)
PAR RUD SERVO MODEL FAILURE PARALLEL RUD SERVO FAILURE	FAILED PARALLEL RUDDER SERVO.	PAR RUDDER INHIBITED. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438. INTERNAL MONITORS: DIAG. 479. SENSOR VALUES: DIAG. 196-197, 204-205.	REF. Paragraph 4.. REF. DUPLEX RUDDER SERVO DRIVE. (PAGEBLOCK 22-13-02/201)
PAR RUD SURFACE MONITOR FAILURE	PARALLEL RUDDER SERVO FAILS TO MOVE RUDDER WITHIN MODEL LIMITS AS SEEN BY RUDDER SURFACE POSITION SENSOR.	A/P DISENGAGE IF IN AUTO- LAND. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DAIG. 479, 499. SENSOR VALUES: DIAG. 224. SERVO TESTS: DIAG. 422-438.	REF. Paragraph 4.. REF. SURFACE POSITION SENSORS. (PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
PITCH MODE CHECK FAILURE 0-DFGC PITCH MODE CHECK FAILURE 1-DFGC PITCH MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL PITCH MODE.	DFGC SHUT-DOWN. ALL SYSTEM FUNCTIONS LOST. SPD AND FD FLAG ON ASSOC. SIDE. A/P AND A/T DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
PMS DATA FAILURE	DFGC RECEIVED NO DATA ON PMS DATA BUS	PERF MODE INOP	DIAG. 508	REF. WIRING DIAG 34-63-0.
PMS/FMS DATA FAILURE (-970 DFGC)	DFGC RECEIVED NO DATA ON PMS/FMS DATA BUS	PERF MODE OR FMS VNAV MODE INOP	DIAG. 508	REF. WIRING DIAG 34-63-0.
QNH INPUT FAILURE. -906 COMPUTER.	QNH ANALOG INPUT UNREA- SONABLE. OPEN, SHORT TO GND OR SHORTED TO THE QFE REFERENCE.	APPLICABLE ONLY IF QNH CORRECT OPTION IS SELECTED. LOSS OF ALT. REF. ALT ARMING AND ALT. ALTERING INHIBITED.	SENSOR VALUES: DIAG. 247.	REMOVE AND REPLACE ASSOC. DFGC(PAGEBLOCK 22-01-01/201) OR 34-11. FAILED BARO SET IN STANDBY ALTIMETER.
RAD ALT 1 SIGNAL FAILURE RAD ALT 1 VALID FAILURE RAD ALT 2 SIGNAL FAILURE RAD ALT 2 VALID FAILURE	FAILED RADIO ALTIMETER -1 OR -2 SIGNAL OR VALID. MONITORED ONLY BELOW 2300 FEET RADIO ALTITUDE.	DEPENDS ON TYPE OF R/A INSTALLED. (a) 552 R/A- AUTO-LAND DISABLED. NO AUTOLAND LITE ON (i.e. NO GROUND AT J102B/94 AND J103B/94 REF. (WDM 22-16-18). (b) 552A R/A- NO AFFECT (GROUND AT J102B/94 AND J103B/94).	SELF TESTS: DIAG. 374-381 PASSIVE DISCRETES: DIAG. 41-44.	REF. Paragraph 4.. REF. RADIO ALTIMETER. (SUBJECT 77-11-02, Page 201)
RAD ALT 1,2 COMP FAILURE	SPLIT BETWEEN BOTH RADIO ALTIMETER SIGNALS WITHOUT A CORRESPONDING RAD ALT 1 OR RAD 2 SIGNAL OR VALID FAILURE.	LOSS OF ILS, AUTO-LAND, TAKE- OFF AND A/T RETARD. A/P DISCONNECT. "NO AUTO- LAND" LIGHT ON.	SELF TESTS: DIAG. 374-381. PASSIVE DISCRETES: DIAG. 41-44.	REF. Paragraph 4.. REF. RADIO ALTIMETER. (SUBJECT 34-42-00, Page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
R/A OPTION PIN FAILURE	RADIO ALTI- METER OPTION PIN DIS- AGREEMENT.	NONE. 552A R/A- CHECK J102A/94 AND J103A/94 FOR GROUND. 552 R/A - CHECK J102A/94 AND J103A/94 FOR OPEN.	PASSIVE DISCRETES: DIAG. 47.	REF. Paragraph 4.. REF. RADIO ALTIMETER. (SUBJECT 77-11-02, Page 201)
RAM FAILURE -DFGC *	VALUE STORED IN RANDOM ACCESS MEMORY (RAM) LOCATION NOT THE SAME AS VALUE READ FROM THE SAME RAM LOCATION.	DFGC SHUT- DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for RAM failure. (Paragraph 1.I.)				
ROLL MODE CHECK FAILURE 0-DFGC ROLL MODE CHECK FAILURE 1-DFGC ROLL MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL ROLL MODE.	DFGC SHUT- DOWN ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
RUD UNRESTRICTED SWITCH FAILURE	TWO SEPARATE FAILURES: (a) EITHER RUDDER UNRESTRICTED SWITCH INDICATING UNRESTRICTED ABOVE 195 KNOTS. (b) EITHER RUDDER UNRESTRICTED SWITCH INDICATING RESTRICTED BELOW 145 KNOTS.	(a) NONE. (b) A/P DISENGAGE "NO AUTO- LAND" LIGHT ON.	(a) CHECK OPERATION OF SWITCH REF. RUDDER. (PAGEBLOCK 27-20-06/201). (b) PASSIVE DISCRETES: DIAG. 37-38.	REF. Paragraph 4.. REF. RUDDER. (PAGEBLOCK 27-20-00/101)
NOTE: -971 computers and subs provide expanded failure messages.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
RUD UNRESTRICTED SWITCH FAIL X	X=0 for a non-isolatable failure X=1 for switch 1 indicating restricted below 145 kts			
	X=2 for switch 2 indicating restricted below 145 kts			
	X=3 for both switches indicating restricted below 145 kts			
	X=4 for switch 1 indicating unrestricted above 205 kts			
	X=5 for switch 2 indicating unrestricted above 205 kts			
	X=6 for both switches indicating unrestricted above 205 kts			
	X=7 for switch 1 indicating restricted during autoland			
	X=8 for switch 2 indicating restricted during autoland			
	X=9 for both switches indicating restricted during autoland			
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on ground.				
RUDDER POS FAILURE	FAILED RUDDER SURFACE POSITION SYNCHRO.	AUTOLAND INHIBIT. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN AUTO- LAND. FD REVERTS TO ILS.	INTERNAL MONITORS: DIAG. 499. SENSOR VALUES: DIAG. 224.	REF. Paragraph 4.. REF. SURFACE POSITION SENSORS. (PAGEBLOCK 22-01-03/201)
SLAT POS 1, 2 COMP FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS WITHOUT LOSING EITHER SLAT VALID.	LOSS OF A/P AND FD TAKEOFF AND GO-AROUND. LOSS OF ALL AUTO-THROTTLE MODES EXCEPT EPR. SLOW-FAST BIAS, SPD FLAG IN VIEW. "ART INOP" LIGHT ON.	PASSIVE DISCRETES: DIAG. 33-34. SECOND SETUP INTER-ACTIVES: DIAG. 334-335, 341-342, 348-349.	REF. Paragraph 4.. REF. SLAT ADVISORY SENSORS. (PAGEBLOCK 27-80-06/201)
SLAT POS 1 VALID FAILURE SLAT POS 2 VALID FAILURE	FAILED SLAT VALID 1 OR SLAT VALID 2 FROM PROXIMITY SWITCH ELECTRONICS UNIT.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING, SLATS OUT OF RETRACT) THEN "ART INOP" LIGHT ON. OTHER-WISE, NO AFFECT. AUTO G/A NOT AVAIL- ABLE.	PASSIVE DISCRETES: DIAG. 33-34.	REF. Paragraph 4.. REF. SLAT ADVISORY SENSORS. PAGEBLOCK 27-80-06/201

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
SLAT POS 1 SIGNAL FAILURE SLAT POS 2 SIGNAL FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS BUT LESS THAN SIXTEEN SECONDS WITHOUT LOSING EITHER SLAT VALID.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING AND SLATS NOT RETRACTED) THEN "ART INOP" LIGHT ON OTHERWISE "NO EFFECT" G/A NOT AVAILABLE	PASSIVE DISCRETES DIAG. 33-34.	REF. Paragraph 4.. REF. SLAT ADVISORY SENSORS. PAGEBLOCK 27-80-06/201
SPEED REF FAILURE	FAILED SPD/ MACH SELECT SYNCHRO IN FGCP.	LOSS OF A/T OPERATION IN SPEED AND MACH MODES. SPD/MACH DISPLAY INOP.	COCKPIT DISPLAYS: DIAG. 170. INTERNAL MONITORS: DIAG. 480.	REF. Paragraph 4.. REF. FGCP. (PAGEBLOCK 22-01-02/201)
SPOILER POS 1 FAILURE SPOILER POS 2 FAILURE	FAILED LEFT (1) OR RIGHT (2) SPOILER POSITION SYNCHRO.	NO AFFECT.	INTERNAL MONITORS: DIAG. 492-493. SENSOR VALUES: DIAG. 186-187.	REF. Paragraph 4.. REF. SURFACE POSITION SENSORS. (PAGEBLOCK 22-01-03/201)
STAB TRIM MOTION MONITOR FAILURE	STAB MOTION POLARITY IS OPPOSITE CMD POLARITY.	A/P DISCONNECT	N/A	FAILED TRIM BRAKE SW S10-8 FAILED UP TRIM RELAY R20-12 FAILED DWN TRIM RELAY R20-13 ASSOCIATED WIRING FAILED DFGC
TEMP SELECT PANEL FAILURE 0 TEMP SELECT PANEL FAILURE 1	TEMPERATURE SELECT PANEL FAILED TO AN ILLEGAL INPUT.	"NO MODE" DISPLAY ON TRI WHEN T.O. FLX IS PRESSED.	COCKPIT DISPLAYS: DIAG. 93-108.	REF. Paragraph 4.. REF. THRUST RATING INDICATOR. (PAGEBLOCK 34-18-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
TICKET CHECK FAILURE 0-DFGC TICKET CHECK FAILURE 1-DFGC TICKET CHECK FAILURE 2-DFGC TICKET CHECK FAILURE 3-DFGC TICKET CHECK FAILURE 4-DFGC TICKET CHECK FAILURE 5-DFGC TICKET CHECK FAILURE 6-DFGC TICKET CHECK FAILURE 7-DFGC	COMPUTER MONITORS DETECT AN INCOMPLETE TASK.	DFGC SHUT-DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)
NOTE: There may be more ticket check failures than those listed. All will cause the same problems as shown.				
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for TICKET CHECK FAILURE. (Paragraph 1.I.)				
TRI VALID FAILURE	THRUST RATING INDICATOR VALID CLEAR FOR GREATER THAN 3 SECONDS. LOGGED ONLY ON SELECTED DFGC.	"NO MODE" DISPLAY ON TRI WITH EPR LIM FLAG IN VIEW. A/T DISCONNECT IN EPR LIM MODE.	PASSIVE DISCRETES: DIAG. 40. COCKPIT DISPLAYS: DIAG. 255-256.	REF. Paragraph 4.. REF. THRUST RATING INDICATOR. (PAGEBLOCK 34-18-02/201)
WJE 401-404, 412, 414, 875-879				
ATTITUDE 1 SIGNAL FAILURE ATTITUDE 1 VALID FAILURE ATTITUDE 1 SIGNAL FAILURE ATTITUDE 2 VALID FAILURE	FAILED ATTITUDE SIGNAL OR VALID FROM NUMBERED ATTITUDE SYSTEM.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. INERTIAL REFERENCE SYSTEM. (PAGEBLOCK 34-43-00/201)
ATTITUDE 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED ATTITUDE SYSTEM WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED SYSTEM.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. INERTIAL REFERENCE SYSTEM. (PAGEBLOCK 34-43-00/201)
WJE 886, 887				
NOTE: -920 and subsequent DFGC's will display ATT for VERT GYRO.				

WJE 886, 887 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ATTITUDE 1 SIGNAL FAILURE ATTITUDE 1 VALID FAILURE ATTITUDE 2 SIGNAL FAILURE ATTITUDE 2 VALID FAILURE	FAILED ATTITUDE SIGNAL OR VALID FROM NUMBERED ATTITUDE SYSTEM.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. ATTITUDE (SUBJECT 34-23-00), REF. HEADING SYSTEM (SUBJECT 34-21-00, Page 201), REF. AHRU (SUBJECT 34-21-10, Page 201).
ATTITUDE 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED VERTICAL GYROS WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED VG.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. Paragraph 4.. REF. ATTITUDE. (SUBJECT 34-23-00)
WJE 401-404, 412, 414, 875-879, 886, 887				
VERT SPD REF FAILURE (-904 DFGC)	FAILED PITCH SELECT WHEEL ON FGCP.	DISPLAYED VALUE FROZEN ON FGCP. VARYING OF PITCH WHEEL INHIBITED.	INTERNAL MONITORS: DIAG. 503. COCKPIT DISPLAYS: DIAG. 263. SWITCHES AND BUTTONS: DIAG. 176.	REF. Paragraph 4.. REF. FGCP. (PAGEBLOCK 22-01-02/201)
VREF FIXED LEFT FAILURE	LABELED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC. CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 1 SIGNAL FAILURE. (b) ANGLE OF ATTACK 1 SIGNAL FAILURE. (c) HEADING 1 SIGNAL FAILURE. (d) CRS ERROR 1 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. REF. (WDM 22-16-11).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VREF FIXED RIGHT FAILURE	LABELED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 2 SIGNAL FAILURE. (b) ANGLE OF ATTACK 2 SIGNAL FAILURE. (c) HEADING 2 SIGNAL FAILURE. (d) CRS ERROR 2 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
VREF SWITCHED LEFT FAILURE	LABELED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) VERT SPD REF FAILURE. (b) SPD SEL FAILURE. (c) ALT SEL FAILURE. (d) AILERON POSITION FAILURE. (e) EPR LEFT FAILURE. (f) SPOILER POS 1 FAILURE. (g) ELEV POS 1 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)

Table 102 (Continued)

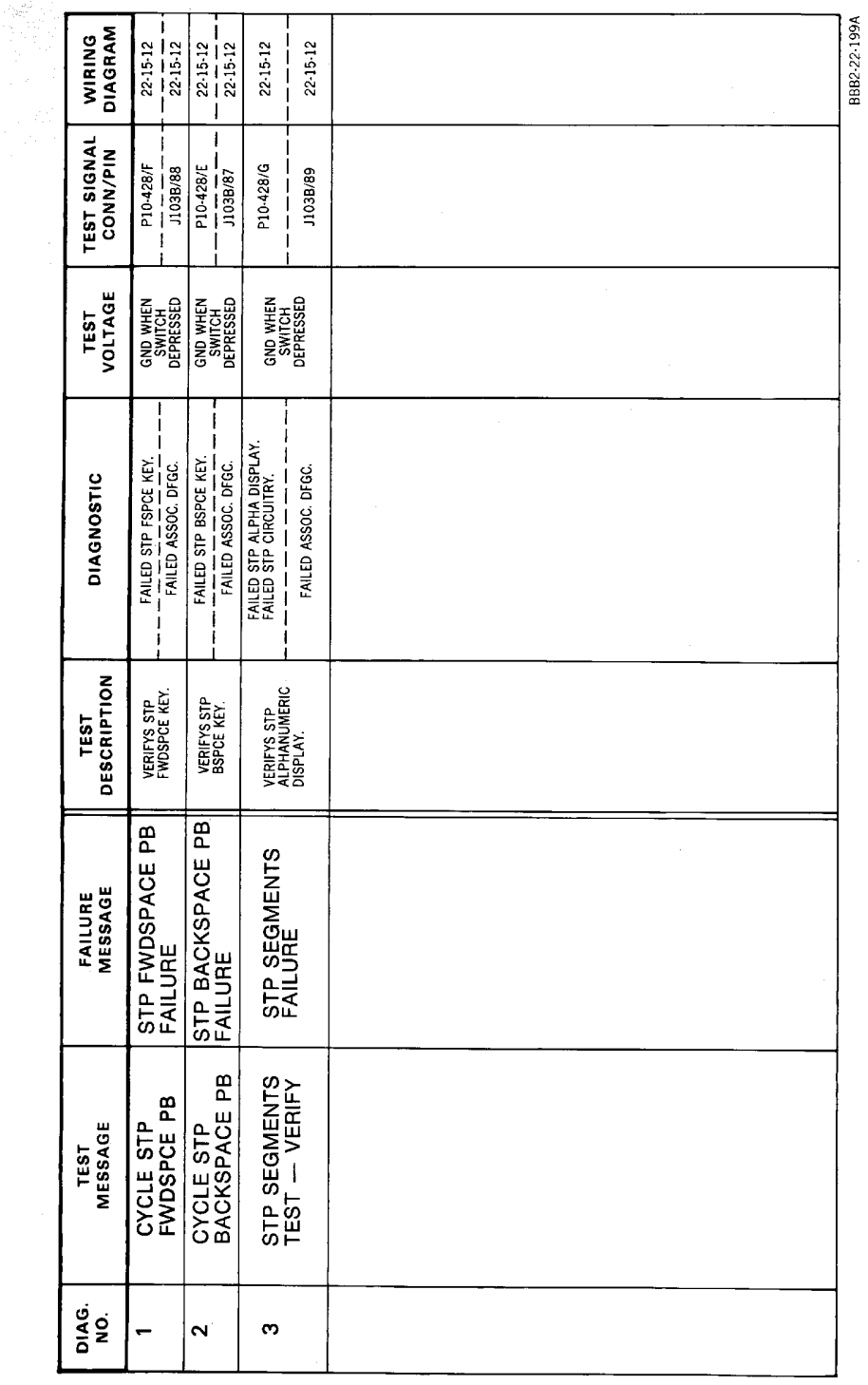
FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VREF SWITCHED RIGHT FAILURE	LABELED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP HANDLE FAILURE. (b) RUDDER POS FAILURE. (c) HOR STAB FAILURE. (d) EPR RIGHT FAILURE. (e) SPOILER POS 2 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
-906 AND SUBSEQUENT COMPUTERS. WHEEL SPINUP-1 SIGNAL FAILURE WHEEL SPINUP-2 SIGNAL FAILURE	DISCRETE FAILED SPIN STATE AT IAS >195 KTS.	NONE.	PASSIVE DISCRETES: DIAG. 49-50	REF. Paragraph 4..
WIND SHEAR DATA FAILURE	FAILED WIND SHEAR COMPUTER (WSC) OR DFGC DOES NOT RECEIVE DATA FROM WSC.	"W/S INOP" LIGHT ON.	INTERNAL MONITORS: DIAG. 509.	REF. WIND SHEAR SELF-TEST. (SUBJECT 34-47-00, Page 201)
YAW DAMP SERVO FAILURE	FAILED YAW DAMPER ACTUATOR.	"YAW DAMP OFF" LIGHT ON.	SERVO TESTS: DIAG. 442-443. SENSOR VALUES: DIAG. 198, 208.	REF. Paragraph 4.. REF. YAW DAMPER ACTUATOR. (PAGEBLOCK 22-13-01/201)
YAW DAMPER POWER FAILURE	FAILURE OF 28 VDC YAW DAMPER POWER.	"YAW DAMP OFF" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 323-324. SERVO TESTS: DIAG. 442-443. INITIAL SETUP INTER- ACTIVES: DIAG. 16-17.	REF. Paragraph 4.. REF. YAW DAMPER ACTUATOR. PAGEBLOCK 22-13-01/201
YAW MODE CHECK FAILURE 1-DFGC YAW MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL YAW MODE.	DFGC SHUT-DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (PAGEBLOCK 22-01-01/201)

4. Trouble Shooting Charts Index

A. These trouble shooting charts are to be used in conjunction with the diagnostic numbers that appear when a failure is displayed on the STP in the Return to Service or the Maintenance test.

Table 103

Sequence	Figure
0 - STP Tests	Figure 104
1 - Initial Setup Interactives	Figure 105
2 - Passive Discretes	Figure 106
3 - Switches and Buttons	Figure 107
4 - Sensor Values	Figure 108
5 - Cockpit Displays	Figure 109
6 - Second Setup Interactives	Figure 110
7 - Self-Tests	Figure 111
8 - Servo Tests	Figure 112
9 - Internal Monitors	Figure 113



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
1	CYCLE STP FWDSPCE PB	STP FWDSPACE PB FAILURE	VERIFYS STP FWDSPCE KEY.	FAILED STP FSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/F J103B/88	22-15-12 22-15-12
2	CYCLE STP BACKSPACE PB	STP BACKSPACE PB FAILURE	VERIFYS STP BSPCE KEY.	FAILED STP BSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/E J103B/87	22-15-12 22-15-12
3	STP SEGMENTS TEST — VERIFY	STP SEGMENTS FAILURE	VERIFYS STP ALPHANUMERIC DISPLAY.	FAILED STP ALPHA DISPLAY. FAILED STP CIRCUITRY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/G J103B/89	22-15-12 22-15-12

BBB2-22-199A

Sequence Zero - STP Tests
Figure 104/22-01-05-990-858

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
4	DISENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. J102A/100	22-14-11 22-14-11
5		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/K SEL 1, J103/K SEL 2. J102A/104	22-14-11 22-14-11
6		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-419/G J102A/96	22-14-11 22-12-12 22-12-12
7		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
8		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J013/H SEL 2. P10-421/G J102A/95	22-14-11 22-11-12 22-11-12
9		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P:10-422/G J103A/95	22-14-11 22-11-12 22-11-12
10		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-423/G J103B/77	22-14-11 22-13-12 22-13-12

BBB2-22-210A

Sequence One - Initial Setup Interactives
Figure 105/22-01-05-990-859 (Sheet 1 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
11		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12
12	FMA-1 A/P LITE OFF — VERIFY	FMA-1 A/P LITE OFF FAILURE	DRIVES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-1.	28 VDC	J101/N P1-644/16 J102B/24	22-17-11 22-17-11 22-17-11
13	FMA-2 A/P LITE OFF — VERIFY	FMA-2 A/P LITE OFF FAILURE	DRIVES FMA A/P-2 ANNUNCIATOR	FAILED FMA A/P-2 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-2.	28 VDC	J101/P P1-644/20 J102B/24	22-17-11 22-17-11 22-17-11
14	DISENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2. J103B/26	22-31-12 22-31-12
15		A/T CLAMP FAILURE	VERIFIES A/T ENGAGE SWITCH AND CLAMP LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AUTOTHROTTLE CLAMP RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2. R50-329/X1, X2 J103B/36	22-31-12 22-31-14 22-31-14
16	DISENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-194 J103B/8	22-13-12 22-13-12
17	YAW DAMP OFF LITE ON — VERIFY	YAW DAMP OFF LITE ON FAILURE	DRIVES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE. FAILED ASSOC. DFGC.	GND	P1-119/C J103B/53	22-13-12 33-12-00 22-13-12

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Sequence One - Initial Setup Interactives
Figure 105/22-01-05-990-859 (Sheet 2 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
18	RCVRS NOT ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 NOT TUNED TO ILS FREQ.	FAILED NAV 1 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-319B/38 J101A/17	34-26-02 34-26-02
19		NAV 2 TUNING FAILURE	VERIFIES NAV 2 NOT TUNED TO ILS FREQ.	FAILED NAV 2 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-320B/38 J104A/17	34-26-02 34-26-02
20	ADVANCE THROTTLE — VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED LEFT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-196 J101A/43	22-31-11 22-31-11
21		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED RIGHT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-198 J104A/43	22-31-11 22-31-11

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Sequence One - Initial Setup Interactives
Figure 105/22-01-05-990-859 (Sheet 3 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
22		ATTITUDE 1 VALID FAILURE	VERIFIES ATT VALID 1	FAILED ATT-1 FAILED ASSOC. DFGC.	28 VDC	P10-18/45 J2A/19, 17 J101A/14	34-24-01 34-24-01 34-24-01
23		ATTITUDE 2 VALID FAILURE	VERIFIES ATT VALID 2	FAILED ATT-2 FAILED ASSOC. DFGC.	28 VDC	P10-19/45 J2B/19, 17 J104B/14	34-24-02 34-24-02 34-24-02
24							
25		HDG 1 VALID FAILURE	VERIFIES HDG 1 VALID	FAILED DG-1. FAILED INSTR. AMP-1./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-4/F R50-323B/53 J101A/15	34-22-03 34-22-03 34-22-03
26		HDG 2 VALID FAILURE	VERIFIES HDG 2 VALID	FAILED DG-2. FAILED INSTR. AMP-2./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-7/F R50-324B/53 J104A/15	34-22-04 34-22-04 34-22-04
27		DLA-A VALID FAILURE	VERIFIES DLA-A VALID	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-412/P J101A/37	22-19-11 22-19-11
28		DLA-B VALID FAILURE	VERIFIES DLA-B VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-413/L J104A/37	22-19-11 22-19-11

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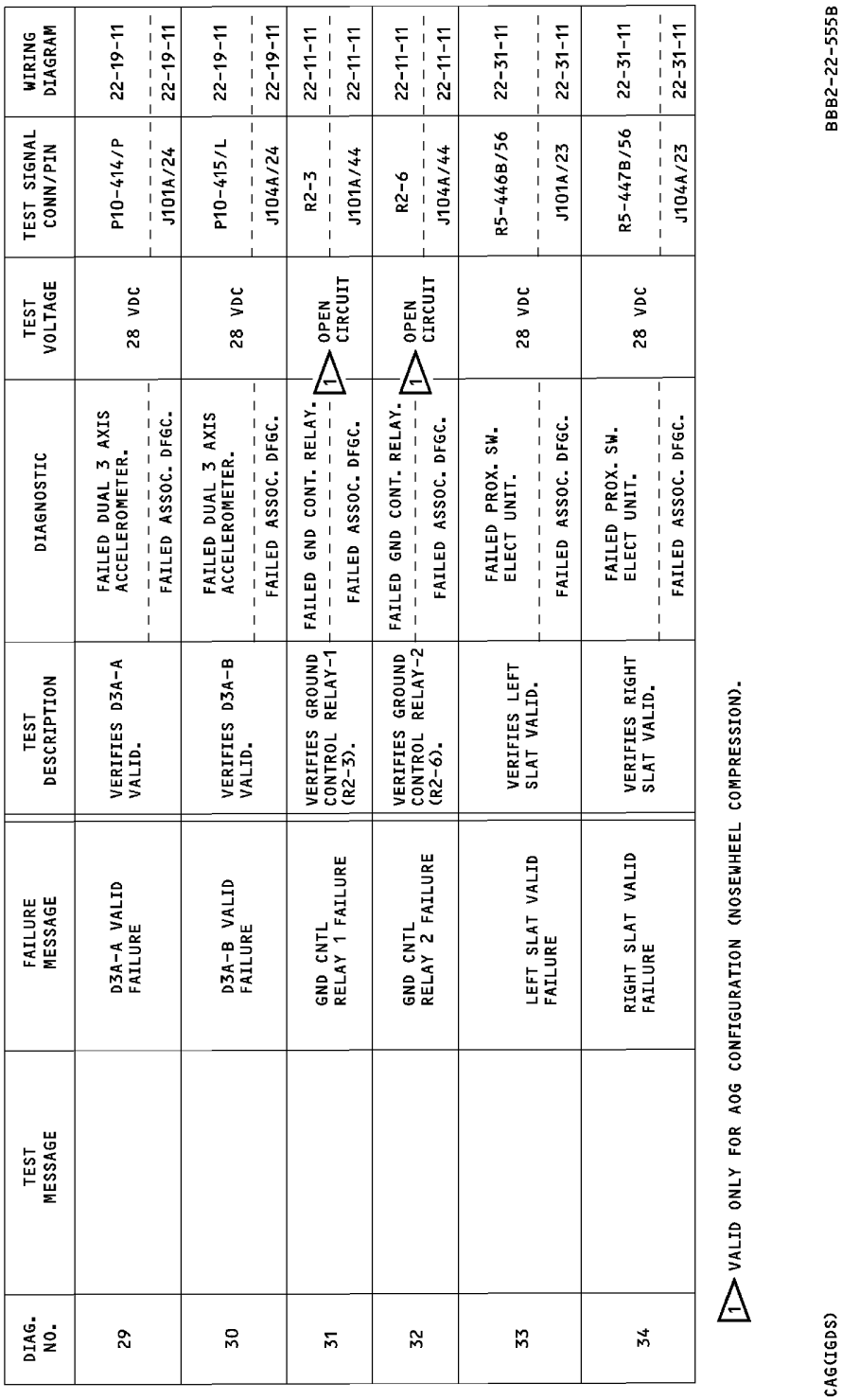
Sequence Two - Passive Discretes
Figure 106/22-01-05-990-860 (Sheet 1 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
29		D3A-A VALID FAILURE	VERIFIES D3A-A VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-414/P J101A/24	22-19-11 22-19-11
30		D3A-B VALID FAILURE	VERIFIES D3A-B VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-415/L J104A/24	22-19-11 22-19-11
31		GND CNTL RELAY 1 FAILURE	VERIFIES GROUND CONTROL RELAY-1 (R2-3).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	(1) OPEN CIRCUIT	R2-3 J101A/44	22-11-11 22-11-11
32		GND CNTL RELAY 2 FAILURE	VERIFIES GROUND CONTROL RELAY-2 (R2-6).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	(1) OPEN CIRCUIT	R2-6 J104A/44	22-11-11 22-11-11
33		LEFT SLAT VALID FAILURE	VERIFIES LEFT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-446B/56 J101A/23	22-31-11 22-31-11
34		RIGHT SLAT VALID FAILURE	VERIFIES RIGHT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-447B/56 J104A/23	22-31-11 22-31-11

(1) VALID ONLY FOR AOG CONFIGURATION (NOSEWHEEL COMPRESSION).

CAG(IGDS)

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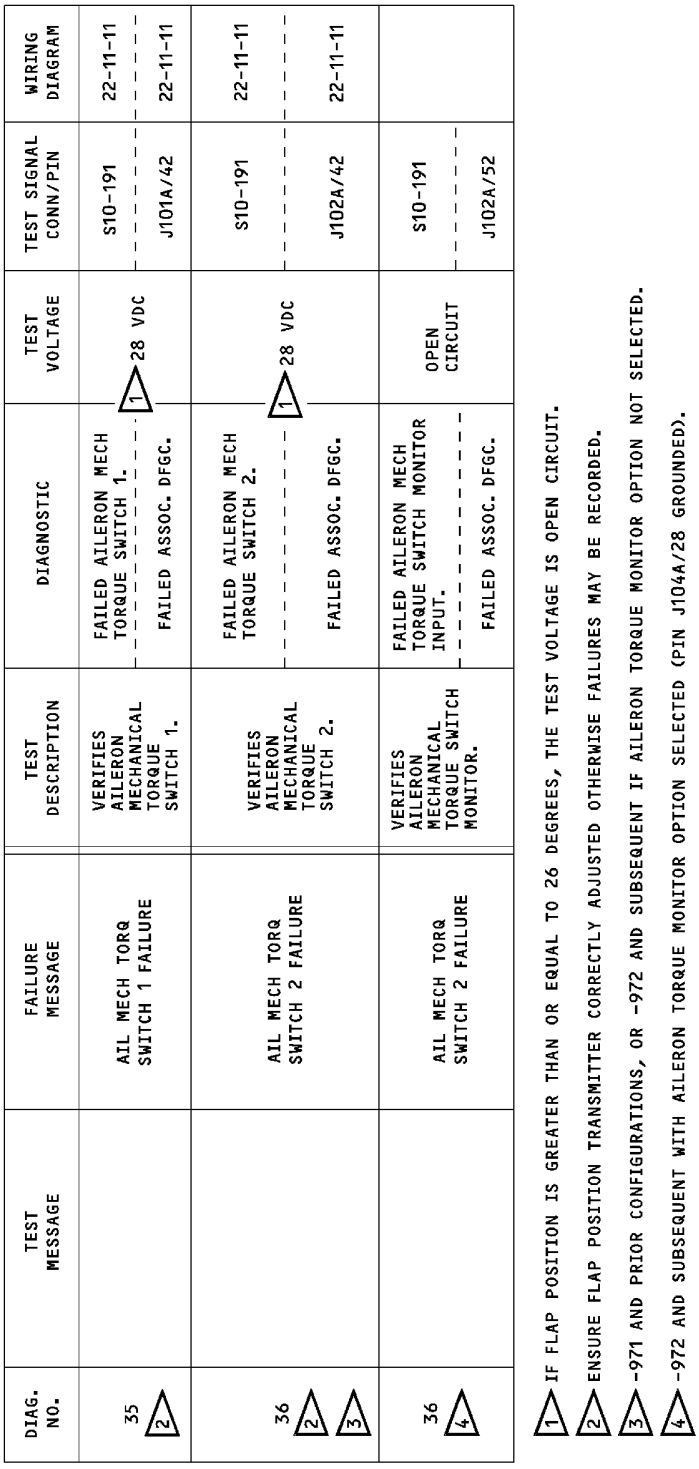
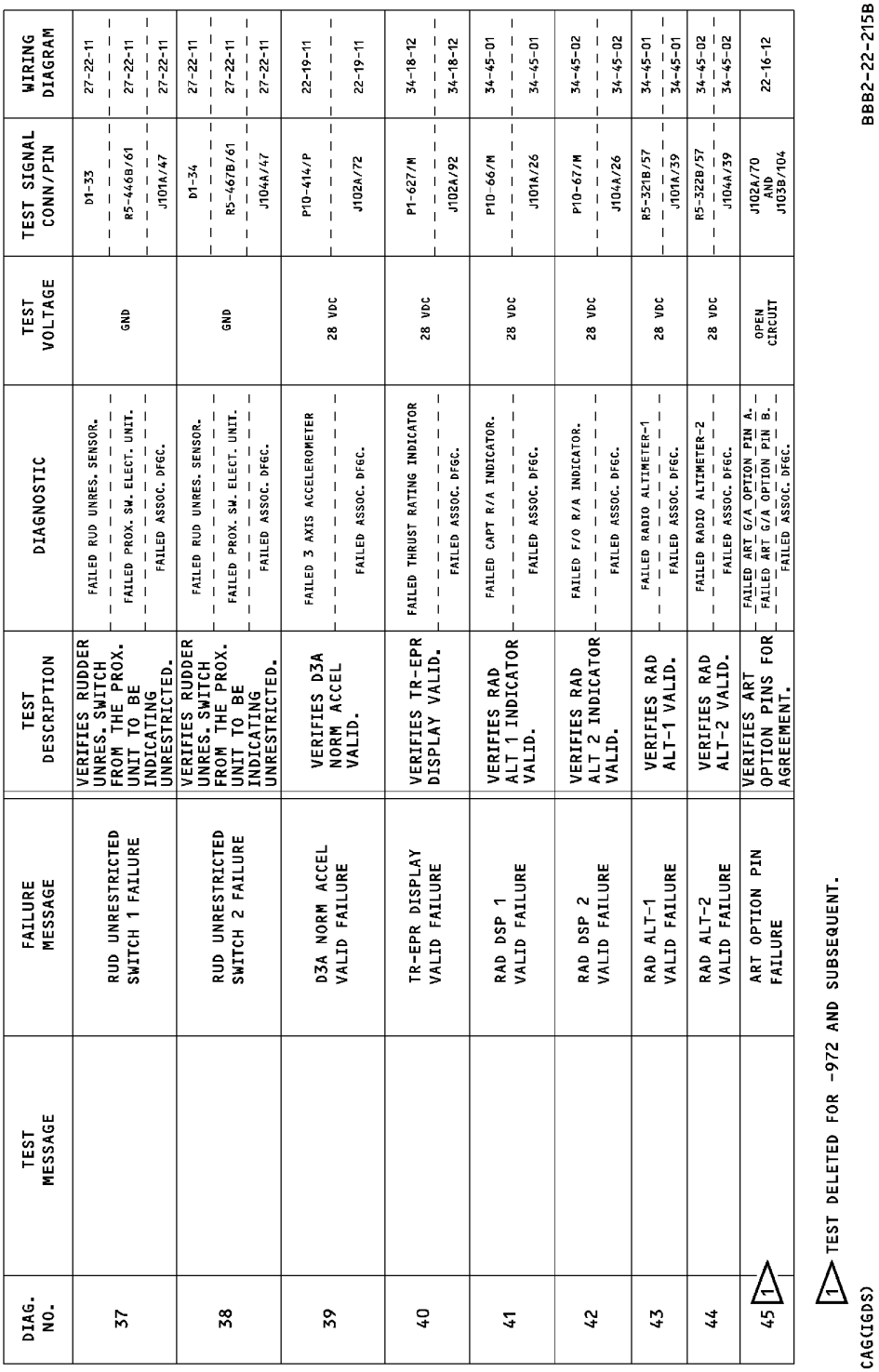
Sequence Two - Passive Discretes
Figure 106/22-01-05-990-860 (Sheet 2 of 6)



Sequence Two - Passive Discretes
Figure 106/22-01-05-990-860 (Sheet 3 of 6)



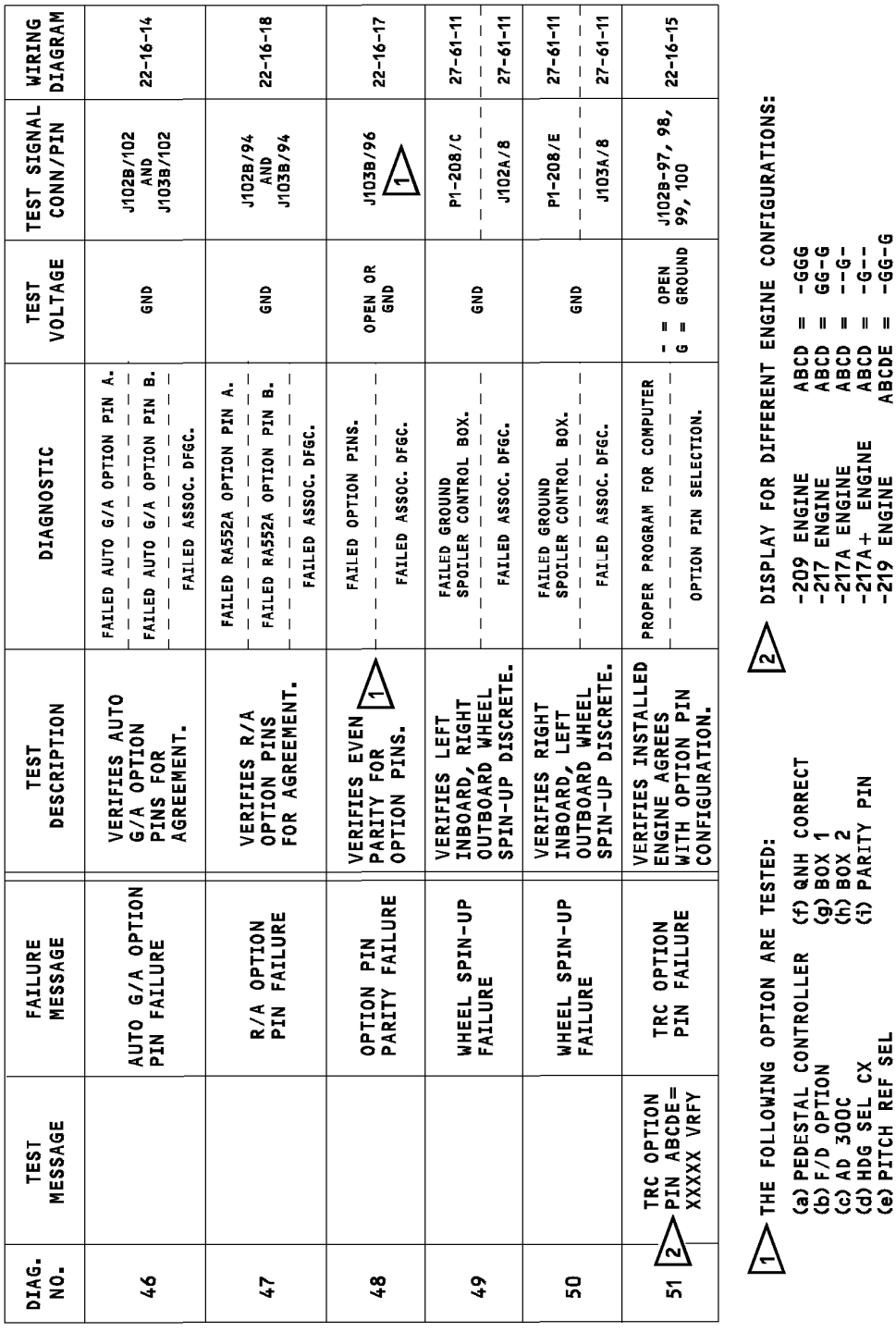
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
37		RUD UNRESTRICTED SWITCH 1 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-33 R5-446B/61 J101A/47	27-22-11 27-22-11 27-22-11
38		RUD UNRESTRICTED SWITCH 2 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-34 R5-467B/61 J104A/47	27-22-11 27-22-11 27-22-11
39		D3A NORM ACCEL VALID FAILURE	VERIFIES D3A NORM ACCEL VALID.	FAILED 3 AXIS ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-414/P J102A/72	22-19-11 22-19-11
40		TR-EPR DISPLAY VALID FAILURE	VERIFIES TR-EPR DISPLAY VALID.	FAILED THRUST RATING INDICATOR FAILED ASSOC. DFGC.	28 VDC	P1-627/M J102A/92	34-18-12 34-18-12
41		RAD DSP 1 VALID FAILURE	VERIFIES RAD ALT 1 INDICATOR VALID.	FAILED CAPT R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-66/M J101A/26	34-45-01 34-45-01
42		RAD DSP 2 VALID FAILURE	VERIFIES RAD ALT 2 INDICATOR VALID.	FAILED F/O R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-67/M J104A/26	34-45-02 34-45-02
43		RAD ALT-1 VALID FAILURE	VERIFIES RAD ALT-1 VALID.	FAILED RADIO ALTIMETER-1 FAILED ASSOC. DFGC.	28 VDC	R5-321B/57 J101A/39	34-45-01 34-45-01
44		RAD ALT-2 VALID FAILURE	VERIFIES RAD ALT-2 VALID.	FAILED RADIO ALTIMETER-2 FAILED ASSOC. DFGC.	28 VDC	R5-322B/57 J104A/39	34-45-02 34-45-02
45 1		ART OPTION PIN FAILURE	VERIFIES ART OPTION PINS FOR AGREEMENT.	FAILED ART G/A OPTION PIN A. FAILED ART G/A OPTION PIN B. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J102A/70 AND J103B/104	22-16-12

1 TEST DELETED FOR -972 AND SUBSEQUENT.

CAG(IGDS)

BBB2-22-215B

Sequence Two - Passive Discretes
Figure 106/22-01-05-990-860 (Sheet 4 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
46		AUTO G/A OPTION PIN FAILURE	VERIFIES AUTO G/A OPTION PINS FOR AGREEMENT.	FAILED AUTO G/A OPTION PIN A. FAILED AUTO G/A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/102 AND J103B/102	22-16-14
47		R/A OPTION PIN FAILURE	VERIFIES R/A OPTION PINS FOR AGREEMENT.	FAILED RA552A OPTION PIN A. FAILED RA552A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/94 AND J103B/94	22-16-18
48		OPTION PIN PARITY FAILURE	VERIFIES EVEN PARITY FOR OPTION PINS. (1)	FAILED OPTION PINS. FAILED ASSOC. DFGC.	OPEN OR GND	J103B/96 (1)	22-16-17
49		WHEEL SPIN-UP FAILURE	VERIFIES LEFT INBOARD, RIGHT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/C J102A/8	27-61-11 27-61-11
50		WHEEL SPIN-UP FAILURE	VERIFIES RIGHT INBOARD, LEFT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/E J103A/8	27-61-11 27-61-11
51 (2)	TRC OPTION PIN ABCDE= XXXXX VRFY	TRC OPTION PIN FAILURE	VERIFIES INSTALLED ENGINE AGREES WITH OPTION PIN CONFIGURATION.	PROPER PROGRAM FOR COMPUTER OPTION PIN SELECTION.	- = OPEN G = GROUND	J102B-97, 98, 99, 100	22-16-15

(1) THE FOLLOWING OPTION ARE TESTED:
(a) PEDESTAL CONTROLLER
(b) F/D OPTION
(c) AD 300C
(d) HDG SEL CX
(e) PITCH REF SEL
(f) QNH CORRECT
(g) BOX 1
(h) BOX 2
(i) PARITY PIN

(2) DISPLAY FOR DIFFERENT ENGINE CONFIGURATIONS:

-209 ENGINE	ABCD =	-GGG
-217 ENGINE	ABCD =	GG-G
-217A ENGINE	ABCD =	--G-
-217A+ ENGINE	ABCD =	-G--
-219 ENGINE	ABCDE =	-GG-G

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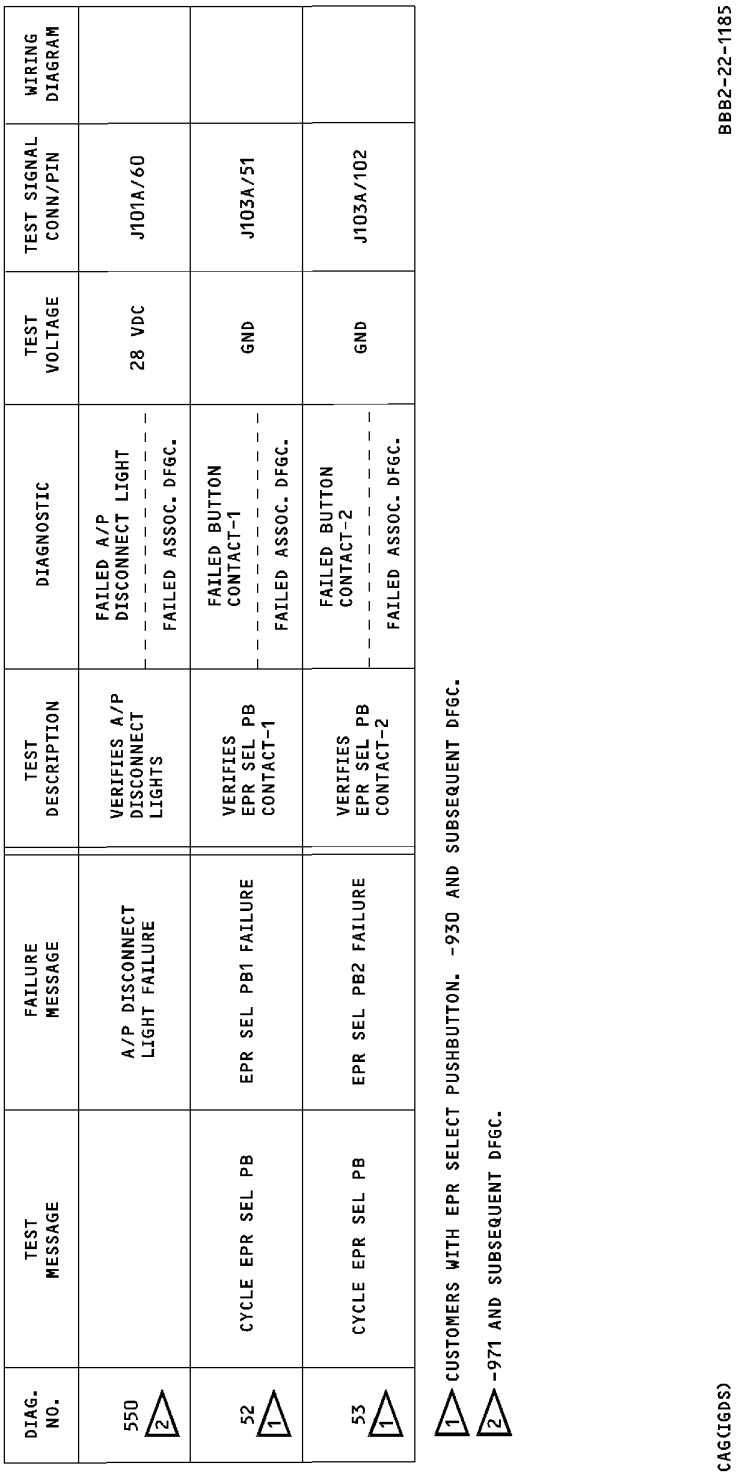
S0006528159V2

Sequence Two - Passive Discretes
Figure 106/22-01-05-990-860 (Sheet 5 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
550 (2)		A/P DISCONNECT LIGHT FAILURE	VERIFIES A/P DISCONNECT LIGHTS	FAILED A/P DISCONNECT LIGHT FAILED ASSOC. DFGC.	28 VDC	J101A/60	
52 (1)	CYCLE EPR SEL PB	EPR SEL PB1 FAILURE	VERIFIES EPR SEL PB CONTACT-1	FAILED BUTTON CONTACT-1 FAILED ASSOC. DFGC.	GND	J103A/51	
53 (1)	CYCLE EPR SEL PB	EPR SEL PB2 FAILURE	VERIFIES EPR SEL PB CONTACT-2	FAILED BUTTON CONTACT-2 FAILED ASSOC. DFGC.	GND	J103A/102	

(1) CUSTOMERS WITH EPR SELECT PUSHBUTTON. -930 AND SUBSEQUENT DFGC.
(2) -971 AND SUBSEQUENT DFGC.

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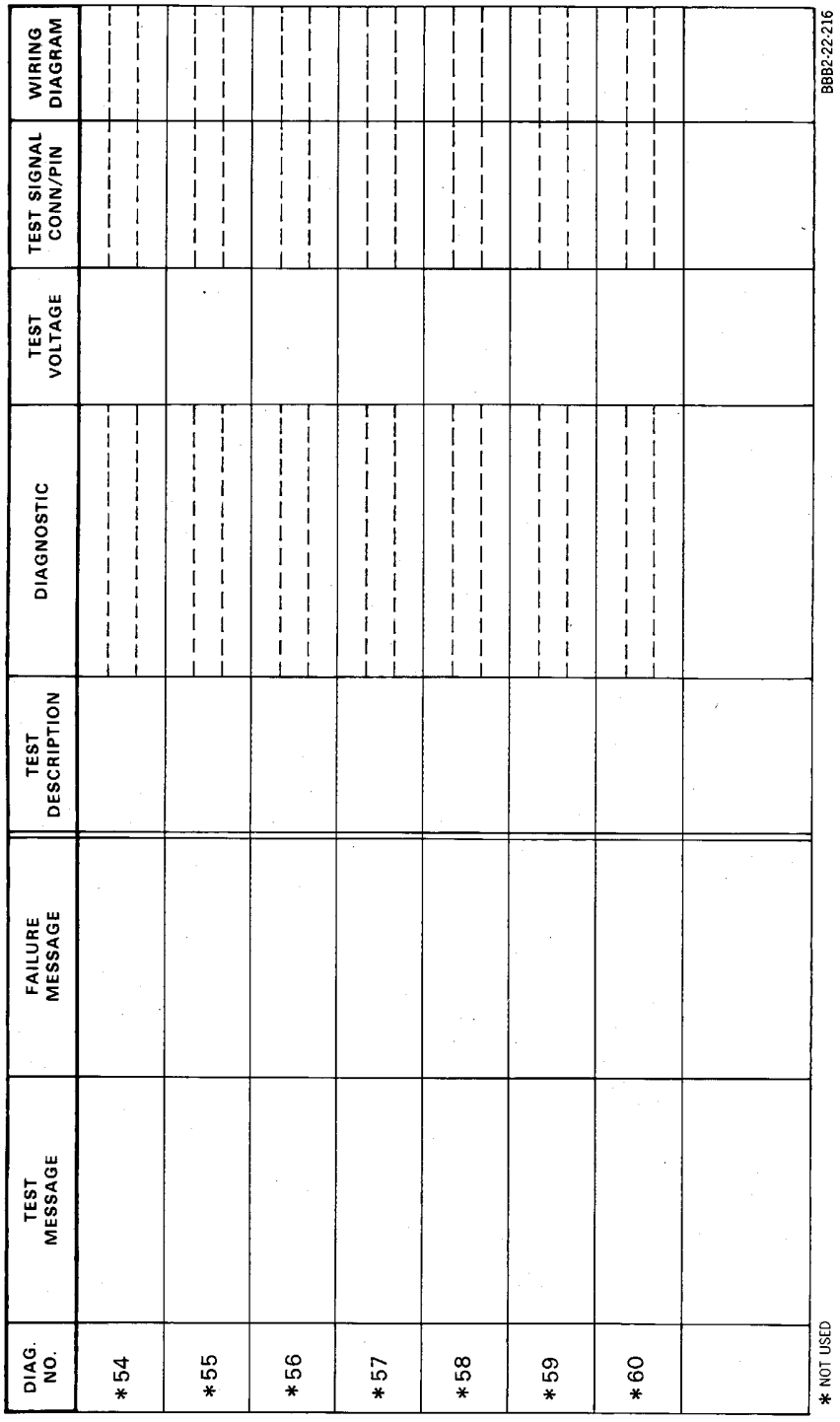
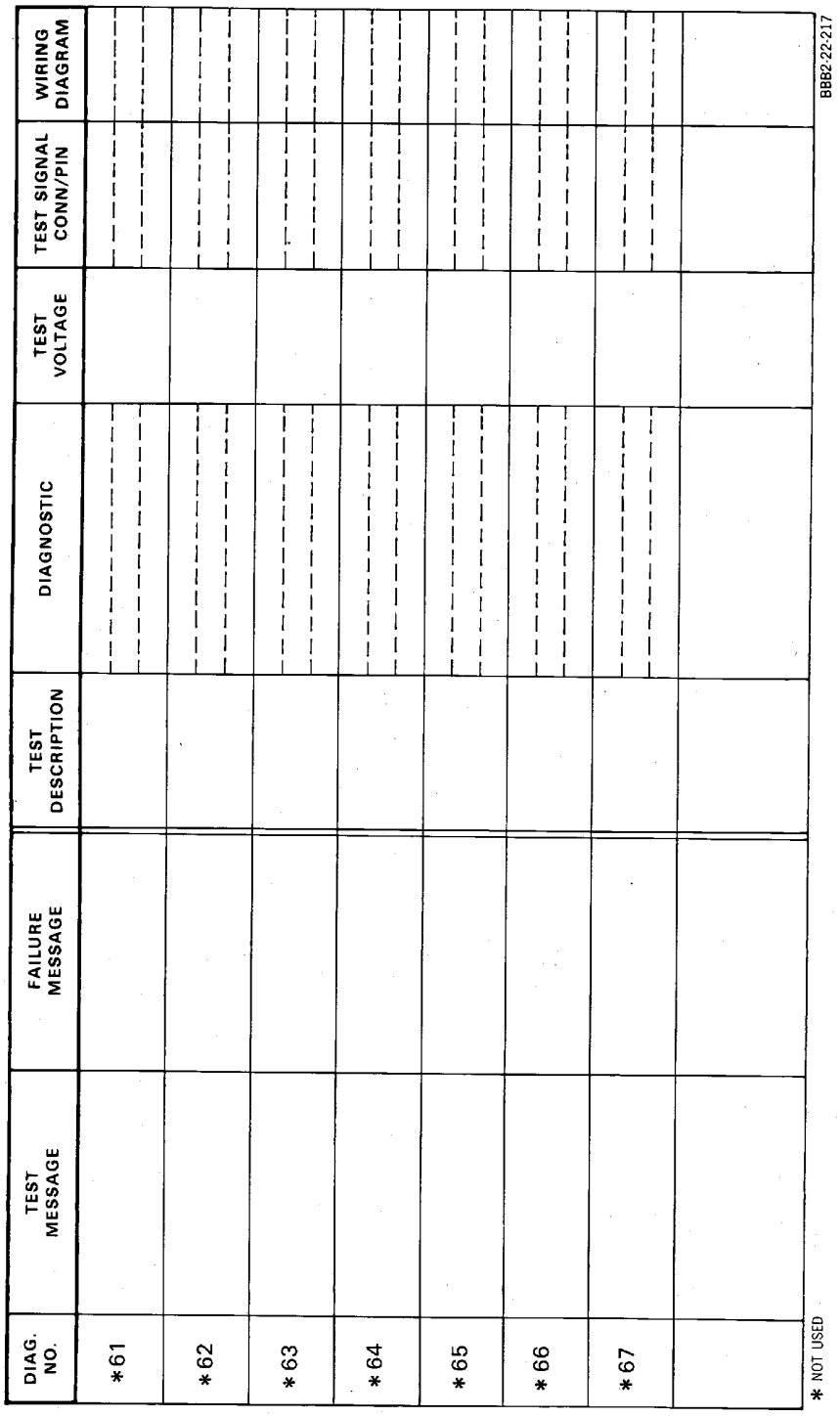
CAG(IGDS)

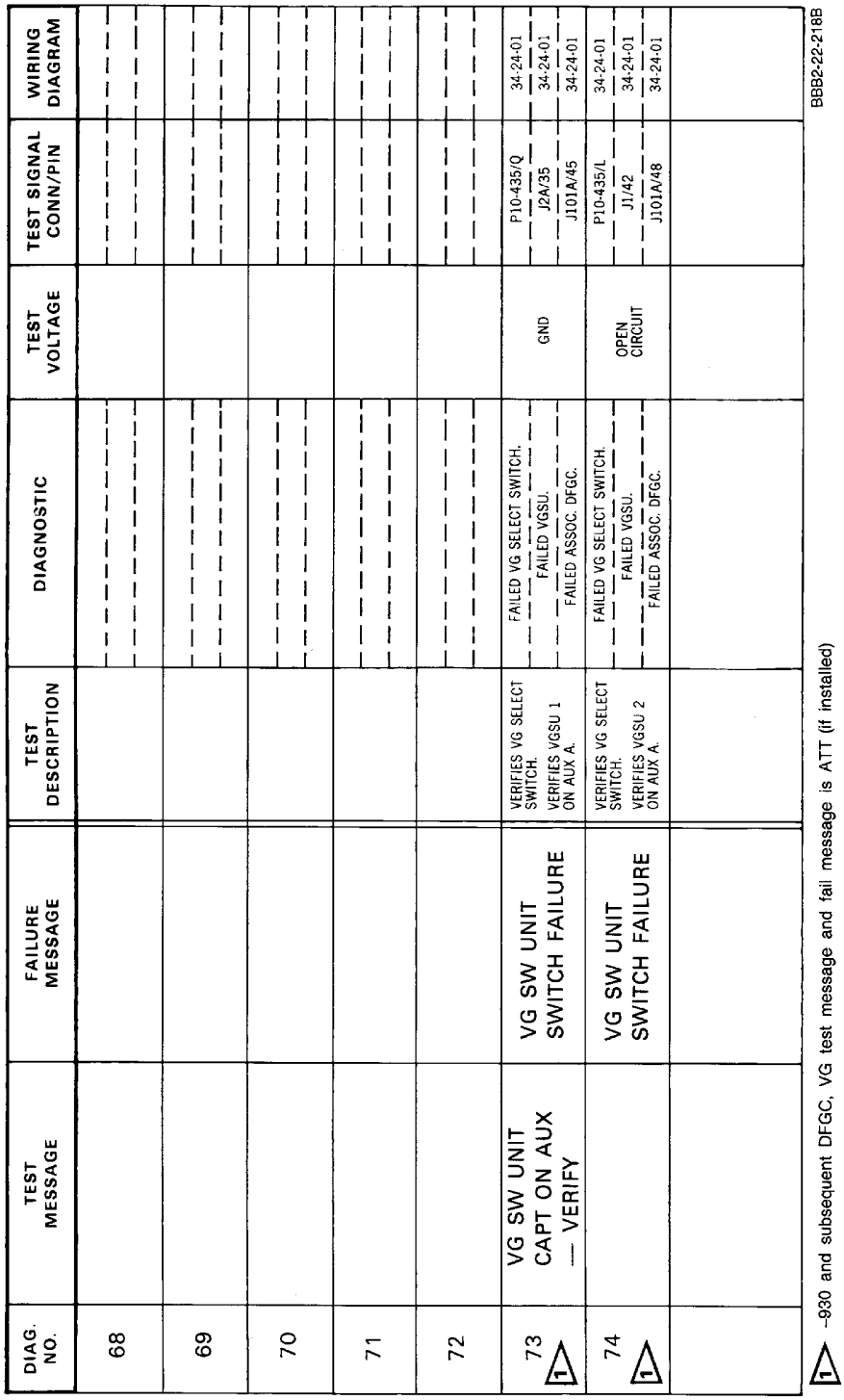
Sequence Two - Passive Discretes
Figure 106/22-01-05-990-860 (Sheet 6 of 6)



Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 1 of 17)



Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 2 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
68							
69							
70							
71							
72							
73 (1)	VG SW UNIT CAPT ON AUX — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
74 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01

(1) -930 and subsequent DFGC, VG test message and fail message is ATT (if installed)

BBB2-22-218B

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 3 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
75 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
76 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
77 (1)	VG SW UNIT F/O ON AUX — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
78 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01
79 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
80 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
81 (1)	VG SW UNIT ON NORMAL — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
(1)							

(1) –930 and subsequent DFGC, VG test message and failure message is ATT

BBB2-22-219A

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 4 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
82 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/42 J101A/48	34-24-01 34-24-01 34-24-01
83 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/44 J104A/45	34-24-01 34-24-01 34-24-01
84 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
85	CADC ON TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/μ, y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
86		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW VERIFIES AIR DATA SWITCHING UNIT	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	GND	P10-435/μ J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
87		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/μ J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
88		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/μ, y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12

[1] -930 and subsequent DFGC, VG is ATT

BBB2-22-220D

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 5 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
89		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	OPEN CIRCUIT	P10-435/u J1A/50 J103A/69	34-16-12 34-16-12 34-16-12
90	CADC ON NON-TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/u J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
91	CADC ON NORM-VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
92		CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
93 ⚠1	TEMP SELECT 48 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/H J103B/69	34-18-12 34-18-12
94		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/J J103B/70	34-18-12 34-18-12
95		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/K J103B/71	34-18-12 34-18-12
96		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/L J103B/72	34-18-12 34-18-12
97		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/N J103B/73	34-18-12 34-18-12

⚠1 Customers with EPR select option. -930 and subsequent TEMP SELECT is 78

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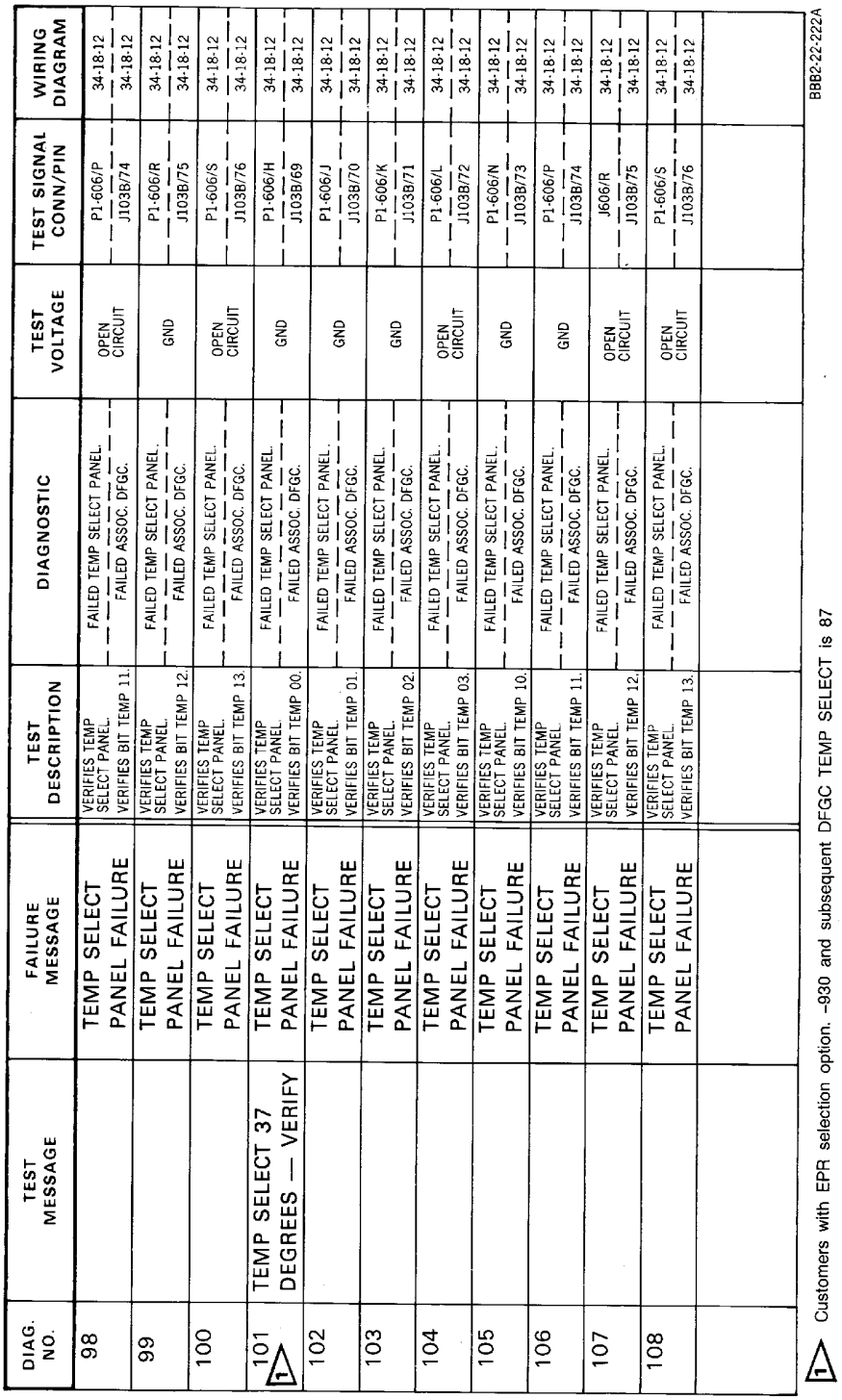
Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 6 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
98		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/P J103B/74	34-18-12 34-18-12
99		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/R J103B/75	34-18-12 34-18-12
100		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12
101 [1]	TEMP SELECT 37 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/H J103B/69	34-18-12 34-18-12
102		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/J J103B/70	34-18-12 34-18-12
103		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/K J103B/71	34-18-12 34-18-12
104		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/L J103B/72	34-18-12 34-18-12
105		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/N J103B/73	34-18-12 34-18-12
106		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/P J103B/74	34-18-12 34-18-12
107		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J606/R J103B/75	34-18-12 34-18-12
108		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12

[1] Customers with EPR selection option, -930 and subsequent DFGC TEMP SELECT is 87

BBB2-22-222A

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 7 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
109	TR MODE T/O — VERIFY	TR MODE T/O FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, T, U J102A/73	34-18-12 34-18-12
110	TR MODE T/O FLX — VERIFY	TR MODE T/O FLX FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O FLX MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/U J102A/73, 74, 75	34-18-12 34-18-12
111	TR MODE G/A — VERIFY	TR MODE GA FAILURE	VERIFIES TRI OPERATION OF GA MODE.	FAILED TRI GA MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/T, U J102A/73, 74	34-18-12 34-18-12
112	TR MODE MCT — VERIFY	TR MODE MCT FAILURE	VERIFIES TRI OPERATION OF MCT MODE.	FAILED TRI MCT MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, S, U J102A/75	34-18-12 34-18-12
113	TR MODE CL — VERIFY	TR MODE CL FAILURE	VERIFIES TRI OPERATION OF CL MODE.	FAILED TRI CL MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, U J102A/73, 75	34-18-12 34-18-12
114	TR MODE CR — VERIFY	TR MODE CR FAILURE	VERIFIES TRI OPERATION OF CR MODE.	FAILED TR CR MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, U J102A/74, 75	34-18-12 34-18-12
115							
116							

BBB2-22-223A

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 8 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
117	CYCLE TO/GA SWITCH 1	TO/GA SWITCH 1 FAILURE	VERIFIES TO/GA 1 (LEFT) SWITCH.	FAILED TO/GA-1 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-197 J101A/41, J104A/41	22-31-11 22-31-11
118	CYCLE TO/GA SWITCH 2	TO/GA SWITCH 2 FAILURE	VERIFIES TO/GA 2 (RIGHT) SWITCH.	FAILED TO/GA-2 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-198 J101A/41, J104A/41	22-31-11 22-31-11
119	CYCLE A/P 1 DISCONENCT	A/P 1 DISCONENCT FAILURE	VERIFIES CAPTAIN'S A/P DISC. PB.	FAILED CAPTAIN'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-13 J102A/36, J103A/36	22-14-11 22-14-11
120	CYCLE A/P 2 DISCONNECT	A/P 2 DISCONNECT FAILURE	VERIFIES FIRST OFFICER'S A/P DISC. PB.	FAILED FIRST OFFICER'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-14 J102A/36, J103A/36	22-14-11 22-14-11
121	CYCLE CAPT FMA RESET PB	CAPT FMA RESET PB FAILURE	VERIFIES CAPTAIN'S FMA RESET PB.	FAILED CAPTAIN'S FMA RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
122	CYCLE F/O FMA RESET PB	F/O FMA RESET PB FAILURE	VERIFIES FIRST OFFICER'S FMA RESET PB.	FAILED FIRST OFFICER'S RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
123	PULL GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1 IS CLOSED (R2-3).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-3 J101A/44	22-11-11 22-11-11
124		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2 IS CLOSED (R2-6).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-6 J104A/44	22-11-11 22-11-11
125	LEFT PNEU X FEED OPEN — VERIFY	LEFT PNEU X FEED OPEN FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN OPEN POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-369 J101A/31	34-18-12 34-18-12

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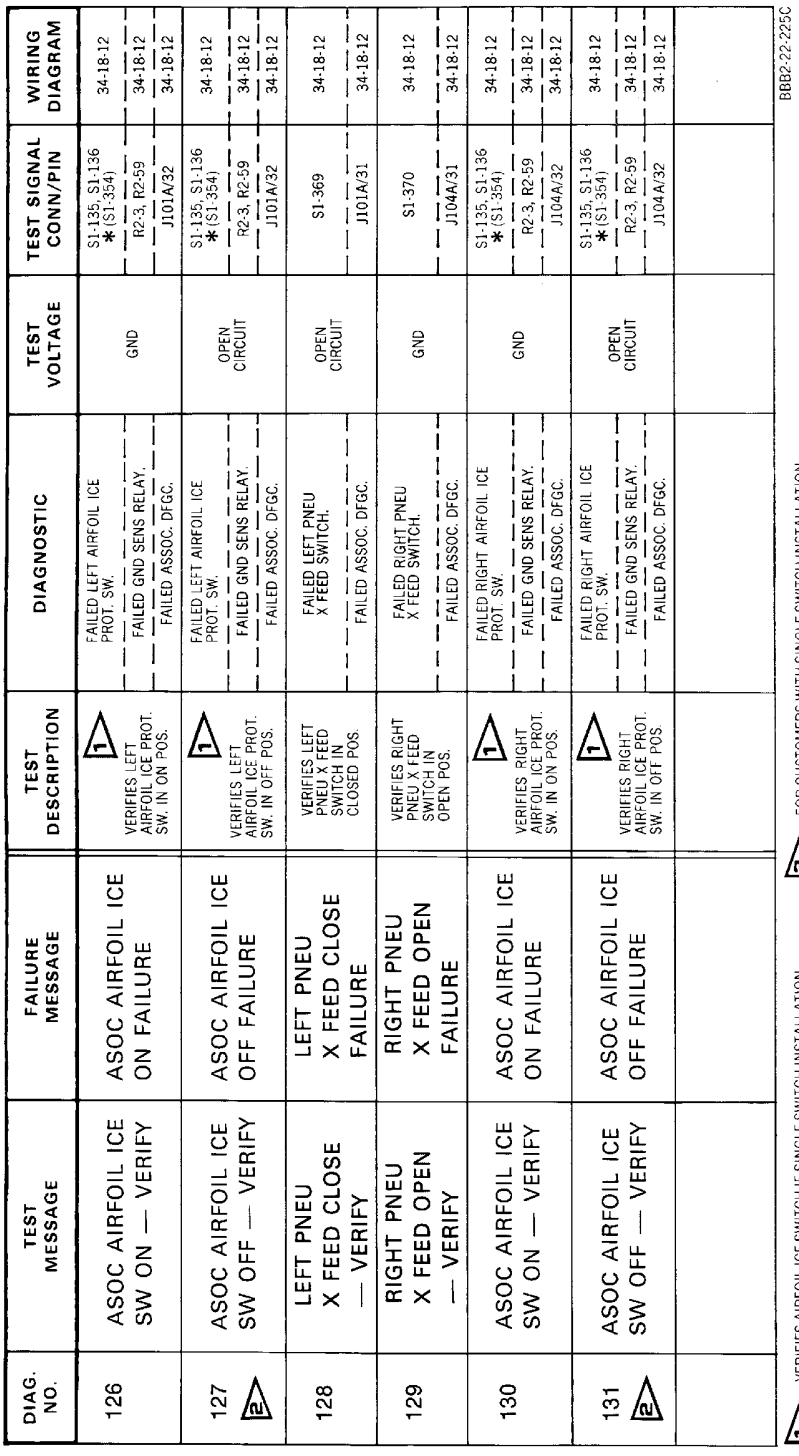
Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 9 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
126	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	1 VERIFIES LEFT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
127 2	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	1 VERIFIES LEFT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
128	LEFT PNEU X FEED CLOSE — VERIFY	LEFT PNEU X FEED CLOSE FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN CLOSED POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-369 J101A/31	34-18-12 34-18-12
129	RIGHT PNEU X FEED OPEN — VERIFY	RIGHT PNEU X FEED OPEN FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN OPEN POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-370 J104A/31	34-18-12 34-18-12
130	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	1 VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12
131 2	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	1 VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12

BBB2-22-225C

1 VERIFIES AIRFOIL ICE SWITCH IF SINGLE SWITCH INSTALLATION.

✱ FOR SINGLE SWITCH INSTALLATION.

2 FOR CUSTOMERS WITH SINGLE SWITCH INSTALLATION.
OPEN TAIL DE-ICE TIMER CIRCUIT BREAKER OR A FAILURE MAY BE LOGGED DUE TO A 2.5 MINUTE TIME WITHIN THE TAIL DE-ICING TIMER (R2-189).

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 10 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
132	RIGHT PNEU X FEED CLOSE — VERIFY	RIGHT PNEU X FEED CLOSE FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN CLOSED POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-370 J104A/31	34-18-12 34-18-12
133	L ENG ANTI-ICE SW ON — VERIFY	L ENG ANTI-ICE SW ON FAILURE	VERIFIES LEFT ANTI-ICE SW. IN ON POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-28 J101A/34	34-18-12 34-18-12
134	L ENG ANTI-ICE SW OFF — VERIFY	L ENG ANTI-ICE SW OFF FAILURE	VERIFIES LEFT ANTI-ICE SW. IN OFF POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-28 J101A/34	34-18-12 34-18-12
135	R ENG ANTI-ICE SW ON — VERIFY	R ENG ANTI-ICE SW ON FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN ON POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-29 J104A/34	34-18-12 34-18-12
136	R ENG ANTI-ICE SW OFF — VERIFY	R ENG ANTI-ICE SW OFF FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN OFF POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-29 J104A/34	34-18-12 34-18-12
137	LEFT A/C SUPPLY SWITCH AUTO — VERIFY	LEFT A/C SUPPLY SW AUTO FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN AUTO POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-255 J101A/33	34-18-12 34-18-12
138	LEFT A/C SUPPLY SWITCH OFF — VERIFY	LEFT A/C SUPPLY SWITCH OFF FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN OFF POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-255 J101A/33	34-18-12 34-18-12

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Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 11 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
139	RIGHT A/C SUPPLY SWITCH AUTO — VERIFY	RIGHT A/C SUPPLY SWITCH AUTO FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN AUTO POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-256 J104A/33	34-18-12 34-18-12
140	RIGHT A/C SUPPLY SWITCH OFF — VERIFY	RIGHT A/C SUPPLY SWITCH OFF — FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN OFF POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-256 J104A/33	34-18-12 34-18-12
141 △1	CLOSE GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/D1, D2, D3 J101A/44	22-11-11 22-11-11
142 △1		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/C1, C2, C3 J104A/44	22-11-11 22-11-11
143	SEL DFGC NON-TEST SIDE — VERIFY	SEL DFGC NON-TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN NON-TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
144	SEL DFGC TEST SIDE — VERIFY	SEL DFGC TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	28 VDC	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
145 *	CYCLE BACKCOURSE PB	BACKCOURSE PB FAILURE	VERIFIES BACKCOURSE PB.	FAILED BACKCOURSE PUSHBUTTON FAILED ASSOC. DFGC	SHORTED TO GND WHEN SWITCH DEPRESSED. SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, F J102A/27, J103A/85	22-15-11 22-15-11
145 **	CYCLE FMS OVRD PB	FMS OVRD PB FAILURE	VERIFIES FMS OVRD PB.	FAILED FMS OVRD PUSH BUTTON FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, F J102A/31, J103A/84	22-15-11 22-15-11
146	CYCLE SPEED SELECT PB	SPEED SELECT PB FAILURE	VERIFIES SPD SEL P.B.	FAILED SPD SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED. SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, F J102A/27, J103A/84	22-15-11 22-15-11
147	CYCLE MACH SELECT PB	MACH SELECT PB FAILURE	VERIFIES MACH SEL P.B.	FAILED MACH SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED. SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, H J102A/29, J103A/87	22-15-11 22-15-11

△1 AFTER CLOSING GND SENS BRKRS, SYSTEM WILL DISPLAY "FLIGHT FAULT REVIEW", FWD SPACE TO MAINTENANCE TEST IF FURTHER DIAGNOSTICS ARE DESIRED.

* USED FOR CUSTOMERS WITH BACKCOURSE OPTION
** USED FOR CUSTOMERS WITH FMS AND -970 DFGC AND SUBS

BBB2-22-227F

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 12 of 17)

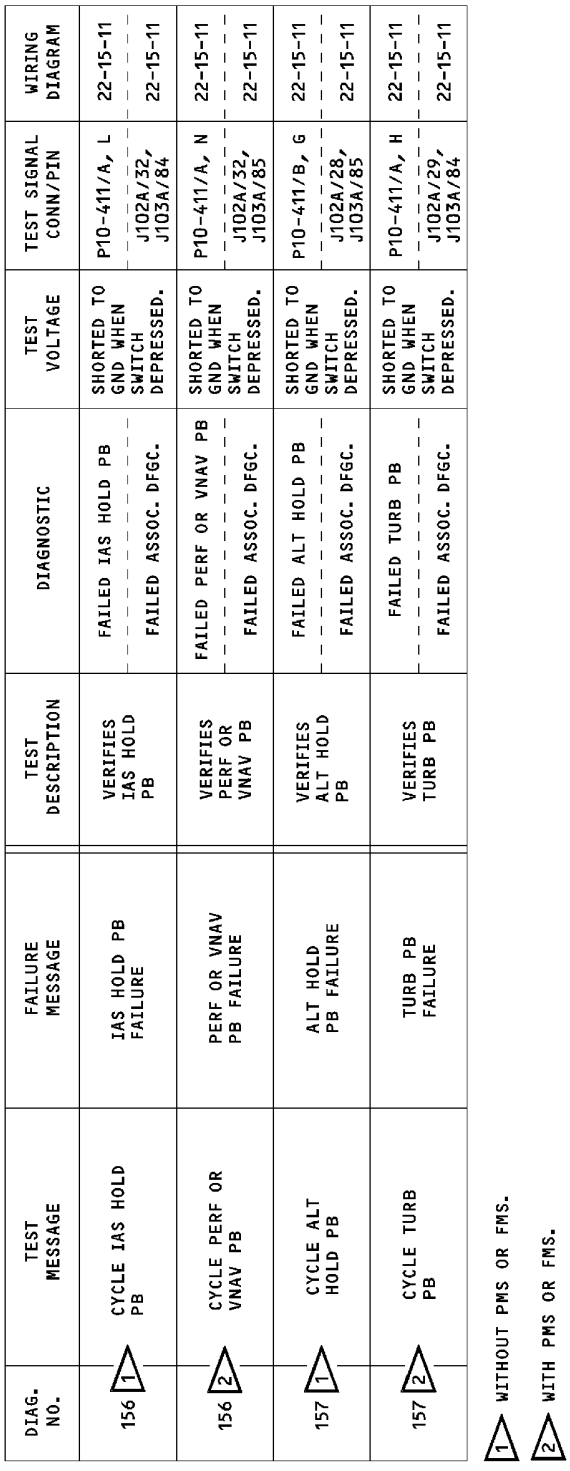
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
148	CYCLE EPR LIMIT PB	EPR LIMIT PB FAILURE	VERIFIES EPR LIM PB	FAILED EPR LIM PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, J J102A/30, J103A/87	22-15-11 22-15-11
*149	CYCLE NAV PB	NAV PB FAILURE	VERIFIES NAV PB	FAILED NAV PB FAILED ASSOC. DFGC.			
150	CYCLE VOR/LOC PB	VOR/LOC PB FAILURE	VERIFIES VOR/LOC PB	FAILED VOR/LOC PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, H J102A/29, J103A/86	22-15-11 22-15-11
151	CYCLE ILS PB	ILS PB FAILURE	VERIFIES ILS PB	FAILED ILS PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, J J102A/30, J103A/86	22-15-11 22-15-11
152	CYCLE AUTOLAND PB	AUTOLAND PB FAILURE	VERIFIES AUTOLAND PB	FAILED AUTOLAND PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, G J102A/28, J103A/86	22-15-11 22-15-11
153	CYCLE VERT SPD PB	VERT SPD PB FAILURE	VERIFIES VERT SPD PB	FAILED VERT SPD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
154	CYCLE MACH HOLD PB	MACH HOLD PB FAILURE	VERIFIES MACH HOLD PB	FAILED MACH HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, J J102A/30, J103A/85	22-15-11 22-15-11
155	CYCLE IAS/MACH PB	IAS/MACH PB FAILURE	VERIFIES IAS/MACH PB	FAILED IAS/MACH PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/28, J103A/84	22-15-11 22-15-11

*CUSTOMERS WITH NAV OPTION.

CAG(IGDS)

BBB2-22-435D

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 13 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
156 1	CYCLE IAS HOLD PB	IAS HOLD PB FAILURE	VERIFIES IAS HOLD PB	FAILED IAS HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, L J102A/32, J103A/84	22-15-11 22-15-11
156 2	CYCLE PERF OR VNAV PB	PERF OR VNAV PB FAILURE	VERIFIES PERF OR VNAV PB	FAILED PERF OR VNAV PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, N J102A/32, J103A/85	22-15-11 22-15-11
157 1	CYCLE ALT HOLD PB	ALT HOLD PB FAILURE	VERIFIES ALT HOLD PB	FAILED ALT HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, G J102A/28, J103A/85	22-15-11 22-15-11
157 2	CYCLE TURB PB	TURB PB FAILURE	VERIFIES TURB PB	FAILED TURB PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/29, J103A/84	22-15-11 22-15-11

1 WITHOUT PMS OR FMS.
2 WITH PMS OR FMS.

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CAG(IGDS)

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 14 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
158	CYCLE HDG SEL PB	HDG SEL PB FAILURE	VERIFIES HDG SEL PB	FAILED HDG SEL PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-472/R, FF J102A/27, J103A/81	22-15-11 22-15-11
159	CYCLE SPEED KNOB (2ND DETENT IN)	SPEED KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF SPEED KNOB DETENT	FAILED SPD/MACH KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, K J102A/31, J103A/87	22-15-11 22-15-11
160	CYCLE HDG KNOB (OUT)	HDG KNOB (OUT) FAILURE	VERIFIES OPERATION OF HDG KNOB (OUT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, F J102A/27, J103A/87	22-15-11 22-15-11
161	CYCLE HDG KNOB (2ND DETENT IN)	HDG KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF HDG KNOB (DETENT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, F J102A/27, J103A/86	22-15-11 22-15-11
162	CYCLE ALT KNOB (OUT)	ALT KNOB (OUT) FAILURE	VERIFIES OPERATION OF ALT KNOB (OUT)	FAILED ALT SELECT (ARM) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, K J102A/31, J103A/86	22-15-11 22-15-11
163	CYCLE ALT KNOB (IN)	ALT KNOB (IN) FAILURE	VERIFIES OPERATION OF ALT KNOB (IN)	FAILED ALT SELECT (ALT) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, K J102A/31, J103A/85	22-11-11 22-11-11
164	BANK LIMIT 15 DEGREES - VERIFY	BANK LIMIT 15 DEGREES FAILURE	VERIFIES BANK LIMIT 15 DEGREES	FAILED 15 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 15 DEGREES	P10-411/E, D J102A/26, J103A/87	22-15-11 22-15-11
165	BANK LIMIT 20 DEGREES - VERIFY	BANK LIMIT 20 DEGREES FAILURE	VERIFIES BANK LIMIT 20 DEGREES	FAILED 20 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 20 DEGREES	P10-411/C, E J102A/26, J103A/86	22-15-11 22-15-11

CAG(IGDS)

BBB2-22-229B

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 15 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
166	BANK LIMIT 25 DEGREES — VERIFY	BANK LIMIT 25 DEGREES FAILURE	VERIFIES BANK LIMIT 25 DEGREES.	FAILED 25 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 25 DEGREES.	P10-411/B, E J102A/26, J103A/85	22-15-11 22-15-11
167	BANK LIMIT 30 DEGREES — VERIFY	BANK LIMIT 30 DEGREES FAILURE	VERIFIES BANK LIMIT 30 DEGREES.	FAILED 30 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 30 DEGREES.	P10-411/A, E J012A/26, J103A/84	22-15-11 22-15-11
168	SPEED REF. OPER. — VERIFY	SPEED REF. OPER FAILURE	VERIFIES SPEED REF. CHANGES VISUALLY.	FAILED SPEED/MACH REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/Z, a, b J101B/46, 47, 48	22-31-11 22-31-11
169	HEADING REF OPER. — VERIFY	HEADING REF. OPER FAILURE	VERIFIES HDG REF. CHANGES VISUALLY.	FAILED HEADING REF. FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20 J104B/18, 19, 20	34-22-03 34-22-03 34-22-04
*170							
*171							
*172							
173	CAPT HDG SEL REF — VERIFY	CAPT HDG SEL REF FAILURE	VERIFIES HDG SEL VISUAL REFERENCE CHANGES.	FAILED HDG SEL KNOB/SYNCHRO . FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20	34-22-03 34-22-03
174	VERT SPD REF OPER. — VERIFY	VERT SPD REF OPER FAILURE	VERIFIES VERT SPD (PITCH WHEEL) REF. CHANGES VISUALLY.	FAILED VERT SPEED REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
175	ALT REF OPER — VERIFY	ALT REF OPER FAILURE	VERIFIES ALT REF. CHANGES VISUALLY.	FAILED ALT. REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/W, X, Y J101B/40, 41, 42	22-11-11 22-11-11

*NOT USED

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Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 16 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
176	CRS-1 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-1 REF. CHANGES VISUALLY.	FAILED CAPT'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-406/f, s, u J101B/5, 6, 7	34-22-03 34-22-03
177	CRS-2 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-2 REF. CHANGES VISUALLY.	FAILED F/O'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-408/j, s, u J104B/5, 6, 7	34-22-04 34-22-04
* 178							
* 179							

* NOT USED

BBB2-22-231B

Sequence Three - Switches and Buttons
Figure 107/22-01-05-990-861 (Sheet 17 of 17)

DIAG. NO	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
180	PITCH ANGLE 1 = XX.XX DEGREES	PITCH ANGLE 1 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-18/34, 35 J101B/71, 72	34-24-01 34-24-01
181	PITCH ANGLE 2 = XX.XX DEGREES	PITCH ANGLE 2 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-19/34, 35 J104B/71, 72	34-24-02 34-24-02
182	PITCH ANGLE 3 = XX.XX DEGREES	PITCH ANGLE 3 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-165/34, 35 J103B/71, 72	34-24-01 34-24-01
183	BANK ANGLE 1 = XX.XX DEGREES	BANK ANGLE 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-18/30, 31 J101B/74, 75	34-24-01 34-24-01
184	BANK ANGLE 2 = XX.XX DEGREES	BANK ANGLE 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-19/30, 31 J104B/74, 75	34-24-02 34-24-02
185	BANK ANGLE 3 = XX.XX DEGREES	BANK ANGLE 3 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-165/34, 35 J103A/74, 75	34-24-01 34-24-01
186	SPOILER POS 1 = XX.XX DEGREES	SPOILER POS 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-1 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-397/3, 4, 5 J101B/35, 36, 37	22-12-11 22-12-11
187	SPOILER POS 2 = XX.XX DEGREES	SPOILER POS 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-2 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-398/3, 4, 5 J104B/35, 36, 37	22-12-11 22-12-11
188	CRS RAD ALT 1 = XXXX. FEET	CRS RAD ALT 1 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-1 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/22, 23 J101B/55, 56	34-45-01 34-45-01
189	CRS RAD ALT 2 = XXXX. FEET	CRS RAD ALT 2 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-2 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/22, 23 J104B/55, 56	34-45-02 34-45-02
190	FINE RAD ALT 1 = XXXX. FEET	FINE RAD ALT 1 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-1 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/46, 47 J102A/55, 56	34-45-01 34-45-01

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Sequence Four - Sensor Values
Figure 108/22-01-05-990-862 (Sheet 1 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
191	FINE RAD ALT 2 = XXXX. FEET	FINE RAD ALT 2 FAILURE	NULL TESTED TO BE <±10 FT.	FAILED RAD ALT-2 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/46, 47 J103A/55, 56	34-45-02 34-45-02
192	ELEV SYNC A = XX.XX DEGREES	ELEV SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
193	ELEV SYNC B = XX.XX DEGREES	ELEV SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
194	AIL SYNC A = XX.XX DEGREES	AIL SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED AIL SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
195	AIL SYNC B = XX.XX DEGREES	AIL SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED AIL SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
196	RUD SYNC A = XX.XX DEGREES	RUD SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED RUD SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
197	RUD SYNC B = XX.XX DEGREES	RUD SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED RUD SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-424/J, S J104B/86, 86	22-13-12 22-13-12
198	YAW DAMP POS = XX.XX DEGREES	YAW DAMP POS FAILURE	NULL TESTED TO BE < ±1°.	FAILED YAW DAMP ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	<0.21 VAC	P10-46/V, W J103B/45, 46	22-13-12 22-13-12
199	MACH TRIM POS = XX.XX INCH	MACH TRIM POS FAILURE	NULL TESTED TO BE < ±.1 INCH.	1 FAILED MACH TRIM ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	>5.0 <6.8 VAC	P10-44/V, W J103B/58, 59	22-21-11 22-21-11
200	ELEV TACH A = XX.XX DEG/SEC	ELEV TACH A FAILURE	NULL TESTED TO BE < ±2°/SEC.	FAILED ELEV TACH A. FAILED ASSOC. DFGC.	<0.53 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

1 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

BBB2-22-233A

Sequence Four - Sensor Values
Figure 108/22-01-05-990-862 (Sheet 2 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
201	ELEV TACH B = XX.XX DEG/SEC	ELEV TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED ELEV TACH B. FAILED ASSOC. DFGC.	<0.53 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
202	AIL TACH A = XX.XX DEG/SEC	AIL TACH A FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED A/L TACH A. FAILED ASSOC. DFGC.	<0.68 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
203	AIL TACH B = XX.XX DEG/SEC	AIL TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED AIL TACH B. FAILED ASSOC. DFGC.	<0.68 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
204	RUD TACH A = XX.XX DEG/SEC	RUD TACH A FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED RUD TACH A. FAILED ASSOC. DFGC.	<0.65 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
205	RUD TACH B = XX.XX DEG/SEC	RUD TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED RUD TACH B. FAILED ASSOC. DFGC.	<0.65 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
206	A/T TACH = XX.XX DEG/SEC	A/T TACH FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED A/T TACH. FAILED ASSOC. DFGC.	<3.2 VAC	P10-430/M, N J103B/33, 34	22-31-14 22-31-14
207	MACH TRIM TACH = XX.XX IN/SEC	MACH TRIM TACH FAILURE	NULL TESTED TO BE < ±.1 INCH/SEC.	FAILED MACH TRIM TACH. 1 FAILED ASSOC. DFGC.	<0.54 VAC	P10-44/T, U J103B/56, 57	22-21-11 22-21-11
208	YAW DAMP TACH = XX.XX DEG/SEC	YAW DAMP TACH FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED YAW DAMP TACH. FAILED ASSOC. DFGC.	<0.28 VAC	P10-46/T, U J103B/43, 44	22-13-12 22-13-12
209	D3A-X ACCEL A = XX.XX FT/SEC *2	D3A-X ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC. 2	FAILED D3A ACCEL A-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/a, Z J101B/57, 58	22-19-11 22-19-11
210	D3A-X ACCEL B = XX.XX FT/SEC *2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC. 2	FAILED D3A ACCEL B-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
211	D3A-Y ACCEL A = XX.XX FT/SEC *2	D3A-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC. 2	FAILED D3A ACCEL A-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/a, b J101B/61, 62	22-19-11 22-19-11

1 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

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Sequence Four - Sensor Values
Figure 108/22-01-05-990-862 (Sheet 3 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
212	D3A-Y ACCEL B = XX.XX FT/SEC **2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/V, U J104B/61, 62	22-19-11 22-19-11
213	D3A-Z ACCEL A = XX.XX FT/SEC **2	D3A-Z ACCEL A FAILURE	NULL TESTED TO BE −32±1.61 FT/SEC**2.	FAILED D3A ACCEL A-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
214	D3A-Z ACCEL B = XX.XX FT/SEC **2	D3A-Z ACCEL B FAILURE	NULL TESTED TO BE −32±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
215	DLA-Y ACCEL A = XX.XX FT/SEC **2	DLA-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-412/c, b J101B/59, 60	22-19-11 22-19-11
216	DLA-Y ACCEL B = XX.XX FT/SEC **2	DLA-Y ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-413/V, U J104B/59, 60	22-19-11 22-19-11
217	G/S DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 1.	NOT A TEST	N/A	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
218	G/S DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 2.	NOT A TEST	N/A	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
219	VOR/LOC DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
220	VOR/LOC DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
221	LEFT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS LEFT ELEVATOR POS.	NOT A TEST	N/A	P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
222	RIGHT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS RIGHT ELEVATOR POS.	NOT A TEST	N/A	P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11

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Sequence Four - Sensor Values
Figure 108/22-01-05-990-862 (Sheet 4 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
223	LEFT AILERON XX.XX DEG	NOT A TEST	DISPLAYS LEFT AILERON POS.	NOT A TEST	N/A	P10-396/3, 4, 5 J101B/49,50, 51	22-12-11 22-12-11
224	RUDDER POS = XX.XX DEG	NOT A TEST	DISPLAYS RUDDER POS.	NOT A TEST	N/A	P10-429/3, 4, 5 J104B/46, 47,48	22-13-11 22-13-11
225	HOR STAB = XX.XX DEG	NOT A TEST	DISPLAYS HOR STAB POS.	NOT A TEST	N/A	P10-418/3, 4, 5 J104B/43, 44, 45	22-11-11 22-11-11
226	ANGLE OF ATT -1 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-1.	NOT A TEST	N/A	P1-648/M, N, P J101B/26, 27, 28	22-31-11 22-31-11
227	ANGLE OF ATT -2 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-2.	NOT A TEST	N/A	P1-649/M, N, P J104B/26, 27, 28	22-31-11 22-31-11
228	EPR LEFT = X.XXX EPR	NOT A TEST	DISPLAYS LEFT EPR TRANSMITTER.	NOT A TEST	N/A	P1-613/D, E, F J101B/32, 33, 34	34-18-12 34-18-12
229	EPR RIGHT = X.XXX EPR	NOT A TEST	DISPLAYS RIGHT EPR TRANSMITTER.	NOT A TEST	N/A	P1-614/D, E, F J104B/32, 33, 34	34-18-12 34-18-12
230	HEADING 1 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-1 DATA.	NOT A TEST	N/A	P10-432/q, r, w J101B/15, 16, 17	34-22-03 34-22-03
231	HEADING 2 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-2 DATA.	NOT A TEST	N/A	P10-410/q, r, s J104B/15, 16, 17	34-22-04 34-22-04
232	LEFT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS LEFT FLAP POSITION.	NOT A TEST	N/A	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
233	RIGHT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS RIGHT FLAP POSITION.	NOT A TEST	N/A	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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Sequence Four - Sensor Values
Figure 108/22-01-05-990-862 (Sheet 5 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
234	FLAP HANDLE = XX.XX DEGREES	NOT A TEST	DISPLAYS FLAP HANDLE POSITION.	NOT A TEST	N/A	T2-10/1,2,3 J104B/40, 41, 42	22-31-11 22-31-11
235	CADC-T ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
236	CADC-N ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS NON-ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
237	CADC-T TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS ASSOC. CADC TAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
238	CADC-N TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS NON-ASSOC. TAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
239	CADC-T ALT RATE= XX.XX FT/SEC	NOT A TEST	DISPLAYS ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
240	CADC-N ALT RATE = XX.XX FT/SEC	NOT A TEST	DISPLAYS NON-ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
241	CADC-T SAT = XX.XX DEGREES	NOT A TEST	VERIFIES ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
242	CADC-N SAT = XX.XX DEGREES	NOT A TEST	VERIFIES NON-ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
243	CADC-T CAS = XXX.X KNOT	NOT A TEST	VERIFIES ASSOC. CADC CAS.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
244	CADC-N CAS = XXX.X KNOT	NOT A TEST	VERIFIES NON-ASSOC. CAS.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J101A/92, 93	34-16-12 34-16-12

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

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Sequence Four - Sensor Values
Figure 108/22-01-05-990-862 (Sheet 6 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
245	CADC-T MACH= X.XXXX MACH	NOT A TEST	DISPLAYS ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40	34-16-12
						J101A/92, 93	34-16-12
246	CADC-N MACH= X.XXXX MACH	NOT A TEST	DISPLAYS NON-ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/61, 62, R50-283B/61,62	34-16-12
						J104A/92, 93	34-16-12
551 △-973	CAPT PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -1	NOT A TEST	N/A	N/A	
552 △-973	F/O PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -2	NOT A TEST	N/A	N/A	
*247	SET BAROMETER TO 26.00-VERIFY	ALT CORRECTION FAILURE	CHECKS BARO SET TO 26.00	BARO POT FAILURE	9.8 V	J102B/75, 79	
				ASSOC. DFGC. FAILURE	5.12 V	J102B/79	

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

△-973 AND SUBSEQUENT IF MABH OPTION SELECTED.

*IF DISPLAY OPTION SELECTED, TEST MESSAGE IS "ALT CORRECTION = ± XXXX.X FEET" TEST DESCRIPTION IS: DISPLAYS QNH CORRECTED ALTITUDE.

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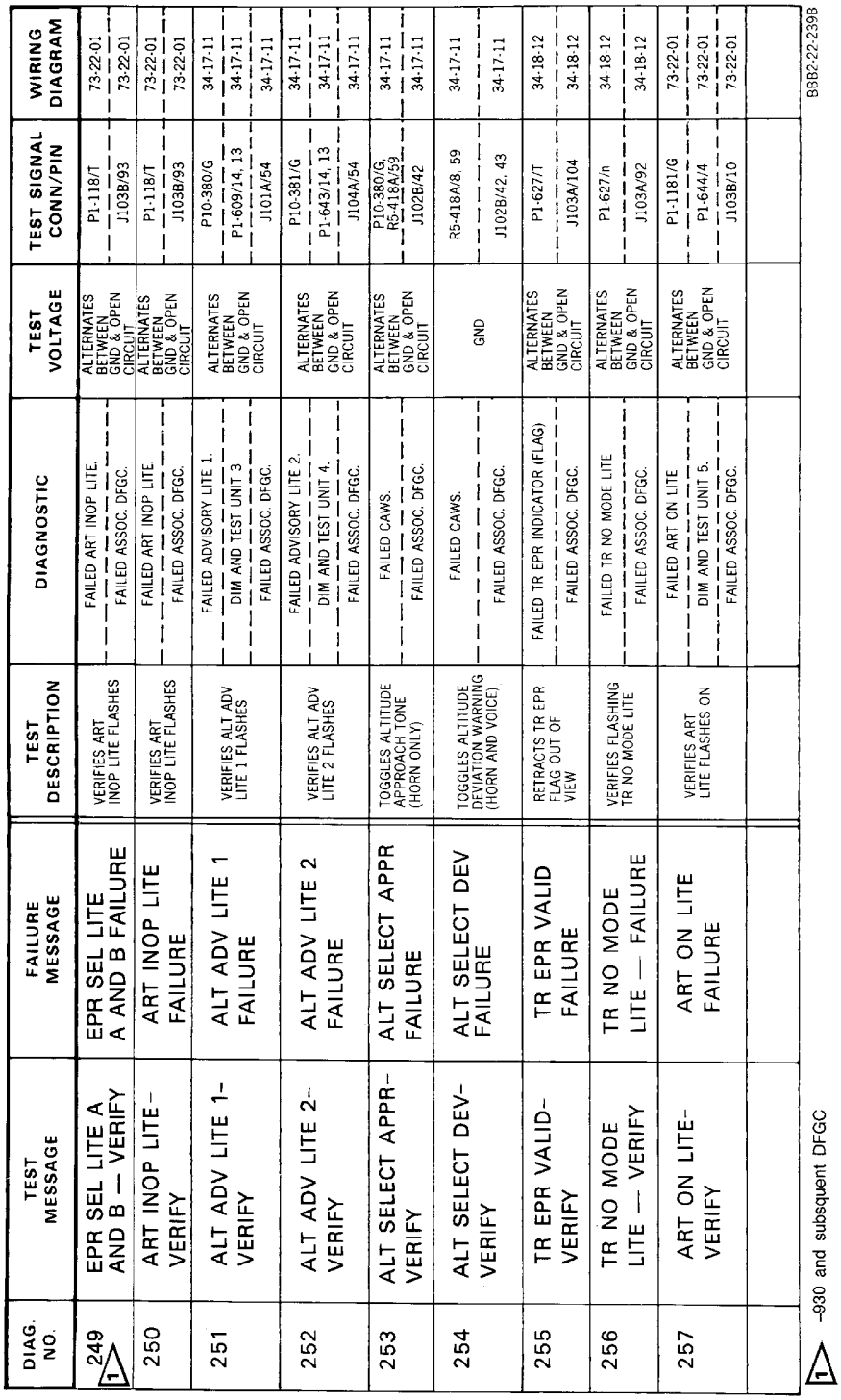
Sequence Four - Sensor Values
Figure 108/22-01-05-990-862 (Sheet 7 of 7)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
249 (1)	EPR SEL LITE A AND B — VERIFY	EPR SEL LITE A AND B FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
250	ART INOP LITE – VERIFY	ART INOP LITE FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
251	ALT ADV LITE 1 – VERIFY	ALT ADV LITE 1 FAILURE	VERIFIES ALT ADV LITE 1 FLASHES	FAILED ADVISORY LITE 1. DIM AND TEST UNIT 3 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G P1-609/14, 13 J101A/54	34-17-11 34-17-11 34-17-11
252	ALT ADV LITE 2 – VERIFY	ALT ADV LITE 2 FAILURE	VERIFIES ALT ADV LITE 2 FLASHES	FAILED ADVISORY LITE 2. DIM AND TEST UNIT 4. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-381/G P1-643/14, 13 J104A/54	34-17-11 34-17-11 34-17-11
253	ALT SELECT APPR – VERIFY	ALT SELECT APPR FAILURE	TOGGLES ALTITUDE APPROACH TONE (HORN ONLY)	FAILED CAWS. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G, R5-418A/59 J102B/42	34-17-11 34-17-11
254	ALT SELECT DEV – VERIFY	ALT SELECT DEV FAILURE	TOGGLES ALTITUDE DEVIATION WARNING (HORN AND VOICE)	FAILED CAWS. FAILED ASSOC. DFGC.	GND	R5-418A/8, 59 J102B/42, 43	34-17-11 34-17-11
255	TR EPR VALID – VERIFY	TR EPR VALID FAILURE	RETRACTS TR EPR FLAG OUT OF VIEW	FAILED TR EPR INDICATOR (FLAG) FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/T J103A/104	34-18-12 34-18-12
256	TR NO MODE LITE — VERIFY	TR NO MODE LITE — FAILURE	VERIFIES FLASHING TR NO MODE LITE	FAILED TR NO MODE LITE FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/n J103A/92	34-18-12 34-18-12
257	ART ON LITE – VERIFY	ART ON LITE FAILURE	VERIFIES ART LITE FLASHES ON	FAILED ART ON LITE DIM AND TEST UNIT 5. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-1181/G P1-644/4 J103B/10	73-22-01 73-22-01 73-22-01

(1) –930 and subsequent DFGC

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Sequence Five - Cockpit Displays
Figure 109/22-01-05-990-863 (Sheet 1 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
258	ART READY LITE-VERIFY	ART READY LITE FAILURE	VERIFIES ART READY LITE FLASHES.	FAILED ART READY LITE DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P1-1181/14 P1-607/22 J103B/66	73-22-01 73-22-01 73-22-01
259	NO AUTOLAND LITE A — VERIFY	NO AUTOLAND LITE A FAILURE	VERIFIES NO AUTOLAND LITE A (CAPT'S, FMA).	FAILED CAPT'S FMA (NO AUTOLAND LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/K P1-607/15 J101A/61	22-18-11 22-18-11 22-18-11
260	NO AUTOLAND LITE B — VERIFY	NO AUTOLAND LITE B FAILURE	VERIFIES NO AUTOLAND LITE B (F/O'S FMA).	FAILED F/O'S FMA (NO AUTOLAND LITE B). DIM AND TEST UNIT 2 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-402/K/P10-403/P P1-608/15 J104A/61	22-18-11 22-18-11 22-18-11
261	A/P TRIM LITE A — VERIFY	A/P TRIM LITE A FAILURE	VERIFIES A/P TRIM LITE A (CAPT'S FMA).	FAILED CAPT'S FMA (A/P TRIM LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/L P1-607/18 J101A/62	22-18-11 22-18-11 22-18-11
262	A/P TRIM LITE B — VERIFY	A/P TRIM LITE B FAILURE	VERIFIES A/P TRIM LITE B (F/O'S FMA).	FAILED F/O'S FMA (A/P TRIM LITE B). DIM AND TEST UNIT 2. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28VDC	P10-402/L P1-608/18 J104A/62	22-18-11 22-18-11 22-18-11
263	VERT SPD DETENT-VERIFY	VERT SPD DETENT FAILURE	VERIFIES VERT SPD DETENT	FAILED DFGCP (PITCH WHEEL CLUTCH) FAILED ASSOC. DFGC.	28 VDC	P10-411/f J103A/77	22-11-11 22-11-11
264	IAS BUG 1 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 1 TO 250 KIAS	FAILED CAPT'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-382/a, Y J102A/43, 44	22-31-14 22-31-14
265	IAS BUG 2 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 2 TO 250 KIAS	FAILED F/O'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-383/a, Y J103A/43, 44	22-31-14 22-31-14

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Sequence Five - Cockpit Displays
Figure 109/22-01-05-990-863 (Sheet 2 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
266	EPR BUG LEFT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES LEFT EPR BUG TO EPR = 1.8	FAILED LEFT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-611/P, N J102A/46, 47	34-18-12 34-18-12
267	EPR BUG RIGHT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES RIGHT EPR BUG TO EPR = 1.8	FAILED RIGHT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-612/P, N J103A/46, 47	34-18-12 34-18-12
268	EPR LIMIT CMD 1.8 EPR — VERIFY	EPR LIMIT CMD FAILURE	DRIVES EPR LIMIT CMD TO EPR = 1.8	FAILED EPR LIMIT DISPLAY ON TRI FAILED ASSOC. DFGC.	12.97 VDC	P1-627/B, J J102A/49, 50	34-18-12 34-18-12
269	CAPT F/D SW ON — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN ON POSITION.	FAILED CAPT'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
270	CAPT F/D LITE ON — VERIFY 1	CAPT F/D LITE ON FAILURE	VERIFIES CAPT'S FMA FD ANNUNCIATOR.	FAILED CAPT'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/M P1-607/19, 25 J102B/25	22-17-11 22-17-11 22-17-11
271	CAPT PITCH FD CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO CENTER.	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
272	CAPT PITCH FD NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO NOSE UP.	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
273	CAPT ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S ROLL COMMAND TO CENTER.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
274	CAPT ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S TO ROLL COMMAND RIGHT.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
275	CAPT F/D SW OFF — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN OFF POSITION.	FAILED CAPT'S FD SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
276	F/O F/D SW ON — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN ON POSITION.	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11

1 IF F/D BLUE LIGHT OBLITERATED PRESS VERIFY AND CONTINUE.

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Sequence Five - Cockpit Displays
Figure 109/22-01-05-990-863 (Sheet 3 of 5)

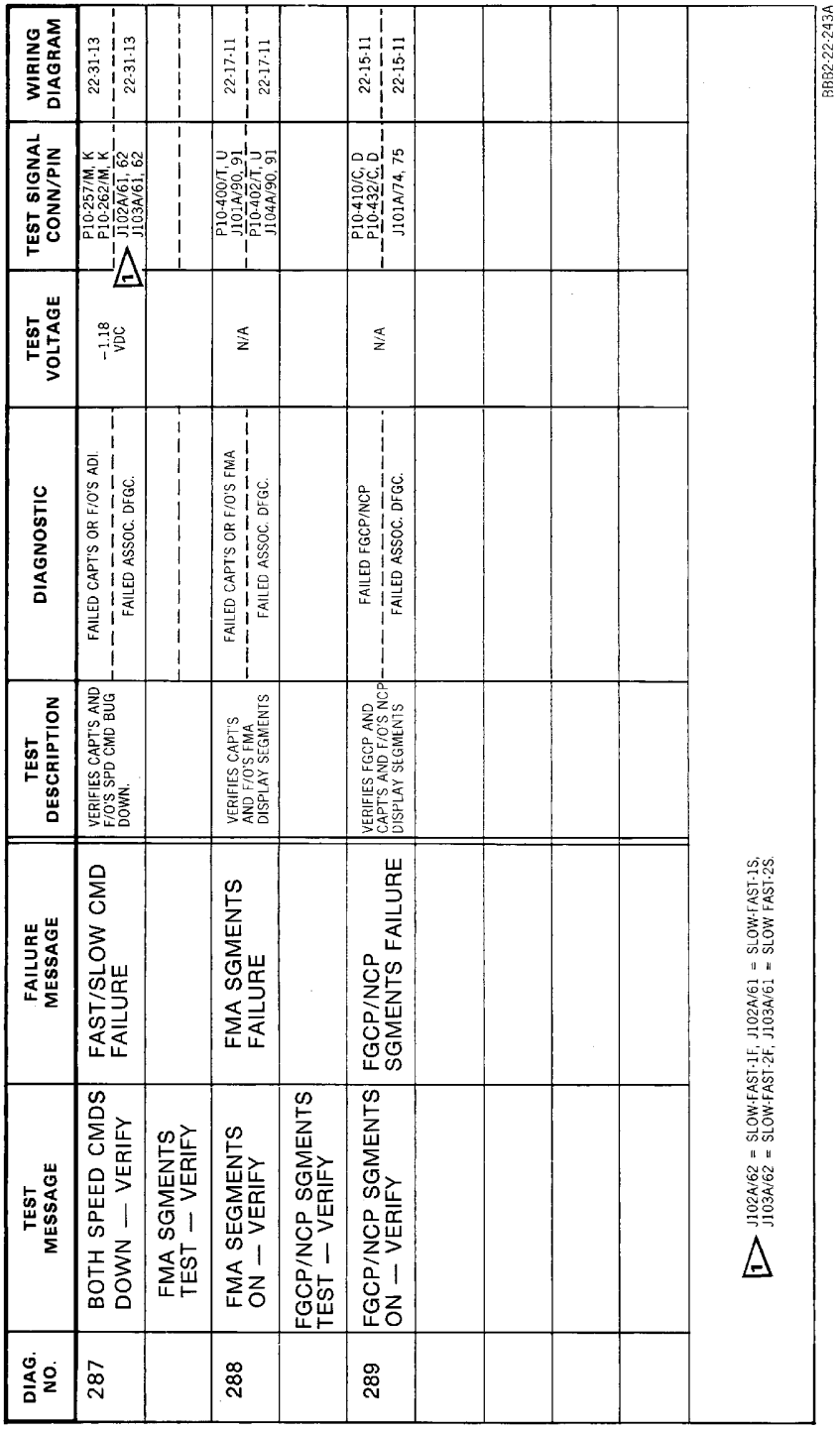
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
277	F/O F/D LITE ON — VERIFY [2]	F/O F/D LITE ON FAILURE	VERIFIES F/O'S FMA FD ANNUNCIATOR.	FAILED F/O'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATE BETWEEN GND & 28VDC	P10-402/M P1-6441/19,25 J103A/25	22-17-11 22-17-11 22-17-11
278	F/O PITCH F/D CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
279	F/O PITCH F/D NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO NOSE UP.	FAILED F/O'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
280	F/O ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
281	F/O ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND RIGHT.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
282	F/O F/D SW OFF — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN OFF POSITION	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11
283	FAST/SLOW 1 VALID — VERIFY	FAST/SLOW 1 VALID FAILURE	TOGGLES FAST/SLOW VALID ON CAPT'S ADI.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-257/A J101A/55	22-31-13 22-31-13
284	FAST/SLOW 2 VALID — VERIFY	FAST/SLOW 2 VALID FAILURE	TOGGLES FAST/SLOW VALID ON F/O'S ADI.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-262/A J104A/55	22-31-13 22-31-13
285	BOTH SPEED CMDS CENTER — VERIFY	F/S CMD FAILURE	COMMANDS CAPT'S AND F/O'S SPD CMD BUG TO CENTER.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62 [1]	22-31-13 22-31-13
286	BOTH SPEED CMDS UP — VERIFY	F/S CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG UP.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	+1.18 VDC	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62 [1]	22-31-13 22-31-13

[1] J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW-FAST-2S.

[2] IF F/O BLUE LIGHT OBLITERATED
PRESS VERIFY AND CONTINUE.

BBB2-22-242B

Sequence Five - Cockpit Displays
Figure 109/22-01-05-990-863 (Sheet 4 of 5)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
287	BOTH SPEED CMDS DOWN — VERIFY	FAST/SLOW CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG DOWN.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	−1.18 VDC	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62	22-31-13 22-31-13
	FMA SGMENTS TEST — VERIFY						
288	FMA SEGMENTS ON — VERIFY	FMA SGMENTS FAILURE	VERIFIES CAPT'S AND F/O'S FMA DISPLAY SEGMENTS	FAILED CAPT'S OR F/O'S FMA FAILED ASSOC. DFGC.	N/A	P10-400/T, U J101A/90, 91 P10-402/T, U J104A/90, 91	22-17-11 22-17-11
	FGCP/NCP SGMENTS TEST — VERIFY						
289	FGCP/NCP SGMENTS ON — VERIFY	FGCP/NCP SGMENTS FAILURE	VERIFIES FGCP AND CAPT'S AND F/O'S NCP DISPLAY SEGMENTS	FAILED FGCP/NCP FAILED ASSOC. DFGC.	N/A	P10-410/C, D P10-432/C, D J101A/74, 75	22-15-11 22-15-11

1. J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
   J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW FAST-2S.

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Sequence Five - Cockpit Displays
Figure 109/22-01-05-990-863 (Sheet 5 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
312	ENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 28 VDC	J101/H SEL 1 J013/H SEL 2 J102A/100	22-14-11 22-14-11
313		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 OPEN CIRCUIT	J101/K SEL 1 J103/K SEL 2 J102A/104	22-14-11 22-14-11
314		AILERON CLUTCH FAILURE	VERIFIES ENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/96	24-14-11 22-12-12
315		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO)	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
316		ELEVATOR CLUTCH FAILURE	VERIFIES ENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/95	22-14-11 22-11-12
317		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-422/G J103A/95	22-14-11 22-11-12 22-11-12
318		RUDDER CLUTCH FAILURE	VERIFIES ENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J103B/77	22-14-11 22-13-12
319		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12

1 IF STICK PUSHER SERVO ACTUATOR OR JUMPER PLUG R5-2003 IS NOT INSTALLED, A/P ENGAGE SWITCH WILL BE LOCKED OFF.

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Sequence Six - Second Setup Interactives
Figure 110/22-01-05-990-864 (Sheet 1 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
320	FMA-1 A/P LITE ON FAILURE	FMA-1 A/P LITE OFF FAILURE	VERIFIES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR; FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-1.	GND	J101/N P1-644/16 J102B/24	22-17-11 22-17-11 22-17-11
321	FMA-2 A/P LITE ON FAILURE	FMA-2 A/P LITE OFF FAILURE	VERIFIES FMA A/P-2 ANNUNCIATOR.	FAILED FMA A/P-2 ANNUNCIATOR; FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-2.	GND	J101/P P1-644/20 J102B/24	22-17-11 22-17-11 22-17-11
322	ENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE AND ENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	P10-432/P J103B/26	22-31-12 22-31-12
323	ENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH. FAILED ASSOC. DFGC.	GND	S10-194 J103B/8	22-13-12 22-13-12
324	Y/D OFF LITE OFF — VERIFY	Y/D OFF LITE OFF FAILURE	VERIFIES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE. FAILED ASSOC. DFGC.	28 VDC	P1-119/c J103B/B	22-13-12 33-12-00 22-13-12
325	RCVRS TO ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 TUNING TO ILS FREQUENCY.	FAILED NAV 1 RCVR. FAILED CAPT'S NCP. FAILED ASSOC. DFGC.	28 VDC	R50-319B/38 P10-407/f J101A/17	34-26-02 34-31-01 34-26-02
326		NAV 2 TUNING FAILURE	VERIFIES NAV 2 TUNING TO ILS FREQUENCY.	FAILED NAV 2 RCVR. FAILED F/O'S NCP. FAILED ASSOC. DFGC.	28 VDC	R50-320B/38 P10-409/f J104A/17	34-26-02 34-31-02 34-26-02

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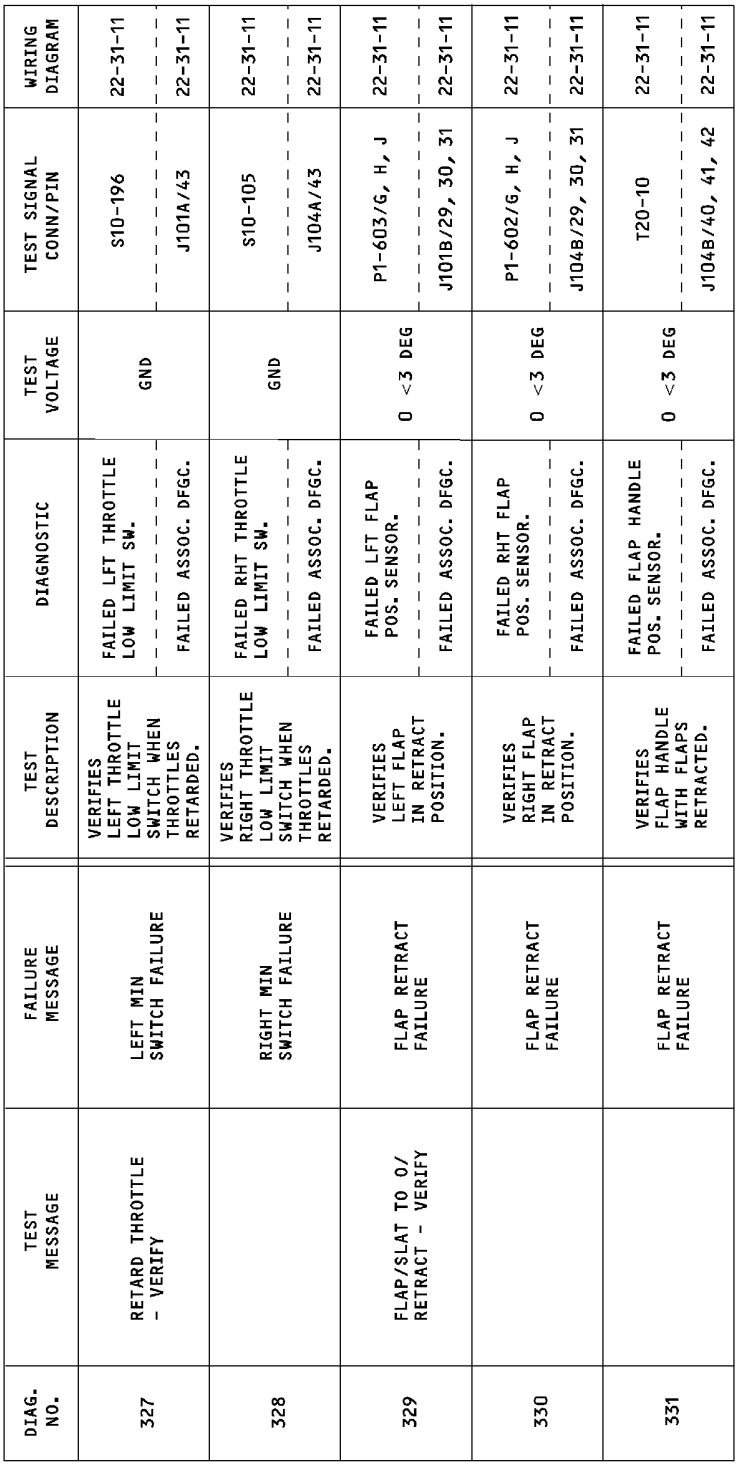
Sequence Six - Second Setup Interactives
Figure 110/22-01-05-990-864 (Sheet 2 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
327	RETARD THROTTLE - VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED LFT THROTTLE LOW LIMIT SW.	GND	S10-196	22-31-11
				FAILED ASSOC. DFGC.		J101A/43	22-31-11
328		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED RHT THROTTLE LOW LIMIT SW.	GND	S10-105	22-31-11
				FAILED ASSOC. DFGC.		J104A/43	22-31-11
329	FLAP/SLAT TO 0/ RETRACT - VERIFY	FLAP RETRACT FAILURE	VERIFIES LEFT FLAP IN RETRACT POSITION.	FAILED LFT FLAP POS. SENSOR.	0 <3 DEG	P1-603/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J101B/29, 30, 31	22-31-11
330		FLAP RETRACT FAILURE	VERIFIES RIGHT FLAP IN RETRACT POSITION.	FAILED RHT FLAP POS. SENSOR.	0 <3 DEG	P1-602/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J104B/29, 30, 31	22-31-11
331		FLAP RETRACT FAILURE	VERIFIES FLAP HANDLE WITH FLAPS RETRACTED.	FAILED FLAP HANDLE POS. SENSOR.	0 <3 DEG	T20-10	22-31-11
				FAILED ASSOC. DFGC.		J104B/40, 41, 42	22-31-11

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CAG(IGDS)

Sequence Six - Second Setup Interactives
Figure 110/22-01-05-990-864 (Sheet 3 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
332 1		ELEV MECH TORQ SWITCH 1 FAILURE	VERIFIES ELEV MECH TORQ SWITCH-1 AT FLAPS = 0 DEGREES.	FAILED ELEV MECH TORQ SW-1. FAILED ASSOC. DFGC.	28 VDC	S10-191 J101A/42	22-11-11 22-11-11
333 1		ELEV MECH TORQ SWITCH 2 FAILURE	VERIFIES ELEV MECH TORQ SWITCH-2 AT FLAPS = 0 DEGREES.	FAILED ELEV MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J104A/42	22-11-11 22-11-11
333 2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SWITCH-2 AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J104A/42	22-11-11 22-11-11
333 3		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SWITCH MONITOR AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SWITCH MONITOR INPUT. FAILED ASSOC. DFGC.	28 VDC	S10-191 J102A/52	
334		SLATS RETRACT FAILURE	VERIFIES LEFT SLAT IN RETRACT POSITION.	FAILED LEFT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 J1B/43 J101A/21	27-81-00 22-31-11 22-31-11
335		SLATS RETRACT FAILURE	VERIFIES RIGHT SLAT IN RETRACT POSITION.	FAILED RIGHT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 J2B/44 J104A/21	27-81-00 22-31-11 22-31-11

1 -930 AND SUBSEQUENT DFGC, ELEV MECH TORQUE IS AILERON MECH TORQUE.
2 -971 AND PRIOR CONFIGURATIONS, OR -972 AND SUBSEQUENT IF AILERON TORQUE MONITOR OPTION NOT SELECTED.
3 -972 AND SUBSEQUENT WITH AILERON TORQUE MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

CAG(IGDS) BBB2-22-246E

Sequence Six - Second Setup Interactives
Figure 110/22-01-05-990-864 (Sheet 4 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
336		RTS SLATS FAILURE	COMPARES LEFT AND RIGHT SLATS DURING RTS TEST.	FAILED LEFT SLAT POS. SENSOR. FAILED RIGHT SLAT POS. SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	N/A	D1-55, D1-56 D1-53, D1-54 J1B/43, J2B/44 J101A/21, J104A/21	27-81-00 27-81-00 22-31-11 22-31-11
337		RTS FLAPS FAILURE	VERIFIES LEFT AND RIGHT FLAPS DURING RTS TEST.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	N/A	T2-98 J101B/29, 30, 31	22-31-11 22-31-11
338	FLAPS/SLAT TO 11/ MID 1 — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAP AT 11 DEG.	FAILED LEFT FLAP SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
339		FLAP POS FAILURE	VERIFIES RIGHT FLAP AT 11 DEG.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11
340		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 11 DEG.	FAILED FLAP HANDLE SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	T20-10 J104B/40, 41, 42	22-31-11 22-31-11
341		SLAT POS FAILURE	VERIFIES LEFT SLAT AT MID POSITION.	FAILED LEFT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 J1B/44 J101A/20	27-81-00 22-31-11 22-31-11
342		SLAT POS FAILURE	VERIFIES RIGHT SLAT AT MID POSITION.	FAILED RIGHT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 J2B/44 J104A/20	27-81-00 22-31-11 22-31-11
343	FLAP/SLAT TO28/ EXTEND — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER L (T2-97). FAILED ASSOC. DFGC.	28 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
344		FLAP POS FAILURE	VERIFIES RIGHT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER R (T2-98). FAILED ASSOC. DFGC.	28 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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Sequence Six - Second Setup Interactives
Figure 110/22-01-05-990-864 (Sheet 5 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
345		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 28°.	FAILED FLAP HANDLE POSITION SENSOR. FAILED ASSOC. DFGC.	28 DEG	T20-10 J104B/40,41,42	22-31-11 22-31-11
346 1		ELEV MECH TORQ SWITCH 1 FAILURE	VERIFIES ELEV MECH TORQ SW-1 AT FLAPS = 28°.	FAILED ELEV MECH TORQ SW-1. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
346 2		AIL MECH TORQ SWITCH 1 FAILURE	VERIFIES AIL MECH TORQ SW-1 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-1. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 1		ELEV MECH TORQ SWITCH 2 FAILURE	VERIFIES ELEV MECH TORQ SW-2 AT FLAPS = 28°.	FAILED ELEV MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW-2 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 3		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW MONITOR AT 28° FLAPS.	FAILED AIL MECH TORQ SW MONITOR INPUT. FAILED ASSOC. DFGC.	28 VDC	S10-191 J101A/52	
348		SLAT POS FAILURE	VERIFIES LEFT SLAT EXTEND DESCRETE.	FAILED LEFT SLAT POS. SENSOR. FAILED PROX. SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 R5-466B/55 J101A/22	27-81-00 22-31-11 22-31-11
349		SLAT POS FAILURE	VERIFIES RIGHT SLAT EXTEND DESCRETE.	FAILED RIGHT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 R5-447B/55 J104A/22	27-81-00 22-31-11 22-31-11

1 -930 AND SUBSEQUENT DFGC, ELEV MECH TORQUE IS AILERON MECH TORQUE.

2 RUN DURING MAINTENANCE TEST ONLY, FOR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

3 -971 AND PRIOR CONFIGURATION, OR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION NOT SELECTED (PIN J104A/28 OPEN).

CAG(IGDS) BBB2-22-248E

Sequence Six - Second Setup Interactives
Figure 110/22-01-05-990-864 (Sheet 6 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
350	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
351	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
352	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
353	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
354	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
355	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
356	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
357	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320B/39, 40 J014B/67, 68	34-26-02 34-26-02
358	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID A IS CLEARED AT SELF-TEST.	SHORTED D3A-A ACCEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P, Z J101A/24	22-19-11 22-19-11
359	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-X ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-114/Z, a J101B/57, 58	22-19-11 22-19-11

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Sequence Seven - Self Tests
Figure 111/22-01-05-990-865 (Sheet 1 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
360	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
361	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B/61, 62	22-19-11 22-19-11
362	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P J101A/24	22-19-11 22-19-11
363	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-414/X, Y J104B/61, 62	22-19-11 22-19-11
364	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA VALID A IS CLEARED AT SELF-TEST.	SHORTED DLA-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-412/P J101A/37	22-19-11 22-19-11
365	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA ACCEL A BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED DLA-A ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B59, 60	22-11-19 22-11-19
366	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
367	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-BX VALID. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
368	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	34-45-02 34-45-02

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Sequence Seven - Self Tests
Figure 111/22-01-05-990-865 (Sheet 2 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
369	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/U, V J104B/61, 62	22-19-11 22-19-11
370	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
371	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
372	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA VALID B IS CLEARED AT SELF-TEST.	SHORTED DLA-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-413/L J104A/37	22-19-11 22-19-11
373	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA ACCEL B BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED DLA-B ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-413/U, V J104B/59, 60	22-19-11 22-19-11
374	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-1 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/12 J101A/26	34-45-01 34-45-01
375	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/22, 23 J101B/55, 56	34-45-01 34-45-01
376	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-1 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/57 J101A/39	34-45-01 34-45-01
377	TEST IN PROGESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/46, 47 J102A/55, 56	34-45-01 34-45-01

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Sequence Seven - Self Tests
Figure 111/22-01-05-990-865 (Sheet 3 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
378	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-2 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322B/12 J104A/26	34-45-02 34-45-02
379	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-322B/22, 23 J104B/55, 56	34-45-02 34-45-02
380	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-2 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322/57 J104A/39	34-45-02 34-45-02
381	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-322/46, 47 J103A/55, 56	34-45-02 34-45-02

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Sequence Seven - Self Tests
Figure 111/22-01-05-990-865 (Sheet 4 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
385	A/P ENGAGED — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH.	[1] 28 VDC	J101/H SEL. 1 J103/H SEL. 2	22-14-11
				FAILED ASSOC. DFGC.		J102A/100	22-14-11
386 [3]	WHEEL TURNS RWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A.	[2] +15°± 2.5° = +2.45±.51 VAC	P10-419/J, S	22-12-12
				FAILED ASSOC. DFGC.		J101B/83, 84	22-12-12
387		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO. TACH A.	> 1.71 VAC	P10-419/N, P	22-12-12
				FAILED ASSOC. DFGC.		J101B/98, 99	22-12-12
388		AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B.	[2] +15°± 2.5° = +2.45±.51 VAC	P10-420/J, S	22-12-12
				FAILED ASSOC. DFGC.		J104B/83, 84	22-12-12
389		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B.	> 1.71 VAC	P10-420/N, P	22-12-12
				FAILED ASSOC. DFGC.		J104B/98, 99	22-12-12
390	WHEEL TURNS RWD — VERIFY	WHEEL RWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO RWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
391		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A.	−5°±1° ≈ −1.03±.2 VAC	P10-419/J, S	22-12-12
				FAILED ASSOC. DFGC.		J101B/83, 84	22-12-12
392		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A.	> 1.71 VAC	P10-419/N, P	22-12-12
				FAILED ASSOC. DFGC.		J101B/98, 99	22-12-12

[1] AN INOPERATIVE TORQUE LIMIT RHEOSTAT MAY PREVENT A/P ENGAGEMENT AND CAN CAUSE AN "AIL SERVO FAILURE" MESSAGE TO BE LOGGED IF FLAPS ARE LESS THAN 26 DEGREES. WITH FLAPS MORE THAN 26 DEGREES, THE TORQUE LIMIT RHEOSTAT WILL NOT PREVENT A/P ENGAGEMENT. PLACE FLAPS MORE THAN 26 DEGREES TO VERIFY.

[2] IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE + 1.5 ± .25 VAC.

[3] WHEN FLAPS ARE LESS THAN 26 DEGREES AILERON SERVO POWER IS SUPPLIED THROUGH THE AILERON SERVO TORQUE LIMITER RHEOSTAT. FAILURE OF THE RHEOSTAT MAY CAUSE THE CONTROL WHEEL TO OSCILLATE AND THE AUTOPILOT TO DISCONNECT. THE MESSAGE STORED IN FLIGHT FAULTS WILL READ, "AILERON SERVO MODEL FAILURE".

DURING RETURN TO SERVICE OR MAINTENANCE TEST THE AILERON PORTION OF THE TEST WILL CAUSE THE CONTROL WHEEL TO OSCILLATE.

IF THESE SYMPTOMS OCCUR PLACE THE FLAPS TO 28 DEGREES AND REPEAT THE SERVO TESTS. IF THE SYMPTOMS HAVE BEEN CORRECTED. CHECK THE RHEOSTAT.

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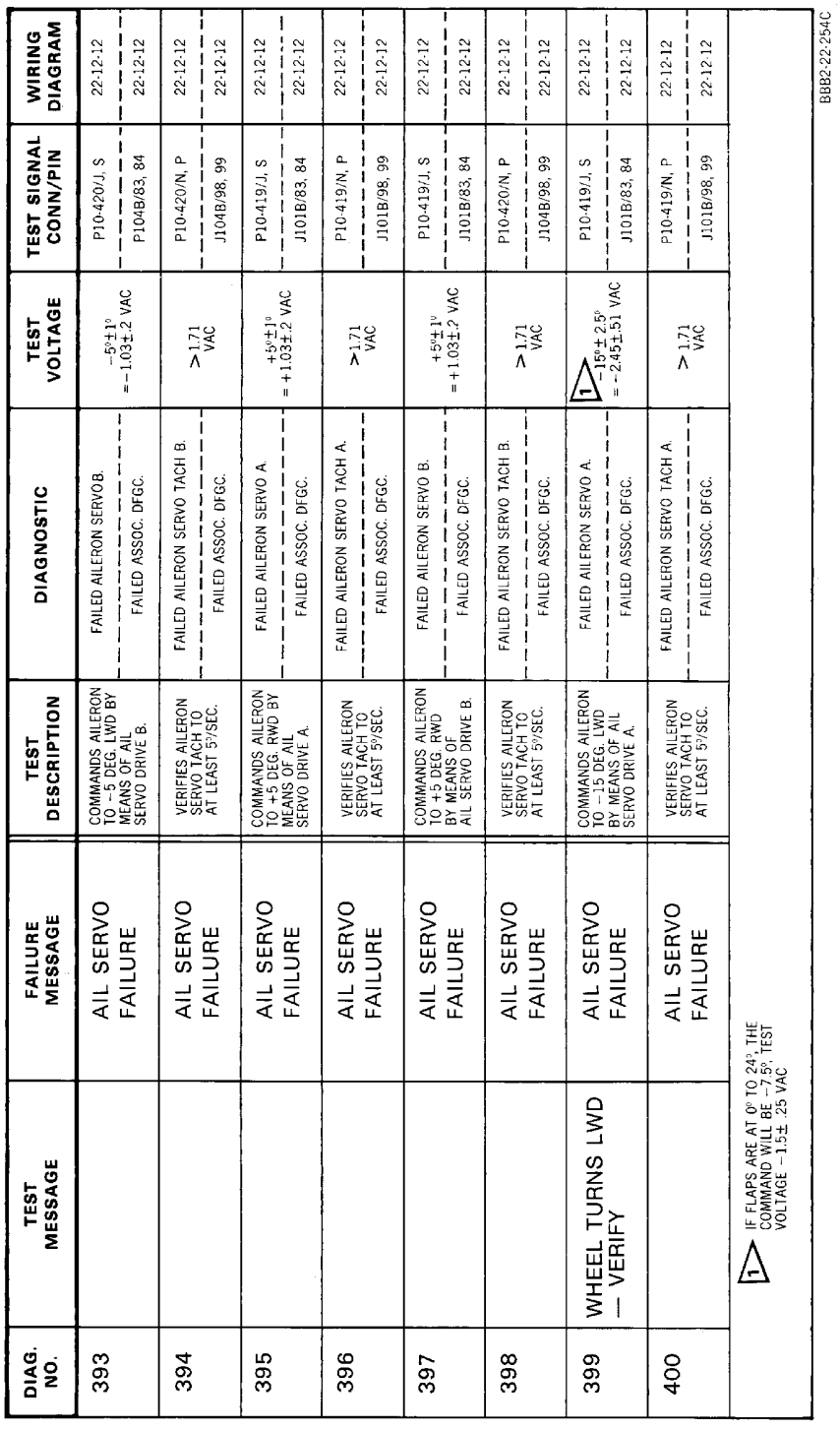
Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 1 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
393		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-420/J, S P104B/83, 84	22-12-12 22-12-12
394		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
395		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
396		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
397		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
398		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
399	WHEEL TURNS LWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	1 −15°±2.5° = −2.45±.51 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
400		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE −1.5±.25 VAC

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Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 2 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
401		AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	1 −15°±2.5° = −2.45±.51 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
402		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
403		WHEEL LWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO LWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
404	COLUMN MOVES FWD — VERIFY	ELV SERVO FAILURE	COMMANDS ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
405		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
406		ELV SERVO FAILURE	COMMAND ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-420/J, S J104B/80, 81	22-11-12 22-11-12
407		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE −1.5±.25 VAC

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Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 3 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
408		COLUMN FWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE DOWN.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A
409		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$-5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
410		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
411		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	$-5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
412		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
413		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$+5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
414		ELV SERVO FAILURE	VERIFIES SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

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Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 4 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
415		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03± .2 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
416		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
417	COLUMN MOVES AFT — VERIFY	ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	-15°±2.5° = -3.05± .51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
418		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
419		ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	-15°± 2.5° = -3.05± .51 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
420		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
421		COLUMN AFT FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE UP.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A

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Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 5 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
422	RHT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMANDS RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	−15°±2.5 = −3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
423		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
424		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	−15°+2.5° = −3.05±.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
425		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
426		RHT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A RIGHT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
427		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
428		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J104B/89, 90	22-13-12 22-13-12

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Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 6 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
429		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
430		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
431		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO –5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	–5°±1° = –1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
432		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
433		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO –5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	–5°±1° = –1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
434		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
435	LEFT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
436		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12

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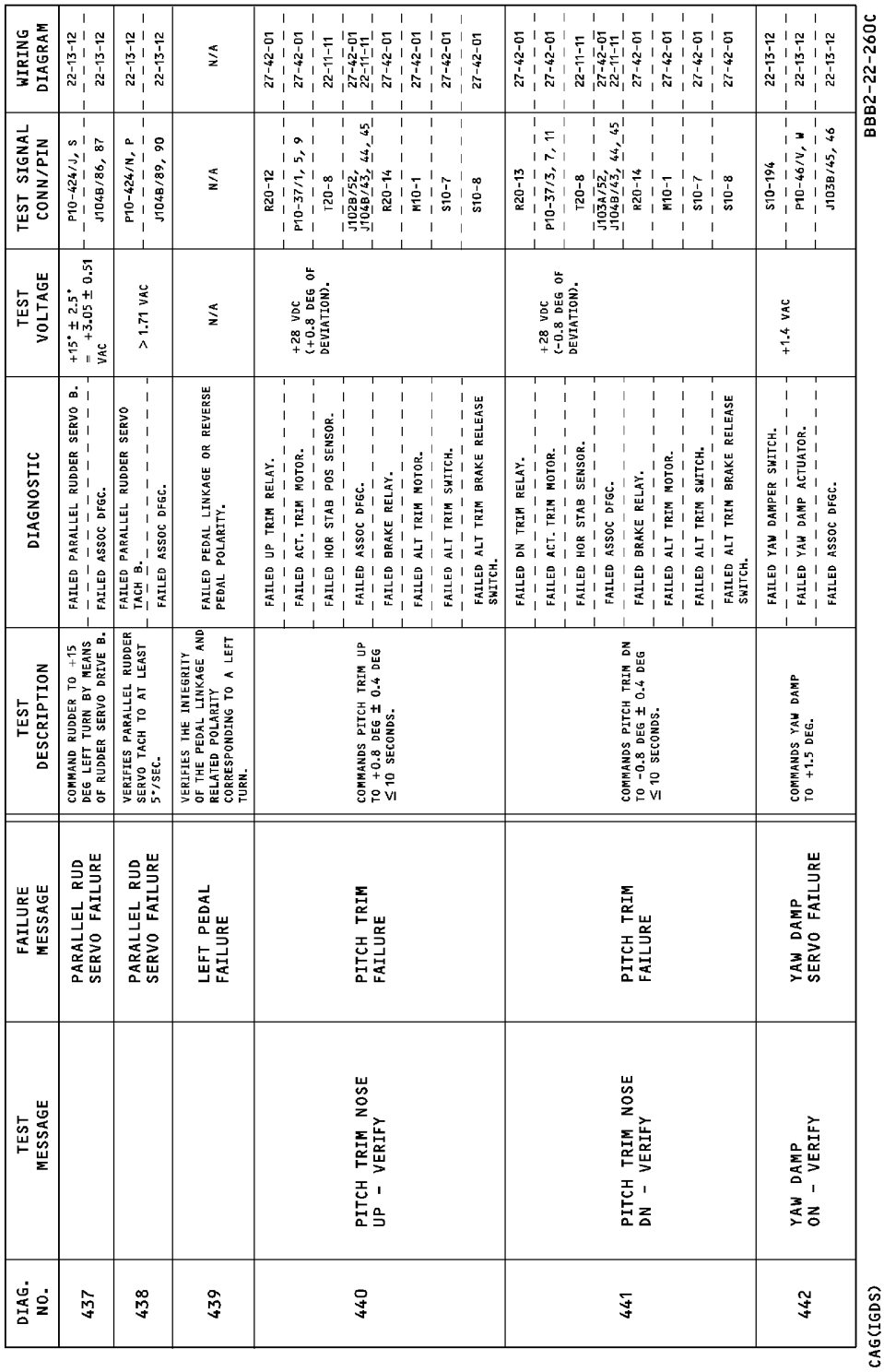
Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 7 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
437		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC DFGC.	+15° ± 2.5° = +3.05 ± 0.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
438		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
439		LEFT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A LEFT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
440	PITCH TRIM NOSE UP - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM UP TO +0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED UP TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB POS SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (+0.8 DEG OF DEVIATION).	R20-12 P10-37/1, 5, 9 T20-8 J102B/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01
441	PITCH TRIM NOSE DN - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM DN TO -0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED DN TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (-0.8 DEG OF DEVIATION).	R20-13 P10-37/3, 7, 11 T20-8 J103A/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01
442	YAW DAMP ON - VERIFY	YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO +1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC DFGC.	+1.4 VAC	S10-194 P10-46/V, W J103B/45, 46	22-13-12 22-13-12 22-13-12

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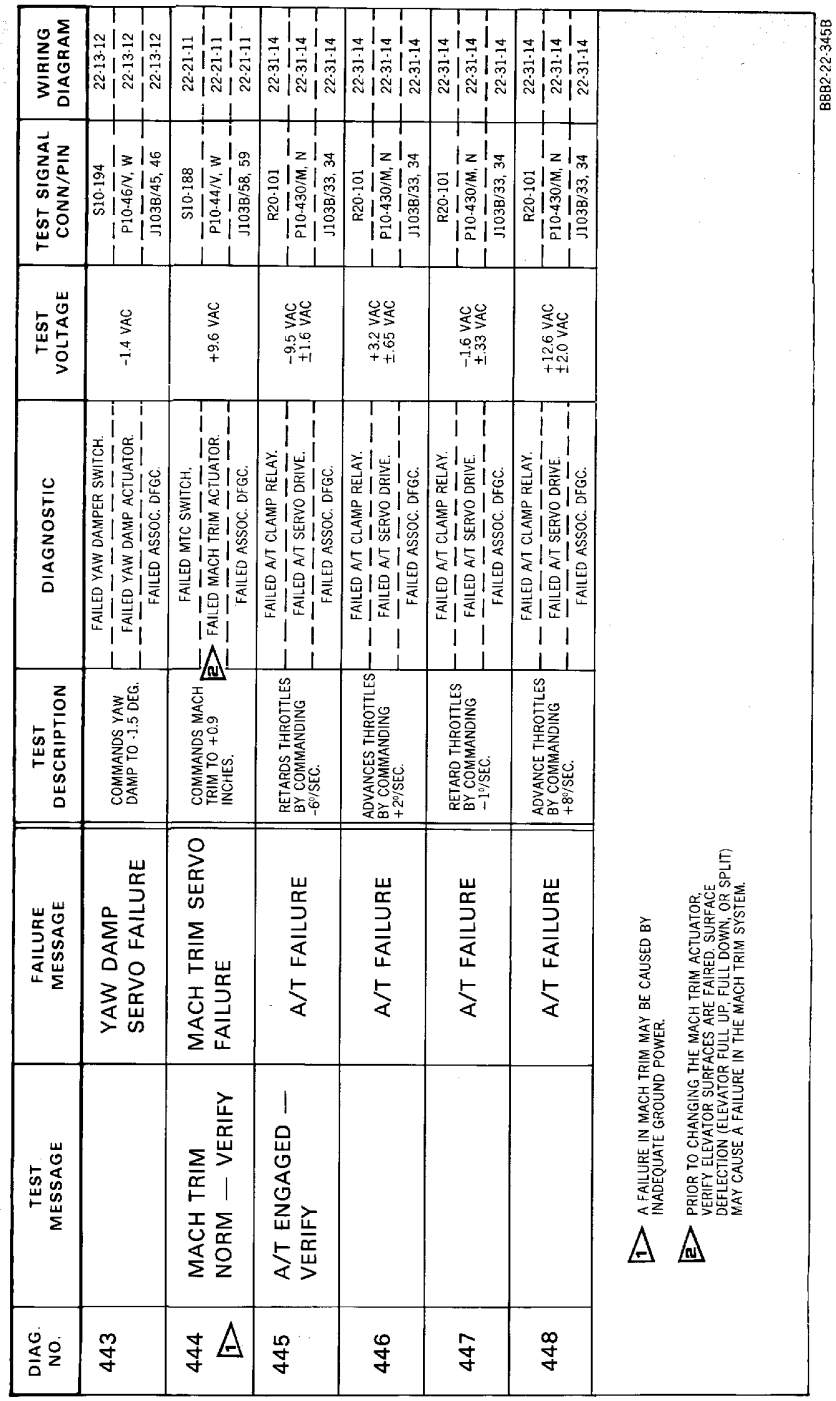
Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 8 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
443		YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO -1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC. DFGC.	-1.4 VAC	S10-194 P10-46/V, W J103B/45, 46	22-13-12 22-13-12 22-13-12
444 ⚠1	MACH TRIM NORM — VERIFY	MACH TRIM SERVO FAILURE	COMMANDS MACH TRIM TO +0.9 INCHES.	FAILED MTC SWITCH. FAILED MACH TRIM ACTUATOR. ⚠2 FAILED ASSOC. DFGC.	+9.6 VAC	S10-188 P10-44/V, W J103B/58, 59	22-21-11 22-21-11 22-21-11
445	A/T ENGAGED — VERIFY	A/T FAILURE	RETARDS THROTTLES BY COMMANDING -6°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-9.5 VAC ±1.6 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
446		A/T FAILURE	ADVANCES THROTTLES BY COMMANDING +2°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+3.2 VAC ± .65 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
447		A/T FAILURE	RETARD THROTTLES BY COMMANDING -1½°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-1.6 VAC ± .33 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
448		A/T FAILURE	ADVANCE THROTTLES BY COMMANDING +8°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+12.6 VAC ±2.0 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14

⚠1 A FAILURE IN MACH TRIM MAY BE CAUSED BY INADEQUATE GROUND POWER.

⚠2 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATOR FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

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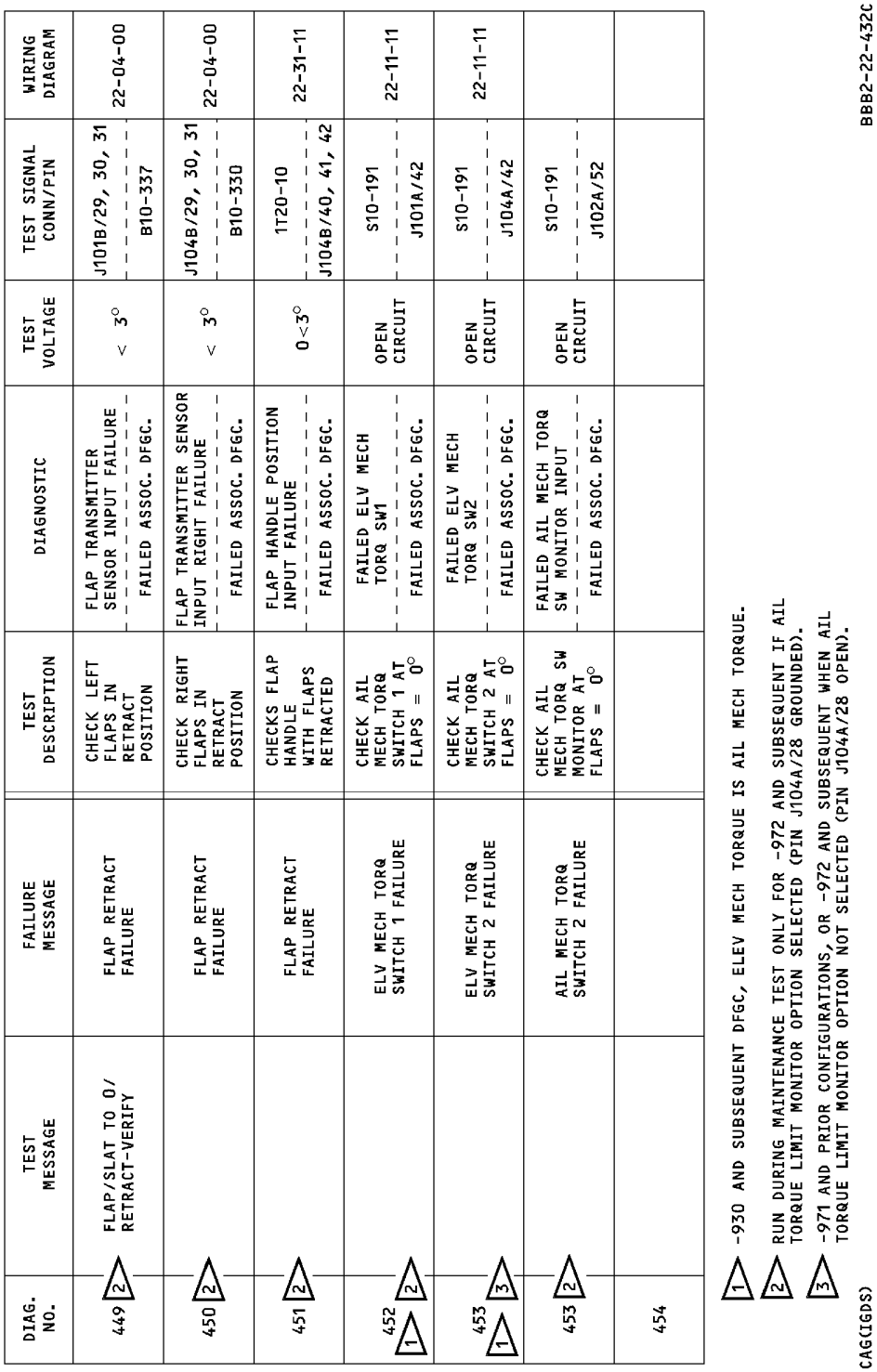
Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 9 of 10)



Sequence Eight - Servo Tests
Figure 112/22-01-05-990-866 (Sheet 10 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
455		HEADING 1 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED AHRS-1 FAILED LEFT FLUX VALVE FAILED ASSOC. DFGC.		P10-4/F T20-1 J101B/15, 16, 17	34-24-10 34-22-01 34-22-03
456		HEADING 2 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED AHRS-2 FAILED RIGHT FLUX VALVE FAILED ASSOC. DFGC.		P10-7/F T20-2 J104B/15, 16, 17	34-24-10 34-22-02 34-22-04
457		LEFT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED LEFT ELEV. POS. SENSOR FAILED ASSOC. DFGC.		P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
458		RIGHT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED RIGHT ELEV. POS. SENSOR. FAILED ASSOC. DFGC.		P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11
459		CADC-T ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1. FAILED ASSOC. DFGC.		R50-280B/38, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
460		CADC-N ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93.	34-16-12 34-16-12
461		CADC-T ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 1 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
462		CADC-N ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
463		CADC-T MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
464		CADC-N MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
465		CADC-T CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
466		CADC-N CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
467		CADC-T VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
468		CADC-N VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
469		CADC-T TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 2 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
470		CADC-N TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
471		CADC-T TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
472		CADC-N TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
473		CADC-T ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITOR	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
474		CADC-N ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
475		CADC-T SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
476		CADC-N SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS. MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
477		AIL TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED AILERON TACH A FAILED AILERON TACH B FAILED ASSOC. DFGC.		P10-419/N, P P10-420/N, P J101A/98, 99 J104A/98,99	22-12-12 22-12-12 22-12-12

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Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 3 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
478		ELEV TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED ELEV TACH A FAILED ELEV TACH B FAILED ASSOC. DFGC.		P10-421/N,P P10-422/N,P J101A/96, 97 J104A/96, 97	22-11-12 22-11-12 22-11-12
479		RUD TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED RUD TACH A FAILED RUD TACH B FAILED ASSOC. DFGC.		P10-423/N,P P10-424/N,P J101B/89, 90 J104B/89, 90	22-13-12 22-13-12 22-13-12
480		SPD REF KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR	FAILED FGCP FAILED ASSOC. DFGC.		P10-411/Zab J101B/46, 47, 48	22-31-11 22-31-11
481 1		VERT GYRO-1 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED AHRS-1 FAILED ASSOC. DFGC.		P10-18/30, 31, 34, 35 J101B/71, 72, 74, 75 J101A/14	34-24-10 34-24-01
482 1		VERT GYRO-2 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED AHRS-2 FAILED ASSOC. DFGC.		P10-19/30, 31, 34, 35 J104B/71, 72, 74, 75 J104A/14	34-24-10 34-24-02
483 1		VERT GYRO-3 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED AHRS-3 FAILED ASSOC. DFGC.		P10-165/30, 31, 34, 35 J103A/71, 72, 74, 75	34-24-10 34-24-01
484		PITCH RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED AHRS-1 FAILED ASSOC. DFGC.		P10-18/30, 31 J101B/71, 72	34-24-10 34-24-01
485		PITCH RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED AHRS-2 FAILED ASSOC. DFGC.		P10-19/30, 31 J104B/71, 72	34-24-10 34-24-02
486		PITCH RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED AHRS-3 FAILED ASSOC. DFGC.		P10-165/30, 31 J103A/71, 72	34-24-10 34-24-01

1 -930 and subsequent DFGC, VERT GYRO test message is ATTITUDE

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Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 4 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
487		ROLL RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED AHRS-1 FAILED ASSOC. DFGC.		P10-18/34, 35 J101B/74, 75	34-24-10 34-24-01
488		ROLL RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED AHRS-2 FAILED ASSOC. DFGC.		P10-19/34, 35 J104B/74, 75	34-24-10 34-24-02
489		ROLL RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED AHRS-3 FAILED ASSOC. DFGC.		P10-165/34, 35 J103B/74, 75	34-24-10 34-24-01
490		ANGLE OF ATT 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-1 SENSOR FAILED ASSOC. DFGC.		P1-648/M, N, P J101B/26, 27, 28	22-31-11 22-31-11
491		ANGLE OF ATT 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-2 SENSOR FAILED ASSOC. DFGC.		P1-649/M, N, P J104B/26, 27, 28	22-31-11 22-31-11
492		SPOILER POS 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-397/3,4, 5 J101B/35, 36, 37	22-12-11 22-12-11
493		SPOILER POS 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-398/3,4,5 J104B/35,36, 37	22-12-11 22-12-11
494		EPR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT EPR XMTTER FAILED ASSOC. DFGC.		R50-303B/32, 33, 34 J101B/32, 33,34	34-18-12 34-18-12
495		EPR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT EPR XMTTR FAILED ASSOC. DFGC.		R50-309B/32, 33, 34 J104B/32, 33, 34	34-18-12 34-18-12
496		LEFT AILERON FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED AILERON POSITION SENSOR FAILED ASSOC. DFGC.		P10-397/3, 4,5 (T20-3) J101B/49, 50, 51	22-12-11 22-12-11

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Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 5 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
497		HOR STAB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED HOR STAB POSITION SENSOR FAILED ASSOC. DFGC.		P10-418/3, 4, 5 J104B/43, 44, 45	22-11-11 22-11-11
498		ALT SEL KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP. FAILED ASSOC.DFGC.		P10-411/W, X, Y J101B/40, 41, 42	22-11-11 22-11-11
499		RUDDER POS FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RUDDER POSITION SENSOR FAILED ASSOC. DFGC.		P10-429/3, 4, 5 J104B/46, 47, 48	22-13-11 22-13-11
500		FLAP HANDLE FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FLAP HANDLE POSITION SENSOR FAILED ASSOC. DFGC.		T20-10 J104B/40, 41, 42	22-31-11 22-31-11
501		FLAP POS FAILURE	VERIFIES LEFT FLAP POS SYNCHRO LEG MONITOR.	FAILED LFT FLAP POS SYNCHRO. FAILED ASSOC. DFGC.		P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
502		FLAP POS FAILURE	VERIFIES RIGHT FLAP POS SYNCHRO LEG MONITOR.	FAILED RHT FLAP POS SYNCHRO. FAILED ASSOC. DFGC.		P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11
503		VERT SPD SEL FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP FAILED ASSOC. DFGC.		P10-411/g, g, g J101B/43, 44, 45	22-11-11 22-11-11
504		CRS ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-1. FAILED AHRS-1 FAILED ASSOC. DFGC.		P10-408/g, j, g P10-7/F J104B/5, 6, 7	34-22-04 34-24-10 34-22-04

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Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 6 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
505		CRS ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-2.		P10-406/s,t,u	34-22-03
				FAILED INSTR AMP-2		R50-323B/54	34-22-03
				FAILED DG-2.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/5,6,7	34-22-03
506		HDG ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-410/t,u,v	34-22-04
				FAILED INSTR AMP-1.		R50-324B/18,19,20	34-22-04
				FAILED DG-1.		P10-7/F	34-22-04
				FAILED ASSOC. DFGC.		J101B/18,19,20	34-22-04
507		HDG ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-432/t,u,v	34-22-03
				FAILED INSTR AMP-1		R50-323B/18,19,20	34-22-03
				FAILED DG-1.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/18,19,20	34-22-03
508 *		PMS DATA FAILURE	VERIFIES PMS DATA IS VALID	FAILED PMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
508 **		PMS/FMS DATA FAILURE	VERIFIES PMS/FMS DATA IS VALID	FAILED PMS/FMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
509 ***		WINDSHEAR DATA FAILURE	VERIFIES WINDSHEAR COMPUTER	FAILED W/S		R50-295A J101A-78,79 R50-297A J102A-88,89	34-47-01
				FAILED ASSOC. DFGC			34-63-22

* CUSTOMERS WITH PMS
** CUSTOMERS WITH FMS AND -970 DFGC AND SUBS
*** CUSTOMERS EQUIPPED WITH WINDSHEAR COMPUTERS

CAG(IGDS)

BBB2-22-270D

Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 7 of 8)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
520	FLAP/SLAT TO 0/ RETRACT — VERIFY	AIL SERVO FAILURE	CMD AILERON TO + 7.5° RWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC.	+7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
521		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
522		AIL SERVO FAILURE	CMD AILERON TO 7.5° RWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	7.5° ± 1.5°	P10420/J, S J104B/83, 84	22-12-12
523		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧ 5°/SEC	FAILED AILERON SERVO TACH B FAILED ASSOC. DFGC	≯ 1.71 VAC	P10420/N, P J104B/98, 99	22-12-12
524		AIL SERVO FAILURE	CMD AILERON TO −7.5° LWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC	−7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
525		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
526		AIL SERVO FAILURE	CMD AILERON TO −7.5° LWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	−7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
527		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10420/N, P J104B/98, 99	22-12-12
528 [1]		MACH TRIM SERVO FAILURE	VERIFIES MACH TRIM ACTUATOR RETRACTS	FAILED MTC SWITCH FAILED MTC ACTUATOR FAILED ASSOC. DFGC	9.6 VDC	S10-18B P10-44/M, X J103B/58, 59	22-21-11

[1] -930 and subsequent DFGC

BBB2-22-433B

Sequence Nine - Internal Monitors
Figure 113/22-01-05-990-867 (Sheet 8 of 8)

DFGS STATUS/TEST (STP) PANEL - TROUBLE SHOOTING

1. General

A. Trouble shooting procedures consist primarily of faulty component replacement. A thorough knowledge of the inter-relationship of components that have a direct bearing on the Digital Flight Guidance System is essential for meaningful trouble shooting.

B. There are two methods of trouble shooting provided within this section. One method is by use of Flight Faults as displayed on the STP after each landing, and the other is by use of Trouble Shooting Charts that are used in conjunction with the Return to Service Test or Maintenance Test.

C. The first portion of the text contains the Flight Fault displays (Paragraph 3.). The Flight Fault displays are listed in alphabetical order. A Failure Message along with a Failure Description and Failure Symptom are provided. These tables should be used to collate written squawks to computer detected faults. Maintenance Test Diagnostic numbers are also provided along with the appropriate Maintenance Action that should be taken.

NOTE: The Maintenance Test Diagnostic numbers are given in the sequence of most probability of failure(s), i.e., Internal Monitors: Diag. 463-464, Sensor Values: Diag. 245-246, etc.

D. The Trouble Shooting charts (Paragraph 4.) contained in this section correlate to all failures that are displayed on the STP during Maintenance or RTS test. The charts provide the normal Test Message that should be displayed along with its corresponding Failure Message and Diagnostic Number. A brief description of the test in conjunction with the Diagnostic (failure) that may have occurred is provided. By use of the Wiring Diagram Manual as called out, the Test Signal Connector Pin can be located and the proper Test Voltage (when applicable) may be taken.

E. When Test Voltage readings are taken, the readings should be at Mod Blocks and not at electrical connectors. Standard electrical test voltages are given in the procedures. A 10% voltage tolerance is permissible, unless otherwise shown.

F. There are two separate wire bundles containing autoland critical wiring, system 1 and system 2. System 1 autoland wiring is normally routed on the left side of the aircraft with other existing wiring and secured with normal white type string ties. System 2 autoland wiring is routed on the right side and easily identifiable by yellow string ties and the wires have run letters beginning with the letter S.

WARNING: WHILE PERFORMING TROUBLE SHOOTING PROCEDURES, AUTOLAND CRITICAL WIRING MUST NEVER BE TAMPERED WITH UNLESS ABSOLUTELY NECESSARY TO PROVIDE WIRING REWORK. IF WIRING REWORK IS REQUIRED, ASSURE THAT ALL PROCEDURES OUTLINED IN CHAPTER 20-11-00, PAGE 201 OF WIRING DIAGRAM MANUAL ARE STRICTLY ADHERED TO.

G. Prior to replacement of a faulty component, or maintenance requirements to clear a fault (rigging, etc.), verify that the using components maintenance procedures are strictly adhered to. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201 for removal/ installation of the CADC)

H. After trouble shooting procedures are completed, verify the proper STP test is initiated to verify and clear the displayed fault(s). If the fault(s) occurred in sequences 1,2,4,6,7,8 or 9 then a Return-To-Service Test may be initiated to clear and verify the displayed fault(s). If the fault(s) occurred in sequence 0,3 or 5 then a System Maintenance test of the failed sequence test step must be performed.

NOTE: The replacement of the Digital Flight Guidance Computer (DFGC) is not always required when the intermittent failure is reported during flight and no failure is found during Flight Fault Review (FFR) test and Return to Service (RTS) test using Status Test Panel (STP) at the ground check. However, if intermittent failures persist, further troubleshooting will be required.

I. In the event the following messages are recorded on the STP, refer to the servo test portion of the STP maintenance test. Perform the alternate trim motor servo test and, using an oscilloscope or memory voltmeter, verify the voltage transient measured across the up and down alternate trim relay coils are nominal (less than approximately 40 VDC) within relay tolerances. If voltage transients greater than 60 VDC are measured, on either alternate trim relay, this indicates the suppression circuitry has failed, therefore, remove and replace relay.

(1) The STP loggings thus far that have caused the DFGC to shut down due to faulty diode circuitry are:

(a) Control Store Failure - A RAM failure occurs during the BITE test portion of the Control Store Parity Checker:

1) A processor failure occurs during External Interrupt.

2) Bad parity is detected in a Control Store Word.

(b) RAM Failure - A value stored in a random access memory (RAM) location is not the same as the value read from the same RAM location.

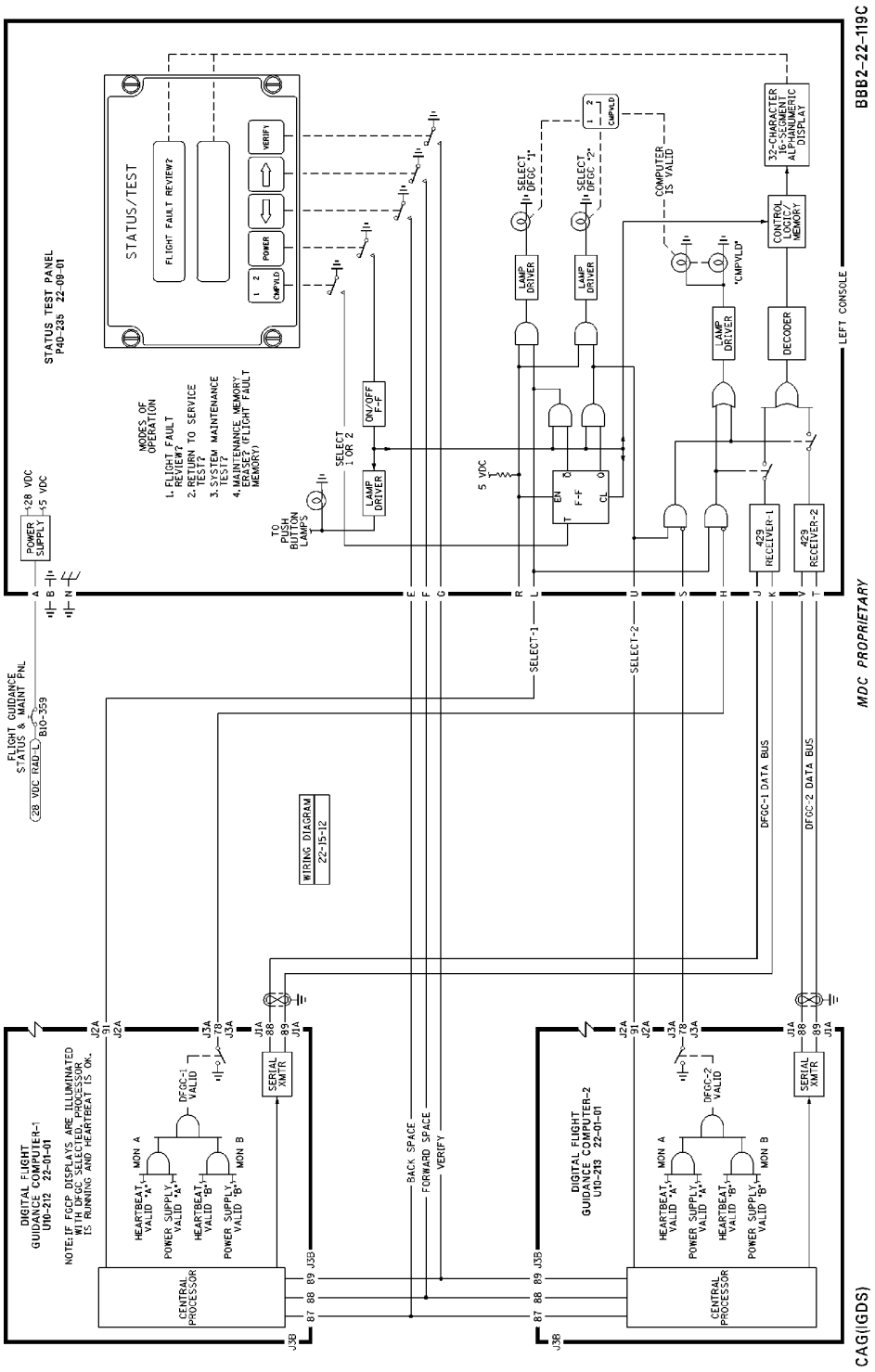
(c) Ticket Check Failure - DFGC monitors detect an incomplete task.

2. Equipment and Materials

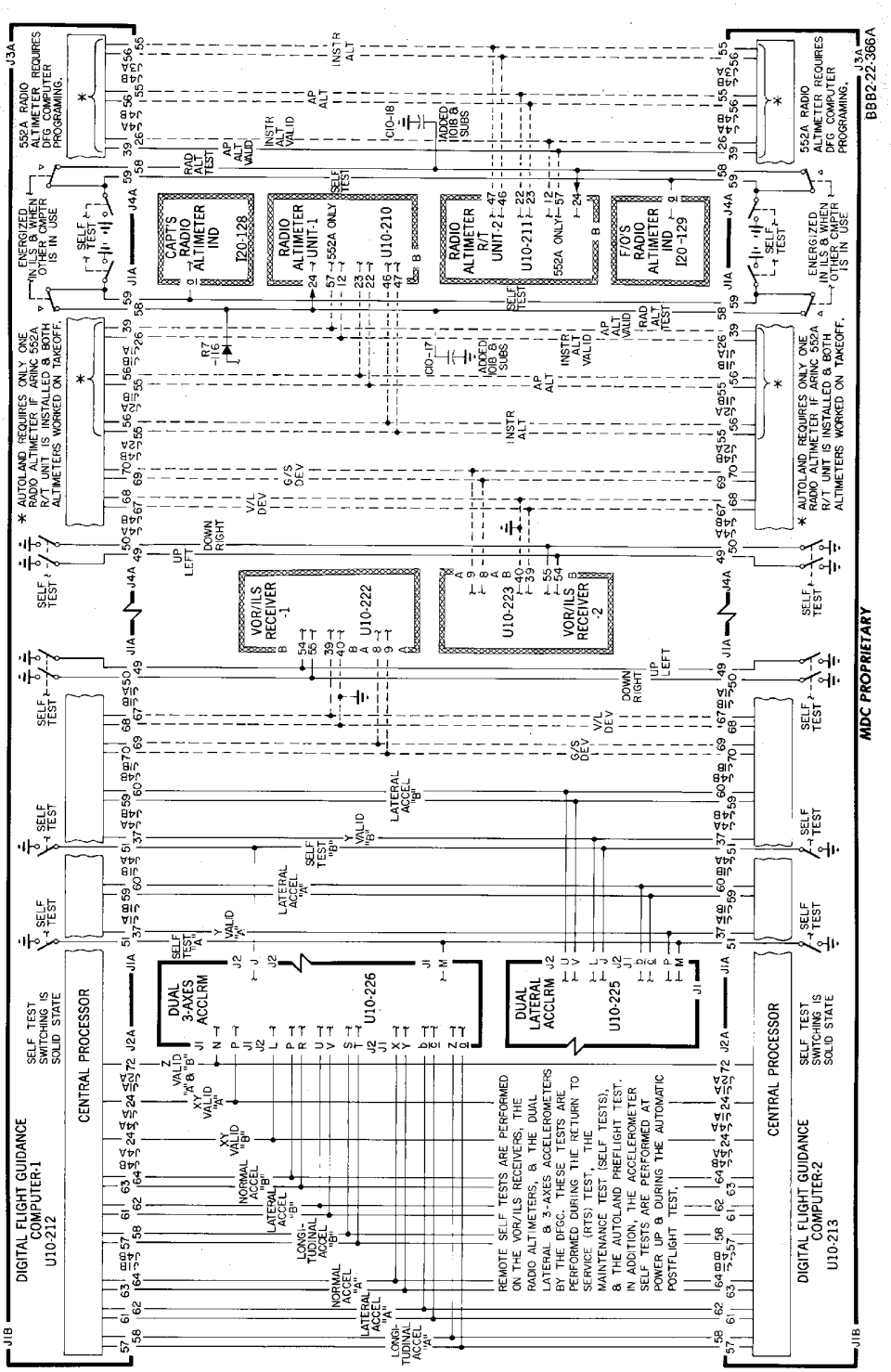
NOTE: Equivalent substitutes may be used instead of the following items.

Table 101

Name and Number	Manufacturer
High impedence voltmeter capable of reading below 30 mv.	



Status/Test Panel (STP)
Figure 101/22-01-05-990-835



Remote Self-Test
Figure 102/22-01-05-990-838

3. **Flight Fault Review**

A. The Digital Flight Guidance Computer (DFGC) has the capability of storing in-flight detected failures in a non-volitale memory. This feature is implemented within the DFGC by surveying the state of logic bits associated with valids and various monitors that provide in-flight information to the DFGC. The DFGC logic looks for this discrete logic information to be in a set condition or in a high condition. When this condition fails, then a corresponding failure will be logged within the DFGC for later recall (by use of the STP) as "FLIGHT FAULT REVIEW?".

B. Since the DFGC is looking for discrete logic information from associated DFGC LRU's or Sensors, the DFGC may log failures that appear only intermittently or for a short period of time (less than one second). These failures may not be visible to the flight crew and will only appear during "FLIGHT FAULT REVIEW?". Therefore, failure logging is not sufficient justification for removing and replacing a displayed LRU or Sensor. Ground test the item as called out in the following Flight Fault displays and use the Trouble Shooting Charts as called out in Paragraph 4. as necessary.

C. Prior to removing a displayed LRU or Sensor, verify the applicable ATA Chapter ground maintenance procedures are strictly adhered to. (i.e. CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201, for Removal/Installation of CADC's)

D. The following charts in this section alphabetically list the failure messages that may appear in the Flight Fault Review. Also shown is the flight compartment symptom that will be present if the failure occurs.

Table 102

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: With -974 DFGC expanded failure message Post S/B 22-133.				
A/P OVERPOWER MON DISCONNECT	PILOT COMMAND CAUSED OVERRIDE OF AUTOPILOT COMMAND. AUTOPILOT DISCONNECT.	NONE	NONE	NONE
ACCEL SELF TEST FAILURE	FAILED DUAL 3- AXIS AND/OR DUAL LATERAL ACCELEROMETER.	AUTOPILOT AND AUTO- THROTTLE WILL NOT ENGAGE AFTER POWER-UP.	SELF TESTS: DIAG. 358-373. SENSOR VALUES: DIAG. 209-216. PASSIVE DISCRETES: DIAG. 27-30.	REF T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201) OR DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ACCEL MISTRIM MON DISENGAGE (-960 DFGC)	MONITOR TRIPPED BECAUSE OF EXCESSIVE LONGITUDINAL ACCELERATION	AUTOPILOT DISCONNECT DURING ALTITUDE HOLD, ALTITUDE CAPTURE OR VERTICAL SPEED MODE	NONE	PERFORM ACCEL SELF- TEST OR NONE IF PILOT USED EPR LIM POWER IN ALT HOLD, ALT CAP OR USED SPD MODE.
AIL SERVO FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL: MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
AIL SERVO AMP FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477 SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR. (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
AILERON SERVO MODEL FAILURE	FAILED AILERON SERVO.	AUTOPILOT OPERATION INHIBITED. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 386-402. INTERNAL MONITORS: DIAG. 477. SENSOR VALUES: DIAG. 194-195, 202-203. SECOND SET- UP INTER- ACTIVES: DIAG. 314-315. INITIAL SETUP INTER- ACTIVES: DIAG. 6-7.	REF. T/S CHARTS. REF. AIL SERVO MOTOR. (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201)
NOTE: Prior to -920/-930 computers AIL read ELEV.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AIL MECH TORQ SWITCH FAILURE	FAILURE OF ONE OR BOTH AILERON MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES CLOSED. 2) FLAP POSITION 20° TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES OPEN.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF. T/S CHARTS.
NOTE: -971 computer and subs provide expanded failure messages.				
AIL MECH TORQ SWITCH FAILURE X	X=0 for a non-isolating failure			
	X=1 for switch 1 indicating unlimited when flaps <20 degrees			
	X=2 for switch 2 indicating unlimited when flaps <20 degrees			
	X=3 for both switches indicating unlimited when flaps <20 degrees			
	X=4 for switch 1 indicating limited when flaps >28 degrees			
	X=5 for switch 2 indicating limited when flaps >28 degrees			
	X=6 for both switches indicating limited when flaps >28 degrees			
	X=7 for switch 1 indicating limited during autoland			
	X=8 for switch 2 indicating limited during autoland			
	X=9 for both switches indicating limited during autoland			
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on the ground.				
AILERON POS FAILURE	FAILED AILERON SURFACE POSI- TION SYNCHRO.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. T/S CHARTS. REF. AIL POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
AILERON SURFACE MONITOR FAILURE	FAILED AILERON SURFACE POSI- TION SYNCHRO OR AILERON RIG OR SURFACE PROBLEM.	NO AFFECT - UNLESS IN AUTOLAND. "NO AUTO- LAND" LIGHT ON, AND AUTOPILOT DISCONNECTS.	INTERNAL MONITORS: DIAG. 496. SENSOR VALUES: DIAG. 223.	REF. T/S CHARTS. REF. AIL POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201) REF. AIL RIGGING (AILERON AND TAB - ADJUSTMENT/TEST, PAGEBLOCK 27-10-00/501)
ALT SEL REF FAILURE	FAILED ALTI- TUDE PRESELECT SYNCHRO.	UNABLE TO CHANGE DISPLAY IN FGCP ALT WINDOW AND/ OR ARM ALT.	INTERNAL MONITORS: DIAG. 498. SWITCHES AND BUTTONS: DIAG. 164-165, 177.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
ANG OF ATT 1 SIGNAL FAILURE	FAILED LEFT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 490. SENSOR VALUES: DIAG. 226.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201)
ANG OF ATT 1, 2 COMP FAILURE	LEFT AND RIGHT ANGLE-OF- ATTACK VANE SPLIT (OUT OF TOLERANCE).	FD AND AP GO-AROUND UNAVAILABLE. SLOW-FAST INDICATOR BIAS OUT OF VIEW. SPD FLAG IN VIEW. BOTH PITCH COM- MANDS OUT OF VIEW. AUTO- THROTTLE EPR ONLY. UNABLE TO STAY IN TAKEOFF MODE ABOVE 60 KNOTS.	SENSOR VALUES: DIAG. 226-227.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201)
ANG OF ATT 2 SIGNAL FAILURE	FAILED RIGHT ANGLE-OF- ATTACK VANE.	AUTO GO- AROUND UNAVAILABLE.	INTERNAL MONITORS: DIAG. 491. SENSOR VALUES: DIAG. 227.	REF. T/S CHARTS. REF. ANG OF ATT SENSOR. (ANGLE-OF-ATTACK TRANSDUCER - MAINTENANCE PRACTICES, PAGEBLOCK 34-19-01/201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: When -971 computers and subs are installed:				
A/P DISCONNECT LIGHT X	X=1 for light "A" (J101A-60) X=2 for light "B" (J104A-60)			
NOTE: A failure will not be logged until both "A" (or "B") bulbs fail or if one bulb fails and the other FMA is removed.				
-906 AND SUBSEQUENT COMPUTERS. ART FOLLOW-UP SWITCH RIGHT FAILURE ART FOLLOW-UP SWITCH LEFT FAILURE	RESPECTIVE FOLLOW-UP SWITCH CLOSED PRIOR TO ART SELF-TEST.	"ART INOP" LIGHT ON.	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (FUEL CONTROL, SUBJECT 73-20-01, page 201)
ART OPTION PIN FAILURE	ART GO-AROUND OPTION PINS IN OPPOSITE STATE DURING POWER-UP.	NONE.	PASSIVE DISCRETES: DIAG. 45.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
-906 AND SUBSEQUENT COMPUTERS ART SOLND LEFT FAILURE ART SOLND RIGHT FAILURE	RESPECTIVE ART FOLLOW-UP SWITCH NOT CLOSING DURING ART SELF-TEST (BOTH SWITCHES MUST CLOSE WITHIN 3 SECONDS AFTER SELF-TEST IS INITIATED).	"ART INOP" LIGHT ON (AFTER ART SELF-TEST).	N/A	REF. LFT OR RHT ENGINE FUEL CONT. (FUEL CONTROL, SUBJECT 73-20-01, page 201)
ASU CAPT ON AUX SWITCH FAILURE ASU F/O ON AUX SWITCH FAILURE -930 AND SUBSEQUENT DFGC.	AUX ATTITUDE SWITCHING UNIT INPUTS IN OPPOSITE STATES FOR MORE THAN 10 SECONDS.	A/P DISCONNECT AND DISABLED. "NO AUTO- LAND" LIGHT ON. A/T DISABLED IN SPD AND MACH.	SWITCHES AND BUTTONS: DIAG. 73-84.	REF. T/S CHARTS. REF. ATTITUDE SW UNIT. (34-23-04, Page 201)
AUTO GA OPTION PIN FAILURE.	AUTO GO- AROUND OPTION PINS IN OPPOSITE STATE DURING POWER- UP.	N/A	PASSIVE DISCRETES: DIAG. 46.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
A/P ENGAGE DISCRETE FAILURE	A/P INDICATING ENGAGED AND OFF FOR TWO OR MORE SECONDS.	AP DISCONNECT. NO AUTOLAND LIGHT ON.	SECOND SET- UP INTER- ACTIVES: DIAG. 312-313. INITIAL SETUP INTER- ACTIVES: DIAG. 4-5.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201) .
A/P ENGAGE FAILURE	AUTPILOT INDICATES DISENGAGE WHEN SERVO CLUTCHES INDICATE ENGAGED.	DFGC SHUT- DOWN ON ASSOCIATED SIDE.	SECOND SET- UP INTER- AVTIVES: DIAG. 312-319. INTIAL SET- UP INTER- ACTIVES: DIAG. 4-11.	REF. T/S CHARTS. REF. AS APPROPRI- ATE: AIL SERVO (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201), ELV SERVO (DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-11-01/201), YAW DAMP ACT. (YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201)
A/P HEARTBEAT TEST FAILURE	DFGC FAILS HEARTBEAT TEST AT POWER-UP.	AUTOPILOT WILL NOT ENGAGE IN ANY MODE.	RETEST DFGC BY GROUND POWER-UP.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
A/T ENGAGE LOGIC FAILURE	AUTOTHROTTLE INDICATES ENGAGED 1 SECOND AFTER DISCONNECT OR POWER-UP.	A/T DISCONNECTS AND WONT REENGAGE.	INTIAL SET- UP INTER- ACTIVES: DIAG. 14-15. SECOND SET- UP INTER- ACTIVES: DIAG. 322	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
A/T MODE CHECK FAILURE O-DFGC A/T MODE CHECK FAILURE 1-DFGC A/T MODE CHECK FAILURE 2-DFGC	INCORRECT AUTOTHROTTLE MODE SEQUENCING WITHIN DFGC.	DFGC SHUT- DOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
A/T SERVO FAILURE	A/T SERVO MOTOR NOT OPERATING WITHIN SPECIFICATION.	A/T DISCONNECT.	SERVO TESTS: DIAG. 445-448.	REF. T/S CHARTS. REF. A/T SERVO MOTOR. (AUTOTHROTTLE/RETARD MODE - MAINTENANCE PRACTICES, PAGEBLOCK 22-31-02/201)
WJE 405, 409, 884				
NOTE: -920/-930 and subsequent computers; prior to these computers ATT display was VERT GYRO.				
ATT 1 SIGNAL FAILURE ATT 1 VALID FAILURE ATT 2 SIGNAL FAILURE ATT 2 VALID FAILURE ATT 3 SIGNAL FAILURE ATT 3 VALID FAILURE	SINGLE VERTICAL GYRO FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. . (VERTICAL GYRO, SUBJECT 34-23-01, Page 201)
ATT 1, 2 COMP FAILURE ATT 1, 3 COMP FAILURE ATT 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. VERT GYROS (VERTICAL GYRO, SUBJECT 34-23-01, Page 201), (ATTITUDE SWITCHING UNIT, SUBJECT 34-23-04, Page 201).
WJE 881, 883				
NOTE: -920/-930 and subsequent computers; prior to these computers ATT display was VERT GYRO.				

WJE 881, 883 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ATT 1 SIGNAL FAILURE ATT 1 VALID FAILURE ATT 2 SIGNAL FAILURE ATT 2 VALID FAILURE ATT 3 SIGNAL FAILURE ATT 3 VALID FAILURE	SINGLE ATTITUDE FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE. (34-23-00, page 201)
ATT 1, 2 COMP FAILURE ATT 1, 3 COMP FAILURE ATT 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. ATTITUDE (34-23-00, page 201), REF. AHRS SW UNIT (34-21-11, page 201).
WJE 405, 409, 881, 883, 884				
BITE FAILURE XXXX-FAILURE	BUILT IN TEST FAILURE.	DFGC SHUT- DOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
CADC ALT BCR 1 SIGNAL FAILURE CADC ALT BCR 1 VALID FAILURE CADC ALT BCR 2 SIGNAL FAILURE CADC ALT BCR 2 VALID FAILURE	FAILURE OF BARO-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 461-462.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201).
CADC ALT NCR 1 SIGNAL FAILURE CADC ALT NCR 1 VALID FAILURE CADC ALT NCR 2 SIGNAL FAILURE CADC ALT NCR 2 VALID FAILURE	FAILURE OF NON-CORRECTED ALTITUDE SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAIL- ABLE.	INTERNAL MONITORS: DIAG. 459-460. SENSOR VALUES: DIAG. 235-236	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC ALT NCR 1,2 COMP FAILURE	SPLIT BETWEEN NON-CORRECTED ALTITUDE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A NCR-1 AND NCR-2 VALID OR SIGNAL FAILURE.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 235-236.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC ALT RATE 1 SIGNAL FAILUR CADC ALT RATE 1 VALID FAILURE CADC ALT RATE 2 SIGNAL FAILURE CADC ALT RATE 2 VALID FAILURE	FAILURE OF ALTITUDE RATE SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAIL- ABLE.	INTERNAL MONITORS: DIAG. 473-474. SENSOR VALUES: DIAG. 239-240.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC ALT RATE 1,2 COMP FAILURE	SPLIT BETWEEN ALT RATE SIGNALS FROM CADC-1 AND CADC-2 WITHOUT AN ALT RATE-1 AND ALT RATE-2 VALID OR SIGNAL FAILURE. NOTE : PITOT STATIC SWITCHING MAY CAUSE THIS FAILURE TO BE LOGGED.	LOSS OF ALL PITCH MODES (BOTH FD AND AP) EXCEPT MACH HOLD, ILS AND AUTO- LAND. BLANKS ALTITUDE PRESELECT WINDOW AND V/S DISPLAY WILL NOT CHANGE. ALSO, DISABLES THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 239-240.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC CAS 1 SIGNAL FAILURE CADC CAS 1 VALID FAILURE CADC CAS 2 SIGNAL FAILURE CADC CAS 2 VALID FAILURE	FAILURE OF COMPUTED AIR-SPEED SIGNAL FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. UNABLE TO ARM FOR TAKEOFF.	INTERNAL MONITORS: DIAG. 465-466. SENSOR VALUES: DIAG. 243-244.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC CAS 1, 2 COMP FAILURE	SPLIT BETWEEN COMPUTED AIR-SPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT CAS-1 AND CAS-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD, TAKE- OFF, GO-AROUND, THRUST RATING, AND AUTO-THROTTLE OPERATION. (IF A/T IN SPD MODE SLOW-FAST INDICATOR BIASES AND SPD FLAG).	SENSOR VALUES: DIAG. 243-244.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC MACH 1 SIGNAL FAILURE CADC MACH 1 VALID FAILURE CADC MACH 2 SIGNAL FAILURE CADC MACH 2 VALID FAILURE	FAILURE OF MACH SIGNAL OR VALID FROM NUMBERED CADC.	UNABLE TO ARM OR STAY IN AUTO GO-AROUND. TAKEOFF MODE UNAVAILABLE.	INTERNAL MONITORS: DIAG. 463-464. SENSOR VALUES: DIAG. 245-246.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC MACH 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH MACH SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A MACH-1 OR MACH-2 VALID OR SIGNAL FAILURE.	LOSS OF IAS HOLD MACH HOLD, GO-AROUND (BOTH FD AND AP), TAKEOFF (FD AND AP), AUTO-THROTTLE OPERATION IN EPR, SPD SEL, MACH SEL AND MACH TRIM COMP.	SENSOR VALUES: DIAG. 245-246.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SAT 1 SIGNAL FAILURE CADC SAT 1 VALID FAILURE CADC SAT 2 SIGNAL FAILURE CADC SAT 2 VALID FAILURE	FAILURE OF STATIC AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 475-476. SENSOR VALUES: DIAG. 241-242.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC SAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH STATIC AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A SAT SIGNAL OR VALID FAILURE.	N/A	SENSOR VALUES: DIAG. 241-242.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CADC SWITCH DISCRETE FAILURE	DFGC DETECTS AIR DATA SWITCHING UNIT IN THE BOTH ON 1 AND BOTH ON 2 POSITION AT THE SAME TIME FOR MORE THAN 10 SECONDS.	ALL CADC VALIDS ARE LOST RESULTING IN A LOSS OF AP AND FD IN ALL MODES (EXCEPT TURB AND AUTOLAND). ALL AUTO- THROTTLE MODES, THRUST RATING, MACH TRIM COMP, AND ALTITUDE ALERT.	SWITCHES AND BUTTONS: DIAG. 85, 87, 89, 90.	REF. T/S CHARTS. REF. AIR DATA SWITCH UNIT. (AIR DATA SWITCHING UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-03/201)
CADC TAS 1 SIGNAL FAILURE CADC TAS 1 VALID FAILURE CADC TAS 2 SIGNAL FAILURE CADC TAS 2 VALID FAILURE	FAILURE OF TRUE AIRSPEED SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC TAS 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIR-SPEED SIGNALS FROM CADC-1 AND CADC-2 WITHOUT A TAS OR VALID FAILURE.	NONE.	INTERNAL MONITORS: DIAG. 469-470.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC TAT 1 SIGNAL FAILURE CADC TAT 1 VALID FAILURE CADC TAT 2 SIGNAL FAILURE CADC TAT 2 VALID FAILURE	FAILURE OF TRUE AIR TEMP SIGNAL OR VALID FROM NUMBERED CADC.	NONE.	INTERNAL MONITORS: DIAG. 471-472. SENSOR VALUES: DIAG. 237-238.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)
CADC TAT 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH TRUE AIR TEMP SIGNALS FROM CADC-1 OR CADC-2 WITHOUT A TAT SIGNAL OR VALID FAILURE.	LOSS OF THRUST RATING AND AUTO-THROTTLE OPERATION IN EPR, SPD SEL, AND MACH SEL.	SENSOR VALUES: DIAG. 237-238.	REF. T/S CHARTS. REF. CADC. (CENTRAL AIR DATA COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-16-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CLOCK FAILURE -DFGC	REAL TIME CLOCK AND PROCESSOR CLOCK DIFFER BY ±0.3% DURING POWER UP.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
CRITICAL STATE MONITOR FAILURE	A DYNAMIC FAILURE LOGGED ON SELECTED DFGC UNDER THE FOLLOWING CONDITIONS: 1) NORMAL ACCEL (Z AXIS) G -1.5g or L -.5g.. 2) PITCH ANGLE G 24.5° OR PITCH ANGLE L -18.0° 3) PITCH RATE G ±5 * deg/ sec. 4) ROLL ANGLE G ±35 deg. 5) ROLL RATE G ±10 * deg/ sec.	AUTOPILOT DISENGAGES UNTIL AIRPLANE BROUGHT WITHIN TOLERANCE.	SENSOR VALUES: NOTE :SINCE THIS IS A DYNAMIC FAILURE, AIRPLANE SENSORS (3-AXIS ACCEL. AND ATTITUDE) ARE PROBABLY NOT FAILED. HOWEVER, THESE SENSORS SHOULD BE VERIFIED NOT TO HAVE LARGE NULL VALUES IN STATIC CONDITION.	PERFORM RETURN-TO-SERVICE TEST. (DFGS STATUS/TEST, SUBJECT 22-01-05, page 201)

NOTE: -971 computers and subs provide expanded failure messages.

		Trip Threshold
CRITICAL STATE MONITOR FAILURE X	X=0 Normal Acceleration	±0.5 g
	X=1 Pitch Attitude >Max	+24.0 Deg
	X=2 Pitch Attitude <Max	-18.0 Deg
	X=3 Roll Attitude	±35.0 Deg
	X=4 Pitch Rate	±5.0 Deg/sec
	X=5 Roll Rate	±10.0 Deg/sec

NOTE: Failure codes 6 through 11 were added to enhance roll attitude. The column marked "Likely Failure" indicates which sensor may have had a slowover or a null which would result in the corresponding failure message.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
	Likely Failure			
			Slowover Sensor	Null Sensor
	X=6 Sensor A		A	B
	X=7 Sensor A		A	C
	X=8 Sensor B		B	A
	X=9 Sensor B		B	C
	X=10 Sensor C		C	A
	X=11 Sensor C		C	B
CRS ERROR 1 SIGNAL FAILURE CRS ERROR 1 VALID FAILURE CRS ERROR 2 SIGNAL FAILURE CRS ERROR 2 VALID FAILURE	FAILURE OF COURSE ERROR SIGNAL OR VALID FROM NUMBERED COURSE INPUT.	IF FAILURE OCCURS ON ASSOC. DFGC, THEN VOR, LOC, ILS AND AUTOLAND (AP AND FD) ARE INHIBITED. FOR FAILURE ON NON-ASSOC. SIDE THEN AUTOLAND IS INHIBITED. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DIAG. 504-505.	REF. T/S CHARTS. REF. VHF/ NAV CONTROL PANEL. (VHF NAV CONTROL PANEL, SUBJECT 34-32-03, page 201)
CRS ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN BOTH COURSE INPUTS WITHOUT A SIGNAL OR VALID FAILURE WHILE IN ILS OR AUTOLAND.	DISABLES AUTOLAND. A/P DIS-ENGAGE IF IN AUTO-LAND.	VERIFY COURSE DISPLAY ON VHF/NAV CONTROL PANEL AGREES WITH COURSE POINTER ON RDI.	REF. T/S CHARTS. REF. VHF/ NAV CONTROL PANEL. (VHF NAV CONTROL PANEL, SUBJECT 34-32-03, page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
CHECKSUM FAILURE 0-DFGC CHECKSUM FAILURE 0001-DFGC CHECKSUM FAILURE 1-DFGC CHECKSUM FAILURE 2-DFGC CHECKSUM FAILURE 3-DFGC CHECKSUM FAILURE 4-DFGC CHECKSUM FAILURE 5-DFGC CHECKSUM FAILURE 6-DFGC CHECKSUM FAILURE 7-DFGC CHECKSUM FAILURE 0071-DFGC CHECKSUM FAILURE 0073-DFGC CHECKSUM FAILURE 0075-DFGC CHECKSUM FAILURE 0077-DFGC	BITE DETECTS PROCESSOR FAILURE.	DFGC SHUTDOWN.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
CONTROL STORE FAILURE (-960 DFGC AND SUBSEQUENT) *	PARITY CHECK HARDWARE ERROR IN INTERNAL PROCESSOR EPROM MEMORY CHECK	DFGC SHUTDOWN	NONE	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for CONTROL STORE FAILURE. (Paragraph 1.I.(1))				
DLA-Y ACCEL 1 SIGNAL FAILURE DLA-Y ACCEL 1 VALID FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE DLA-Y ACCEL 2 SIGNAL FAILURE	FAILED LATERAL ACCEL. SIDE A (1) OR SIDE B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 27-28. SELF TESTS: DIAG. 364-365,372-373 SENSOR VALUES: DIAG. 215-216	REF. T/S CHARTS. REF. DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
DLA-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B LATERAL ACCEL. SIGNALS WITHOUT CHANNEL A OR CHANNEL B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT. DISENGAGES AP IF IN. AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 364-365. SENSOR VALUES: DIAG. 215-216. PASSIVE DISCRETES: DIAG. 27-28.	REF. T/S CHARTS. REF. DUAL LATERAL ACCEL. (DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-02/201)
DUAL COMP FAILURE -DFGC	SIDE A COMPUTATION DISAGREES WITH SIDE B COMPUTATION.	COMPUTER SHUTDOWN. ALL FUNCTIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
DUAL COMP FAIL XXXX-DFGC	XXXX=least significant 10 bits of failure address			
NOTE: Only the first failed address is logged when the DFGC is shut down even though more variables may actually miscompare. This failure indicates an internal problem within the DFGC.				
D3A-X ACCEL 1 SIGNAL FAILURE D3A-X ACCEL 1 VALID FAILURE D3A-X ACCEL 2 SIGNAL FAILURE D3A-X ACCEL 2 VALID FAILURE	FAILED CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCEL. LONGITUDINAL (X) AXIS.	UNABLE TO ARM FOR TAKEOFF. A/P DISENGAGE IF IN AUTO- LAND. AUTO G/A UNAVAILABLE.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-X ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) ACCELERO METER X AXIS SIGNALS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AP AND FD IAS HOLD, MACH HOLD, GO- AROUND AND TAKEOFF. DISABLES AUTOLAND. DISENGAGES AUTOPILOT AND BIASES FD PITCH BAR. ALSO, LOSS OF AUTO- THROTTLE OPERATION IN EPR, TAKEOFF, SPD SEL, MACH SEL.	SELF TESTS: DIAG. 358-359, 366-367. SENSOR VALUES: DIAG. 209-210. PASSIVE DISCRETES: DIAG. 29-30.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D3A-Y ACCEL 1 SIGNAL FAILURE D3A-Y ACCEL 1 VALID FAILURE D3A-Y ACCEL 2 SIGNAL FAILURE D3A-Y ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER LATERAL (Y) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 360-361, 368-369. SENSOR VALUES: DIAG. 211-212.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Y ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A AND CHANNEL B 3-AXIS ACCELEROMETER SIGNALS IN THE LATERAL (Y) AXIS WITHOUT A CHANNEL A (1) OR B (2) SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISENGAGES AP IF IN AUTOLAND. YAW DAMP DISABLED WITH "YAW DAMP OFF" LIGHT ON.	SELF TESTS: DIAG. 360-361, 368-369. PASSIVE DISCRETES: DIAG. 29-30. SENSOR VALUES:	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Z ACCEL 1 SIGNAL FAILURE D3A-Z ACCEL 1 VALID FAILURE D3A-Z ACCEL 2 SIGNAL FAILURE D3A-Z ACCEL 2 VALID FAILURE	FAILURE OF CHANNEL A (1) OR CHANNEL B (2) SIGNAL OR VALID FROM THE 3-AXIS ACCELEROMETER NORMAL (Z) AXIS.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. DISABLES GO-AROUND. DISENGAGES AP IF ENGAGED IN AUTOLAND OR AUTO GO- AROUND.	PASSIVE DISCRETES: DIAG. 29-30. SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: 213-214.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)
D3A-Z ACCEL 1, 2 COMP FAILURE	SPLIT BETWEEN CHANNEL A (1) AND CHANNEL B (2) 3-AXIS ACCELEROMETER SIGNALS IN THE NORMAL (Z) AXIS WITHOUT A CHANNEL A OR B SIGNAL OR VALID FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. ALL AP AND FD PITCH MODES DISABLED, EXCEPT TURB (AP DISCONNECT AND/OR FLIGHT DIRECTOR PITCH COMMAND BIASES OUT OF VIEW). ALSO, DISABLES AUTO-THROTTLE RETARD MODE.	SELF TESTS: DIAG. 362-363, 370-371. SENSOR VALUES: DIAG. 213-214. PASSIVE DISCRETES: DIAG. 29-30.	REF. T/S CHARTS. REF. DUAL 3-AXIS ACCEL. (DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES, PAGEBLOCK 22-19-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
D/A-A/D FAILURE -DFGC	BITE DETECTED A/D-D/A FAILURE.	AP DIS- CONNECT, AT DISCONNECT, FD INVALID (ASSOC. FD BARS BIAS OUT OF VIEW), FAST-SLOW INVALID (POINTER OUT OF VIEW), HUD VALID CLEARED, YAW DAMP INVALID ("YAW DAMP OFF" LIGHT ON), MACH TRIM DISABLED ("MACH TRIM INOP" LIGHT ON), "NO AUTOLAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
ELEV MECH TORQ SWITCH FAILURE (-920 DFGC AND SUBSEQUENT, ELEV IS AIL)	FAILURE OF ONE OR BOTH ELEVATOR MECHANICAL TORQUE LIMIT SWITCHES. THE FOLLOWING CRITERIA IS USED: 1) FLAP POSITION 0° TO 20°; BOTH SWITCHES OPEN. 2) FLAP POSITION 20° TO 28°; SWITCHES CAN EITHER BE OPENED OR CLOSED. 3) FLAP POSITION 28° TO 40°; BOTH SWITCHES CLOSED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 332-333, 346-347. PASSIVE DISCRETES: 35-36.	REF. T/S CHARTS.
ELEVATOR POS 1 SIGNAL FAILURE ELEVATOR POS 2 SIGNAL FAILURE	FAILURE OF LEFT (1) OR RIGHT (2) ELEVATOR POSITION SENSOR.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	INTERNAL MONITORS: DIAG. 457-458. SENSOR VALUES: DIAG. 221-222.	REF. T/S CHARTS. REF. ELEV. POS SENSOR (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
ELEV POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT ELEV. SURFACE POS. SENSORS WITHOUT AN INDIVIDUAL 1 OR 2 SIGNAL FAILURE.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222.	REF. T/S CHARTS. REF. ELEV. POS SENSOR (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
NOTE: LOGGING OF THIS FAILURE IS INHIBITED BELOW 60 KNOTS.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ELEVATOR SURFACE MONITOR FAILURE	FAILED LEFT OR RIGHT ELEVATOR SURFACE POSITION SIGNAL OR DETERIORATED ELEVATOR PERFORMANCE DURING AUTO-LAND. ONLY LOGGED ON SELECTED DFGC WHILE IN AUTOLAND.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. AP DISENGAGE IF IN AUTO- LAND.	SENSOR VALUES: DIAG. 221-222. INTERNAL MONITORS: DIAG. 457-458.	REF. T/S CHARTS. REF. ELEV. POS SENSOR. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
ELV SERVO FAILURE	FAILED ELEVATOR SERVO.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. T/S CHARTS. REF. ELEV. SERVO MOTOR. (DUPLEX ELEVATOR SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-12-01/201)
ELV SERVO AMP FAILURE	FAILED ELEVATOR SERVO AMPLIFIER IN DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INITIAL SETUP INTER- ACTIVES: DIAG. 8-9. SECOND SETUP INTER- ACTIVES: DIAG. 316-317.	REF. T/S CHARTS. REF. DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201).
ELV SERVO MODEL FAILURE	ELEVATOR SERVO FAILS TO PERFORM WITHIN THE LIMITATIONS OF ITS MODEL.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	SERVO TESTS: DIAG. 403-421. INTERNAL MONITORS: DIAG. 478. SENSOR VALUES: DIAG. 192-193, 200-201.	REF. T/S CHARTS. REF. ELEV. SERVO MOTOR. (DUPLEX ELEVATOR SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-12-01/201)
EL/AIL CLUTCH FAILURE	EITHER OR BOTH ELEVATOR OR AILERON CLUTCHES INDICATING ENGAGED WHEN AP DISENGAGED OR DISENGAGED WHEN AP ENGAGED.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 6-9. SECOND SETUP INTER- ACTIVES: DIAG. 314-317.	REF. T/S CHARTS.
NOTE: -971 computers and subs provide expanded failure messages.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
EL/AIL CLUTCH FAILURE X	X=0 for a non-isolatable failure			
	X=1 for an elevator clutch failure			
	X=2 for an aileron clutch failure			
	X=3 for both elevator and aileron clutch failure			
END AROUND FAILURE 0-DFGC END AROUND FAILURE 1-DFGC	D/A-A/D END AROUND MONITOR FAILURE.	NONE.	NONE.	MONITOR OCCURANCE, IF FAILURE PERSISTS, REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 2-DFGC END AROUND FAILURE 3-DFGC END AROUND FAILURE 4-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201).
NOTE: More END AROUND failures may occur than shown. All require same maintenance action.				
END AROUND FAILURE 5-DFGC	YAW DAMPER COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	YAW DAMP INVALID. "YAW DAMP INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 6-DFGC END AROUND FAILURE 7-DFGC END AROUND FAILURE 8-DFGC	DUAL SERVO COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 9-DFGC	AUTOTHROTTLE COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AUTO- THROTTLE DISENGAGE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 10-DFGC END AROUND FAILURE 11-DFGC END AROUND FAILURE 12-DFGC END AROUND FAILURE 13-DFGC	FLIGHT DIRECTOR END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FD COMMAND BARS BIAS OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 14-DFGC END AROUND FAILURE 15-DFGC	FAST/SLOW END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	FAST/SLOW POINTER BIASES OUT OF VIEW.	NONE.	REMOVE AND REPLACE DFGC. ((DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 16-DFGC END AROUND FAILURE 17-DFGC	EPR INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 18-DFGC	MACH TRIM END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	DISABLED MACH TRIM COMP. "MACH TRIM INOP" LIGHT ON.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 19-DFGC END AROUND FAILURE 20-DFGC	IAS INDICATOR BUG END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
END AROUND FAILURE 21-DFGC END AROUND FAILURE 22-DFGC	AILERON TORQUE LIMIT COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	AP DISENGAGE. "NO AUTO- LAND" LIGHT ON.	NONE	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 23-DFGC END AROUND FAILURE 24-DFGC	EPR LIMIT END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 25-DFGC	HUD COMMAND END AROUND FAILURE. LOGGED ONLY ON SELECTED DFGC.	HUD VALID CLEARED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
END AROUND FAILURE 26-DFGC. -906 COMPUTER.	QNH REFERENCE VOLTAGE END AROUND FAILURE.	ALT PRE- SELECT DISPLAY BLANK ALT CANNOT BE ARMED.	NONE.	REMOVE AND REPLACE ASSOCIATED DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
ENGINE OPTION PIN FAILURE	ENGINE OPTION PINS NOT IN ALLOWABLE CONFIGURATION.	TRI DIS- PLAYS 2.00 WITH FLAG AND "NO MODE" DISPLAYED. THRUST RATING AND AUTO- THROTTLE DISABLED.	VERIFY PROPER GROUND OF ENGINE OPTION PINS (TRC A, B, C, D,).	REF. W/D. (WDM 22-16-15)
EPR LEFT FAILURE EPR RIGHT FAILURE EPR SENSOR FAILURE	FAILED EPR TRANSMITTER.	AUTO- THROTTLE DISENGAGE.	INTERNAL MONITORS: DIAG. 494-495. SENSOR VALUES: DIAG. 228-229.	REF. T/S CHARTS. REF. EPR TRANSMITTER. (ENGINE PRESSURE RATIO (EPR) TRANSMITTERS, SUBJECT 77-11-02, page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
FLAG FAILURE -DFGC	INTERNAL HARD-WARE FLAG FAILURE.	DFGC SHUT- DOWN. ALL FUNCTIONS DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAG FAILURE XX-DFGC	XX=decimal number of failed flag			
NOTE: A flag failure is an internal failure within the DFGC.				
FLAP HANDLE FAILURE	FAILED FLAP POSITION INPUT FROM FLAP HANDLE.	NONE.	INTERNAL MONITORS: DIAG. 500. SECOND SETUP INTER- ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG. 234.	REF. T/S CHARTS.
NOTE: POSSIBLE FAILURE MAY BE LOGGED WHEN FLAP/ SLAT HANDLE MOVED FROM LAND/EXT TO 0 DEGREES RAPIDLY.				
FLAP POS 1 SIGNAL FAILURE FLAP POS 1 VALID FAILURE	FAILED FLAP POSITION INPUT FROM LEFT (1) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 331, 340, 345. SENSOR VALUES: DIAG: 232.	REF. T/S CHARTS. REF. L FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)
FLAP POS 1, 2 COMP FAILURE	SPLIT BETWEEN LEFT AND RIGHT FLAP POSITION SYNCHROS WITHOUT A LEFT OR RIGHT SIGNAL OR VALID FAILURE.	AP AND FD TAKEOFF AND GO-AROUND DISABLED. AUTO-THROTTLE INHIBITED. SPD FLAG IN VIEW.	SENSOR VALUES: DIAG. 232-233.	REF. T/S CHARTS. REF. L OR R FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
FLAP POS 2 SIGNAL FAILURE FLAP POS 2 VALID FAILURE	FAILED FLAP POSITION INPUT FROM RIGHT (2) SYNCHRO.	NONE.	SECOND SETUP INTER- ACTIVES: DIAG. 330, 339, 344. SENSOR VALUES: DIAG. 233.	REF. T/S CHARTS. REF. R FLAP POSITION TRANSMITTER. (FLAP POSITION INDICATING TRANSMITTER - MAINTENANCE PRACTICES, PAGEBLOCK 27-54-01/201)
NOTE: -971 computers and subs provide expanded failure messages.				
FLAP POS 3 SIGNAL FAILURE	If flaps are less than 24 degrees, autoland engagement is disallowed and the A/P will disconnect at 300 feet if autoland is armed. If flaps become less than 24 degrees after autoland is engaged, the A/P will disengage immediately. This failure message is logged into maintenance memory when an A/P disconnect occurs for either of these cases.			
GEN LOG ILLEGAL INST -DFGC	INTERNAL MONITORING DETECTS AN ILLEGAL OR UNDEFINED GENERAL LOGIC INSTRUCTION.	DFGC SHUT- DOWN. ALL DFGC FUNCTIONS FROM AFFECTED DFGC UNUSEABLE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
GND SENSOR FAILURE	AT LEAST ONE GROUND SENSOR DISAGREES WITH THE OTHERS FOR MORE THAN 40 SECONDS (THERE ARE FOUR GROUND SENSORS: 2 GROUND CONTROL RELAYS, AND 2 MAIN GEAR WEIGHT ON WHEELS SENSORS.	AUTOLAND INHIBITED. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG. 31-32. SWITCHES AND BUTTONS: DIAG. 123-124, 141-142.	REF. T/S CHARTS.
NOTE: -971 computers and subs provide expanded failure messages.				
GND SENSOR FAILURE X	X=0 for non-isolatable failure			
	X=1 for Ground control relay 1 (left) failed			
	X=2 for Ground control relay 2 (right) failed			
	X=3 for Left main gear WOW sensor failed			
	X=4 for Right main gear WOW sensor failed			

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
G/S DEV 1 SIGNAL FAILURE G/S DEV 1 VALID FAILURE G/S DEV 2 SIGNAL FAILURE G/S DEV 2 VALID FAILURE	FAILED GLIDE-SLOPE DEVIA- TION SIGNAL OR VALID FROM NUMBERED RECEIVER.	LOSS OF ASSOC. INPUT (i.e. G/S DEV 1 WITH DFGC 1 SELECTED) RESULTS IN A/P DISENGAGE IN ILS AND NON-ASSOC. PITCH CMD BIAS. LOSS OF NON-ASSOC. INPUT AFTER G/S TRACK RESULTS IN A/P DISENGAGE AND NON-ASSOC. FD CMD BAR BIAS. A/P IS REEN- GAGEABLE INTO ILS. LOSS OF EITHER DISABLES AUTOLAND. THIS FAILURE CAN ONLY BE LOGGED IF IN G/S CAPTURE OR TRACK ABOVE 50 FEET RADIO ALTITUDE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, Page 201)
NOTE: When -971 computers and subs are installed, G/S DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				
G/S DEV 1,2 COMP FAILURE	SPLIT BETWEEN GLIDESLOPE DEVIATION SIGNALS WITHOUT CORRESPONDING G/S DEV 1 OR G/S DEV 2 SIGNAL OR VALID FAILURE. CAN ONLY BE LOGGED IN G/S CAPTURE OR TRACK AND RADIO ALTITUDE ABOVE 50 FEET.	DISABLES AUTOLAND. A/P DIS-ENGAGE IF IN ILS OR AUTOLAND.	SELF TESTS: DIAG. 350-357.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, Page 201)
HDG ERROR 1 SIGNAL FAILURE HDG ERROR 1 VALID FAILURE HDG ERROR 2 SIGNAL FAILURE HDG ERROR 2 VALID FAILURE.	FAILED HEADING ERROR SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUT-NO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. INTERNAL MONITORS: DIAG. 506-507.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (HEADING SYSTEM, SUBJECT 34-21-00, page 201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
HDG ERROR 1, 2 COMP FAILURE	SPLIT BETWEEN HEADING ERROR SIGNAL WITHOUT A CORRESPONDING HDG ERROR 1 OR HDG ERROR 2 SIGNAL OR VALID	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE FD COMMAND BAR BIAS IN HDG HLD, HDG SEL AND VOR.	INTERNAL MONITORS: DIAG. 506-507.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
HEADING 1 SIGNAL FAILURE HEADING 1 VALID FAILURE HEADING 2 SIGNAL FAILURE HEADING 2 VALID FAILURE	FAILED HEADING SIGNAL OR VALID FROM NUMBERED HEADING SYSTEM.	DISABLES AUTOLAND. "NO AUTO- LAND" LIGHT ON. IF FAILURE OCCURS DURING ALIGN OR ROLLOUT-NO AFFECT.	PASSIVE DISCRETES: DIAG. 25-26. SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231. INTERNAL MONITORS: DIAG. 455-456.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (HEADING SYSTEM, SUBJECT 34-21-00, page 201)
HEADING 1,2 COMP FAILURE	SPLIT (APPROX 5°) BETWEEN THE TWO HEADING SIGNALS WITH- OUT A CORRESPONDING HEADING 1 OR HEADING 2 SIGNAL OR VALID FAILURE.	A/P DIS- ENGAGE. FD ROLL CMD BIAS IN HDG HLD, HDG SEL, VOR. "HEADING" MONITOR LIGHT ON.	SENSOR VALUES: (DISPLAY OPTION DIAG. 230-231.	REF. T/S CHARTS. REF. COMPASS SYSTEM. (HEADING SYSTEM, SUBJECT 34-21-00, page 201)
NOTE: 0 TO 180° CARD = 0 TO 180° ON STP. 181° TO 359° = -179° TO -1° ON STP.				
HOR STAB FAILURE	FAILED HORI- ZONTAL STAB. POSITION SENSOR.	TAKOFF MODE INHIBITED. SLOW/FAST BIAS. SPD FLAG IN VIEW. IF FAILURE OCCURS BEFORE G/S CAP, A/P AND FD GA INHIBITED.	SENSOR VALUES: (DISPLAY OPTION). DIAG. 225. INTERNAL MONITORS: DIAG. 497. SERVO TESTS: DIAG. 440-441.	REF. T/S CHARTS. REF. SURFACE POS SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
ILLEGAL A/T MODE 0-DFGC ILLEGAL A/T MODE 1-DFGC ILLEGAL A/T MODE 2-DFGC ILLEGAL PITCH MODE 0-DFGC ILLEGAL PITCH MODE 1-DFGC ILLEGAL PITCH MODE 2-DFGC ILLEGAL ROLL MODE 0-DFGC ILLEGAL ROLL MODE 1-DFGC ILLEGAL ROLL MODE 2-DFGC ILLEGAL YAW MODE 1-DFGC ILLEGAL YAW MODE 2-DFGC ILLEGAL PITCH MODE 3-DFGC ILLEGAL PITCH MODE 4-DFGC ILLEGAL ROLL MODE 3-DFGC ILLEGAL ROLL MODE 4-DFGC ILLEGAL YAW MODE 0-DFGC ILLEGAL YAW MODE 3-DFGC	COMPUTER MONITORS DETECT AN ILLEGALLY SEQUENCED MODE.	COMPUTER SHUTDOWN. FGCP BLANK. ASSOC. SPD AND FD FLAGS IN VIEW. ALL FUNCTIONS FROM ASSOC. DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
LAND INHIBIT DISCRETE FAILURE	LAND INHIBIT INPUTS IN DIFFERENT STATES FOR MORE THAN 10 SECONDS.	A/P DIS- ENGAGE. "NO AUTOLAND" LIGHT ON.	NONE.	REF. COMPASS SWITCHING (34-21-08, Page 201), REF. VHF/ NAV SWITCHING (34-32-04, Page 201).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
LOC DEV 1 SIGNAL FAILURE LOC DEV 1 VALID FAILURE LOC DEV 2 SIGNAL FAILURE LOC DEV 2 VALID FAILURE	FAILED LOCALIZER DEVIATION SIGNAL OR VALID FROM NUMBERED RECEIVER. FAILURE LOGGED ON SELECTED DFGC WHEN A/P IS ENGAGED IN LOC, ILS, OR AUTOLAND (ALIGN AND ROLLOUT).	LOSS OF ASSOC. SIGNAL OR VALID (i.e. LOC DEV 1 SIGNAL FAILURE WITH DFGC-1 SELECTED) INHIBITS LOC, ILS AND AUTO-LAND. A/P DISENGAGES, FD CMD BAR BIAS. LOSS OF NON ASSOC INPUT AFTER LOC TRK RESULTS IN AP DISENGAGE AND FD CMD BAR BIAS. A/P CAN BE REENGAGED IN ILS OR LOC MODE.	SELF TESTS: DIAG. 350-357. SECOND SETUP INTER-ACTIVES: DIAG. 325-326.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, Page 201)
NOTE: When -971 computers and subs are installed, LOC DEV X VALID FAILURE message will be logged if the A/P disconnects at 300 feet because the offside receiver was invalid and autoland was armed.				
LOC DEV 1,2 COMP FAILURE	SPLIT BETWEEN LOCALIZER DEVIATION SIGNAL WITHOUT A CORRE-SPONDING LOC DEV 1 OR LOC DEV 2 SIGNAL OR VALID FAILURE. FAILURE LOGGED ON SELECTED DFGC ONLY WHEN A/P ENGAGED IN LOC, ILS OR AUTOLAND (ALIGN OR ROLLOUT).	IF ENGAGED IN LOC, ILS OR AUTO- LAND, NON- ASSOC FD CMD BAR BIASES OUT OF VIEW.	SELF TESTS: DIAG. 350-357. SENSOR VALUES: (DISPLAY OPTION) DIAG. 219-220.	REF. T/S CHARTS. REF. ILS RECEIVER. (INSTRUMENT LANDING SYSTEM (ILS), SUBJECT 34-32-00, Page 201)
NOTE: USE SIG. GEN. TO VERIFY LOC DEV.FROM EACH ILS RCVR.				
MACH TRIM POWER FAILURE	LOSS OF MACH TRIM SERVO AMPLIFIER POWER. LOGGED ONLY ON SELECTED DFGC.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. T/S CHARTS. REF. MACH TRIM ACT. (MACH TRIM ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-22-01/201)
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
MACH TRIM SERVO FAILURE	FAILED MACH TRIM SERVO.	"MACH TRIM INOP" LIGHT ON.	SERVO TESTS: DIAG. 444.	REF. T/S CHARTS. REF. MACH TRIM ACT. (MACH TRIM ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-22-01/201)
NOTE: PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.				
MAINT MEMORY FAILURE -DFGC	FAILURE DETECTED IN MAINTENANCE MEMORY USED TO STORE FLIGHT FAULTS.	NONE.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
N1 LEFT FAILURE N1 RIGHT FAILURE	N1 VALID DATA FROM INDICATED N1 TRANSMITTER GONE FOR MORE THAN .6 SECONDS OR N1 COUNT NOT IN ALLOWABLE LIMITS WHEN VALID IS PRESENT.	EPR SYNCH DISABLED. IF FAILURE OCCURS WHEN ART IS ARMED THEN ART WILL FIRE, OTHERWISE "ART INOP" LIGHT ON. LOGGED IF AIRPLANE IS IN FLIGHT MODE (WEIGHT ON WHEEL SENSORS AND GND CONT RELAYS OPEN AND ENGINES RUNNING).	NONE.	VERIFY N1 INDICATORS DURING NEXT ENGINE RUNUP (POWER, SUBJECT 77-10-00, page 501), IF PROPER, VERIFY WIRING TO DFGC. REF. W/D (WDM 77-12-00).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
OPTION PIN FAILURE	FAILED EVEN PARITY CHECK. NINE DFGC OPTION PINS ARE CHECKED FOR GROUNDS. AFTER CHECK THERE SHOULD BE AN EVEN NUMBER OF GROUNDS. THE OPTION PINS ARE: (a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) PARITY PIN	A/P AND FD DISABLED. A/P DIS-ENGAGE AND FD CMD BIAS.	PASSIVE DISCRETES: DIAG. 48.	REF. T/S CHARTS.
NOTE: FOR AIRPLANES WITH -906 AND SUBSEQUENT COMPUTERS, TEN DFGC OPTION PINS.				
	(a) PEDESTAL CONTROLLER (b) F/D OPTION (c) AD300C (d) HDG SEL CX (e) PITCH REF SEL (f) QNH CORRECT (g) BOX 2-A BOX 2-B (h) PARITY PIN (i) MD-87			
NOTE: -971 computers and subs provide expanded failure messages.				
OPTION PIN FAILURE X	X=0 for option pin parity failure based on the input discretes alone			
	X=1 for Box 2A vs. Box 2B option pin disagreement			
	X=2 for VG3 flag vs. VG3 option pin disagreement			
	X=3 for parity failure of critical option input discretes vs. their corresponding hardware flags.			
PAR RUD CLUTCH FAILURE	PARALLEL RUDDER SERVO CLUTCH INDI- CATES ENGAGED WHEN A/P DISENGAGED, OR DISENGAGED WHEN A/P ENGAGED DURING AUTOLAND, ILS OR AUTO GO-AROUND.	A/P DIS- ENGAGE. "NO AUTO- LAND" LIGHT ON.	INITIAL SETUP INTER- ACTIVES: DIAG. 10-11. SECOND SETUP INTER-ACTIVES: DIAG. 318-319. SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
PAR RUD SERVO AMP FAILURE	FAILED PARALLEL RUDDER SERVO AMPLIFIER.	PAR RUDDER INHIBITED. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)
PAR RUD SERVO MODEL FAILURE PARALLEL RUD SERVO FAILURE	FAILED PARALLEL RUDDER SERVO.	PAR RUDDER INHIBITED. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN PAR RUDDER MODE.	SERVO TESTS: DIAG. 422-438. INTERNAL MONITORS: DIAG. 479. SENSOR VALUES: DIAG. 196-197, 204-205.	REF. T/S CHARTS. REF. DUPLEX RUDDER SERVO DRIVE. (DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-02/201)
PAR RUD SURFACE MONITOR FAILURE	PARALLEL RUDDER SERVO FAILS TO MOVE RUDDER WITHIN MODEL LIMITS AS SEEN BY RUDDER SURFACE POSITION SENSOR.	A/P DIS- ENGAGE IF IN AUTO- LAND. "NO AUTO- LAND" LIGHT ON.	INTERNAL MONITORS: DAIG. 479, 499. SENSOR VALUES: DIAG. 224. SERVO TESTS: DIAG. 422-438.	REF. T/S CHARTS. REF. SURFACE POSITION SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)
PITCH MODE CHECK FAILURE 0-DFGC PITCH MODE CHECK FAILURE 1-DFGC PITCH MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL PITCH MODE.	DFGC SHUT- DOWN. ALL SYSTEM FUNCTIONS LOST. SPD AND FD FLAG ON ASSOC. SIDE. A/P AND A/T DISABLED.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
PMS DATA FAILURE	DFGC RECEIVED NO DATA ON PMS DATA BUS	PERF MODE INOP	DIAG. 508	REFERENCE WIRING DIAG 34-63-0.
PMS/FMS DATA FAILURE (-970 DFGC)	DFGC RECEIVED NO DATA ON PMS/FMS DATA BUS	PERF MODE OR FMS VNAV MODE INOP	DIAG. 508	REFERENCE WIRING DIAG 34-63-0.

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
QNH INPUT FAILURE. -906 COMPUTER.	QNH ANALOG INPUT UNREASONABLE. OPEN, SHORT TO GND OR SHORTED TO THE QFE REFERENCE.	APPLICABLE ONLY IF QNH CORRECT OPTION IS SELECTED. LOSS OF ALT. REF. ALT ARMING AND ALT. ALTERING INHIBITED.	SENSOR VALUES: DIAG. 247.	REMOVE AND REPLACE ASSOC. DFGC(DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201) OR 34-11. FAILED BARO SET IN STANDBY ALTIMETER.
RAD ALT 1 SIGNAL FAILURE RAD ALT 1 VALID FAILURE RAD ALT 2 SIGNAL FAILURE RAD ALT 2 VALID FAILURE	FAILED RADIO ALTIMETER -1 OR -2 SIGNAL OR VALID. MONITORED ONLY BELOW 2300 FEET RADIO ALTITUDE.	DEPENDS ON TYPE OF R/A INSTALLED. (a) 552 R/A- AUTO-LAND DISABLED. NO AUTOLAND LITE ON (i.e. NO GROUND AT J102B/94 AND J103B/94 REF. W/D (WDM 22-16-18). (b) 552A R/A- NO AFFECT (GROUND AT J102B/94 AND J103B/94).	SELF TESTS: DIAG. 374-381 PASSIVE DISCRETES: DIAG. 41-44.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (ENGINE PRESSURE RATIO (EPR) TRANSMITTERS, SUBJECT 77-11-02, page 201)
RAD ALT 1,2 COMP FAILURE	SPLIT BETWEEN BOTH RADIO ALTIMETER SIGNALS WITHOUT A CORRESPONDING RAD ALT 1 OR RAD 2 SIGNAL OR VALID FAILURE.	LOSS OF ILS, AUTO-LAND, TAKE- OFF AND A/T RETARD. A/P DISCONNECT. "NO AUTO- LAND" LIGHT ON.	SELF TESTS: DIAG. 374-381. PASSIVE DISCRETES: DIAG. 41-44.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (RADIO ALTIMETER SYSTEM, SUBJECT 34-42-00, Page 201)
R/A OPTION PIN FAILURE	RADIO ALTI- METER OPTION PIN DIS-AGREEMENT.	NONE. 552A R/A- CHECK J102A/94 AND J103A/94 FOR GROUND. 552 R/A - CHECK J102A/94 AND J103A/94 FOR OPEN.	PASSIVE DISCRETES: DIAG. 47.	REF. T/S CHARTS. REF. RADIO ALTIMETER. (ENGINE PRESSURE RATIO (EPR) TRANSMITTERS, SUBJECT 77-11-02, page 201)
RAM FAILURE -DFGC *	VALUE STORED IN RANDOM ACCESS MEMORY (RAM) LOCATION NOT THE SAME AS VALUE READ FROM THE SAME RAM LOCATION.	DFGC SHUT- DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for RAM failure. (Paragraph 1.I.(1))				
ROLL MODE CHECK FAILURE 0-DFGC ROLL MODE CHECK FAILURE 1-DFGC ROLL MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL ROLL MODE.	DFGC SHUT- DOWN ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
RUD UNRESTRICTED SWITCH FAILURE	TWO SEPERATE FAILURES: (a) EITHER RUDDER UNRESTRICTED SWITCH INDICATING UNRE- STRICTED ABOVE 195 KNOTS. (b) EITHER RUDDER UNRESTRICTED SWITCH INDICATING RESTRICTED BELOW 145 KNOTS.	(a) NONE. (b) A/P DISENGAGE "NO AUTO- LAND" LIGHT ON.	(a) CHECK OPERATION OF SWITCH REF. RUDDER. (RUDDER THROW-LIMITER - MAINTENANCE PRACTICES, PAGEBLOCK 27-20-06/201). (b) PASSIVE DISCRETES: DIAG. 37-38.	REF. T/S CHARTS. REF. RUDDER. (RUDDER AND TAB - TROUBLE SHOOTING, PAGEBLOCK 27-20-00/101)
NOTE: -971 computers and subs provide expanded failure messages.				
RUD UNRESTRICTED SWITCH FAIL X	X=0 for a non-isolatable failure X=1 for switch 1 indicating restricted below 145 kts			
	X=2 for switch 2 indicating restricted below 145 kts			
	X=3 for both switches indicating restricted below 145 kts			
	X=4 for switch 1 indicating unrestricted above 205 kts			
	X=5 for switch 2 indicating unrestricted above 205 kts			
	X=6 for both switches indicating unrestricted above 205 kts			
	X=7 for switch 1 indicating restricted during autoland			
	X=8 for switch 2 indicating restricted during autoland			
	X=9 for both switches indicating restricted during autoland			
NOTE: Cases 7 through 9 are only logged when the A/P disconnects at 300 feet while armed for but not engaged in autoland. Cases 0 through 6 are logged when they occur except on ground.				
RUDDER POS FAILURE	FAILED RUDDER SURFACE POSITION SYNCHRO.	AUTOLAND INHIBIT. "NO AUTO- LAND" LIGHT ON. A/P DISENGAGE IF IN AUTO- LAND. FD REVERTS TO ILS.	INTERNAL MONITORS: DIAG. 499. SENSOR VALUES: DIAG. 224.	REF. T/S CHARTS. REF. SURFACE POSITION SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
SLAT POS 1, 2 COMP FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS WITHOUT LOSING EITHER SLAT VALID.	LOSS OF A/P AND FD TAKEOFF AND GO-AROUND. LOSS OF ALL AUTO-THROTTLE MODES EXCEPT EPR. SLOW-FAST BIAS, SPD FLAG IN VIEW. "ART INOP" LIGHT ON.	PASSIVE DISCRETES: DIAG. 33-34. SECOND SETUP INTER-ACTIVES: DIAG. 334-335, 341-342, 348-349.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. (SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201)
SLAT POS 1 VALID FAILURE SLAT POS 2 VALID FAILURE	FAILED SLAT VALID 1 OR SLAT VALID 2 FROM PROXIMITY SWITCH ELECTRONICS UNIT.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING, SLATS OUT OF RETRACT) THEN "ART INOP" LIGHT ON. OTHERWISE, NO AFFECT. AUTO G/A NOT AVAILABLE.	PASSIVE DISCRETES: DIAG. 33-34.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201
SLAT POS 1 SIGNAL FAILURE SLAT POS 2 SIGNAL FAILURE	LEFT AND RIGHT SLAT POSITION DISAGREE FOR MORE THAN SIX SECONDS BUT LESS THAN SIX- TEEN SECONDS WITHOUT LOSING EITHER SLAT VALID.	IF FAILURE OCCURS PRIOR TO AUTO RESERVE THRUST SELF-TEST (BOTH ENGINES RUNNING AND SLATS NOT RETRACTED) THEN "ART INOP" LIGHT ON OTHER- WISE "NO EFFECT" G/A NOT AVAILABLE	PASSIVE DISCRETES DIAG. 33-34.	REF. T/S CHARTS. REF. SLAT ADVISORY SENSORS. SENSORS SLAT ADVISORY - MAINTENANCE PRACTICES, PAGEBLOCK 27-80-06/201
SPEED REF FAILURE	FAILED SPD/ MACH SELECT SYNCHRO IN FGCP.	LOSS OF A/T OPERATION IN SPEED AND MACH MODES. SPD/MACH DISPLAY INOP.	COCKPIT DISPLAYS: DIAG. 170. INTERNAL MONITORS: DIAG. 480.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
SPOILER POS 1 FAILURE SPOILER POS 2 FAILURE	FAILED LEFT (1) OR RIGHT (2) SPOILER POSITION SYNCHRO.	NO AFFECT.	INTERNAL MONITORS: DIAG. 492-493. SENSOR VALUES: DIAG. 186-187.	REF. T/S CHARTS. REF. SURFACE POS SENSORS. (SURFACE POSITION SENSORS - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-03/201)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
STAB TRIM MOTION MONITOR FAILURE	STAB MOTION POLARITY IS OPPOSITE CMD POLARITY.	A/P DIS- CONNECT	N/A	FAILED TRIM BRAKE SW S10-8 FAILED UP TRIM RELAY R20-12 FAILED DWN TRIM RELAY R20-13 ASSOCIATED WIRING FAILED DFGC
TEMP SELECT PANEL FAILURE 0 TEMP SELECT PANEL FAILURE 1	TEMPERATURE SELECT PANEL FAILED TO AN ILLEGAL INPUT.	"NO MODE" DISPLAY ON TRI WHEN T.O. FLX IS PRESSED.	COCKPIT DISPLAYS: DIAG. 93-108.	REF. T/S CHARTS. REF. THRUST RATING INDICATOR. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
TICKET CHECK FAILURE 0-DFGC TICKET CHECK FAILURE 1-DFGC TICKET CHECK FAILURE 2-DFGC TICKET CHECK FAILURE 3-DFGC TICKET CHECK FAILURE 4-DFGC TICKET CHECK FAILURE 5-DFGC TICKET CHECK FAILURE 6-DFGC TICKET CHECK FAILURE 7-DFGC *	COMPUTER MONITORS DETECT AN INCOMPLETE TASK.	DFGC SHUT- DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)
NOTE: There may be more ticket check failures than those listed. All will cause the same problems as shown.				
NOTE: * If message reappears after maintenance action has been performed, refer to special test procedure for TICKET CHECK FAILURE. (Paragraph 1.I.(1))				
TRI VALID FAILURE	THRUST RATING INDICATOR VALID CLEAR FOR GREATER THAN 3 SECONDS. LOGGED ONLY ON SELECTED DFGC.	"NO MODE" DISPLAY ON TRI WITH EPR LIM FLAG IN VIEW. A/T DISCONNECT IN EPR LIM MODE.	PASSIVE DISCRETES: DIAG. 40. COCKPIT DISPLAYS: DIAG. 255-256.	REF. T/S CHARTS. REF. THRUST RATING INDICATOR. (RAT/THRUST RATING INDICATOR - MAINTENANCE PRACTICES, PAGEBLOCK 34-18-02/201)
WJE 405, 409, 884				
NOTE: -920 and subsequent DFGC's will display ATT for VERT GYRO.				

WJE 405, 409, 884 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VERT GYRO 1 SIGNAL FAILURE VERT GYRO 1 VALID FAILURE VERT GYRO 2 SIGNAL FAILURE VERT GYRO 2 VALID FAILURE VERT GYRO 3 SIGNAL FAILURE VERT GYRO 3 VALID FAILURE	SINGLE VERTICAL GYRO FAILURE HAS NO AFFECT ON SYSTEM.	NONE.	PASSIVE DISCRETES: DIAG. 22-24. SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. VERT GYROS. (VERTICAL GYRO, SUBJECT 34-23-01, Page 201)
VERT GYRO 1, 2 COMP FAILURE VERT GYRO 1, 3 COMP FAILURE VERT GYRO 2, 3 COMP FAILURE	SPLIT BETWEEN ONE VG AND REMAINING TWO STILL LEAVES TWO GOOD VG'S. THEREFORE "NO AFFECT".	NONE.	SENSOR VALUES: DIAG. 180-185. INTERNAL MONITORS: DIAG. 481-489.	REF. T/S CHARTS. REF. VERT GYROS (VERTICAL GYRO, SUBJECT 34-23-01, Page 201), REF. ATTITUDE SW UNIT (ATTITUDE SWITCHING UNIT, SUBJECT 34-23-04, Page 201).
WJE 881, 883				
NOTE: -920 and subsequent DFGC's will display ATT for VERT GYRO.				
VERT GYRO 1 SIGNAL FAILURE VERT GYRO 1 VALID FAILURE VERT GYRO 2 SIGNAL FAILURE VERT GYRO 2 VALID FAILURE	FAILED ATTITUDE SIGNAL OR VALID FROM NUMBERED ATTITUDE SYSTEM.	LOSS OF AUTO GO-AROUND AND AUTOLAND. "NO AUTO- LAND" LIGHT ON.	PASSIVE DISCRETES: DIAG: 22-23. SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. ATTITUDE SYSTEM.
VERT GYRO 1, 2 COMP FAILURE	SPLIT BETWEEN NUMBERED ATTITUDE SYSTEM WITHOUT A CORRESPONDING SIGNAL OR VALID FAILURE FROM LISTED SYSTEM.	LOSS OF ALL A/P, FD AND A/T MODES. A/P, A/T DISENGAGE. FD CMD BARS BIAS. "NO AUTOLAND" LIGHT ON.	SENSOR VALUES: DIAG. 180-181, 183-184. INTERNAL MONITORS: DIAG. 481-482, 484-485, 487-488.	REF. T/S CHARTS. REF. ATTITUDE SYSTEM.

WJE 881, 883 (Continued)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
WJE 405, 409, 881, 883, 884				
VERT SPD REF FAILURE (-904 DFGC)	FAILED PITCH SELECT WHEEL ON FGCP.	DISPLAYED VALUE FROZEN ON FGCP. VARYING OF PITCH WHEEL INHIBITED.	INTERNAL MONITORS: DIAG. 503. COCKPIT DISPLAYS: DIAG. 263. SWITCHES AND BUTTONS: DIAG. 176.	REF. T/S CHARTS. REF. FGCP. (DIGITAL FLIGHT GUIDANCE CONTROL PANEL (DFGCP) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-02/201)
VGSU CAPT ON AUX SWITCH FAILURE VGSU F/O ON AUX SWITCH FAILURE (IF INSTALLED)	AUX VERT GYRO SWITCHING UNIT INPUTS IN OPPOSITE STATES FOR MORE THAN 10 SECONDS.	A/P DISCONNECT AND DISABLED. "NO AUTOLAND" LIGHT ON. A/T DIS- ABLED IN SPD AND MACH.	SWITCHES AND BUTTONS: DIAG. 73-84.	REF. T/S CHARTS. REF. ATTTITUDE SW UNIT. (34-23-04, Page 201)
VREF FIXED LEFT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC. CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 1 SIGNAL FAILURE. (b) ANGLE OF ATTACK 1 SIGNAL FAILURE. (c) HEADING 1 SIGNAL FAILURE. (d) CRS ERROR 1 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. REF. W/D (WDM 22-16-11).

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VREF FIXED RIGHT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP POS 2 SIGNAL FAILURE. (b) ANGLE OF ATTACK 2 SIGNAL FAILURE. (c) HEADING 2 SIGNAL FAILURE. (d) CRS ERROR 2 VALID FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
VREF SWITCHED LEFT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) VERT SPD REF FAILURE. (b) SPD SEL FAILURE. (c) ALT SEL FAILURE. (d) AILERON POSITION FAILURE. (e) EPR LEFT FAILURE. (f) SPOILER POS 1 FAILURE. (g) ELEV POS 1 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)

Table 102 (Continued)

FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
VREF SWITCHED RIGHT FAILURE	LABLED REFERENCE VOLTAGE LESS THAN 18.2 VAC OR GREATER THAN 33.8 VAC CORRESPONDS TO FOLLOWING SENSORS: (a) FLAP HANDLE FAILURE. (b) RUDDER POS FAILURE. (c) HOR STAB FAILURE. (d) EPR RIGHT FAILURE. (e) SPOILER POS 2 FAILURE.	A/P, A/T, DISCONNECT. FD CMD BAR BIAS. "NO AUTOLAND" LIGHT ON.	NONE.	MEASURE 26 VAC TO AFFECTED DFGC. (WDM 22-16-11)
-906 AND SUBSEQUENT COMPUTERS. WHEEL SPINUP-1 SIGNAL FAILURE WHEEL SPINUP-2 SIGNAL FAILURE	DISCRETE FAILED SPIN STATE AT IAS >195 KTS.	NONE.	PASSIVE DISCRETES: DIAG. 49-50	REF T/S CHARTS.
WIND SHEAR DATA FAILURE	FAILED WIND SHEAR COMPUTER (WSC) OR DFGC DOES NOT RECEIVE DATA FROM WSC.	"W/S INOP" LIGHT ON.	INTERNAL MONITORS: DIAG. 509.	REF. WIND SHEAR SELF-TEST. (Windshear Alert and Guidance System (WAGS), 34-47-00, Page 201)
YAW DAMP SERVO FAILURE	FAILED YAW DAMPER ACTUATOR.	"YAW DAMP OFF" LIGHT ON.	SERVO TESTS: DIAG. 442-443. SENSOR VALUES: DIAG. 198, 208.	REF. T/S CHARTS. REF. YAW DAMPER ACTUATOR. (YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201)
YAW DAMPER POWER FAILURE	FAILURE OF 28 VDC YAW DAMPER POWER.	"YAW DAMP OFF" LIGHT ON.	SECOND SETUP INTER- ACTIVES: DIAG. 323-324. SERVO TESTS: DIAG. 442-443. INITIAL SETUP INTER-ACTIVES: DIAG. 16-17.	REF. T/S CHARTS. REF. YAW DAMPER ACTUATOR. YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES, PAGEBLOCK 22-13-01/201

Table 102 (Continued)

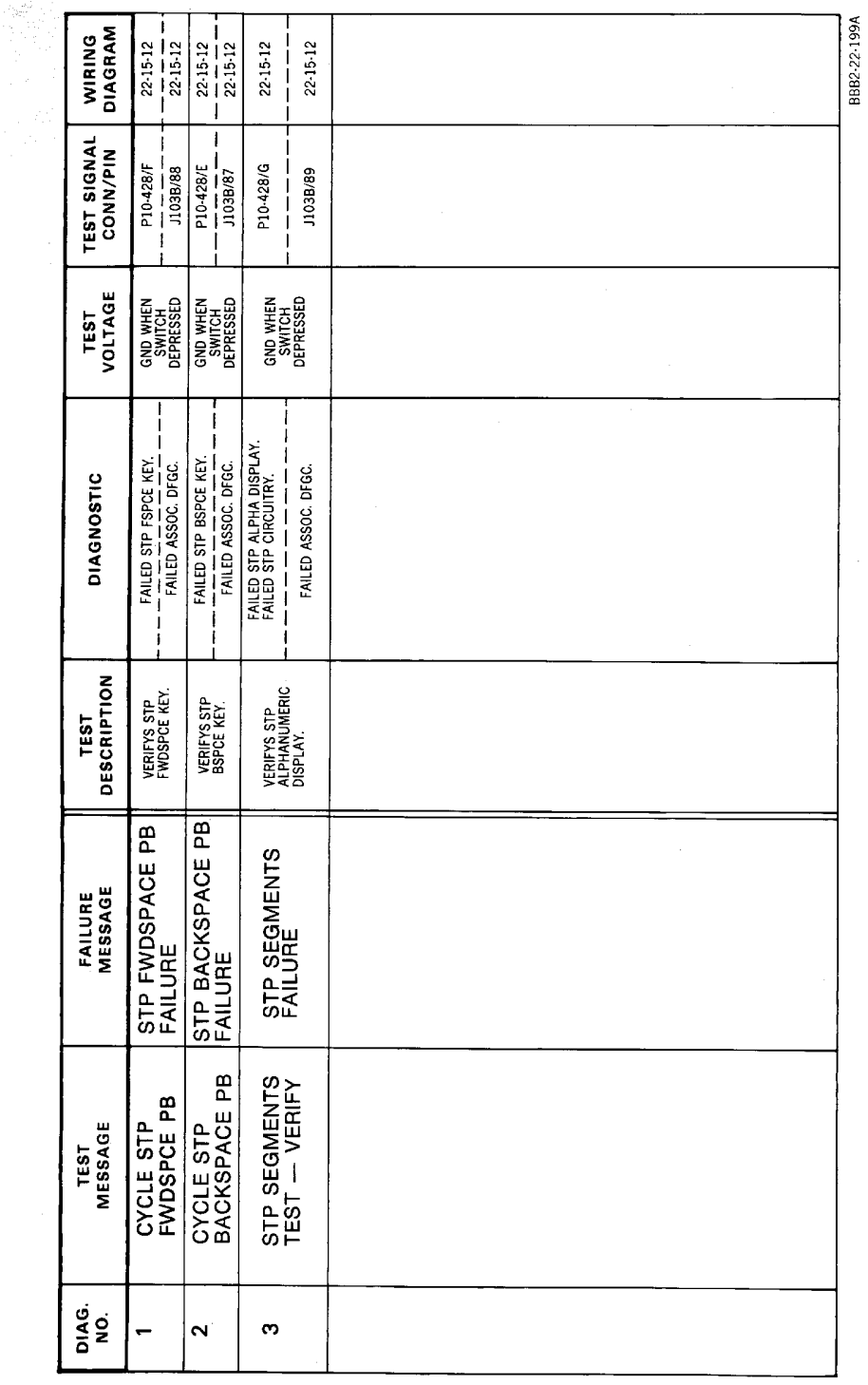
FAILURE MESSAGE	FAILURE DESCRIPTION	FAILURE SYMPTOM	MNT. TEST DIAGNOSTIC	MNT. ACTION
YAW MODE CHECK FAILURE 1-DFGC YAW MODE CHECK FAILURE 2-DFGC	DFGC DETECTS AN ILLEGAL YAW MODE.	DFGC SHUT- DOWN. ALL FUNCTIONS FROM AFFECTED DFGC LOST.	NONE.	REMOVE AND REPLACE DFGC. (DIGITAL FLIGHT GUIDANCE COMPUTER (DFGC) - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-01/201)

4. Trouble Shooting Charts Index

A. These trouble shooting charts are to be used in conjunction with the diagnostic numbers that appear when a failure is displayed on the STP in the Return to Service or the Maintenance test.

Table 103

Sequence	Figure
0 - STP Tests	Figure 103
1 - Initial Setup Interactives	Figure 104
2 - Passive Discretes	Figure 105
3 - Switches and Buttons	Figure 106
4 - Sensor Values	Figure 107
5 - Cockpit Displays	Figure 108
6 - Second Setup Interactives	Figure 109
7 - Self-Tests	Figure 110
8 - Servo Tests	Figure 111
9 - Internal Monitors	Figure 112



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
1	CYCLE STP FWDSPCE PB	STP FWDSPACE PB FAILURE	VERIFYS STP FWDSPCE KEY.	FAILED STP FSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/F J103B/88	22-15-12 22-15-12
2	CYCLE STP BACKSPACE PB	STP BACKSPACE PB FAILURE	VERIFYS STP BSPCE KEY.	FAILED STP BSPCE KEY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/E J103B/87	22-15-12 22-15-12
3	STP SEGMENTS TEST — VERIFY	STP SEGMENTS FAILURE	VERIFYS STP ALPHANUMERIC DISPLAY.	FAILED STP ALPHA DISPLAY. FAILED STP CIRCUITRY. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	P10-428/G J103B/89	22-15-12 22-15-12

BBB2-22-199A

Sequence Zero - STP Tests
Figure 103/22-01-05-990-841

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
4	DISENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. J102A/100	22-14-11 22-14-11
5		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/K SEL 1, J103/K SEL 2. J102A/104	22-14-11 22-14-11
6		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-419/G J102A/96	22-14-11 22-12-12 22-12-12
7		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
8		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J013/H SEL 2. P10-421/G J102A/95	22-14-11 22-11-12 22-11-12
9		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P1-0422/G J103A/95	22-14-11 22-11-12 22-11-12
10		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2. P10-423/G J103B/77	22-14-11 22-13-12 22-13-12

BBB2-22-210A

Sequence One - Initial Setup Interactives
Figure 104/22-01-05-990-842 (Sheet 1 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
11		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12
12	FMA-1 A/P LITE OFF — VERIFY	FMA-1 A/P LITE OFF FAILURE	DRIVES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-1.	28 VDC	J101/N P1-644/16 J102B/24	22-17-11 22-17-11 22-17-11
13	FMA-2 A/P LITE OFF — VERIFY	FMA-2 A/P LITE OFF FAILURE	DRIVES FMA A/P-2 ANNUNCIATOR	FAILED FMA A/P-2 ANNUNCIATOR, FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-2.	28 VDC	J101/P P1-644/20 J102B/24	22-17-11 22-17-11 22-17-11
14	DISENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2. J103B/26	22-31-12 22-31-12
15		A/T CLAMP FAILURE	VERIFIES A/T ENGAGE SWITCH AND CLAMP LOGIC.	FAILED A/T ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AUTOTHROTTLE CLAMP RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J103/P SEL. 1, J101/P SEL. 2. R50-329/X1, X2 J103B/36	22-31-12 22-31-14 22-31-14
16	DISENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND DISENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-194 J103B/8	22-13-12 22-13-12
17	YAW DAMP OFF LITE ON — VERIFY	YAW DAMP OFF LITE ON FAILURE	DRIVES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE. FAILED ASSOC. DFGC.	GND	P1-119/C J103B/53	22-13-12 33-12-00 22-13-12

BBB2-22-211B

Sequence One - Initial Setup Interactives
Figure 104/22-01-05-990-842 (Sheet 2 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
18	RCVRS NOT ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 NOT TUNED TO ILS FREQ.	FAILED NAV 1 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-319B/38 J101A/17	34-26-02 34-26-02
19		NAV 2 TUNING FAILURE	VERIFIES NAV 2 NOT TUNED TO ILS FREQ.	FAILED NAV 2 RCVR TUNING. FAILED ASSOC. DFGC.	0 VDC	R50-320B/38 J104A/17	34-26-02 34-26-02
20	ADVANCE THROTTLE — VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED LEFT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-196 J101A/43	22-31-11 22-31-11
21		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WITH THROTTLE ADVANCED.	FAILED RIGHT THROTTLE LOW LIMIT SWITCH. FAILED ASSOC. DFGC.	0 VDC	S10-198 J104A/43	22-31-11 22-31-11

BBB2-22-213

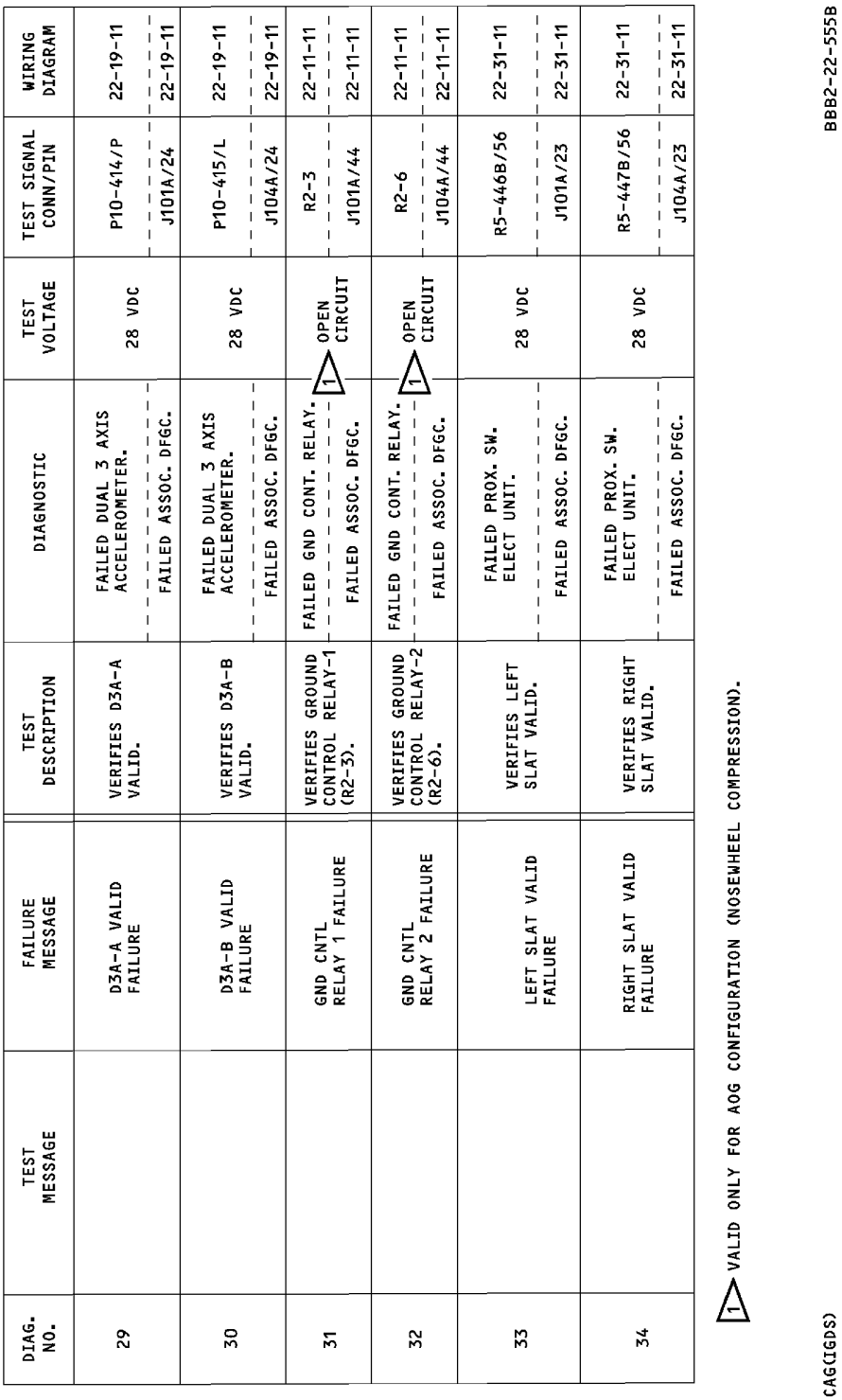
Sequence One - Initial Setup Interactives
Figure 104/22-01-05-990-842 (Sheet 3 of 3)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
22 (1)		VERT GYRO 1 VALID FAILURE	VERIFIES VG VALID 1.	FAILED VG-1. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-18/45 J2A/19, 17 J101A/14	34-24-01 34-24-01 34-24-01
23 (1)		VERT GYRO 2 VALID FAILURE	VERIFIES VG VALID 2.	FAILED VG-2. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-19/45 J2B/19, 17 J104B/14	34-24-02 34-24-02 34-24-02
24 (1) (2)		VERT GYRO 3 VALID FAILURE	VERIFIES VG VALID 3.	FAILED VG-3. FAILED VERTICAL GYRO SWITCHING UNIT. FAILED ASSOC. DFGC.	28 VDC	P10-165/45 J1/49 J103A/70	34-24-01 34-24-01 34-24-01
25		HDG 1 VALID FAILURE	VERIFIES HDG 1 VALID.	FAILED DG-1. FAILED INSTR. AMP-1./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-4/F R50-323B/53 J101A/15	34-22-03 34-22-03 34-22-03
26		HDG 2 VALID FAILURE	VERIFIES HDG 2 VALID.	FAILED DG-2. FAILED INSTR. AMP-2./COMPASS AMP FAILED ASSOC. DFGC.	28 VDC	P10-7/F R50-324B/53 J104A/15	34-22-04 34-22-04 34-22-04
27		DLA-A VALID FAILURE	VERIFIES DLA-A VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-412/P J101A/37	22-19-11 22-19-11
28		DLA-B VALID FAILURE	VERIFIES DLA-B VALID.	FAILED DUAL LATERAL ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-413/L J104A/37	22-19-11 22-19-11

(1) -930 and subsequent DFGC, VERT GYRO failure message is ATT
(2) (if installed)

BBB2-22-350B

Sequence Two - Passive Discretes
Figure 105/22-01-05-990-843 (Sheet 1 of 6)



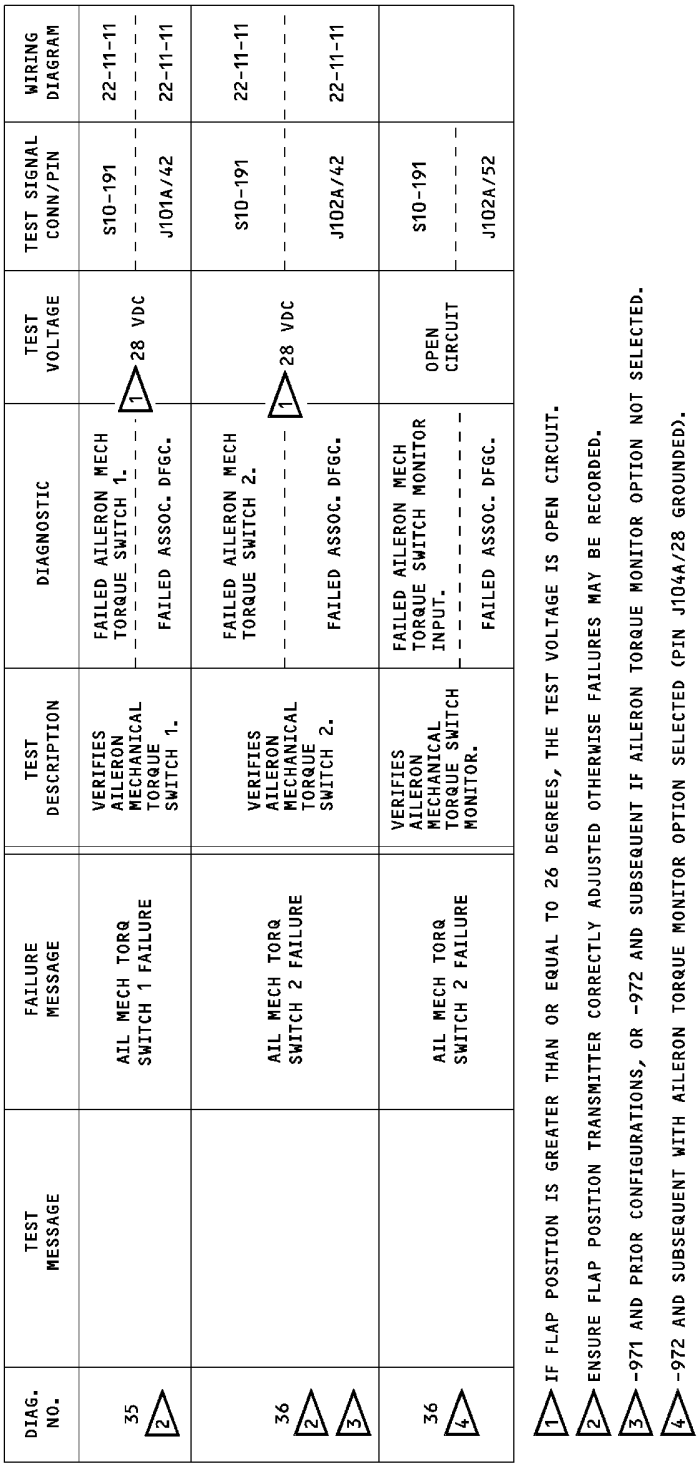
DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
29		D3A-A VALID FAILURE	VERIFIES D3A-A VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-414/P J101A/24	22-19-11 22-19-11
30		D3A-B VALID FAILURE	VERIFIES D3A-B VALID.	FAILED DUAL 3 AXIS ACCELEROMETER. FAILED ASSOC. DFGC.	28 VDC	P10-415/L J104A/24	22-19-11 22-19-11
31		GND CNTL RELAY 1 FAILURE	VERIFIES GROUND CONTROL RELAY-1 (R2-3).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT (1)	R2-3 J101A/44	22-11-11 22-11-11
32		GND CNTL RELAY 2 FAILURE	VERIFIES GROUND CONTROL RELAY-2 (R2-6).	FAILED GND CONT. RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT (1)	R2-6 J104A/44	22-11-11 22-11-11
33		LEFT SLAT VALID FAILURE	VERIFIES LEFT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-446B/56 J101A/23	22-31-11 22-31-11
34		RIGHT SLAT VALID FAILURE	VERIFIES RIGHT SLAT VALID.	FAILED PROX. SW. ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	R5-447B/56 J104A/23	22-31-11 22-31-11

(1) VALID ONLY FOR AOG CONFIGURATION (NOSEWHEEL COMPRESSION).

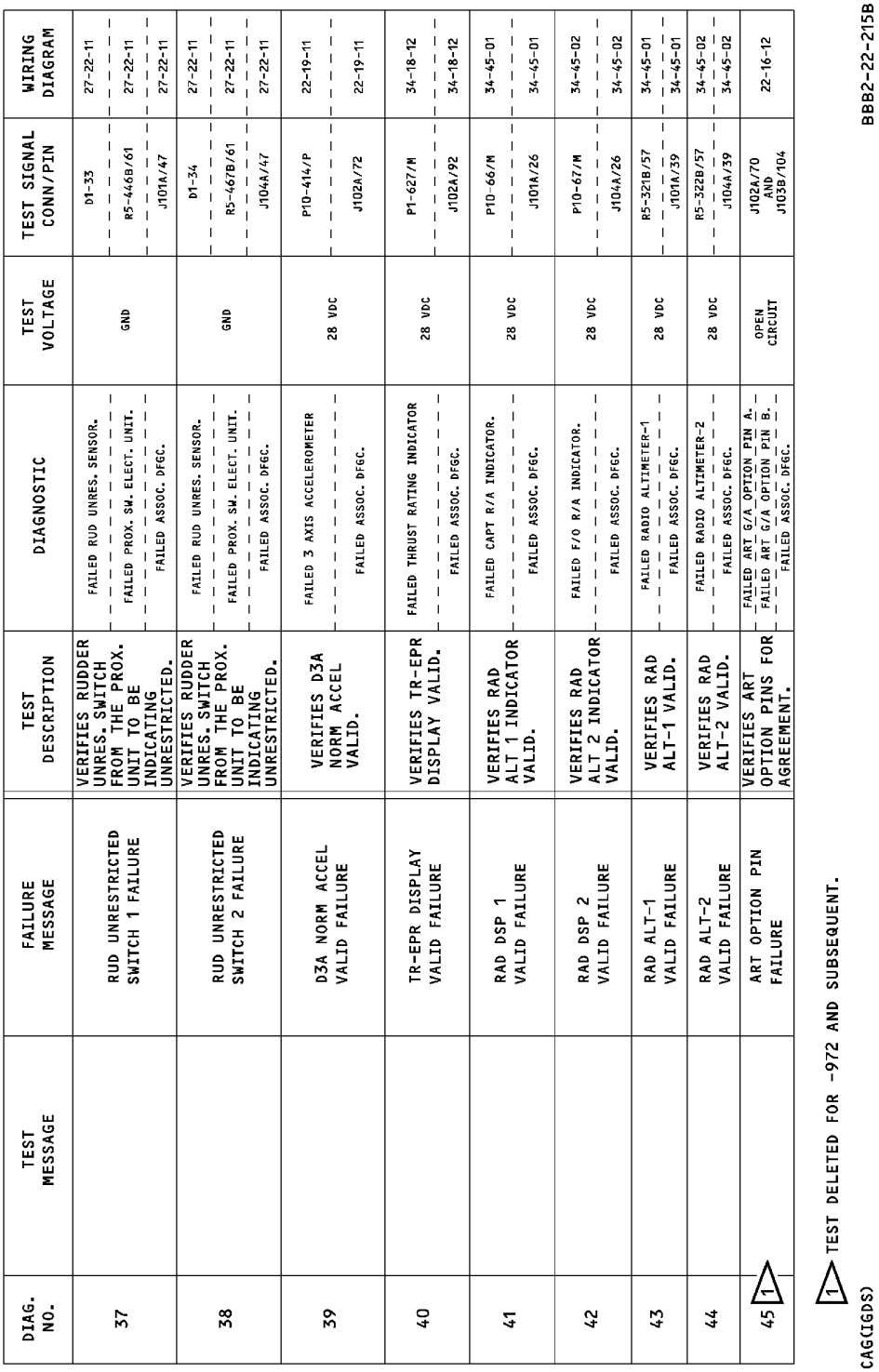
CAG(IGDS)

BBB2-22-555B

Sequence Two - Passive Discretes
Figure 105/22-01-05-990-843 (Sheet 2 of 6)



Sequence Two - Passive Discretes
Figure 105/22-01-05-990-843 (Sheet 3 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
37		RUD UNRESTRICTED SWITCH 1 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-33 R5-446B/61 J101A/47	27-22-11 27-22-11 27-22-11
38		RUD UNRESTRICTED SWITCH 2 FAILURE	VERIFIES RUDDER UNRES. SWITCH FROM THE PROX. UNIT TO BE INDICATING UNRESTRICTED.	FAILED RUD UNRES. SENSOR. FAILED PROX. SW. ELECT. UNIT. FAILED ASSOC. DFGC.	GND	D1-34 R5-467B/61 J104A/47	27-22-11 27-22-11 27-22-11
39		D3A NORM ACCEL VALID FAILURE	VERIFIES D3A NORM ACCEL VALID.	FAILED 3 AXIS ACCELEROMETER FAILED ASSOC. DFGC.	28 VDC	P10-414/P J102A/72	22-19-11 22-19-11
40		TR-EPR DISPLAY VALID FAILURE	VERIFIES TR-EPR DISPLAY VALID.	FAILED THRUST RATING INDICATOR FAILED ASSOC. DFGC.	28 VDC	P1-627/M J102A/92	34-18-12 34-18-12
41		RAD DSP 1 VALID FAILURE	VERIFIES RAD ALT 1 INDICATOR VALID.	FAILED CAPT R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-66/M J101A/26	34-45-01 34-45-01
42		RAD DSP 2 VALID FAILURE	VERIFIES RAD ALT 2 INDICATOR VALID.	FAILED F/O R/A INDICATOR. FAILED ASSOC. DFGC.	28 VDC	P10-67/M J104A/26	34-45-02 34-45-02
43		RAD ALT-1 VALID FAILURE	VERIFIES RAD ALT-1 VALID.	FAILED RADIO ALTIMETER-1 FAILED ASSOC. DFGC.	28 VDC	R5-321B/57 J101A/39	34-45-01 34-45-01
44		RAD ALT-2 VALID FAILURE	VERIFIES RAD ALT-2 VALID.	FAILED RADIO ALTIMETER-2 FAILED ASSOC. DFGC.	28 VDC	R5-322B/57 J104A/39	34-45-02 34-45-02
45 1		ART OPTION PIN FAILURE	VERIFIES ART OPTION PINS FOR AGREEMENT.	FAILED ART G/A OPTION PIN A. FAILED ART G/A OPTION PIN B. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J102A/70 AND J103B/104	22-16-12

1 TEST DELETED FOR -972 AND SUBSEQUENT.

CAG(IGDS)

BBB2-22-215B

Sequence Two - Passive Discretes
Figure 105/22-01-05-990-843 (Sheet 4 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
46		AUTO G/A OPTION PIN FAILURE	VERIFIES AUTO G/A OPTION PINS FOR AGREEMENT.	FAILED AUTO G/A OPTION PIN A. FAILED AUTO G/A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/102 AND J103B/102	22-16-14
47		R/A OPTION PIN FAILURE	VERIFIES R/A OPTION PINS FOR AGREEMENT.	FAILED RA552A OPTION PIN A. FAILED RA552A OPTION PIN B. FAILED ASSOC. DFGC.	GND	J102B/94 AND J103B/94	22-16-18
48		OPTION PIN PARITY FAILURE	VERIFIES EVEN PARITY FOR OPTION PINS. (1)	FAILED OPTION PINS. FAILED ASSOC. DFGC.	OPEN OR GND	J103B/96 (1)	22-16-17
49		WHEEL SPIN-UP FAILURE	VERIFIES LEFT INBOARD, RIGHT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/C J102A/8	27-61-11 27-61-11
50		WHEEL SPIN-UP FAILURE	VERIFIES RIGHT INBOARD, LEFT OUTBOARD WHEEL SPIN-UP DISCRETE.	FAILED GROUND SPOILER CONTROL BOX. FAILED ASSOC. DFGC.	GND	P1-208/E J103A/8	27-61-11 27-61-11
51 (2)	TRC OPTION PIN ABCDE= XXXXX VRFY	TRC OPTION PIN FAILURE	VERIFIES INSTALLED ENGINE AGREES WITH OPTION PIN CONFIGURATION.	PROPER PROGRAM FOR COMPUTER OPTION PIN SELECTION.	- = OPEN G = GROUND	J102B-97, 98, 99, 100	22-16-15

(1) THE FOLLOWING OPTION ARE TESTED:
(a) PEDESTAL CONTROLLER
(b) F/D OPTION
(c) AD 300C
(d) HDG SEL CX
(e) PITCH REF SEL
(f) QNH CORRECT
(g) BOX 1
(h) BOX 2
(i) PARITY PIN

(2) DISPLAY FOR DIFFERENT ENGINE CONFIGURATIONS:

-209 ENGINE	ABCD = -GGG
-217 ENGINE	ABCD = GG-G
-217A ENGINE	ABCD = --G-
-217A+ ENGINE	ABCD = -G--
-219 ENGINE	ABCDE = -GG-G

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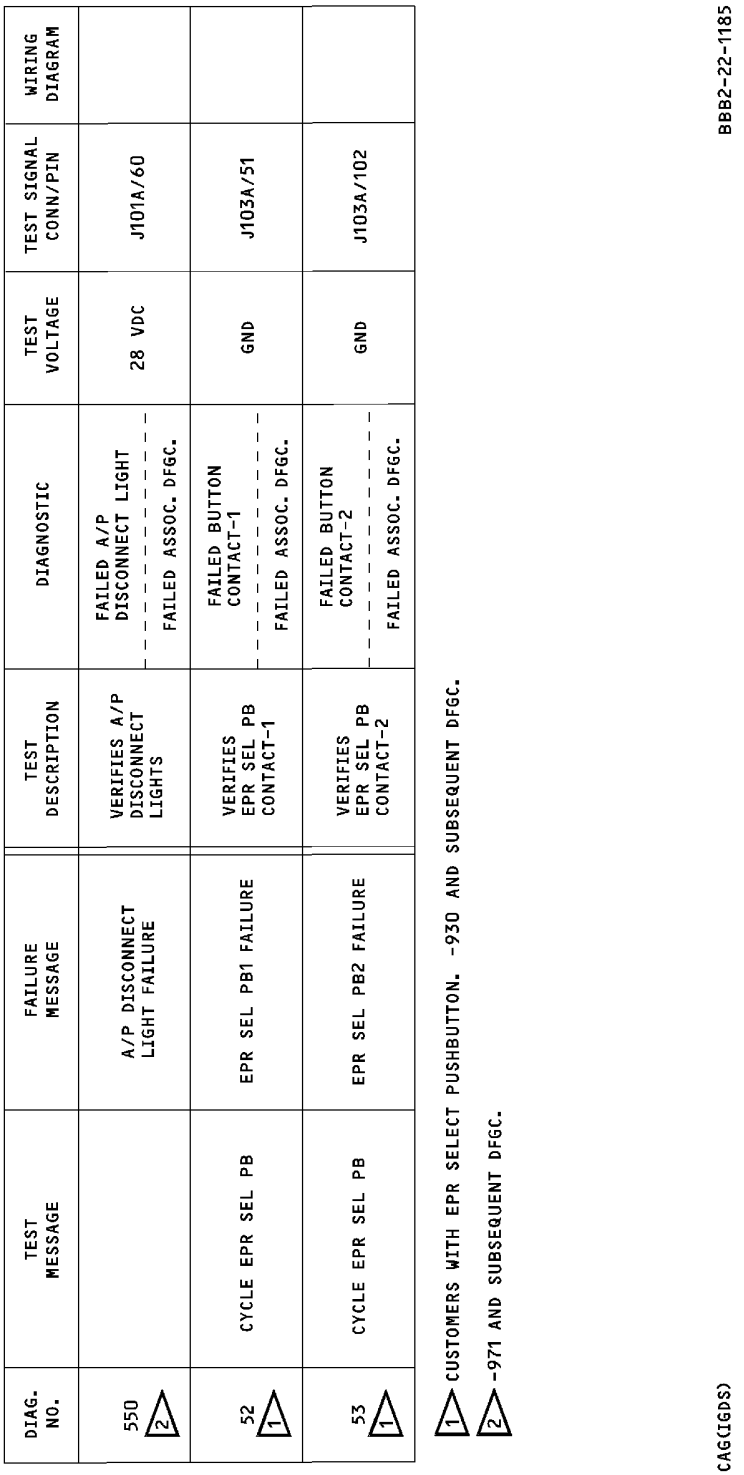
S0006528159V2

Sequence Two - Passive Discretes
Figure 105/22-01-05-990-843 (Sheet 5 of 6)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
550 (2)		A/P DISCONNECT LIGHT FAILURE	VERIFIES A/P DISCONNECT LIGHTS	FAILED A/P DISCONNECT LIGHT FAILED ASSOC. DFGC.	28 VDC	J101A/60	
52 (1)	CYCLE EPR SEL PB	EPR SEL PB1 FAILURE	VERIFIES EPR SEL PB CONTACT-1	FAILED BUTTON CONTACT-1 FAILED ASSOC. DFGC.	GND	J103A/51	
53 (1)	CYCLE EPR SEL PB	EPR SEL PB2 FAILURE	VERIFIES EPR SEL PB CONTACT-2	FAILED BUTTON CONTACT-2 FAILED ASSOC. DFGC.	GND	J103A/102	

(1) CUSTOMERS WITH EPR SELECT PUSHBUTTON. -930 AND SUBSEQUENT DFGC.
(2) -971 AND SUBSEQUENT DFGC.

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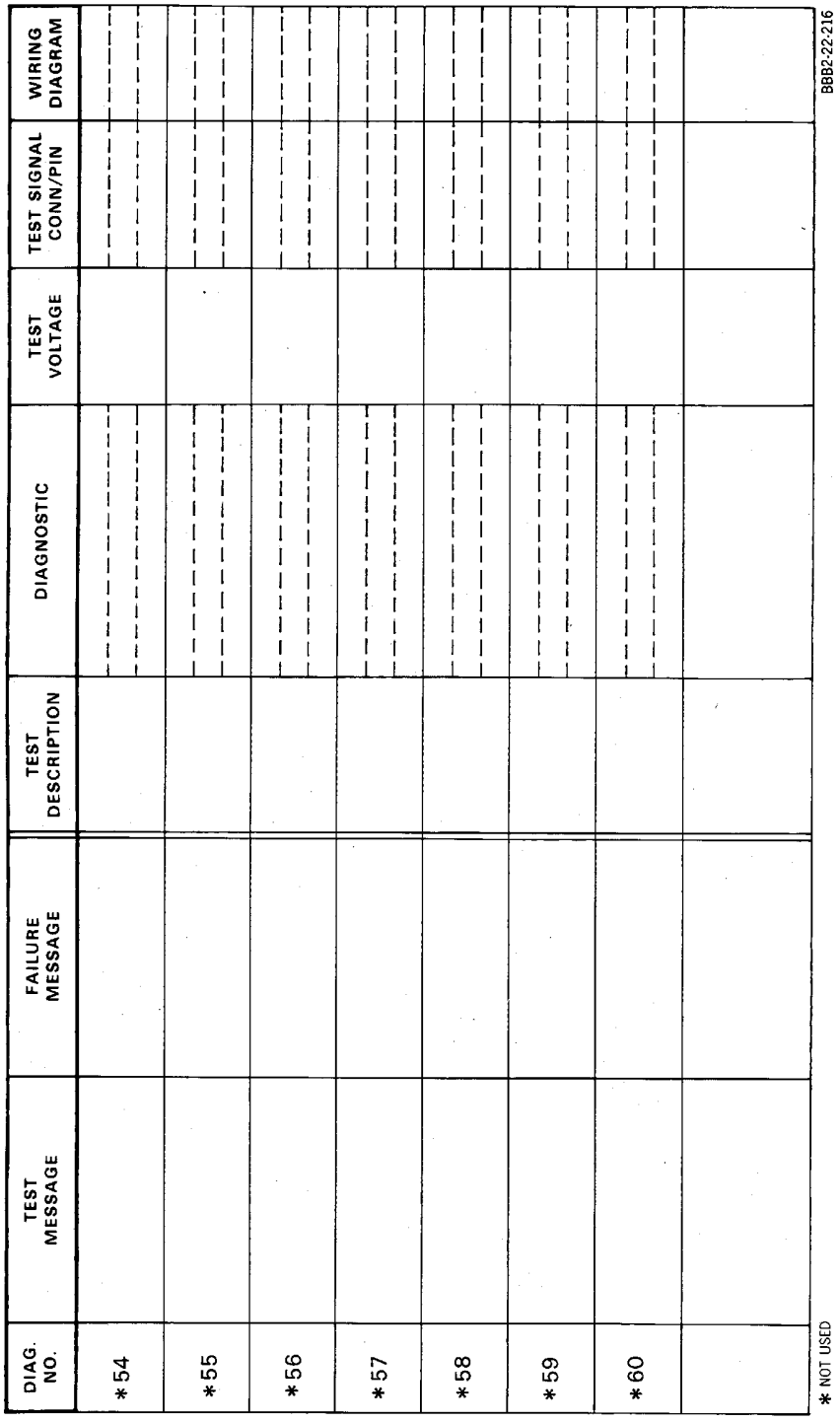
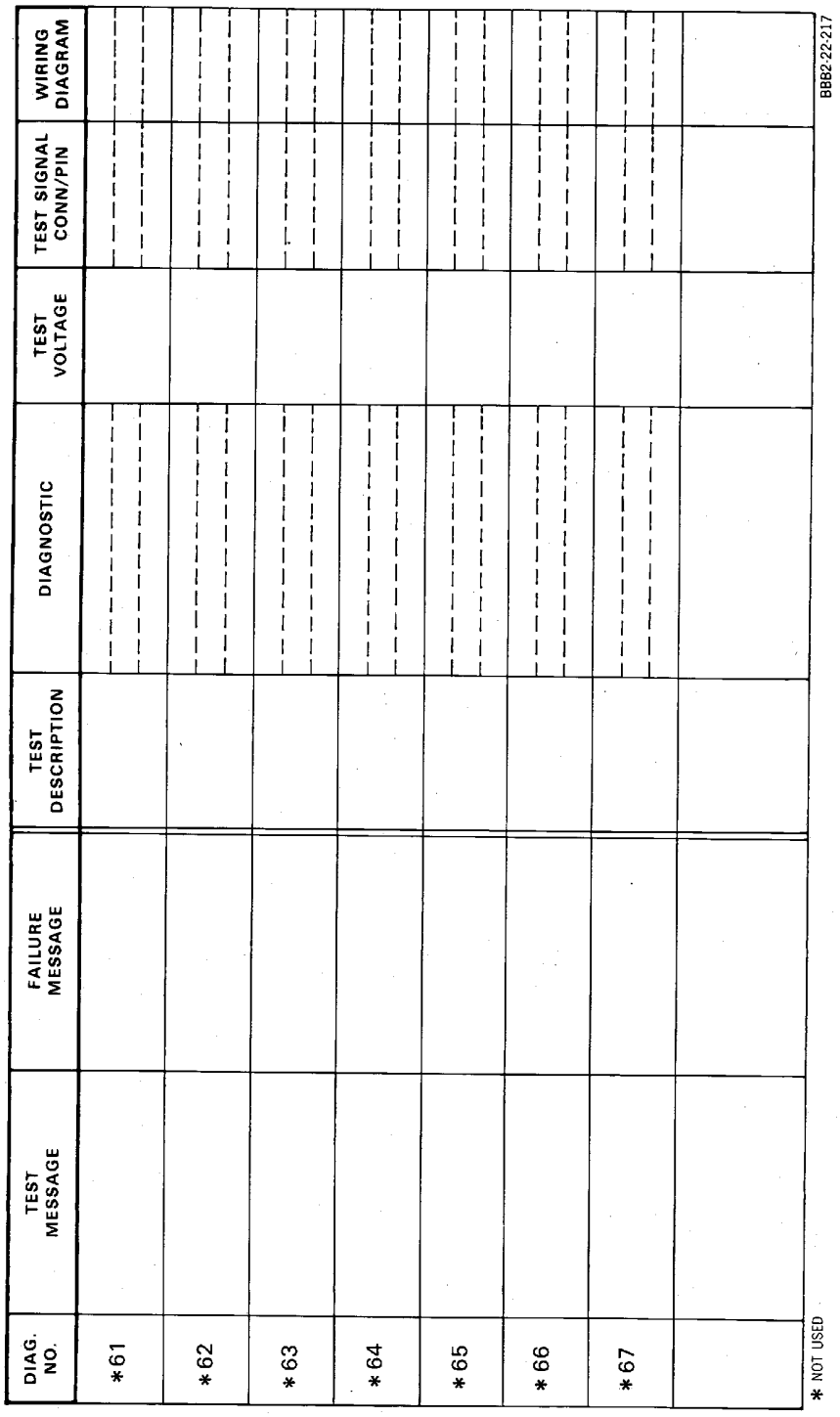
CAG(IGDS)

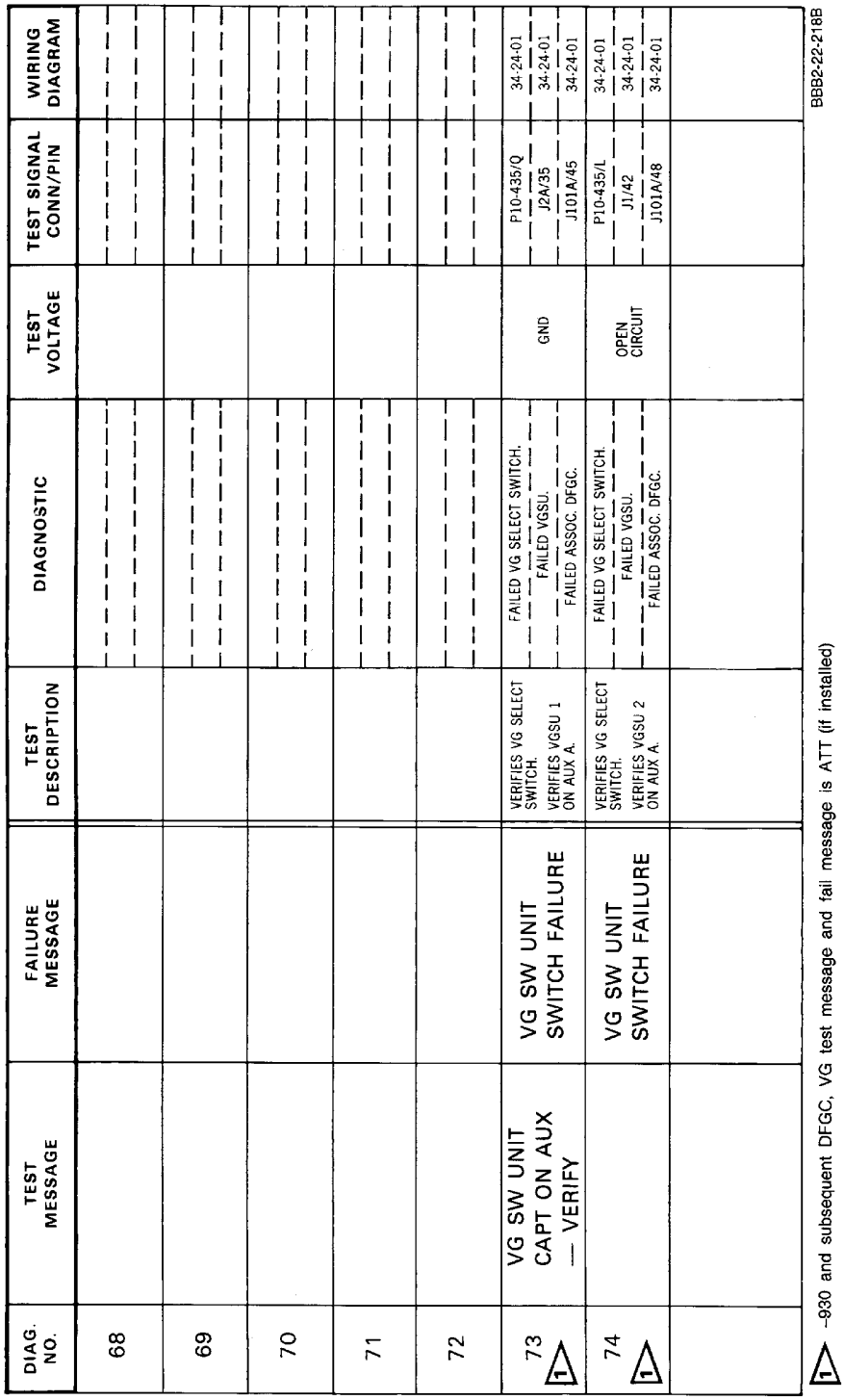
Sequence Two - Passive Discretes
Figure 105/22-01-05-990-843 (Sheet 6 of 6)



Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 1 of 17)



Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 2 of 17)

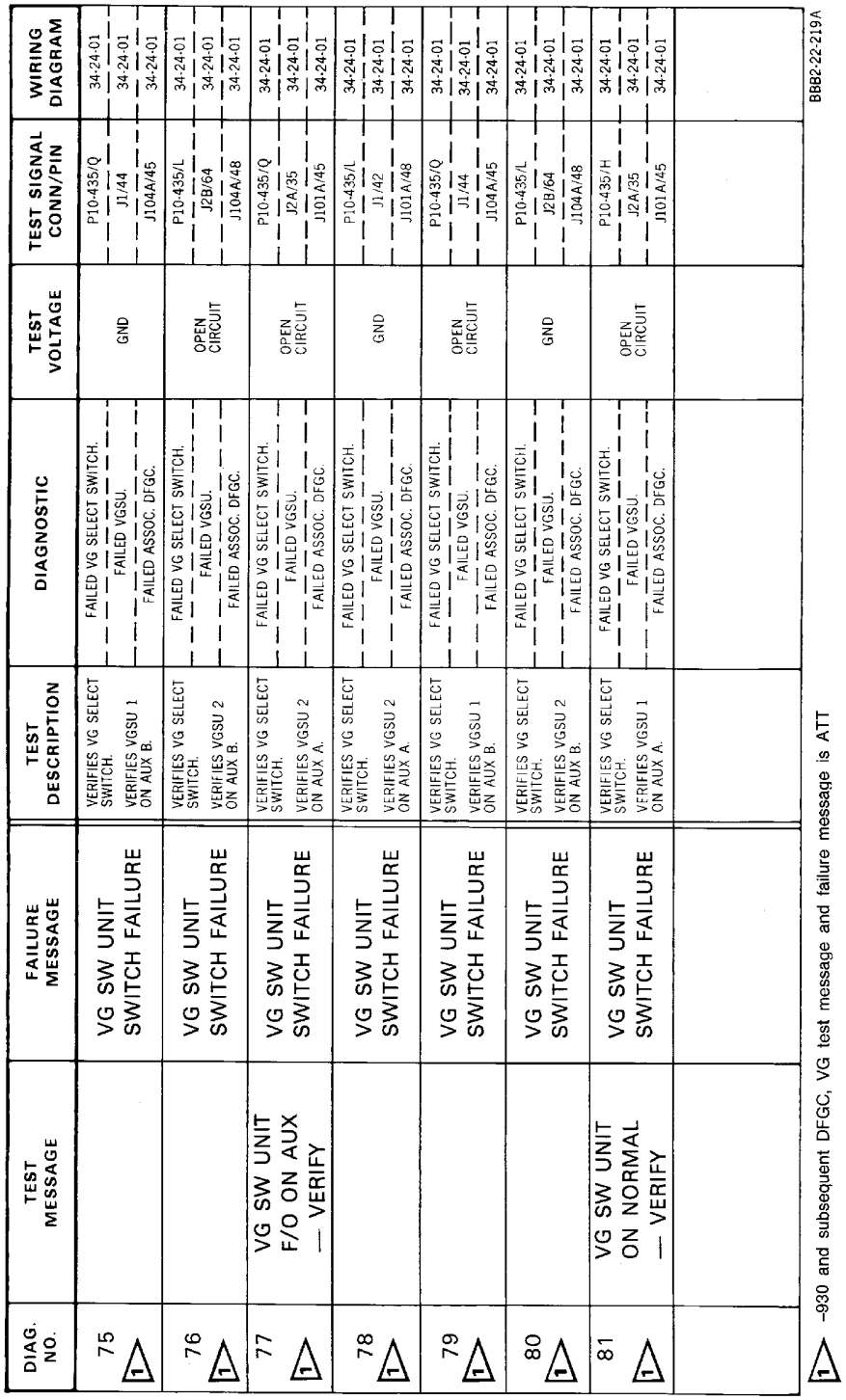


DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
68							
69							
70							
71							
72							
73 (1)	VG SW UNIT CAPT ON AUX — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
74 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01

(1) -930 and subsequent DFGC, VG test message and fail message is ATT (if installed)

BBB2-22-218B

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 3 of 17)

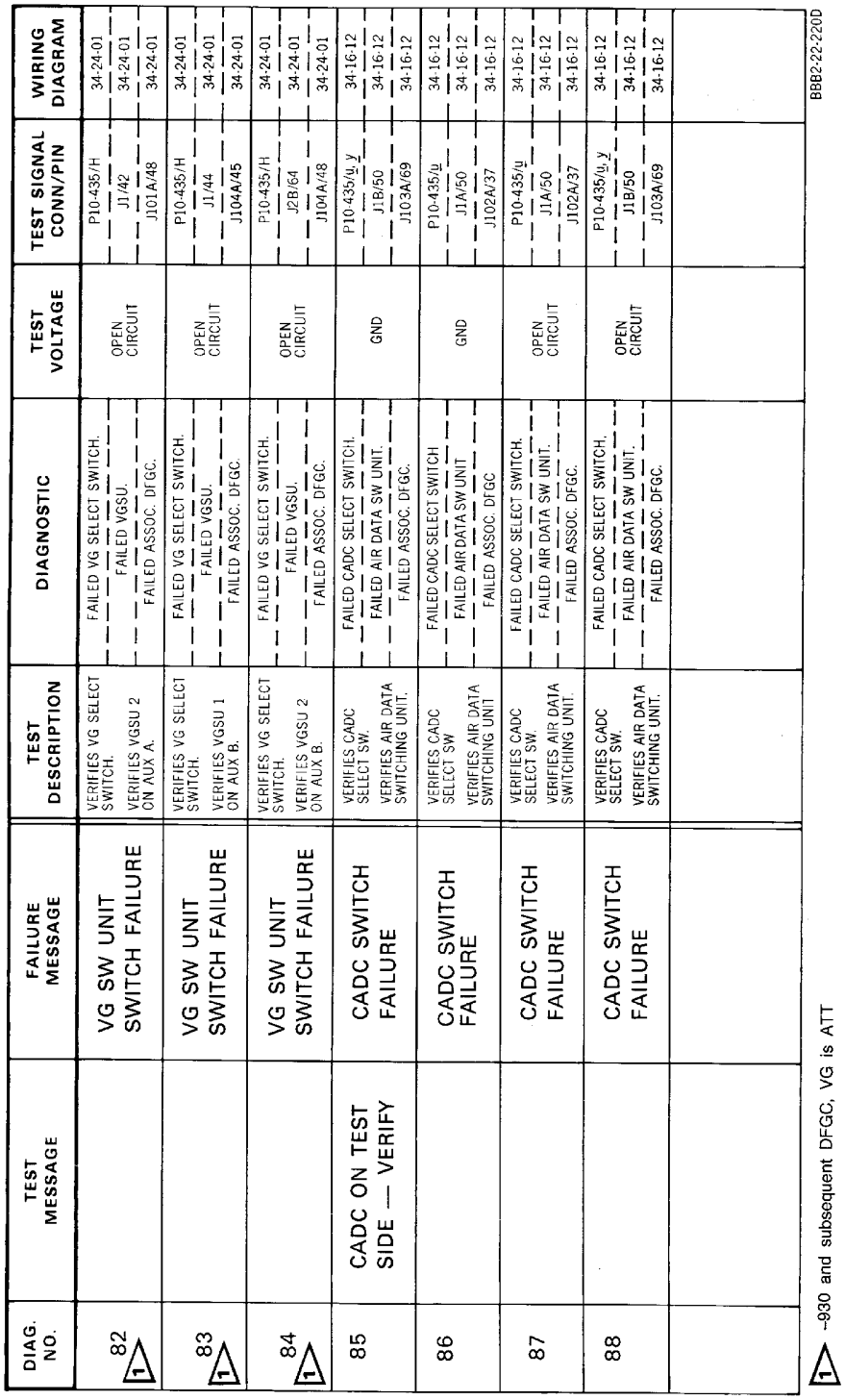


DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
75 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
76 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
77 [1]	VG SW UNIT F/O ON AUX — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J2A/35 J101A/45	34-24-01 34-24-01 34-24-01
78 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/L J1/42 J101A/48	34-24-01 34-24-01 34-24-01
79 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/Q J1/44 J104A/45	34-24-01 34-24-01 34-24-01
80 [1]		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	GND	P10-435/L J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
81 [1]	VG SW UNIT ON NORMAL — VERIFY	VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2A/35 J101A/45	34-24-01 34-24-01 34-24-01

[1] -930 and subsequent DFGC, VG test message and failure message is ATT

BBB2-22-219A

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 4 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
82 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX A.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/42 J101A/48	34-24-01 34-24-01 34-24-01
83 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 1 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J1/44 J104A/45	34-24-01 34-24-01 34-24-01
84 (1)		VG SW UNIT SWITCH FAILURE	VERIFIES VG SELECT SWITCH. VERIFIES VGSU 2 ON AUX B.	FAILED VG SELECT SWITCH. FAILED VGSU. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/H J2B/64 J104A/48	34-24-01 34-24-01 34-24-01
85	CADC ON TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/μ_y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
86		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW VERIFIES AIR DATA SWITCHING UNIT	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	GND	P10-435/μ J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
87		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/μ J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
88		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/μ_y J1B/50 J103A/69	34-16-12 34-16-12 34-16-12

(1) -930 and subsequent DFGC, VG is ATT

BBB2-22-220D

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 5 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
89		CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH FAILED AIR DATA SW UNIT FAILED ASSOC. DFGC	OPEN CIRCUIT	P10-435/u J1A/50 J103A/69	34-16-12 34-16-12 34-16-12
90	CADC ON NON-TEST SIDE — VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SW. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW UNIT. FAILED ASSOC. DFGC.	GND	P10-435/u J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
91	CADC ON NORM-VERIFY	CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1B/50 J103A/69	34-16-12 34-16-12 34-16-12
92		CADC SWITCH FAILURE	VERIFIES CADC SELECT SWITCH. VERIFIES AIR DATA SWITCHING UNIT.	FAILED CADC SELECT SWITCH. FAILED AIR DATA SW. UNIT. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-435/b J1A/50 J102A/37	34-16-12 34-16-12 34-16-12
93 ⚠1	TEMP SELECT 48 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/H J103B/69	34-18-12 34-18-12
94		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/J J103B/70	34-18-12 34-18-12
95		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/K J103B/71	34-18-12 34-18-12
96		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/L J103B/72	34-18-12 34-18-12
97		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/N J103B/73	34-18-12 34-18-12

⚠1 Customers with EPR select option. -930 and subsequent TEMP SELECT is 78

BBB2:22:221C

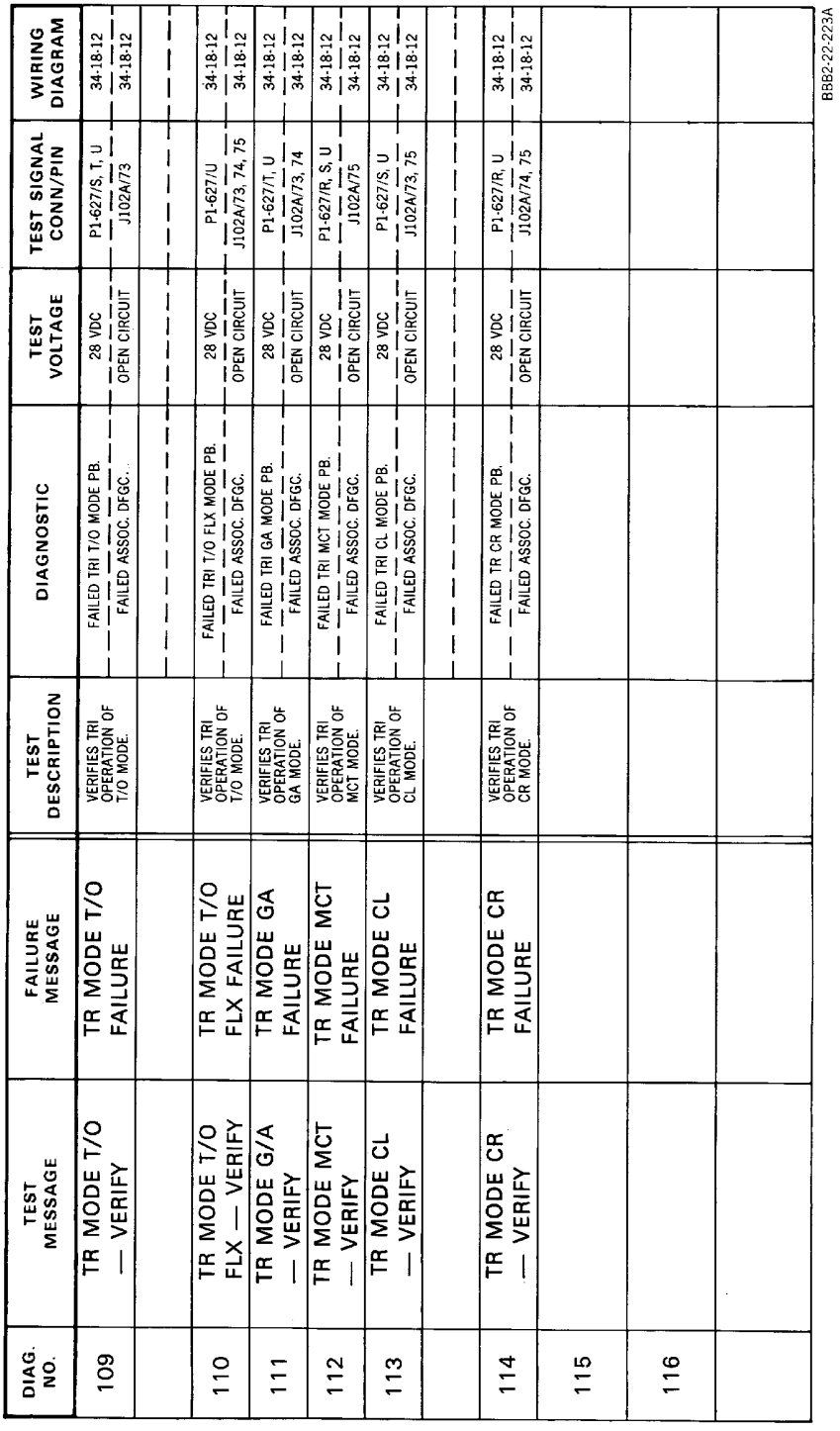
Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 6 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
98		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/P J103B/74	34-18-12 34-18-12
99		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/R J103B/75	34-18-12 34-18-12
100		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12
101 [1]	TEMP SELECT 37 DEGREES — VERIFY	TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 00.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/H J103B/69	34-18-12 34-18-12
102		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 01.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/J J103B/70	34-18-12 34-18-12
103		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 02.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/K J103B/71	34-18-12 34-18-12
104		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 03.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/L J103B/72	34-18-12 34-18-12
105		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 10.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/N J103B/73	34-18-12 34-18-12
106		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 11.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	GND	P1-606/P J103B/74	34-18-12 34-18-12
107		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 12.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	J606/R J103B/75	34-18-12 34-18-12
108		TEMP SELECT PANEL FAILURE	VERIFIES TEMP SELECT PANEL. VERIFIES BIT TEMP 13.	FAILED TEMP SELECT PANEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P1-606/S J103B/76	34-18-12 34-18-12

[1] Customers with EPR selection option. -930 and subsequent DFGC TEMP SELECT is 87

BBB2-22-222A

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 7 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
109	TR MODE T/O — VERIFY	TR MODE T/O FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, T, U J102A/73	34-18-12 34-18-12
110	TR MODE T/O FLX — VERIFY	TR MODE T/O FLX FAILURE	VERIFIES TRI OPERATION OF T/O MODE.	FAILED TRI T/O FLX MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/U J102A/73, 74, 75	34-18-12 34-18-12
111	TR MODE G/A — VERIFY	TR MODE GA FAILURE	VERIFIES TRI OPERATION OF GA MODE.	FAILED TRI GA MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/T, U J102A/73, 74	34-18-12 34-18-12
112	TR MODE MCT — VERIFY	TR MODE MCT FAILURE	VERIFIES TRI OPERATION OF MCT MODE.	FAILED TRI MCT MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, S, U J102A/75	34-18-12 34-18-12
113	TR MODE CL — VERIFY	TR MODE CL FAILURE	VERIFIES TRI OPERATION OF CL MODE.	FAILED TRI CL MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/S, U J102A/73, 75	34-18-12 34-18-12
114	TR MODE CR — VERIFY	TR MODE CR FAILURE	VERIFIES TRI OPERATION OF CR MODE.	FAILED TR CR MODE PB. FAILED ASSOC. DFGC.	28 VDC OPEN CIRCUIT	P1-627/R, U J102A/74, 75	34-18-12 34-18-12
115							
116							

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 8 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
117	CYCLE TO/GA SWITCH 1	TO/GA SWITCH 1 FAILURE	VERIFIES TO/GA 1 (LEFT) SWITCH.	FAILED TO/GA-1 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-197 J101A/41, J104A/41	22-31-11 22-31-11
118	CYCLE TO/GA SWITCH 2	TO/GA SWITCH 2 FAILURE	VERIFIES TO/GA 2 (RIGHT) SWITCH.	FAILED TO/GA-2 SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-198 J101A/41, J104A/41	22-31-11 22-31-11
119	CYCLE A/P 1 DISCONENCT	A/P 1 DISCONENCT FAILURE	VERIFIES CAPTAIN'S A/P DISC. PB.	FAILED CAPTAIN'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-13 J102A/36, J103A/36	22-14-11 22-14-11
120	CYCLE A/P 2 DISCONNECT	A/P 2 DISCONNECT FAILURE	VERIFIES FIRST OFFICER'S A/P DISC. PB.	FAILED FIRST OFFICER'S A/P SWITCH. FAILED ASSOC. DFGC.	GND WHEN SWITCH DEPRESSED	S10-14 J102A/36, J103A/36	22-14-11 22-14-11
121	CYCLE CAPT FMA RESET PB	CAPT FMA RESET PB FAILURE	VERIFIES CAPTAIN'S FMA RESET PB.	FAILED CAPTAIN'S FMA RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
122	CYCLE F/O FMA RESET PB	F/O FMA RESET PB FAILURE	VERIFIES FIRST OFFICER'S FMA RESET PB.	FAILED FIRST OFFICER'S RESET PB. FAILED ASSOC. DFGC.	GND WHEN RESET DEPRESSED	J102/V J102A/34	34-27-12 34-27-12
123	PULL GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1 IS CLOSED (R2-3).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-3 J101A/44	22-11-11 22-11-11
124		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2 IS CLOSED (R2-6).	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	GND	R2-6 J104A/44	22-11-11 22-11-11
125	LEFT PNEU X FEED OPEN — VERIFY	LEFT PNEU X FEED OPEN FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN OPEN POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-369 J101A/31	34-18-12 34-18-12

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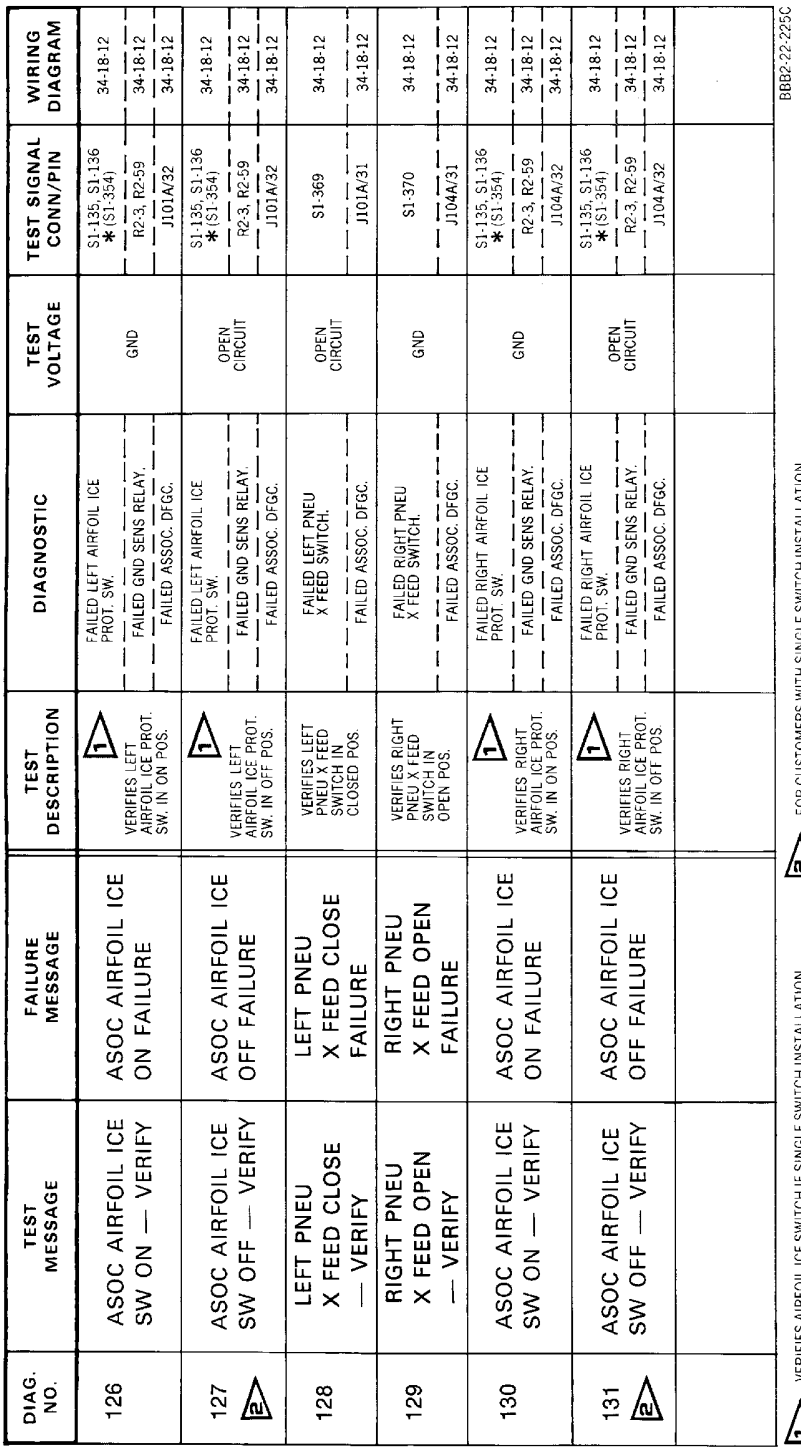
Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 9 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
126	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	1 VERIFIES LEFT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
127 2	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	1 VERIFIES LEFT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED LEFT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J101A/32	34-18-12 34-18-12 34-18-12
128	LEFT PNEU X FEED CLOSE — VERIFY	LEFT PNEU X FEED CLOSE FAILURE	VERIFIES LEFT PNEU X FEED SWITCH IN CLOSED POS.	FAILED LEFT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-369 J101A/31	34-18-12 34-18-12
129	RIGHT PNEU X FEED OPEN — VERIFY	RIGHT PNEU X FEED OPEN FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN OPEN POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	GND	S1-370 J104A/31	34-18-12 34-18-12
130	ASOC AIRFOIL ICE SW ON — VERIFY	ASOC AIRFOIL ICE ON FAILURE	1 VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN ON POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	GND	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12
131 2	ASOC AIRFOIL ICE SW OFF — VERIFY	ASOC AIRFOIL ICE OFF FAILURE	1 VERIFIES RIGHT AIRFOIL ICE PROT. SW. IN OFF POS.	FAILED RIGHT AIRFOIL ICE PROT. SW. FAILED GND SENS RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-135, S1-136 ✱(S1-354) R2-3, R2-59 J104A/32	34-18-12 34-18-12 34-18-12

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1 VERIFIES AIRFOIL ICE SWITCH IF SINGLE SWITCH INSTALLATION.

✱ FOR SINGLE SWITCH INSTALLATION.

2 FOR CUSTOMERS WITH SINGLE SWITCH INSTALLATION.
OPEN TAIL DE-ICE TIMER CIRCUIT BREAKER OR A FAILURE MAY BE LOGGED DUE TO A 2.5 MINUTE TIME WITHIN THE TAIL DE-ICING TIMER (R2-189).

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 10 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
132	RIGHT PNEU X FEED CLOSE — VERIFY	RIGHT PNEU X FEED CLOSE FAILURE	VERIFIES RIGHT PNEU X FEED SWITCH IN CLOSED POS.	FAILED RIGHT PNEU X FEED SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-370 J104A/31	34-18-12 34-18-12
133	L ENG ANTI-ICE SW ON — VERIFY	L ENG ANTI-ICE SW ON FAILURE	VERIFIES LEFT ANTI-ICE SW. IN ON POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-28 J101A/34	34-18-12 34-18-12
134	L ENG ANTI-ICE SW OFF — VERIFY	L ENG ANTI-ICE SW OFF FAILURE	VERIFIES LEFT ANTI-ICE SW. IN OFF POS.	FAILED LEFT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-28 J101A/34	34-18-12 34-18-12
135	R ENG ANTI-ICE SW ON — VERIFY	R ENG ANTI-ICE SW ON FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN ON POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	GND	S1-29 J104A/34	34-18-12 34-18-12
136	R ENG ANTI-ICE SW OFF — VERIFY	R ENG ANTI-ICE SW OFF FAILURE	VERIFIES RIGHT ANTI-ICE SW. IN OFF POS.	FAILED RIGHT ENGINE ANTI-ICE SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S1-29 J104A/34	34-18-12 34-18-12
137	LEFT A/C SUPPLY SWITCH AUTO — VERIFY	LEFT A/C SUPPLY SW AUTO FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN AUTO POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-255 J101A/33	34-18-12 34-18-12
138	LEFT A/C SUPPLY SWITCH OFF — VERIFY	LEFT A/C SUPPLY SWITCH OFF FAILURE	VERIFIES LEFT A/C SUPPLY SWITCH IN OFF POS.	FAILED LEFT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-255 J101A/33	34-18-12 34-18-12

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 11 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
139	RIGHT A/C SUPPLY SWITCH AUTO — VERIFY	RIGHT A/C SUPPLY SWITCH AUTO FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN AUTO POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	GND	R2-256 J104A/33	34-18-12 34-18-12
140	RIGHT A/C SUPPLY SWITCH OFF — VERIFY	RIGHT A/C SUPPLY SWITCH OFF — FAILURE	VERIFIES RIGHT A/C SUPPLY SWITCH IN OFF POS.	FAILED RIGHT A/C SUPPLY SW. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-256 J104A/33	34-18-12 34-18-12
141 △1	CLOSE GND SENS BRKRS — VERIFY	GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-1.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/D1, D2, D3 J101A/44	22-11-11 22-11-11
142 △1		GND SENSOR FAILURE	VERIFIES GROUND CONTROL RELAY-2.	FAILED GND CONTROL RELAY. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R2-3/C1, C2, C3 J104A/44	22-11-11 22-11-11
143	SEL DFGC NON-TEST SIDE — VERIFY	SEL DFGC NON-TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN NON-TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
144	SEL DFGC TEST SIDE — VERIFY	SEL DFGC TEST SIDE FAILURE	VERIFIES SIDE SELECT SWITCH IN TEST SIDE.	FAILED SIDE SELECT SWITCH. FAILED ASSOC. DFGC.	28 VDC	P10-410/H P10-432/M J102A/6, 102	22-15-11 22-15-11
145 *	CYCLE BACKCOURSE PB	BACKCOURSE PB FAILURE	VERIFIES BACKCOURSE PB.	FAILED BACKCOURSE PUSHBUTTON FAILED ASSOC. DFGC	SHORTED TO GND WHEN SWITCH DEPRESSED. SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, F J102A/27, J103A/85	22-15-11 22-15-11
145 **	CYCLE FMS OVRD PB	FMS OVRD PB FAILURE	VERIFIES FMS OVRD PB.	FAILED FMS OVRD PUSH BUTTON FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, F J102A/31, J103A/84	22-15-11 22-15-11
146	CYCLE SPEED SELECT PB	SPEED SELECT PB FAILURE	VERIFIES SPD SEL P.B.	FAILED SPD SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED. SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, F J102A/27, J103A/84	22-15-11 22-15-11
147	CYCLE MACH SELECT PB	MACH SELECT PB FAILURE	VERIFIES MACH SEL P.B.	FAILED MACH SEL PUSHBUTTON. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED. SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, H J102A/29, J103A/87	22-15-11 22-15-11

△1 AFTER CLOSING GND SENS BRKRS, SYSTEM WILL DISPLAY "FLIGHT FAULT REVIEW", FWD SPACE TO MAINTENANCE TEST IF FURTHER DIAGNOSTICS ARE DESIRED.

* USED FOR CUSTOMERS WITH BACKCOURSE OPTION
** USED FOR CUSTOMERS WITH FMS AND -970 DFGC AND SUBS

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 12 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
148	CYCLE EPR LIMIT PB	EPR LIMIT PB FAILURE	VERIFIES EPR LIM PB	FAILED EPR LIM PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, J J102A/30, J103A/87	22-15-11 22-15-11
*149	CYCLE NAV PB	NAV PB FAILURE	VERIFIES NAV PB	FAILED NAV PB FAILED ASSOC. DFGC.			
150	CYCLE VOR/LOC PB	VOR/LOC PB FAILURE	VERIFIES VOR/LOC PB	FAILED VOR/LOC PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, H J102A/29, J103A/86	22-15-11 22-15-11
151	CYCLE ILS PB	ILS PB FAILURE	VERIFIES ILS PB	FAILED ILS PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, J J102A/30, J103A/86	22-15-11 22-15-11
152	CYCLE AUTOLAND PB	AUTOLAND PB FAILURE	VERIFIES AUTOLAND PB	FAILED AUTOLAND PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, G J102A/28, J103A/86	22-15-11 22-15-11
153	CYCLE VERT SPD PB	VERT SPD PB FAILURE	VERIFIES VERT SPD PB	FAILED VERT SPD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
154	CYCLE MACH HOLD PB	MACH HOLD PB FAILURE	VERIFIES MACH HOLD PB	FAILED MACH HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, J J102A/30, J103A/85	22-15-11 22-15-11
155	CYCLE IAS/MACH PB	IAS/MACH PB FAILURE	VERIFIES IAS/MACH PB	FAILED IAS/MACH PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/28, J103A/84	22-15-11 22-15-11

*CUSTOMERS WITH NAV OPTION.

CAG(IGDS)

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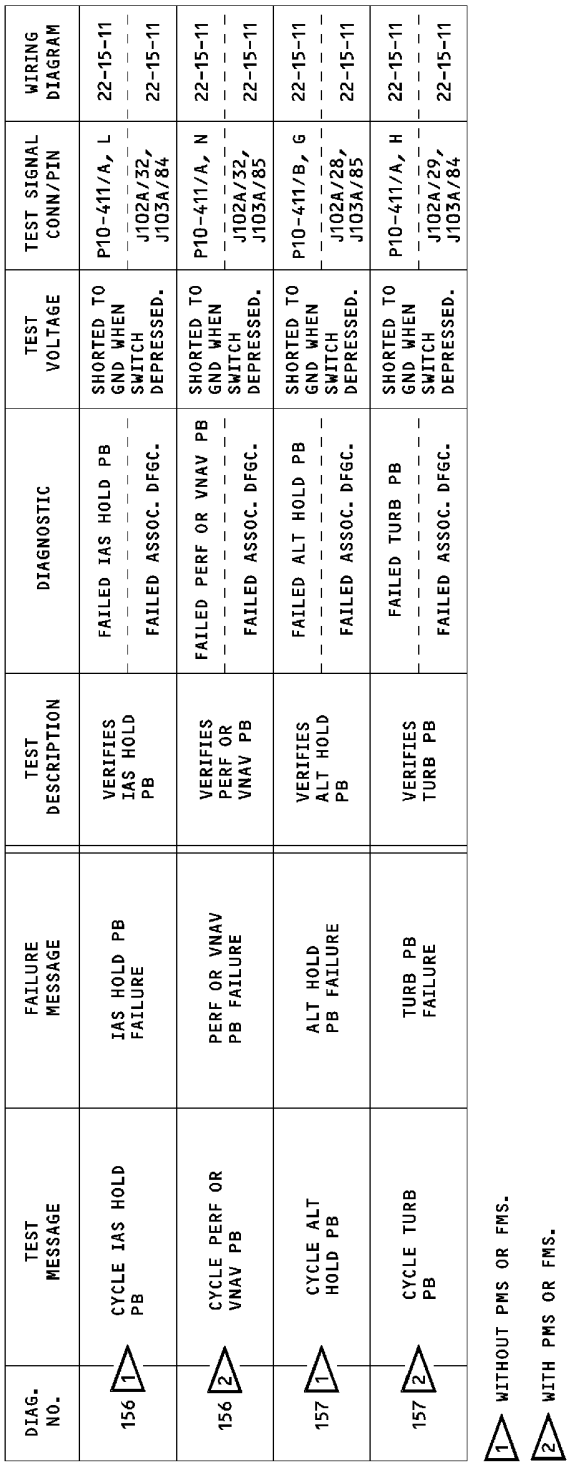
Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 13 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
156 1	CYCLE IAS HOLD PB	IAS HOLD PB FAILURE	VERIFIES IAS HOLD PB	FAILED IAS HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, L J102A/32, J103A/84	22-15-11 22-15-11
156 2	CYCLE PERF OR VNAV PB	PERF OR VNAV PB FAILURE	VERIFIES PERF OR VNAV PB	FAILED PERF OR VNAV PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, N J102A/32, J103A/85	22-15-11 22-15-11
157 1	CYCLE ALT HOLD PB	ALT HOLD PB FAILURE	VERIFIES ALT HOLD PB	FAILED ALT HOLD PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, G J102A/28, J103A/85	22-15-11 22-15-11
157 2	CYCLE TURB PB	TURB PB FAILURE	VERIFIES TURB PB	FAILED TURB PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/A, H J102A/29, J103A/84	22-15-11 22-15-11

1 WITHOUT PMS OR FMS.
2 WITH PMS OR FMS.

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CAG(IGDS)

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 14 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
158	CYCLE HDG SEL PB	HDG SEL PB FAILURE	VERIFIES HDG SEL PB	FAILED HDG SEL PB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-472/R, FF J102A/27, J103A/81	22-15-11 22-15-11
159	CYCLE SPEED KNOB (2ND DETENT IN)	SPEED KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF SPEED KNOB DETENT	FAILED SPD/MACH KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, K J102A/31, J103A/87	22-15-11 22-15-11
160	CYCLE HDG KNOB (OUT)	HDG KNOB (OUT) FAILURE	VERIFIES OPERATION OF HDG KNOB (OUT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/D, F J102A/27, J103A/87	22-15-11 22-15-11
161	CYCLE HDG KNOB (2ND DETENT IN)	HDG KNOB (2ND DET IN) FAILURE	VERIFIES OPERATION OF HDG KNOB (DETENT)	FAILED HDG KNOB FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, F J102A/27, J103A/86	22-15-11 22-15-11
162	CYCLE ALT KNOB (OUT)	ALT KNOB (OUT) FAILURE	VERIFIES OPERATION OF ALT KNOB (OUT)	FAILED ALT SELECT (ARM) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/C, K J102A/31, J103A/86	22-15-11 22-15-11
163	CYCLE ALT KNOB (IN)	ALT KNOB (IN) FAILURE	VERIFIES OPERATION OF ALT KNOB (IN)	FAILED ALT SELECT (ALT) FAILED ASSOC. DFGC.	SHORTED TO GND WHEN SWITCH DEPRESSED.	P10-411/B, K J102A/31, J103A/85	22-11-11 22-11-11
164	BANK LIMIT 15 DEGREES - VERIFY	BANK LIMIT 15 DEGREES FAILURE	VERIFIES BANK LIMIT 15 DEGREES	FAILED 15 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 15 DEGREES	P10-411/E, D J102A/26, J103A/87	22-15-11 22-15-11
165	BANK LIMIT 20 DEGREES - VERIFY	BANK LIMIT 20 DEGREES FAILURE	VERIFIES BANK LIMIT 20 DEGREES	FAILED 20 DEG BANK LIMIT DETENT FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 20 DEGREES	P10-411/C, E J102A/26, J103A/86	22-15-11 22-15-11

CAG(IGDS)

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Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 15 of 17)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
166	BANK LIMIT 25 DEGREES — VERIFY	BANK LIMIT 25 DEGREES FAILURE	VERIFIES BANK LIMIT 25 DEGREES.	FAILED 25 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 25 DEGREES.	P10-411/B, E J102A/26, J103A/85	22-15-11 22-15-11
167	BANK LIMIT 30 DEGREES — VERIFY	BANK LIMIT 30 DEGREES FAILURE	VERIFIES BANK LIMIT 30 DEGREES.	FAILED 30 DEG. BANK LIMIT DETENT. FAILED ASSOC. DFGC.	SHORTED TO GND WHEN BANK LIMIT 30 DEGREES.	P10-411/A, E J012A/26, J103A/84	22-15-11 22-15-11
168	SPEED REF. OPER. — VERIFY	SPEED REF. OPER FAILURE	VERIFIES SPEED REF. CHANGES VISUALLY.	FAILED SPEED/MACH REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/Z, a, b J101B/46, 47, 48	22-31-11 22-31-11
169	HEADING REF OPER. — VERIFY	HEADING REF. OPER FAILURE	VERIFIES HDG REF. CHANGES VISUALLY.	FAILED HEADING REF. FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20 J104B/18, 19, 20	34-22-03 34-22-03 34-22-04
*170							
*171							
*172							
173	CAPT HDG SEL REF — VERIFY	CAPT HDG SEL REF FAILURE	VERIFIES HDG SEL VISUAL REFERENCE CHANGES.	FAILED HDG SEL KNOB/SYNCHRO . FAILED ASSOC. DFGC.	VARIABLE	P10-432/t, u, v J101B/18, 19, 20	34-22-03 34-22-03
174	VERT SPD REF OPER. — VERIFY	VERT SPD REF OPER FAILURE	VERIFIES VERT SPD (PITCH WHEEL) REF. CHANGES VISUALLY.	FAILED VERT SPEED REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/c, d, e J101B/43, 44, 45	22-11-11 22-11-11
175	ALT REF OPER — VERIFY	ALT REF OPER FAILURE	VERIFIES ALT REF. CHANGES VISUALLY.	FAILED ALT. REF. FAILED ASSOC. DFGC.	VARIABLE	P10-411/W, X, Y J101B/40, 41, 42	22-11-11 22-11-11

*NOT USED

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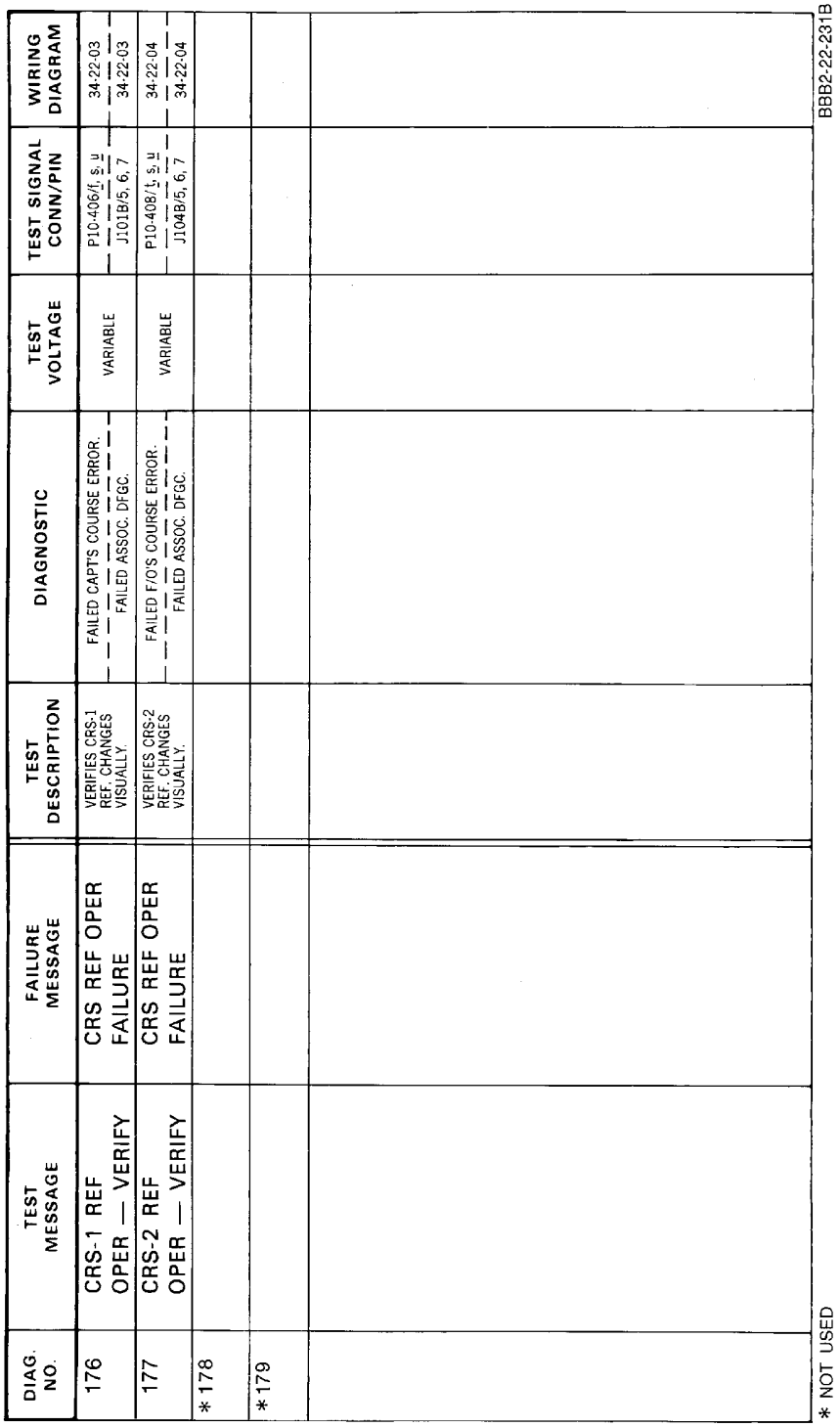
Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 16 of 17)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
176	CRS-1 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-1 REF. CHANGES VISUALLY.	FAILED CAPT'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-406/f, s, u J101B/5, 6, 7	34-22-03 34-22-03
177	CRS-2 REF OPER — VERIFY	CRS REF OPER FAILURE	VERIFIES CRS-2 REF. CHANGES VISUALLY.	FAILED F/O'S COURSE ERROR. FAILED ASSOC. DFGC.	VARIABLE	P10-408/j, s, u J104B/5, 6, 7	34-22-04 34-22-04
* 178							
* 179							

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* NOT USED

Sequence Three - Switches and Buttons
Figure 106/22-01-05-990-844 (Sheet 17 of 17)

DIAG. NO	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
180	PITCH ANGLE 1 = XX.XX DEGREES	PITCH ANGLE 1 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-18/34, 35 J101B/71, 72	34-24-01 34-24-01
181	PITCH ANGLE 2 = XX.XX DEGREES	PITCH ANGLE 2 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-19/34, 35 J104B/71, 72	34-24-02 34-24-02
182	PITCH ANGLE 3 = XX.XX DEGREES	PITCH ANGLE 3 FAILURE	NULL TESTED TO BE < ±3°	FAILED PITCH ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.62 VAC	P10-165/34, 35 J103B/71, 72	34-24-01 34-24-01
183	BANK ANGLE 1 = XX.XX DEGREES	BANK ANGLE 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 1 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-18/30, 31 J101B/74, 75	34-24-01 34-24-01
184	BANK ANGLE 2 = XX.XX DEGREES	BANK ANGLE 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 2 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-19/30, 31 J104B/74, 75	34-24-02 34-24-02
185	BANK ANGLE 3 = XX.XX DEGREES	BANK ANGLE 3 FAILURE	NULL TESTED TO BE < ±2°	FAILED BANK ANGLE 3 DATA. FAILED ASSOC. DFGC.	<0.41 VAC	P10-165/34, 35 J103A/74, 75	34-24-01 34-24-01
186	SPOILER POS 1 = XX.XX DEGREES	SPOILER POS 1 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-1 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-397/3, 4, 5 J101B/35, 36, 37	22-12-11 22-12-11
187	SPOILER POS 2 = XX.XX DEGREES	SPOILER POS 2 FAILURE	NULL TESTED TO BE < ±2°	FAILED SPOILER-2 POSITION. FAILED ASSOC. DFGC.	<0.41 VAC	P10-398/3, 4, 5 J104B/35, 36, 37	22-12-11 22-12-11
188	CRS RAD ALT 1 = XXXX. FEET	CRS RAD ALT 1 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-1 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/22, 23 J101B/55, 56	34-45-01 34-45-01
189	CRS RAD ALT 2 = XXXX. FEET	CRS RAD ALT 2 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-2 COARSE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/22, 23 J104B/55, 56	34-45-02 34-45-02
190	FINE RAD ALT 1 = XXXX. FEET	FINE RAD ALT 1 FAILURE	NULL TESTED TO BE < ±10 FT.	FAILED RAD ALT-1 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-321B/46, 47 J102A/55, 56	34-45-01 34-45-01

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-845 (Sheet 1 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
191	FINE RAD ALT 2 = XXXX. FEET	FINE RAD ALT 2 FAILURE	NULL TESTED TO BE <±10 FT.	FAILED RAD ALT-2 FINE DATA. FAILED ASSOC. DFGC.	>0.2 <0.7 VAC	R50-322B/46, 47 J103A/55, 56	34-45-02 34-45-02
192	ELEV SYNC A = XX.XX DEGREES	ELEV SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
193	ELEV SYNC B = XX.XX DEGREES	ELEV SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED ELEV SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
194	AIL SYNC A = XX.XX DEGREES	AIL SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED AIL SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
195	AIL SYNC B = XX.XX DEGREES	AIL SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED AIL SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
196	RUD SYNC A = XX.XX DEGREES	RUD SYNC A FAILURE	NULL TESTED TO BE < ±1°.	FAILED RUD SERVO SYNCHRO A. FAILED ASSOC. DFGC.	<0.21 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
197	RUD SYNC B = XX.XX DEGREES	RUD SYNC B FAILURE	NULL TESTED TO BE < ±1°.	FAILED RUD SERVO SYNCHRO B. FAILED ASSOC. DFGC.	<0.21 VAC	P10-424/J, S J104B/86, 86	22-13-12 22-13-12
198	YAW DAMP POS = XX.XX DEGREES	YAW DAMP POS FAILURE	NULL TESTED TO BE < ±1°.	FAILED YAW DAMP ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	<0.21 VAC	P10-46/V, W J103B/45, 46	22-13-12 22-13-12
199	MACH TRIM POS = XX.XX INCH	MACH TRIM POS FAILURE	NULL TESTED TO BE < ±.1 INCH.	1 FAILED MACH TRIM ACTUATOR SYNCHRO. FAILED ASSOC. DFGC.	>5.0 <6.8 VAC	P10-44/V, W J103B/58, 59	22-21-11 22-21-11
200	ELEV TACH A = XX.XX DEG/SEC	ELEV TACH A FAILURE	NULL TESTED TO BE < ±2%/SEC.	FAILED ELEV TACH A. FAILED ASSOC. DFGC.	<0.53 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

1 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-845 (Sheet 2 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
201	ELEV TACH B = XX.XX DEG/SEC	ELEV TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED ELEV TACH B. FAILED ASSOC. DFGC.	<0.53 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
202	AIL TACH A = XX.XX DEG/SEC	AIL TACH A FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED A/L TACH A. FAILED ASSOC. DFGC.	<0.68 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
203	AIL TACH B = XX.XX DEG/SEC	AIL TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED AIL TACH B. FAILED ASSOC. DFGC.	<0.68 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
204	RUD TACH A = XX.XX DEG/SEC	RUD TACH A FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED RUD TACH A. FAILED ASSOC. DFGC.	<0.65 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
205	RUD TACH B = XX.XX DEG/SEC	RUD TACH B FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED RUD TACH B. FAILED ASSOC. DFGC.	<0.65 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
206	A/T TACH = XX.XX DEG/SEC	A/T TACH FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED A/T TACH. FAILED ASSOC. DFGC.	<3.2 VAC	P10-430/M, N J103B/33, 34	22-31-14 22-31-14
207	MACH TRIM TACH = XX.XX IN/SEC	MACH TRIM TACH FAILURE	NULL TESTED TO BE < ±.1 INCH/SEC.	FAILED MACH TRIM TACH. 1 FAILED ASSOC. DFGC.	<0.54 VAC	P10-44/T, U J103B/56, 57	22-21-11 22-21-11
208	YAW DAMP TACH = XX.XX DEG/SEC	YAW DAMP TACH FAILURE	NULL TESTED TO BE < ± 2°/SEC.	FAILED YAW DAMP TACH. FAILED ASSOC. DFGC.	<0.28 VAC	P10-46/T, U J103B/43, 44	22-13-12 22-13-12
209	D3A-X ACCEL A = XX.XX FT/SEC *2	D3A-X ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.2	FAILED D3A ACCEL A-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/a, Z J101B/57, 58	22-19-11 22-19-11
210	D3A-X ACCEL B = XX.XX FT/SEC *2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.2	FAILED D3A ACCEL B-X AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
211	D3A-Y ACCEL A = XX.XX FT/SEC *2	D3A-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC.2	FAILED D3A ACCEL A-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-414/c, b J101B/61, 62	22-19-11 22-19-11

1 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED, SURFACE DEFLECTION (ELEVATORS FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

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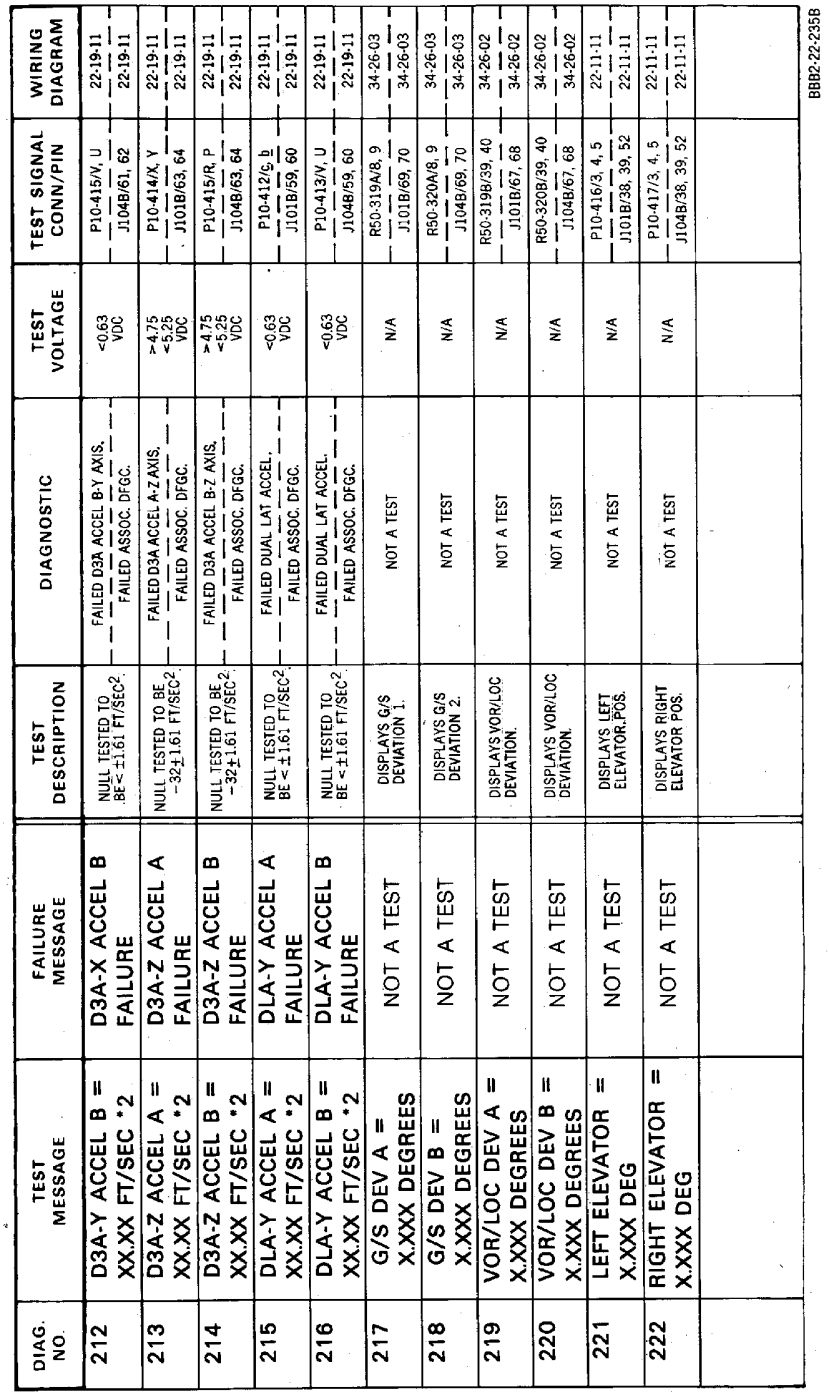
Sequence Four - Sensor Values
Figure 107/22-01-05-990-845 (Sheet 3 of 7)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
212	D3A-Y ACCEL B = XX.XX FT/SEC **2	D3A-X ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Y AXIS. FAILED ASSOC. DFGC.	<0.63 VDC	P10-415/V, U J104B/61, 62	22-19-11 22-19-11
213	D3A-Z ACCEL A = XX.XX FT/SEC **2	D3A-Z ACCEL A FAILURE	NULL TESTED TO BE −32±1.61 FT/SEC**2.	FAILED D3A ACCEL A-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
214	D3A-Z ACCEL B = XX.XX FT/SEC **2	D3A-Z ACCEL B FAILURE	NULL TESTED TO BE −32±1.61 FT/SEC**2.	FAILED D3A ACCEL B-Z AXIS. FAILED ASSOC. DFGC.	>4.75 <5.25 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
215	DLA-Y ACCEL A = XX.XX FT/SEC **2	DLA-Y ACCEL A FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-412/c, b J101B/59, 60	22-19-11 22-19-11
216	DLA-Y ACCEL B = XX.XX FT/SEC **2	DLA-Y ACCEL B FAILURE	NULL TESTED TO BE < ±1.61 FT/SEC**2.	FAILED DUAL LAT ACCEL. FAILED ASSOC. DFGC.	<0.63 VDC	P10-413/V, U J104B/59, 60	22-19-11 22-19-11
217	G/S DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 1.	NOT A TEST	N/A	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
218	G/S DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS G/S DEVIATION 2.	NOT A TEST	N/A	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
219	VOR/LOC DEV A = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
220	VOR/LOC DEV B = X.XXX DEGREES	NOT A TEST	DISPLAYS VOR/LOC DEVIATION.	NOT A TEST	N/A	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
221	LEFT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS LEFT ELEVATOR POS.	NOT A TEST	N/A	P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
222	RIGHT ELEVATOR = X.XXX DEG	NOT A TEST	DISPLAYS RIGHT ELEVATOR POS.	NOT A TEST	N/A	P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-845 (Sheet 4 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
223	LEFT AILERON XX.XX DEG	NOT A TEST	DISPLAYS LEFT AILERON POS.	NOT A TEST	N/A	P10-396/3, 4, 5 J101B/49,50, 51	22-12-11 22-12-11
224	RUDDER POS = XX.XX DEG	NOT A TEST	DISPLAYS RUDDER POS.	NOT A TEST	N/A	P10-429/3, 4, 5 J104B/46, 47,48	22-13-11 22-13-11
225	HOR STAB = XX.XX DEG	NOT A TEST	DISPLAYS HOR STAB POS.	NOT A TEST	N/A	P10-418/3, 4, 5 J104B/43, 44, 45	22-11-11 22-11-11
226	ANGLE OF ATT -1 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-1.	NOT A TEST	N/A	P1-648/M, N, P J101B/26, 27, 28	22-31-11 22-31-11
227	ANGLE OF ATT -2 = XX.XX DEGREES	NOT A TEST	DISPLAYS ANGLE OF ATTACK SENSOR-2.	NOT A TEST	N/A	P1-649/M, N, P J104B/26, 27, 28	22-31-11 22-31-11
228	EPR LEFT = X.XXX EPR	NOT A TEST	DISPLAYS LEFT EPR TRANSMITTER.	NOT A TEST	N/A	P1-613/D, E, F J101B/32, 33, 34	34-18-12 34-18-12
229	EPR RIGHT = X.XXX EPR	NOT A TEST	DISPLAYS RIGHT EPR TRANSMITTER.	NOT A TEST	N/A	P1-614/D, E, F J104B/32, 33, 34	34-18-12 34-18-12
230	HEADING 1 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-1 DATA.	NOT A TEST	N/A	P10-432/q, r, w J101B/15, 16, 17	34-22-03 34-22-03
231	HEADING 2 = XXX.X DEGREES	NOT A TEST	DISPLAYS HEADING-2 DATA.	NOT A TEST	N/A	P10-410/q, r, s J104B/15, 16, 17	34-22-04 34-22-04
232	LEFT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS LEFT FLAP POSITION.	NOT A TEST	N/A	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
233	RIGHT FLAP POS = XX.XX DEGREES	NOT A TEST	DISPLAYS RIGHT FLAP POSITION.	NOT A TEST	N/A	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-845 (Sheet 5 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
234	FLAP HANDLE = XX.XX DEGREES	NOT A TEST	DISPLAYS FLAP HANDLE POSITION.	NOT A TEST	N/A	T2-10/1,2,3 J104B/40, 41, 42	22-31-11 22-31-11
235	CADC-T ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
236	CADC-N ALT NCR = XXXX. FEET	NOT A TEST	DISPLAYS NON-ASSOC. CADC NON CORRECTED ALTITUDE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
237	CADC-T TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS ASSOC. CADC TAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
238	CADC-N TAT = XX.XX DEGREES	NOT A TEST	DISPLAYS NON-ASSOC. TAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
239	CADC-T ALT RATE= XX.XX FT/SEC	NOT A TEST	DISPLAYS ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
240	CADC-N ALT RATE = XX.XX FT/SEC	NOT A TEST	DISPLAYS NON-ASSOC. CADC ALT RATE.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
241	CADC-T SAT = XX.XX DEGREES	NOT A TEST	VERIFIES ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
242	CADC-N SAT = XX.XX DEGREES	NOT A TEST	VERIFIES NON-ASSOC. CADC SAT.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J104A/92, 93	34-16-12 34-16-12
243	CADC-T CAS = XXX.X KNOT	NOT A TEST	VERIFIES ASSOC. CADC CAS.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40, J101A/92, 93	34-16-12 34-16-12
244	CADC-N CAS = XXX.X KNOT	NOT A TEST	VERIFIES NON-ASSOC. CAS.	NOT A TEST	N/A	R50-280B/60, 61, R50-283B/60, 61, J101A/92, 93	34-16-12 34-16-12

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

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Sequence Four - Sensor Values
Figure 107/22-01-05-990-845 (Sheet 6 of 7)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
245	CADC-T MACH= X.XXXX MACH	NOT A TEST	DISPLAYS ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/39, 40, R50-283B/39, 40	34-16-12
						J101A/92, 93	34-16-12
246	CADC-N MACH= X.XXXX MACH	NOT A TEST	DISPLAYS NON-ASSOC. CADC MACH.	NOT A TEST	N/A	R50-280B/61, 62, R50-283B/61,62	34-16-12
						J104A/92, 93	34-16-12
551 △-1	CAPT PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -1	NOT A TEST	N/A	N/A	
552 △-1	F/O PFD DH= ±XXX. FEET	NOT A TEST	DISPLAYS DECISION HEIGHT -2	NOT A TEST	N/A	N/A	
*247	SET BAROMETER TO 26.00-VERIFY	ALT CORRECTION FAILURE	CHECKS BARO SET TO 26.00	BARO POT FAILURE	9.8 V	J102B/75, 79	
				ASSOC. DFGC. FAILURE	5.12 V	J102B/79	

NOTE: DURING CADC TEST, THE LETTER T STANDS FOR CADC ON TEST SIDE AND THE LETTER N STANDS FOR CADC ON NON-TEST SIDE.

△-1 -973 AND SUBSEQUENT IF MABH OPTION SELECTED.

*IF DISPLAY OPTION SELECTED, TEST MESSAGE IS "ALT CORRECTION = ± XXXX.X FEET" TEST DESCRIPTION IS: DISPLAYS QNH CORRECTED ALTITUDE.

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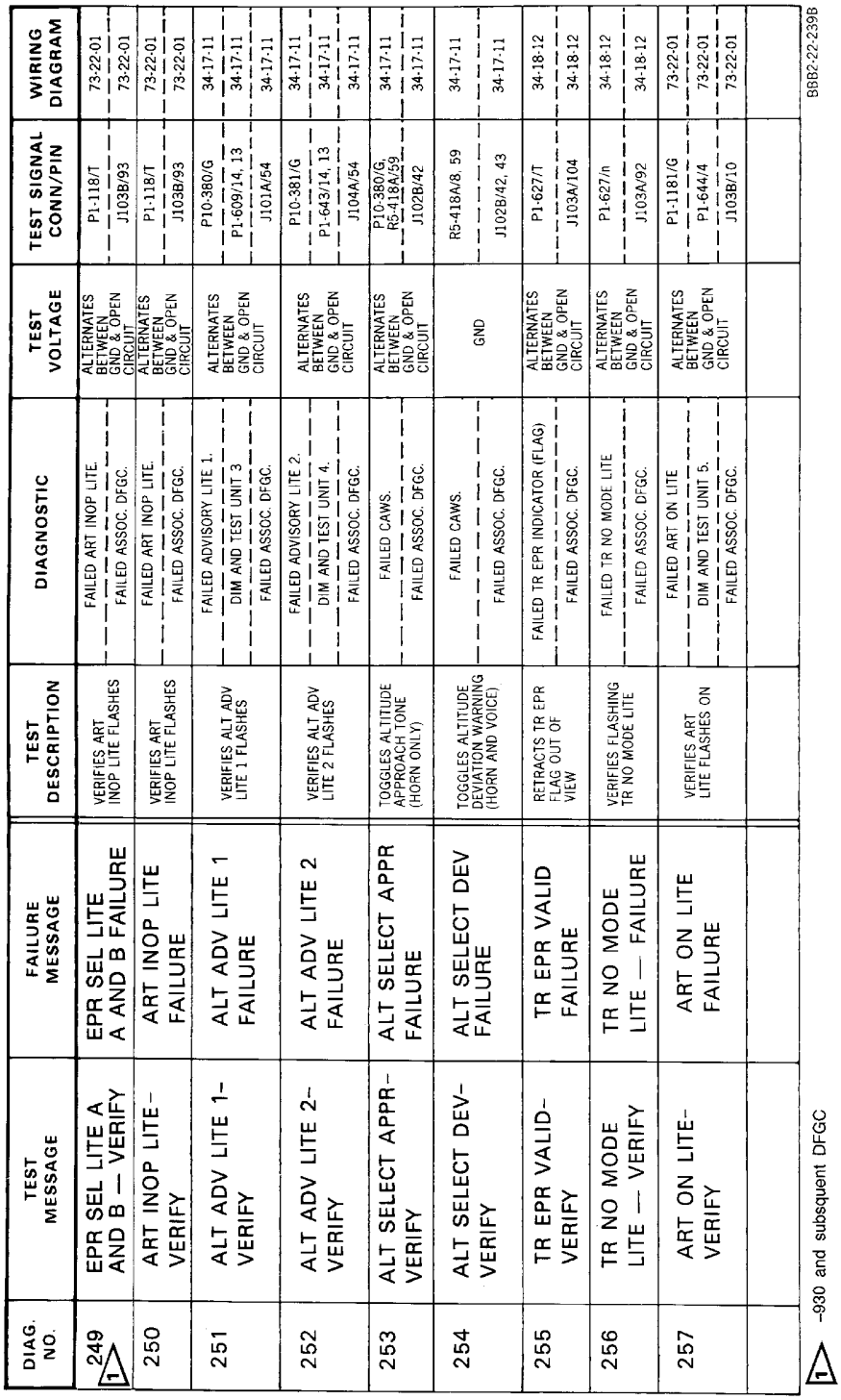
Sequence Four - Sensor Values
Figure 107/22-01-05-990-845 (Sheet 7 of 7)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
249 (1)	EPR SEL LITE A AND B — VERIFY	EPR SEL LITE A AND B FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
250	ART INOP LITE – VERIFY	ART INOP LITE FAILURE	VERIFIES ART INOP LITE FLASHES	FAILED ART INOP LITE. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-118/T J103B/93	73-22-01 73-22-01
251	ALT ADV LITE 1 – VERIFY	ALT ADV LITE 1 FAILURE	VERIFIES ALT ADV LITE 1 FLASHES	FAILED ADVISORY LITE 1. DIM AND TEST UNIT 3 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G P1-609/14, 13 J101A/54	34-17-11 34-17-11 34-17-11
252	ALT ADV LITE 2 – VERIFY	ALT ADV LITE 2 FAILURE	VERIFIES ALT ADV LITE 2 FLASHES	FAILED ADVISORY LITE 2. DIM AND TEST UNIT 4. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-381/G P1-643/14, 13 J104A/54	34-17-11 34-17-11 34-17-11
253	ALT SELECT APPR – VERIFY	ALT SELECT APPR FAILURE	TOGGLES ALTITUDE APPROACH TONE (HORN ONLY)	FAILED CAWS. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P10-380/G, R5-418A/59 J102B/42	34-17-11 34-17-11 34-17-11
254	ALT SELECT DEV – VERIFY	ALT SELECT DEV FAILURE	TOGGLES ALTITUDE DEVIATION WARNING (HORN AND VOICE)	FAILED CAWS. FAILED ASSOC. DFGC.	GND	R5-418A/8, 59 J102B/42, 43	34-17-11 34-17-11
255	TR EPR VALID – VERIFY	TR EPR VALID FAILURE	RETRACTS TR EPR FLAG OUT OF VIEW	FAILED TR EPR INDICATOR (FLAG) FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/T J103A/104	34-18-12 34-18-12
256	TR NO MODE LITE — VERIFY	TR NO MODE LITE — FAILURE	VERIFIES FLASHING TR NO MODE LITE	FAILED TR NO MODE LITE FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-627/n J103A/92	34-18-12 34-18-12
257	ART ON LITE – VERIFY	ART ON LITE FAILURE	VERIFIES ART LITE FLASHES ON	FAILED ART ON LITE DIM AND TEST UNIT 5. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & OPEN CIRCUIT	P1-1181/G P1-644/4 J103B/10	73-22-01 73-22-01 73-22-01

(1) –930 and subsequent DFGC

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Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-846 (Sheet 1 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
258	ART READY LITE-VERIFY	ART READY LITE FAILURE	VERIFIES ART READY LITE FLASHES.	FAILED ART READY LITE DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P1-1181/14 P1-607/22 J103B/66	73-22-01 73-22-01 73-22-01
259	NO AUTOLAND LITE A — VERIFY	NO AUTOLAND LITE A FAILURE	VERIFIES NO AUTOLAND LITE A (CAPT'S, FMA).	FAILED CAPT'S FMA (NO AUTOLAND LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/K P1-607/15 J101A/61	22-18-11 22-18-11 22-18-11
260	NO AUTOLAND LITE B — VERIFY	NO AUTOLAND LITE B FAILURE	VERIFIES NO AUTOLAND LITE B (F/O'S FMA).	FAILED F/O'S FMA (NO AUTOLAND LITE B). DIM AND TEST UNIT 2 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-402/K/P10-403/P P1-608/15 J104A/61	22-18-11 22-18-11 22-18-11
261	A/P TRIM LITE A — VERIFY	A/P TRIM LITE A FAILURE	VERIFIES A/P TRIM LITE A (CAPT'S FMA).	FAILED CAPT'S FMA (A/P TRIM LITE A). DIM AND TEST UNIT 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/L P1-607/18 J101A/62	22-18-11 22-18-11 22-18-11
262	A/P TRIM LITE B — VERIFY	A/P TRIM LITE B FAILURE	VERIFIES A/P TRIM LITE B (F/O'S FMA).	FAILED F/O'S FMA (A/P TRIM LITE B). DIM AND TEST UNIT 2. FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28VDC	P10-402/L P1-608/18 J104A/62	22-18-11 22-18-11 22-18-11
263	VERT SPD DETENT-VERIFY	VERT SPD DETENT FAILURE	VERIFIES VERT SPD DETENT	FAILED DFGCP (PITCH WHEEL CLUTCH) FAILED ASSOC. DFGC.	28 VDC	P10-411/f J103A/77	22-11-11 22-11-11
264	IAS BUG 1 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 1 TO 250 KIAS	FAILED CAPT'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-382/a, Y J102A/43, 44	22-31-14 22-31-14
265	IAS BUG 2 250 KIAS — VERIFY	IAS BUG FAILURE	DRIVES IAS BUG 2 TO 250 KIAS	FAILED F/O'S IAS BUG FAILED ASSOC. DFGC.	5,5 VDC	P10-383/a, Y J103A/43, 44	22-31-14 22-31-14

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Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-846 (Sheet 2 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
266	EPR BUG LEFT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES LEFT EPR BUG TO EPR = 1.8	FAILED LEFT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-611/P, N J102A/46, 47	34-18-12 34-18-12
267	EPR BUG RIGHT 1.8 EPR — VERIFY	EPR BUG FAILURE	DRIVES RIGHT EPR BUG TO EPR = 1.8	FAILED RIGHT EPR INDICATOR FAILED ASSOC. DFGC.	7.2 VDC	P1-612/P, N J103A/46, 47	34-18-12 34-18-12
268	EPR LIMIT CMD 1.8 EPR — VERIFY	EPR LIMIT CMD FAILURE	DRIVES EPR LIMIT CMD TO EPR = 1.8	FAILED EPR LIMIT DISPLAY ON TRI FAILED ASSOC. DFGC.	12.97 VDC	P1-627/g, r J102A/49, 50	34-18-12 34-18-12
269	CAPT F/D SW ON — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN ON POSITION.	FAILED CAPT'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
270	CAPT F/D LITE ON — VERIFY 1	CAPT F/D LITE ON FAILURE	VERIFIES CAPT'S FMA FD ANNUNCIATOR.	FAILED CAPT'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATES BETWEEN GND & 28 VDC	P10-400/M P1-607/19, 25 J102B/25	22-17-11 22-17-11 22-17-11
271	CAPT PITCH FD CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO CENTER.	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
272	CAPT PITCH FD NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS CAPT'S PITCH COMMAND TO NOSE UP.	FAILED CAPT'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-257/C, D J102A/57, 58	34-25-11 34-25-11
273	CAPT ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S ROLL COMMAND TO CENTER.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
274	CAPT ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS CAPT'S TO ROLL COMMAND RIGHT.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-257/F, E J102A/59, 60	34-25-11 34-25-11
275	CAPT F/D SW OFF — VERIFY	CAPT F/D SW FAILURE	VERIFIES CAPT'S FD SWITCH IN OFF POSITION.	FAILED CAPT'S FD SWITCH. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, D J102A/32, J103A/87	22-15-11 22-15-11
276	F/O F/D SW ON — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN ON POSITION.	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	GND	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11

1 IF F/D BLUE LIGHT OBLITERATED PRESS VERIFY AND CONTINUE.

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Sequence Five - Cockpit Displays
Figure 108/22-01-05-990-846 (Sheet 3 of 5)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
277	F/O F/D LITE ON — VERIFY [2]	F/O F/D LITE ON FAILURE	VERIFIES F/O'S FMA FD ANNUNCIATOR.	FAILED F/O'S FD LITE FAILED DIM & TEST UNIT NO. 1 FAILED ASSOC. DFGC.	ALTERNATE BETWEEN GND & 28VDC	P10-402/M P1-6441/19,25 J103A/25	22-17-11 22-17-11 22-17-11
278	F/O PITCH F/D CENTER — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
279	F/O PITCH F/D NOSE UP — VERIFY	PITCH F/D FAILURE	COMMANDS F/O'S PITCH COMMAND TO NOSE UP.	FAILED F/O'S ADI FAILED ASSOC. DFGC.	0.76 VDC	P10-262/C, D J103A/57, 58	34-25-11 34-25-11
280	F/O ROLL F/D CENTER — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND TO CENTER.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
281	F/O ROLL F/D RIGHT — VERIFY	ROLL F/D FAILURE	COMMANDS F/O'S ROLL COMMAND RIGHT.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	0.76 VDC	P10-262/E, F J103A/59, 60	34-25-11 34-25-11
282	F/O F/D SW OFF — VERIFY	F/O F/D SW FAILURE	VERIFIES F/O'S FD SWITCH IN OFF POSITION	FAILED F/O'S FD SWITCH FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-411/L, C J102A/32, J103A/86	22-15-11 22-15-11
283	FAST/SLOW 1 VALID — VERIFY	FAST/SLOW 1 VALID FAILURE	TOGGLES FAST/SLOW VALID ON CAPT'S ADI.	FAILED CAPT'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-257/A J101A/55	22-31-13 22-31-13
284	FAST/SLOW 2 VALID — VERIFY	FAST/SLOW 2 VALID FAILURE	TOGGLES FAST/SLOW VALID ON F/O'S ADI.	FAILED F/O'S ADI. FAILED ASSOC. DFGC.	28 VDC	P10-262/A J104A/55	22-31-13 22-31-13
285	BOTH SPEED CMDS CENTER — VERIFY	F/S CMD FAILURE	COMMANDS CAPT'S AND F/O'S SPD CMD BUG TO CENTER.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62 [1]	22-31-13 22-31-13
286	BOTH SPEED CMDS UP — VERIFY	F/S CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG UP.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	+1.18 VDC	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62 [1]	22-31-13 22-31-13

[1] J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW-FAST-2S.

[2] IF F/D BLUE LIGHT OBLITERATED PRESS VERIFY AND CONTINUE.

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Sequence Five - Cockpit Displays
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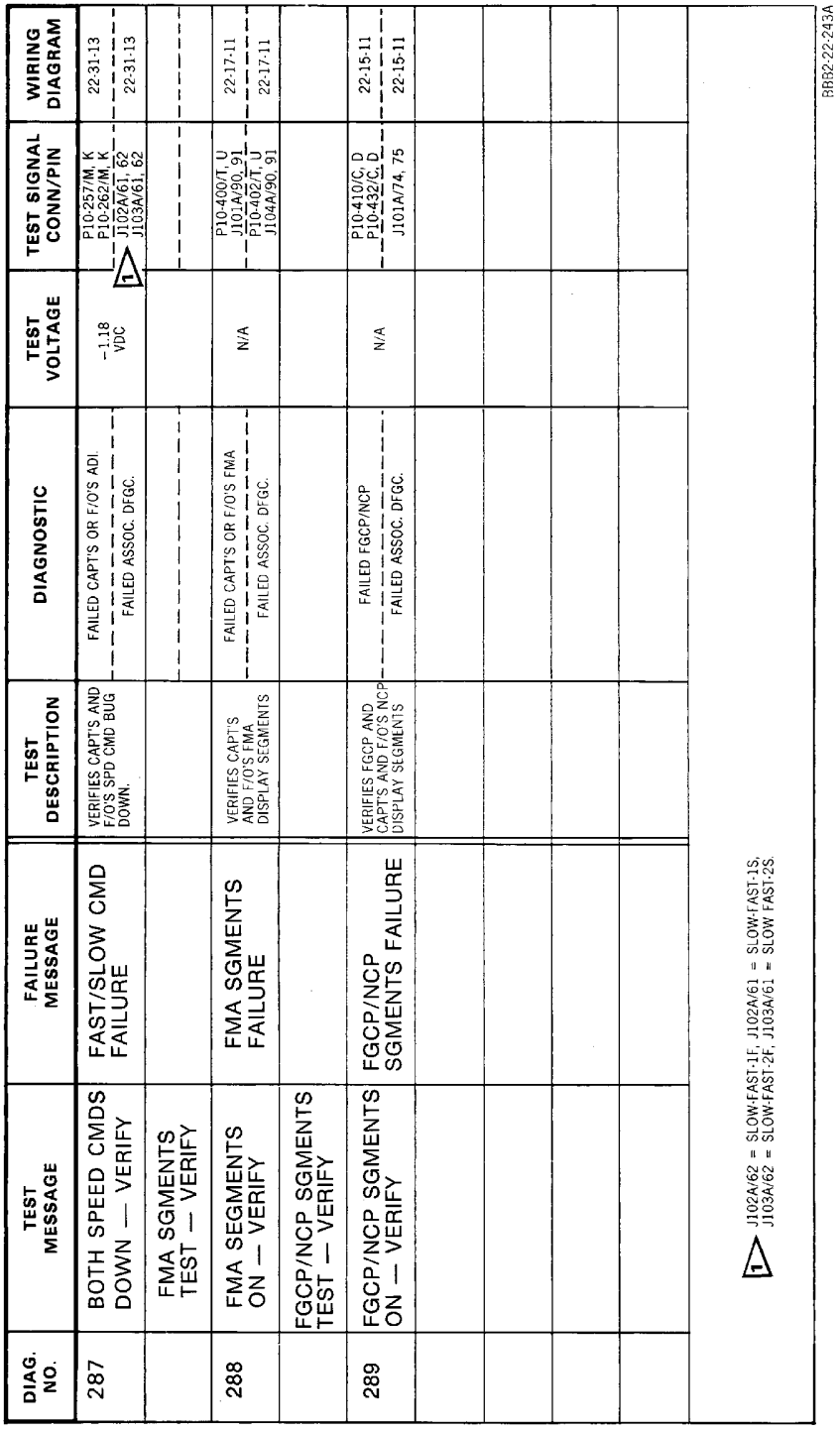

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
287	BOTH SPEED CMDS DOWN — VERIFY	FAST/SLOW CMD FAILURE	VERIFIES CAPT'S AND F/O'S SPD CMD BUG DOWN.	FAILED CAPT'S OR F/O'S ADI. FAILED ASSOC. DFGC.	−1.18 VDC	P10-257/M, K P10-262/M, K J102A/61, 62 J103A/61, 62	22-31-13 22-31-13
	FMA SGMENTS TEST — VERIFY						
288	FMA SEGMENTS ON — VERIFY	FMA SGMENTS FAILURE	VERIFIES CAPT'S AND F/O'S FMA DISPLAY SEGMENTS	FAILED CAPT'S OR F/O'S FMA FAILED ASSOC. DFGC.	N/A	P10-400/T, U J101A/90, 91 P10-402/T, U J104A/90, 91	22-17-11 22-17-11
	FGCP/NCP SGMENTS TEST — VERIFY						
289	FGCP/NCP SGMENTS ON — VERIFY	FGCP/NCP SGMENTS FAILURE	VERIFIES FGCP AND CAPT'S AND F/O'S NCP DISPLAY SEGMENTS	FAILED FGCP/NCP FAILED ASSOC. DFGC.	N/A	P10-410/C, D P10-432/C, D J101A/74, 75	22-15-11 22-15-11

1. J102A/62 = SLOW-FAST-1F, J102A/61 = SLOW-FAST-1S,
J103A/62 = SLOW-FAST-2F, J103A/61 = SLOW FAST-2S.

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Sequence Five - Cockpit Displays
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DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
312	ENGAGE A/P — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 28 VDC	J101/H SEL 1 J013/H SEL 2 J102A/100	22-14-11 22-14-11
313		A/P OFF FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	1 OPEN CIRCUIT	J101/K SEL 1 J103/K SEL 2 J102A/104	22-14-11 22-14-11
314		AILERON CLUTCH FAILURE	VERIFIES ENGAGEMENT OF AILERON CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/96	24-14-11 22-12-12
315		AILERON CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF AILERON CLUTCH (LO)	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED AILERON SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-420/G J103A-96	22-14-11 22-12-12 22-12-12
316		ELEVATOR CLUTCH FAILURE	VERIFIES ENGAGEMENT OF ELEVATOR CLUTCH (HI).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J102A/95	22-14-11 22-11-12
317		ELEVATOR CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF ELEVATOR CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED ELEVATOR SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-422/G J103A/95	22-14-11 22-11-12 22-11-12
318		RUDDER CLUTCH FAILURE	VERIFIES ENGAGEMENT OF RUDDER CLUTCH (HI).	FAILED A/P ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	J101/H SEL 1 J103/H SEL 2 J103B/77	22-14-11 22-13-12
319		RUDDER CLUTCH FAILURE	VERIFIES DISENGAGEMENT OF RUDDER CLUTCH (LO).	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH. FAILED RUDDER SERVO CLUTCH FAILED ASSOC. DFGC.	GND	J101/H SEL 1, J103/H SEL 2 P10-474/G J103B/78	22-14-11 22-13-12 22-13-12

1 IF STICK PUSHER SERVO ACTUATOR OR JUMPER PLUG R5-2003 IS NOT INSTALLED, A/P ENGAGE SWITCH WILL BE LOCKED OFF.

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Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-847 (Sheet 1 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
320	FMA-1 A/P LITE ON FAILURE	FMA-1 A/P LITE OFF FAILURE	VERIFIES FMA A/P-1 ANNUNCIATOR.	FAILED FMA A/P-1 ANNUNCIATOR; FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-1.	GND	J101/N P1-644/16 J102B/24	22-17-11 22-17-11 22-17-11
321	FMA-2 A/P LITE ON FAILURE	FMA-2 A/P LITE OFF FAILURE	VERIFIES FMA A/P-2 ANNUNCIATOR.	FAILED FMA A/P-2 ANNUNCIATOR; FAILED FMA SELECT LOGIC. FAILED DIM AND TEST UNIT. FAILED DFGC-2.	GND	J101/P P1-644/20 J102B/24	22-17-11 22-17-11 22-17-11
322	ENGAGE A/T — VERIFY	A/T ENGMNT FAILURE	VERIFIES A/T ENGAGE AND ENGAGE LOGIC.	FAILED A/T ENGAGE SWITCH; FAILED SEL 1/2 SWITCH. FAILED ASSOC. DFGC.	28 VDC	P10-432/P J103B/26	22-31-12 22-31-12
323	ENGAGE YAW DAMP — VERIFY	YAW DAMP ENGMNT FAILURE	VERIFIES YAW DAMPER ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED YAW DAMPER ENGAGE SWITCH. FAILED ASSOC. DFGC.	GND	S10-194 J103B/8	22-13-12 22-13-12
324	Y/D OFF LITE OFF — VERIFY	Y/D OFF LITE OFF FAILURE	VERIFIES YAW DAMPER OFF LITE.	FAILED YAW DAMPER OFF LITE. FAILED ASSOC. DFGC.	28 VDC	P1-119/c J103B/B	22-13-12 33-12-00 22-13-12
325	RCVRS TO ILS — VERIFY	NAV 1 TUNING FAILURE	VERIFIES NAV 1 TUNING TO ILS FREQUENCY.	FAILED NAV 1 RCVR. FAILED CAPT'S NCP. FAILED ASSOC. DFGC.	28 VDC	R50-319B/38 P10-407/f J101A/17	34-26-02 34-31-01 34-26-02
326		NAV 2 TUNING FAILURE	VERIFIES NAV 2 TUNING TO ILS FREQUENCY.	FAILED NAV 2 RCVR. FAILED F/O'S NCP. FAILED ASSOC. DFGC.	28 VDC	R50-320B/38 P10-409/f J104A/17	34-26-02 34-31-02 34-26-02

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Sequence Six - Second Setup Interactives
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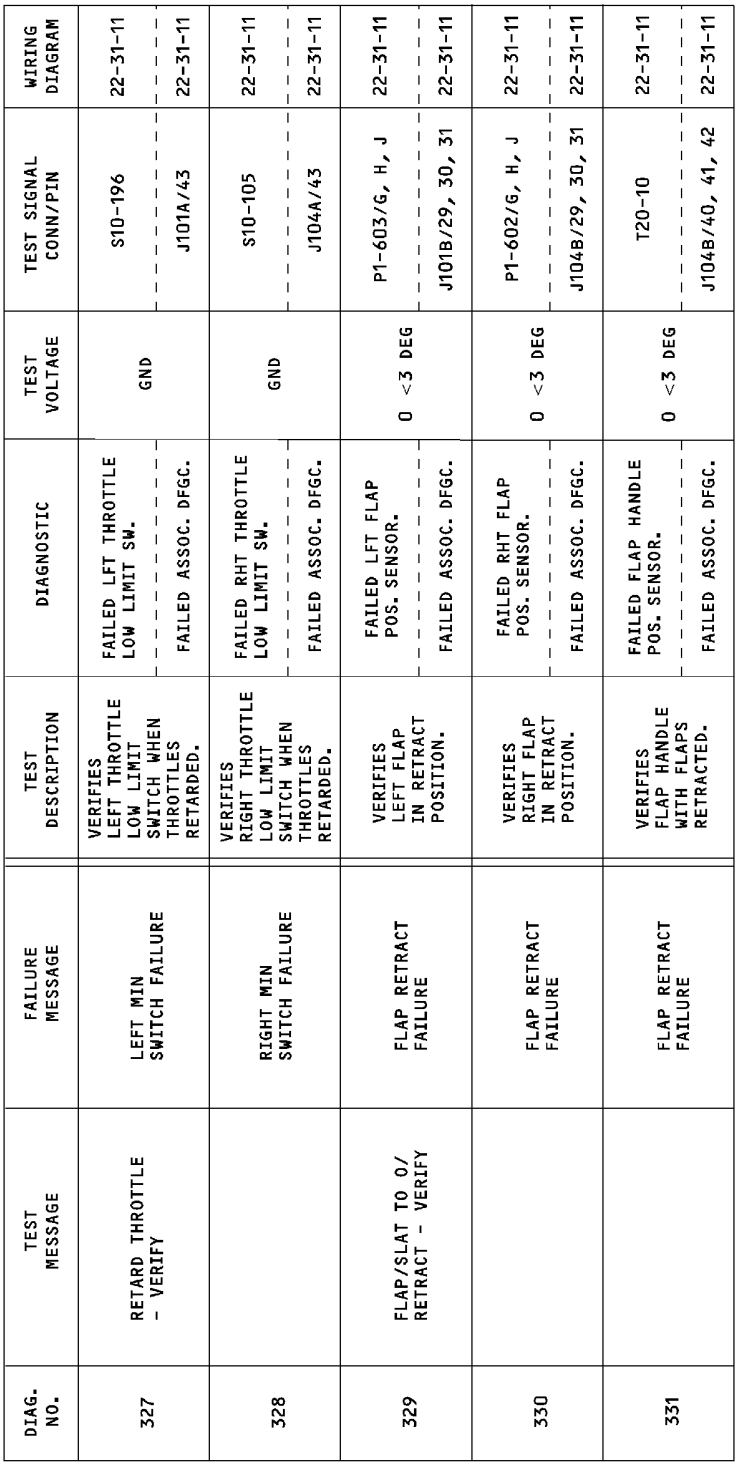

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
327	RETARD THROTTLE - VERIFY	LEFT MIN SWITCH FAILURE	VERIFIES LEFT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED LFT THROTTLE LOW LIMIT SW.	GND	S10-196	22-31-11
				FAILED ASSOC. DFGC.		J101A/43	22-31-11
328		RIGHT MIN SWITCH FAILURE	VERIFIES RIGHT THROTTLE LOW LIMIT SWITCH WHEN THROTTLES RETARDED.	FAILED RHT THROTTLE LOW LIMIT SW.	GND	S10-105	22-31-11
				FAILED ASSOC. DFGC.		J104A/43	22-31-11
329	FLAP/SLAT TO 0/ RETRACT - VERIFY	FLAP RETRACT FAILURE	VERIFIES LEFT FLAP IN RETRACT POSITION.	FAILED LFT FLAP POS. SENSOR.	0 <3 DEG	P1-603/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J101B/29, 30, 31	22-31-11
330		FLAP RETRACT FAILURE	VERIFIES RIGHT FLAP IN RETRACT POSITION.	FAILED RHT FLAP POS. SENSOR.	0 <3 DEG	P1-602/G, H, J	22-31-11
				FAILED ASSOC. DFGC.		J104B/29, 30, 31	22-31-11
331		FLAP RETRACT FAILURE	VERIFIES FLAP HANDLE WITH FLAPS RETRACTED.	FAILED FLAP HANDLE POS. SENSOR.	0 <3 DEG	T20-10	22-31-11
				FAILED ASSOC. DFGC.		J104B/40, 41, 42	22-31-11

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CAG(IGDS)

Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-847 (Sheet 3 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
332 1		ELEV MECH TORQ SWITCH 1 FAILURE	VERIFIES ELEV MECH TORQ SWITCH-1 AT FLAPS = 0 DEGREES.	FAILED ELEV MECH TORQ SW-1. FAILED ASSOC. DFGC.	28 VDC	S10-191 J101A/42	22-11-11 22-11-11
333 1		ELEV MECH TORQ SWITCH 2 FAILURE	VERIFIES ELEV MECH TORQ SWITCH-2 AT FLAPS = 0 DEGREES.	FAILED ELEV MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J104A/42	22-11-11 22-11-11
333 2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SWITCH-2 AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J104A/42	22-11-11 22-11-11
333 3		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SWITCH MONITOR AT FLAPS = 0 DEGREES.	FAILED AIL MECH TORQ SWITCH MONITOR INPUT. FAILED ASSOC. DFGC.	28 VDC	S10-191 J102A/52	
334		SLATS RETRACT FAILURE	VERIFIES LEFT SLAT IN RETRACT POSITION.	FAILED LEFT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 J1B/43 J101A/21	27-81-00 22-31-11 22-31-11
335		SLATS RETRACT FAILURE	VERIFIES RIGHT SLAT IN RETRACT POSITION.	FAILED RIGHT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 J2B/44 J104A/21	27-81-00 22-31-11 22-31-11

1 -930 AND SUBSEQUENT DFGC, ELEV MECH TORQUE IS AILERON MECH TORQUE.
2 -971 AND PRIOR CONFIGURATIONS, OR -972 AND SUBSEQUENT IF AILERON TORQUE MONITOR OPTION NOT SELECTED.
3 -972 AND SUBSEQUENT WITH AILERON TORQUE MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

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Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-847 (Sheet 4 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
336		RTS SLATS FAILURE	COMPARES LEFT AND RIGHT SLATS DURING RTS TEST.	FAILED LEFT SLAT POS. SENSOR. FAILED RIGHT SLAT POS. SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	N/A	D1-55, D1-56 D1-53, D1-54 J1B/43, J2B/44 J101A/21, J104A/21	27-81-00 27-81-00 22-31-11 22-31-11
337		RTS FLAPS FAILURE	VERIFIES LEFT AND RIGHT FLAPS DURING RTS TEST.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	N/A	T2-98 J101B/29, 30, 31	22-31-11 22-31-11
338	FLAPS/SLAT TO 11/ MID 1 — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAP AT 11 DEG.	FAILED LEFT FLAP SYNCRHO. FAILED ASSOC. DFGC.	11 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
339		FLAP POS FAILURE	VERIFIES RIGHT FLAP AT 11 DEG.	FAILED RIGHT FLAP SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11
340		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 11 DEG.	FAILED FLAP HANDLE SYNCHRO. FAILED ASSOC. DFGC.	11 DEG	T20-10 J104B/40, 41, 42	22-31-11 22-31-11
341		SLAT POS FAILURE	VERIFIES LEFT SLAT AT MID POSITION.	FAILED LEFT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 J1B/44 J101A/20	27-81-00 22-31-11 22-31-11
342		SLAT POS FAILURE	VERIFIES RIGHT SLAT AT MID POSITION.	FAILED RIGHT SLAT POS SENSOR. FAILED PROX. SW ELEC. UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 J2B/44 J104A/20	27-81-00 22-31-11 22-31-11
343	FLAP/SLAT TO28/ EXTEND — VERIFY	FLAP POS FAILURE	VERIFIES LEFT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER L (T2-97). FAILED ASSOC. DFGC.	28 DEG	P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
344		FLAP POS FAILURE	VERIFIES RIGHT FLAPS AT 28 DEGREES.	FAILED FLAP TRANSMITTER R (T2-98). FAILED ASSOC. DFGC.	28 DEG	P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11

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Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-847 (Sheet 5 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
345		FLAP POS FAILURE	VERIFIES FLAP HANDLE AT FLAPS = 28°.	FAILED FLAP HANDLE POSITION SENSOR. FAILED ASSOC. DFGC.	28 DEG	T20-10 J104B/40,41,42	22-31-11 22-31-11
346 1		ELEV MECH TORQ SWITCH 1 FAILURE	VERIFIES ELEV MECH TORQ SW-1 AT FLAPS = 28°.	FAILED ELEV MECH TORQ SW-1. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
346 2		AIL MECH TORQ SWITCH 1 FAILURE	VERIFIES AIL MECH TORQ SW-1 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-1. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 1		ELEV MECH TORQ SWITCH 2 FAILURE	VERIFIES ELEV MECH TORQ SW-2 AT FLAPS = 28°.	FAILED ELEV MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 2		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW-2 AT FLAPS = 28°.	FAILED AIL MECH TORQ SW-2. FAILED ASSOC. DFGC.	OPEN CIRCUIT	S10-191 J101A/42	22-11-11 22-11-11
347 3		AIL MECH TORQ SWITCH 2 FAILURE	VERIFIES AIL MECH TORQ SW MONITOR AT 28° FLAPS.	FAILED AIL MECH TORQ SW MONITOR INPUT. FAILED ASSOC. DFGC.	28 VDC	S10-191 J101A/52	
348		SLAT POS FAILURE	VERIFIES LEFT SLAT EXTEND DESCRETE.	FAILED LEFT SLAT POS. SENSOR. FAILED PROX. SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-55, D1-56 R5-466B/55 J101A/22	27-81-00 22-31-11 22-31-11
349		SLAT POS FAILURE	VERIFIES RIGHT SLAT EXTEND DESCRETE.	FAILED RIGHT SLAT POS. SENSOR. FAILED PROX SW ELECT UNIT. FAILED ASSOC. DFGC.	28 VDC	D1-53, D1-54 R5-447B/55 J104A/22	27-81-00 22-31-11 22-31-11

1 -930 AND SUBSEQUENT DFGC, ELEV MECH TORQUE IS AILERON MECH TORQUE.

2 RUN DURING MAINTENANCE TEST ONLY, FOR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION SELECTED (PIN J104A/28 GROUNDED).

3 -971 AND PRIOR CONFIGURATION, OR -972 AND SUBSEQUENT IF AILERON TORQUE LIMIT MONITOR OPTION NOT SELECTED (PIN J104A/28 OPEN).

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Sequence Six - Second Setup Interactives
Figure 109/22-01-05-990-847 (Sheet 6 of 6)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
350	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
351	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
352	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
353	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF UP/LEFT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320B/39, 40 J104B/67, 68	34-26-02 34-26-02
354	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-319A/8, 9 J101B/69, 70	34-26-03 34-26-03
355	TEST IN PROGRESS	NAV 1 SELF-TEST FAILURE	VERIFIES NAV-1 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 1 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-319B/39, 40 J101B/67, 68	34-26-02 34-26-02
356	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (G/S) RCVR. FAILED ASSOC. DFGC.	-75 MVDC	R50-320A/8, 9 J104B/69, 70	34-26-03 34-26-03
357	TEST IN PROGRESS	NAV 2 SELF-TEST FAILURE	VERIFIES NAV-2 RCVR BY MEANS OF DN/RIGHT SELF-TEST DISCRETE.	FAILED NAV 2 (LOC) RCVR. FAILED ASSOC. DFGC.	+75 MVDC	R50-320B/39, 40 J014B/67, 68	34-26-02 34-26-02
358	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID A IS CLEARED AT SELF-TEST.	SHORTED D3A-A ACCEL. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P, Z J101A/24	22-19-11 22-19-11
359	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-X ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-114/Z, a J101B/57, 58	22-19-11 22-19-11

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Sequence Seven - Self Tests
Figure 110/22-01-05-990-848 (Sheet 1 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
360	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-414/X, Y J101B/63, 64	22-19-11 22-19-11
361	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B/61, 62	22-19-11 22-19-11
362	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A VALID IS CLEARED AT SELF-TEST.	SHORTED D3A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-114/P J101A/24	22-19-11 22-19-11
363	TEST IN PROGRESS	D3A-A SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED D3A-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-414/X, Y J104B/61, 62	22-19-11 22-19-11
364	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA VALID A IS CLEARED AT SELF-TEST.	SHORTED DLA-A VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-412/P J101A/37	22-19-11 22-19-11
365	TEST IN PROGRESS	DLA-A SELF-TEST FAILURE	VERIFIES DLA ACCEL A BY MEANS OF ACCEL SELF-TEST DISCRETE A.	FAILED DLA-A ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-412/c, b J101B59, 60	22-11-19 22-11-19
366	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
367	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-X ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-BX VALID. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/T, S J104B/57, 58	22-19-11 22-19-11
368	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	34-45-02 34-45-02

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Sequence Seven - Self Tests
Figure 110/22-01-05-990-848 (Sheet 2 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
369	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Y ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B Y ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-415/U, V J104B/61, 62	22-19-11 22-19-11
370	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-VALID B IS CLEARED AT SELF-TEST.	SHORTED D3A-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-415/L J104A/24	22-19-11 22-19-11
371	TEST IN PROGRESS	D3A-B SELF-TEST FAILURE	VERIFIES D3A-Z ACCEL BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED D3A-B-Z ACCEL. FAILED ASSOC. DFGC.	+9.0 VDC	P10-415/R, P J104B/63, 64	22-19-11 22-19-11
372	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA VALID B IS CLEARED AT SELF-TEST.	SHORTED DLA-B VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	P10-413/L J104A/37	22-19-11 22-19-11
373	TEST IN PROGRESS	DLA-B SELF-TEST FAILURE	VERIFIES DLA ACCEL B BY MEANS OF ACCEL SELF-TEST DISCRETE B.	FAILED DLA-B ACCEL. FAILED ASSOC. DFGC.	-8.6 VDC	P10-413/U, V J104B/59, 60	22-19-11 22-19-11
374	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-1 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/12 J101A/26	34-45-01 34-45-01
375	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/22, 23 J101B/55, 56	34-45-01 34-45-01
376	TEST IN PROGRESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-1 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-321B/57 J101A/39	34-45-01 34-45-01
377	TEST IN PROGESS	R/A 1 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-1 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-321B/46, 47 J102A/55, 56	34-45-01 34-45-01

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Sequence Seven - Self Tests
Figure 110/22-01-05-990-848 (Sheet 3 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
378	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER INST VALID IS CLEARED AT SELF-TEST.	SHORTED R/A-2 INST. VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322B/12 J104A/26	34-45-02 34-45-02
379	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER COURSE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 COURSE DATA. FAILED ASSOC. DFGC.	N/A	R5-322B/22, 23 J104B/55, 56	34-45-02 34-45-02
380	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER A/P VALID IS CLEARED AT SELF-TEST	SHORTED R/A-2 A/P VALID. FAILED ASSOC. DFGC.	OPEN CIRCUIT	R5-322/57 J104A/39	34-45-02 34-45-02
381	TEST IN PROGRESS	R/A 2 SELF-TEST FAILURE	VERIFIES RADIO ALTIMETER FINE DATA BY MEANS OF SELF-TEST DISCRETE.	FAILED R/A-2 FINE DATA. FAILED ASSOC. DFGC.	N/A	R5-322/46, 47 J103A/55, 56	34-45-02 34-45-02

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Sequence Seven - Self Tests
Figure 110/22-01-05-990-848 (Sheet 4 of 4)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
385	A/P ENGAGED — VERIFY	A/P ENGMNT FAILURE	VERIFIES A/P ENGAGE SWITCH AND ENGAGE LOGIC.	FAILED A/P ENGAGE SWITCH, FAILED SEL 1/2 SWITCH.	[1] 28 VDC	J101/H SEL. 1 J103/H SEL. 2	22-14-11
				FAILED ASSOC. DFGC.		J102A/100	22-14-11
386 [3]	WHEEL TURNS RWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A.	[2] +15°±2.5° = +2.45±.51 VAC	P10-419/J, S	22-12-12
				FAILED ASSOC. DFGC.		J101B/83, 84	22-12-12
387		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO. TACH A.	> 1.71 VAC	P10-419/N, P	22-12-12
				FAILED ASSOC. DFGC.		J101B/98, 99	22-12-12
388		AIL SERVO FAILURE	COMMANDS AILERON TO +12 DEG. RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B.	[2] +15°± 2.5° = +2.45±.51 VAC	P10-420/J, S	22-12-12
				FAILED ASSOC. DFGC.		J104B/83, 84	22-12-12
389		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B.	> 1.71 VAC	P10-420/N, P	22-12-12
				FAILED ASSOC. DFGC.		J104B/98, 99	22-12-12
390	WHEEL TURNS RWD — VERIFY	WHEEL RWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO RWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
391		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A.	−5°±1° ≈ −1.03±.2 VAC	P10-419/J, S	22-12-12
				FAILED ASSOC. DFGC.		J101B/83, 84	22-12-12
392		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH TO AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A.	> 1.71 VAC	P10-419/N, P	22-12-12
				FAILED ASSOC. DFGC.		J101B/98, 99	22-12-12

[1] AN INOPERATIVE TORQUE LIMIT RHEOSTAT MAY PREVENT A/P ENGAGEMENT AND CAN CAUSE AN "AIL SERVO FAILURE" MESSAGE TO BE LOGGED IF FLAPS ARE LESS THAN 26 DEGREES. WITH FLAPS MORE THAN 26 DEGREES, THE TORQUE LIMIT RHEOSTAT WILL NOT PREVENT A/P ENGAGEMENT. PLACE FLAPS MORE THAN 26 DEGREES TO VERIFY.

[2] IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE +1.5 ± .25 VAC.

[3] WHEN FLAPS ARE LESS THAN 26 DEGREES AILERON SERVO POWER IS SUPPLIED THROUGH THE AILERON SERVO TORQUE LIMITER RHEOSTAT. FAILURE OF THE RHEOSTAT MAY CAUSE THE CONTROL WHEEL TO OSCILLATE AND THE AUTOPILOT TO DISCONNECT. THE MESSAGE STORED IN FLIGHT FAULTS WILL READ, "AILERON SERVO MODEL FAILURE".

DURING RETURN TO SERVICE OR MAINTENANCE TEST THE AILERON PORTION OF THE TEST WILL CAUSE THE CONTROL WHEEL TO OSCILLATE.

IF THESE SYMPTOMS OCCUR PLACE THE FLAPS TO 28 DEGREES AND REPEAT THE SERVO TESTS. IF THE SYMPTOMS HAVE BEEN CORRECTED, CHECK THE RHEOSTAT.

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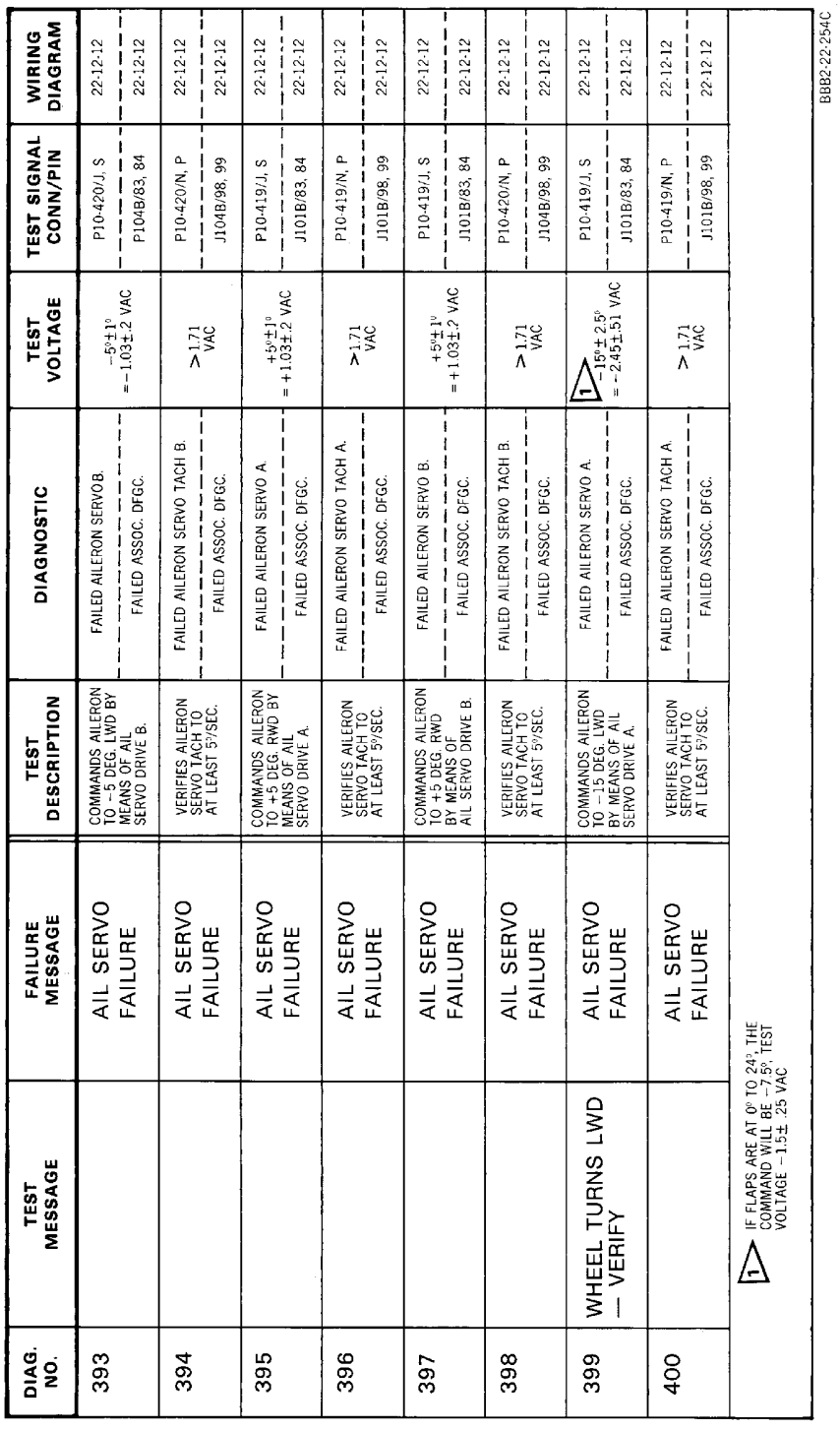
Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 1 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
393		AIL SERVO FAILURE	COMMANDS AILERON TO −5 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-420/J, S P104B/83, 84	22-12-12 22-12-12
394		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
395		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG. RWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
396		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12
397		AIL SERVO FAILURE	COMMANDS AILERON TO +5 DEG RWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
398		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
399	WHEEL TURNS LWD — VERIFY	AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE A.	FAILED AILERON SERVO A. FAILED ASSOC. DFGC.	1 −15°±2.5° = −2.45±.51 VAC	P10-419/J, S J101B/83, 84	22-12-12 22-12-12
400		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-419/N, P J101B/98, 99	22-12-12 22-12-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE −1.5±.25 VAC

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 2 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
401		AIL SERVO FAILURE	COMMANDS AILERON TO −15 DEG. LWD BY MEANS OF AIL SERVO DRIVE B.	FAILED AILERON SERVO B. FAILED ASSOC. DFGC.	1 −15°±2.5° = −2.45±.51 VAC	P10-420/J, S J104B/83, 84	22-12-12 22-12-12
402		AIL SERVO FAILURE	VERIFIES AILERON SERVO TACH AT LEAST 5°/SEC.	FAILED AILERON SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-420/N, P J104B/98, 99	22-12-12 22-12-12
403		WHEEL LWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO LWD.	FAILED WHEEL LINKAGE OR REVERSE WHEEL POLARITY.	N/A	N/A	N/A
404	COLUMN MOVES FWD — VERIFY	ELV SERVO FAILURE	COMMANDS ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
405		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
406		ELV SERVO FAILURE	COMMAND ELEVATOR TO +15 DEG. NOSE DOWN BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-420/J, S J104B/80, 81	22-11-12 22-11-12
407		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12

1 IF FLAPS ARE AT 0° TO 24°, THE COMMAND WILL BE −7.5°, TEST VOLTAGE −1.5±.25 VAC

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 3 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
408		COLUMN FWD FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE DOWN.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A
409		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$-5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
410		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
411		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	$-5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
412		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
413		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	$+5^{\circ}\pm1^{\circ}$ = $-1.03\pm.2$ VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
414		ELV SERVO FAILURE	VERIFIES SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12

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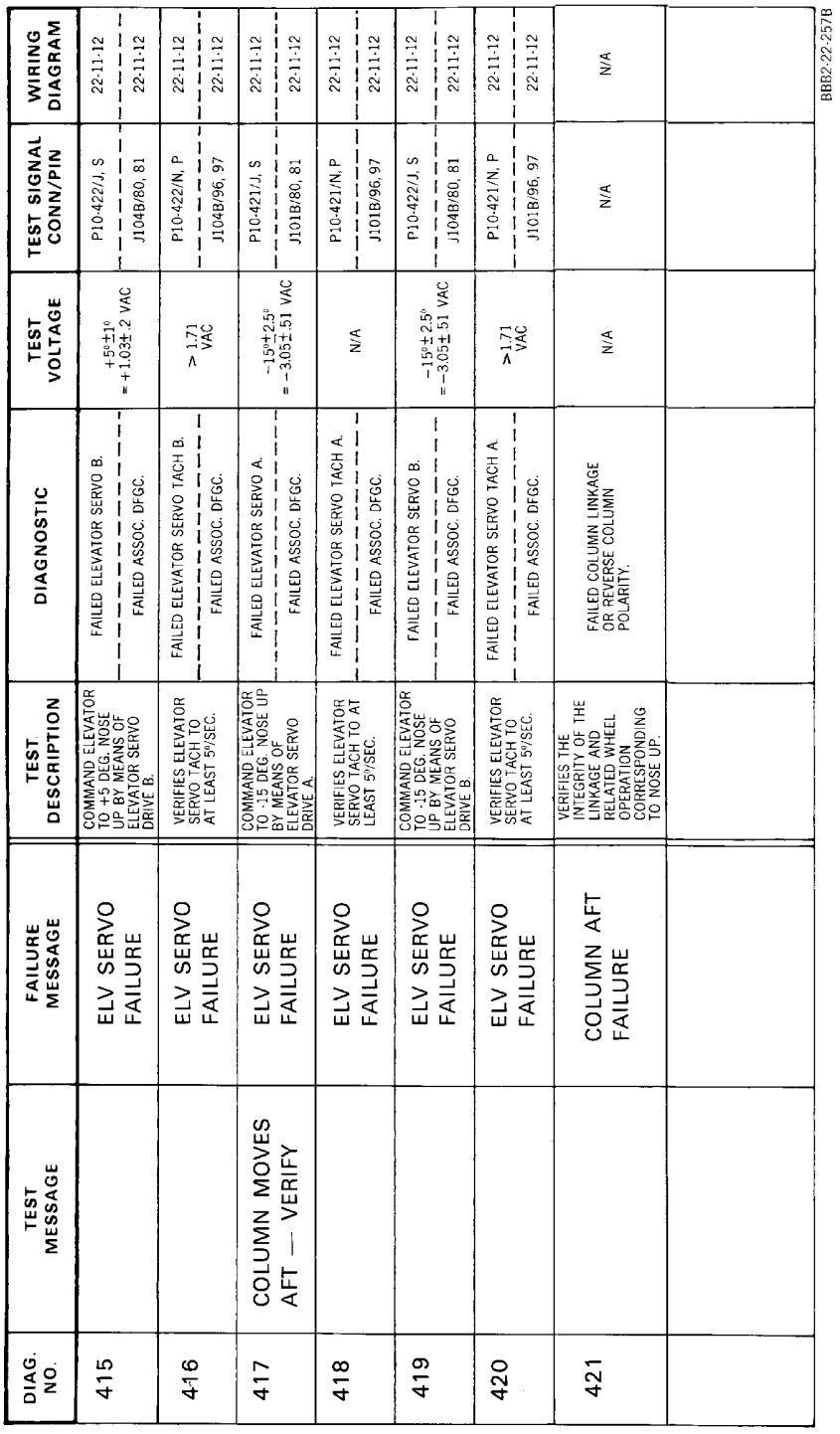
Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 4 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
415		ELV SERVO FAILURE	COMMAND ELEVATOR TO +5 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
416		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-422/N, P J104B/96, 97	22-11-12 22-11-12
417	COLUMN MOVES AFT — VERIFY	ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE A.	FAILED ELEVATOR SERVO A. FAILED ASSOC. DFGC.	-15°±2.5° = -3.05±.51 VAC	P10-421/J, S J101B/80, 81	22-11-12 22-11-12
418		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
419		ELV SERVO FAILURE	COMMAND ELEVATOR TO -15 DEG. NOSE UP BY MEANS OF ELEVATOR SERVO DRIVE B.	FAILED ELEVATOR SERVO B. FAILED ASSOC. DFGC.	-15°±2.5° = -3.05±.51 VAC	P10-422/J, S J104B/80, 81	22-11-12 22-11-12
420		ELV SERVO FAILURE	VERIFIES ELEVATOR SERVO TACH TO AT LEAST 5°/SEC.	FAILED ELEVATOR SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-421/N, P J101B/96, 97	22-11-12 22-11-12
421		COLUMN AFT FAILURE	VERIFIES THE INTEGRITY OF THE LINKAGE AND RELATED WHEEL OPERATION CORRESPONDING TO NOSE UP.	FAILED COLUMN LINKAGE OR REVERSE COLUMN POLARITY.	N/A	N/A	N/A

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 5 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
422	RHT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMANDS RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	−15°±2.5 = −3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
423		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
424		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO −15 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	−15°+2.5° = −3.05±.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
425		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
426		RHT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A RIGHT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
427		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
428		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	> 1.71 VAC	P10-423/N, P J104B/89, 90	22-13-12 22-13-12

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 6 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
429		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +5 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	+5°±1° = +1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
430		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
431		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO −5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
432		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	N/A	P10-423/N, P J101B/89, 90	22-13-12 22-13-12
433		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO -5 DEG. RIGHT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC. DFGC.	−5°±1° = −1.03±.2 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
434		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC. DFGC.	>1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
435	LEFT PEDAL MOVES FWD — VERIFY	PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG. LEFT TURN BY MEANS OF RUDDER SERVO DRIVE A.	FAILED PARALLEL RUDDER SERVO A. FAILED ASSOC. DFGC.	+15°±2.5° = +3.05±.51 VAC	P10-423/J, S J101B/86, 87	22-13-12 22-13-12
436		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH A. FAILED ASSOC. DFGC.	>1.71 VAC	P10-423/N, P J101B/89, 90	22-13-12 22-13-12

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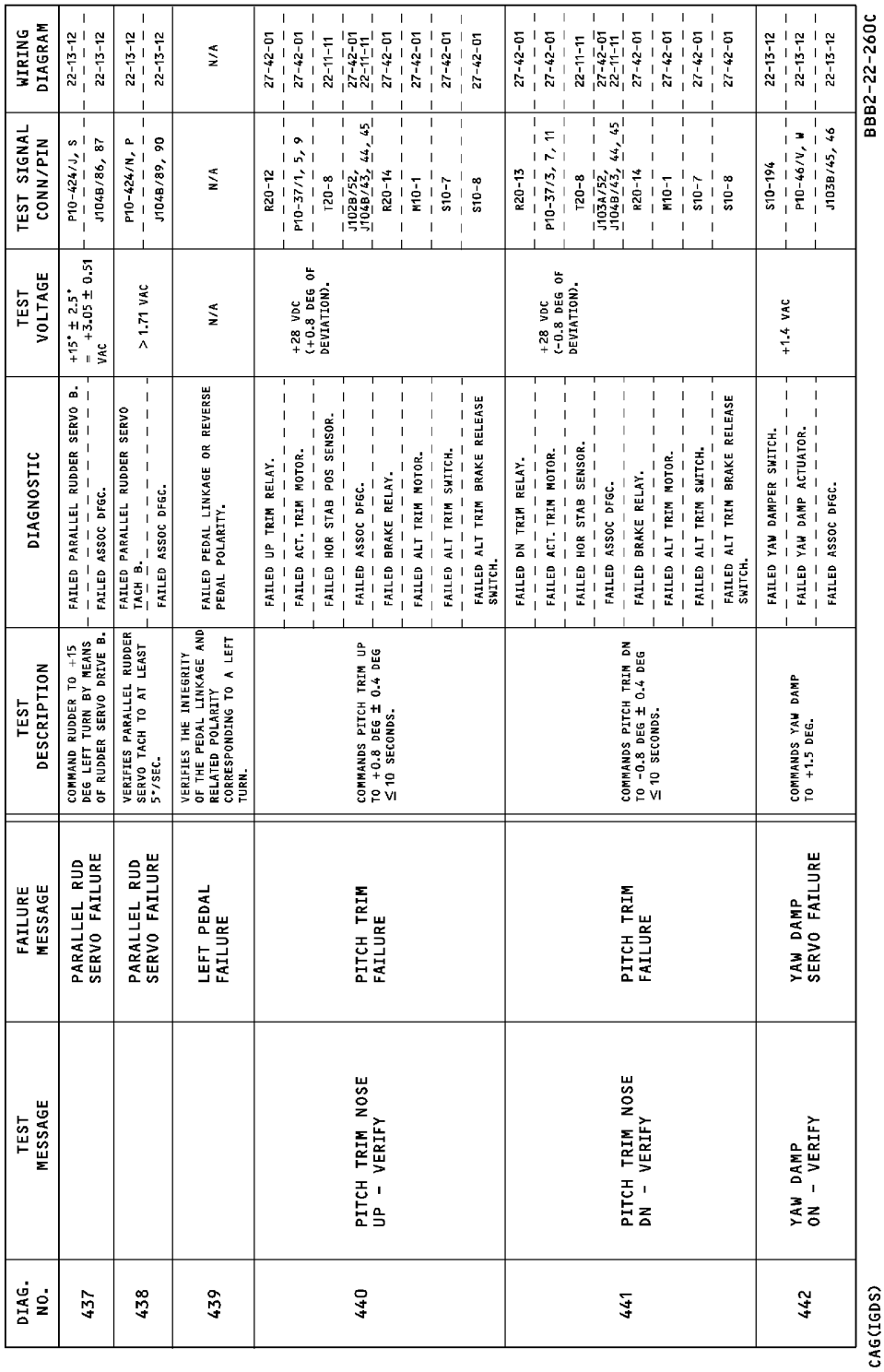
Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 7 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
437		PARALLEL RUD SERVO FAILURE	COMMAND RUDDER TO +15 DEG LEFT TURN BY MEANS OF RUDDER SERVO DRIVE B.	FAILED PARALLEL RUDDER SERVO B. FAILED ASSOC DFGC.	+15° ± 2.5° = +3.05 ± 0.51 VAC	P10-424/J, S J104B/86, 87	22-13-12 22-13-12
438		PARALLEL RUD SERVO FAILURE	VERIFIES PARALLEL RUDDER SERVO TACH TO AT LEAST 5°/SEC.	FAILED PARALLEL RUDDER SERVO TACH B. FAILED ASSOC DFGC.	> 1.71 VAC	P10-424/N, P J104B/89, 90	22-13-12 22-13-12
439		LEFT PEDAL FAILURE	VERIFIES THE INTEGRITY OF THE PEDAL LINKAGE AND RELATED POLARITY CORRESPONDING TO A LEFT TURN.	FAILED PEDAL LINKAGE OR REVERSE PEDAL POLARITY.	N/A	N/A	N/A
440	PITCH TRIM NOSE UP - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM UP TO +0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED UP TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB POS SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (+0.8 DEG OF DEVIATION).	R20-12 P10-37/1, 5, 9 T20-8 J102B/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01 27-42-01
441	PITCH TRIM NOSE DN - VERIFY	PITCH TRIM FAILURE	COMMANDS PITCH TRIM DN TO -0.8 DEG ± 0.4 DEG ≤ 10 SECONDS.	FAILED DN TRIM RELAY. FAILED ACT. TRIM MOTOR. FAILED HOR STAB SENSOR. FAILED ASSOC DFGC. FAILED BRAKE RELAY. FAILED ALT TRIM MOTOR. FAILED ALT TRIM SWITCH. FAILED ALT TRIM BRAKE RELEASE SWITCH.	+28 VDC (-0.8 DEG OF DEVIATION).	R20-13 P10-37/3, 7, 11 T20-8 J103A/52, J104B/43, 44, 45 R20-14 M10-1 S10-7 S10-8	27-42-01 27-42-01 22-11-11 27-42-01 22-11-11 27-42-01 27-42-01 27-42-01 27-42-01
442	YAW DAMP ON - VERIFY	YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO +1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC DFGC.	+1.4 VAC	S10-194 P10-46/V, W J103B/45, 46	22-13-12 22-13-12 22-13-12

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Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 8 of 10)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
443		YAW DAMP SERVO FAILURE	COMMANDS YAW DAMP TO -1.5 DEG.	FAILED YAW DAMPER SWITCH. FAILED YAW DAMP ACTUATOR. FAILED ASSOC. DFGC.	-1.4 VAC	S10-194 P10-46/V, W J103B/45, 46	22-13-12 22-13-12 22-13-12
444 ⚠1	MACH TRIM NORM — VERIFY	MACH TRIM SERVO FAILURE	COMMANDS MACH TRIM TO +0.9 INCHES.	FAILED MTC SWITCH. FAILED MACH TRIM ACTUATOR. ⚠2 FAILED ASSOC. DFGC.	+9.6 VAC	S10-188 P10-44/V, W J103B/58, 59	22-21-11 22-21-11 22-21-11
445	A/T ENGAGED — VERIFY	A/T FAILURE	RETARDS THROTTLES BY COMMANDING -6°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-9.5 VAC ±1.6 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
446		A/T FAILURE	ADVANCES THROTTLES BY COMMANDING +2°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+3.2 VAC ± .65 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
447		A/T FAILURE	RETARD THROTTLES BY COMMANDING -1½°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	-1.6 VAC ± .33 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14
448		A/T FAILURE	ADVANCE THROTTLES BY COMMANDING +8°/SEC.	FAILED A/T CLAMP RELAY. FAILED A/T SERVO DRIVE. FAILED ASSOC. DFGC.	+12.6 VAC ±2.0 VAC	R20-101 P10-430/M, N J103B/33, 34	22-31-14 22-31-14 22-31-14

⚠1 A FAILURE IN MACH TRIM MAY BE CAUSED BY INADEQUATE GROUND POWER.

⚠2 PRIOR TO CHANGING THE MACH TRIM ACTUATOR, VERIFY ELEVATOR SURFACES ARE FAIRED. SURFACE DEFLECTION (ELEVATOR FULL UP, FULL DOWN, OR SPLIT) MAY CAUSE A FAILURE IN THE MACH TRIM SYSTEM.

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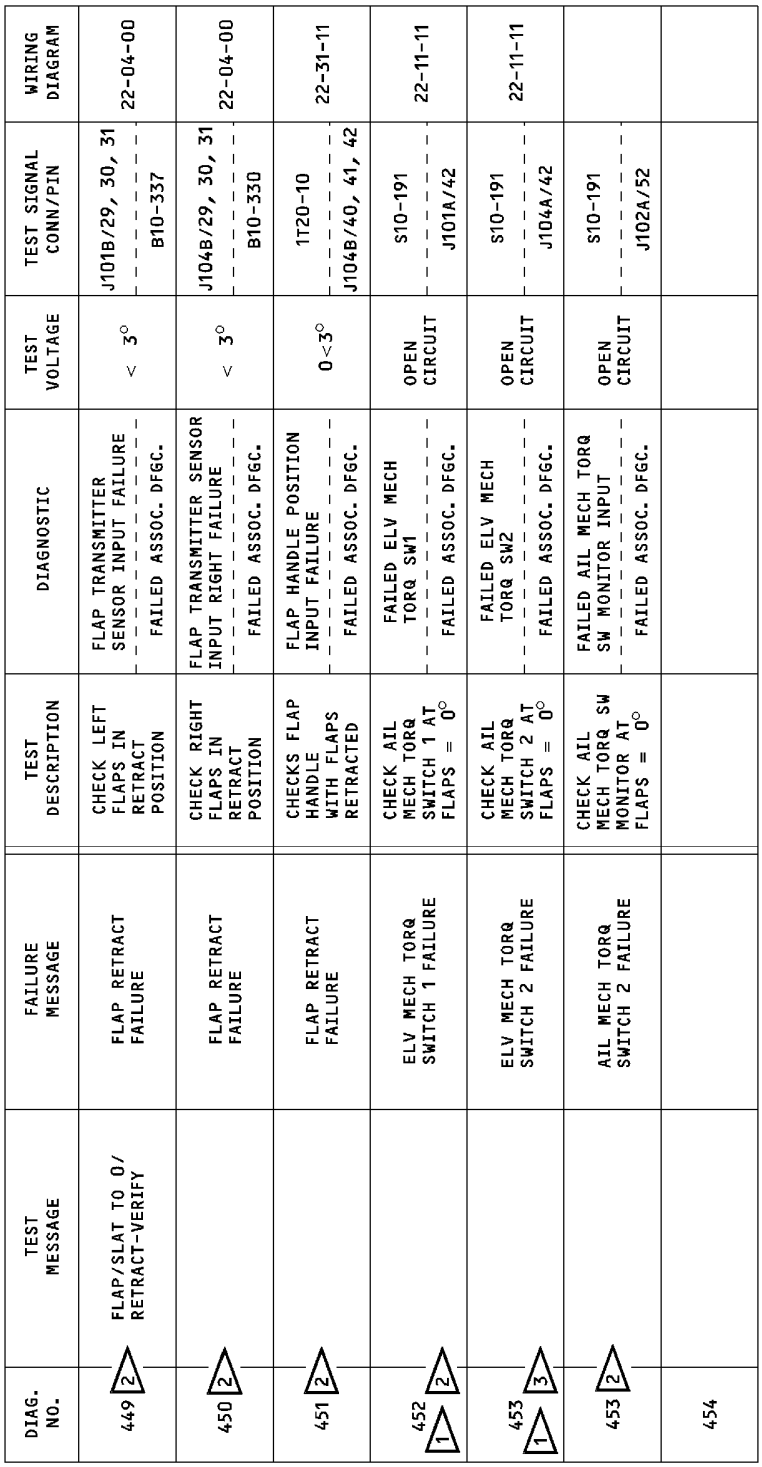
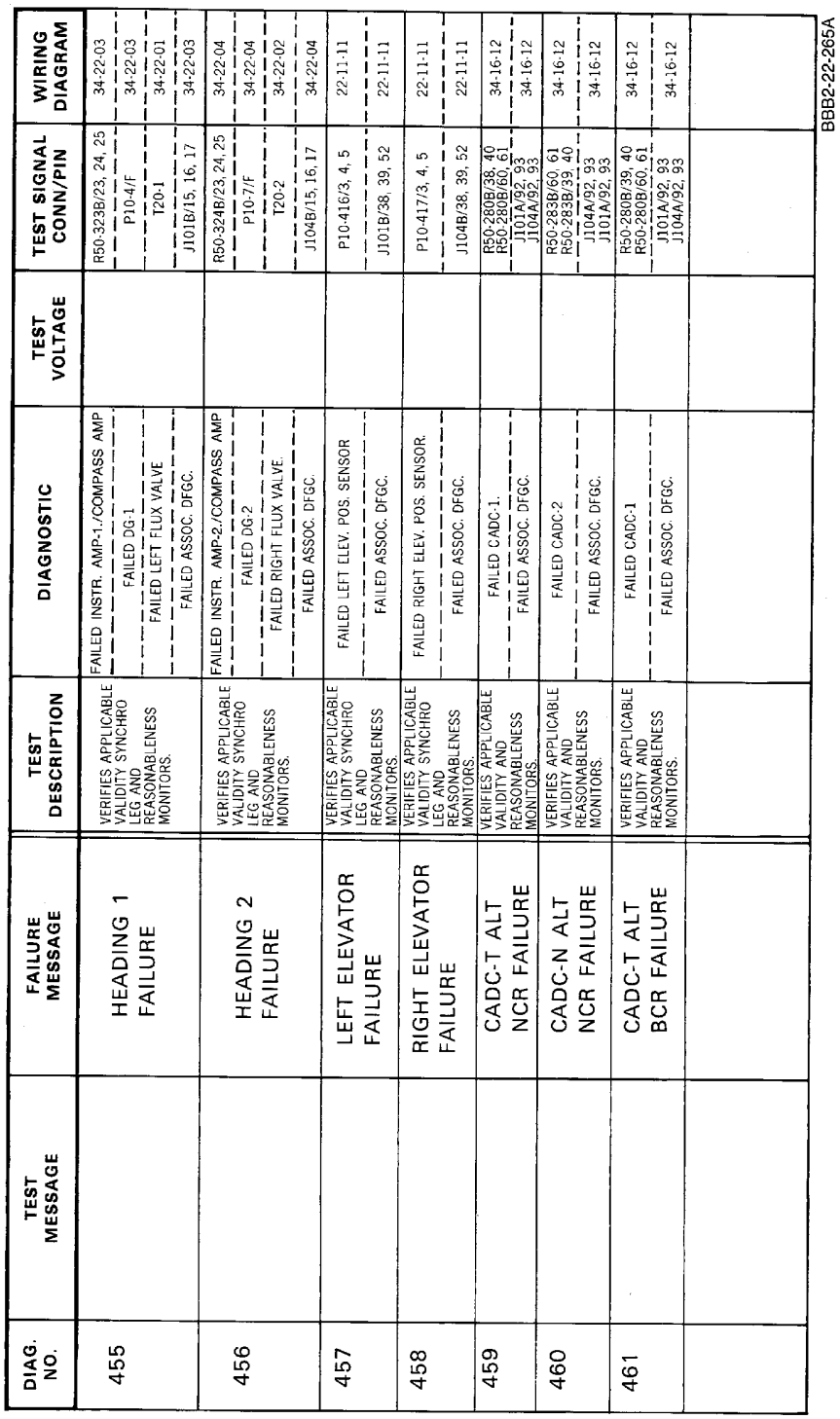
Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 9 of 10)



Sequence Eight - Servo Tests
Figure 111/22-01-05-990-849 (Sheet 10 of 10)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
455		HEADING 1 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED INSTR. AMP-1./COMPASS AMP FAILED DG-1 FAILED LEFT FLUX VALVE FAILED ASSOC. DFGC.		R50-323B/23, 24, 25 P10-4/F T20-1 J101B/15, 16, 17	34-22-03 34-22-03 34-22-01 34-22-03
456		HEADING 2 FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED INSTR. AMP-2./COMPASS AMP FAILED DG-2 FAILED RIGHT FLUX VALVE. FAILED ASSOC. DFGC.		R50-324B/23, 24, 25 P10-7/F T20-2 J104B/15, 16, 17	34-22-04 34-22-04 34-22-02 34-22-04
457		LEFT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED LEFT ELEV. POS. SENSOR FAILED ASSOC. DFGC.		P10-416/3, 4, 5 J101B/38, 39, 52	22-11-11 22-11-11
458		RIGHT ELEVATOR FAILURE	VERIFIES APPLICABLE VALIDITY SYNCHRO LEG AND REASONABLENESS MONITORS.	FAILED RIGHT ELEV. POS. SENSOR. FAILED ASSOC. DFGC.		P10-417/3, 4, 5 J104B/38, 39, 52	22-11-11 22-11-11
459		CADC-T ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1. FAILED ASSOC. DFGC.		R50-280B/38, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
460		CADC-N ALT NCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
461		CADC-T ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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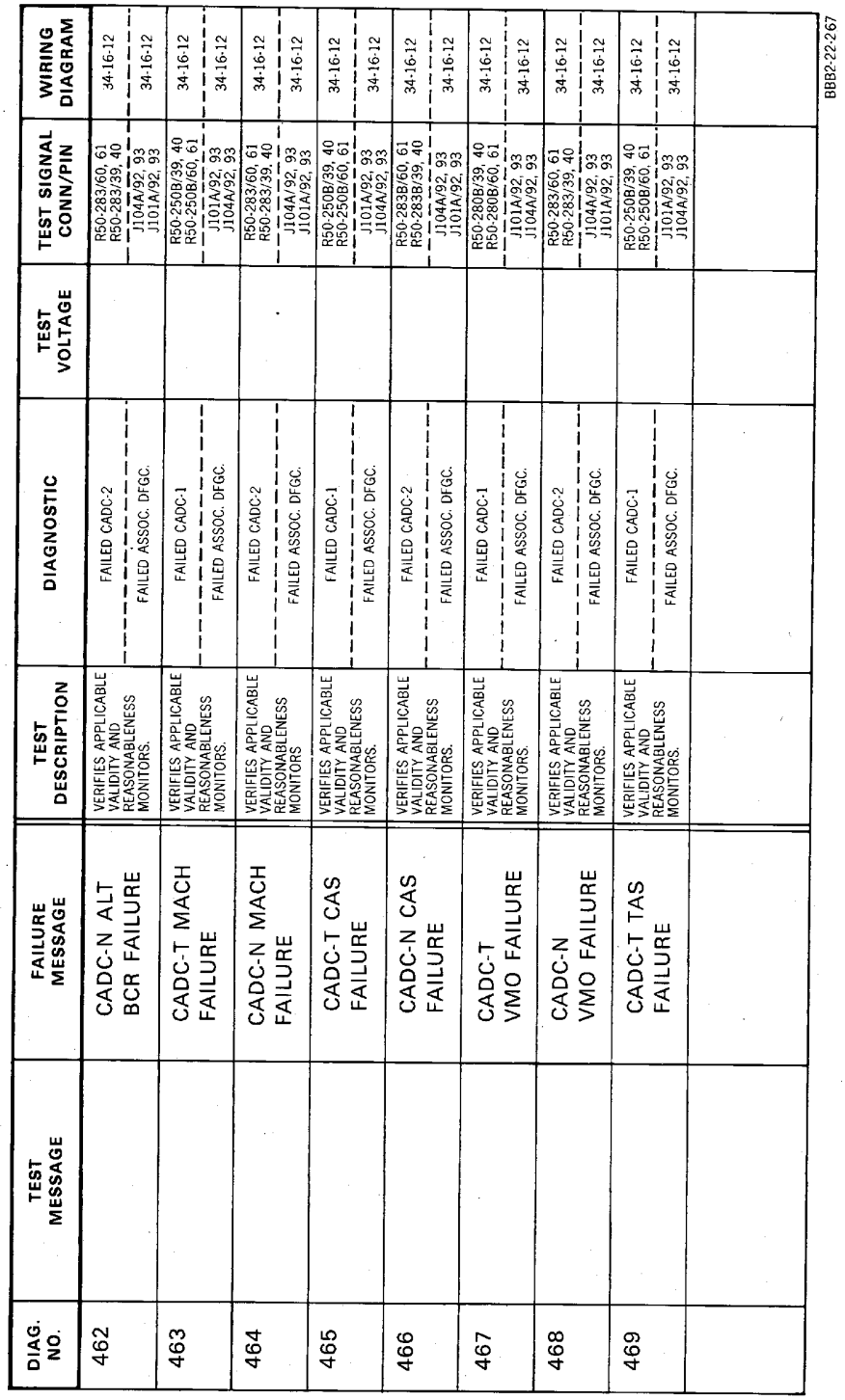
Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-850 (Sheet 1 of 9)



DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
462		CADC-N ALT BCR FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
463		CADC-T MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
464		CADC-N MACH FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
465		CADC-T CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
466		CADC-N CAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
467		CADC-T VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
468		CADC-N VMO FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
469		CADC-T TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-850 (Sheet 2 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
470		CADC-N TAS FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
471		CADC-T TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
472		CADC-N TAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283B/60, 61 R50-283B/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
473		CADC-T ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITOR	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-280B/39, 40 R50-280B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
474		CADC-N ALT RATE FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
475		CADC-T SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED CADC-1 FAILED ASSOC. DFGC.		R50-250B/39, 40 R50-250B/60, 61 J101A/92, 93 J104A/92, 93	34-16-12 34-16-12
476		CADC-N SAT FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS. MONITORS	FAILED CADC-2 FAILED ASSOC. DFGC.		R50-283/60, 61 R50-283/39, 40 J104A/92, 93 J101A/92, 93	34-16-12 34-16-12
477		AIL TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED AILERON TACH A FAILED AILERON TACH B FAILED ASSOC. DFGC.		P10-419/N, P P10-420/N, P J101A/98, 99 J104A/98,99	22-12-12 22-12-12 22-12-12

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-850 (Sheet 3 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
478		ELEV TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED ELEV TACH A FAILED ELEV TACH B FAILED ASSOC. DFGC.		P10-421/N, P P10-422/N, P J101A/96, 97 J104A/96, 97	22-11-12 22-11-12 22-11-12
479		RUD TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED RUD TACH A FAILED RUD TACH B FAILED ASSOC. DFGC.		P10-423/N, P P10-424/N, P J101B/89, 90 J104B/89, 90	22-13-12 22-13-12 22-13-12
480		SPD REF KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR	FAILED FGCP FAILED ASSOC. DFGC.		P10-411/2ab J101B/46, 47, 48	22-31-11 22-31-11
481 1		VERT GYRO-1 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-1 FAILED ASSOC. DFGC.		P10-18/30, 31, 34, 35 J101B/71, 72, 74, 75 J101A/14	34-24-01 34-24-01
482 1		VERT GYRO-2 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-2 FAILED ASSOC. DFGC.		P10-19/30, 31, 34, 35 J104B/71, 72, 74, 75 J104A/14	34-24-02 34-24-02
483 1		VERT GYRO-3 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS	FAILED VG-2 FAILED ASSOC. DFGC.		P10-165/30, 31, 34, 35 J103A/71, 72, 74, 75	34-24-01 34-24-01
484		PITCH RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-1. FAILED ASSOC. DFGC.		P10-18/30, 31 J101B/71, 72	34-24-01 34-24-01
485		PITCH RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-2. FAILED ASSOC. DFGC.		P10-19/30, 31 J104B/71,72	34-24-02 34-24-02
486		PITCH RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-3. FAILED ASSOC. DFGC.		P10-165/30, 31 J103A/71, 72	34-24-01 34-24-01

1 --930 and subsequent DFGC. VERT GYRO failure message is ATTITUDE

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Sequence Nine - Internal Monitors
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DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
478		ELEV TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED ELEV TACH A FAILED ELEV TACH B FAILED ASSOC. DFGC.		P10-421/N, P P10-422/N, P J101A/96, 97 J104A/96, 97	22-11-12 22-11-12 22-11-12
479		RUD TACH FAILURE	VERIFIES APPLICABLE DUAL COMPARISON MONITOR	FAILED RUD TACH A FAILED RUD TACH B FAILED ASSOC. DFGC.		P10-423/N, P P10-424/N, P J101B/89, 90 J104B/89, 90	22-13-12 22-13-12 22-13-12
480		SPD REF KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR	FAILED FGCP FAILED ASSOC. DFGC.		P10-411/2ab J101B/46, 47, 48	22-31-11 22-31-11
481 [1]		VERT GYRO-1 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-1 FAILED ASSOC. DFGC.		P10-18/30, 31, 34, 35 J101B/71, 72, 74, 75 J101A/14	34-24-01 34-24-01
482 [1]		VERT GYRO-2 FAILURE	VERIFIES APPLICABLE VALIDITY AND REASONABLENESS MONITORS.	FAILED VG-2 FAILED ASSOC. DFGC.		P10-19/30, 31, 34, 35 J104B/71, 72, 74, 75 J104A/14	34-24-02 34-24-02
483							
484		PITCH RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-1. FAILED ASSOC. DFGC.		P10-18/30, 31 J101B/71, 72	34-24-01 34-24-01
485		PITCH RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-2. FAILED ASSOC. DFGC.		P10-19/30, 31 J104B/71, 72	34-24-02 34-24-02
486							

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[1] –930 and subsequent DFGC, VERT GYRO failure message is ATTITUDE

Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-850 (Sheet 5 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
487		ROLL RATE 1 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-1. FAILED ASSOC. DFGC.		P10-18/34, 35 J101B/74, 75	34-24-01 34-24-01
488		ROLL RATE 2 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-2. FAILED ASSOC. DFGC.		P10-19/34, 35 J104B/74, 75	34-24-02 34-24-02
489		ROLL RATE 3 FAILURE	VERIFIES APPLICABLE REASONABLENESS MONITORS	FAILED VG-3. FAILED ASSOC. DFGC.		P10-165/34, 35 J103B/74, 75	34-24-01 34-24-01
490		ANGLE OF ATT 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-1 SENSOR FAILED ASSOC. DFGC.		P1-648/M, N, P J101B/26, 27, 28	22-31-11 22-31-11
491		ANGLE OF ATT 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED ANGLE-OF-ATTACK-2 SENSOR FAILED ASSOC. DFGC.		P1-649/M, N, P J104B/26, 27, 28	22-31-11 22-31-11
492		SPOILER POS 1 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-397/3,4, 5 J101B/35, 36, 37	22-12-11 22-12-11
493		SPOILER POS 2 FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT SPOILER POSITION SENSOR FAILED ASSOC. DFGC.		P10-398/3,4,5 J104B/35,36, 37	22-12-11 22-12-11
494		EPR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED LEFT EPR XMTTER FAILED ASSOC. DFGC.		R50-303B/32, 33, 34 J101B/32, 33,34	34-18-12 34-18-12
495		EPR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RIGHT EPR XMTTR FAILED ASSOC. DFGC.		R50-309B/32, 33, 34 J104B/32, 33, 34	34-18-12 34-18-12
496		LEFT AILERON FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED AILERON POSITION SENSOR FAILED ASSOC. DFGC.		P10-396/3, 4, 5 (T20-3) J101B/49, 50, 51	22-12-11 22-12-11

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Sequence Nine - Internal Monitors
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DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
497		HOR STAB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED HOR STAB POSITION SENSOR FAILED ASSOC. DFGC.		P10-418/3, 4, 5 J104B/43, 44, 45	22-11-11 22-11-11
498		ALT SEL KNOB FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP. FAILED ASSOC.DFGC.		P10-411/W, X, Y J101B/40, 41, 42	22-11-11 22-11-11
499		RUDDER POS FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED RUDDER POSITION SENSOR FAILED ASSOC. DFGC.		P10-429/3, 4, 5 J104B/46, 47, 48	22-13-11 22-13-11
500		FLAP HANDLE FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FLAP HANDLE POSITION SENSOR FAILED ASSOC. DFGC.		T20-10 J104B/40, 41, 42	22-31-11 22-31-11
501		FLAP POS FAILURE	VERIFIES LEFT FLAP POS SYNCHRO LEG MONITOR.	FAILED LFT FLAP POS SYNCHRO FAILED ASSOC. DFGC.		P1-603/G, H, J J101B/29, 30, 31	22-31-11 22-31-11
502		FLAP POS FAILURE	VERIFIES RIGHT FLAP POS SYNCHRO LEG MONITOR.	FAILED RHT FLAP POS SYNCHRO. FAILED ASSOC. DFGC.		P1-602/G, H, J J104B/29, 30, 31	22-31-11 22-31-11
503		VERT SPD SEL FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED DFGCP FAILED ASSOC. DFGC.		P10-411/g, d, e J101B/43, 44,45	22-11-11 22-11-11
504		CRS ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-1. FAILED INSTR AMP-1. FAILED DG-1. FAILED ASSOC. DFGC.		P10-408/s, t, u R50-324B/54 P10-7/F J104B/5, 6, 7	34-22-04 34-22-04 34-22-04 34-22-04

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-850 (Sheet 7 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
505		CRS ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED NCP-2.		P10-406/s,t,u	34-22-03
				FAILED INSTR AMP-2		R50-323B/54	34-22-03
				FAILED DG-2.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/5,6,7	34-22-03
506		HDG ERROR LEFT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-410/t,u,v	34-22-04
				FAILED INSTR AMP-1.		R50-324B/18,19,20	34-22-04
				FAILED DG-1.		P10-7/F	34-22-04
				FAILED ASSOC. DFGC.		J101B/18,19,20	34-22-04
507		HDG ERROR RIGHT FAILURE	VERIFIES APPLICABLE SYNCHRO LEG MONITOR.	FAILED FGCP.		P10-432/t,u,v	34-22-03
				FAILED INSTR AMP-1		R50-323B/18,19,20	34-22-03
				FAILED DG-1.		P10-4/F	34-22-03
				FAILED ASSOC. DFGC.		J104B/18,19,20	34-22-03
508 *		PMS DATA FAILURE	VERIFIES PMS DATA IS VALID	FAILED PMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
508 **		PMS/FMS DATA FAILURE	VERIFIES PMS/FMS DATA IS VALID	FAILED PMS/FMS		R50-390A/59,60	34-63-13
				FAILED ASSOC. DFGC		J101A/76,77	34-63-13
509 ***		WINDSHEAR DATA FAILURE	VERIFIES WINDSHEAR COMPUTER	FAILED W/S		R50-295A J101A-78,79 R50-297A J102A-88,89	34-47-01
				FAILED ASSOC. DFGC			34-63-22

* CUSTOMERS WITH PMS
** CUSTOMERS WITH FMS AND -970 DFGC AND SUBS
*** CUSTOMERS EQUIPPED WITH WINDSHEAR COMPUTERS

CAG(IGDS) BBB2-22-270D

Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-850 (Sheet 8 of 9)

DIAG. NO.	TEST MESSAGE	FAILURE MESSAGE	TEST DESCRIPTION	DIAGNOSTIC	TEST VOLTAGE	TEST SIGNAL CONN/PIN	WIRING DIAGRAM
520	FLAP/SLAT TO 0/ RETRACT — VERIFY	AIL SERVO FAILURE	CMD AILERON TO +7.5° RWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC.	+7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
521		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
522		AIL SERVO FAILURE	CMD AILERON TO 7.5° RWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	7.5° ± 1.5°	P10420/J, S J104B/83, 84	22-12-12
523		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧ 5°/SEC	FAILED AILERON SERVO TACH B FAILED ASSOC. DFGC	≯ 1.71 VAC	P10420/N, P J104B/98, 99	22-12-12
524		AIL SERVO FAILURE	CMD AILERON TO −7.5° LWD BY MEANS OF SERVO DRIVE A	FAILED AILERON SERVO DRIVE A FAILED ASSOC. DFGC	−7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
525		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH A ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10419/N, P J101B/98, 99	22-12-12
526		AIL SERVO FAILURE	CMD AILERON TO −7.5° LWD BY MEANS OF SERVO DRIVE B	FAILED AILERON SERVO DRIVE B FAILED ASSOC. DFGC	−7.5° ± 1.5°	P10419/J, S J101B/83, 84	22-12-12
527		AIL SERVO FAILURE	VERIFIES AIL SERVO TACH B ≧ 5°/SEC	FAILED AILERON SERVO TACH A FAILED ASSOC. DFGC	≯ 1.71 VAC	P10420/N, P J104B/98, 99	22-12-12
528 1		MACH TRIM SERVO FAILURE	VERIFIES MACH TRIM ACTUATOR RETRACTS	FAILED MTC SWITCH FAILED MTC ACTUATOR FAILED ASSOC. DFGC	9.6 VDC	S10-188 P10-44/M, X J103B/58, 59	22-21-11

1 -930 and subsequent DFGC

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Sequence Nine - Internal Monitors
Figure 112/22-01-05-990-850 (Sheet 9 of 9)

DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

1. General

A. The DFGS Status/Test (STP) panel is located beneath the captain's briefcase compartment. The STP has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The STP provides the operator with a display of English language commands and questions.

B. BIT provides three modes of testing. Continuous (Flight Fault Review) BIT, Return to Service (RTS) BIT, and System Maintenance BIT. The Autoland Preflight Test is also provided in this section, since a failure during this test can be recalled and displayed on the STP.

C. A self-test feature of the STP (during System Maintenance BIT) is provided to assure the operator that the STP is functional prior to test initiation. All keys and pushbuttons are checked and appropriate message displays are verified.

D. During System Maintenance BIT, pressing the Forward Space (FSPCE) key on the STP will automatically advance the STP to the next test step. If a complete sequence of tests are to be bypassed, pressing the FSPCE key at the beginning of a test sequence will automatically advance the test to the next test sequence.

E. During System Maintenance BIT, pressing the Back Space (BSPCE) key on the STP will automatically back the test to the previous test step if a failure has occurred. Pressing the BSPCE key twice in succession after a failure will program the test sequence over again.

F. During System Maintenance BIT, if a failure occurs, an English language message ending with the word "FAILURE" will appear. Pressing the VERIFY pushbutton on the STP will cause a diagnostic number to appear, then pressing the VERIFY pushbutton the second time will cause the message to reappear on the STP. If the failure is not corrected at that time, pressing the FSPCE key will log the failure and continue the test. At the conclusion of testing, the message "FAILURE RECAP?" will be displayed. At this time all failures can be recorded for correction. Once the test is exited, failures recorded are automatically erased.

G. During RTS BIT an interruption does not occur if a failure is detected during the test. If a failure is detected, "NO GO - SYSTEM AFFECTED?" will be displayed upon completion of the test. When "NO GO - SYSTEM AFFECTED?" is displayed, pressing the VERIFY pushbutton will display the function(s) that are affected, i.e. NO AUTOLAND, AP/FD, etc. If a system is listed it indicates only that a problem has been detected and not necessarily that the system is inoperable. After the function(s) is displayed, all failures can be recorded for correction. If no failures occur during RTS, GO is displayed.

H. Ten sequences of tests are provided on the STP during System Maintenance Bit. Each sequence has diagnostic numbers that accompanies each failure detected. Portions of the testing requires operator interaction, and portions of the testing are automatic. Any failures that occur during the Maintenance Test will be displayed immediately upon detection.

I. Seven sequences of tests are provided during RTS BIT. The diagnostic numbers and failures are called out at the conclusion of testing during "FAILURE RECAP?"

J. Personnel should be familiar with the functional use of all keys and pushbuttons on the STP prior to performing any tests that require operator interaction. (Figure 201).

WARNING: DURING SYSTEM MAINTENANCE BIT, THE USE OF HYDRAULIC POWER IS REQUIRED. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL, AND CONTROL SURFACE AREAS ARE CLEARED OF ALL PERSONNEL AND EQUIPMENT.

CAUTION: VERIFY METER SEL & HEAT SWITCH, LOCATED ON OVERHEAD PANEL IS IN THE OFF POSITION ANYTIME THE AIRPLANE IS IN THE FLIGHT MODE, (GROUND SENSING CIRCUIT BREAKERS OPENED, OR ON JACKS), TO PREVENT DAMAGE TO AIR DATA OR ANGLE-OF-ATTACK SENSORS.

CAUTION: WHENEVER UNIT(S) AND/OR COCKPIT INSTRUMENT(S) ARE POWERED ON THE GROUND, THE TWO AVIONICS COOLING FANS AND INSTRUMENT COOLING FAN MUST BE OPERATING. IN ADDITION, IF FLIGHT COMPARTMENT AIR TEMPERATURE IS ABOVE 85° F., AIR CONDITIONING SHOULD BE PROVIDED. IF AIR CONDITIONING IS NOT AVAILABLE, FLIGHT COMPARTMENT WINDOWS AND ELECTRICAL/ELECTRONICS ACCESS DOOR MUST BE OPEN TO PREVENT OVERHEAT OF EQUIPMENT.

K. Repeat any failed test step to verify that after maintenance action has been performed and completed, the fault has been cleared.

L. The following table describes flight guidance circuit breakers and how they function and the importance to the operation of the aircraft. It gives the associated problems caused when these breakers fail.

Table 201

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-361	28VAC-L	J1B-12	Loss of power from this breaker, if the aircraft is on the ground, would cause loss of the Flight Guidance Control Panels Altitude window, Both #1 and #2 Flight Director Bars Bias Out of View (if in Takeoff mode). The Mach Trim Fault, Yaw Damper Off and Windshear Inop messages are displayed (AP1 selected).
DFGS-1	B10-351	115VAC-L	J2A-12	Loss of power from this breaker, on the ground will cause the entire Flight Guidance Control Panel and the Nav Control Panel Course window to go blank. The #1 Flight Director Bars Biased Out of View and the #1 Fast/Slow Indicator displayed a Fail Flag. The Mach Trim Fault and Yaw Damper Off messages were displayed (AP1 selected). In addition, #1 Auto- throttles became Inop, and the TRP had a NO MODE light on.
DFGS-1	B10-360	28VAC-R	J4B-12	Loss of power from this circuit breaker caused the NO AUTOLAND light to be displayed, with AP1 selected.
DFGS-1	B10-347	28VDC-R	J2A-1,2	No cockpit indications were present if this circuit breaker is inoperative. No messages were displayed if AP2 was selected.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
Yaw Damper-1	B10-345	28VDC-L	J3B-7	With the Yaw Damper Switch in the ON position and AP1 selected, the YAW DAMPER OFF message appeared.
AP-1	B10-353	28VDC-L	J4B-104 J1B-104 J1A-94 J4A-94	With AP1 selected, the NO AUTOLAND message was displayed.
DFGS-1	B10-349	28VDC-L	J1A-1 J3A-1,2, 3,4	The Flight Guidance Control Panel blanked if breaker power was lost and AP1 selected. In addition, both Nav Panels blanked. The TRP had a NO MODE light on. The #1 Flight Director Bars Bias Out of View and the #1 Slow/Fast Fail flag appeared.
DFGS-2	B10-362	28VAC-R	J4B-12	With the aircraft on the ground and AP2 selected, loss of this circuit breakers' power caused the NO AUTOLAND light to be displayed. In addition, The Flight Guidance Control Panels' Altitude was blank and the #2 Nav Panels CRS numbers were randomly cycling. Both Flight Director Bars Biased Out of View. On the overhead, the Mach Trim Fault and Yaw Damper OFF messages were displayed. #1 and #2 Slow/Fast Indicators became Inop (AP2 was selected).
DFGS-2	B10-352	115VAC-R	J2A-12	With AP2 selected the Flight Guidance Control Panel blanked, the Mach Trim Fault Yaw Damper Off message were displayed Both Nav Panels CRS windows blanked and the TRP had a NO MODE message displayed. Autothrottles were Inop.
DFGS-2	B10-363	28VAC-L	J1B-12	Loss of this breakers' power caused the NO AUTOLAND message to be displayed if AP2 was selected.
DFGS-2	B10-348	28VDC-L	J2A-1,2	There is no cockpit indication that DFGC#2 is not receiving power from this breaker. (On the ground, AP2 selected.)
Yaw Damper-2	B10-346	28VDC-R	J3B-7	With AP2 selected and this breaker not supplying power, the Yaw Damper OFF message was displayed.
AP-2	B10-354	28VDC-R	J4B-104 J1B-104	With AP2 selected the NO AUTOLAND light was displayed.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-2	B10-350	28VDC-L	J1A-94 J1A-1 J3A-1,2, 3,4	With AP2 selected and the aircraft on the ground, the AP TRIM, AP1 and AP2 annunciators on FMA#2 were illuminated. In addition, #2 Fast/Slow was Inop. The TRP had a NO MODE light displayed. On the overhead the Mach Trim Fault, Yaw Damper OFF and Windshear Inop messages displayed.
DFGS AP/AT Warning LTS "A"	B10-341	28VDC Xfer	FMA (J1-A)	With this circuit breaker not supplying power, both FMA'S A/T and AP OFF red warning lights "A" bulb was inop.
DFGS AP/AT Warning LTS "B"	B10-342	28VDC Xfer	FMA (J4A-1)	This circuit breaker supplies basic power for both DFGC's Channel "B" processor. Loss of power from this breaker will cause both #1 and #2 Flight Directors to fail. In addition, the Fast/Slow Indicators failed, the NO AUTOLAND light was displayed, the TRP had a NO MODE light, and the Flight Guidance Control Panels Altitude window went blank. (Breaker power was lost after initial power up.) The Nav Panels' CRS Windows also blanked. Loss of power from this breaker also affects Status Test Panel operation.

2. STP Test Functions

A. Procedures for Testing DFGS

Table 202

Paragraph	Test Function
Paragraph 3.A.	Continuous (Flight Fault Review) BIT
Paragraph 3.B.	Autoland Preflight Test
Paragraph 3.C.	Return to Service (RTS) BIT (DFGS)
Paragraph 3.D.	System Maintenance BIT (Maintenance Test)

B. Digital Flight Guidance System (DFGS) Power-Up Test Prior to STP Test

NOTE: Both Digital Flight Guidance Computers (DFGC's) may fail to come on line and halt STP testing procedures.

(1) When DFGS information is not displayed with side select switch in either position, proceed as follows:

(a) Check 115 VAC power and ground to each DFGC electrical connector. (PAGEBLOCK 22-16-00/101)

(b) Check no ground exists at DFGC jack connector pins J2A (36) and J3A (36). Remove ground(s) when ground(s) exist and check DFGS operation is normal. (PAGEBLOCK 22-14-00/101)

NOTE: A ground at the J2A (36) and J3A (36) points represents holding down of the autopilot disconnect (on control wheel) not allowing DFGC to begin internal checks.

(c) Check short to ground is not present at jack connector pins J1 (Z) and J3 (Z) on DFGS control panel. Should a ground exist, isolate ground source and repair. (PAGEBLOCK 22-01-03/101)

NOTE: Before incorporation of Service Bulletin 24-67, the auxiliary power unit (APU) generator field wiring can contact air conditioning piping resulting in malfunction of the APU generator and/or Digital Flight Guidance System-1 (DFGS-1). This can occur due to chafing wire.

(2) When partial DFGS displays such as one Flight Mode Annunciator (FMA) indicating HDG HLD, ALT HLD, and opposite FMA blank with both Flight Director (FD) switches on, proceed as follows:

(a) Check 28 VDC is available at jack pins J1A (1 and 60) and J4A (1) on each DFGC electrical connector. (PAGEBLOCK 22-17-00/101)

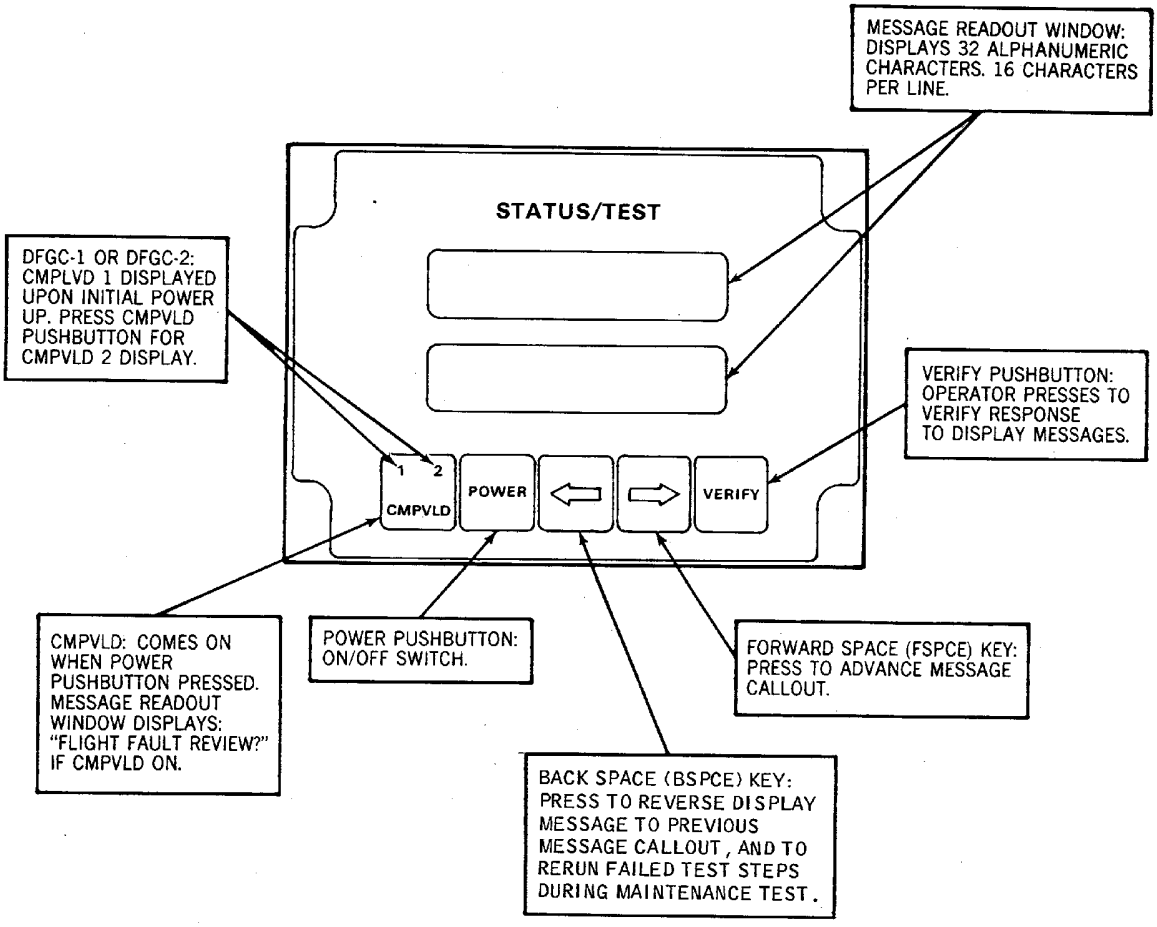
NOTE: This 28 VDC is source power for the "A" and "B" channels of the central processor.

C. On aircraft with Service Bulletin 22-85 (-920 DFGC) incorporated, following steps are necessary for completion of Maintenance and Return to Service testing:

(1) Right Ground Control Relay Sensing circuit breaker must be open to enable completion of Maintenance and Return to Service tests.

(2) During Maintenance Test, if failure message "GROUND SENSOR FAILURE" (diagnostic 124) is logged, test should be repeated with Right Ground Control relay sensing circuit breaker temporarily closed. Remainder of test can be run with Right Ground Control relay sensing circuit breaker open.

(3) During Return to Service test "GO" status may be assumed if only "GROUND SENSOR FAILURE" is logged and no other failures are logged.



Status/Test (STP) Panel
Figure 201/22-01-05-990-930

3. STP Functional Tests

A. Continuous (Flight Fault Review) BIT

NOTE: Continuous BIT is an internal monitor mode of the DFGC and is not controlled by the STP. Continuous BIT begins operation as soon as power is applied to the DFGS and operates continuously, even during Autoland Availability Preflight BIT, RTS BIT and System Maintenance BIT. If Continuous BIT recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel. If the autoland mode is affected, the "NO AUTOLAND" annunciator on each FMA will come on and flash to alert the flight crew that the autoland mode of operation is not available.

NOTE: Flight Fault Review Bit is provided from continuous Bit which is an internal monitor mode of the DFGC after airplane liftoff. Continuous Bit begins operation as soon as power is applied to the DFCS and operates continuously. If Continuous Bit recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel as Flight Fault Review Bit.

Table 203

Action	Desired Result
(1) On aircraft with EFIS, ensure DFGC/EFIS select switch is in the DFGS position.	
(1a) Verify DFGS switch is in same position 1, or 2 as used during flight.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
NOTE: If it is desired to interrogate DFGC 2, press and release CMPVLD pushbutton and number 2 will appear.	
(3) Press and release VERIFY pushbutton.	"NO FAULTS" displayed.
NOTE: If a failure has occurred, the number of flights and number of failures will appear. For example, if the airplane had five flights and two failures, the display message would read "5 FLIGHTS 2 FAILURES". Pressing and releasing the VERIFY pushbutton will display the most recent flight, i.e. "FLIGHT 1 1 FAILURE". Pressing and releasing the FSPCE key will display each flight and number of failures recorded for each flight. If zero failures have occurred, "NO FAULTS" will be the message displayed. Proceed to step (8) if "NO FAULTS" is the displayed message.	
(4) Press and release VERIFY pushbutton.	"FLIGHT 1 - XX FAILURE" displayed.
(5) Press and release FSPCE key.	"FLIGHT 2 - XX FAILURE" displayed.
(6) Read and record all flight faults by pressing and releasing VERIFY pushbutton until the message "FLIGHT FAULT REVIEW?" is displayed.	"FLIGHT FAULT REVIEW?" displayed.

Table 203 (Continued)

Action	Desired Result
NOTE: The in-flight logging system of the DFGS provides a feature that allows stored failures (maintenance memory) to be erased. This may be accomplished in one of two ways manually or automatically. MANUALLY: The STP may be used to erase the memory by use of the FSPCE key until the message "MAINTENANCE MEMORY ERASE?" is displayed. Pressing and releasing the VERIFY pushbutton will then display "VERIFY TO ERASE MEMORY?". Pressing and releasing the VERIFY pushbutton will then clear all of the stored failures. AUTOMATICALLY: If the maintenance memory is not periodically cleared, it will eventually fill up. Each time the DFGC is powered up, the maintenance memory is checked. If the memory store is more than 80%, the DFGC saves the most recent 150 failures and clears the rest. The memory can store approximately 350 failures, thus leaving room for approximately 200 failures. The maintenance memory is dedicated for in-flight failure logging only. These failures are displayed only during "FLIGHT FAULT REVIEW?". This memory is entirely independent of the memory used by the Return To Service Test or the Maintenance Test. Failures logged while performing these tests are erased by exiting the respective test.	
(7) Press and release FSPCE key.	"RUN RETURN TO SERVICE TEST?" displayed.
NOTE: If a Return to Service (RTS) test is desired, press and release VERIFY pushbutton. If an RTS is not desired, proceed to step (8).	
(8) Press and release POWER pushbutton.	STP message display blank.
(9) Place airplane in normal ground configuration.	No test.
NOTE: If maintenance action has been performed, proceed to either Paragraph 3.C. or Paragraph 3.D. as appropriate.	

B. Autoland Preflight Test

NOTE: The Autoland Availability Preflight BIT provides assurance to the flight crew that the autoland mode of operation is available. However, this test is designed primarily for the flight crew, maintenance personnel should use the RTS to check autoland status. The Autoland Preflight Test will only check radio altimeter self test, dual accelerometers self test, elevator torque limit switch verified both agree for flap configuration, rudder unrestricted switch indicating unrestricted state and NAV receivers self test. Both NAV receivers must be tuned to an ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control Panel must be pressed.

Table 204

Action	Desired Result
(1) Verify DFGS switch is placed in position 1, or 2 as appropriate for next flight.	No test.
NOTE: While performing the Autoland Preflight Test, if the Status/Test Panel is activated the Autoland Preflight Test cannot be initiated.	
(2) Tune both VHF/NAV Control panels to an ILS frequency.	Both NAV receivers tuned to an ILS frequency.
(2a) Set switches as follows: (1) Both FD switches to off. (2) AP engage switch to OFF. (3) Overhead FLT DIR switch to NORM.	No test.
NOTE: On later aircraft FLT DIR switch is FD CMD.	

Table 204 (Continued)

Action	Desired Result
(3) On Flight Guidance Control Panel, press and release AUTO LAND pushbutton.	Associated Flight Mode Annunciators (FMA) on instrument panel displays AUTO LND/PRE/FLT/TEST, and NO AUTOLAND appears flashing.
(4) Wait approximately 45 seconds.	Both captain's and first officer's FMA's blank, if FD switches are in OFF position.
(5) Observe both FMA's and verify that the NO AUTOLAND legend goes blank.	NO AUTOLAND legend blank on both FMA's.
NOTE: If the NO AUTOLAND legend remains on the FMA's, either the ILS, radio altimeters, dual accelerometers or Continuous BIT detected a failure that would inhibit the autoland mode of operation. Proceed to Paragraph 3.C. to isolate failure(s).	
NOTE: For AHRS equipped aircraft, during the autoland preflight test the AHRS system preflight test is conducted. A steady "NO AUTOLAND" message on the FMA's is normal during the AHRS preflight test, and does not indicate a failed test unless it remains on after the AHRS test is complete and the AHRS has returned to the normal mode.	

C. Return to Service (RTS) BIT (DFGS)

NOTE: Refer to NAVIGATION DISPLAYS, SUBJECT 34-22-00, Page 201, for EFIS RTS.

NOTE: Return to Service (RTS) BIT is provided to place the airplane back into a non-restricted (including autoland) service after maintenance action has been performed (i.e. LRU replacement). The STP is capable of performing ten sequences of tests 0 thru 9 (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201). Sequences 1, 2, 4, 6, 7, 8 and 9 are only performed during RTS. All sequences of tests are performed during System Maintenance BIT. The RTS is run completely and failures are displayed at end of test.

NOTE: All switches such as CADC, V.G., NAV and Flight Director selector switches should be in NORM position for the RTS test.

Table 205

Action	Desired Result
(1) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.
(1a) Place flap/slat handle to LAND EXT position.	No test.
(1b) Verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release FSPCE key until "RUN RETURN TO SERVICE TEST?" appears.	"RUN RETURN TO SERVICE TEST?" displayed.
(4) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE VERIFY" displayed.
NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.	

Table 205 (Continued)

Action	Desired Result
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.	
(5) Press and release VERIFY pushbutton.	"TURN ON AUX HYD PUMP VERIFY" displayed.
NOTE: The RTS test requires the aircraft to be in the landing configuration. Hydraulic power is required to properly set the flaps and rudder. Hydraulic power is not required if flaps are at 28 to 40 degrees and the rudder is centered (crosswinds may blow the rudder hardover causing the Rudder Servo test to fail).	
(6) Place HYD PUMPS - AUX and TRANS switches on F/O instrument panel to ON position. Press VERIFY.	"TURN ON RUDDER HYD - VERIFY" displayed.
(7) Turn on rudder hydraulics (on fwd pedestal). Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/EXTEND VERIFY" displayed.
(7a) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
(8) Check A/P is disengaged then press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.
(9) Check A/T is disengaged. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.
(10) Disengage Y/D if engaged then press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.
(11) Detune receivers from ILS frequency (if tuned) then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
NOTE: Sequence two "PASSIVE DISCRETES" and sequence four "SENSOR VALUES" are checked automatically. Sequence three and sequence five tests are skipped and are performed during System Maintenance BIT. During the tests, the message "TEST IN PROGRESS" will be displayed.	
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
(12) When step (11) is complete, observe STP.	"ENGAGE A/P - VERIFY" displayed.
(13) Engage A/P then press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.
(14) Engage autothrottle then press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.
(15) Engage Yaw Damper then press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.
NOTE: Tune receivers to a valid ILS frequency.	
(16) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" followed by "RETARD THROTTLES - VERIFY" displayed.
NOTE: Verify both throttle levers are below the minimum authority switches.	
(17) Retard throttles, then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
SEQUENCE SEVEN - "SELF TESTS"	

Table 205 (Continued)

Action	Desired Result
NOTE: Sequence seven is an automatic self-test of the NAV receivers, R/A units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion. At end of sequence seven, the STP will display "WHEEL TURNS RWD - VERIFY".	
SEQUENCE EIGHT - "SERVO TESTS"	
CAUTION: CONTROL WHEEL, COLUMN, PEDALS, STABILIZER, AUTOTHROTTLES, MACH TRIM AND Y/D ACTUATOR WILL MOVE DURING TEST EIGHT.	
NOTE: During this sequence, the operator will check control movement by cycling the verify pushbutton. A failure will be acknowledged by cycling the forward space pushbutton.	
NOTE: Failures as detected by the software will appear in the Failure Recap which can be displayed at the end of "RTS Tests".	
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed. While the servos are in operation, the message will display flashing.	
(18) Check control wheel is stationary and displaced in CW direction from neutral position.	
(19) Press and release VERIFY pushbutton.	Control wheel will move and during this test period, STP displays "TEST IN PROGRESS".
(20) At test completion STP displays new message.	"WHEEL TURNS LWD - VERIFY" is displayed.
(21) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position. STP displays "TEST IN PROGRESS".
(22) At test completion STP displays new message.	"COLUMN MOVES FWD - VERIFY" is displayed.
(23) Check control column is stationary and forward of neutral position. Press and release VERIFY pushbutton.	Control column will move. STP displays "TEST IN PROGRESS".
(24) At test completion STP displays new message.	"COLUMN MOVES AFT VERIFY" is displayed.
(25) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position and right rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(26) At test completion STP displays new message.	"RHT PEDAL MOVES FWD - VERIFY" is displayed.
(27) Check right rudder pedal moved forward. Press and release VERIFY pushbutton.	Left rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(28) At test completion STP displays new message.	"LEFT PEDAL MOVES FWD VERIFY" is displayed.
(28a) Check left rudder pedal moves forward. Press and release VERIFY pushbutton.	During this test STP displays "TEST IN PROGRESS".
NOTE: Part of sequence eight and all of sequence nine test are done automatically.	
(28b) At test completion STP displays new message.	"FLAP/SLAT TO 0 RETRACT VERIFY" is displayed.
(28c) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"GO OR NO-GO SYSTEM AFFECTED" is displayed.
SEQUENCE NINE - "INTERNAL MONITORS"	

Table 205 (Continued)

Action	Desired Result
NOTE: Sequence nine is an automatic check of the real time internal monitors appropriate to ground testing. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of the test either "GO" or "NO GO - SYSTEM AFFECTED?" will be displayed.	
NOTE: If "GO" is displayed, proceed to step (33) to conclude testing. If "NO GO - SYSTEM AFFECTED?" is displayed, proceed to step (29).	
(29) Press and release VERIFY pushbutton.	One or more of the following faults may appear if a problem is detected in the system. "DFGC" "NO AUTOLAND" "AP/FD" "A/T" "S/C" "ART" "TRC" "M/T" "Y/D"
(30) Press and release FSPCE key.	"FAILURE RECAP?" displayed.
(31) Press and release VERIFY pushbutton.	The number of faults will be displayed momentarily (approx. 3 seconds), then the STP will momentarily flash "VERIFY-DIAG NUM FWD=NEXT FAILURE" and the first fault will be displayed.
(32) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" is displayed.	"FAILURE RECAP?" displayed.
NOTE: While failure is displayed, pressing VERIFY will display associated diagnostic number.	
(33) Press and release POWER pushbutton.	STP message display blank.
NOTE: Autothrottle and autopilot will automatically disengage if STP is turned off.	
(34) Hold control wheel (if wheel or column is displaced) and disengage autopilot. Press and release either AP disconnect switch.	Autopilot disengaged, AP red off warning lights on until either AP disconnect switch pressed.
(35) Disengage yaw damper. Place YAW DAMP switch to OFF at right of overhead panel.	Yaw damper disengaged.
(36) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.
(37) Place aircraft in normal ground configuration.	No test.

NOTE: Following is a list of failures and diagnostic numbers that may appear if a RTS "NO GO - SYSTEM AFFECTED?" message appears.

Table 206

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5

Table 206 (Continued)

Failure	Diagnostic Number
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: On aircraft with -930 and subsequent DFGC, VERT GYRO is ATT.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40

Table 206 (Continued)

Failure	Diagnostic Number
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP POS FAILURE	198

Table 206 (Continued)

Failure	Diagnostic Number
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325

Table 206 (Continued)

Failure	Diagnostic Number
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQ SWITCH 1 FAILURE	332
ELEV MECH TORQ SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQ SWITCH 1 FAILURE	346
ELEV MECH TORQ SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356

Table 206 (Continued)

Failure	Diagnostic Number
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392

Table 206 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
NOTE: * An inoperative torque limit rheostat may prevent A/P engagement and can cause an "AIL SERVO FAILURE" message to be logged if flaps are less than 26 degrees. With flaps greater than 26 degrees the torque limit rheostat will not prevent A/P engagement. Place flaps greater than 26 degrees to verify.	
NOTE: With Service Bulletin 22-111 incorporated and the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per KCN (K1123) Service Bulletin, then the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422

Table 206 (Continued)

Failure	Diagnostic Number
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455

Table 206 (Continued)

Failure	Diagnostic Number
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR FAILURE	461
CADC -N ALT BCR FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488

Table 206 (Continued)

Failure	Diagnostic Number
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528

D. System Maintenance BIT (Maintenance Test)

NOTE: System Maintenance BIT is a command response type test requiring operator interaction. All sequences can be tested by use of system Maintenance BIT. Failures detected during Maintenance Test will be displayed immediately. Hydraulic power is required during the use of this test only if the Flap/Slat tests and/or the rudder test is to be run.

NOTE: Put RAM AIR TEMP & PROBE HEATER circuit breaker in lower electrical power center CPB (B1-62) Z29 to on.

Table 207

Action	Desired Result	Diagnostic Number
(1) On FGCP verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.	
NOTE: Each sequence of tests is called out during the test procedure. If a sequence or test step is to be bypassed, press and release the FSPCE key. Pressing the FSPCE key at the beginning of a sequence will automatically program the STP to the next sequence of tests. Pressing the FSPCE key during a test step or failed test-step will program the STP to the next test step. The FSPCE key may also be used for fast slew capabilities between test sequence steps. To repeat a failed-test step, press and release the BSPCE key. Pressing the BSPCE key twice in succession will program the test to the beginning of the test sequence if a test step failed.		
NOTE: If the main gear is not compressed, then install main gear proximity switch target inhibitors on left and right weight-on-wheel sensors to place the DFGC system in the ground mode.		
(2) Deleted.		
(3) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.	
(4) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed.	"RUN MAINTENANCE TEST?" displayed.	
NOTE: Pressing VERIFY pushbutton after step (4) results in either "MD-87 OPTION VERIFY" or "MD-80 OPTION VERIFY" being displayed before step (4a) for MD-80 or MD-87 aircraft. On other aircraft pressing VERIFY pushbutton results in "SEL DFGC TEST SIDE - VERIFY" being displayed as in next step.		
(4a) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	
NOTE: If DFGC switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.		
(5) Press and release VERIFY pushbutton.	"STP TESTS?" displayed.	
NOTE: During System Maintenance BIT, the FMA associated with the DFGS switch, (i.e., DFGS in position 1 corresponds to captain's FMA), will display in ATS window RTS/MNT, and in pitch window TEST, while the test is being performed.		
SEQUENCE ZERO - "STP TESTS"		
(6) Press and release VERIFY pushbutton.	"CYCLE STP FWDSPACE PB" displayed.	1
(7) Press and release FSPCE key.	"CYCLE STP BACKSPACE PB" displayed.	2
(8) Press and release BSPCE key.	"STP SEGMENTS TEST - VERIFY" displayed.	3
(9) Press and release VERIFY pushbutton.	STAR bursts displayed.	
NOTE: The STP will display all star bursts for ten seconds. (Aircraft using the FMS MCDU for an STP will display all diamonds).		
NOTE: In order to increase the life of the message display lamps, the program only allows 10 seconds before resetting segments and reissuing the original display message. If segments are not to be checked, press and release FSPCE key. If FSPCE key is pressed while segments are displayed, a failure will be logged.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(9a) After ten seconds are over, see display.	"STP SEGMENT TEST VERIFY" will be displayed.	
(10) Press and release FSPCE key.	"INITIAL SETUP INTERACTIVES?" displayed.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"		
(11) Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.	4 through 11
(12) Verify autopilot switch placed off. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE OFF - VERIFY" displayed.	12
(13) On captain's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE OFF - VERIFY" displayed.	13
(14) On first officer's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.	14
(15) Verify AUTO THROT switch placed OFF. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.	15 16
(16) On overhead panel verify YAW DAMP switch placed OFF. Press and release VERIFY pushbutton.	"YAW DAMP OFF LITE ON - VERIFY" displayed.	17
(17) On overhead annunciator panel verify YAW DAMP OFF light is on. Press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.	18 19
(18) Verify that both NAV control panels are not tuned to an ILS frequency. Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.	20
(18a) "TEST IN PROGRESS" will display for approximately 5 seconds.	When test successful STP displays "ADVANCE THROTTLE - VERIFY".	
(19) Advance throttle levers to mid range. Press and release VERIFY pushbutton.	"PASSIVE DISCRETES?" displayed.	
SEQUENCE TWO - "PASSIVE DISCRETES"		
NOTE: Sequence two is checked automatically. If a fault is recognized, the testing sequence will stop and the failure message will appear. Cycling VERIFY pushbutton provides diagnostic number for the failure. Press and release FWD key to initiate testing again.		
(20) Press and release VERIFY pushbutton. Wait approximately (.25) seconds.	"TRC OPTION PIN ABCD = XXXX VERIFY".	51
(20a) Upon completion of automatic testing, MCDU will display status of engine option pins for Thrust Rating.	TRC OPTION PIN ABCDE = XXXX VERIFY displays.	51

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: These option pins will be different for the type engine used as follows: -209 engine ABCDE = -GGG-, ABCD = -GGG -217A engine ABCDE = --G-- -217A/-217C engine ABCD = --G- -217 engine ABCDE = GG-G-, ABCD = GG-G -219 engine ABCDE = -GG-G		
NOTE: G = GROUND, - = OPEN. Reference Trouble Shooting section, Sequence Two - "PASSIVE DISCRETES" Diagnostic Number 51.		
(20b) Press and release VERIFY pushbutton.	"SWITCHES AND BUTTONS?" displayed.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"		
NOTE: Aircraft with -930 and subsequent DFGC, VG is ATT.		
(21) Press and release VERIFY pushbutton.	"VG SW UNIT CAPT ON AUX - VERIFY" displayed.	73 through 76
(22) On overhead panel place VERT GYRO (or AHRS) switch to L on AUX. Press and release VERIFY pushbutton.	"VG SW UNIT F/O ON AUX - VERIFY" displayed.	77 through 80
(23) Place VERT GYRO (or AHRS) switch to R ON AUX. Press and release VERIFY pushbutton.	"VG SW UNIT ON NORMAL - VERIFY" displayed.	81 through 84
(24) Place VERT GYRO (or AHRS) switch to NORM position. Press and release VERIFY pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	88
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 48 DEGREES - VERIFY" displayed.	93 through 100
(28) Above center instrument panel adjust ASSUMED TEMP indicator to 48 degrees. Press and release VERIFY pushbutton.	"TEMP SELECT 37 DEGREES - VERIFY" displayed.	101 through 108
NOTE: On aircraft with Thrust Rating Panel (TRP), press T/O FLX pushbutton on TRP. ASSUMED TEMP will be displayed on offside FMA window. Set ASSUMED TEMP knob on TRP to 48°C. Press and release VERIFY pushbutton.		
(29) Adjust ASSUMED TEMP to 37 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
(30) On Thrust Rating Indicator press and release T.O. pushbutton. Press and release VERIFY pushbutton.	"TR MODE T/O FLX - VERIFY" displayed.	110

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: Steps applying to the Thrust Rating Indicator (TRI) are only checking buttons and button lights. Thrust Rating Mode is not checked during this step, but is done continuously by DFGC.		
(31) Press and release T.O. FLX pushbutton. Press and release VERIFY pushbutton.	"TR MODE GA - VERIFY" displayed.	111
(32) Press and release GA pushbutton. Press and release VERIFY pushbutton.	"TR MODE MCT - VERIFY" displayed.	112
(33) Press and release MCT pushbutton. Press and release VERIFY pushbutton.	"TR MODE CL - VERIFY" displayed.	113
(34) Press and release CL pushbutton. Press and release VERIFY pushbutton.	"TR MODE CR - VERIFY" displayed.	114
(35) Press and release CR pushbutton. Press and release VERIFY pushbutton.	"CYCLE TO/GA SWITCH 1" displayed.	117
(36) On throttle lever press and release left TO/GA switch.	"CYCLE TO/GA SWITCH 2" displayed.	118
(37) Press and release right TO/GA switch.	"CYCLE A/P 1 DISCONNECT" displayed.	119
(38) Press and release captain's control wheel AP disconnect switch.	"CYCLE A/P 2 DISCONNECT" displayed.	120
(39) Press and release first officer's control wheel AP disconnect switch.	"CYCLE CAPT FMA RESET PB" displayed.	121
(40) Press and release RESET button on captain's FMA.	"CYCLE F/O FMA RESET PB" displayed.	122
(41) Press and release RESET button on first officer's FMA.	"PULL GND SENS BRKRS - VERIFY" displayed.	123
NOTE: If testing of the Bleed Inputs (steps (42) through (58)) is not desired, leave GND SENS BRKRS closed and cycle FSPCE key. Pressing the FSPCE key will skip the above mentioned tests and resume on step (59).		
(58) Place right AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"CLOSE GND SENS BRKRS - VERIFY" displayed.	141 142
(59) On upper EPC close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers.	"SEL DFGC NON-TST SIDE - VERIFY" displayed.	143
(60) On FGCP place DFGS 1, 2, switch to opposite position. Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	144
(61) Place DFGS switch back to test side indicated by illuminated "1" or "2" legend of STP CMPVLD pushbutton. Press pushbutton.	"CYCLE BACKCOURSE PB" displayed.	145

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: The following test sequences verify that the pushbuttons and knobs on the FGCP will make and break contact. If the STP does not cycle to the next test, then the cycling was not detected by the DFGC. Pressing and releasing the VERIFY pushbutton will advise the DFGC of the failure. Pressing and releasing the FSPCE key will advance the STP to the next display message.		
NOTE: The ILS or Autoland modes are not being tested during this sequence. Only the switch operation is checked.		
(61a) Press and release FSPCE key.	"CYCLE SPEED SELECT PB" displayed.	146
(62) Press and release SPD SEL pushbutton.	"CYCLE MACH SELECT PB" displayed.	147
(63) Press and release MACH SEL pushbutton.	"CYCLE EPR LIMIT PB" displayed.	148
(64) Press and release EPR LIM pushbutton.	"CYCLE NAV PB" displayed.	149
(64a) Press and release FSPCE pushbutton (if NAV not installed).	"CYCLE VOR/LOC PB" displayed.	150
(65) Press and release VOR/LOC pushbutton.	"CYCLE ILS PB" displayed.	151
(66) Press and release ILS pushbutton.	"CYCLE AUTOLAND PB" displayed.	152
(67) Press and release AUTO LAND pushbutton.	"CYCLE VERT SPD PB" displayed.	153
(68) Press and release FSPCE key (if VERT SPD not installed).	"CYCLE IAS/MACH PB" displayed.	154
(69) Press and release IAS/MACH pushbutton.	"CYCLE PERF PB" displayed.	155
(70) Press and release FSPCE pushbutton (if PERF not installed).	"CYCLE ALT HOLD PB" displayed.	156
(71) Press and release ALT HOLD pushbutton.	"CYCLE TURB PB" displayed.	157
(72) Press and release TURB pushbutton.	"CYCLE SPEED KNOB (2ND DET IN)" displayed.	159
(73) Push SPD MACH knob full in and release.	"CYCLE HDG KNOB OUT)" displayed.	160
(74) Pull H knob full out and release.	"CYCLE HDG KNOB (2ND DET IN)" displayed.	161
(75) Push H knob full in and release.	"CYCLE ALT KNOB (OUT)" displayed.	162
(76) Pull ALT knob full out and release.	"CYCLE ALT KNOB (IN)" displayed.	163
(77) Push ALT knob full in and release.	"BANK LIMIT 15 DEGREES - VERIFY" displayed.	164
(78) Rotate outer heading knob to 15 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 20 DEGREES - VERIFY" displayed.	165

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(79) Rotate to 20 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 25 DEGREES - VERIFY" displayed.	166
(80) Rotate to 25 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 30 DEGREES - VERIFY" displayed.	167
(81) Rotate to 30 degrees. Press and release VERIFY pushbutton.	"SPEED REF OPER - VERIFY" displayed.	168
(82) Rotate SPD MACH knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"HEADING REF OPER - VERIFY" displayed.	169
(83) Rotate H knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"VERT SPD REF OPER - VERIFY" displayed.	174
(84) Rotate pitch wheel full ANU and AND. Press and release VERIFY pushbutton.	"ALT REF OPER - VERIFY" displayed.	175
(85) Rotate ALT knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-1 REF OPER - VERIFY" displayed.	176
(86) Rotate captain's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-2 REF OPER - VERIFY" displayed.	177
(87) Rotate first officer's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"SENSOR VALUES?" displayed.	
NOTE: The DFGC is not testing the knobs referred to in steps (82) through (87). These are prompter messages to have mechanic be sure knob turns freely and digital display changes.		
SEQUENCE FOUR - "SENSOR VALUES"		
(88) Press and release VERIFY pushbutton.	"DISPLAY OPTION?" displayed.	
NOTE: There are three testing options available when the message "DISPLAY OPTION " appears. FIRST: Pressing and releasing the FSPCE key will automatically null check the sensor values. The values are compared to a ground reference tolerance, and if out of tolerance a fault message will be displayed. SECOND: Pressing and releasing the VERIFY push- button will display the first sensor value. The FSPCE and BSPCE keys can be used at this time for slew capability. Failures are not recognized when this option is selected. THIRD: After pressing and releasing FSPCE key the automatic slewing of measurements occurs until the STP displays "COCKPIT DISPLAYS".		
(89) Press and release VERIFY pushbutton for display option, or FSPCE key.	"PITCH ANGLE 1 = XX.XX DEGREES" displayed.	180
(90) Press and release FSPCE key.	"PITCH ANGLE 2 = XX.XX DEGREES" displayed.	181

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(91) Press and release FSPCE key.	"PITCH ANGLE 3 = XX.XX DEGREES" displayed.	182
(92) Press and release FSPCE key.	"BANK ANGLE 1 = XX.XX DEGREES" displayed.	183
(93) Press and release FSPCE key.	"BANK ANGLE 2 = XX.XX DEGREES" displayed.	184
(94) Press and release FSPCE key.	"BANK ANGLE 3 = XX.XX DEGREES" displayed.	185
(95) Press and release FSPCE key.	"SPOILER POS 1 = (TED or TEU) XX.XX DEG" displayed.	186
(96) Press and release FSPCE key.	"SPOILER POS 2 = (TED or TEU) XX.XX DEG" displayed.	187
(97) Press and release FSPCE key.	"CRS RAD ALT 1 = XXXX. FEET" displayed.	188
(98) Press and release FSPCE key.	"CRS RAD ALT 2 = XXXX. FEET" displayed.	189
(99) Press and release FSPCE key.	"FINE RAD ALT 1 = XXXX. FEET" displayed.	190
(100) Press and release FSPCE key.	"FINE RAD ALT 2 = XXXX. FEET" displayed.	191
(101) Press and release FSPCE key.	"ELEV SYNC A = XX.XX DEGREES" displayed.	192
(102) Press and release FSPCE key.	"ELEV SYNC B = XX.XX DEGREES" displayed.	193
(103) Press and release FSPCE key.	"AIL SYNC A = XX.XX DEGREES" displayed.	194
(104) Press and release FSPCE key.	"AIL SYNC B = XX.XX DEGREES" displayed.	195
(105) Press and release FSPCE key.	"RUD SYNC A = XX.XX DEGREES" displayed.	196
(106) Press and release FSPCE key.	"RUD SYNC B = XX.XX DEGREES" displayed.	197
(107) Press and release FSPCE key.	"YAW DAMP POS = XX.XX DEGREES" displayed.	198
(108) Press and release FSPCE key.	"MACH TRIM POS = XX.XX INCH" displayed.	199
(109) Press and release FSPCE key.	"ELEV TACH A = XX.XX DEG/SEC" displayed.	200
(110) Press and release FSPCE key.	"ELEV TACH B = XX.XX DEG/SEC" displayed.	201

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(111) Press and release FSPCE key.	"AIL TACH A = XX.XX DEG/SEC" displayed.	202
(112) Press and release FSPCE key.	"AIL TACH B = XX.XX DEG/SEC" displayed.	203
(113) Press and release FSPCE key.	"RUD TACH A = XX.XX DEG/SEC" displayed.	204
(114) Press and release FSPCE key.	"RUD TACH B = XX.XX DEG/SEC" displayed.	205
(115) Press and release FSPCE key.	"A/T TACH = XX.XX DEG/SEC" displayed.	206
(116) Press and release FSPCE key.	"MACH TRIM TACH = XX.XX DEG/SEC" displayed.	207
(117) Press and release FSPCE key.	"YAW DAMP TACH = XX.XX DEG/SEC" displayed.	208
(118) Press and release FSPCE key.	"D3A-X ACCEL A = XX.XX FT/SEC*2" displayed.	209
(119) Press and release FSPCE key.	"D3A-X ACCEL B = XX.XX FT/SEC*2" displayed.	210
(120) Press and release FSPCE key.	"D3A-Y ACCEL A = XX.XX FT/SEC*2" displayed.	211
(121) Press and release FSPCE key.	"D3A Y ACCEL B = XX.XX FT/SEC*2" displayed.	212
(122) Press and release FSPCE key.	"D3A-Z ACCEL A = XX.XX FT/SEC*2" displayed.	213
(123) Press and release FSPCE key.	"D3A-Z ACCEL B = XX.XX FT/SEC*2" displayed.	214
(124) Press and release FSPCE key.	"DLA-Y ACCEL A = XX.XX FT/SEC*2" displayed.	215
(125) Press and release FSPCE key.	"DLA-Y ACCEL B = XX.XX FT/SEC*2" displayed.	216
(126) Press and release FSPCE key.	"G/S DEV A = X.XXX DEGREES" displayed.	217
(127) Press and release FSPCE key.	"G/S DEV B = X.XXX DEGREES" displayed.	218
(128) Press and release FSPCE key.	"VOR/LOC DEV A = X.XXX DEGREES" displayed.	219
(129) Press and release FSPCE key.	"VOR/LOC DEV B = X.XXX DEGREES" displayed.	220
(130) Press and release FSPCE key.	"LEFT ELEVATOR = (TEU or TED) X.XXX DEG" displayed.	221
(131) Press and release FSPCE key.	"RIGHT ELEVATOR = (TEU or TED) X.XXX DEG" displayed.	222

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(132) Press and release FSPCE key.	"LEFT AILERON = (TEU or TED) XX.XX DEG" displayed.	223
(133) Press and release FSPCE key.	"RUDDER POS = (TER or TEL) XX.XX DEG" displayed.	224
(134) Press and release FSPCE key.	"HOR STAB = (TEU or TED) XX.XX DEG" displayed.	225
(135) Press and release FSPCE key.	"ANGLE OF ATT 1 = XX.XX DEGREES" displayed.	226
(136) Press and release FSPCE key.	"ANGLE OF ATT 2 = XX.XX DEGREES" displayed.	227
(137) Press and release FSPCE key.	"EPR LEFT = XX.XX EPR" displayed.	228
(138) Press and release FSPCE key.	"EPR RIGHT = XX.XX EPR" displayed.	229
(139) Press and release FSPCE key.	"HEADING 1 = XX.XX DEGREES" displayed.	230
(140) Press and release FSPCE key.	"HEADING 2 = XX.XX DEGREES" displayed.	231
(141) Press and release FSPCE key.	"LEFT FLAPS POS = XX.XX DEGREES displayed.	232
(142) Press and release FSPCE key.	"RIGHT FLAP POS = XX.XX DEGREES" displayed.	233
(143) Press and release FSPCE key.	"FLAP HANDLE = XX.XX DEGREES" displayed.	234
NOTE: During CADC test, the letter T is displayed for CADC on test side and the letter N is for CADC on non test side.		
(144) Press and release FSPCE key.	"CADC-T ALT NCR = XXXX. FEET" displayed.	235
(145) Press and release FSPCE key.	"CADC-N ALT NCR = XXXX. FEET" displayed.	236
(146) Press and release FSPCE key.	"CADC-T TAT = XX.XX DEGREES" displayed.	237
(147) Press and release FSPCE key.	"CADC-N TAT = XX.XX DEGREES" displayed.	238
(148) Press and release FSPCE key.	"CADC-T ALT RATE = XX.XX FT/SEC" displayed.	239
(149) Press and release FSPCE key.	"CADC-N ALT RATE = XX.XX FT/SEC" displayed.	240
(150) Press and release FSPCE key.	"CADC-T SAT = XX.XX DEGREES" displayed.	241
(151) Press and release FSPCE key.	"CADC-N SAT = XX.XX DEGREES" displayed.	242

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(152) Press and release FSPCE key.	"CADC-T CAS = XXX.X FT/SEC" displayed.	243
(153) Press and release FSPCE key.	"CADC-N CAS = XXX.X FT/SEC" displayed.	244
(154) Press and release FSPCE key.	"CADC-T MACH = X.XXXX FT/SEC" displayed.	245
(155) Press and release FSPCE key.	"CADC-N MACH = X.XXXX FT/SEC" displayed.	246
(156) Press and release FSPCE key.	"COCKPIT DISPLAYS?" displayed.	
SEQUENCE FIVE - "COCKPIT DISPLAYS"		
(156a) Place both FD switches to ON.		
NOTE: "ART switch must be in the AUTO position prior to running this sequence."		
(157) Press and release VERIFY pushbutton.	"ART INOP LITE - VERIFY" displayed.	250
(158) On overhead annunciator panel verify ART INOP light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 1 - VERIFY" displayed.	251
(159) On captain's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 2 - VERIFY" displayed.	252
(160) On first officer's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT SELECT APPR - VERIFY" displayed.	253
(161) Verify aural warning sounds. Press and release VERIFY pushbutton.	"ALT SELECT DEV - VERIFY" displayed.	254
(162) Verify aural warning sounds. Press and release VERIFY pushbutton.	"TR EPR VALID - VERIFY" displayed.	255
(163) On center instrument panel EPR flag out of view. If electronic engine display panel is installed, EPR LIMIT is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR indicator/panel. Press and release VERIFY pushbutton.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - displayed.	258
NOTE: The following steps (166) through (169) verify that the AUTOLAND and AP TRIM legends on each FMA have two operable bulbs. "A" light refers to left light bulb; "B" light refers to right light bulb.		
(166) Verify READY light on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE A VERIFY" displayed.	259

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(167) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE B VERIFY" displayed.	260
(168) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE A - VERIFY" displayed.	261
(169) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE B - VERIFY" displayed.	262
(170) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"VERT SPD DETENT - VERIFY" displayed.	263
(171) On FGCP verify pitch wheel detent (cycle) position. Press and release VERIFY pushbutton.	"IAS BUG 1 250 KIAS - VERIFY" displayed.	264
(172) On captain's Mach/ Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"IAS BUS 2 250 KIAS - VERIFY" displayed.	265
(173) On first officer's Mach/Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"EPR BUG LEFT 1.8 EPR - VERIFY" displayed.	266
NOTE: Care must be taken to be sure EPR bug manual set knobs on the EPR indicators are in the automatic (IN) position.		
(174) On center instrument panel verify left EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR BUG RIGHT 1.8 - VERIFY" displayed.	267
(175) Verify right EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR LIMIT CMD 1.8 EPR - VERIFY" displayed.	268
(176) On TRI/EEDP verify EPR LIM reads 1.80(±0.014). Press and release VERIFY pushbutton.	"F/D CMD SW to TEST SIDE - VERIFY" displayed.	269
(176a) On overhead panel, set FD CMD switch to side under test. Press and release VERIFY pushbutton.	"CAPT F/D SW ON VERIFY" displayed.	
NOTE: Side under test corresponds to CMP VLD light number on STP.		
(177) On FGCP, place captain's FD switch to FD position. Press and release VERIFY pushbutton.	"CAPT F/D LITE ON - VERIFY" displayed.	270
(178) On captain's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"CAPT PITCH F/D CENTER - VERIFY" displayed.	271
(179) On captain's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"CAPT PITCH F/D NOSE UP - VERIFY" displayed.	272

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(180) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"CAPT ROLL F/D CENTER - VERIFY" displayed.	273
(181) Verify roll command centered. Press and release VERIFY pushbutton.	"CAPT ROLL F/D RIGHT - VERIFY displayed.	274
(182) Verify roll command moves right. Press and release VERIFY pushbutton.	"CAPT F/D SW OFF - VERIFY displayed.	275
(183) On FGCP, place captain's FD switch to OFF position. Press and release VERIFY pushbutton.	"F/O F/D SW ON - VERIFY" displayed.	276
(184) On FGCP, place F/O's FD switch to FD position. Press and release VERIFY pushbutton.	"F/O F/D LITE ON - VERIFY" displayed.	277
(185) On F/O's FMA, verify blue FD light is flash- ing. Press and release VERIFY pushbutton.	"F/O PITCH F/D CENTER - VERIFY" displayed.	278
(186) On first officer's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"F/O PITCH F/D NOSE UP - VERIFY" displayed.	279
(187) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"F/O ROLL F/D CENTER - VERIFY" displayed.	280
(188) Verify roll command centered. Press and release VERIFY pushbutton.	"F/O ROLL F/D RIGHT - VERIFY" displayed.	281
(189) Verify roll command moves right. Press and release VERIFY pushbutton.	"F/O F/D SW OFF - VERIFY" displayed.	282
(190) On FGCP, place F/O's FD switch to OFF position. Press and release VERIFY pushbutton.	"FAST/SLOW 1 VALID - VERIFY" displayed.	283
(191) On captain's ADI/PFD verify SPD flag in and out of view and slow- fast pointer in and out of view. Press and release VERIFY pushbutton.	"FAST/SLOW 2 VALID - VERIFY" displayed.	284
(192) On first officer's ADI/PFD verify SPD flag in and out of view and slow-fast pointer in and out of view. and release VERIFY pushbutton.	"BOTH SPEED CMDS CENTER - VERIFY" displayed.	285
(193) On captain's and first officer's ADI's/PFD's verify fast-slow pointers centered. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS UP - VERIFY" displayed.	286
(194) Verify both fast-slow pointers move to the fast side. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS DOWN - VERIFY" displayed.	287

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(195) Verify both fast-slow pointers move to the slow side. Press and release VERIFY pushbutton.	"FMA SEGMENTS TEST - VERIFY" displayed, then "FMA SEGMENTS ON - VERIFY" displayed.	288
(196) On captain's and first officer's FMA's verify all alpha-numeric characters display as a STARBURST for approxi- imately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"FGCP/NCP SGMENTS TEST - VERIFY" dis played, then "FGCP/ NCP SGMENTS ON VERIFY" displayed.	289
(197) On FGCP and NAV Control panels verify all numerical seven- segment digits are displayed for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"SECOND SETUP INTERACTIVES?" displayed.	
NOTE: After completion of sequence five, place FD CMD switch on overhead panel back to NORM position.		
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"		
(198) Press and release VERIFY pushbutton.	"ENGAGE A/P - VERIFY" displayed.	312 through 319
(199) On FGCP place AP switch to ON position. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE ON - VERIFY" displayed.	320
(200) On captain's FMA verify AP light on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE ON - VERIFY" displayed.	321
(201) On first officer's FMA verify AP light on. Press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.	322
(202) On FGCP place auto- throttle switch to AUTO THROT position. Press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.	323
(203) On overhead panel verify YAW DAMP switch placed ON. Press and release VERIFY pushbutton.	"Y/D OFF LITE OFF - VERIFY" displayed.	324
(204) On overhead annun- ciator panel verify YAW DAMP OFF light is not on. Press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.	325 326
(205) Tune both NAV control panels to a valid ILS frequency. Press and release VERIFY pushbutton.	"RETARD THROTTLE - VERIFY" displayed.	327 328
(206) Place both throttle levers to the aft mechanical stop. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/ RETRACT VERIFY" displayed.	329 through 337
NOTE: After the FLAP/SLAT handle has been moved, and the VERIFY pushbutton has been pressed, the message "FLAP TEST IN PROGRESS" will be displayed for approximately 30 seconds.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.		
(206a) On center instrument panel, place HYD PUMPS AUX switch to ON, and ALT switch to ON.	Hydraulic pressure available.	
(207) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 11/ MID - VERIFY" displayed.	338 through 342
(208) Place flap/slat handle to 11 degrees. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/ EXTEND - VERIFY" displayed.	343 through 349
(209) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"SELF TESTS?" displayed.	
SEQUENCE SEVEN - "SELF TESTS"		
(209a) Press and release VERIFY pushbutton.	"RCVRS TO ILS VERIFY" displayed.	
NOTE: If testing of the ILS receivers is not desired, press and release FSPCE key and only the radio altimeters and accelerometers self-tests will be performed.		
(210) Press and release VERIFY pushbutton. Wait approximately (30) seconds.	"SERVO TESTS?" displayed.	350 through 381
NOTE: Sequence seven is an automatic self-test of the ILS receivers, R/T units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion.		
SEQUENCE EIGHT - "SERVO TESTS"		
NOTE: For convenience it is possible to selectively run portions of the servo test. For example, step (211) states "A/P ENGAGED - VERIFY"; if the autopilot is engaged and the VERIFY pushbutton is pressed, all 3 Dual Servo tests and the Auto Pitch Trim are performed. If these tests are not to be performed, disengage the autopilot and press and release the FSPCE key. The STP will then display "YAW DAMP ON - VERIFY" step 220). Turning the YAW DAMP off and pressing the FSPCE key will result in the message "MACH TRIM NORM - VERIFY" without having run the yaw damp test. The same procedure also applies for the Mach Trim Actuator and the autothrottle.		
(211) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.	
(211a) Press and release VERIFY pushbutton.		
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed.		
(212) Verify autopilot switch ON. Press and release VERIFY pushbutton.	"A/P ENGAGED - VERIFY" displayed.	385 through 389
(213) Verify both control wheels turn right wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS RWD - VERIFY" displayed.	390 through 402

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(214) Verify both control wheels turn left wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS LWD - VERIFY" displayed.	403 through 407
(215) Verify both control columns move forward. Press and release VERIFY pushbutton.	"COLUMN MOVES FWD - VERIFY" displayed.	408 through 420
(216) Verify both control columns move aft. Press and release VERIFY pushbutton.	"COLUMN MOVES AFT - VERIFY" displayed.	421 through 425
(217) Verify right rudder pedal moves forward. Press and release VERIFY pushbutton.	"RHT PEDAL MOVES FWD - VERIFY" displayed.	426 through 438
(218) Verify left rudder pedal moves forward. Press and release VERIFY pushbutton.	"LEFT PEDAL MOVES FWD - VERIFY" displayed.	439
(219) On pedestal verify trim indicator moves towards nose up. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE UP - VERIFY" displayed.	440
(220) On pedestal verify trim indicator moves towards nose down. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE DN - VERIFY" displayed.	441
(221) On overhead panel, verify YAW DAMP switch ON. Press and release VERIFY pushbutton.	"YAW DAMP ON - VERIFY" displayed.	443
NOTE: If ground power is being applied, verify correct voltage, or a failure may be recorded in the Mach Trim system.		
(222) On overhead panel, verify MACH TRIM COMP switch is in NORM position. Press and release VERIFY pushbutton.	"MACH TRIM NORM - VERIFY" displayed.	444
(223) On FGCP, verify AUTO THROT switch is ON. Press and release VERIFY pushbutton.	"A/T ENGAGED - VERIFY" displayed.	445 through 448
(223a) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/RETRACT VERIFY" displayed. "FLAP TEST IN PROGRESS" displayed.	449
NOTE: If a failure has not been detected, "INTERNAL MONITORS?" will be displayed.		
(223b) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.	
SEQUENCE NINE - "INTERNAL MONITORS"		
NOTE: Sequence nine is an automatic check of the validity of synchros, resolvers and also performs a reasonableness test. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of testing, "FAILURE RECAP?" will be displayed.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(224) Press and release VERIFY pushbutton.	The total number of faults will be displayed momentarily, then the first fault will be displayed.	
NOTE: Momentarily pressing the VERIFY pushbutton after each failure is recorded, will display the diagnostic number.		
(225) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" displayed.	"FAILURE RECAP?" displayed.	
NOTE: If a "FAILURE RECAP?" is desired, press and release VERIFY pushbutton and the total number of faults will again be displayed.		
(226) Press and release FSPCE key.	"MAINTENANCE MEMORY ERASE?" displayed.	
NOTE: At this time the autopilot and autothrottle automatically disengage. Turn off autopilot and autothrottle red warning lights by cycling the disconnect switches.		
(227) Press and release VERIFY pushbutton.	"VERIFY TO ERASE MEMORY?" displayed.	
NOTE: If Maintenance Memory is to be retained, press and release FSPCE key and "FLIGHT FAULT REVIEW?" will be displayed.		
(228) Press and release VERIFY pushbutton.	"FLIGHT FAULT REVIEW?" displayed.	
(229) Press and release POWER pushbutton.	STP message display blank.	
(230) Autopilot and Autothrottle disengage automatically at the conclusion of System Maintenance BIT.	Autopilot disengaged. AP red off warning lights on until either AP disconnect switch pressed. Auto throttle disengaged. THROTTLE red off warning lights on until throttle disconnect switch pressed.	
(231) Place airplane in normal ground configuration.	No test.	

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. Reference DFGS STATUS/TEST, SUBJECT 22-01-05, Page 101, for trouble shooting procedures corresponding to failure.

Table 208

Failure	Diagnostic Number
SEQUENCE ZERO - "STP TESTS"	
STP FWDSPACE PB FAILURE	1
STP BACKSPACE PB FAILURE	2
STP SGMENTS FAILURE	3
NOTE: In tests that multiple failures of a sensor occurs, such as servo failures, the fault will only be displayed once during the FAILURE RECAP.	

Table 208 (Continued)

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
FMA-1 A/P LITE OFF FAILURE	12
FMA-2 A/P LITE OFF FAILURE	13
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
YAW DAMP OFF LITE ON FAILURE	17
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34

Table 208 (Continued)

Failure	Diagnostic Number
ELEVATOR TORQUE LIMIT SWITCH 1 FAILURE	35
ELEVATOR TORQUE LIMIT SWITCH 2 FAILURE	36
NOTE: For -930 and subsequent DFGC's, ELEVATOR is AIL MECH.	
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"	
VG SW UNIT SWITCH FAILURE	73
VG SW UNIT SWITCH FAILURE	74
VG SW UNIT SWITCH FAILURE	75
VG SW UNIT SWITCH FAILURE	76
VG SW UNIT SWITCH FAILURE	77
VG SW UNIT SWITCH FAILURE	78
VG SW UNIT SWITCH FAILURE	79
VG SW UNIT SWITCH FAILURE	80
VG SW UNIT SWITCH FAILURE	81
VG SW UNIT SWITCH FAILURE	82
VG SW UNIT SWITCH FAILURE	83
VG SW UNIT SWITCH FAILURE	84

Table 208 (Continued)

Failure	Diagnostic Number
NOTE: For -930 and subsequent DFGC's, VG is ATT.	
CADC SWITCH FAILURE	85
CADC SWITCH FAILURE	86
CADC SWITCH FAILURE	87
CADC SWITCH FAILURE	88
CADC SWITCH FAILURE	89
CADC SWITCH FAILURE	90
CADC SWITCH FAILURE	91
CADC SWITCH FAILURE	92
TEMP SELECT PANEL FAILURE	93
TEMP SELECT PANEL FAILURE	94
TEMP SELECT PANEL FAILURE	95
TEMP SELECT PANEL FAILURE	96
TEMP SELECT PANEL FAILURE	97
TEMP SELECT PANEL FAILURE	98
TEMP SELECT PANEL FAILURE	99
TEMP SELECT PANEL FAILURE	100
TEMP SELECT PANEL FAILURE	101
TEMP SELECT PANEL FAILURE	102
TEMP SELECT PANEL FAILURE	103
TEMP SELECT PANEL FAILURE	104
TEMP SELECT PANEL FAILURE	105
TEMP SELECT PANEL FAILURE	106
TEMP SELECT PANEL FAILURE	107
TEMP SELECT PANEL FAILURE	108
TR MODE T/O FAILURE	109
TR MODE T/O FLEX FAILURE	110
TR MODE GA FAILURE	111
TR MODE MCT FAILURE	112
TR MODE CL FAILURE	113
TR MODE CR FAILURE	114
TO/GA SWITCH 1 FAILURE	117
TO/GA SWITCH 2 FAILURE	118
A/P 1 DISCONNECT FAILURE	119

Table 208 (Continued)

Failure	Diagnostic Number
A/P 2 DISCONNECT FAILURE	120
CAPT FMA RESET PB FAILURE	121
F/O FMA RESET PB FAILURE	122
GND SENSOR FAILURE	123
GND SENSOR FAILURE	124
LEFT PNEU X FEED OPEN FAILURE	125
ASOC AIRFOIL ICE ON FAILURE	126
ASOC AIRFOIL ICE OFF FAILURE	127
LEFT PNEU X FEED CLOSE FAILURE	128
RIGHT PNEU X FEED OPEN FAILURE	129
ASOC AIRFOIL ICE ON FAILURE	130
ASOC AIRFOIL ICE OFF FAILURE	131
RIGHT PNEU X FEED CLOSE FAILURE	132
L ENG ANTI-ICE SW ON FAILURE	133
L ENG ANTI-ICE SW OFF FAILURE	134
R ENG ANTI-ICE SW ON FAILURE	135
R ENG ANTI-ICE SW OFF FAILURE	136
LEFT A/C SUP SW AUTO FAILURE	137
LEFT A/C SUP SW OFF FAILURE	138
RIGHT A/C SUP SW AUTO FAILURE	139
RIGHT A/C SUP SW OFF FAILURE	140
GND SENSOR FAILURE	141
GND SENSOR FAILURE	142
SEL DFGC NON-TST SIDE FAILURE	143
SEL DFGC TEST SIDE FAILURE	144
BACK COURSE PB FAILURE	145*
FMS OVRD PB FAILURE	145**
SPEED SELECT PB FAILURE	146
MACH SELECT PB FAILURE	147
EPR LIMIT PB FAILURE	148
NAV PB FAILURE	149
VOR/LOC PB FAILURE	150
ILS PB FAILURE	151
AUTOLAND PB FAILURE	152

Table 208 (Continued)

Failure	Diagnostic Number
VERT SPD PB FAILURE	153
IAS/MACH PB FAILURE	154
PERF PB FAILURE	155
PERF OR VNAV PB FAILURE	155***
ALT HOLD PB FAILURE	156
TURB PB FAILURE	157
SPEED KNOB (2ND DET IN) FAILURE	159
HDG KNOB (OUT) FAILURE	160
HDG KNOB (2ND DET IN) FAILURE	161
ALT KNOB (OUT) FAILURE	162
ALT KNOB (IN) FAILURE	163
BANK LIMIT 15 DEGREES FAILURE	164
BANK LIMIT 20 DEGREES FAILURE	165
BANK LIMIT 25 DEGREES FAILURE	166
BANK LIMIT 30 DEGREES FAILURE	167
SPEED REF OPER FAILURE	168
HEADING REF OPER FAILURE	169
CAPT HDG SEL REF FAILURE	173
VERT SPD REF OPER FAILURE	174
ALT REF OPER FAILURE	175
CRS-1 REF OPER FAILURE	176
CRS-2 REF OPER FAILURE	177
NOTE: * Used for customers with back course option. ** Used for customers with FMS and -970 DFGC and subs. *** Used for customers with -970 DFGC and subs.	
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188

Table 208 (Continued)

Failure	Diagnostic Number
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP SYNC FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE FIVE - "COCKPIT DISPLAYS"	
EPR SEL LITE A AND B FAILURE	249
ART INOP LITE FAILURE	250
ALT ADV LITE 1 FAILURE	251
ALT ADV LITE 2 FAILURE	252

Table 208 (Continued)

Failure	Diagnostic Number
ALT SELECT APPR FAILURE	253
ALT SELECT DEV FAILURE	254
TR EPR VALID FAILURE	255
TR NO MODE LITE FAILURE	256
ART ON LITE FAILURE	257
ART READY LITE FAILURE	258
NO AUTOLAND LITE A FAILURE	259
NO AUTOLAND LITE B FAILURE	260
A/P TRIM LITE A FAILURE	261
A/P TRIM LITE B FAILURE	262
VERT SPD DETENT FAILURE	263
IAS BUG FAILURE	264
IAS BUG FAILURE	265
EPR BUG FAILURE	266
EPR BUG FAILURE	267
EPR LIMIT CMD FAILURE	268
CAPT F/D SW FAILURE	269
CAPT F/D LITE ON FAILURE	270
PITCH F/D FAILURE	271
PITCH F/D FAILURE	272
ROLL F/D FAILURE	273
ROLL F/D FAILURE	274
CAPT F/D SW FAILURE	275
F/O F/D SW FAILURE	276
F/O F/D LITE ON FAILURE	277
PITCH F/D FAILURE	278
PITCH F/D FAILURE	279
ROLL F/D FAILURE	280
ROLL F/D FAILURE	281
F/O F/D SWITCH FAILURE	282
FAST/SLOW 1 VALID FAILURE	283
FAST/SLOW 2 VALID FAILURE	284
FAST/SLOW CMD FAILURE	285
FAST/SLOW CMD FAILURE	286

Table 208 (Continued)

Failure	Diagnostic Number
FAST/SLOW CMD FAILURE	287
FMA SEGMENTS FAILURE	288
FGCP/NCP SEGMENTS FAILURE	289
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQUE SWITCH 1 FAILURE	332
ELEV MECH TORQUE SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340

Table 208 (Continued)

Failure	Diagnostic Number
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQUE SWITCH 1 FAILURE	346
ELEV MECH TORQUE SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372

Table 208 (Continued)

Failure	Diagnostic Number
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - "SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
* An open Aileron Torque Limit Rheostat will prevent A/P engage with flaps above 26 degrees, but will not prevent engage when flaps are below 26 degrees.	
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407

Table 208 (Continued)

Failure	Diagnostic Number
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RIGHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441

Table 208 (Continued)

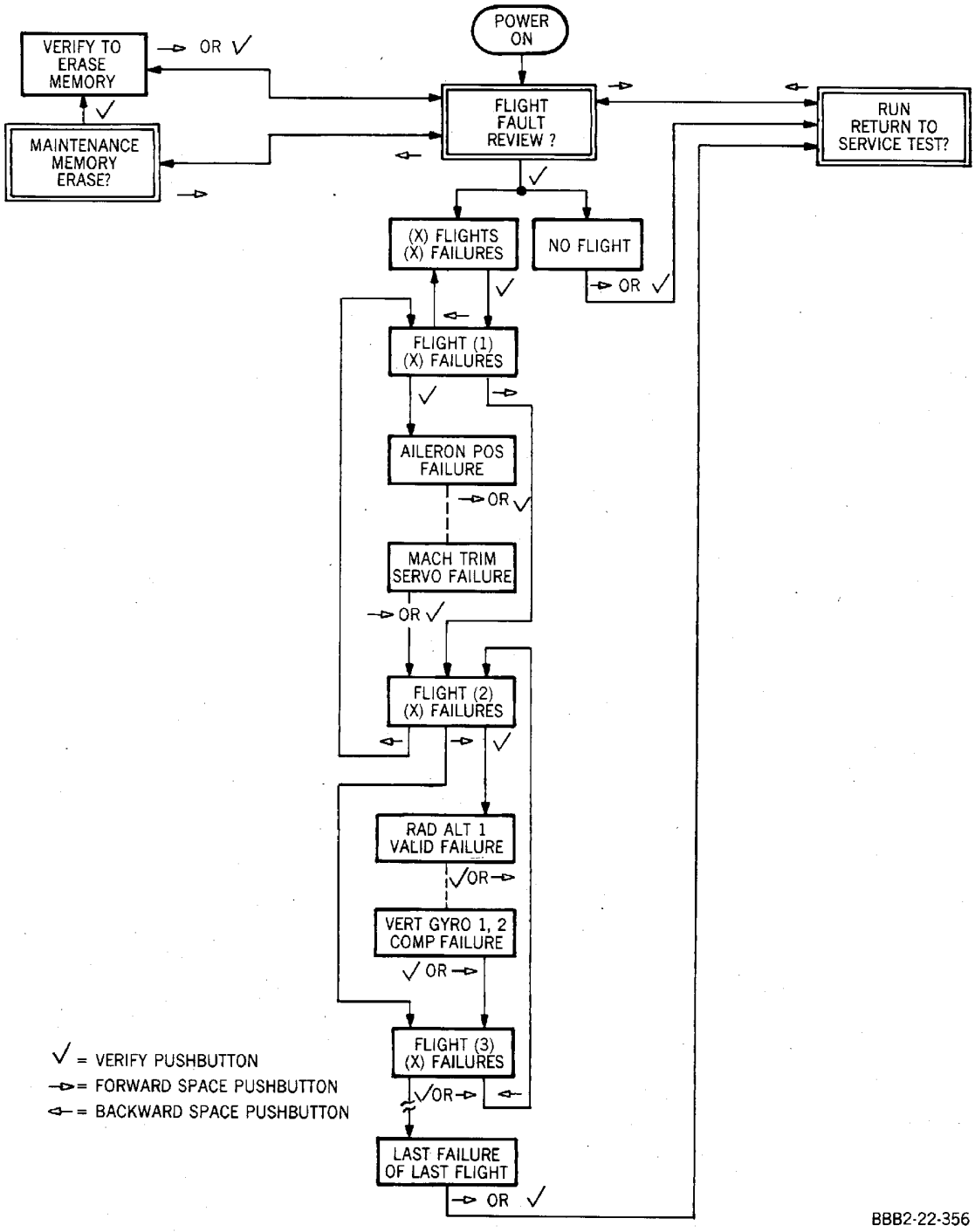
Failure	Diagnostic Number
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR RATE FAILURE	461
CADC -N ALT BCR RATE FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474

Table 208 (Continued)

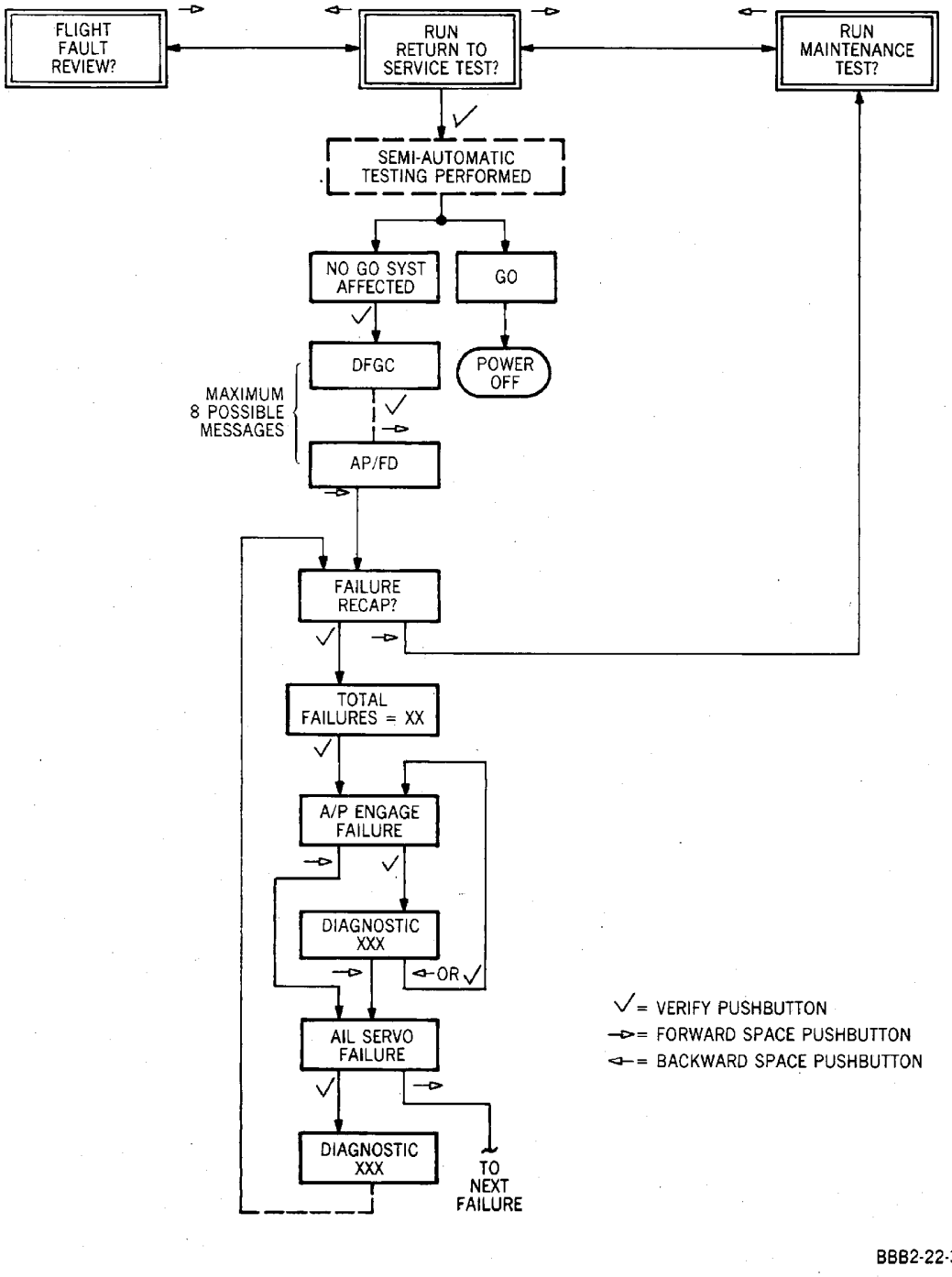
Failure	Diagnostic Number
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT/SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507

Table 208 (Continued)

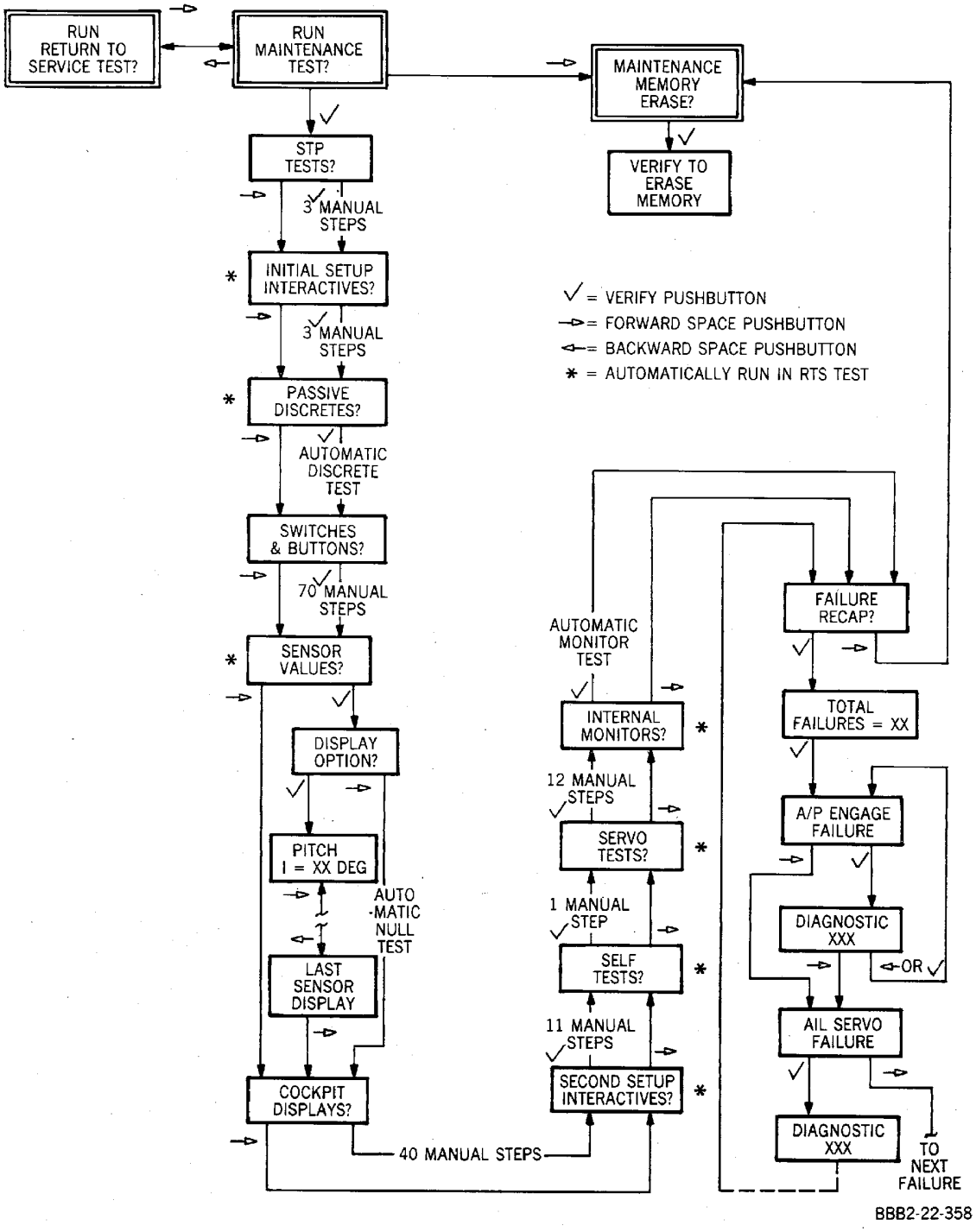
Failure	Diagnostic Number
PMS DATA FAILURE	508*
PMS/FMS DATA FAILURE	508**
WINDSHEAR DATA FAILURE	509***
NOTE: * For customers with PMS. ** For customers with FMS and -970 DFGC and subs. *** For customers equipped with windshear computers.	
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528



STP - Flight Fault Review Operation
Figure 202/22-01-05-990-931



STP - Run Return to Service Operation
Figure 203/22-01-05-990-932



STP - Run Maintenance Test Operation
Figure 204/22-01-05-990-933

DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

1. General

A. The DFGS Status/Test (STP) panel is located beneath the captain's briefcase compartment. The STP has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The STP provides the operator with a display of English language commands and questions.

B. BIT provides three modes of testing. Continuous (Flight Fault Review) BIT, Return to Service (RTS) BIT, and System Maintenance BIT. The Autoland Preflight Test is also provided in this section, since a failure during this test can be recalled and displayed on the STP.

C. A self-test feature of the STP (during System Maintenance BIT) is provided to assure the operator that the STP is functional prior to test initiation. All keys and pushbuttons are checked and appropriate message displays are verified.

D. During System Maintenance BIT, pressing the Forward Space (FSPCE) key on the STP will automatically advance the STP to the next test step. If a complete sequence of tests are to be bypassed, pressing the FSPCE key at the beginning of a test sequence will automatically advance the test to the next test sequence.

E. During System Maintenance BIT, pressing the Back Space (BSPCE) key on the STP will automatically back the test to the previous test step if a failure has occurred. Pressing the BSPCE key twice in succession after a failure will program the test sequence over again.

F. During System Maintenance BIT, if a failure occurs, an English language message ending with the word "FAILURE" will appear. Pressing the VERIFY pushbutton on the STP will cause a diagnostic number to appear, then pressing the VERIFY pushbutton the second time will cause the message to reappear on the STP. If the failure is not corrected at that time, pressing the FSPCE key will log the failure and continue the test. At the conclusion of testing, the message "FAILURE RECAP?" will be displayed. At this time all failures can be recorded for correction. Once the test is exited, failures recorded are automatically erased.

G. During RTS BIT an interruption does not occur if a failure is detected during the test. If a failure is detected, "NO GO - SYSTEM AFFECTED?" will be displayed upon completion of the test. When "NO GO - SYSTEM AFFECTED?" is displayed, pressing the VERIFY pushbutton will display the function(s) that are affected, i.e. NO AUTOLAND, AP/FD, etc. If a system is listed it indicates only that a problem has been detected and not necessarily that the system is inoperative. After the function(s) is displayed, all failures can be recorded for correction. If no failures occur during RTS, GO is displayed.

H. Ten sequences of tests are provided on the STP during System Maintenance Bit. Each sequence has diagnostic numbers that accompanies each failure detected. Portions of the testing requires operator interaction, and portions of the testing are automatic. Any failures that occur during the Maintenance Test will be displayed immediately upon detection.

I. Seven sequences of tests are provided during RTS BIT. The diagnostic numbers and failures are called out at the conclusion of testing during "FAILURE RECAP?"

J. Personnel should be familiar with the functional use of all keys and pushbuttons on the STP prior to performing any tests that require operator interaction. (Figure 201)

WARNING: DURING SYSTEM MAINTENANCE BIT, THE USE OF HYDRAULIC POWER IS REQUIRED. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL, AND CONTROL SURFACE AREAS ARE CLEARED OF ALL PERSONNEL AND EQUIPMENT.

CAUTION: VERIFY METER SEL & HEAT SWITCH, LOCATED ON OVERHEAD PANEL IS IN THE OFF POSITION ANYTIME THE AIRPLANE IS IN THE FLIGHT MODE, (GROUND SENSING CIRCUIT BREAKERS OPENED, OR ON JACKS), TO PREVENT DAMAGE TO AIR DATA OR ANGLE-OF-ATTACK SENSORS.

CAUTION: WHENEVER UNIT(S) AND/OR COCKPIT INSTRUMENT(S) ARE POWERED ON THE GROUND, THE TWO AVIONICS COOLING FANS AND INSTRUMENT COOLING FAN MUST BE OPERATING. IN ADDITION, IF FLIGHT COMPARTMENT AIR TEMPERATURE IS ABOVE 85° F., AIR CONDITIONING SHOULD BE PROVIDED. IF AIR CONDITIONING IS NOT AVAILABLE, FLIGHT COMPARTMENT WINDOWS AND ELECTRICAL/ELECTRONICS ACCESS DOOR MUST BE OPEN TO PREVENT OVERHEAT OF EQUIPMENT.

K. Repeat any failed test step to verify that after maintenance action has been performed and completed, the fault has been cleared.

L. The following table describes flight guidance circuit breakers and how they function and the importance to the operation of the aircraft. It gives the associated problems caused when these breakers fail.

Table 201

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-361	28VAC-L	J1B-12	Loss of power from this breaker, if the aircraft is on the ground, would cause loss of the Flight Guidance Control Panels Altitude window, Both #1 and #2 Flight Director Bars Bias Out of View (if in Takeoff mode). The Mach Trim Fault, Yaw Damper Off and Windshear Inop messages are displayed (AP1 selected).
DFGS-1	B10-351	115VAC-L	J2A-12	Loss of power from this breaker, on the ground will cause the entire Flight Guidance Control Panel and the Nav Control Panel Course window to go blank. The #1 Flight Director Bars Biased Out of View and the #1 Fast/Slow Indicator displayed a Fail Flag. The Mach Trim Fault and Yaw Damper Off messages were displayed (AP1 selected). In addition, #1 Auto- throttles became Inop, and the TRP had a NO MODE light on.
DFGS-1	B10-360	28VAC-R	J4B-12	Loss of power from this circuit breaker caused the NO AUTOLAND light to be displayed, with AP1 selected.
DFGS-1	B10-347	28VDC-R	J2A-1,2	No cockpit indications were present if this circuit breaker is inoperative. No messages were displayed if AP2 was selected.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
Yaw Damper-1	B10-345	28VDC-L	J3B-7	With the Yaw Damper Switch in the ON position and AP1 selected, the YAW DAMPER OFF message appeared.
AP-1	B10-353	28VDC-L	J4B-104 J1B-104 J1A-94 J4A-94	With AP1 selected, the NO AUTOLAND message was displayed.
DFGS-1	B10-349	28VDC-L	J1A-1 J3A-1,2, 3,4	The Flight Guidance Control Panel blanked if breaker power was lost and AP1 selected. In addition, both Nav Panels blanked. The TRP had a NO MODE light on. The #1 Flight Director Bars Bias Out of View and the #1 Slow/Fast Fail flag appeared.
DFGS-2	B10-362	28VAC-R	J4B-12	With the aircraft on the ground and AP2 selected, loss of this circuit breakers' power caused the NO AUTOLAND light to be displayed. In addition, The Flight Guidance Control Panels' Altitude was blank and the #2 Nav Panels CRS numbers were randomly cycling. Both Flight Director Bars Biased Out of View. On the overhead, the Mach Trim Fault and Yaw Damper OFF messages were displayed. #1 and #2 Slow/Fast Indicators became Inop (AP2 was selected).
DFGS-2	B10-352	115VAC-R	J2A-12	With AP2 selected the Flight Guidance Control Panel blanked, the Mach Trim Fault Yaw Damper Off message were displayed Both Nav Panels CRS windows blanked and the TRP had a NO MODE message displayed. Autothrottles were Inop.
DFGS-2	B10-363	28VAC-L	J1B-12	Loss of this breakers' power caused the NO AUTOLAND message to be displayed if AP2 was selected.
DFGS-2	B10-348	28VDC-L	J2A-1,2	There is no cockpit indication that DFGC#2 is not receiving power from this breaker. (On the ground, AP2 selected.)
Yaw Damper-2	B10-346	28VDC-R	J3B-7	With AP2 selected and this breaker not supplying power, the Yaw Damper OFF message was displayed.
AP-2	B10-354	28VDC-R	J4B-104 J1B-104	With AP2 selected the NO AUTOLAND light was displayed.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-2	B10-350	28VDC-L	J1A-94 J1A-1 J3A-1,2, 3,4	With AP2 selected and the aircraft on the ground, the AP TRIM, AP1 and AP2 annunciators on FMA#2 were illuminated. In addition, #2 Fast/Slow was Inop. The TRP had a NO MODE light displayed. On the overhead the Mach Trim Fault, Yaw Damper OFF and Windshear Inop messages displayed.
DFGS AP/AT Warning LTS "A"	B10-341	28VDC Xfer	FMA (J1-A)	With this circuit breaker not supplying power, both FMA'S A/T and AP OFF red warning lights "A" bulb was inop.
DFGS AP/AT Warning LTS "B"	B10-342	28VDC Xfer	FMA (J4A-1)	This circuit breaker supplies basic power for both DFGC's Channel "B" processor. Loss of power from this breaker will cause both #1 and #2 Flight Directors to fail. In addition, the Fast/Slow Indicators failed, the NO AUTOLAND light was displayed, the TRP had a NO MODE light, and the Flight Guidance Control Panels Altitude window went blank. (Breaker power was lost after initial power up.) The Nav Panels' CRS Windows also blanked. Loss of power from this breaker also affects Status Test Panel operation.

2. STP Test Functions

A. Procedures for Testing DFGS

Table 202

Paragraph	Test Function
Paragraph 3.A.	Continuous (Flight Fault Review) BIT
Paragraph 3.B.	Autoland Preflight Test
Paragraph 3.C.	Return to Service (RTS) BIT (DFGS)
Paragraph 3.D.	System Maintenance BIT (Maintenance Test)

B. Digital Flight Guidance System (DFGS) Power-Up Test Prior to STP Test

NOTE: Both Digital Flight Guidance Computers (DFGC's) may fail to come on line and halt STP testing procedures.

(1) When DFGS information is not displayed with side select switch in either position, proceed as follows:

(a) Check 115 VAC power and ground to each DFGC electrical connector. (PAGEBLOCK 22-16-00/101)

(b) Check no ground exists at DFGC jack connector pins J2A (36) and J3A (36). Remove ground(s) when ground(s) exist and check DFGS operation is normal. (PAGEBLOCK 22-14-00/101)

NOTE: A ground at the J2A (36) and J3A (36) points represents holding down of the autopilot disconnect (on control wheel) not allowing DFGC to begin internal checks.

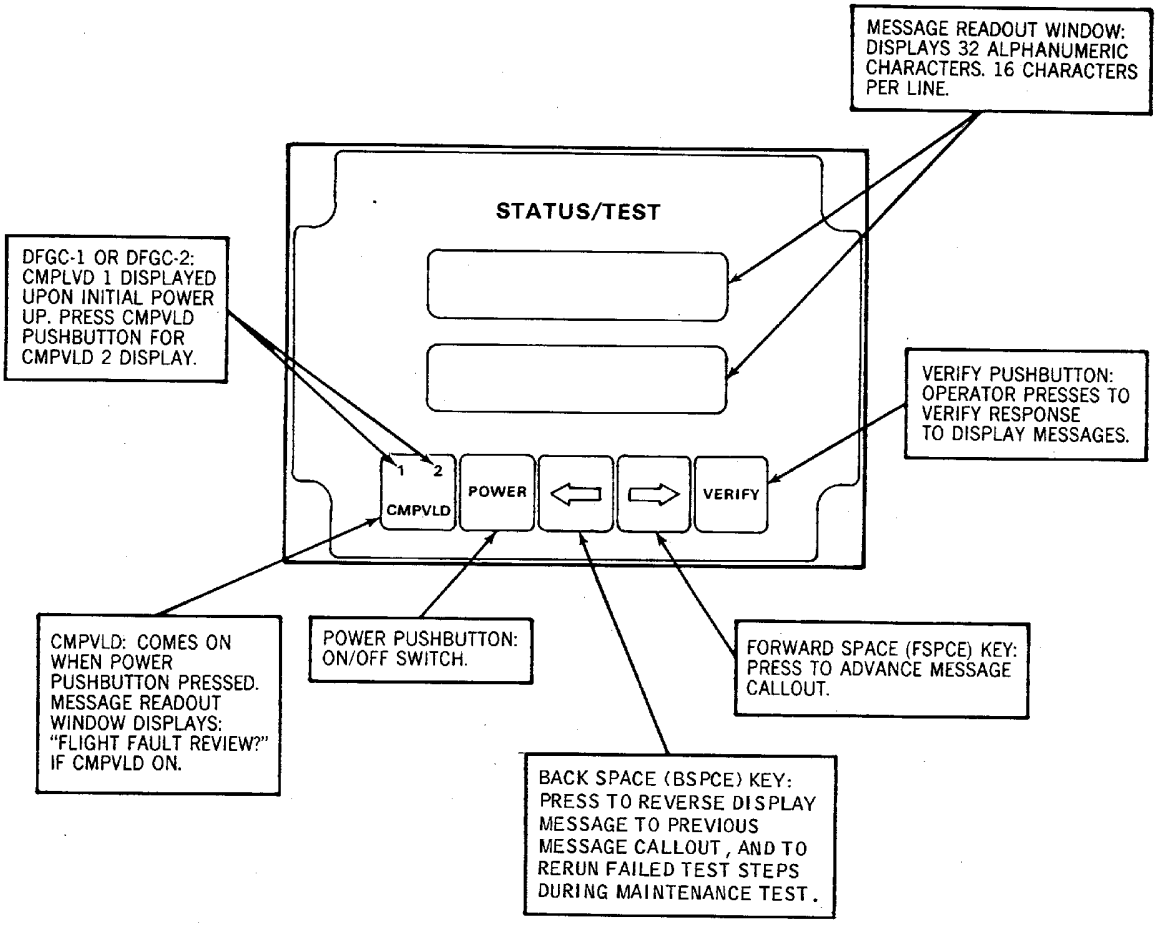
(c) Check short to ground is not present at jack connector pins J1 (Z) and J3 (Z) on DFGS control panel. Should a ground exist, isolate ground source and repair. (PAGEBLOCK 22-01-03/101)

NOTE: Before incorporation of Service Bulletin 24-67, the auxiliary power unit (APU) generator field wiring can contact air conditioning piping resulting in malfunction of the APU generator and/or Digital Flight Guidance System-1 (DFGS-1). This can occur due to chafing wire.

(2) When partial DFGS displays such as one Flight Mode Annunciator (FMA) indicating HDG HLD, ALT HLD, and opposite FMA blank with both Flight Director (FD) switches on, proceed as follows:

(a) Check 28 VDC is available at jack pins J1A (1 and 60) and J4A (1) on each DFGC electrical connector. (PAGEBLOCK 22-17-00/101)

NOTE: This 28 VDC is source power for the "A" and "B" channels of the central processor.



Status/Test (STP) Panel
Figure 201/22-01-05-990-934

3. STP Functional Tests

A. Continuous (Flight Fault Review) BIT

NOTE: Continuous BIT is an internal monitor mode of the DFGC and is not controlled by the STP. Continuous BIT begins operation as soon as power is applied to the DFGS and operates continuously, even during Autoland Availability Preflight BIT, RTS BIT and System Maintenance BIT. If Continuous BIT recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel. If the autoland mode is affected, the "NO AUTOLAND" annunciator on each FMA will come on and flash to alert the flight crew that the autoland mode of operation is not available.

NOTE: Flight Fault Review Bit is provided from continuous Bit which is an internal monitor mode of the DFGC after airplane liftoff. Continuous Bit begins operation as soon as power is applied to the DFCS and operates continuously. If Continuous Bit recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel as Flight Fault Review Bit.

Table 203

Action	Desired Result
(1) On aircraft with EFIS, ensure DFGC/EFIS select switch is in the DFGC position.	
(1a) Verify DFGS switch is in same position 1, or 2 as used during flight.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
NOTE: If it is desired to interrogate DFGC 2, press and release CMPVLD pushbutton and number 2 will appear.	
(3) Press and release VERIFY pushbutton.	"NO FAULTS" displayed.
NOTE: If a failure has occurred, the number of flights and number of failures will appear. For example, if the airplane had five flights and two failures, the display message would read "5 FLIGHTS 2 FAILURES". Pressing and releasing the VERIFY pushbutton will display the most recent flight, i.e. "FLIGHT 1 1 FAILURE". Pressing and releasing the FSPCE key will display each flight and number of failures recorded for each flight. If zero failures have occurred, "NO FAULTS" will be the message displayed. Proceed to step (8) if "NO FAULTS" is the displayed message.	
(4) Press and release VERIFY pushbutton.	"FLIGHT 1 - XX FAILURE" displayed.
(5) Press and release FSPCE key.	"FLIGHT 2 - XX FAILURE" displayed.
(6) Read and record all flight faults by pressing and releasing VERIFY pushbutton until the message "FLIGHT FAULT REVIEW?" is displayed.	"FLIGHT FAULT REVIEW?" displayed.

Table 203 (Continued)

Action	Desired Result
NOTE: The in-flight logging system of the DFGS provides a feature that allows stored failures (maintenance memory) to be erased. This may be accomplished in one of two ways manually or automatically. MANUALLY: The STP may be used to erase the memory by use of the FSPCE key until the message "MAINTENANCE MEMORY ERASE?" is displayed. Pressing and releasing the VERIFY pushbutton will then display "VERIFY TO ERASE MEMORY?". Pressing and releasing the VERIFY pushbutton will then clear all of the stored failures. AUTOMATICALLY: If the maintenance memory is not periodically cleared, it will eventually fill up. Each time the DFGC is powered up, the maintenance memory is checked. If the memory store is more than 80%, the DFGC saves the most recent 150 failures and clears the rest. The memory can store approximately 350 failures, thus leaving room for approximately 200 failures. The maintenance memory is dedicated for in-flight failure logging only. These failures are displayed only during "FLIGHT FAULT REVIEW?". This memory is entirely independent of the memory used by the Return To Service Test or the Maintenance Test. Failures logged while performing these tests are erased by exiting the respective test.	
(7) Press and release FSPCE key.	"RUN RETURN TO SERVICE TEST?" displayed.
NOTE: If a Return to Service (RTS) test is desired, press and release VERIFY pushbutton. If an RTS is not desired, proceed to step (8).	
(8) Press and release POWER pushbutton.	STP message display blank.
(9) Place aircraft in normal ground configuration.	No test.
NOTE: If maintenance action has been performed, proceed to either Paragraph 3.C. or Paragraph 3.D. as appropriate.	

B. Autoland Preflight Test

Table 204

Action	Desired Result
NOTE: The Autoland Preflight Test provides assurance to the flight crew that the autoland mode of operation is available. However, this test is designed primarily for the flight crew, maintenance personnel should use the RTS to check autoland status. The Autoland Preflight Test will only check radio altimeters self test, dual accelerometer self test, elevator torque limit switch verified both agree for flap configuration, rudder unrestricted switches are indicating unrestricted state and NAV receivers self test. Both NAV receivers must be tuned to an ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control Panel must be pressed.	
(1) Verify DFGS switch is placed in position 1, or 2 as appropriate for next flight.	No test.
NOTE: While performing the Autoland Preflight Test, if the Status/Test Panel is activated the Autoland Preflight Test cannot be initiated.	
(2) Tune both VHF/NAV Control panels to an ILS frequency.	Both NAV receivers tuned to an ILS frequency.
(2a) Set switches as follows: (1) Both FD switches to OFF. (2) AP engage switch to OFF. (3) Overhead FLT DIR switch to NORM.	No test.
NOTE: On later aircraft FLT DIR switch is FD CMD.	
(3) On Flight Guidance Control Panel, press and release AUTO LAND pushbutton.	Associated Flight Mode Annunciator (FMA) on instrument panel displays AUTO LND/PRE/FLT/TEST, and NO AUTOLAND appears flashing.

Table 204 (Continued)

Action	Desired Result
(4) Wait approximately 45 seconds.	Both captain's and first officer's FMA's blank, if FD switches are in OFF position.
(5) Observe both FMA's and verify that the NO AUTOLAND legend goes blank.	NO AUTOLAND legend blank on both FMA's.
NOTE: If the NO AUTOLAND legend remains on the FMA's, either the ILS, radio altimeters, dual accelerometers or Continuous BIT detected a failure that would inhibit the autoland mode of operation. Proceed to Paragraph 3.C. to isolate failure(s).	
NOTE: For AHRS equipped aircraft, during the autoland preflight test the AHRS system preflight test is conducted. A steady "NO AUTOLAND" message on the FMA's is normal during the AHRS preflight test, and does not indicate a failed test unless it remains on after the AHRS test is complete and the AHRS has returned to the normal mode.	

C. Return to Service (RTS) BIT (DFGS)

Table 205

Action	Desired Result
NOTE: Return to Service (RTS) BIT is provided to place the airplane back into a non-restricted (including autoland) service after maintenance action has been performed (i.e. LRU replacement). The STP is capable of performing ten sequences of tests 0 thru 9 (DFGS STATUS/TEST, SUBJECT 22-01-05, Pages 212-218). Sequences 1, 2, 4, 6, 7, 8 and 9 are only performed during RTS. All sequences of tests are performed during System Maintenance BIT. The RTS is run completely and failures are displayed at the end of test.	
NOTE: All switches such as CADC, V.G., NAV and Flight Director switches should be in the NORMAL position for the Return To Service test.	
(1) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.
(1a) Place flap/slat handle to LAND EXT position.	No test.
(1b) Verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release FSPCE key until "RUN RETURN TO SERVICE TEST?" appears.	"RUN RETURN TO SERVICE TEST?" displayed.
(4) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE VERIFY" displayed.
NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.	
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.	
(5) Press and release VERIFY pushbutton.	"TURN ON AUX HYD PUMP VERIFY" displayed.
NOTE: The RTS test requires the aircraft to be in the landing configuration. Hydraulic power is required to properly set the flaps and rudder. Hydraulic power is not required if flaps are at 28 to 40 degrees and the rudder is centered (crosswinds may blow the rudder hardover causing the Rudder Servo test to fail).	
(6) Place HYD PUMPS - AUX and TRANS switches on F/O instrument panel to ON position. Press VERIFY.	"TURN ON RUDDER HYD - VERIFY" displayed.

Table 205 (Continued)

Action	Desired Result
(7) Turn on rudder hydraulics (on fwd pedestal). Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/EXTEND - VERIFY" displayed.
(7a) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
(8) Check A/P is disengaged then press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.
(9) Check A/T is disengaged. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.
(10) Disengage Y/D if engaged then "RCVRS NOT ILS - VERIFY" press and release VERIFY pushbutton.	displayed.
(11) Detune receivers from ILS frequency (if tuned) then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
NOTE: Sequence two "PASSIVE DISCRETES" and sequence four "SENSOR VALUES" are checked automatically. Sequence three and sequence five tests are skipped and are performed during System Maintenance BIT. During the tests, the message "TEST IN PROGRESS" will be displayed.	
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
(12) When step (11) is complete, observe STP.	"ENGAGE A/P - VERIFY" displayed.
(13) Engage A/P then press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.
(14) Engage autothrottle then press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.
(15) Engage Yaw Damper then press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.
NOTE: Tune receivers to a valid ILS frequency.	
(16) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" followed by "RETARD THROTTLES - VERIFY" displayed.
NOTE: Verify both throttle levers are below the minimum authority switches.	
(17) Retard throttles then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
SEQUENCE SEVEN - "SELF TESTS"	
NOTE: Sequence seven is an automatic self-test of the NAV receivers, R/A units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion. At end of sequence seven, the STP will display "WHEEL TURNS RWD - VERIFY".	
SEQUENCE EIGHT - "SERVO TESTS"	

Table 205 (Continued)

Action	Desired Result
CAUTION: CONTROL WHEEL, COLUMN, PEDALS, STABILIZER, AUTOTHROTTLES, MACH TRIM AND Y/D ACTUATOR WILL MOVE DURING TEST EIGHT.	
NOTE: During this sequence, the operator will check control movement by cycling the verify pushbutton. A failure will be acknowledged by cycling the forward space pushbutton.	
NOTE: Failures as detected by the software will appear in the Failure Recap which can be displayed at the end of "RTS Tests".	
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed. While the servos are in operation, the message will display flashing.	
(18) Check control wheel is stationary and displaced in CW direction from neutral position.	
(19) Press and release VERIFY pushbutton.	Control wheel will move and during this test period, STP displays "TEST IN PROGRESS".
(20) At test completion STP displays new message.	"WHEEL TURNS LWD - VERIFY" is displayed.
(21) Check control wheel is stationary and displaced in CCW direction from neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position. STP displays "TEST IN PROGRESS".
(22) At test completion STP displays new message.	"COLUMN MOVES FWD - VERIFY" is displayed.
(23) Check control column is stationary and forward of neutral position. Press and release VERIFY pushbutton.	Control column will move. STP displays "TEST IN PROGRESS".
(24) At test completion STP displays new message.	"COLUMN MOVES AFT VERIFY" is displayed.
(25) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position and right rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(26) At test completion STP displays new message.	"RHT PEDAL MOVES FWD VERIFY" is displayed.
(27) Check right rudder pedal moved forward. Press and release VERIFY pushbutton.	Left rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(28) At test completion STP displays new message.	"LEFT PEDAL MOVES FWD VERIFY" is displayed.
(28a) Check left rudder pedal moves forward. Press and release VERIFY pushbutton.	During this test STP displays "TEST IN PROGRESS".
NOTE: Part of sequence eight and all of sequence nine tests are done automatically.	
(28b) At test completion STP displays new message.	"FLAP/SLAT TO 0 RETRACT VERIFY" is displayed.
(28c) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"GO OR NO-GO-SYSTEM AFFECTED" is displayed.
SEQUENCE NINE - "INTERNAL MONITORS"	
NOTE: Sequence nine is an automatic check of the real time internal monitors appropriate to ground testing. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of the test either "GO" or "NO GO - SYSTEM AFFECTED?" will be displayed.	

Table 205 (Continued)

Action	Desired Result
NOTE: If "GO" is displayed, proceed to step (33) to conclude testing. If "NO GO - SYSTEM AFFECTED?" is displayed, proceed to step (29).	
(29) Press and release VERIFY pushbutton.	One or more of the following faults may appear if a fault is detected in the system. "DFGC" "NO AUTOLAND" "AP/FD" "A/T" "S/C" "ART" "TRC" "M/T" "Y/D"
(30) Press and release FSPCE key.	"FAILURE RECAP?" displayed.
(31) Press and release VERIFY pushbutton.	The number of faults will be displayed momentarily (approx. 3 seconds), then the STP will momentarily flash VERIFY = DIAG NUM FWD = NEXT FAILURE and the first fault will be displayed.
(32) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" is displayed.	"FAILURE RECAP?" displayed.
NOTE: While failure is displayed, pressing VERIFY will display associated diagnostic number.	
(33) Press and release POWER pushbutton.	STP message display blank.
NOTE: Autopilot and Autothrottle will automatically disengage if STP is turned off.	
(34) Hold control wheel (if wheel or column is dis- placed) and disengage autopilot. Press and release either AP disconnect switch.	Autopilot disengaged, AP red off warning lights on until either AP disconnect switch pressed.
(35) Disengage yaw damper. Place YAW DAMP switch to OFF at right of overhead panel.	Yaw damper disengaged.
(36) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.
(37) Place aircraft in normal ground configuration.	No test.

NOTE: Following is a list of failures and diagnostic numbers that may appear during a maintenance test or after a RTS "NO GO - SYSTEM AFFECTED?" message appears.

Table 206

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8

Table 206 (Continued)

Failure	Diagnostic Number
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
NOTE: On aircraft with -930 and subsequent DFGC, VERT GYRO is ATT.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43

Table 206 (Continued)

Failure	Diagnostic Number
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP POS FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202

Table 206 (Continued)

Failure	Diagnostic Number
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW/DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328

Table 206 (Continued)

Failure	Diagnostic Number
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQ SWITCH 1 FAILURE	332
ELEV MECH TORQ SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQ SWITCH 1 FAILURE	346
ELEV MECH TORQ SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358

Table 206 (Continued)

Failure	Diagnostic Number
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393

Table 206 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
NOTE: * An inoperative torque limit rheostat may prevent A/P engagement and can cause an "AIL SERVO FAILURE" message to be logged if flaps are less than 26 degrees. With flaps greater than 26 degrees the torque limit rheostat will not prevent A/P engagement. Place flaps greater than 26 degrees to verify.	
WJE 892, 893	
NOTE: With Service Bulletin 22-111 incorporated and the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per aircraft KCN (K1123) Service Bulletin, the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891	
NOTE: With the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per aircraft KCN (K1123) Service Bulletin, the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	

WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891 (Continued)

Table 206 (Continued)

Failure	Diagnostic Number
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 891-893	
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450

Table 206 (Continued)

Failure	Diagnostic Number
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR FAILURE	461
CADC -N ALT BCR FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482

Table 206 (Continued)

Failure	Diagnostic Number
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528

D. System Maintenance BIT

NOTE: System Maintenance BIT is a command response type test requiring operator interaction. All sequences can be tested by use of system Maintenance BIT. Failures detected during the Maintenance test will be displayed immediately. Hydraulic power is required during the use of this test only if the Flap/Slat tests and/or the rudder test is to be run.

NOTE: Put RAM AIR TEMP & PROBE HEATER circuit breaker in lower electrical power center CPB (B1-62) Z29 to on.

Table 207

Action	Desired Result	Diagnostic Number
(1) On FGCP verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.	
(2) Deleted.		
NOTE: Each sequence of tests is called out during the test procedure. If a sequence or test step is to be bypassed, press and release the FSPCE key. Pressing the FSPCE key at the beginning of a sequence will automatically program the STP to the next sequence of tests. Pressing the FSPCE key during a test step or failed test-step will program the STP to the next test step. The FSPCE key may also be used for fast slew capabilities between test sequence steps. To repeat a failed-test step, press and release the BSPCE key. Pressing the BSPCE key twice in succession will program the test to the beginning of the test sequence if a test step failed.		
NOTE: If the main gear is not compressed then install main gear proximity switch target inhibitors on left and right weight-on-wheel sensors to place the DFGC system in the ground mode.		
(3) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.	
(4) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed.	"RUN MAINTENANCE TEST?" displayed.	
NOTE: Pressing VERIFY pushbutton after step (4) results in either "MD-87 OPTION VERIFY" or "MD-80 OPTION VERIFY" being displayed before step (4a) for MD-80 or MD-87 aircraft. On other aircraft pressing VERIFY pushbutton results in "SEL DFGC TEST SIDE - VERIFY" being displayed as in next step.		
(4a) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	
NOTE: If DFGC switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.		
(5) Press and release VERIFY pushbutton.	"STP TESTS?" displayed.	
NOTE: During System Maintenance BIT, the FMA associated with the DFGS switch, (i.e., DFGS in position 1 corresponds to captain's FMA), will display in ATS window RTS/MNT, and in pitch window TEST, while the test is being performed.		
SEQUENCE ZERO - "STP TESTS"		
(6) Press and release VERIFY pushbutton.	"CYCLE STP FWDSPACE PB" displayed.	1
(7) Press and release FSPCE key.	"CYCLE STP BACKSPACE PB" displayed.	2
(8) Press and release BSPCE key.	"STP SEGMENTS TEST - VERIFY" displayed.	3

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(9) Press and release VERIFY pushbutton.	STAR bursts displayed.	
NOTE: The STP will display ALL STAR bursts for ten seconds. (Aircraft using the FMS MCDU for an STP will display ALL diamonds.)		
NOTE: In order to increase the life of the message display lamps, the program only allows 10 seconds before resetting segments and reissuing the original dis play message. If segments are not to be checked, press and release FSPCE key. If FSPCE key is pressed while segments are displayed, a failure will be logged.		
(9a) After ten seconds are over see display.	"STP SEGMENT TEST - VERIFY" will be displayed.	
(10) Press and release FSPCE key.	"INITIAL SETUP INTERACTIVES?" displayed.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"		
(11) Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.	4 through 11
(12) Verify autopilot switch placed off. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE OFF - VERIFY" displayed.	12
(13) On captain's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE OFF - VERIFY" displayed.	13
(14) On first officer's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.	14 15
(15) Verify AUTO THROT switch placed OFF. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.	16
(16) On overhead panel verify YAW DAMP switch placed OFF. Press and release VERIFY pushbutton.	"YAW DAMP OFF LITE ON - VERIFY" displayed.	17
(17) On overhead annunciator panel verify YAW DAMP OFF light is on. Press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.	18 19
(18) Verify that both NAV control panels are not tuned to an ILS frequency. Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.	20 21
(18a) "TEST IN PROGRESS" will display for approximately 5 seconds.	When test successful STP displays "ADVANCE THROTTLE VERIFY".	
(19) Advance throttle levers to mid range. Press and release VERIFY pushbutton.	"PASSIVE DISCRETES?" displayed.	
SEQUENCE TWO - "PASSIVE DISCRETES"		
NOTE: Sequence two is checked automatically. If a fault is recognized, the testing sequence will stop and the failure message will appear. Cycling VERIFY pushbutton provides diagnostic number for the failure. Press and release FSPCE key to initiate testing again.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(20) Press and release VERIFY pushbutton. Wait approximately (.25) seconds.	"TRC OPTION PIN ABCD = XXXX VERIFY".	51
(20a) Upon completion of automatic testing, STP will display status of engine option pins for Thrust Rating.	TRC OPTION PIN ABCDE = XXXXX VERIFY displays.	51
NOTE: These option pins will be different for the type engine used as follows: -209 engine ABCDE = -GGG-, ABCD = -GGG -217A/-217C engine ABCDE = --G--, ABCD = --G- -217 engine ABCDE = GG-G-, ABCD = GG-G -219 engine ABCDE = -GG-G		
NOTE: G = GROUND, - = OPEN. Reference Trouble Shooting section, Sequence Two - "PASSIVE DISCRETES" Diagnostic Number 51.		
(20b) Press and release VERIFY pushbutton.	"SWITCHES AND BUTTONS?" displayed.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"		
(21) Deleted.		
(22) Deleted.		
(23) Deleted.		
(24) Press and release VERIFY pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	88
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 48 DEGREES - VERIFY" displayed.	93 through 100
(28) Above center instrument panel adjust ASSUMED TEMP indicator to 48 degrees. Press and release VERIFY pushbutton.	"TEMP SELECT 37 DEGREES - VERIFY" displayed.	101 through 108
NOTE: On aircraft with Thrust Rating Panel (TRP), press T/O FLX pushbutton on TRP. ASSUMED TEMP will be displayed in offside FMA window. Set ASSUMED TEMP knob on TRP to 48°C. Press and release VERIFY pushbutton.		
(29) Adjust ASSUMED TEMP to 37 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
(31) Press and release T.O. FLX pushbutton. Press and release VERIFY pushbutton.	"TR MODE GA - VERIFY" displayed.	111
(32) Press and release GA pushbutton. Press and release VERIFY pushbutton.	"TR MODE MCT - VERIFY" displayed.	112

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(33) Press and release MCT pushbutton. Press and release VERIFY pushbutton.	"TR MODE CL - VERIFY" displayed.	113
(34) Press and release CL pushbutton. Press and release VERIFY pushbutton.	"TR MODE CR - VERIFY" displayed.	114
(35) Press and release CR pushbutton. Press and release VERIFY pushbutton.	"CYCLE TO/GA SWITCH 1" displayed.	117
(36) On throttle lever press and release left TO/GA switch.	"CYCLE TO/GA SWITCH 2" displayed.	118
(37) Press and release right TO/GA switch.	"CYCLE A/P 1 DISCONNECT" displayed.	119
(38) Press and release captain's control wheel AP disconnect switch.	"CYCLE A/P 2 DISCONNECT" displayed.	120
(39) Press and release first officer's control wheel AP disconnect switch.	"CYCLE CAPT FMA RESET PB" displayed.	121
(40) Press and release RESET button on captain's FMA.	"CYCLE F/O FMA RESET PB" displayed.	122
(41) Press and release RESET button on first officer's FMA.	"PULL GND SENS BRKRS - VERIFY" displayed.	123 124
NOTE: If testing of the Bleed Inputs (steps (42) through (58)) is not desired, leave GND SENS BRKRS closed and cycle FSPCE key. Pressing the FSPCE key will skip the above mentioned tests and resume on step (59).		
(42) On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and RIGHT circuit breakers. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED OPEN - VERIFY" displayed.	125
NOTE: When pneumatic switches are opened, PNEU X FEED VALVE OPEN is displayed adjacent to the left and right pneumatic X-FEED lever.		
(43) On pedestal, place left pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	126
NOTE: On aircraft with single AIR FOIL switch, open TAIL DE-ICE TIMER circuit breaker.		
(44) On overhead panel, place AIR FOIL (L SYS) switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
(45) On overhead panel, place AIR FOIL (L SYS) switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
(46) On pedestal, close left pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED OPEN - VERIFY" displayed.	129
(47) On pedestal, place right pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	130

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(48) On overhead panel, place AIR FOIL (R SYS) switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY displayed.	131
(49) On overhead panel, place AIR FOIL (R SYS) switch OFF. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132
NOTE: On aircraft with single AIR FOIL switch, close TAIL DE-ICE TIMER circuit breaker.		
(50) On pedestal, close right pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW ON - VERIFY" displayed.	133
(51) On overhead panel place ICE PROTECT ENG L switch ON. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW OFF - VERIFY" displayed.	134
(52) Place ICE PROTECT ENG L switch OFF. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW ON - VERIFY" displayed.	135
(53) Place ICE PROTECT ENG R switch ON. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW OFF - VERIFY" displayed.	136
(54) Place ICE PROTECT ENG R switch OFF. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW AUTO - VERIFY" displayed.	137
(55) On overhead panel place left AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW OFF - VERIFY" displayed.	138
(56) Place left AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW AUTO - VERIFY" displayed.	139
(57) Place right AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW OFF - VERIFY" displayed.	140
(58) Place right AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"CLOSE GND SENS BRKRS - VERIFY" displayed.	141
(59) On upper EPC close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers.	"SEL DFGC NON-TST SIDE - VERIFY" displayed.	143
(60) On FGCP place DFGS 1, 2, switch to opposite position. Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	144
(61) Place DFGS switch back to test side indicated by illuminated "1" or "2" legend of STP CMPVLD pushbutton. Press and release VERIFY pushbutton.	"CYCLE BACKCOURSE PB" displayed.	145

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: The following test sequences verify that the pushbuttons and knobs on the FGCP will make and break contact. If the STP does not cycle to the next test, then the cycling was not detected by the DFGC. Pressing and releasing the VERIFY pushbutton will advise the DFGC of the failure. Pressing and releasing the FSPCE key will advance the STP to the next display message.		
NOTE: The ILS or Autoland modes are not being tested during this sequence. Only the switch operation is checked.		
(61a) Press and release FSPCE key (if BACKCOURSE not installed).	"CYCLE SPEED SELECT PB" displayed.	146
(62) Press and release SPD SEL pushbutton.	"CYCLE MACH SELECT PB" displayed.	147
(63) Press and release MACH SEL pushbutton.	"CYCLE EPR LIMIT PB" displayed.	148
(64) Press and release EPR LIM pushbutton.	"CYCLE NAV PB" displayed.	149
(64a) Press and release FSPCE pushbutton (if NAV not installed).	"CYCLE VOR/LOC PB" displayed.	150
(65) Press and release VOR/LOC pushbutton.	"CYCLE ILS PB" displayed.	151
(66) Press and release ILS pushbutton.	"CYCLE AUTOLAND PB" displayed.	152
(67) Press and release AUTO LAND pushbutton.	"CYCLE VERT SPD PB" displayed.	153
(68) Press and release VERT SPD pushbutton.	"CYCLE IAS/MACH PB" displayed.	154
(69) Press and release IAS/MACH pushbutton.	"CYCLE PERF PB" displayed.	155
(70) Press and release PERF pushbutton.	"CYCLE ALT HOLD PB" displayed.	156
(71) Press and release ALT HOLD pushbutton.	"CYCLE TURB PB" displayed.	157
(72) Press and release TURB pushbutton.	"CYCLE SPEED KNOB (2ND DET IN)" displayed.	159
(73) Push SPD MACH knob full in and release.	"CYCLE HDG KNOB (OUT)" displayed.	160
(74) Pull H knob full out and release.	"CYCLE HDG KNOB (2ND DET IN)" displayed.	161
(75) Push H knob full in and release.	"CYCLE ALT KNOB (OUT)" displayed.	162
(76) Pull ALT knob full out and release.	"CYCLE ALT KNOB (IN)" displayed.	163
(77) Push ALT knob full in and release.	"BANK LIMIT 15 DEGREES - VERIFY" displayed.	164
(78) Rotate outer heading knob to 15 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 20 DEGREES - VERIFY" displayed.	165

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(79) Rotate to 20 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 25 DEGREES - VERIFY" displayed.	166
(80) Rotate to 25 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 30 DEGREES - VERIFY" displayed.	167
(81) Rotate to 30 degrees. Press and release VERIFY pushbutton.	"SPEED REF OPER - VERIFY" displayed.	168
(82) Rotate SPD MACH knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"HEADING REF OPER - VERIFY" displayed.	169
(83) Rotate H knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"VERT SPD REF OPER - VERIFY" displayed.	174
(84) Rotate pitch wheel full ANU and AND. Press and release VERIFY pushbutton.	"ALT REF OPER - VERIFY" displayed.	175
(85) Rotate ALT knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-1 REF OPER - VERIFY" displayed.	176
(86) Rotate captain's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-2 REF OPER - VERIFY" displayed.	177
(87) Rotate first officer's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"SENSOR VALUES?" displayed.	
NOTE: The DFGC is not testing the knobs in steps (82) through (87). These are promptly messages to have mechanic be sure knobs turn freely and digital displays change.		
SEQUENCE FOUR - "SENSOR VALUES"		
(88) Press and release VERIFY pushbutton.	"DISPLAY OPTION?" displayed.	
NOTE: There are three testing options available when the message "DISPLAY OPTION " appears. FIRST: Pressing and releasing the FSPCE key will automatically null check the sensor values. The values are compared to a ground reference tolerance, and if out of tolerance a fault message will be displayed. SECOND: Pressing and releasing the VERIFY pushbutton will display the first sensor value. The FSPCE and BSPCE keys can be used at this time for slew capability. Failures are not recognized when this option is selected. THIRD: After pressing and releasing FSPCE key the automatic slewing of measurements occurs until the STP displays "COCKPIT DISPLAYS".		
(89) Press and release VERIFY pushbutton, for display option, or FSPCE key.	"PITCH ANGLE 1 = XX.XX DEGREES" displayed.	180
(90) Press and release FSPCE key.	"PITCH ANGLE 2 = XX.XX DEGREES" displayed.	181
(91) Deleted.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(92) Press and release FSPCE key.	"BANK ANGLE 1 = XX.XX DEGREES" displayed.	183
(93) Press and release FSPCE key.	"BANK ANGLE 2 = XX.XX DEGREES" displayed.	184
(94) Deleted.		
(95) Press and release FSPCE key.	"SPOILER POS 1 = (TED or TEU) XX.XX DEG" displayed.	186
(96) Press and release FSPCE key.	"SPOILER POS 2 = (TED or TEU) XX.XX DEG" displayed.	187
(97) Press and release FSPCE key.	"CRS RAD ALT 1 = XXXX. FEET" displayed.	188
(98) Press and release FSPCE key.	"CRS RAD ALT 2 = XXXX. FEET" displayed.	189
(99) Press and release FSPCE key.	"FINE RAD ALT 1 = XXXX. FEET" displayed.	190
(100) Press and release FSPCE key.	"FINE RAD ALT 2 = XXXX. FEET" displayed.	191
(101) Press and release FSPCE key.	"ELEV SYNC A = XX.XX DEGREES" displayed.	192
(102) Press and release FSPCE key.	"ELEV SYNC B = XX.XX DEGREES" displayed.	193
(103) Press and release FSPCE key.	"AIL SYNC A = XX.XX DEGREES" displayed.	194
(104) Press and release FSPCE key.	"AIL SYNC B = XX.XX DEGREES" displayed.	195
(105) Press and release FSPCE key.	"RUD SYNC A = XX.XX DEGREES" displayed.	196
(106) Press and release FSPCE key.	"RUD SYNC B = XX.XX DEGREES" displayed.	197
(107) Press and release FSPCE key.	"YAW DAMP POS = XX.XX DEGREES" displayed.	198
(108) Press and release FSPCE key.	"MACH TRIM POS = XX.XX INCH" displayed.	199
(109) Press and release FSPCE key.	"ELEV TACH A = XX.XX DEG/SEC" displayed.	200
(110) Press and release FSPCE key.	"ELEV TACH B = XX.XX DEG/SEC" displayed.	201
(111) Press and release FSPCE key.	"AIL TACH A = XX.XX DEG/SEC" displayed.	202
(112) Press and release FSPCE key.	"AIL TACH B = XX.XX DEG/SEC" displayed.	203

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(113) Press and release FSPCE key.	"RUD TACH A = XX.XX DEG/SEC" displayed.	204
(114) Press and release	"RUD TACH B = XX.XX DEG/SEC" displayed.	205
(115) Press and release FSPCE key.	"A/T TACH = XX.XX DEG/SEC" displayed.	206
(116) Press and release FSPCE key.	"MACH TRIM TACH = XX.XX DEG/SEC" displayed.	207
(117) Press and release FSPCE key.	"YAW DAMP TACH = XX.XX DEG/SEC" displayed.	208
(118) Press and release FSPCE key.	"D3A-X ACCEL A = XX.XX FT/SEC*2" displayed.	209
(119) Press and release FSPCE key.	"D3A-X ACCEL B = XX.XX FT/SEC*2" displayed.	210
(120) Press and release FSPCE key.	"D3A-Y ACCEL A = XX.XX FT/SEC*2" displayed.	211
(121) Press and release FSPCE key.	"D3A Y ACCEL B = XX.XX FT/SEC*2" displayed.	212
(122) Press and release FSPCE key.	"D3A-Z ACCEL A = XX.XX FT/SEC*2" displayed.	213
(123) Press and release FSPCE key.	"D3A-Z ACCEL B = XX.XX FT/SEC*2" displayed.	214
(124) Press and release FSPCE key.	"DLA-Y ACCEL A = XX.XX FT/SEC*2" displayed.	215
(125) Press and release FSPCE key.	"DLA-Y ACCEL B = XX.XX FT/SEC*2" displayed.	216
(126) Press and release FSPCE key.	"G/S DEV A = X.XXX DEGREES" displayed.	217
(127) Press and release FSPCE key.	"G/S DEV B = X.XXX DEGREES" displayed.	218
(128) Press and release FSPCE key.	"VOR/LOC DEV A = X.XXX DEGREES" displayed.	219
(129) Press and release FSPCE key.	"VOR/LOC DEV B = X.XXX DEGREES" displayed.	220
(130) Press and release FSPCE key.	"LEFT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	221
(131) Press and release FSPCE key.	"RIGHT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	222
(132) Press and release FSPCE key.	"LEFT AILERON = (TEU or TED) XX.XX DEG" displayed.	223

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(133) Press and release FSPCE key.	"RUDDER POS = (TEL or TER) XX.XX DEG" displayed.	224
(134) Press and release FSPCE key.	"HOR STAB = (TEU or TED) XX.XX DEG" displayed.	225
(135) Press and release FSPCE key.	"ANGLE OF ATT 1 = XX.XX DEGREES" displayed.	226
(136) Press and release FSPCE key.	"ANGLE OF ATT 2 = XX.XX DEGREES" displayed.	227
(137) Press and release FSPCE key.	"EPR LEFT = XX.XX EPR" displayed.	228
(138) Press and release FSPCE key.	"EPR RIGHT = XX.XX EPR" displayed.	229
(139) Press and release FSPCE key.	"HEADING 1 = XX.XX DEGREES" displayed.	230
(140) Press and release FSPCE key.	"HEADING 2 = XX.XX DEGREES" displayed.	231
(141) Press and release FSPCE key.	"LEFT FLAPS POS = XX.XX DEGREES displayed.	232
(142) Press and release FSPCE key.	"RIGHT FLAP POS = XX.XX DEGREES" displayed.	233
(143) Press and release FSPCE key.	"FLAP HANDLE = XX.XX DEGREES" displayed.	234
NOTE: During CADC test, the letter T is displayed for CADC on test side and the letter N is for CADC on non test side.		
(144) Press and release FSPCE key.	"CADC-T ALT NCR = XXXX. FEET" displayed.	235
(145) Press and release FSPCE key.	"CADC-N ALT NCR = XXXX. FEET" displayed.	236
(146) Press and release FSPCE key.	"CADC-T TAT = XX.XX DEGREES" displayed.	237
(147) Press and release FSPCE key.	"CADC-N TAT = XX.XX DEGREES" displayed.	238
(148) Press and release FSPCE key.	"CADC-T ALT RATE = XX.XX FT/SEC" displayed.	239
(149) Press and release FSPCE key.	"CADC-N ALT RATE = XX.XX FT/SEC" displayed.	240
(150) Press and release FSPCE key.	"CADC-T SAT = XX.XX DEGREES" displayed.	241
(151) Press and release FSPCE key.	"CADC-N SAT = XX.XX DEGREES" displayed.	242
(152) Press and release FSPCE key.	"CADC-T CAS = XXX.X FT/SEC" displayed.	243

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(153) Press and release FSPCE key.	"CADC-N CAS = XXX.X FT/SEC" displayed.	244
(154) Press and release FSPCE key.	"CADC-T MACH = X.XXXX FT/SEC" displayed.	245
(155) Press and release FSPCE key.	"CADC-N MACH = X.XXXX FT/SEC" displayed.	246
(156) Press and release FSPCE key.	"COCKPIT DISPLAYS?" displayed.	
SEQUENCE FIVE - "COCKPIT DISPLAYS"		
(156a) Place both FD switches to ON.		
NOTE: "ART switch must be in the AUTO position prior to running this sequence."		
(157) Press and release VERIFY pushbutton.	"ART INOP LITE - VERIFY" displayed.	250
(158) On overhead annunciator panel verify ART INOP light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 1 - VERIFY" displayed.	251
(159) On captain's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 2 - VERIFY" displayed.	252
(160) On first officer's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT SELECT APPR - VERIFY" displayed.	253
(161) Verify aural warning sounds. Press and release VERIFY pushbutton.	"ALT SELECT DEV - VERIFY" displayed.	254
(162) Verify aural warning sounds. Press and release VERIFY pushbutton.	"TR EPR VALID - VERIFY" displayed.	255
(163) On center instrument panel EPR flag out of view. If electronic engine display panel is installed, EPR LIMIT is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR Indicator.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - displayed.	258
NOTE: The following steps (166) through (169) verify that the AUTOLAND and AP TRIM legends on each FMA have two operable bulbs. The "A" light refers to left light bulb and "B" light refers to right light bulb.		
(166) Verify READY light on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE A VERIFY" displayed.	259
(167) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE B VERIFY" displayed.	260

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(168) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE A - VERIFY" displayed.	261
(169) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE B - VERIFY" displayed.	262
(170) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"VERT SPD DETENT - VERIFY" displayed.	263
(171) On FGCP verify pitch wheel detent (cycle) position. Press and release VERIFY pushbutton.	"IAS BUG 1 250 KIAS - VERIFY" displayed.	264
(172) On captain's Mach/ Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"IAS BUS 2 250 KIAS - VERIFY" displayed.	265
(173) On first officer's Mach/Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"EPR BUG LEFT 1.8 EPR - VERIFY" displayed.	266
NOTE: Care must be taken to be sure EPR bug manual set knobs on EPR indicators are in the automatic (IN) position.		
(174) On center instrument panel verify left EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR BUG RIGHT 1.8 - VERIFY" displayed.	267
(175) Verify right EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR LIMIT CMD 1.8 EPR - VERIFY" displayed.	268
(176) On TRI/EDP verify EPR LIM reads 1.80(±0.014). Press and release VERIFY pushbutton.	"F/D CMD SW to TEST SIDE - VERIFY" displayed.	269
(176a) On overhead panel, set FD CMD switch to side under test. Press and release VERIFY pushbutton.	"CAPT F/D SW ON VERIFY" displayed.	
NOTE: Side under test corresponds to CMP VLD light number on the STP.		
(177) On FGCP, place captain's FD switch to FD position. Press and release VERIFY pushbutton.	"CAPT F/D LITE ON - VERIFY" displayed.	270
NOTE: FD flag is cycling in and out of view on Collins ADI's and FD CMD bars are moving.		
(178) On captain's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"CAPT PITCH F/D CENTER - VERIFY" displayed.	271
(179) On captain's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"CAPT PITCH F/D NOSE UP - VERIFY" displayed.	272
(180) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"CAPT ROLL F/D CENTER - VERIFY" displayed.	273

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(181) Verify roll command centered. Press and release VERIFY pushbutton.	"CAPT ROLL F/D RIGHT - VERIFY displayed.	274
(182) Verify roll command moves right. Press and release VERIFY pushbutton.	"CAPT F/D SW OFF - VERIFY displayed.	275
(183) On FGCP, place captain's FD switch to OFF position. Press and release VERIFY pushbutton.	"F/O F/D SW ON - VERIFY" displayed.	276
(184) On FGCP, place F/O's FD switch to FD position. Press and release VERIFY pushbutton.	"F/O F/D LITE ON - VERIFY" displayed.	277
(185) On F/O's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"F/O PITCH F/D CENTER - VERIFY" displayed.	278
(186) On first officer's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"F/O PITCH F/D NOSE UP - VERIFY" displayed.	279
(187) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"F/O ROLL F/D CENTER - VERIFY" displayed.	280
(188) Verify roll command centered. Press and release VERIFY pushbutton.	"F/O ROLL F/D RIGHT - VERIFY" displayed.	281
(189) Verify roll command moves right. Press and release VERIFY pushbutton.	"F/O F/D SW OFF - VERIFY" displayed.	282
(190) On FGCP, place F/O's FD switch to OFF position. Press and release VERIFY pushbutton.	"FAST/SLOW 1 VALID - VERIFY" displayed.	283
(191) On captain's ADI/PFD verify SPD flag in and out of view and slow- fast pointer in and out of view. Press and release VERIFY pushbutton.	"FAST/SLOW 2 VALID - VERIFY" displayed.	284
(192) On first officer's ADI/PFD verify SPD flag in and out of view and slow- fast pointer in and out of view. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS CENTER - VERIFY" displayed.	285
(193) On captain's and first officer's ADI/PFD verify fast-slow pointers centered. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS UP - VERIFY" displayed.	286
(194) Verify both fast-slow pointers move to the fast side. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS DOWN - VERIFY" displayed.	287
(195) Verify both fast-slow pointers move to the slow side. Press and release VERIFY pushbutton.	"FMA SEGMENTS TEST - VERIFY" displayed, then "FMA SEGMENTS ON - VERIFY" displayed.	288

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(196) On captain's and first officer's FMA's verify all alphanumeric characters display as a STARBURST for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"FGCP/NCP SGMENTS" TEST" displayed, then "FGCP/NCP SGMENTS ON - VERIFY" displayed.	289
(197) On FGCP and NAV Control panels verify all numerical seven- segment digits are displayed for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"SECOND SETUP INTERACTIVES?" displayed.	
NOTE: After completion of sequence five, place FD CMD switch on overhead panel back to NORM position.		
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"		
(198) Press and release VERIFY pushbutton.	"ENGAGE A/P - VERIFY" displayed.	312 through 319
(199) On FGCP place AP switch to ON position. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE ON - VERIFY" displayed.	320
(200) On captain's FMA verify AP light on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE ON - VERIFY" displayed.	321
(201) On first officer's FMA verify AP light on. Press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.	322
(202) On FGCP place auto- throttle switch to AUTO THROT position. Press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.	323
(203) On overhead panel verify YAW DAMP switch placed ON. Press and release VERIFY pushbutton.	"Y/D OFF LITE OFF - VERIFY" displayed.	324
(204) On overhead annunciator panel verify YAW DAMP OFF light is not on. Press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.	325 326
(205) Tune both NAV control panels to a valid ILS frequency. Press and release VERIFY pushbutton.	"RETARD THROTTLE - VERIFY" displayed.	327 328
(206) Place both throttle levers to the aft mechanical stop. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/ RETRACT VERIFY" displayed.	329 through 337
NOTE: After the FLAP/SLAT handle has been moved, and the VERIFY pushbutton has been pressed, the message "FLAP TEST IN PROGRESS" will be displayed for approximately 30 seconds.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.		
(206a) On F/O's instrument panel, place HYD PUMPS AUX switch to ON, and TRANS switch to ON.	Hydraulic pressure available.	
(207) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 11/ MID - VERIFY" displayed.	338 through 342
(208) Place flap/slat handle to 11 degrees. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/ EXTEND - VERIFY" displayed.	343 through 349
(209) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"SELF TESTS?" displayed.	
SEQUENCE SEVEN - "SELF TESTS"		
(209a) Press and release VERIFY pushbutton.	"RCVRS TO ILS VERIFY" displayed.	
NOTE: If testing of the ILS receivers is not desired, press and release FSPCE key and only the radio altimeters and accelerometers self-tests will be performed.		
(210) Press and release VERIFY pushbutton. Wait approximately (30) seconds.	"TEST IN PROGRESS" displayed.	350 through 381
NOTE: Sequence seven is an automatic self-test of the ILS receivers, R/T units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion.		
SEQUENCE EIGHT - "SERVO TESTS"		
NOTE: For convenience it is possible to selectively run portions of the servo test. For example, step (211) states "A/P ENGAGED - VERIFY"; if the autopilot is engaged and the VERIFY pushbutton is pressed, all 3 Dual Servo tests and the Auto Pitch Trim are performed. If these tests are not to be performed, disengage the autopilot and press and release the FSPCE key. The STP will then display "YAW DAMP ON - VERIFY" (step 220). Turning the YAW DAMP off and pressing the FSPCE key will result in the message "MACH TRIM NORM - VERIFY" without having run the yaw damp test. The same procedure also applies for the Mach Trim Actuator and the autothrottle.		
(211) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.	
(211a) Press and release VERIFY pushbutton.		
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed.		
(212) Verify autopilot switch ON. Press and release VERIFY pushbutton.	"A/P ENGAGED - VERIFY" displayed.	385

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(213) Verify both control wheels turn right wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS RWD - VERIFY" displayed.	386 through 398
(214) Verify both control wheels turn left wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS LWD - VERIFY" displayed.	399 through 403
(215) Verify both control columns move forward. Press and release VERIFY pushbutton.	"COLUMN MOVES FWD - VERIFY" displayed.	404 through 416
(216) Verify both control columns move aft. Press and release	"COLUMN MOVES AFT - VERIFY" displayed.	417 through 421
(217) Verify right rudder pedal moves forward. Press and release VERIFY pushbutton.	"RHT PEDAL MOVES FWD - VERIFY" displayed.	422 through 434
(218) Verify left rudder pedal moves forward. Press and release VERIFY pushbutton.	"LEFT PEDAL MOVES FWD - VERIFY" displayed.	435 through 439
(219) On pedestal verify trim indicator moves towards nose up. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE UP - VERIFY" displayed.	440
(220) On pedestal verify trim indicator moves towards nose down. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE DN - VERIFY" displayed.	441
(221) On overhead panel, verify YAW DAMP switch ON. Press and release VERIFY pushbutton.	"YAW DAMP ON - VERIFY" displayed.	442 443
NOTE: If ground power is being applied, verify correct voltage, or a failure may be recorded in the Mach Trim system.		
(222) On overhead panel, verify MACH TRIM COMP switch is in NORM position. Press and release VERIFY pushbutton.	"MACH TRIM NORM - VERIFY" displayed.	444
(223) On FGCP, verify AUTO THROT switch is ON. Press and release VERIFY pushbutton.	"A/T ENGAGED - VERIFY" displayed.	445 through 448
(223a) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/RETRACT VERIFY" displayed. "FLAP TEST IN PROGRESS" displayed.	449
NOTE: If a failure has not been detected, "INTERNAL MONITORS?" will be displayed.		
(223b) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.	
SEQUENCE NINE - "INTERNAL MONITORS"		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: Sequence nine is an automatic check of the validity of synchro, resolvers and also performs a reasonableness test. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of testing, "FAILURE RECAP?" will be displayed.		
(224) Press and release VERIFY pushbutton.	The total number of faults will be displayed momentarily, then the first fault will be displayed.	
NOTE: Momentarily pressing the VERIFY pushbutton after each failure is recorded, will display the diagnostic number.		
(225) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" displayed.	"FAILURE RECAP?" displayed.	
NOTE: If a "FAILURE RECAP?" is desired, press and release VERIFY pushbutton and the total number of faults will again be displayed.		
(226) Press and release FSPCE key.	"MAINTENANCE MEMORY ERASE?" displayed.	
NOTE: At this time the autopilot and autothrottle automatically disengage. Turn off autopilot and autothrottle red warning lights by cycling the disconnect switches.		
(227) Press and release VERIFY pushbutton.	"VERIFY TO ERASE MEMORY?" displayed.	
NOTE: If Maintenance Memory is to be retained, press and release FSPCE key and "FLIGHT FAULT REVIEW?" will be displayed.		
(228) Press and release VERIFY pushbutton.	"FLIGHT FAULT REVIEW?" displayed.	
(229) Press and release POWER pushbutton.	STP message display blank.	
(230) Autopilot and Authrottle disengage automatically at the conclusion of System Maintenance BIT.	Autopilot disengaged. AP red off warning lights on until either AP disconnect switch pressed. Auto throttle disengaged. THROTTLE red off warning lights on until throttle disconnect switch pressed.	
(231) Place airplane in normal ground configuration.	No test.	

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. Reference DFGS STATUS/TEST, SUBJECT 22-01-05, Page 101 for trouble shooting procedures corresponding to failure.

Table 208

Failure	Diagnostic Number
SEQUENCE ZERO - "STP TESTS"	
STP FWDSPACE PB FAILURE	1
STP BACKSPACE PB FAILURE	2
STP SGMENTS FAILURE	3

Table 208 (Continued)

Failure	Diagnostic Number
NOTE: In tests that multiple failures of a sensor occurs, such as servo failures, the fault will only be displayed once during the FAILURE RECAP.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
FMA-1 A/P LITE OFF FAILURE	12
FMA-2 A/P LITE OFF FAILURE	13
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
YAW DAMP OFF LITE ON FAILURE	17
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32

Table 208 (Continued)

Failure	Diagnostic Number
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
ELEVATOR TORQUE LIMIT SWITCH 1 FAILURE	35
ELEVATOR TORQUE LIMIT SWITCH 2 FAILURE	36
NOTE: For -930 and subsequent DFGC's, ELEVATOR is AIL MECH.	
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"	
VG SW UNIT SWITCH FAILURE	73
VG SW UNIT SWITCH FAILURE	74
VG SW UNIT SWITCH FAILURE	75
VG SW UNIT SWITCH FAILURE	76
VG SW UNIT SWITCH FAILURE	77
VG SW UNIT SWITCH FAILURE	78
VG SW UNIT SWITCH FAILURE	79
VG SW UNIT SWITCH FAILURE	80
VG SW UNIT SWITCH FAILURE	81

Table 208 (Continued)

Failure	Diagnostic Number
VG SW UNIT SWITCH FAILURE	82
VG SW UNIT SWITCH FAILURE	83
VG SW UNIT SWITCH FAILURE	84
NOTE: For -930 and subsequent DFGC's, VG is ATT.	
CADC SWITCH FAILURE	85
CADC SWITCH FAILURE	86
CADC SWITCH FAILURE	87
CADC SWITCH FAILURE	88
CADC SWITCH FAILURE	89
CADC SWITCH FAILURE	90
CADC SWITCH FAILURE	91
CADC SWITCH FAILURE	92
TEMP SELECT PANEL FAILURE	93
TEMP SELECT PANEL FAILURE	94
TEMP SELECT PANEL FAILURE	95
TEMP SELECT PANEL FAILURE	96
TEMP SELECT PANEL FAILURE	97
TEMP SELECT PANEL FAILURE	98
TEMP SELECT PANEL FAILURE	99
TEMP SELECT PANEL FAILURE	100
TEMP SELECT PANEL FAILURE	101
TEMP SELECT PANEL FAILURE	102
TEMP SELECT PANEL FAILURE	103
TEMP SELECT PANEL FAILURE	104
TEMP SELECT PANEL FAILURE	105
TEMP SELECT PANEL FAILURE	106
TEMP SELECT PANEL FAILURE	107
TEMP SELECT PANEL FAILURE	108
TR MODE T/O FAILURE	109
TR MODE T/O FLX FAILURE	110
TR MODE GA FAILURE	111
TR MODE MCT FAILURE	112
TR MODE CL FAILURE	113
TR MODE CR FAILURE	114

Table 208 (Continued)

Failure	Diagnostic Number
TO/GA SWITCH 1 FAILURE	117
TO/GA SWITCH 2 FAILURE	118
A/P 1 DISCONNECT FAILURE	119
A/P 2 DISCONNECT FAILURE	120
CAPT FMA RESET PB FAILURE	121
F/O FMA RESET PB FAILURE	122
GND SENSOR FAILURE	123
GND SENSOR FAILURE	124
LEFT PNEU X FEED OPEN FAILURE	125
ASOC AIRFOIL ICE ON FAILURE	126
ASOC AIRFOIL ICE OFF FAILURE	127
LEFT PNEU X FEED CLOSE FAILURE	128
RIGHT PNEU X FEED OPEN FAILURE	129
ASOC AIRFOIL ICE ON FAILURE	130
ASOC AIRFOIL ICE OFF FAILURE	131
RIGHT PNEU X FEED CLOSE FAILURE	132
L ANTI-ICE SW ON FAILURE	133
L ANTI-ICE SW OFF FAILURE	134
R ANTI-ICE SW ON FAILURE	135
R ANTI-ICE SW OFF FAILURE	136
LEFT A/C SUP SW AUTO FAILURE	137
LEFT A/C SUP SW OFF FAILURE	138
RIGHT A/C SUP SW AUTO FAILURE	139
RIGHT A/C SUP SW OFF FAILURE	140
GND SENSOR FAILURE	141
GND SENSOR FAILURE	142
SEL DFGC NON-TEST SIDE FAILURE	143
SEL DFGC TEST SIDE FAILURE	144
BACK COURSE PB FAILURE	145*
FMS OVRD PB FAILURE	145**
SPEED SELECT PB FAILURE	146
MACH SELECT PB FAILURE	147
EPR LIMIT PB FAILURE	148
NAV PB FAILURE	149

Table 208 (Continued)

Failure	Diagnostic Number
VOR/LOC PB FAILURE	150
ILS PB FAILURE	151
AUTOLAND PB FAILURE	152
VERT SPD PB FAILURE	153
MACH/IAS PB FAILURE	154
PERF PB FAILURE	155
PERF OR VNAV PB FAILURE	155***
ALT HOLD PB FAILURE	156
TURB PB FAILURE	157
SPEED KNOB (2ND DET IN) FAILURE	159
HDG KNOB (OUT) FAILURE	160
HDG KNOB (2ND DET IN) FAILURE	161
ALT KNOB (OUT) FAILURE	162
ALT KNOB (IN) FAILURE	163
NOTE: * Used for customers with back course option. ** Used for customers with FMS and -970 DFGC and subs. *** Used for customers with -970 DFGC and subs.	
BANK LIMIT 15 DEGREES FAILURE	164
BANK LIMIT 20 DEGREES FAILURE	165
BANK LIMIT 25 DEGREES FAILURE	166
BANK LIMIT 30 DEGREES FAILURE	167
SPEED REF OPER FAILURE	168
HEADING REF OPER FAILURE	169
CAPT HDG SEL REF FAILURE	173
VERT SPD REF OPER FAILURE	174
ALT REF OPER FAILURE	175
CRS-1 REF OPER FAILURE	176
CRS-2 REF OPER FAILURE	177
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
SPOILER POS 1 FAILURE	186

Table 208 (Continued)

Failure	Diagnostic Number
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP SYNC FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE FIVE - "COCKPIT DISPLAYS"	
EPR SEL LITE A AND B FAILURE	249

Table 208 (Continued)

Failure	Diagnostic Number
ART INOP LITE FAILURE	250
ALT ADV LITE 1 FAILURE	251
ALT ADV LITE 2 FAILURE	252
ALT SELECT APPR FAILURE	253
ALT SELECT DEV FAILURE	254
TR EPR VALID FAILURE	255
TR NO MODE LITE FAILURE	256
ART ON LITE FAILURE	257
ART READY LITE FAILURE	258
NO AUTOLAND LITE A FAILURE	259
NO AUTOLAND LITE B FAILURE	260
A/P TRIM LITE A FAILURE	261
A/P TRIM LITE B FAILURE	262
VERT SPD DETENT FAILURE	263
IAS BUG FAILURE	264
IAS BUG FAILURE	265
EPR BUG FAILURE	266
EPR BUG FAILURE	267
EPR LIMIT CMD FAILURE	268
CAPT F/D SW FAILURE	269
CAPT F/D LITE ON FAILURE	270
PITCH F/D FAILURE	271
PITCH F/D FAILURE	272
ROLL F/D FAILURE	273
ROLL F/D FAILURE	274
CAPT F/D SW FAILURE	275
F/O F/D SW FAILURE	276
F/O F/D LITE ON FAILURE	277
PITCH F/D FAILURE	278
PITCH F/D FAILURE	279
ROLL F/D FAILURE	280
ROLL F/D FAILURE	281
F/O F/D SWITCH FAILURE	282
FAST/SLOW 1 VALID FAILURE	283

Table 208 (Continued)

Failure	Diagnostic Number
FAST/SLOW 2 VALID FAILURE	284
FAST/SLOW CMD FAILURE	285
FAST/SLOW CMD FAILURE	286
FAST/SLOW CMD FAILURE	287
FMA SEGMENTS FAILURE	288
FGCP/NCP SEGMENTS FAILURE	289
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQUE SWITCH 1 FAILURE	332
ELEV MECH TORQUE SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336

Table 208 (Continued)

Failure	Diagnostic Number
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQUE SWITCH 1 FAILURE	346
ELEV MECH TORQUE SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367

Table 208 (Continued)

Failure	Diagnostic Number
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - "SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
* An open Aileron Torque Limit Rheostat will prevent A/P engage with flaps above 26 degrees, but will not prevent engage when flaps are below 26 degrees.	
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401

Table 208 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RIGHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435

Table 208 (Continued)

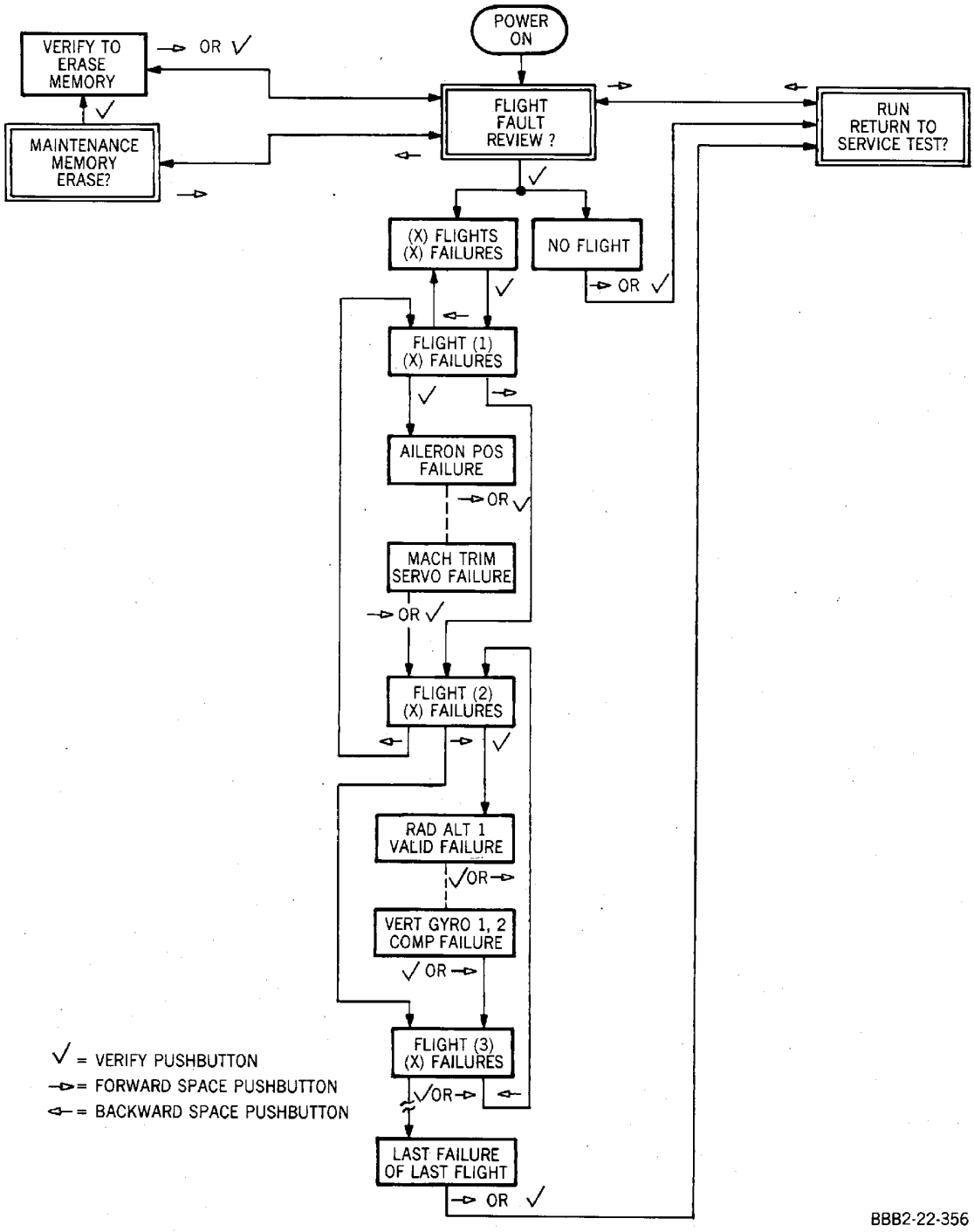
Failure	Diagnostic Number
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR RATE FAILURE	461
CADC -N ALT BCR RATE FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467

Table 208 (Continued)

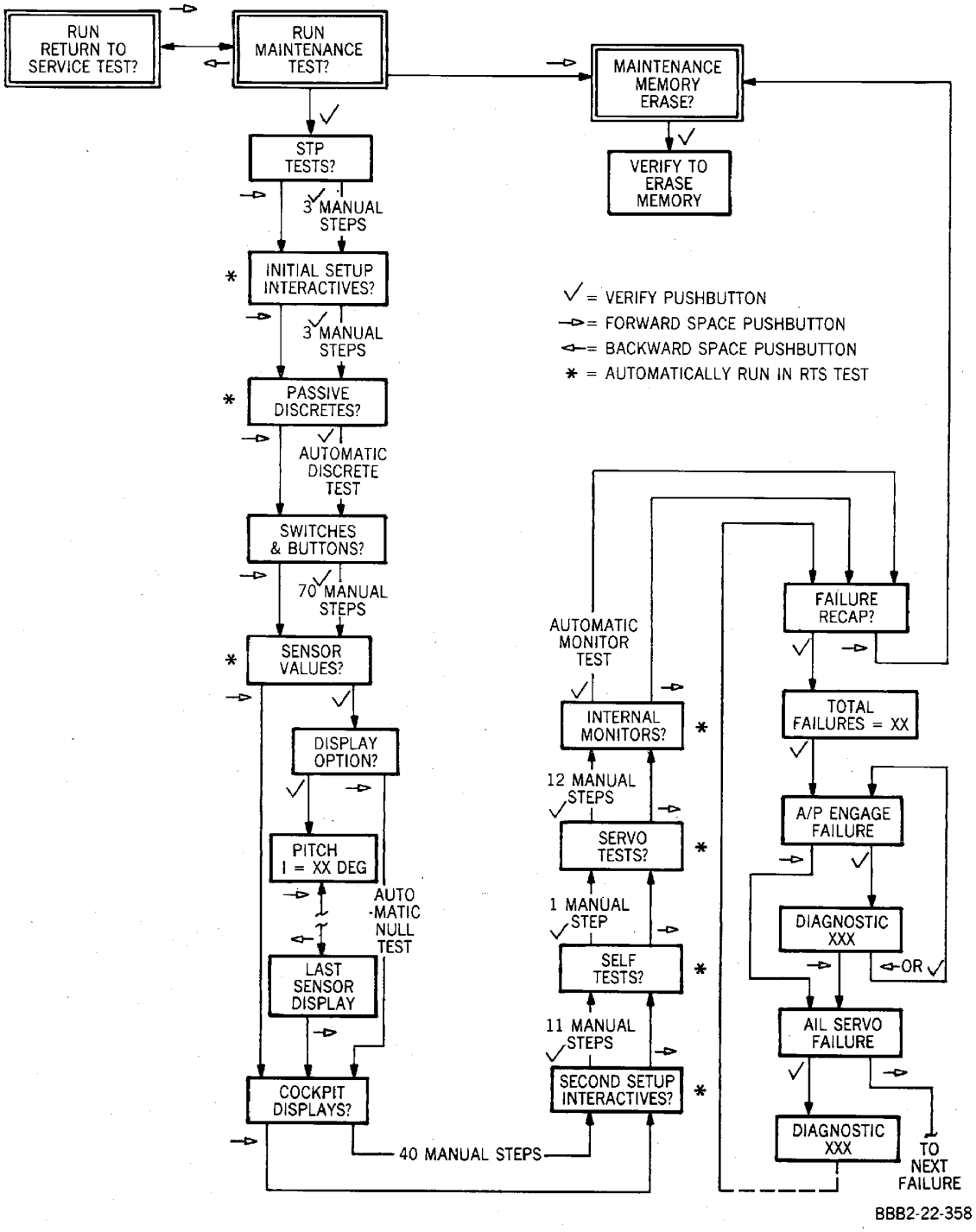
Failure	Diagnostic Number
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503

Table 208 (Continued)

Failure	Diagnostic Number
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
PMS DATA FAILURE	508*
PMS/FMS DATA FAILURE	508**
WINDSHEAR DATA FAILURE	509***
NOTE: * For customers with PMS. ** For customers with FMS and -970 DFGC and subs. *** For customers equipped with windshear computers.	
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528



STP - Flight Fault Review Operation
Figure 202/22-01-05-990-935



STP - Run Maintenance Test Operation
Figure 203/22-01-05-990-936

DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

1. General

A. The DFGS Status/Test (STP) panel is located beneath the captain's briefcase compartment. The STP has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The STP provides the operator with a display of English language commands and questions.

B. BIT provides three modes of testing. Continuous (Flight Fault Review) BIT, Return to Service (RTS) BIT, and System Maintenance BIT. The Autoland Preflight Test is also provided in this section, since a failure during this test can be recalled and displayed on the STP. There is also an IRS/Autoland Discrete Test for aircraft with Inertial Reference Systems.

C. A self-test feature of the STP (during System Maintenance BIT) is provided to assure the operator that the STP is functional prior to test initiation. All keys and pushbuttons are checked and appropriate message displays are verified.

D. During System Maintenance BIT, pressing the Forward Space (FSPCE) key on the STP will automatically advance the STP to the next test step. If a complete sequence of tests are to be bypassed, pressing the FSPCE key at the beginning of a test sequence will automatically advance the test to the next test sequence.

E. During System Maintenance BIT, pressing the Back Space (BSPCE) key on the STP will automatically back the test to the previous test step if a failure has occurred. Pressing the BSPCE key twice in succession after a failure will program the test sequence over again.

F. During System Maintenance BIT, if a failure occurs, an English language message ending with the word "FAILURE" will appear. Pressing the VERIFY pushbutton on the STP will cause a diagnostic number to appear, then pressing the VERIFY pushbutton the second time will cause the message to reappear on the STP. If the failure is not corrected at that time, pressing the FSPCE key will log the failure and continue the test. At the conclusion of testing, the message "FAILURE RECAP?" will be displayed. At this time all failures can be recorded for correction. Once the test is exited, failures recorded are automatically erased.

G. During RTS BIT an interruption does not occur if a failure is detected during the test. If a failure is detected, "NO GO - SYSTEM AFFECTED?" will be displayed upon completion of the test. When "NO GO - SYSTEM AFFECTED?" is displayed, pressing the VERIFY pushbutton will display the function(s) that are affected, i.e. NO AUTOLAND, AP/FD, etc. If a system is listed it indicates only that a problem has been detected and not necessarily that the system is inoperative. After the function(s) is displayed, all failures can be recorded for correction. If no failures occur during RTS, GO is displayed.

H. Ten sequences of tests are provided to the STP during System Maintenance Bit. Each sequence has diagnostic numbers that accompanies each failure detected. Portions of the testing requires operator interaction, and portions of the testing are automatic. Any failures that occur during the Maintenance Test will be displayed immediately upon detection.

I. Seven sequences of tests are provided during RTS BIT. The diagnostic numbers and failures are called out at the conclusion of testing during "FAILURE RECAP?"

J. Personnel should be familiar with the functional use of all keys and pushbuttons on the STP prior to performing any tests that require operator interaction. (Figure 201)

WARNING: DURING SYSTEM MAINTENANCE BIT, THE USE OF HYDRAULIC POWER IS REQUIRED. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL, AND CONTROL SURFACE AREAS ARE CLEARED OF ALL PERSONNEL AND EQUIPMENT.

CAUTION: VERIFY METER SEL & HEAT SWITCH, LOCATED ON OVERHEAD PANEL IS IN THE OFF POSITION ANYTIME THE AIRPLANE IS IN THE FLIGHT MODE, (GROUND SENSING CIRCUIT BREAKERS OPENED, OR ON JACKS), TO PREVENT DAMAGE TO AIR DATA OR ANGLE-OF-ATTACK SENSORS.

CAUTION: WHENEVER UNIT(S) AND/OR COCKPIT INSTRUMENT(S) ARE POWERED ON THE GROUND, THE TWO AVIONICS COOLING FANS AND INSTRUMENT COOLING FAN MUST BE OPERATING. IN ADDITION, IF FLIGHT COMPARTMENT AIR TEMPERATURE IS ABOVE 85° F., AIR CONDITIONING SHOULD BE PROVIDED. IF AIR CONDITIONING IS NOT AVAILABLE, FLIGHT COMPARTMENT WINDOWS AND ELECTRICAL/ELECTRONICS ACCESS DOOR MUST BE OPEN TO PREVENT OVERHEAT OF EQUIPMENT.

K. Repeat any failed test step to verify that after maintenance action has been performed and completed, the fault has been cleared.

L. The following table describes flight guidance circuit breakers and how they function and the importance to the operation of the aircraft. It gives the associated problems caused when these breakers fail.

Table 201

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-361	28VAC-L	J1B-12	Loss of power from this breaker, if the aircraft is on the ground, would cause loss of the Flight Guidance Control Panels Altitude window, Both #1 and #2 Flight Director Bars Bias Out of View (if in Takeoff mode). The Mach Trim Fault, Yaw Damper Off and Windshear Inop messages are displayed (AP1 selected).
DFGS-1	B10-351	115VAC-L	J2A-12	Loss of power from this breaker, on the ground will cause the entire Flight Guidance Control Panel and the Nav Control Panel Course window to go blank. The #1 Flight Director Bars Biased Out of View and the #1 Fast/Slow Indicator displayed a Fail Flag. The Mach Trim Fault and Yaw Damper Off messages were displayed (AP1 selected). In addition, #1 Auto- throttles became Inop, and the TRP had a NO MODE light on.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-360	28VAC-R	J4B-12	Loss of power from this circuit breaker caused the NO AUTOLAND light to be displayed, with AP1 selected.
DFGS-1	B10-347	28VDC-R	J2A-1,2	No cockpit indications were present if this circuit breaker is inoperative.
Yaw Damper-1	B10-345	28VDC-L	J3B-7	With the Yaw Damper Switch in the ON position and AP1 selected, the YAW DAMPER OFF message appeared. No messages were displayed if AP2 was selected.
AP-1	B10-353	28VDC-L	J4B-104 J1B-104 J1A-94 J4A-94	With AP1 selected, the NO AUTOLAND message was displayed.
DFGS-1	B10-349	28VDC-L	J1A-1 J3A-1,2, 3,4	The Flight Guidance Control Panel blanked if breaker power was lost and AP1 selected. In addition, both Nav Panels blanked. The TRP had a NO MODE light on. The #1 Flight Director Bars Bias Out of View and the #1 Slow/Fast Fail flag appeared.
DFGS-2	B10-362	28VAC-R	J4B-12	With the aircraft on the ground and AP2 selected, loss of this circuit breakers' power caused the NO AUTOLAND light to be displayed. In addition, The Flight Guidance Control Panels' Altitude was blank and the #2 Nav Panels CRS numbers were randomly cycling. Both Flight Director Bars Biased Out of View. On the overhead, the Mach Trim Fault and Yaw Damper OFF messages were displayed. #1 and #2 Slow/Fast Indicators became Inop (AP2 was selected).

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-2	B10-352	115VAC-R	J2A-12	With AP2 selected the Flight Guidance Control Panel blanked, the Mach Trim Fault Yaw Damper Off message were displayed. Both Nav Panels CRS windows blanked and the TRP had a NO MODE message displayed. Autothrottles were Inop.
DFGS-2	B10-363	28VAC-L	J1B-12	Loss of this breakers' power caused the NO AUTOLAND message to be displayed if AP2 was selected.
DFGS-2	B10-348	28VDC-L	J2A-1,2	There is no cockpit indication that DFGC#2 is not receiving power from this breaker. (On the ground, AP2 selected.)
Yaw Damper-2	B10-346	28VDC-R	J3B-7	With AP2 selected and this breaker not supplying power, the Yaw Damper OFF message was displayed.
AP-2	B10-354	28VDC-R	J4B-104 J1B-104	With AP2 selected the NO AUTOLAND light was displayed.
DFGS-2	B10-350	28VDC-L	J1A-94 J1A-1 J3A-1,2, 3,4	With AP2 selected and the aircraft on the ground, the AP TRIM, AP1 and AP2 annunciators on FMA#2 were illuminated. In addition, #2 Fast/Slow was Inop. The TRP had a NO MODE light displayed. On the overhead the Mach Trim Fault, Yaw Damper OFF and Windshear Inop messages displayed.
DFGS AP/AT Warning LTS "A"	B10-341	28VDC Xfer	FMA (J1-A)	With this circuit breaker not supplying power, both FMA'S A/T and AP OFF red warning lights "A" bulb was inop.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS AP/AT Warning LTS "B"	B10-342	28VDC Xfer	FMA (J4A-1)	This circuit breaker supplies basic power for both DFGC's Channel "B" processor. Loss of power from this breaker will cause both #1 and #2 Flight Directors to fail. In addition, the Fast/Slow Indicators failed, the NO AUTOLAND light was displayed, the TRP had a NO MODE light, and the Flight Guidance Control Panels Altitude window went blank. (Breaker power was lost after initial power up.) The Nav Panels' CRS Windows also blanked. Loss of power from this breaker also affects Status Test Panel operation.

2. STP Test Functions

A. Procedures for Testing DFGS

Table 202

Paragraph	Test Function
Paragraph 3.A.	Continuous (Flight Fault Review) BIT
Paragraph 3.C.	Autoland Preflight Test
Paragraph 3.D.	Return to Service (RTS) BIT (DFGS)
Paragraph 3.E.	System Maintenance BIT (Maintenance Test)

B. Digital Flight Guidance System (DFGS) Power-Up Test Prior to STP Test

NOTE: Both Digital Flight Guidance Computers (DFGC's) may fail to come on line and halt STP testing procedures.

(1) When DFGS information is not displayed with side select switch in either position, proceed as follows:

(a) Check 115 VAC power and ground to each DFGC electrical connector. (PAGEBLOCK 22-16-00/101)

(b) Check no ground exists at DFGC jack connector pins J2A (36) and J3A (36). Remove ground(s) when ground(s) exist and check DFGS operation is normal. (PAGEBLOCK 22-14-00/101)

NOTE: A ground at the J2A (36) and J3A (36) points represents holding down of the autopilot disconnect (on control wheel) not allowing DFGC to begin internal checks.

(c) Check short to ground is not present at jack connector pins J1 (Z) and J3 (Z) on DFGS control panel. Should a ground exist, isolate ground source and repair. (PAGEBLOCK 22-01-03/101)

NOTE: Before incorporation of Service Bulletin 24-67, the auxiliary power unit (APU) generator field wiring can contact air conditioning piping resulting in malfunction of the APU generator and/or Digital Flight Guidance System-1 (DFGS-1). This can occur due to chafing wire.

(2) When partial DFGS displays such as one Flight Mode Annunciator (FMA) indicating HDG HLD, ALT HLD, and opposite FMA blank with both Flight Director (FD) switches on, proceed as follows:

(a) Check 28 VDC is available at jack pins J1A (1 and 60) and J4A (1) on each DFGC electrical connector. (PAGEBLOCK 22-17-00/101)

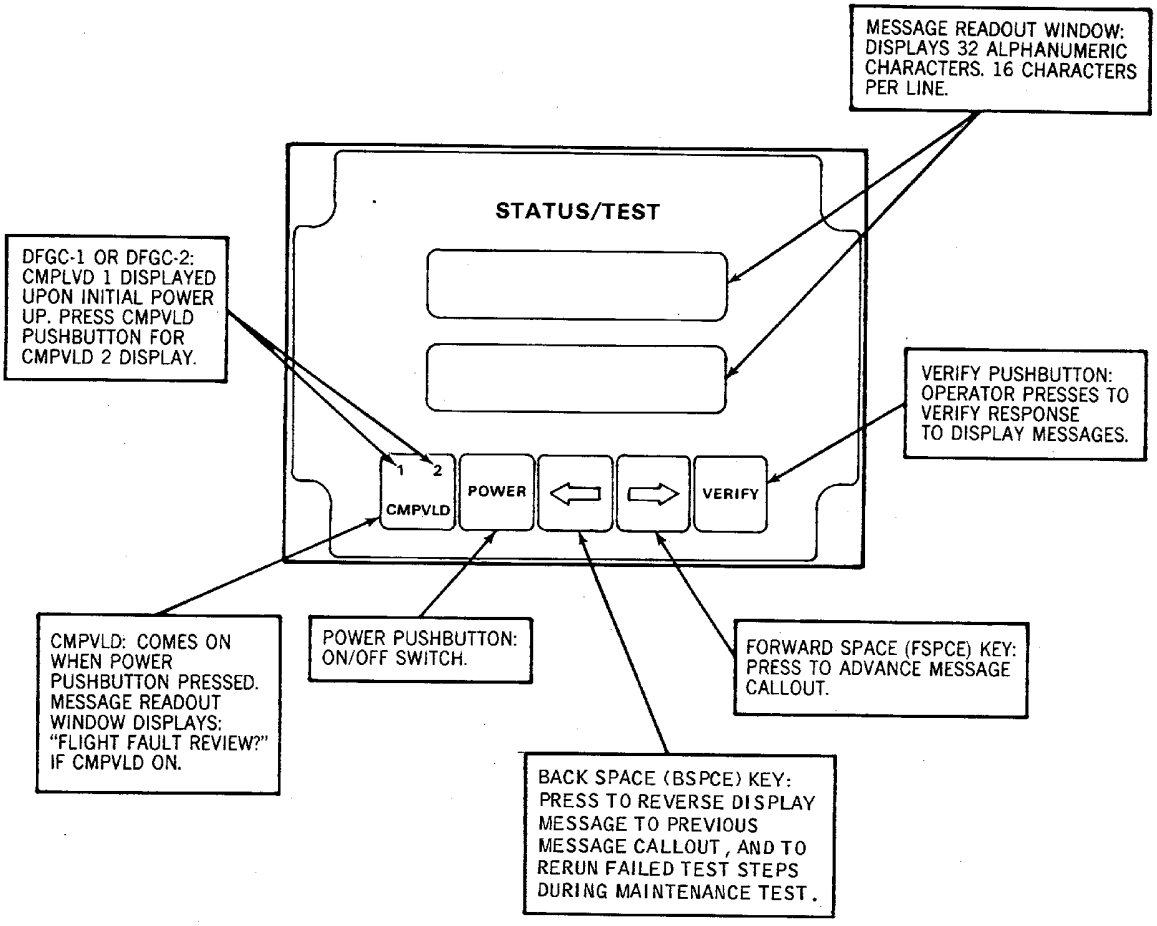
NOTE: This 28 VDC is source power for the "A" and "B" channels of the central processor.

C. On aircraft with Service Bulletin 22-85 (-920 DFGC) incorporated, following steps are necessary for completion of Maintenance and Return to Service testing:

(1) Right Ground Control Relay Sensing circuit breaker must be open to enable completion of Maintenance and Return to Service tests.

(2) During Maintenance Test, if failure message "GROUND SENSOR FAILURE" (diagnostic 124) is logged, test should be repeated with Right Ground Control relay sensing circuit breaker temporarily closed. Remainder of test can be run with Right Ground Control relay sensing circuit breaker open.

(3) During Return to Service test "GO" status may be assumed if only "GROUND SENSOR FAILURE" is logged and no other failures are logged.



Status/Test (STP) Panel
Figure 201/22-01-05-990-926

3. **STP Functional Tests**

A. Continuous (Flight Fault Review) BIT

NOTE: Continuous BIT is an internal monitor mode of the DFGC and is not controlled by the STP. Continuous BIT begins operation as soon as power is applied to the DFGS and operates continuously, even during Autoland Availability Preflight BIT, RTS BIT and System Maintenance BIT. If Continuous BIT recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel. If the autoland mode is affected, the "NO AUTOLAND" annunciator on each FMA will come on and flash to alert the flight crew that the autoland mode of operation is not available.

NOTE: Flight Fault Review Bit is provided from continuous Bit which is an internal monitor mode of the DFGC after airplane liftoff. Continuous Bit begins operation as soon as power is applied to the DFCS and operates continuously. If Continuous Bit recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel as Flight Fault Review Bit.

Table 203

Action	Desired Result
(1) On aircraft with EFIS, ensure DFGC/EFIS select switch is in the DFGC position.	
(1a) Verify DFGS switch is in same position 1, or 2 as used during flight.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
NOTE: If it is desired to interrogate DFGC 2, press and release CMPVLD pushbutton and number 2 will appear.	
(3) Press and release VERIFY pushbutton.	"NO FAULTS" displayed.
NOTE: If a failure has occurred, the number of flights and number of failures will appear. For example, if the airplane had five flights and two failures, the display message would read "5 FLIGHTS 2 FAILURES". Pressing and releasing the VERIFY pushbutton will display the most recent flight, i.e. "FLIGHT 1 1 FAILURE". Pressing and releasing the FSPCE key will display each flight and number of failures recorded for each flight. If zero failures have occurred, "NO FAULTS" will be the message displayed. Proceed to step (8) if "NO FAULTS" is the displayed message.	
(4) Press and release VERIFY pushbutton.	"FLIGHT 1 - XX FAILURE" displayed.
(5) Press and release FSPCE key.	"FLIGHT 2 - XX FAILURE" displayed.
(6) Read and record all flight faults by pressing and releasing VERIFY pushbutton until the message "FLIGHT FAULT REVIEW?" is displayed.	"FLIGHT FAULT REVIEW?" displayed.

Table 203 (Continued)

Action	Desired Result
NOTE: The in-flight logging system of the DFGS provides a feature that allows stored failures (maintenance memory) to be erased. This may be accomplished in one of two ways manually or automatically. MANUALLY: The STP may be used to erase the memory by use of the FSPCE key until the message "MAINTENANCE MEMORY ERASE?" is displayed. Pressing and releasing the VERIFY pushbutton will then display "VERIFY TO ERASE MEMORY?". Pressing and releasing the VERIFY pushbutton will then clear all of the stored failures. AUTOMATICALLY: If the maintenance memory is not periodically cleared, it will eventually fill up. Each time the DFGC is powered up, the maintenance memory is checked. If the memory store is more than 80%, the DFGC saves the most recent 150 failures and clears the rest. The memory can store approximately 350 failures, thus leaving room for approximately 200 failures. The maintenance memory is dedicated for in-flight failure logging only. These failures are displayed only during "FLIGHT FAULT REVIEW?". This memory is entirely independent of the memory used by the Return To Service Test or the Maintenance Test. Failures logged while performing these tests are erased by exiting the respective test.	
(7) Press and release FSPCE key.	"RUN RETURN TO SERVICE TEST?" displayed.
NOTE: If a Return to Service (RTS) test is desired, press and release VERIFY pushbutton. If an RTS is not desired, proceed to step (8).	
(8) Press and release POWER pushbutton.	STP message display blank.
(9) Place aircraft in normal ground configuration.	No test.
NOTE: If maintenance action has been performed, proceed to either Paragraph 3.D. or Paragraph 3.E. as appropriate.	

B. IRS/Autoland Inhibit Discrete Test

NOTE: This procedure checks the AUTOLAND INHIBIT Discrete wire connecting IRU-1 (J1B D5) to DFGC-1 and DFGC-2 (J102B 103). It also checks the AUTOLAND INHIBIT Discrete wire connecting IRU-2 (J1B D5) to DFGC-1 and DFGC-2 (J103B 103).

Table 204

Action	Desired Result
(1) Place both IRS's to NAV position and align. (INERTIAL REFERENCE SYSTEM, SUBJECT 34-43-00, Page 201)	Check that NO AUTOLAND light on FMA's goes off.
NOTE: IRS alignment requires 2.5 to 10 minutes. ALIGN lights flash if IRS has completed alignment without position entered. ALIGN light will go off after position is entered and alignment is complete.	
(2) Place IRS-1 switch to ATT position.	Attitude and heading displays go out of view on Captain's ND and PFD. Check that following lights come on: - Capt's ALIGN light on MSU - NO AUTOLAND light on FMA - IRS 1 ATT MODE light on OAP.
NOTE: The switch is detented in NAV position. Pull out firmly on switch before turning.	
(3) After approximately 20 seconds, check for following:	Attitude and heading displays come in view on Captain's ND and PFD. ALIGN light goes off. NO AUTOLAND and IRS 1 ATT MODE lights remain on.
(4) Enter Heading 1 on MCDU IRS INIT/REF page to agree with Heading 2(±2.0°).	After 10 seconds, check that NO AUTOLAND light remains on.

Table 204 (Continued)

Action	Desired Result
(5) Place DFGC selector switch to opposite position (1 or 2).	Check that NO AUTOLAND light remains on.
(6) Place IRS-1 switch to OFF.	
(7) After minimum 5 seconds, place IRS-1 switch to NAV.	
(8) On MCDU IRS INIT/REF page, enter present Latitude and Longitude.	
(9) After IRS-1 is aligned (approx. 10 minutes), check for following indications:	ALIGN and NO AUTOLAND lights go off.
(10) Place IRS-2 switch to ATT position.	Attitude and heading displays go out of view on F/O's ND and PFD. Check that following lights come on: - F/O's ALIGN light on MSU - NO AUTOLAND light on FMA - IRS 2 ATT MODE light on OAP.
NOTE: The switch is detented in NAV position. Pull out firmly on switch before turning.	
(11) After approximately 20 seconds, check for following:	Attitude and heading displays come in view on F/O's ND and PFD. ALIGN light goes off. NO AUTOLAND and IRS 2 ATT MODE lights remain on.
(12) Enter Heading 2 on MCDU IRS INIT/REF page to agree with Heading 1 (±2.0°)	After 10 seconds, check that NO AUTOLAND light remains on.
(13) Place DFGC selector switch to opposite position (1 or 2).	Check that NO AUTOLAND light remains on.
(14) Place both IRS switches to OFF.	
(15) Return aircraft to required configuration.	

C. Autoland Preflight Test

NOTE: The Autoland Availability Preflight BIT provides assurance to the flight crew that the autoland mode of operation is available. However, this test is designed primarily for the flight crew, maintenance personnel should use the RTS to check autoland status. The Autoland Preflight Test will only check radio altimeter self test, dual accelerometers self test, elevator torque limit switch verified both agree for flap configuration, rudder unrestricted switches are indicating unrestricted state and NAV receivers self test. Both NAV receivers must be tuned to an ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control Panel must be pressed.

Table 205

Action	Desired Result
(1) Verify DFGS switch is placed in position 1, or 2 as appropriate for next flight.	No test.
NOTE: While performing the Autoland Preflight Test, if the Status/Test Panel is activated the Autoland Preflight Test cannot be initiated.	
(2) Tune both VHF/NAV Control panels to an ILS frequency.	Both NAV receivers tuned to an ILS frequency.

Table 205 (Continued)

Action	Desired Result
(2a) Set switches as follows: (1) Both FD switches to off. (2) AP engage switch to OFF. (3) Overhead FLT DIR switch to NORM.	No test.
NOTE: On later aircraft FLT DIR switch is FD CMD.	
(3) On Flight Guidance Control Panel, press and release AUTO LAND pushbutton.	Associated Flight Mode Annunciators (FMA) on instrument panel displays AUTO LND/PRE/FLT/TEST, and NO AUTOLAND appears flashing.
(4) Wait approximately 45 seconds.	Both captain's and first officer's FMA's blank, if FD switches are in OFF position.
(5) Observe both FMA's and verify that the NO AUTOLAND legend goes blank.	NO AUTOLAND legend blank on both FMA's.
NOTE: If the NO AUTOLAND legend remains on the FMA's, either the ILS, radio altimeters, dual accelerometers or Continuous BIT detected a failure that would inhibit the autoland mode of operation. Proceed to Paragraph 3.D. to isolate failure(s).	
NOTE: For AHRS equipped aircraft, during the autoland preflight test the AHRS system preflight test is conducted. A steady "NO AUTOLAND" message on the FMA's is normal during the AHRS preflight test, and does not indicate a failed test unless it remains on after the AHRS test is complete and the AHRS has returned to the normal mode.	

D. Return to Service (RTS) BIT (DFGS)

NOTE: Refer to NAVIGATION DISPLAYS - MAINTENANCE PRACTICES, PAGEBLOCK 34-22-00/201 Config 1 for EFIS RTS.

NOTE: Return to Service (RTS) BIT is provided to place the aircraft back into a non-restricted (including autoland) service after maintenance action has been performed (i.e. LRU replacement). The STP is capable of performing ten sequences of tests 0 thorough 9. Sequences 1, 2, 4, 6, 7, 8 and 9 are only performed during RTS. All sequences of tests are performed during System Maintenance BIT. RTS is run completely and failures are displayed at end of test.

NOTE: All switches such as CADC, V.G., NAV and Flight Director selector switches should be in the NORM position for the Return to Service test (RTS).

Table 206

Action	Desired Result
(1) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.
(1a) Place flap/slat handle to LAND EXT position.	No test.
(1b) Verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release FSPCE key until "RUN RETURN TO SERVICE TEST?" appears.	"RUN RETURN TO SERVICE TEST?" displayed.
(4) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE VERIFY" displayed.

Table 206 (Continued)

Action	Desired Result
NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.	
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.	
(5) Press and release VERIFY pushbutton.	"TURN ON AUX HYD PUMP VERIFY" displayed.
NOTE: The RTS test requires the airplane to be in the landing configuration. Hydraulic power is required to properly set the flaps and rudder. Hydraulic power is not required if flaps are at 28 to 40 degrees and the rudder is centered (crosswinds may blow the rudder hardover causing the Rudder Servo test to fail).	
(6) Place HYD PUMPS - AUX and TRANS switches on F/O instrument panel to ON position. Press VERIFY.	"TURN ON RUDDER HYD - VERIFY" displayed.
(7) Turn on rudder hydraulics (on fwd pedestal). Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/EXTEND VERIFY" displayed.
(7a) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
(8) Check A/P is disengaged then press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.
(9) Check A/T is disengaged. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.
(10) Disengage Y/D if engaged then press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.
(11) Detune receivers from ILS frequency (if tuned) then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
NOTE: Sequence two "PASSIVE DISCRETES" and sequence four "SENSOR VALUES" are checked automatically. Sequence three and sequence five tests are skipped and are performed during System Maintenance BIT. During the tests, the message "TEST IN PROGRESS" will be displayed.	
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
(12) When step (11) is complete, observe STP.	"ENGAGE A/P - VERIFY" displayed.
(13) Engage A/P then press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.
(14) Engage autothrottle then press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.
(15) Engage yaw damper then press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.
NOTE: Tune receivers to a valid ILS frequency.	
(16) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" followed by "RETARD THROTTLES - VERIFY" displayed.
NOTE: Verify both throttle levers are below the minimum authority switches.	

Table 206 (Continued)

Action	Desired Result
(17) Retard throttles then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
SEQUENCE SEVEN - "SELF TESTS"	
NOTE: Sequence seven is an automatic self-test of the NAV receivers, R/A units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion. At end of sequence seven, the STP will display "WHEEL TURNS RWD - VERIFY".	
SEQUENCE EIGHT - "SERVO TESTS"	
CAUTION: CONTROL WHEEL, COLUMN, PEDALS, STABILIZER, AUTOTHROTTLES, MACH TRIM AND Y/D ACTUATOR WILL MOVE DURING TEST EIGHT.	
NOTE: During this sequence, the operator will check control movement by cycling the verify pushbutton. A failure will be acknowledged by cycling the forward space pushbutton.	
NOTE: Failures as detected by the software will appear in the Failure Recap which can be displayed at the end of "RTS Tests".	
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed. While the servos are in operation, the message will display flashing.	
(18) Check control wheel is stationary and displaced in CW direction from neutral position.	
(19) Press and release VERIFY pushbutton.	Control wheel will move and during this test period, STP displays "TEST IN PROGRESS".
(20) At test completion STP displays new message.	"WHEEL TURNS LWD - VERIFY" is displayed.
(21) Check control wheel is stationary and displaced in CCW direction from neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position. STP displays "TEST IN PROGRESS".
(22) At test completion STP displays new message.	"COLUMN MOVES FWD - VERIFY" is displayed.
(23) Check control column is stationary and forward of neutral position. Press and release VERIFY pushbutton.	Control column will move. STP displays "TEST IN PROGRESS".
(24) At test completion STP displays new message.	"COLUMN MOVES AFT - VERIFY" is displayed.
(25) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position and right rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(26) At test completion STP displays new message.	"RHT PEDAL MOVES FWD VERIFY" is displayed.
(27) Check right rudder pedal moved forward. Press and release VERIFY pushbutton.	Left rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(28) At test completion STP displays new message.	"LEFT PEDAL MOVES FWD VERIFY" is displayed.
(28a) Check left rudder pedal moves forward. Press and release VERIFY pushbutton.	During this test STP displays "TEST IN PROGRESS".
NOTE: Part of sequence eight and all of sequence nine test are done automatically.	

Table 206 (Continued)

Action	Desired Result
(28b) At test completion STP displays new message.	"FLAP/SLAT TO 0 RETRACT VERIFY" is displayed.
(28c) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"GO OR NO-GO SYSTEM AFFECTED" is displayed.
SEQUENCE NINE - "INTERNAL MONITORS"	
NOTE: Sequence nine is an automatic check of the real time internal monitors appropriate to ground testing. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of the test either "GO" or "NO GO - SYSTEM AFFECTED?" will be displayed.	
NOTE: If "GO" is displayed, proceed to step (33) to conclude testing. If "NO GO - SYSTEM AFFECTED?" is displayed, proceed to step (29).	
(29) Press and release VERIFY pushbutton.	One or more of the following faults may appear if a problem is detected in the system. "DFGC" "NO AUTOLAND" "AP/FD" "A/T" "S/C" "ART" "TRC" "M/T" "Y/D"
(30) Press and release FSPCE key.	"FAILURE RECAP?" displayed.
(31) Press and release VERIFY pushbutton.	The number of faults will be displayed momentarily (approx. 3 seconds), then the STP will momentarily flash VERIFY = DIAG NUM FWD = NEXT FAILURE and the first fault will be displayed.
(32) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" is displayed.	"FAILURE RECAP?" displayed.
NOTE: While failure is displayed, pressing VERIFY will display associated diagnostic number.	
(33) Press and release POWER pushbutton.	STP message display blank.
NOTE: Autothrottle and Autopilot will automatically disengage if the STP is turned off.	
(34) Hold control wheel (if wheel or column is displaced) and disengage autopilot. Press and release either AP disconnect switch.	Autopilot disengaged, AP red off warning lights on until either AP disconnect switch pressed.
(35) Disengage yaw damper. Place YAW DAMP switch to OFF at right of overhead panel.	Yaw damper disengaged.
(36) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.
(37) Place aircraft in normal ground configuration.	No test.

NOTE: Following is a list of failures and diagnostic numbers that may appear if a RTS "NO GO - SYSTEM AFFECTED?" message appears.

Table 207

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: On aircraft with -930 and subsequent DFGC, VERT GYRO is ATT.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36

Table 207 (Continued)

Failure	Diagnostic Number
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193

Table 207 (Continued)

Failure	Diagnostic Number
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP POS FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319

Table 207 (Continued)

Failure	Diagnostic Number
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQ SWITCH 1 FAILURE	332
ELEV MECH TORQ SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
** AIL MECH TORQ SWITCH 1 FAILURE	332
** AIL MECH TORQ SWITCH 2 FAILURE	333
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQ SWITCH 1 FAILURE	346
ELEV MECH TORQ SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349

Table 207 (Continued)

Failure	Diagnostic Number
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381

Table 207 (Continued)

Failure	Diagnostic Number
SEQUENCE EIGHT - SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416

Table 207 (Continued)

Failure	Diagnostic Number
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450

Table 207 (Continued)

Failure	Diagnostic Number
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR FAILURE	461
CADC -N ALT BCR FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482

Table 207 (Continued)

Failure	Diagnostic Number
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527

Table 207 (Continued)

Failure	Diagnostic Number
MACH TRIM SERVO FAILURE	528

E. System Maintenance BIT (Maintenance Test)

NOTE: System Maintenance BIT is a command response type test requiring operator interaction. All sequences can be tested by use of system Maintenance BIT. Hydraulic power is required during the use of this test only if the Flap/Slat tests and/or the rudder test is to be run. Failures detected during the Maintenance Test will be displayed immediately.

Make sure that this circuit breaker is closed:

LOWER EPC, AC BUS

Row	Col	Number	Name
Z	29	B1-62	RAM AIR TEMP & PROBE HEATER

Table 208

Action	Desired Result	Diagnostic Number
(1) On FGCP verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.	
NOTE: Each sequence of tests is called out during the test procedure. If a sequence or test step is to be bypassed, press and release the FSPCE key. Pressing the FSPCE key at the beginning of a sequence will automatically program the STP to the next sequence of tests. Pressing the FSPCE key during a test step or failed test-step will program the STP to the next test step. The FSPCE key may also be used for fast slew capabilities between test sequence steps. To repeat a failed-test step, press and release the BSPCE key. Pressing the BSPCE key twice in succession will program the test to the beginning of the test sequence if a test step failed.		
(2) Deleted.		
NOTE: If the main gear is not compressed then install main gear proximity switch target inhibitors on left and right weight-on-wheel sensors to place the DFGC system in the ground mode.		
(3) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.	
(4) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed.	"RUN MAINTENANCE TEST?" displayed.	
NOTE: Pressing VERIFY pushbutton after step (4) results in either "MD-87 OPTION VERIFY" or "MD-80 OPTION VERIFY" being displayed before step (4a) for MD-80 or MD-87 aircraft. On other aircraft pressing VERIFY pushbutton results in "SEL DFGC TEST SIDE - VERIFY being displayed as in next step.		
(4a) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	
NOTE: If DFGC switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.		
(5) Press and release VERIFY pushbutton.	"STP TESTS?" displayed.	
NOTE: During System Maintenance BIT, the FMA associated with the DFGS switch, (i.e., DFGS in position 1 corresponds to captain's FMA), will display in ATS window RTS/MNT, and in pitch window TEST, while the test is being performed.		
SEQUENCE ZERO - "STP TESTS"		

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(6) Press and release VERIFY pushbutton.	"CYCLE STP FWDSPACE PB" displayed.	1
(7) Press and release FSPCE key.	"CYCLE STP BACKSPACE PB" displayed.	2
(8) Press and release BSPCE key.	"STP SEGMENTS TEST - VERIFY" displayed.	3
(9) Press and release VERIFY pushbutton.	STAR bursts displayed.	
NOTE: The STP will display ALL STAR bursts for ten seconds. (Aircraft using the MCDU for an STP will display ALL diamonds.)		
NOTE: In order to increase the life of the message display lamps, the program only allows 10 seconds before resetting segments and reissuing the original display message. If segments are not to be checked, press and release FSPCE key. If FSPCE key is pressed while segments are displayed, a failure will be logged.		
(9a) After ten seconds are over see display.	"STP SEGMENT TEST - VERIFY" will be displayed.	
(10) Press and release FSPCE key.	"INITIAL SETUP INTERACTIVES?" displayed.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"		
(11) Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.	4 5 6 7 8 9 10 11
(12) Verify autopilot switch placed off. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE OFF - VERIFY" displayed.	12
(13) On captain's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE OFF - VERIFY" displayed.	13
(14) On first officer's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.	14 15
(15) Verify AUTO THROT switch placed OFF. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.	16
(16) On overhead panel verify YAW DAMP switch placed OFF. Press and release VERIFY pushbutton.	"YAW DAMP OFF LITE ON - VERIFY" displayed.	17
(17) On overhead annunciator panel verify YAW DAMP OFF light is on. Press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.	18 19
(18) Verify that both NAV control panels are not tuned to an ILS frequency. Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.	20 21

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(18a) "TEST IN PROGRESS" will display for approximately 5 seconds.	When test successful STP displays "ADVANCE THROTTLE VERIFY".	
(19) Advance throttle levers to mid range. Press and release VERIFY pushbutton.	"PASSIVE DISCRETES?" displayed.	
SEQUENCE TWO - "PASSIVE DISCRETES"		
NOTE: Sequence two is checked automatically. If a fault is recognized, the testing sequence will stop and the failure message will appear. Cycling VERIFY pushbutton provides diagnostic number for the failure. Press and release FSPCE key to initiate testing again.		
(20) Press and release VERIFY pushbutton. Wait approximately (.25) seconds.	"TRC OPTION PIN ABCD = XXXX VERIFY".	51
(20a) Upon completion of automatic testing, STP will display status of engine option pins for Thrust Rating.	TRC OPTION PIN ABCDE = XXXXX VERIFY displays.	51
NOTE: These option pins will be different for the type engine used as follows: -209 engine ABCDE = -GGG-, ABCD = -GGG -217A/-217C engine ABCDE = --G--, ABCD = --G- -217 engine ABCDE = GG-G-, ABCD = GG-G -219 engine ABCDE = -GG-G		
NOTE: G = GROUND, - = OPEN. Reference Trouble Shooting section, Sequence Two - "PASSIVE DISCRETES" Diagnostic Number 51.		
(20b) Press and release VERIFY pushbutton.	Once all failures have been sequenced, STP will display "SWITCHES AND BUTTONS"	
SEQUENCE THREE - "SWITCHES AND BUTTONS"		
(21) Press and release VERIFY pushbutton.	"CYCLE EPR SEL PB" displayed.	73 74 75 76
(22) Press and release EPR SEL pushbutton.	"PRESS VERIFY" displayed.	77 78 79 80
(23) Press and release VERIFY pushbutton.	"CYCLE EPR SEL PB" displayed.	81 82 83 84
(24) Press and release EPR SEL pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	90
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 48 DEGREES - VERIFY" displayed.	93 94 95 96 97 98 99 100
(28) On Thrust Rating Panel (TRP), press T/O FLX pushbutton. ASSUMED TEMP will be displayed in offside FMA window. Set ASSUMED TEMP knob on TRP to 78°C. Press and release VERIFY pushbutton.	"TEMP SELECT 87 DEGREES - VERIFY" displayed.	101 102 103 104 105 106 107 108
(29) Adjust ASSUMED TEMP to 87 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
(30) On Thrust Rating Panel press and release T.O pushbutton. Press and release VERIFY pushbutton.	"TR MODE T/O FLX - VERIFY" displayed.	110
NOTE: Steps applying to the TRP are only checking the buttons and their lights. Thrust Rating Mode is not checked during this step but is checked continuously by the DFGC.		
(31) Press and release T.O. FLX pushbutton. Press and release VERIFY pushbutton.	"TR MODE GA - VERIFY" displayed.	111
(32) Press and release GA pushbutton. Press and release VERIFY pushbutton.	"TR MODE MCT - VERIFY" displayed.	112
(33) Press and release MCT pushbutton. Press and release VERIFY pushbutton.	"TR MODE CL - VERIFY" displayed.	113
(34) Press and release CL pushbutton. Press and release VERIFY pushbutton.	"TR MODE CR - VERIFY" displayed.	114
(35) Press and release CR pushbutton. Press and release VERIFY pushbutton.	"CYCLE TO/GA SWITCH 1" displayed.	117
(36) On throttle lever press and release left TO/GA switch.	"CYCLE TO/GA SWITCH 2" displayed.	118
(37) Press and release right TO/GA switch.	"CYCLE A/P 1 DISCONNECT" displayed.	119

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(38) Press and release captain's control wheel AP disconnect switch.	"CYCLE A/P 2 DISCONNECT" displayed.	120
(39) Press and release first officer's control wheel AP disconnect switch.	"CYCLE CAPT FMA RESET PB" displayed.	121
(40) Press and release RESET button on captain's FMA.	"CYCLE F/O FMA RESET PB" displayed.	122
(41) Press and release RESET button on first officer's FMA.	"PULL GND SENS BRKRS - VERIFY" displayed.	123 124
NOTE: If testing of the Bleed Inputs (steps (42) through (58)) is not desired, leave GND SENS BRKRS closed and cycle FSPCE key. Pressing the FSPCE key will skip the above mentioned tests and resume on step (59).		
WARNING: NORMAL ELECTRICAL POWER TO VARIOUS SYSTEMS MAY BE INTERRUPTED WHEN GROUND CONTROL RELAY CIRCUIT BREAKERS ARE OPENED. IF GROUND CONTROL RELAY CIRCUIT BREAKERS ARE TO BE OPENED WHILE PERFORMING PROCEDURES, MAKE CERTAIN SWITCHES AND CONTROLS OF AFFECTED SYSTEMS ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF EQUIPMENT.		
WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.		
(42) Open these circuit breakers:		125
REF DES / CIRCUIT BREAKER / LOCATION / PANEL AREA / ROW/COL		
B1-23 / LEFT GROUND CONTROL RELAY / UPPER EPC / L AC BUS / K/33 B1-24 / RIGHT GROUND CONTROL RELAY / UPPER EPC / L AC BUS / L/33		
(42a) Press and releaseVERIFYpushbutton.	"LEFT PNEU X FEED OPEN - VERIFY" displayed.	
NOTE: When pneumatic switches are opened, PNEU X FEED VALVE OPEN is displayed adjacent to the left and right pneumatic X-FEED lever.		
(43) On pedestal, place left pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	126
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH AUTO CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SINGLE SWITCH)		
WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.		
(43A) Open this circuit breaker:		
REF DES \ CIRCUIT BREAKER \ LOCATION \ PANEL AREA \ ROW/COL		
B1-591 \ TAIL DE-ICE TIMER \ LOWER EPC \ RIGHT DC BUS \ N/31		

WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH AUTO CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SINGLE SWITCH) (Continued)

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(44) On overhead panel, place AIR FOIL switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH MANUAL CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SEPARATE SWITCHES)		
(44) On overhead panel, place AIR FOIL L SYS switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
(45) On overhead panel, place AIR FOIL L SYS switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH AUTO CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SINGLE SWITCH)		
(45) On overhead panel, place AIR FOIL switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
(46) On pedestal, close left pneumatic switch. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED OPEN - VERIFY" displayed.	129
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH MANUAL CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SEPARATE SWITCHES)		
(46) On pedestal, close left pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED OPEN - VERIFY" displayed.	129
(47) On pedestal, place right pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	130
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH AUTO CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SINGLE SWITCH)		
(47) On pedestal, place right pneumatic switch to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	130
(48) On overhead panel, place AIR FOIL switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	131
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH MANUAL CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SEPARATE SWITCHES)		
(48) On overhead panel, place AIR FOIL R SYS switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	131
(49) On overhead panel, place ICE PROTECT AIR FOIL R SYS switch OFF. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132

WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH MANUAL CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SEPARATE SWITCHES) (Continued)

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH AUTO CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SINGLE SWITCH)		
(49) On overhead panel, place ICE PROTECT AIR FOIL switch OFF. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH MANUAL CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SEPARATE SWITCHES)		
(50) On pedestal, close right pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW ON - VERIFY" displayed.	133
WJE 401-404, 412, 414, 875-877; AIRCRAFT WITH AUTO CYCLING FROM WING ANTI-ICE TO TAIL DE-ICE (SINGLE SWITCH)		
(49a) Remove the safety tag and close this circuit breaker:		
REF DES \ CIRCUIT BREAKER \ LOCATION \ PANEL AREA \ ROW/COL		
B1-591 \ TAIL DE-ICE TIMER \ LOWER EPC \ RIGHT DC BUS \ N/31		
(50) On pedestal, close right pneumatic switch. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW ON - VERIFY" displayed.	133
WJE 401-404, 412, 414, 875-877		
(51) On overhead panel place ICE PROTECT ENG L switch ON. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW OFF - VERIFY" displayed.	134
(52) Place ICE PROTECT ENG L switch OFF. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW ON - VERIFY" displayed.	135
(53) Place ICE PROTECT ENG R switch ON. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW OFF - VERIFY" displayed.	136
(54) Place ICE PROTECT ENG R switch OFF. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW AUTO - VERIFY" displayed.	137
(55) On overhead panel place left AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW OFF - VERIFY" displayed.	138
(56) Place left AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW AUTO - VERIFY" displayed.	139
(57) Place right AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW OFF - VERIFY" displayed.	140
(58) Place right AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"CLOSE GND SENS BRKRS - VERIFY" displayed.	141 142

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(59) Remove the safety tags and close these circuit breakers:		
REF DES / CIRCUIT BREAKER / LOCATION / PANEL AREA / ROW/COL		
B1-23 / LEFT GROUND CONTROL RELAY / UPPER EPC / L AC BUS / K/33 B1-24 / RIGHT GROUND CONTROL RELAY / UPPER EPC / L AC BUS / L/33		
(59a)	"SEL DFGC NON-TST SIDE - VERIFY" displayed.	143
(60) On FGCP place DFGS 1, 2, switch to opposite position. Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	144
(61) Place DFGS switch back to test side indicated by illuminated "1" or "2" legend of STP CMPVLD pushbutton. Press and release VERIFY pushbutton.	"CYCLE FMS OVRD PB" displayed.	145
NOTE: The following test sequences verify that the pushbuttons and knobs on the FGCP will make and break contact. If the STP does not cycle to the next test, then the cycling was not detected by the DFGC. Pressing and releasing the VERIFY pushbutton will advise the DFGC of the failure. Pressing and releasing the FSPCE key will advance the STP to the next display message.		
NOTE: The ILS or autoland modes are not being tested during this sequence. Only the switch operation is checked.		
(61a) Press and release FMS OVRD pushbutton.	"CYCLE SPEED SELECT PB" displayed.	146
(62) Press and release SPD SEL pushbutton.	"CYCLE MACH SELECT PB" displayed.	147
(63) Press and release MACH SEL pushbutton.	"CYCLE EPR LIMIT PB" displayed.	148
(64) Press and release EPR LIM pushbutton.	"CYCLE NAV PB" displayed.	149
(64a) Press and release NAV pushbutton.	"CYCLE VOR/LOC PB" displayed.	150
(65) Press and release VOR/LOC pushbutton.	"CYCLE ILS PB" displayed.	151
(66) Press and release ILS pushbutton.	"CYCLE AUTOLAND PB" displayed.	152
(67) Press and release AUTO LAND pushbutton.	"CYCLE VERT SPD PB" displayed.	153
(68) Press and release VERT SPD pushbutton.	"CYCLE IAS/MACH PB" displayed.	154
(69) Press and release IAS/MACH pushbutton.	"CYCLE VNAV PB" displayed.	155
(70) Press and release VNAV pushbutton.	"CYCLE ALT HOLD PB" displayed.	156
(71) Press and release ALT HOLD pushbutton.	"CYCLE TURB PB" displayed.	157
(72) Press and release TURB pushbutton.	"CYCLE SPEED KNOB (2ND DET IN)" displayed.	159
(73) Push SPD MACH knob full in and release.	"CYCLE HDG KNOB (OUT)" displayed.	160
(74) Pull H knob full out and release.	"CYCLE HDG KNOB (2ND DET IN)" displayed.	161

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(75) Push H knob full in and release.	"CYCLE ALT KNOB (OUT)" displayed.	162
(76) Pull ALT knob full out and release.	"CYCLE ALT KNOB (IN)" displayed.	163
(77) Push ALT knob full in and release.	"BANK LIMIT 15 DEGREES - VERIFY" displayed.	164
(78) Rotate outer heading knob to 15 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 20 DEGREES - VERIFY" displayed.	165
(79) Rotate to 20 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 25 DEGREES - VERIFY" displayed.	166
(80) Rotate to 25 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 30 DEGREES - VERIFY" displayed.	167
(81) Rotate to 30 degrees. Press and release VERIFY pushbutton.	"SPEED REF OPER - VERIFY" displayed.	168
(82) Rotate SPD MACH knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"HEADING REF OPER - VERIFY" displayed.	169
(83) Rotate H knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"VERT SPD REF OPER - VERIFY" displayed.	174
(84) Rotate pitch wheel full ANU and AND. Press and release VERIFY pushbutton.	"ALT REF OPER - VERIFY" displayed.	175
(85) Rotate ALT knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-1 REF OPER - VERIFY" displayed.	176
(86) Rotate captain's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-2 REF OPER - VERIFY" displayed.	177
(87) Rotate first officer's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"SENSOR VALUES?" displayed.	
NOTE: The DFGC is not testing the knobs in steps (82) through (87). They are prompter messages to have mechanic be sure knob turns freely and digital displays change.		
SEQUENCE FOUR - "SENSOR VALUES"		
(88) Press and release VERIFY pushbutton.	"DISPLAY OPTION?" displayed.	
NOTE: There are three testing options available when the message "DISPLAY OPTION " appears. FIRST: Pressing and releasing the FSPCE key will automatically null check the sensor values. The values are compared to a ground reference tolerance, and if out of tolerance a fault message will be displayed. SECOND: Pressing and releasing the VERIFY push- button will display the first sensor value. The FSPCE and BSPCE keys can be used at this time for slew capability. Failures are not recognized when this option is selected. THIRD: After pressing and releasing FSPCE key the automatic slewing of measurements occurs until the STP displays "COCKPIT DISPLAYS".		

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(89) Press and release VERIFY pushbutton for display option, or FSPCE key.	"PITCH ANGLE 1 = XX.XX DEGREES" displayed.	180
(90) Press and release FSPCE key.	"PITCH ANGLE 2 = XX.XX DEGREES" displayed.	181
(91) Press and release FSPCE key.	"PITCH ANGLE 3 = XX.XX DEGREES" displayed.	182
(92) Press and release FSPCE key.	"BANK ANGLE 1 = XX.XX DEGREES" displayed.	183
(93) Press and release FSPCE key.	"BANK ANGLE 2 = XX.XX DEGREES" displayed.	184
(94) Press and release FSPCE key.	"BANK ANGLE 3 = XX.XX DEGREES" displayed.	185
(95) Press and release FSPCE key.	"SPOILER POS 1 = (TED or TEU) XX.XX DEG" displayed.	186
(96) Press and release FSPCE key.	"SPOILER POS 2 = (TED or TEU) XX.XX DEG" displayed.	187
(97) Press and release FSPCE key.	"CRS RAD ALT 1 = XXXX. FEET" displayed.	188
(98) Press and release FSPCE key.	"CRS RAD ALT 2 = XXXX. FEET" displayed.	189
(99) Press and release FSPCE key.	"FINE RAD ALT 1 = XXXX. FEET" displayed.	190
(100) Press and release FSPCE key.	"FINE RAD ALT 2 = XXXX. FEET" displayed.	191
(101) Press and release FSPCE key.	"ELEV SYNC A = XX.XX DEGREES" displayed.	192
(102) Press and release FSPCE key.	"ELEV SYNC B = XX.XX DEGREES" displayed.	193
(103) Press and release FSPCE key.	"AIL SYNC A = XX.XX DEGREES" displayed.	194
(104) Press and release FSPCE key.	"AIL SYNC B = XX.XX DEGREES" displayed.	195
(105) Press and release FSPCE key.	"RUD SYNC A = XX.XX DEGREES" displayed.	196
(106) Press and release FSPCE key.	"RUD SYNC B = XX.XX DEGREES" displayed.	197
(107) Press and release FSPCE key.	"YAW DAMP POS = XX.XX DEGREES" displayed.	198
(108) Press and release FSPCE key.	"MACH TRIM POS = XX.XX INCH" displayed.	199
(109) Press and release FSPCE key.	"ELEV TACH A = XX.XX DEG/SEC" displayed.	200

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(110) Press and release FSPCE key.	"ELEV TACH B = XX.XX DEG/SEC" displayed.	201
(111) Press and release FSPCE key.	"AIL TACH A = XX.XX DEG/SEC" displayed.	202
(112) Press and release FSPCE key.	"AIL TACH B = XX.XX DEG/SEC" displayed.	203
(113) Press and release FSPCE key.	"RUD TACH A = XX.XX DEG/SEC" displayed.	204
(114) Press and release FSPCE key.	"RUD TACH B = XX.XX DEG/SEC" displayed.	205
(115) Press and release FSPCE key.	"A/T TACH = XX.XX DEG/SEC" displayed.	206
(116) Press and release FSPCE key.	"MACH TRIM TACH = XX.XX DEG/SEC" displayed.	207
(117) Press and release FSPCE key.	"YAW DAMP TACH = XX.XX DEG/SEC" displayed.	208
(118) Press and release FSPCE key.	"D3A-X ACCEL A = XX.XX FT/SEC*2" displayed.	209
(119) Press and release FSPCE key.	"D3A-X ACCEL B = XX.XX FT/SEC*2" displayed.	210
(120) Press and release FSPCE key.	"D3A-Y ACCEL A = XX.XX FT/SEC*2" displayed.	211
(121) Press and release FSPCE key.	"D3A Y ACCEL B = XX.XX FT/SEC*2" displayed.	212
(122) Press and release FSPCE key.	"D3A-Z ACCEL A = XX.XX FT/SEC*2" displayed.	213
(123) Press and release FSPCE key.	"D3A-Z ACCEL B = XX.XX FT/SEC*2" displayed.	214
(124) Press and release FSPCE key.	"DLA-Y ACCEL A = XX.XX FT/SEC*2" displayed.	215
(125) Press and release FSPCE key.	"DLA-Y ACCEL B = XX.XX FT/SEC*2" displayed.	216
(126) Press and release FSPCE key.	"G/S DEV A = X.XXX DEGREES" displayed.	217
(127) Press and release FSPCE key.	"G/S DEV B = X.XXX DEGREES" displayed.	218
(128) Press and release FSPCE key.	"VOR/LOC DEV A = X.XXX DEGREES" displayed.	219
(129) Press and release FSPCE key.	"VOR/LOC DEV B = X.XXX DEGREES" displayed.	220
(130) Press and release FSPCE key.	"LEFT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	221

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(131) Press and release FSPCE key.	"RIGHT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	222
(132) Press and release FSPCE key.	"LEFT AILERON = (TEU or TED) XX.XX DEG" displayed.	223
(133) Press and release FSPCE key.	"RUDDER POS = (TEL or TER) XX.XX DEG" displayed.	224
(134) Press and release FSPCE key.	"HOR STAB = (TEU or TED) XX.XX DEG" displayed.	225
(135) Press and release FSPCE key.	"ANGLE OF ATT 1 = XX.XX DEGREES" displayed.	226
(136) Press and release FSPCE key.	"ANGLE OF ATT 2 = XX.XX DEGREES" displayed.	227
(137) Press and release FSPCE key.	"EPR LEFT = XX.XX EPR" displayed.	228
(138) Press and release FSPCE key.	"EPR RIGHT = XX.XX EPR" displayed.	229
(139) Press and release FSPCE key.	"HEADING 1 = XX.XX DEGREES" displayed.	230
(140) Press and release FSPCE key.	"HEADING 2 = XX.XX DEGREES" displayed.	231
(141) Press and release FSPCE key.	"LEFT FLAPS POS = XX.XX DEGREES displayed.	232
(142) Press and release FSPCE key.	"RIGHT FLAP POS = XX.XX DEGREES" displayed.	233
(143) Press and release FSPCE key.	"FLAP HANDLE = XX.XX DEGREES" displayed.	234
NOTE: During CADC test, the letter T is displayed for CADC on test side and the letter N is for CADC on non test side.		
(144) Press and release FSPCE key.	"CADC-T ALT NCR = XXXX. FEET" displayed.	235
(145) Press and release FSPCE key.	"CADC-N ALT NCR = XXXX. FEET" displayed.	236
(146) Press and release FSPCE key.	"CADC-T TAT = XX.XX DEGREES" displayed.	237
(147) Press and release FSPCE key.	"CADC-N TAT = XX.XX DEGREES" displayed.	238
(148) Press and release FSPCE key.	"CADC-T ALT RATE = XX.XX FT/SEC" displayed.	239
(149) Press and release FSPCE key.	"CADC-N ALT RATE = XX.XX FT/SEC" displayed.	240
(150) Press and release FSPCE key.	"CADC-T SAT = XX.XX DEGREES" displayed.	241

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(151) Press and release FSPCE key.	"CADC-N SAT = XX.XX DEGREES" displayed.	242
(152) Press and release FSPCE key.	"CADC-T CAS = XXX.X FT/SEC" displayed.	243
(153) Press and release FSPCE key.	"CADC-N CAS = XXX.X FT/SEC" displayed.	244
(154) Press and release FSPCE key.	"CADC-T MACH = X.XXXX FT/SEC" displayed.	245
(155) Press and release FSPCE key.	"CADC-N MACH = X.XXXX FT/SEC" displayed.	246
(156) Press and release FSPCE key.	"COCKPIT DISPLAYS?" displayed.	
SEQUENCE FIVE - "COCKPIT DISPLAYS"		
(156a) Place both FD switches to ON.		
NOTE: "ART switch must be in the AUTO position prior to running this sequence."		
(157) Press and release VERIFY pushbutton.	"EPR SEL light A and B - VERIFY" displayed.	249
(157a) Press and release VERIFY pushbutton.	"ART INOP LITE - VERIFY" displayed.	250
(158) On overhead annunciator panel verify ART INOP light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 1 - VERIFY" displayed.	251
(159) On captain's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 2 - VERIFY" displayed.	252
(160) On first officer's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT SELECT APPR - VERIFY" displayed.	253
(161) Verify aural warning sounds. Press and release VERIFY pushbutton.	"ALT SELECT DEV - VERIFY" displayed.	254
(162) Verify aural warning sounds. Press and release VERIFY pushbutton.	"TR EPR VALID - VERIFY" displayed.	255
(163) On center instrument panel EPR flag out of view. If electronic engine display panel is installed, EPR limit is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR indicator/panel.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - VERIFY" displayed.	258
NOTE: The following steps (166) through (169) verify that the AUTOLAND and AP TRIM legends on each FMA have two operable bulbs. The "A" light refers to left light bulb and the "B" light refers to right light bulb.		

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(166) Verify READY light on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE A VERIFY" displayed.	259
(167) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE B VERIFY" displayed.	260
(168) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE A - VERIFY" displayed.	261
(169) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE B - VERIFY" displayed.	262
(170) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"VERT SPD DETENT - VERIFY" displayed.	263
(171) On FGCP verify pitch wheel detent (cycle) position. Press and release VERIFY pushbutton.	"IAS BUG 1 250 KIAS - VERIFY" displayed.	264
(172) On captain's Mach/ Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"IAS BUS 2 250 KIAS - VERIFY" displayed.	265
(173) On first officer's Mach/Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"EPR BUG LEFT 1.8 EPR - VERIFY" displayed.	266
NOTE: Care must be taken to be sure EPR bug manual set knobs on EPR indicators are in automatic (IN) position.		
(174) On center instrument panel verify left EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR BUG RIGHT 1.8 - VERIFY" displayed.	267
(175) Verify right EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR LIMIT CMD 1.8 EPR - VERIFY" displayed.	268
(176) On thrust rating indicator/EEDP verify EPR LIM reads 1.80(±0.014). Press and release VERIFY pushbutton.	"F/D CMD SW to TEST SIDE - VERIFY" displayed.	269
(176A) On overhead panel, set FD CMD switch to side under test. Press and release VERIFY pushbutton.	"CAPT F/D SW ON VERIFY" displayed.	
NOTE: Side under test corresponds to CMP VLD light number on STP.		
(177) On FGCP, place captain's FD switch to FD position. Press and release VERIFY pushbutton.	"CAPT F/D LITE ON - VERIFY" displayed.	270
(178) On captain's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"CAPT PITCH F/D CENTER - VERIFY" displayed.	271
(179) On captain's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"CAPT PITCH F/D NOSE UP - VERIFY" displayed.	272
(180) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"CAPT ROLL F/D CENTER - VERIFY" displayed.	273

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(181) Verify roll command centered. Press and release VERIFY pushbutton.	"CAPT ROLL F/D RIGHT - VERIFY" displayed.	274
(182) Verify roll command moves right. Press and release VERIFY pushbutton.	"CAPT F/D SW OFF - VERIFY displayed.	275
(183) On FGCP, place captain's FD switch to OFF position. Press and release VERIFY pushbutton.	"F/O F/D SW ON - VERIFY" displayed.	276
(184) On FGCP, place F/O's FD switch to FD position. Press and release VERIFY pushbutton.	"F/O F/D LITE ON - VERIFY" displayed.	277
(185) On F/O's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"F/O PITCH F/D CENTER - VERIFY" displayed.	278
(186) On first officer's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"F/O PITCH F/D NOSE UP - VERIFY" displayed.	279
(187) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"F/O ROLL F/D CENTER - VERIFY" displayed.	280
(188) Verify roll command centered. Press and release VERIFY pushbutton.	"F/O ROLL F/D RIGHT - VERIFY" displayed.	281
(189) Verify roll command moves right. Press and release VERIFY pushbutton.	"F/O F/D SW OFF - VERIFY" displayed.	282
(190) On FGCP, place F/O's FD switch to OFF position. Press and release VERIFY pushbutton.	"FAST/SLOW 1 VALID - VERIFY" displayed.	283
(191) On captain's ADI/PFD verify SPD flag in and out of view and slow- fast pointer in and out of view. Press and release VERIFY pushbutton.	"FAST/SLOW 2 VALID - VERIFY" displayed.	284
(192) On first officer's ADI/PFD verify SPD flag in and out of view and slow-fast pointer in and out of view. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS CENTER - VERIFY" displayed.	285
(193) On captain's and first officer's ADI's/PFD's verify fast-slow pointers centered. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS UP - VERIFY" displayed.	286
(194) Verify both fast-slow pointers move to the fast side. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS DOWN - VERIFY" displayed.	287
(195) Verify both fast-slow pointers move to the slow side. Press and release VERIFY pushbutton.	"FMA SEGMENTS TEST - VERIFY" displayed, then "FMA SEGMENTS ON - VERIFY" displayed.	288
(196) On captain's and first officer's FMA's verify all alpha-numeric characters display as a STARBURST for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"FGCP/NCP SGMENTS TEST - VERIFY" displayed, then "FGCP/NCP SGMENTS ON - VERIFY" displayed.	289

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(197) On FGCP and NAV Control panels verify all numerical seven- segment digits are displayed for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"SECOND SETUP INTERACTIVES?" displayed.	
NOTE: After completion of sequence five, place FD CMD switch on overhead panel back to NORM position.		
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"		
(198) Press and release VERIFY pushbutton.	"ENGAGE A/P - VERIFY" displayed.	312 through 319
(199) On FGCP place AP switch to ON position. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE ON - VERIFY" displayed.	320
(200) On captain's FMA verify AP light on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE ON - VERIFY" displayed.	321
(201) On first officer's FMA verify AP light on. Press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.	322
(202) On FGCP place auto- throttle switch to AUTO THROT position. Press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.	323
(203) On overhead panel verify YAW DAMP switch placed ON. Press and release VERIFY pushbutton.	"Y/D OFF LITE OFF - VERIFY" displayed.	324
(204) On overhead annunciator panel verify YAW DAMP OFF light is not on. Press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.	325 326
(205) Tune both NAV control panels to a valid ILS frequency. Press and release VERIFY pushbutton.	"RETARD THROTTLE - VERIFY" displayed.	327 328
(206) Place both throttle levers to the aft mechanical stop. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/ RETRACT VERIFY" displayed.	329 through 337
NOTE: After the FLAP/SLAT handle has been moved, and the VERIFY pushbutton has been pressed, the message "FLAP TEST IN PROGRESS" will be displayed for approximately 30 seconds.		
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.		
(206a) On center instrument panel, place HYD PUMPS AUX switch to ON, and ALT switch to ON.	Hydraulic pressure available.	
(207) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 11/ MID - VERIFY" displayed.	338 through 342
(208) Place flap/slat handle to 11 degrees. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/ EXTEND - VERIFY" displayed.	343 through 349

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(209) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"SELF TESTS?" displayed.	
SEQUENCE SEVEN - "SELF TESTS"		
(209a) Press and release VERIFY pushbutton.	"RCVRS TO ILS VERIFY" displayed.	
NOTE: If testing of the ILS receivers is not desired, press and release FSPCE key and only the radio altimeters and accelerometers self-tests will be performed.		
(210) Press and release VERIFY pushbutton. Wait approximately (30) seconds.	"SERVO TESTS?" displayed.	350 through 381
NOTE: Sequence seven is an automatic self-test of the ILS receivers, R/T units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion.		
SEQUENCE EIGHT - "SERVO TESTS"		
NOTE: For convenience it is possible to selectively run portions of the servo test. For example, step (211) states "A/P ENGAGED - VERIFY"; if the autopilot is engaged and the VERIFY pushbutton is pressed, all 3 Dual Servo tests and the Auto Pitch Trim are performed. If these tests are not to be performed, disengage the autopilot and press and release the FSPCE key. The STP will then display "YAW DAMP ON - VERIFY" (step 220). Turning the YAW DAMP off and pressing the FSPCE key will result in the message "MACH TRIM NORM - VERIFY" without having run the yaw damp test. The same procedure also applies for the Mach Trim Actuator and the autothrottle.		
(211) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.	
(211a) Press and release VERIFY pushbutton.		
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed.		
(212) Verify autopilot switch ON. Press and release VERIFY pushbutton.	"A/P ENGAGED - VERIFY" displayed.	385
(213) Verify both control wheels turn right wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS RWD - VERIFY" displayed.	386 through 398
(214) Verify both control wheels turn left wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS LWD - VERIFY" displayed.	399 through 403
(215) Verify both control columns move forward. Press and release VERIFY pushbutton.	"COLUMN MOVES FWD - VERIFY" displayed.	404 through 416
(216) Verify both control columns move aft. Press and release VERIFY pushbutton.	"COLUMN MOVES AFT - VERIFY" displayed.	417 through 421
(217) Verify right rudder pedal moves forward. Press and release VERIFY pushbutton.	"RHT PEDAL MOVES FWD - VERIFY" displayed.	422 through 434
(218) Verify left rudder pedal moves forward. Press and release VERIFY pushbutton.	"LEFT PEDAL MOVES FWD - VERIFY" displayed.	435 through 439
(219) On pedestal verify trim indicator moves towards nose up. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE UP - VERIFY" displayed.	440

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(220) On pedestal verify trim indicator moves towards nose down. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE DN - VERIFY" displayed.	441
(221) On overhead panel, verify YAW DAMP switch ON. Press and release VERIFY pushbutton.	"YAW DAMP ON - VERIFY" displayed.	442 443
NOTE: If ground power is being applied, verify correct voltage, or a failure may be recorded in the Mach Trim system.		
(222) On overhead panel, verify MACH TRIM COMP switch is in NORM position. Press and release VERIFY pushbutton.	"MACH TRIM NORM - VERIFY" displayed.	444
(223) On FGCP, verify AUTO THROT switch is ON. Press and release VERIFY pushbutton.	"A/T ENGAGED - VERIFY" displayed.	445 through 448
(223a) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/RETRACT VERIFY" displayed. "FLAP TEST IN PROGRESS" displayed.	449
NOTE: If a failure has not been detected, "INTERNAL MONITORS?" will be displayed.		
(223b) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.	
SEQUENCE NINE - "INTERNAL MONITORS"		
NOTE: Sequence nine is an automatic check of the validity of synchros, resolvers and performs a reasonableness test. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of testing, "FAILURE RECAP?" will be displayed.		
(224) Press and release VERIFY pushbutton.	The total number of faults will be displayed momentarily, then the first fault will be displayed.	
NOTE: Momentarily pressing the VERIFY pushbutton after each failure is recorded, will display the diagnostic number.		
(225) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" displayed.	"FAILURE RECAP?" displayed.	
NOTE: If a "FAILURE RECAP?" is desired, press and release VERIFY pushbutton and the total number of faults will again be displayed.		
(226) Press and release FSPCE key.	"MAINTENANCE MEMORY ERASE?" displayed.	
NOTE: At this time the autopilot and autothrottle automatically disengage. Turn off autopilot and autothrottle red warning lights by cycling the disconnect switches.		
(227) Press and release VERIFY pushbutton.	"VERIFY TO ERASE MEMORY?" displayed.	
NOTE: If Maintenance Memory is to be retained, press and release FSPCE key and "FLIGHT FAULT REVIEW?" will be displayed.		

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(228) Press and release VERIFY pushbutton.	"FLIGHT FAULT REVIEW?" displayed.	
(229) Press and release POWER pushbutton.	STP message display blank.	
(230) Autopilot and Authrottle disengage automatically at the conclusion of System Maintenance BIT.	Autopilot disengaged. AP red off warning lights on until either AP disconnect switch pressed. Autothrottle disengaged. THROTTLE red off warning lights on until throttle disconnect switch pressed.	
(231) Place airplane in normal ground configuration.	No test.	

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. Reference DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201, for trouble shooting procedures corresponding to failure.

Table 209

Failure	Diagnostic Number
SEQUENCE ZERO - "STP TESTS"	
STP FWDSPACE PB FAILURE	1
STP BACKSPACE PB FAILURE	2
STP SGMENTS FAILURE	3
NOTE: In tests that multiple failures of a sensor occurs, such as servo failures, the fault will only be displayed once during the FAILURE RECAP.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
FMA-1 A/P LITE OFF FAILURE	12
FMA-2 A/P LITE OFF FAILURE	13
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16

Table 209 (Continued)

Failure	Diagnostic Number
YAW DAMP OFF LITE ON FAILURE	17
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
ELEVATOR TORQUE LIMIT SWITCH 1 FAILURE	35
ELEVATOR TORQUE LIMIT SWITCH 2 FAILURE	36
NOTE: For -930 and subsequent DFGC's, ELEVATOR is AIL MECH.	
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46

Table 209 (Continued)

Failure	Diagnostic Number
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"	
VG SW UNIT SWITCH FAILURE	73
VG SW UNIT SWITCH FAILURE	74
VG SW UNIT SWITCH FAILURE	75
VG SW UNIT SWITCH FAILURE	76
VG SW UNIT SWITCH FAILURE	77
VG SW UNIT SWITCH FAILURE	78
VG SW UNIT SWITCH FAILURE	79
VG SW UNIT SWITCH FAILURE	80
VG SW UNIT SWITCH FAILURE	81
VG SW UNIT SWITCH FAILURE	82
VG SW UNIT SWITCH FAILURE	83
VG SW UNIT SWITCH FAILURE	84
NOTE: For -930 and subsequent DFGC's, VG is ATT.	
CADC SWITCH FAILURE	85
CADC SWITCH FAILURE	86
CADC SWITCH FAILURE	87
CADC SWITCH FAILURE	88
CADC SWITCH FAILURE	89
CADC SWITCH FAILURE	90
CADC SWITCH FAILURE	91
CADC SWITCH FAILURE	92
TEMP SELECT PANEL FAILURE	93
TEMP SELECT PANEL FAILURE	94
TEMP SELECT PANEL FAILURE	95

Table 209 (Continued)

Failure	Diagnostic Number
TEMP SELECT PANEL FAILURE	96
TEMP SELECT PANEL FAILURE	97
TEMP SELECT PANEL FAILURE	98
TEMP SELECT PANEL FAILURE	99
TEMP SELECT PANEL FAILURE	100
TEMP SELECT PANEL FAILURE	101
TEMP SELECT PANEL FAILURE	102
TEMP SELECT PANEL FAILURE	103
TEMP SELECT PANEL FAILURE	104
TEMP SELECT PANEL FAILURE	105
TEMP SELECT PANEL FAILURE	106
TEMP SELECT PANEL FAILURE	107
TEMP SELECT PANEL FAILURE	108
TR MODE T/O FAILURE	109
TR MODE T/O FLEX FAILURE	110
TR MODE GA FAILURE	111
TR MODE MCT FAILURE	112
TR MODE CL FAILURE	113
TR MODE CR FAILURE	114
TO/GA SWITCH 1 FAILURE	117
TO/GA SWITCH 2 FAILURE	118
A/P 1 DISCONNECT FAILURE	119
A/P 2 DISCONNECT FAILURE	120
CAPT FMA RESET PB FAILURE	121
F/O FMA RESET PB FAILURE	122
GND SENSOR FAILURE	123
GND SENSOR FAILURE	124
LEFT PNEU X FEED OPEN FAILURE	125
ASOC AIRFOIL ICE ON FAILURE	126
ASOC AIRFOIL ICE OFF FAILURE	127
LEFT PNEU X FEED CLOSE FAILURE	128
RIGHT PNEU X FEED OPEN FAILURE	129
ASOC AIRFOIL ICE ON FAILURE	130
ASOC AIRFOIL ICE OFF FAILURE	131

Table 209 (Continued)

Failure	Diagnostic Number
RIGHT PNEU X FEED CLOSE FAILURE	132
L ENG ANTI-ICE SW ON FAILURE	133
L ENG ANTI-ICE SW OFF FAILURE	134
R ENG ANTI-ICE SW ON FAILURE	135
R ENG ANTI-ICE SW OFF FAILURE	136
LEFT A/C SUP SW AUTO FAILURE	137
LEFT A/C SUP SW OFF FAILURE	138
RIGHT A/C SUP SW AUTO FAILURE	139
RIGHT A/C SUP SW OFF FAILURE	140
GND SENSOR FAILURE	141
GND SENSOR FAILURE	142
SEL DFGC NON-TEST SIDE FAILURE	143
SEL DFGC TEST SIDE FAILURE	144
BACK COURSE PB FAILURE	145*
FMS OVRD PB FAILURE	145**
SPEED SELECT PB FAILURE	146
MACH SELECT PB FAILURE	147
EPR LIMIT PB FAILURE	148
NAV PB FAILURE	149
VOR/LOC PB FAILURE	150
ILS PB FAILURE	151
AUTOLAND PB FAILURE	152
VERT SPD PB FAILURE	153
MACH/IAS PB FAILURE	154
PERF PB FAILURE	155
PERF OR VNAV PB FAILURE	155***
ALT HOLD PB FAILURE	156
TURB PB FAILURE	157
SPEED KNOB (2ND DET IN) FAILURE	159
HDG KNOB (OUT) FAILURE	160
HDG KNOB (2ND DET IN) FAILURE	161
ALT KNOB (OUT) FAILURE	162
ALT KNOB (IN) FAILURE	163

Table 209 (Continued)

Failure	Diagnostic Number
NOTE: * Used for customers with back course option. ** Used for customers with FMS and -970 DFGC and subs. *** Used for customers with -970 DFGC and subs.	
BANK LIMIT 15 DEGREES FAILURE	164
BANK LIMIT 20 DEGREES FAILURE	165
BANK LIMIT 25 DEGREES FAILURE	166
BANK LIMIT 30 DEGREES FAILURE	167
SPEED REF OPER FAILURE	168
HEADING REF OPER FAILURE	169
CAPT HDG SEL REF FAILURE	173
VERT SPD REF OPER FAILURE	174
ALT REF OPER FAILURE	175
CRS-1 REF OPER FAILURE	176
CRS-2 REF OPER FAILURE	177
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP SYNC FAILURE	198

Table 209 (Continued)

Failure	Diagnostic Number
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE FIVE - "COCKPIT DISPLAYS"	
EPR SEL LITE A AND B FAILURE	249
ART INOP LITE FAILURE	250
ALT ADV LITE 1 FAILURE	251
ALT ADV LITE 2 FAILURE	252
ALT SELECT APPR FAILURE	253
ALT SELECT DEV FAILURE	254
TR EPR VALID FAILURE	255
TR NO MODE LITE FAILURE	256
ART ON LITE FAILURE	257
ART READY LITE FAILURE	258
NO AUTOLAND LITE A FAILURE	259
NO AUTOLAND LITE B FAILURE	260
A/P TRIM LITE A FAILURE	261

Table 209 (Continued)

Failure	Diagnostic Number
A/P TRIM LITE B FAILURE	262
VERT SPD DETENT FAILURE	263
IAS BUG FAILURE	264
IAS BUG FAILURE	265
EPR BUG FAILURE	266
EPR BUG FAILURE	267
EPR LIMIT CMD FAILURE	268
CAPT F/D SW FAILURE	269
CAPT F/D LITE ON FAILURE	270
PITCH F/D FAILURE	271
PITCH F/D FAILURE	272
ROLL F/D FAILURE	273
ROLL F/D FAILURE	274
CAPT F/D SW FAILURE	275
F/O F/D SW FAILURE	276
F/O F/D LITE ON FAILURE	277
PITCH F/D FAILURE	278
PITCH F/D FAILURE	279
ROLL F/D FAILURE	280
ROLL F/D FAILURE	281
F/O F/D SWITCH FAILURE	282
FAST/SLOW 1 VALID FAILURE	283
FAST/SLOW 2 VALID FAILURE	284
FAST/SLOW CMD FAILURE	285
FAST/SLOW CMD FAILURE	286
FAST/SLOW CMD FAILURE	287
FMA SEGMENTS FAILURE	288
FGCP/NCP SEGMENTS FAILURE	289
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315

Table 209 (Continued)

Failure	Diagnostic Number
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQUE SWITCH 1 FAILURE	332
ELEV MECH TORQUE SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQUE SWITCH 1 FAILURE	346
ELEV MECH TORQUE SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	

Table 209 (Continued)

Failure	Diagnostic Number
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379

Table 209 (Continued)

Failure	Diagnostic Number
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - "SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
NOTE: * An open Aileron Torque Limit Rheostat will prevent A/P engage with flaps above 26 degrees, but will not prevent engage when flaps are below 26 degrees.	
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413

Table 209 (Continued)

Failure	Diagnostic Number
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RIGHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447

Table 209 (Continued)

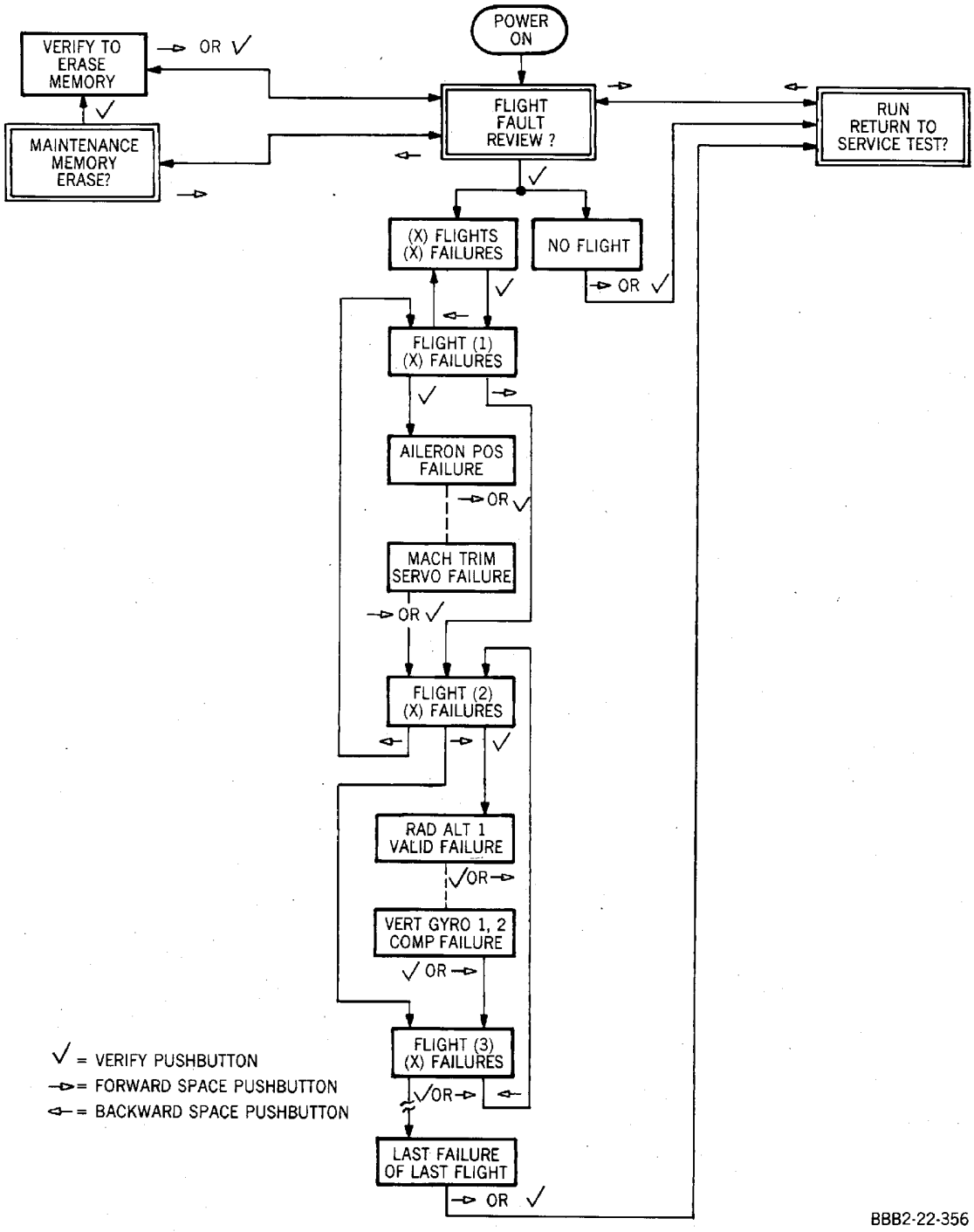
Failure	Diagnostic Number
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR RATE FAILURE	461
CADC -N ALT BCR RATE FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479

Table 209 (Continued)

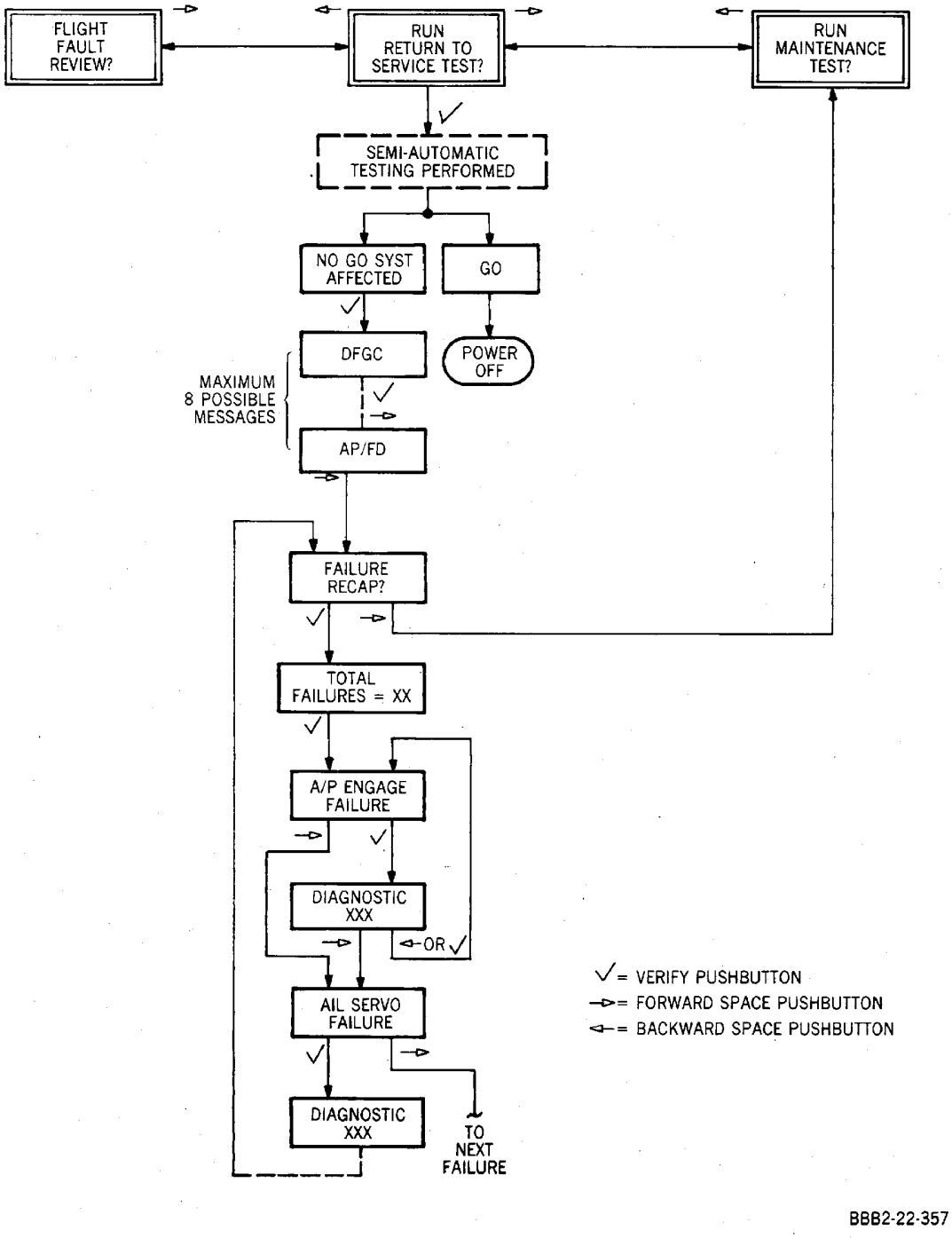
Failure	Diagnostic Number
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT/SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
PMS DATA FAILURE	508*
PMS/FMS DATA FAILURE	508**
WINDSHEAR DATA FAILURE	509***
NOTE: * For customers with PMS. ** For customers with FMS and -970 DFGC and subs. *** For customers equipped with windshear computers.	

Table 209 (Continued)

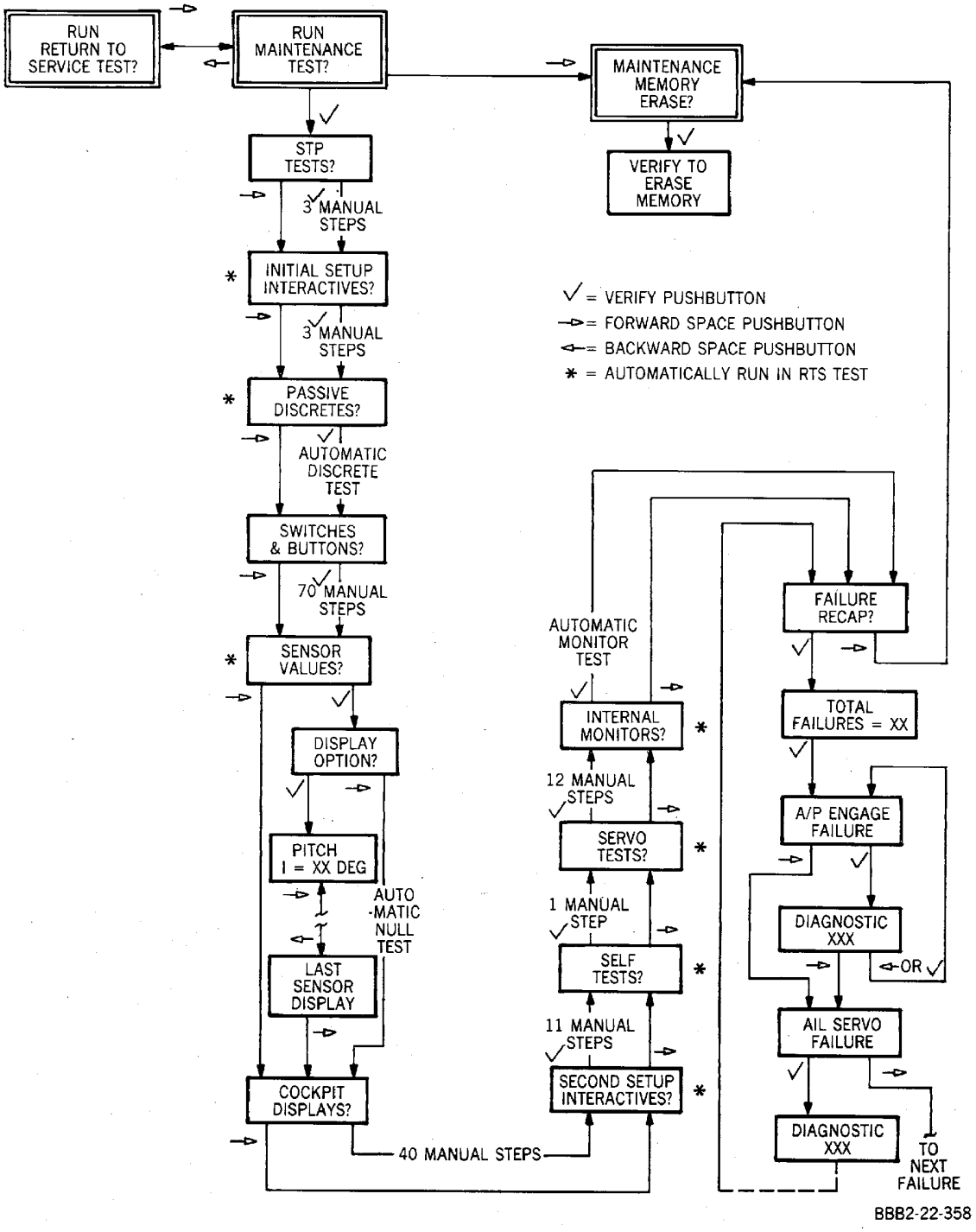
Failure	Diagnostic Number
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528



STP - Flight Fault Review Operation
Figure 202/22-01-05-990-927



STP - Run Return to Service Operation
Figure 203/22-01-05-990-928



STP - Run Maintenance Test Operation
Figure 204/22-01-05-990-929

DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

1. General

A. The MCDU has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The MCDU provides the operator with a display of English language commands and questions.

B. The Test Panel page of the FMS MCDU allows the MCDU to be used for the DFGS Status/Test. Each MCDU serves as a test panel for only the onside systems. MCDU-1 on the left side of the pedestal serves as the test panel for DFGC-1, and MCDU-2 on the right side of the pedestal serves as the test panel for DFGC-2. To use the MCDU select the MENU pushbutton and the "MCDU MENU" page will appear. Selecting the "TEST PANEL" pushbutton 6L will produce the TEST PANEL page. Refer to Figure 201 for operation of the MCDU.

C. BIT provides three modes of testing. Continuous (Flight Fault Review) BIT, Return to Service (RTS) BIT, and System Maintenance BIT. The Autoland Preflight Test is also provided in this section, since a failure during this test can be recalled and displayed on the MCDU. There is also an IRS/Autoland Discrete Test.

D. A self-test feature of the MCDU (during System Maintenance BIT) is provided to assure the operator that the MCDU is functional prior to test initiation. All keys and pushbuttons are checked and appropriate message displays are verified.

E. During System Maintenance BIT, pressing the forward space (FWD) key on the MCDU will automatically advance the MCDU to the next test step. If a complete sequence of tests are to be bypassed, pressing the FWD key at the beginning of a test sequence will automatically advance the test to the next test sequence.

F. During System Maintenance BIT, pressing the back space (BACK) key on the MCDU will automatically back the test to the previous test step if a failure has occurred. Pressing the BACK key twice in succession after a failure will program the test sequence over again.

G. During System Maintenance BIT, if a failure occurs, an English language message ending with the word "FAILURE" will appear. Pressing the VERIFY pushbutton on the MCDU will cause a diagnostic number to appear, then pressing the VERIFY pushbutton the second time will cause the message to reappear on the MCDU. If the failure is not corrected at that time, pressing the FWD key will log the failure and continue the test. At the conclusion of testing, the message "FAILURE RECAP?" will be displayed. At this time all failures can be recorded for correction. Once the test is exited, failures recorded are automatically erased.

H. During RTS BIT an interruption does not occur if a failure is detected during the test. If a failure is detected, "NO GO - SYSTEM AFFECTED?" will be displayed upon completion of the test. When "NO GO - SYSTEM AFFECTED?" is displayed, pressing the VERIFY pushbutton will display the function(s) that are affected, i.e. NO AUTOLAND, AP/FD, etc. If a system is listed it indicates only that a problem has been detected and not necessarily that the system is inoperative. After the function(s) is displayed, all failures can be recorded for correction. If no failures occur during RTS, GO is displayed.

I. Ten sequences of tests are provided on the MCDU during System Maintenance Bit. Each sequence has diagnostic numbers that accompanies each failure detected. Portions of the testing requires operator interaction, and portions of the testing are automatic. Any failures that occur during the Maintenance Test will be displayed immediately upon detection.

J. Seven sequences of tests are provided during RTS BIT. The diagnostic numbers and failures are called out at the conclusion of testing during "FAILURE RECAP?"

K. Personnel should be familiar with the functional use of all keys and pushbuttons on the MCDU prior to performing any tests that require operator interaction. (Figure 201)

L. The following table describes flight guidance circuit breakers and how they function and the importance to the operation of the aircraft. It gives the associated problems caused when these breakers fail.

Table 201

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-361	28VAC-L	J1B-12	Loss of power from this breaker, if the aircraft is on the ground, would cause loss of the Flight Guidance Control Panels Altitude window, Both #1 and #2 Flight Director Bars Bias Out of View (if in Takeoff mode). The Mach Trim Fault, Yaw Damper Off and Windshear Inop messages are displayed (AP1 selected).
DFGS-1	B10-351	115VAC-L	J2A-12	Loss of power from this breaker, on the ground will cause the entire Flight Guidance Control Panel and the Nav Control Panel Course window to go blank. The #1 Flight Director Bars Biased Out of View and the #1 Fast/Slow Indicator displayed a Fail Flag. The Mach Trim Fault and Yaw Damper Off messages were displayed (AP1 selected). In addition, #1 Auto- throttles became Inop, and the TRP had a NO MODE light on.
DFGS-1	B10-360	28VAC-R	J4B-12	Loss of power from this circuit breaker caused the NO AUTOLAND light to be displayed, with AP1 selected.
DFGS-1	B10-347	28VDC-R	J2A-1,2	No cockpit indications were present if this circuit breaker is inoperative. No messages were displayed if AP2 was selected.
Yaw Damper-1	B10-345	28VDC-L	J3B-7	With the Yaw Damper Switch in the ON position and AP1 selected, the YAW DAMPER OFF message appeared.
AP-1	B10-353	28VDC-L	J4B-104 J1B-104 J1A-94 J4A-94	With AP1 selected, the NO AUTOLAND message was displayed.
DFGS-1	B10-349	28VDC-L	J1A-1 J3A-1,2, 3,4	The Flight Guidance Control Panel blanked if breaker power was lost and AP1 selected. In addition, both Nav Panels blanked. The TRP had a NO MODE light on. The #1 Flight Director Bars Bias Out of View and the #1 Slow/Fast Fail flag appeared.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-2	B10-362	28VAC-R	J4B-12	With the aircraft on the ground and AP2 selected, loss of this circuit breakers' power caused the NO AUTOLAND light to be displayed. In addition, The Flight Guidance Control Panels' Altitude was blank and the #2 Nav Panels CRS numbers were randomly cycling. Both Flight Director Bars Biased Out of View. On the overhead, the Mach Trim Fault and Yaw Damper OFF messages were displayed. #1 and #2 Slow/Fast Indicators became Inop (AP2 was selected).
DFGS-2	B10-352	115VAC-R	J2A-12	With AP2 selected the Flight Guidance Control Panel blanked, the Mach Trim Fault Yaw Damper Off message were displayed Both Nav Panels CRS windows blanked and the TRP had a NO MODE message displayed. Autothrottles were Inop.
DFGS-2	B10-363	28VAC-L	J1B-12	Loss of this breakers' power caused the NO AUTOLAND message to be displayed if AP2 was selected.
DFGS-2	B10-348	28VDC-L	J2A-1,2	There is no cockpit indication that DFGC#2 is not receiving power from this breaker. (On the ground, AP2 selected.)
Yaw Damper-2	B10-346	28VDC-R	J3B-7	With AP2 selected and this breaker not supplying power, the Yaw Damper OFF message was displayed.
AP-2	B10-354	28VDC-R	J4B-104 J1B-104	With AP2 selected the NO AUTOLAND light was displayed.
DFGS-2	B10-350	28VDC-L	J1A-94 J1A-1 J3A-1,2, 3,4	With AP2 selected and the aircraft on the ground, the AP TRIM, AP1 and AP2 annunciators on FMA#2 were illuminated. In addition, #2 Fast/Slow was Inop. The TRP had a NO MODE light displayed. On the overhead the Mach Trim Fault, Yaw Damper OFF and Windshear Inop messages displayed.
DFGS AP/AT Warning LTS "A"	B10-341	28VDC Xfer	FMA (J1-A)	With this circuit breaker not supply ing power, both FMA'S A/T and AP OFF red warning lights "A" bulb was inop.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS AP/AT Warning LTS "B"	B10-342	28VDC Xfer	FMA (J4A-1)	This circuit breaker supplies basic power for both DFGC's Channel "B" processor. Loss of power from this breaker will cause both #1 and #2 Flight Directors to fail. In addition, the Fast/Slow Indicators failed, the NO AUTOLAND light was displayed, the TRP had a NO MODE light, and the Flight Guidance Control Panels Altitude window went blank. (Breaker power was lost after initial power up.) The Nav Panels' CRS Windows also blanked. Loss of power from this breaker also affects Status Test Panel operation.

WARNING: DURING SYSTEM MAINTENANCE BIT, THE USE OF HYDRAULIC POWER IS REQUIRED. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL, AND CONTROL SURFACE AREAS ARE CLEARED OF ALL PERSONNEL AND EQUIPMENT.

CAUTION: VERIFY METER SEL & HEAT SWITCH, LOCATED ON OVERHEAD PANEL IS IN THE OFF POSITION ANYTIME THE AIRPLANE IS IN THE FLIGHT MODE, (GROUND SENSING CIRCUIT BREAKERS OPENED, OR ON JACKS), TO PREVENT DAMAGE TO AIR DATA OR ANGLE-OF-ATTACK SENSORS.

CAUTION: WHENEVER UNIT(S) AND/OR COCKPIT INSTRUMENT(S) ARE POWERED ON THE GROUND, THE TWO AVIONICS COOLING FANS AND INSTRUMENT COOLING FAN MUST BE OPERATING. IN ADDITION, IF FLIGHT COMPARTMENT AIR TEMPERATURE IS ABOVE 85° F., AIR CONDITIONING SHOULD BE PROVIDED. IF AIR CONDITIONING IS NOT AVAILABLE, FLIGHT COMPARTMENT WINDOWS AND ELECTRICAL/ELECTRONICS ACCESS DOOR MUST BE OPEN TO PREVENT OVERHEAT OF EQUIPMENT.

M. Repeat any failed test step to verify that after maintenance action has been performed and completed, the fault has been cleared.

2. **MCDU Test Functions**

A. Procedures for Testing DFGS

Table 202

Paragraph	Test Function
Paragraph 3.A.	Continuous (Flight Fault Review) BIT
Paragraph 3.C.	Autoland Preflight Test
Paragraph 3.D.	Return to Service (RTS) BIT (DFGS)
Paragraph 3.E.	System Maintenance BIT (Maintenance Test)

B. Digital Flight Guidance System (DFGS) Power-Up Test Prior to MCDU Test

NOTE: Both Digital Flight Guidance Computers (DFGC's) may fail to come on line and halt MCDU testing procedures.

(1) When DFGS information is not displayed with side select switch in either position, proceed as follows:

(a) Check 115 VAC power and ground to each DFGC electrical connector. (PAGEBLOCK 22-16-00/101)

(b) Check no ground exists at DFGC jack connector pins J2A (36) and J3A (36). Remove ground(s) when ground(s) exist and check DFGS operation is normal. (PAGEBLOCK 22-14-00/101)

NOTE: A ground at the J2A (36) and J3A (36) points represents holding down of the autopilot disconnect (on control wheel) not allowing DFGC to begin internal checks.

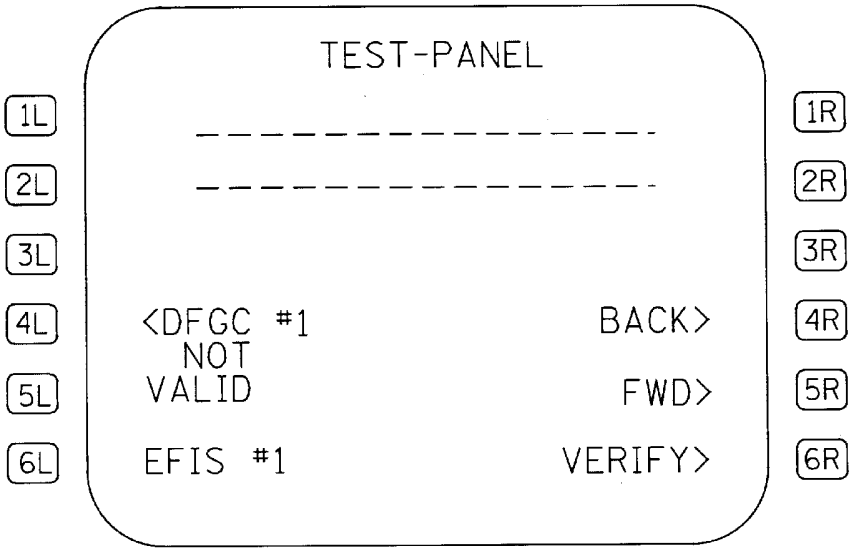
(c) Check short to ground is not present at jack connector pins J1 (Z) and J3 (Z) on DFGS control panel. Should a ground exist, isolate ground source and repair. (PAGEBLOCK 22-01-03/101)

NOTE: Before incorporation of Service Bulletin 24-67, the auxiliary power unit (APU) generator field wiring can contact air conditioning piping resulting in malfunction of the APU generator and/or Digital Flight Guidance System-1 (DFGS-1). This can occur due to chafing wire.

(2) When partial DFGS displays such as one Flight Mode Annunciator (FMA) indicating HDG HLD, ALT HLD, and opposite FMA blank with both Flight Director (FD) switches on, proceed as follows:

(a) Check 28 VDC is available at jack pins J1A (1 and 60) and J4A (1) on each DFGC electrical connector. (PAGEBLOCK 22-17-00/101)

NOTE: This 28 VDC is source power for the "A" and "B" channels of the central processor.



NOTE: THE DASHES SHOWN IN THIS ILLUSTRATION ARE ONLY PROVIDED AS AN INDICATION OF THE LOCATION OF DFGC FURNISHED DATA. IF THE DFGC IS NOT FURNISHING DATA, THE INDICATED FIELDS ON THE ACTUAL MCDU PAGE DISPLAY BLANKS.

NOTE: DEPRESSING LINE SELECT KEY 4L INFORMS THE MCDU THAT IT IS FUNCTIONING AS A DFGC STP AND SUPPLIES A SELECT SIGNAL TO THE ONSIDE DFGC.

CAG(IGDS)

BBB2-22-656

MCDU Test Panel Page
Figure 201/22-01-05-990-923

EFFECTIVITY
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879

3. MCDU Functional Tests

A. Continuous (Flight Fault Review) BIT

NOTE: Continuous BIT is an internal monitor mode of the DFGC and is not controlled by the MCDU. Continuous BIT begins operation as soon as power is applied to the DFGS and operates continuously, even during Autoland Availability Preflight BIT, RTS BIT and System Maintenance BIT. If Continuous BIT recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel. If the autoland mode is affected, the "NO AUTOLAND" annunciator on each FMA will come on and flash to alert the flight crew that the autoland mode of operation is not available.

NOTE: Flight Fault Review Bit is provided from continuous Bit which is an internal monitor mode of the DFGC after airplane liftoff. Continuous Bit begins operation as soon as power is applied to the DFCS and operates continuously. If Continuous Bit recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel as Flight Fault Review Bit.

Table 203

Action	Desired Result
(1) Verify DFGS switch is in same position 1, or 2 as used during flight.	No test.
(2) On MCDU, press MENU pushbutton.	MCDU MENU page displayed.
(2a) Press TEST PANEL key 6L.	TEST PANEL page displayed. DFGS VALID status displayed adjacent to key 5L. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release VERIFY pushbutton.	"NO FAULTS" displayed.
NOTE: If a failure has occurred, the number of flights and number of failures will appear. For example, if the airplane had five flights and two failures, the display message would read "5 FLIGHTS 2 FAILURES". Pressing and releasing the VERIFY pushbutton will display the most recent flight, i.e. "FLIGHT 1 1 FAILURE". Pressing and releasing the FSPCE key will display each flight and number of failures recorded for each flight. If zero failures have occurred, "NO FAULTS" will be the message displayed. Proceed to step (8) if "NO FAULTS" is the displayed message.	
(4) Press and release VERIFY pushbutton.	"FLIGHT 1 - XX FAILURE" displayed.
(5) Press and release FSPCE key.	"FLIGHT 2 - XX FAILURE" displayed.
(6) Read and record all flight faults by pressing and releasing VERIFY pushbutton until the message "FLIGHT FAULT REVIEW?" is displayed.	"FLIGHT FAULT REVIEW?" displayed.
NOTE: The in-flight logging system of the DFGS provides a feature that allows stored failures (maintenance memory) to be erased. This may be accomplished in one of two ways manually or automatically. MANUALLY: The MCDU may be used to erase the memory by use of the FWD key until the message "MAINTENANCE MEMORY ERASE?" is displayed. Pressing and releasing the VERIFY pushbutton will then display "VERIFY TO ERASE MEMORY?". Pressing and releasing the VERIFY pushbutton will then clear all of the stored failures. AUTOMATICALLY: If the maintenance memory is not period- ically cleared, it will eventually fill up. Each time the DFGC is powered up, the maintenance memory is checked. If the memory store is more than 80%, the DFGC saves the most recent 150 failures and clears the rest. The memory can store approximately 350 failures, thus leaving room for approximately 200 failures. The maintenance memory is dedicated for in-flight failure logging only. These failures are displayed only during "FLIGHT FAULT REVIEW?". This memory is entirely independent of the memory used by the Return To Service Test or the Maintenance Test. Failures logged while performing these tests are erased by exiting the respective test.	

Table 203 (Continued)

Action	Desired Result
(7) Press and release FWD key.	"RUN RETURN TO SERVICE TEST?" displayed.
NOTE: If a Return to Service (RTS) test is desired, press and release VERIFY pushbutton. If an RTS is not desired, proceed to step (8).	
(8) Press and release MENU pushbutton.	MCDU MENU displayed.
(9) Place aircraft in normal ground configuration.	No test.
NOTE: If maintenance action has been performed, proceed to either Paragraph 3.D. or Paragraph 3.E..	

B. IRS/Autoland Inhibit Discrete Test

NOTE: This procedure checks the AUTOLAND INHIBIT Discrete wire connecting IRU-1 (J1B D5) to DFGC-1 and DFGC-2 (J102B 103). It also checks the AUTOLAND INHIBIT Discrete wire connecting IRU-2 (J1B D5) to DFGC-1 and DFGC-2 (J103B 103).

Table 204

Action	Desired Result
(1) Place both IRS's to NAV position and align. (INERTIAL REFERENCE SYSTEM, SUBJECT 34-43-00, Page 201)	Check that NO AUTOLAND light on FMA's goes off.
NOTE: IRS alignment requires 2.5 to 10 minutes. ALIGN lights flash if IRS has completed alignment without position entered. ALIGN light will go off after position is entered and alignment is complete.	
(2) Place IRS-1 switch to ATT position.	Attitude and heading displays go out of view on Captain's ND and PFD. Check that following lights come on: - Capt's ALIGN light on MSU - NO AUTOLAND light on FMA - IRS 1 ATT MODE light on OAP.
NOTE: The switch is detented in NAV position. Pull out firmly on switch before turning.	
(3) After approximately 20 seconds, check for following:	Attitude and heading displays come in view on Captain's ND and PFD. ALIGN light goes off. NO AUTOLAND and IRS 1 ATT MODE lights remain on.
(4) Enter Heading 1 on MCDU IRS INIT/REF page to agree with Heading 2(±2.0°).	After 10 seconds, check that NO AUTOLAND light remains on.
(5) Place DFGC selector switch to opposite position (1 or 2).	Check that NO AUTOLAND light remains on.
(6) Place IRS-1 switch to OFF.	
(7) After minimum 5 seconds, place IRS-1 switch to NAV.	
(8) On MCDU IRS INIT/REF page, enter present Latitude and Longitude.	
(9) After IRS-1 is aligned (approx. 10 minutes), check for following indications:	ALIGN and NO AUTOLAND lights go off.
(10) Place IRS-2 switch to ATT position.	Attitude and heading displays go out of view on F/O's ND and PFD. Check that following lights come on: - F/O's ALIGN light on MSU - NO AUTOLAND light on FMA - IRS 2 ATT MODE light on OAP.

Table 204 (Continued)

Action	Desired Result
NOTE: The switch is detented in NAV position. Pull out firmly on switch before turning.	
(11) After approximately 20 seconds, check for following:	Attitude and heading displays come in view on F/O's ND and PFD. ALIGN light goes off. NO AUTOLAND and IRS 2 ATT MODE lights remain on.
(12) Enter Heading 2 on MCDU IRS INIT/REF page to agree with Heading 1 (±2.0°)	After 10 seconds, check that NO AUTOLAND light remains on.
(13) Place DFGC selector switch to opposite position (1 or 2).	Check that NO AUTOLAND light remains on.
(14) Place both IRS switches to OFF.	
(15) Return aircraft to required configuration.	

C. Autoland Preflight Test

NOTE: The Autoland Preflight Test provides assurance to the flight crew that the autoland mode of operation is available. However, this test is designed primarily for the flight crew, maintenance personnel should use the RTS to check autoland status. The Autoland Preflight Test will only check radio altimeters self test, dual accelerometer self test, elevator torque limit switch verified both agree for flap configuration, rudder unrestricted switches are indicating unrestricted state and NAV receivers self test. Both NAV receivers must be tuned to an ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control Panel must be pressed.

Table 205

Action	Desired Result
(1) Verify DFGS switch is placed in position 1, or 2 as appropriate for next flight.	No test.
NOTE: While performing the Autoland Preflight Test, if the Status/Test is activated the Autoland Preflight Test cannot be initiated.	
(2) Tune both VHF/NAV Control panels to an ILS frequency.	Both NAV receivers tuned to an ILS frequency.
(2a) Set switches as follows: (1) Both FD switches to OFF. (2) AP engage switch to OFF. (3) Overhead FLT DIR switch to NORM.	No test.
NOTE: On later aircraft FLT DIR switch is FD CMD.	
(3) On Flight Guidance Control Panel, press and release AUTO LAND pushbutton.	Associated Flight Mode Annunciators (FMA) on instrument panel displays AUTO LND/PRE/FLT/TEST, and NO AUTOLAND appears flashing.
(4) Wait approximately 45 seconds.	Both captain's and first officer's FMA's blank, if FD switches are in OFF position.
(5) Observe both FMA's and verify that the NO AUTOLAND legend goes blank.	NO AUTOLAND legend blank on both FMA's.
NOTE: If the NO AUTOLAND legend remains on the FMA's, either the ILS, radio altimeters, dual acceler ometers or Continuous BIT detected a failure that would inhibit the autoland mode of operation. Proceed to Paragraph 3.D. to isolate failure(s).	

D. Return to Service (RTS) BIT (DFGS)

NOTE: Refer to NAVIGATION DISPLAYS - MAINTENANCE PRACTICES, PAGEBLOCK 34-22-00/201 Config 1 for EFIS RTS.

NOTE: Return to Service (RTS) BIT is provided to place the airplane back into a non-restricted (including autoland) service after maintenance action has been performed (i.e. LRU replacement). The MCDU is capable of performing ten sequences of tests 0 thorough 9. Sequences 1, 2, 4, 6, 7, 8 and 9 are only performed during RTS. All sequences of tests are performed during System Maintenance BIT. The RTS is run completely and failures are displayed at the end of test.

NOTE: All switches such as CADC, NAV and Flight Director switches should be in the NORM position for the Return To Service test.

Table 206

Action	Desired Result
(1) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.
(1a) Place FLAP/SLAT handle to LAND EXT position.	No test.
(1b) Verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.
(2) On MCDU, press MENU push- button then TEST PANEL key 6L.	TEST PANEL page displayed. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release FWD key until "RUN RETURN TO SERVICE TEST?" appears.	"RUN RETURN TO SERVICE TEST?" displayed.
(4) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE VERIFY" displayed.
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.	
(5) Press and release VERIFY pushbutton.	"TURN ON AUX HYD PUMP VERIFY" displayed.
NOTE: The RTS test requires the aircraft to be in the landing configuration. Hydraulic power is required to properly set the flaps and rudder. Hydraulic power is not required if flaps are at 28 to 40 degrees and the rudder is centered (crosswinds may blow the rudder hardover causing the Rudder Servo test to fail).	
(6) Place HYD PUMPS - AUX and TRANS switches on F/O instrument panel to ON position. Press VERIFY.	"TURN ON RUDDER HYD - VERIFY" displayed.
(7) Turn on rudder hydraulics (on fwd pedestal). Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/EXTEND - VERIFY" displayed.
(7a) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
(8) Check A/P is disengaged then press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.
(9) Check A/T is disengaged. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.

Table 206 (Continued)

Action	Desired Result
(10) Disengage Y/D if engaged then "RCVRS NOT ILS - VERIFY" press and release VERIFY pushbutton.	displayed.
(11) Detune receivers from ILS frequency (if tuned) then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
NOTE: Sequence two "PASSIVE DISCRETES" and sequence four "SENSOR VALUES" are checked automatically. Sequence three and sequence five tests are skipped and are performed during System Maintenance BIT. During the tests, the message "TEST IN PROGRESS" will be displayed.	
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
(12) When step (11) is complete, observe MDCU.	"ENGAGE A/P - VERIFY" displayed.
(13) Engage A/P then press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.
(14) Engage autothrottle then press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.
(15) Engage Yaw Damper then press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.
NOTE: Tune receivers to a valid ILS frequency.	
(16) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" followed by "RETARD THROTTLES - VERIFY" displayed.
NOTE: Verify both throttle levers are below the minimum authority switches.	
(17) Retard throttles then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
SEQUENCE SEVEN - "SELF TESTS"	
NOTE: Sequence seven is an automatic self-test of the NAV receivers, R/A units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the MCDU will flash to advise of test completion. At end of sequence seven, the MCDU will display "WHEEL TURNS RWD - VERIFY".	
SEQUENCE EIGHT - "SERVO TESTS"	
CAUTION: CONTROL WHEEL, COLUMN, PEDALS, STABILIZER, AUTOTHROTTLES, MACH TRIM AND Y/D ACTUATOR WILL MOVE DURING TEST EIGHT.	
NOTE: During this sequence, the operator will check control movement by cycling the verify pushbutton. A failure will be acknowledged by cycling the forward space pushbutton.	
NOTE: Failures as detected by the software will appear in the Failure Recap which can be displayed at the end of "RTS Tests".	
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed. While the servos are in operation, the message will display flashing.	
(18) Check control wheel is stationary and displaced in CW direction from neutral position.	

Table 206 (Continued)

Action	Desired Result
(19) Press and release VERIFY pushbutton.	Control wheel will move and during this test period, MCDU displays "TEST IN PROGRESS".
(20) At test completion MCDU displays new message.	"WHEEL TURNS LWD - VERIFY" is displayed.
(21) Check control wheel is stationary and displaced in CCW direction from neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position. MCDU displays "TEST IN PROGRESS".
(22) At test completion MCDU displays new message.	"COLUMN MOVES FWD - VERIFY" is displayed.
(23) Check control column is stationary and forward of neutral position. Press and release VERIFY pushbutton.	Control column will move. MCDU displays "TEST" IN PROGRESS".
(24) At test completion MCDU displays new message.	"COLUMN MOVES AFT VERIFY" is displayed.
(25) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position and right rudder pedal will move forward. MCDU displays "TEST IN PROGRESS".
(26) At test completion MCDU displays new message.	"RHT PEDAL MOVES FWD VERIFY" is displayed.
(27) Check right rudder pedal moved forward. Press and release VERIFY pushbutton.	Left rudder pedal will move forward. MCDU displays "TEST IN PROGRESS".
(28) At test completion MCDU displays new message.	"LEFT PEDAL MOVES FWD VERIFY" is displayed.
(28a) Check left rudder pedal moves forward. Press and release VERIFY pushbutton.	During this test MCDU displays "TEST IN PROGRESS".
NOTE: Part of sequence eight and all of sequence nine tests are done automatically.	
(28b) At test completion MCDU displays new message.	"FLAP/SLAT TO 0 RETRACT VERIFY" is displayed.
(28c) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"GO OR NO-GO SYSTEM AFFECTED" is displayed.
SEQUENCE NINE - "INTERNAL MONITORS"	
NOTE: Sequence nine is an automatic check of the real time internal monitors appropriate to ground testing. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of the test either "GO" or "NO GO - SYSTEM AFFECTED?" will be displayed.	
NOTE: If "GO" is displayed, proceed to step (33) to conclude testing. If "NO GO - SYSTEM AFFECTED?" is displayed, proceed to step (29).	
(29) Press and release VERIFY pushbutton.	One or more of the following faults may appear if a fault is detected in the system. "DFGC" "NO AUTOLAND" "AP/FD" "A/T" "S/C" "ART" "TRC" "M/T" "Y/D"
(30) Press and release FSPCE key.	"FAILURE RECAP?" displayed.

Table 206 (Continued)

Action	Desired Result
(31) Press and release VERIFY pushbutton.	The number of faults will be displayed momentarily (approx. 3 seconds), then the MCDU will momentarily flash VERIFY = DIAG NUM FWD = NEXT FAILURE and the first fault will be displayed.
(32) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" is displayed.	"FAILURE RECAP?" displayed.
NOTE: While failure is displayed, pressing VERIFY will display associated diagnostic number.	
(33) Press and release MENU pushbutton.	MCDU MENU displayed.
(34) Hold control wheel (if wheel or column is dis- placed) and disengage autopilot. Press and release either AP disconnect switch.	Autopilot disengaged, AP red off warning lights on until either AP disconnect switch pressed.
(35) Disengage yaw damper. Place YAW DAMP switch to OFF at right of overhead panel.	Yaw damper disengaged.
(36) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.
(37) Place aircraft in normal ground configuration.	No test.

NOTE: Following is a list of failures and diagnostic numbers that may appear if a RTS "NO GO - SYSTEM AFFECTED?" message appears.

Table 207

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21

Table 207 (Continued)

Failure	Diagnostic Number
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
NOTE: On aircraft with -930 and subsequent DFGC, VERT GYRO is ATT.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	

Table 207 (Continued)

Failure	Diagnostic Number
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP POS FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213

Table 207 (Continued)

Failure	Diagnostic Number
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW/DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
AIL MECH TORQ SWITCH 1 FAILURE	332
AIL MECH TORQ SWITCH 2 FAILURE	333
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339

Table 207 (Continued)

Failure	Diagnostic Number
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
AIL MECH TORQ SWITCH 1 FAILURE	346
AIL MECH TORQ SWITCH 2 FAILURE	347
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371

Table 207 (Continued)

Failure	Diagnostic Number
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406

Table 207 (Continued)

Failure	Diagnostic Number
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
NOTE: * An inoperative torque limit rheostat may prevent A/P engagement and can cause an "AIL SERVO FAILURE" message to be logged if flaps are less than 26 degrees. With flaps greater than 26 degrees the torque limit rheostat will not prevent A/P engagement. Place flaps greater than 26 degrees to verify.	
WJE 878, 879	
NOTE: With Service Bulletin 22-111 incorporated and the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per aircraft KCN (K1123) Service Bulletin, the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872	
NOTE: With the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per aircraft KCN (K1123) Service Bulletin, the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879	
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430

Table 207 (Continued)

Failure	Diagnostic Number
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
AIL MECH TORQ SWITCH 1 FAILURE	452
AIL MECH TORQ SWITCH 2 FAILURE	453
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR FAILURE	461
CADC -N ALT BCR FAILURE	462
CADC -T MACH FAILURE	463

Table 207 (Continued)

Failure	Diagnostic Number
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
ATTITUDE GYRO 1 FAILURE	481
ATTITUDE GYRO 2 FAILURE	482
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500

Table 207 (Continued)

Failure	Diagnostic Number
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528

E. System Maintenance BIT

Make sure that this circuit breaker is closed:

LOWER EPC, AC BUS

Row	Col	Number	Name
Z	29	B1-62	RAM AIR TEMP & PROBE HEATER

Table 208

Action	Desired Result	Diagnostic Number
NOTE: System Maintenance BIT is a command response type test requiring operator interaction. All sequences can be tested by use of system Maintenance BIT. Failures detected during the Maintenance test will be displayed immediately. Hydraulic power is required during the use of this test only if the Flap/Slat tests and/or the rudder test is to be run.		
(1) On FGCP verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.	
(2) Deleted.		
NOTE: Each sequence of tests is called out during the test procedure. If a sequence or test step is to be bypassed, press and release the FWD key. Pressing the FWD key at the beginning of a sequence will automatically program the MCDU to the next sequence of tests. Pressing the FWD key during a test step or failed test-step will program the MCDU to the next test step. The FWD key may also be used for fast slew capabilities between test sequence steps. To repeat a failed-test step, press and release the BACK key. Pressing the BACK key twice in succession will program the test to the beginning of the test sequence if a test step failed.		

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: If the main gear is not compressed then install main gear proximity switch target inhibitors on left and right weight-on-wheel sensors to place the DFGC system in the ground mode.		
(3) On MCDU, press MENU pushbutton then TEST PANEL key 6L.	TEST PANEL page displayed. "FLIGHT FAULT REVIEW?" displayed.	
(4) Press and release FWD key until "RUN MAINTENANCE TEST?" is displayed.	"RUN MAINTENANCE TEST?" displayed.	
NOTE: Pressing VERIFY pushbutton after step (4) results in either "MD-87 OPTION VERIFY" or "MD-80 OPTION VERIFY" being displayed before step (4a) for MD-80 or MD-87 aircraft. On other aircraft pressing VERIFY pushbutton results in "SEL DFGC TEST SIDE - VERIFY" being displayed as in next step.		
(4a) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	
(5) Press and release VERIFY pushbutton.	"STP TESTS?" displayed.	
NOTE: During System Maintenance BIT, the FMA associated with the DFGS switch, (i.e., DFGS in position 1 corresponds to captain's FMA), will display in ATS window RTS/MNT, and in pitch window TEST, while the test is being performed.		
SEQUENCE ZERO - "MCDU TESTS"		
(6) Press and release VERIFY pushbutton.	"CYCLE STP FWDSPACE PB" displayed.	1
(7) Press and release FWD key.	"CYCLE STP BACKSPACE PB" displayed.	2
(8) Press and release BACK key.	"STP SEGMENTS TEST - VERIFY" displayed.	3
(9) Press and release VERIFY pushbutton.	MCDU displays all diamonds.	
NOTE: In order to increase the life of the message display lamps, the program only allows 10 seconds before resetting segments and reissuing the original dis play message. If segments are not to be checked, press and release FWD key. If FWD key is pressed while segments are displayed, a failure will be logged.		
(9a) After ten seconds are over see display.	"STP SEGMENT TEST - VERIFY" will be displayed.	
(10) Press and release FWD key.	"INITIAL SETUP INTERACTIVES?" displayed.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"		
(11) Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.	4 through 11
(12) Verify autopilot switch placed off. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE OFF - VERIFY" displayed.	12
(13) On captain's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE OFF - VERIFY" displayed.	13
(14) On first officer's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.	14 15

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(15) Verify AUTO THROT switch placed OFF. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.	16
(16) On overhead panel verify YAW DAMP switch placed OFF. Press and release VERIFY pushbutton.	"YAW DAMP OFF LITE ON - VERIFY" displayed.	17
(17) On overhead annunciator panel verify YAW DAMP OFF light is on. Press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.	18 19
(18) Verify that both NAV control panels are not tuned to an ILS frequency. Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.	20 21
(18a) "TEST IN PROGRESS" will display for approximately 5 seconds.	When test successful MCDU displays "ADVANCE THROTTLE - VERIFY".	
(19) Advance throttle levers to mid range. Press and release VERIFY pushbutton.	"PASSIVE DISCRETES?" displayed.	
SEQUENCE TWO - "PASSIVE DISCRETES"		
NOTE: Sequence two is checked automatically. If a fault is recognized, the testing sequence will stop and the failure message will appear. Cycling VERIFY pushbutton provides diagnostic number for the failure. Press and release FWD key to initiate testing again.		
(20) Press and release VERIFY pushbutton. Wait approximately (.25) seconds.	"TRC OPTION PIN ABCD = XXXX VERIFY".	51
(20a) Upon completion of automatic testing, MCDU will display status of engine option pins for Thrust Rating.	TRC OPTION PIN ABCDE = XXXX VERIFY displays.	51
NOTE: These option pins will be different for the type engine used as follows: -209 engine ABCDE = -GGG-, ABCD = -GGG -217A engine ABCDE = --G-- -217A/-217C engine ABCD = --G- -217 engine ABCDE = GG-G-, ABCD = GG-G -219 engine ABCDE = -GG-G		
NOTE: G = GROUND, - = OPEN. Reference Trouble Shooting section, Sequence Two - "PASSIVE DISCRETES" Diagnostic Number 51.		
(20b) Press and release VERIFY pushbutton.	"SWITCHES AND BUTTONS?" displayed.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"		
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872		
(21) Deleted.		
(22) Deleted.		
(23) Deleted.		

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872 (Continued)

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(24) Press and release VERIFY pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	88
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91
NOTE: Aircraft with -930 and subsequent DFGC and EPR select option, TEMP SELECT is 78.		
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 48 DEGREES - VERIFY" displayed.	93 through 100
NOTE: Aircraft with -930 and subsequent DFGC and EPR select option, TEMP SELECT is 87.		
(28) On Thrust Rating Panel (TRP), press T/O FLX pushbutton on TRP. ASSUMED TEMP will be displayed in offside FMA window. Set ASSUMED TEMP knob on TRP to 48°C. Press and release VERIFY pushbutton.	"TEMP SELECT 37 DEGREES - VERIFY" displayed.	101 through 108
(29) Adjust ASSUMED TEMP to 37 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
WJE 878, 879		
(21) Press and release VERIFY pushbutton.	"CYCLE EPR SEL PB" displayed.	73 74 75 76
(22) Press and release EPR SEL pushbutton.	"PRESS VERIFY" displayed.	77 78 79 80
(23) Press and release VERIFY pushbutton.	"CYCLE EPR SEL PB" displayed.	81 82 83 84
(24) Press and release EPR SEL pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	90
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91

WJE 878, 879 (Continued)

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 78 DEGREES - VERIFY" displayed.	93 94 95 96 97 98 99 100
(28) On Thrust Rating Panel (TRP), press T/O FLX pushbutton. ASSUMED TEMP will be displayed in offside FMA window. Set ASSUMED TEMP knob on TRP to 78°C. Press and release VERIFY pushbutton.	"TEMP SELECT 87 DEGREES - VERIFY" displayed.	101 102 103 104 105 106 107 108
(29) Adjust ASSUMED TEMP to 87 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879		
(30) On Thrust Rating Panel press and release T.O. pushbutton. Press and release VERIFY pushbutton.	"TR MODE T/O FLX - VERIFY" displayed.	110
NOTE: The steps applying to TRP are only checking the buttons and their lights. The Thrust Rating Mode is not checked during this step. It is done continuously by the DFGC.		
(31) Press and release T.O. FLX pushbutton. Press and release VERIFY pushbutton.	"TR MODE GA - VERIFY" displayed.	111
(32) Press and release GA pushbutton. Press and release VERIFY pushbutton.	"TR MODE MCT - VERIFY" displayed.	112
(33) Press and release MCT pushbutton. Press and release VERIFY pushbutton.	"TR MODE CL - VERIFY" displayed.	113
(34) Press and release CL pushbutton. Press and release VERIFY pushbutton.	"TR MODE CR - VERIFY" displayed.	114
(35) Press and release CR pushbutton. Press and release VERIFY pushbutton.	"CYCLE TO/GA SWITCH 1" displayed.	117
(36) On throttle lever press and release left TO/GA switch.	"CYCLE TO/GA SWITCH 2" displayed.	118
(37) Press and release right TO/GA switch.	"CYCLE A/P 1 DISCONNECT" displayed.	119
(38) Press and release captain's control wheel AP disconnect switch.	"CYCLE A/P 2 DISCONNECT" displayed.	120
(39) Press and release first officer's control wheel AP disconnect switch.	"CYCLE CAPT FMA RESET PB" displayed.	121

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(40) Press and release RESET button on captain's FMA.	"CYCLE F/O FMA RESET PB" displayed.	122
(41) Press and release RESET button on first officer's FMA.	"PULL GND SENS BRKRS - VERIFY" displayed.	123 124
NOTE: If testing of the Bleed Inputs (steps (42) through (58)) is not desired, leave GND SENS BRKRS closed and cycle FWD key. Pressing the FWD key will skip the above mentioned tests and resume on step (59).		
WARNING: NORMAL ELECTRICAL POWER TO VARIOUS SYSTEMS MAY BE INTERRUPTED WHEN GROUND CONTROL RELAY CIRCUIT BREAKERS ARE OPENED. IF GROUND CONTROL RELAY CIRCUIT BREAKERS ARE TO BE OPENED WHILE PERFORMING PROCEDURES, MAKE CERTAIN SWITCHES AND CONTROLS OF AFFECTED SYSTEMS ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF EQUIPMENT. **WARNING:** TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.		
(42) Open these circuit breakers:		125
REF DES \ CIRCUIT BREAKERS \ LOCATION \ PANEL AREA \ ROW/COL		
WJE 415, 418, 863, 864, 866, 878, 879		
B1-23 \ LEFT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ K/33 B1-24 \ RIGHT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ L/33		
WJE 417, 419, 421, 423, 865, 869, 871, 872		
B1-23 \ LEFT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ K/30 B1-24 \ RIGHT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ L/30		
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879		
Press and release VERIFY pushbutton.	"LEFT PNEU X FEED OPEN - VERIFY" displayed.	
NOTE: When pneumatic switches are opened, PNEU X FEED VALVE OPEN is displayed adjacent to the left and right pneumatic X-FEED lever.		
(43) On pedestal, place left pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	126
WJE 878, 879		
(44) On overhead panel, place AIR FOIL switch ON.		127

WJE 878, 879 (Continued)

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR. Open this circuit breaker:		
REF DES \ CIRCUIT BREAKERS \ LOCATION \ PANEL AREA \ ROW/COL		
B1-591 \ TAIL DE-ICE TIMER \ LOWER EPC \ RIGHT DC BUS \ N/31		
Press and re lease VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
(45) On overhead panel, place AIR FOIL switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872		
(44) On overhead panel, place AIR FOIL (L SYS) switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
(45) On overhead panel, place AIR FOIL (L SYS) switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879		
(46) On pedestal, close left pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED OPEN - VERIFY" displayed.	129
(47) On pedestal, place right pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	130
WJE 878, 879		
(48) On overhead panel, place AIR FOIL switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY displayed.	131
(49) On overhead panel, place AIR FOIL switch OFF. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132
Remove the safety tag and close this circuit breaker:		
REF DES \ CIRCUIT BREAKERS \ LOCATION \ PANEL AREA \ ROW/COL		

WJE 878, 879 (Continued)

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
B1-591 \ TAIL DE-ICE TIMER \ LOWER EPC \ RIGHT DC BUS \ N/31		
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872		
(48) On overhead panel, place AIR FOIL (R SYS) switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY displayed.	131
(49) On overhead panel, place AIR FOIL (R SYS) switch OFF. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879		
(50) On pedestal, close right pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW ON - VERIFY" displayed.	133
(51) On overhead panel place ICE PROTECT ENG L switch ON. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW OFF - VERIFY" displayed.	134
(52) Place ICE PROTECT ENG L switch OFF. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW ON - VERIFY" displayed.	135
(53) Place ICE PROTECT ENG R switch ON. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW OFF - VERIFY" displayed.	136
(54) Place ICE PROTECT ENG R switch OFF. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW AUTO - VERIFY" displayed.	137
(55) On overhead panel place left AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW OFF - VERIFY" displayed.	138
(56) Place left AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW AUTO - VERIFY" displayed.	139
(57) Place right AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW OFF - VERIFY" displayed.	140
(58) Place right AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"CLOSE GND SENS BRKRS - VERIFY" displayed.	141
(59) Remove the safety tags and close these circuit breakers:		143
REF DES \ CIRCUIT BREAKERS \ LOCATION \ PANEL AREA \ ROW/COL		
WJE 415, 418, 863, 864, 866, 878, 879		
B1-23 \ LEFT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ K/33		

WJE 415, 418, 863, 864, 866, 878, 879 (Continued)

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
B1-24 \ RIGHT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ L/33		
WJE 417, 419, 421, 423, 865, 869, 871, 872		
B1-23 \ LEFT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ K/30 B1-24 \ RIGHT GROUND CONTROL RELAY \ UPPER EPC \ L AC BUS \ L/30		
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879		
	"SEL DFGC NON-TST SIDE - VERIFY" displayed.	
(60) On FGCP place DFGS 1, 2, switch to opposite position. Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	144
(61) Place DFGS switch back to test side indicated by DFGC VALID status line on MCDU. Press and release VERIFY pushbutton.	"CYCLE FMS OVRD PB" displayed.	145
NOTE: The following test sequences verify that the pushbuttons and knobs on the FGCP will make and break contact. If the MCDU does not cycle to the next test, then the cycling was not detected by the DFGC. Pressing and releasing the VERIFY pushbutton will advise the DFGC of the failure. Pressing and releasing the FWD key will advance the MCDU to the next display message.		
NOTE: The ILS or Autoland modes are not being tested during this sequence. Only the switch operation is checked.		
(61a) Press and release FMS OVRD pushbutton.	"CYCLE SPEED SELECT PB" displayed.	146
(62) Press and release SPD SEL pushbutton.	"CYCLE MACH SELECT PB" displayed.	147
(63) Press and release MACH SEL pushbutton.	"CYCLE EPR LIMIT PB" displayed.	148
(64) Press and release EPR LIM pushbutton.	"CYCLE NAV PB" displayed.	149
(64a) Press and release NAV pushbutton	"CYCLE VOR/LOC PB" displayed.	150
(65) Press and release VOR/LOC pushbutton.	"CYCLE ILS PB" displayed.	151
(66) Press and release ILS pushbutton.	"CYCLE AUTOLAND PB" displayed.	152
(67) Press and release AUTO LAND pushbutton.	"CYCLE VERT SPD PB" displayed.	153
(68) Press and release FWD key.	"CYCLE IAS/MACH PB" displayed.	154
(69) Press and release IAS/MACH pushbutton.	"CYCLE PERF or VNAV PB" displayed.	155
(70) Press and release PERF or VNAV pushbutton.	"CYCLE ALT HOLD PB" displayed.	156

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(71) Press and release ALT HOLD pushbutton.	"CYCLE TURB PB" displayed.	157
(72) Press and release TURB pushbutton.	"CYCLE SPEED KNOB (2ND DET IN)" displayed.	159
(73) Push SPD MACH knob full in and release.	"CYCLE HDG KNOB (OUT)" displayed.	160
(74) Pull H knob full out and release.	"CYCLE HDG KNOB (2ND DET IN)" displayed.	161
(75) Push H knob full in and release.	"CYCLE ALT KNOB (OUT)" displayed.	162
(76) Pull ALT knob full out and release.	"CYCLE ALT KNOB (IN)" displayed.	163
(77) Push ALT knob full in and release.	"BANK LIMIT 15 DEGREES - VERIFY" displayed.	164
(78) Rotate outer heading knob to 15 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 20 DEGREES - VERIFY" displayed.	165
(79) Rotate to 20 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 25 DEGREES - VERIFY" displayed.	166
(80) Rotate to 25 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 30 DEGREES - VERIFY" displayed.	167
(81) Rotate to 30 degrees. Press and release VERIFY pushbutton.	"SPEED REF OPER - VERIFY" displayed.	168
(82) Rotate SPD MACH knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"HEADING REF OPER - VERIFY" displayed.	169
(83) Rotate H knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"VERT SPD REF OPER - VERIFY" displayed.	174
(84) Rotate pitch wheel full ANU and AND. Press and release VERIFY pushbutton.	"ALT REF OPER - VERIFY" displayed.	175
(85) Rotate ALT knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-1 REF OPER - VERIFY" displayed.	176
(86) Rotate captain's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-2 REF OPER - VERIFY" displayed.	177
(87) Rotate first officer's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"SENSOR VALUES?" displayed.	

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: The DFGC is not testing the knobs in steps (82) through (87). These are messages to have mechanic be sure knobs turn freely and digital displays change.		
SEQUENCE FOUR - "SENSOR VALUES"		
(88) Press and release VERIFY pushbutton.	"DISPLAY OPTION?" displayed.	
NOTE: There are three testing options available when the message "DISPLAY OPTION " appears. FIRST: Pressing and releasing the FWD key will automatically null check the sensor values. The values are compared to a ground reference tolerance, and if out of tolerance a fault message will be displayed. SECOND: Pressing and releasing the VERIFY pushbutton will display the first sensor value. The FWD and BACK keys can be used at this time for slew capability. Failures are not recognized when this option is selected. THIRD: After pressing and releasing FWD key the automatic slewing of measurements occurs until the MCDU displays "COCKPIT DISPLAYS".		
(89) Press and release VERIFY pushbutton, for display option, or FWD key.	"PITCH ANGLE 1 = XX.XX DEGREES" displayed.	180
(90) Press and release FWD key.	"PITCH ANGLE 2 = XX.XX DEGREES" displayed.	181
(91) Deleted.		
(92) Press and release FWD key.	"BANK ANGLE 1 = XX.XX DEGREES" displayed.	183
(93) Press and release FWD key.	"BANK ANGLE 2 = XX.XX DEGREES" displayed.	184
(94) Deleted.		
(95) Press and release FWD key.	"SPOILER POS 1 = (TED or TEU) XX.XX DEG" displayed.	186
(96) Press and release FWD key.	"SPOILER POS 2 = (TED or TEU) XX.XX DEG" displayed.	187
(97) Press and release FWD key.	"CRS RAD ALT 1 = XXXX. FEET" displayed.	188
(98) Press and release FWD key.	"CRS RAD ALT 2 = XXXX. FEET" displayed.	189
(99) Press and release FWD key.	"FINE RAD ALT 1 = XXXX. FEET" displayed.	190
(100) Press and release FWD key.	"FINE RAD ALT 2 = XXXX. FEET" displayed.	191
(101) Press and release FWD key.	"ELEV SYNC A = XX.XX DEGREES" displayed.	192
(102) Press and release FWD key.	"ELEV SYNC B = XX.XX DEGREES" displayed.	193
(103) Press and release FWD key.	"AIL SYNC A = XX.XX DEGREES" displayed.	194
(104) Press and release FWD key.	"AIL SYNC B = XX.XX DEGREES" displayed.	195

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(105) Press and release FWD key.	"RUD SYNC A = XX.XX DEGREES" displayed.	196
(106) Press and release FWD key.	"RUD SYNC B = XX.XX DEGREES" displayed.	197
(107) Press and release FWD key.	"YAW DAMP POS = XX.XX DEGREES" displayed.	198
(108) Press and release FWD key.	"MACH TRIM POS = XX.XX INCH" displayed.	199
(109) Press and release FWD key.	"ELEV TACH A = XX.XX DEG/SEC" displayed.	200
(110) Press and release FWD key.	"ELEV TACH B = XX.XX DEG/SEC" displayed.	201
(111) Press and release FWD key.	"AIL TACH A = XX.XX DEG/SEC" displayed.	202
(112) Press and release FWD key.	"AIL TACH B = XX.XX DEG/SEC" displayed.	203
(113) Press and release FWD key.	"RUD TACH A = XX.XX DEG/SEC" displayed.	204
(114) Press and release FWD key.	"RUD TACH B = XX.XX DEG/SEC" displayed.	205
(115) Press and release FWD key.	"A/T TACH = XX.XX DEG/SEC" displayed.	206
(116) Press and release FWD key.	"MACH TRIM TACH = XX.XX DEG/SEC" displayed.	207
(117) Press and release FWD key.	"YAW DAMP TACH = XX.XX DEG/SEC" displayed.	208
(118) Press and release FWD key.	"D3A-X ACCEL A = XX.XX FT/SEC*2" displayed.	209
(119) Press and release FWD key.	"D3A-X ACCEL B = XX.XX FT/SEC*2" displayed.	210
(120) Press and release FWD key.	"D3A-Y ACCEL A = XX.XX FT/SEC*2" displayed.	211
(121) Press and release FWD key.	"D3A Y ACCEL B = XX.XX FT/SEC*2" displayed.	212
(122) Press and release FWD key.	"D3A-Z ACCEL A = XX.XX FT/SEC*2" displayed.	213
(123) Press and release FWD key.	"D3A-Z ACCEL B = XX.XX FT/SEC*2" displayed.	214
(124) Press and release FWD key.	"DLA-Y ACCEL A = XX.XX FT/SEC*2" displayed.	215
(125) Press and release FWD key.	"DLA-Y ACCEL B = XX.XX FT/SEC*2" displayed.	216

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(126) Press and release FWD key.	"G/S DEV A = X.XXX DEGREES" displayed.	217
(127) Press and release FWD key.	"G/S DEV B = X.XXX DEGREES" displayed.	218
(128) Press and release FWD key.	"VOR/LOC DEV A = X.XXX DEGREES" displayed.	219
(129) Press and release FWD key.	"VOR/LOC DEV B = X.XXX DEGREES" displayed.	220
(130) Press and release FWD key.	"LEFT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	221
(131) Press and release FWD key.	"RIGHT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	222
(132) Press and release FWD key.	"LEFT AILERON = (TEU or TED) XX.XX DEG" displayed.	223
(133) Press and release FWD key.	"RUDDER POS = (TEL or TER) XX.XX DEG" displayed.	224
(134) Press and release FWD key.	"HOR STAB = (TEU or TED) XX.XX DEG" displayed.	225
(135) Press and release FWD key.	"ANGLE OF ATT 1 = XX.XX DEGREES" displayed.	226
(136) Press and release FWD key.	"ANGLE OF ATT 2 = X.XXX DEGREES" displayed.	227
(137) Press and release FWD key.	"EPR LEFT = X.XXX EPR" displayed.	228
(138) Press and release FWD key.	"EPR RIGHT = X.XXX EPR" displayed.	229
(139) Press and release FWD key.	"HEADING 1 = XXX.X DEGREES" displayed.	230
(140) Press and release FWD key.	"HEADING 2 = XXX.X DEGREES" displayed.	231
(141) Press and release FWD key.	"LEFT FLAPS POS = XX.XX DEGREES displayed.	232
(142) Press and release FWD key.	"RIGHT FLAP POS = XX.XX DEGREES" displayed.	233
(143) Press and release FWD key.	"FLAP HANDLE = XX.XX DEGREES" displayed.	234
NOTE: During CADC test, the letter T is displayed for CADC on test side and the letter N is for CADC on non test side.		
(144) Press and release FWD key.	"CADC-T ALT NCR = XXXX. FEET" displayed.	235
(145) Press and release FWD key.	"CADC-N ALT NCR = XXXX. FEET" displayed.	236

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(146) Press and release FWD key.	"CADC-T TAT = XX.XX DEGREES" displayed.	237
(147) Press and release FWD key.	"CADC-N TAT = XX.XX DEGREES" displayed.	238
(148) Press and release FWD key.	"CADC-T ALT RATE = XX.XX FT/SEC" displayed.	239
(149) Press and release FWD key.	"CADC-N ALT RATE = XX.XX FT/SEC" displayed.	240
(150) Press and release FWD key.	"CADC-T SAT = XX.XX DEGREES" displayed.	241
(151) Press and release FWD key.	"CADC-N SAT = XX.XX DEGREES" displayed.	242
(152) Press and release FWD key.	"CADC-T CAS = XXX.X KNOT" displayed.	243
(153) Press and release FWD key.	"CADC-N CAS = XXX.X KNOT" displayed.	244
(154) Press and release FWD key.	"CADC-T MACH = X.XXXX MACH" displayed.	245
(155) Press and release FWD key.	"CADC-N MACH = X.XXXX MACH" displayed.	246
(156) Press and release FWD key.	"COCKPIT DISPLAYS?" displayed.	
SEQUENCE FIVE - "COCKPIT DISPLAYS"		
(156a) Place both FD switches to ON.		
NOTE: "ART switch must be in the AUTO position prior to running this sequence."		
(156b) Press and release VERIFY pushbutton.	"EPR SEL LITE A and B - VERIFY" displayed.	249
(157) Press and release VERIFY pushbutton.	"ART INOP LITE - VERIFY" displayed.	250
(158) On overhead annunciator panel verify ART INOP light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 1 - VERIFY" displayed.	251
(159) On captain's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 2 - VERIFY" displayed.	252
(160) On first officer's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT SELECT APPR - VERIFY" displayed.	253
(161) Verify aural warning sounds. Press and release VERIFY pushbutton.	"ALT SELECT DEV - VERIFY" displayed.	254
(162) Verify aural warning sounds. Press and release VERIFY pushbutton.	"TR EPR VALID - VERIFY" displayed.	255

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872		
(163) On EDP, EPR limit is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR panel.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - VERIFY displayed.	258
WJE 878, 879		
(163) On center instrument panel EPR flag out of view. If electronic engine display panel is installed, EPR limit is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR indicator/panel.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - displayed.	258
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879		
NOTE: The following steps (166) through (169) verify that the AUTOLAND and AP TRIM legends on each FMA have two operable bulbs. The "A" light refers to left light bulb and "B" light refers to right light bulb.		
(166) Verify READY light on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE A VERIFY" displayed.	259
(167) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE B VERIFY" displayed.	260
(168) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE A - VERIFY" displayed.	261
(169) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE B - VERIFY" displayed.	262
(170) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"VERT SPD DETENT - VERIFY" displayed.	263
(171) On FGCP verify pitch wheel detent (cycle) position. Press and release VERIFY pushbutton.	"IAS BUG 1 250 KIAS - VERIFY" displayed.	264
(172) On captain's Mach/ Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"IAS BUS 2 250 KIAS - VERIFY" displayed.	265

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(173) On first officer's Mach/Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"EPR BUG LEFT 1.8 EPR - VERIFY" displayed.	266
NOTE: Care must be taken to be sure EPR bug manual set knobs on EPR indicators are in the automatic (IN) position.		
(174) On center instrument panel verify left EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR BUG RIGHT 1.8 - VERIFY" displayed.	267
(175) Verify right EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR LIMIT CMD 1.8 EPR - VERIFY" displayed.	268
(176) On EEDP verify EPR LIM reads 1.80(±0.014). Press and release VERIFY pushbutton.	"F/D CMD SW to TEST SIDE - VERIFY" displayed.	269
(176a) On overhead panel, set FD CMD switch to side under test. Press and release VERIFY pushbutton.	"CAPT F/D SW ON VERIFY" displayed.	
(177) On FGCP, place captain's FD switch to FD position. Press and release VERIFY pushbutton.	"CAPT F/D LITE ON - VERIFY" displayed.	270
NOTE: Not applicable when deactivated by AOL 9-1622A.		
(178) On captain's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"CAPT PITCH F/D CENTER - VERIFY" displayed.	271
(179) On captain's PFD verify pitch command centered. Press and release VERIFY pushbutton.	"CAPT PITCH F/D NOSE UP - VERIFY" displayed.	272
(180) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"CAPT ROLL F/D CENTER - VERIFY" displayed.	273
(181) Verify roll command centered. Press and release VERIFY pushbutton.	"CAPT ROLL F/D RIGHT - VERIFY displayed.	274
(182) Verify roll command moves right. Press and release VERIFY pushbutton.	"CAPT F/D SW OFF - VERIFY displayed.	275
(183) On FGCP, place captain's FD switch to OFF position. Press and release VERIFY pushbutton.	"F/O F/D SW ON - VERIFY" displayed.	276
(184) On FGCP, place F/O's FD switch to FD position. Press and release VERIFY pushbutton.	"F/O F/D LITE ON - VERIFY" displayed.	277
NOTE: Not applicable when deactivated by AOL 9-1622A.		
(185) On F/O's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"F/O PITCH F/D CENTER - VERIFY" displayed.	278

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(186) On first officer's PFD verify pitch command centered. Press and release VERIFY pushbutton.	"F/O PITCH F/D NOSE UP - VERIFY" displayed.	279
(187) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"F/O ROLL F/D CENTER - VERIFY" displayed.	280
(188) Verify roll command centered. Press and release VERIFY pushbutton.	"F/O ROLL F/D RIGHT - VERIFY" displayed.	281
(189) Verify roll command moves right. Press and release VERIFY pushbutton.	"F/O F/D SW OFF - VERIFY" displayed.	282
(190) On FGCP, place F/O's FD switch to OFF position. Press and release VERIFY pushbutton.	"FAST/SLOW 1 VALID - VERIFY" displayed.	283
(191) On captain's PFD verify SPD flag in and out of view and slow-fast pointer in and out of view. Press and release VERIFY pushbutton.	"FAST/SLOW 2 VALID - VERIFY" displayed.	284
(192) On first officer's PFD verify SPD flag in and out of view and slow-fast pointer in and out of view. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS CENTER - VERIFY" displayed.	285
(193) On captain's and first officer's PFD's verify fast-slow pointers centered. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS UP - VERIFY" displayed.	286
(194) Verify both fast-slow pointers move to the fast side. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS DOWN - VERIFY" displayed.	287
(195) Verify both fast-slow pointers move to the slow side. Press and release VERIFY pushbutton.	"FMA SEGMENTS TEST - VERIFY" displayed, then "FMA SEGMENTS ON - VERIFY" displayed.	288
(196) On captain's and first officer's FMA's verify all alpha-numeric characters display as a STARBURST for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"FGCP/NCP SGMENTS" TEST" displayed, then "FGCP/NCP SGMENTS ON - VERIFY" displayed.	289
(197) On FGCP and NAV Control panels verify all numerical seven- segment digits are displayed for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"SECOND SETUP INTERACTIVES?" displayed.	
NOTE: After completion of sequence five, place FD CMD switch on overhead panel back to NORM position.		
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"		
(198) Press and release VERIFY pushbutton.	"ENGAGE A/P - VERIFY" displayed.	312 through 319

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(199) On FGCP place AP switch to ON position. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE ON - VERIFY" displayed.	320
(200) On captain's FMA verify AP light on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE ON - VERIFY" displayed.	321
(201) On first officer's FMA verify AP light on. Press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.	322
(202) On FGCP place auto- throttle switch to AUTO THROT position. Press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.	323
(203) On overhead panel verify YAW DAMP switch placed ON. Press and release VERIFY pushbutton.	"Y/D OFF LITE OFF - VERIFY" displayed.	324
(204) On overhead annunciator panel verify YAW DAMP OFF light is not on. Press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.	325 326
(205) Tune both NAV control panels to a valid ILS frequency. Press and release VERIFY pushbutton.	"RETARD THROTTLE - VERIFY" displayed.	327 328
(206) Place both throttle levers to the aft mechanical stop. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/ RETRACT VERIFY" displayed.	329 through 337
NOTE: After the FLAP/SLAT handle has been moved, and the VERIFY pushbutton has been pressed, the message "FLAP TEST IN PROGRESS" will be displayed for approximately 30 seconds.		
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.		
(206a) On center instrument panel, place HYD PUMPS AUX switch to ON, and ALT switch to ON.	Hydraulic pressure available.	
(207) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 11/ MID - VERIFY" displayed.	338 through 342
(208) Place flap/slat handle to 11 degrees. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/ EXTEND - VERIFY" displayed.	343 through 349
(209) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"SELF TESTS?" displayed.	
SEQUENCE SEVEN - "SELF TESTS"		
(209a) Press and release VERIFY pushbutton.	"RCVRS TO ILS VERIFY" displayed.	

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: If testing of the ILS receivers is not desired, press and release FWD key and only the radio altimeters and accelerometers self-tests will be performed.		
(210) Press and release VERIFY pushbutton. Wait approximately (30) seconds.	"TEST IN PROGRESS" displayed.	350 through 381
NOTE: Sequence seven is an automatic self-test of the ILS receivers, R/T units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the MCDU will flash to advise of test completion.		
SEQUENCE EIGHT - "SERVO TESTS"		
NOTE: For convenience it is possible to selectively run portions of the servo test. For example, step (211) states "A/P ENGAGED - VERIFY"; if the autopilot is engaged and the VERIFY pushbutton is pressed, all 3 Dual Servo tests and the Auto Pitch Trim are performed. If these tests are not to be performed, disengage the autopilot and press and release the FWD key. The MCDU will then display "YAW DAMP ON - VERIFY" (step 220). Turning the YAW DAMP off and pressing the FWD key will result in the message "MACH TRIM NORM - VERIFY" without having run the yaw damp test. The same procedure also applies for the Mach Trim Actuator and the autothrottle.		
(211) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.	
(211a) Press and release VERIFY pushbutton.		
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed.		
(212) Verify autopilot switch ON. Press and release VERIFY pushbutton.	"A/P ENGAGED - VERIFY" displayed.	385
(213) Verify both control wheels turn right wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS RWD - VERIFY" displayed.	386 through 398
(214) Verify both control wheels turn left wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS LWD - VERIFY" displayed.	399 through 403
(215) Verify both control columns move forward. Press and release VERIFY pushbutton.	"COLUMN MOVES FWD - VERIFY" displayed.	404 through 416
(216) Verify both control columns move aft. Press and release	"COLUMN MOVES AFT - VERIFY" displayed.	417 through 421
(217) Verify right rudder pedal moves forward. Press and release VERIFY pushbutton.	"RHT PEDAL MOVES FWD - VERIFY" displayed.	422 through 434
(218) Verify left rudder pedal moves forward. Press and release VERIFY pushbutton.	"LEFT PEDAL MOVES FWD - VERIFY" displayed.	435 through 439
(219) On pedestal verify trim indicator moves towards nose up. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE UP - VERIFY" displayed.	440

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(220) On pedestal verify trim indicator moves towards nose down. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE DN - VERIFY" displayed.	441
(221) On overhead panel, verify YAW DAMP switch ON. Press and release VERIFY pushbutton.	"YAW DAMP ON - VERIFY" displayed.	442 443
NOTE: If ground power is being applied, verify correct voltage, or a failure may be recorded in the Mach Trim system.		
(222) On overhead panel, verify MACH TRIM COMP switch is in NORM position. Press and release VERIFY pushbutton.	"MACH TRIM NORM - VERIFY" displayed.	444
(223) On FGCP, verify AUTO THROT switch is ON. Press and release VERIFY pushbutton.	"A/T ENGAGED - VERIFY" displayed.	445 through 448
(223a) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/RETRACT VERIFY" displayed. "FLAP TEST IN PROGRESS" displayed.	449
NOTE: If a failure has not been detected, "INTERNAL MONITORS?" will be displayed.		
(223b) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.	
SEQUENCE NINE - "INTERNAL MONITORS"		
NOTE: Sequence nine is an automatic check of the validity of synchro, resolvers and also performs a reasonableness test. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of testing, "FAILURE RECAP?" will be displayed.		
(224) Press and release VERIFY pushbutton.	The total number of faults will be dis played momentarily, then the first fault will be displayed.	
NOTE: Momentarily pressing the VERIFY pushbutton after each failure is recorded, will display the diag nostic number.		
(225) Read and record all faults by pressing and releasing FWD pushbutton, until the message "FAILURE RECAP?" displayed.	"FAILURE RECAP?" displayed.	
NOTE: If a "FAILURE RECAP?" is desired, press and release VERIFY pushbutton and the total number of faults will again be displayed.		
(226) Press and release FWD key.	"MAINTENANCE MEMORY ERASE?" displayed.	
NOTE: At this time the autopilot and autothrottle automatically disengage. Turn off autopilot and autothrottle red warning lights by cycling the disconnect switches.		
(227) Press and release VERIFY pushbutton.	"VERIFY TO ERASE MEMORY?" displayed.	
NOTE: If Maintenance Memory is to be retained, press and release FWD key and "FLIGHT FAULT REVIEW?" will be displayed.		
(228) Press and release VERIFY pushbutton.	"FLIGHT FAULT REVIEW?" displayed.	
(229) Press and release MENU pushbutton.	MCDU MENU displayed.	

Table 208 (Continued)

Action	Desired Result	Diagnostic Number
(230) Autopilot and Authrottle disengage automatically at the conclusion of System Maintenance BIT.	Autopilot disengaged. AP red off warning lights on until either AP disconnect switch pressed. Auto throttle disengaged. THROTTLE red off warning lights on until throttle disconnect switch pressed.	
(231) Place airplane in normal ground configuration.	No test.	

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. DFGS STATUS/TEST (STP) PANEL - TROUBLE SHOOTING, PAGEBLOCK 22-01-05/101 Config 1 for trouble shooting procedures corresponding to failure.

WJE 878, 879

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. DFGS STATUS/TEST (STP) PANEL - TROUBLE SHOOTING, PAGEBLOCK 22-01-05/101 Config 3 for trouble shooting procedures corresponding to failure.

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872, 878, 879

Table 209

Failure	Diagnostic Number
SEQUENCE ZERO - "STP TESTS"	
STP FWDSPACE PB FAILURE	1
STP BACKSPACE PB FAILURE	2
STP SGMENTS FAILURE	3
NOTE: In tests that multiple failures of a sensor occurs, such as servo failures, the fault will only be displayed once during the FAILURE RECAP.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
FMA-1 A/P LITE OFF FAILURE	12
FMA-2 A/P LITE OFF FAILURE	13

Table 209 (Continued)

Failure	Diagnostic Number
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
YAW DAMP OFF LITE ON FAILURE	17
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
ATTITUDE VALID 1 FAILURE	22
ATTITUDE VALID 2 FAILURE	23
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46

Table 209 (Continued)

Failure	Diagnostic Number
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"	
CADC SWITCH FAILURE	85
CADC SWITCH FAILURE	86
CADC SWITCH FAILURE	87
CADC SWITCH FAILURE	88
CADC SWITCH FAILURE	89
CADC SWITCH FAILURE	90
CADC SWITCH FAILURE	91
CADC SWITCH FAILURE	92
TEMP SELECT PANEL FAILURE	93
TEMP SELECT PANEL FAILURE	94
TEMP SELECT PANEL FAILURE	95
TEMP SELECT PANEL FAILURE	96
TEMP SELECT PANEL FAILURE	97
TEMP SELECT PANEL FAILURE	98
TEMP SELECT PANEL FAILURE	99
TEMP SELECT PANEL FAILURE	100
TEMP SELECT PANEL FAILURE	101
TEMP SELECT PANEL FAILURE	102
TEMP SELECT PANEL FAILURE	103
TEMP SELECT PANEL FAILURE	104
TEMP SELECT PANEL FAILURE	105
TEMP SELECT PANEL FAILURE	106
TEMP SELECT PANEL FAILURE	107
TEMP SELECT PANEL FAILURE	108

Table 209 (Continued)

Failure	Diagnostic Number
TR MODE T/O FAILURE	109
TR MODE T/O FLEX FAILURE	110
TR MODE GA FAILURE	111
TR MODE MCT FAILURE	112
TR MODE CL FAILURE	113
TR MODE CR FAILURE	114
TO/GA SWITCH 1 FAILURE	117
TO/GA SWITCH 2 FAILURE	118
F/O FMA RESET PB FAILURE	122
GND SENSOR FAILURE	123
GND SENSOR FAILURE	124
LEFT PNEU X FEED OPEN FAILURE	125
ASOC AIRFOIL ICE ON FAILURE	126
ASOC AIRFOIL ICE OFF FAILURE	127
LEFT PNEU X FEED CLOSE FAILURE	128
RIGHT PNEU X FEED OPEN FAILURE	129
ASOC AIRFOIL ICE ON FAILURE	130
ASOC AIRFOIL ICE OFF FAILURE	131
RIGHT PNEU X FEED CLOSE FAILURE	132
L ANTI-ICE SW ON FAILURE	133
L ANTI-ICE SW OFF FAILURE	134
R ANTI-ICE SW ON FAILURE	135
R ANTI-ICE SW OFF FAILURE	136
LEFT A/C SUP SW AUTO FAILURE	137
LEFT A/C SUP SW OFF FAILURE	138
RIGHT A/C SUP SW AUTO FAILURE	139
RIGHT A/C SUP SW OFF FAILURE	140
GND SENSOR FAILURE	141
GND SENSOR FAILURE	142
SEL DFGC NON-TEST SIDE FAILURE	143
SEL DFGC TEST SIDE FAILURE	144
FMS OVRD PB FAILURE	145**
SPEED SELECT PB FAILURE	146
MACH SELECT PB FAILURE	147

Table 209 (Continued)

Failure	Diagnostic Number
EPR LIMIT PB FAILURE	148
NAV PB FAILURE	149
VOR/LOC PB FAILURE	150
ILS PB FAILURE	151
AUTOLAND PB FAILURE	152
VERT SPD PB FAILURE	153
MACH/IAS PB FAILURE	154
PERF OR VNAV PB FAILURE	155***
ALT HOLD PB FAILURE	156
TURB PB FAILURE	157
SPEED KNOB (2ND DET IN) FAILURE	159
HDG KNOB (OUT) FAILURE	160
HDG KNOB (2ND DET IN) FAILURE	161
ALT KNOB (OUT) FAILURE	162
ALT KNOB (IN) FAILURE	163
NOTE: ** Used for customers with FMS and -970 DFGC and subs. *** Used for customers with -970 DFGC and subs.	
BANK LIMIT 15 DEGREES FAILURE	164
BANK LIMIT 20 DEGREES FAILURE	165
BANK LIMIT 25 DEGREES FAILURE	166
BANK LIMIT 30 DEGREES FAILURE	167
SPEED REF OPER FAILURE	168
HEADING REF OPER FAILURE	169
CAPT HDG SEL REF FAILURE	173
VERT SPD REF OPER FAILURE	174
ALT REF OPER FAILURE	175
CRS-1 REF OPER FAILURE	176
CRS-2 REF OPER FAILURE	177
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184

Table 209 (Continued)

Failure	Diagnostic Number
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP SYNC FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE FIVE - "COCKPIT DISPLAYS"	

Table 209 (Continued)

Failure	Diagnostic Number
EPR SEL LITE A AND B FAILURE	249
ART INOP LITE FAILURE	250
ALT ADV LITE 1 FAILURE	251
ALT ADV LITE 2 FAILURE	252
ALT SELECT APPR FAILURE	253
ALT SELECT DEV FAILURE	254
TR EPR VALID FAILURE	255
TR NO MODE LITE FAILURE	256
ART ON LITE FAILURE	257
ART READY LITE FAILURE	258
NO AUTOLAND LITE A FAILURE	259
NO AUTOLAND LITE B FAILURE	260
A/P TRIM LITE A FAILURE	261
A/P TRIM LITE B FAILURE	262
VERT SPD DETENT FAILURE	263
IAS BUG FAILURE	264
IAS BUG FAILURE	265
EPR BUG FAILURE	266
EPR BUG FAILURE	267
EPR LIMIT CMD FAILURE	268
CAPT F/D SW FAILURE	269
CAPT F/D LITE ON FAILURE	270
PITCH F/D FAILURE	271
PITCH F/D FAILURE	272
ROLL F/D FAILURE	273
ROLL F/D FAILURE	274
CAPT F/D SW FAILURE	275
F/O F/D SW FAILURE	276
F/O F/D LITE ON FAILURE	277
PITCH F/D FAILURE	278
PITCH F/D FAILURE	279
ROLL F/D FAILURE	280
ROLL F/D FAILURE	281
F/O F/D SWITCH FAILURE	282

Table 209 (Continued)

Failure	Diagnostic Number
FAST/SLOW 1 VALID FAILURE	283
FAST/SLOW 2 VALID FAILURE	284
FAST/SLOW CMD FAILURE	285
FAST/SLOW CMD FAILURE	286
FAST/SLOW CMD FAILURE	287
FMA SEGMENTS FAILURE	288
FGCP/NCP SEGMENTS FAILURE	289
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
AIL MECH TORQUE SWITCH 1 FAILURE	332
AIL MECH TORQUE SWITCH 2 FAILURE	333
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336

Table 209 (Continued)

Failure	Diagnostic Number
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
AIL MECH TORQUE SWITCH 1 FAILURE	346
AIL MECH TORQUE SWITCH 2 FAILURE	347
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368

Table 209 (Continued)

Failure	Diagnostic Number
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - "SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
NOTE: * An open Aileron Torque Limit Rheostat will prevent A/P engage with flaps above 26 degrees, but will not prevent engage when flaps are below 26 degrees.	
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401

Table 209 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RIGHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435

Table 209 (Continued)

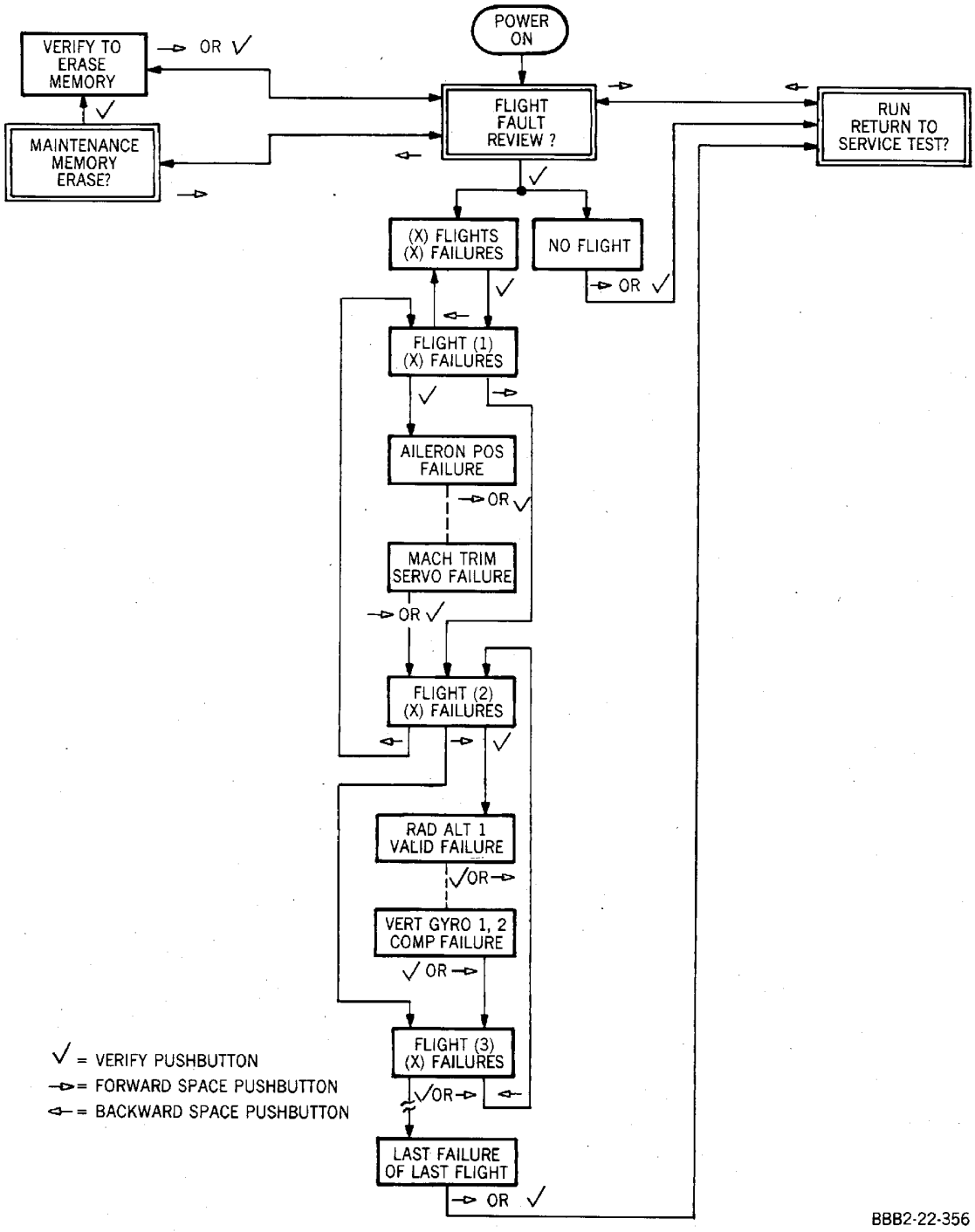
Failure	Diagnostic Number
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
AIL MECH TORQ SWITCH 1 FAILURE	452
AIL MECH TORQ SWITCH 2 FAILURE	453
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR RATE FAILURE	461
CADC -N ALT BCR RATE FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468

Table 209 (Continued)

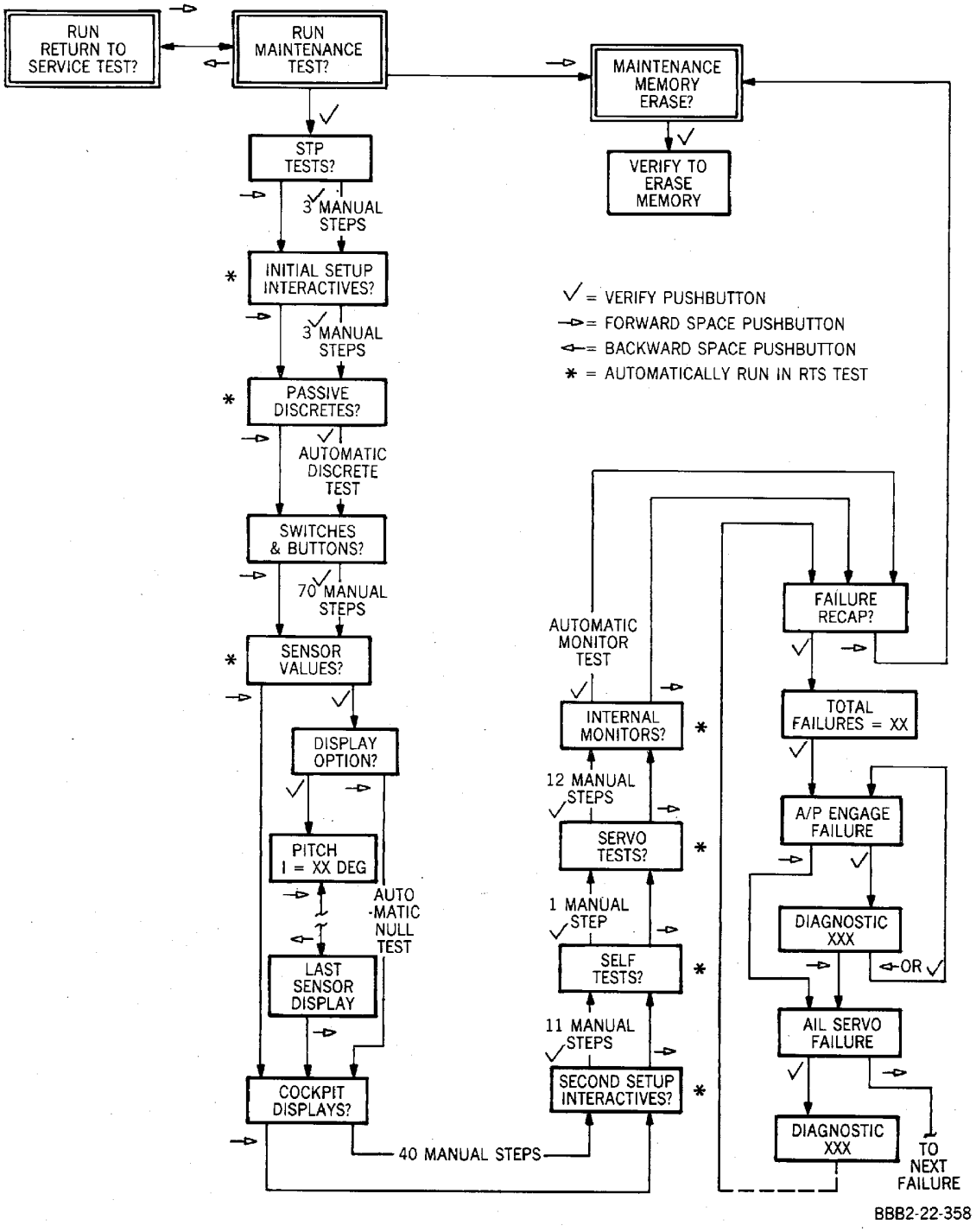
Failure	Diagnostic Number
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
ATTITUDE GYRO 1 FAILURE	481
ATTITUDE GYRO 2 FAILURE	482
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505

Table 209 (Continued)

Failure	Diagnostic Number
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
PMS/FMS DATA FAILURE	508**
WINDSHEAR DATA FAILURE	509***
NOTE: ** For customers with FMS and -970 DFGC and subs. *** For customers equipped with windshear computers	
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528



STP - Flight Fault Review Operation
Figure 202/22-01-05-990-924



STP - Run Maintenance Test Operation
Figure 203/22-01-05-990-925

DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

1. General

A. The DFGS Status/Test (STP) panel is located beneath the captain's briefcase compartment. The STP has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The STP provides the operator with a display of English language commands and questions.

B. BIT provides three modes of testing. Continuous (Flight Fault Review) BIT, Return to Service (RTS) BIT, and System Maintenance BIT. The Autoland Preflight Test is also provided in this section, since a failure during this test can be recalled and displayed on the STP. There is also an IRS/Autoland Inhibit Discrete Test for aircraft equipped with Inertial Reference Systems.

C. A self-test feature of the STP (during System Maintenance BIT) is provided to assure the operator that the STP is functional prior to test initiation. All keys and pushbuttons are checked and appropriate message displays are verified.

D. During System Maintenance BIT, pressing the Forward Space (FSPCE) key on the STP will automatically advance the STP to the next test step. If a complete sequence of tests are to be bypassed, pressing the FSPCE key at the beginning of a test sequence will automatically advance the test to the next test sequence.

E. During System Maintenance BIT, pressing the Back Space (BSPCE) key on the STP will automatically back the test to the previous test step if a failure has occurred. Pressing the BSPCE key twice in succession after a failure will program the test sequence over again.

F. During System Maintenance BIT, if a failure occurs, an English language message ending with the word "FAILURE" will appear. Pressing the VERIFY pushbutton on the STP will cause a diagnostic number to appear, then pressing the VERIFY pushbutton the second time will cause the message to reappear on the STP. If the failure is not corrected at that time, pressing the FSPCE key will log the failure and continue the test. At the conclusion of testing, the message "FAILURE RECAP?" will be displayed. At this time all failures can be recorded for correction. Once the test is exited, failures recorded are automatically erased.

G. During RTS BIT an interruption does not occur if a failure is detected during the test. If a failure is detected, "NO GO - SYSTEM AFFECTED?" will be displayed upon completion of the test. When "NO GO - SYSTEM AFFECTED?" is displayed, pressing the VERIFY pushbutton will display the function(s) that are affected, i.e. NO AUTOLAND, AP/FD, etc. If a system is listed it indicates only that a problem has been detected and not necessarily that the system is inoperative. After the function(s) is displayed, all failures can be recorded for correction. If no failures occur during RTS, GO is displayed.

H. Ten sequences of tests are provided to the STP during System Maintenance Bit. Each sequence has diagnostic numbers that accompanies each failure detected. Portions of the testing requires operator interaction, and portions of the testing are automatic. Any failures that occur during the Maintenance Test will be displayed immediately upon detection.

I. Seven sequences of tests are provided during RTS BIT. The diagnostic numbers and failures are called out at the conclusion of testing during "FAILURE RECAP?"

J. Personnel should be familiar with the functional use of all keys and pushbuttons on the STP prior to performing any tests that require operator interaction. (Figure 201)

WARNING: DURING SYSTEM MAINTENANCE BIT, THE USE OF HYDRAULIC POWER IS REQUIRED. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL, AND CONTROL SURFACE AREAS ARE CLEARED OF ALL PERSONNEL AND EQUIPMENT.

CAUTION: VERIFY METER SEL & HEAT SWITCH, LOCATED ON OVERHEAD PANEL IS IN THE OFF POSITION ANYTIME THE AIRPLANE IS IN THE FLIGHT MODE, (GROUND SENSING CIRCUIT BREAKERS OPENED, OR ON JACKS), TO PREVENT DAMAGE TO AIR DATA OR ANGLE-OF-ATTACK SENSORS.

CAUTION: WHENEVER UNIT(S) AND/OR COCKPIT INSTRUMENT(S) ARE POWERED ON THE GROUND, THE TWO AVIONICS COOLING FANS AND INSTRUMENT COOLING FAN MUST BE OPERATING. IN ADDITION, IF FLIGHT COMPARTMENT AIR TEMPERATURE IS ABOVE 85° F., AIR CONDITIONING SHOULD BE PROVIDED. IF AIR CONDITIONING IS NOT AVAILABLE, FLIGHT COMPARTMENT WINDOWS AND ELECTRICAL/ELECTRONICS ACCESS DOOR MUST BE OPEN TO PREVENT OVERHEAT OF EQUIPMENT.

K. Repeat any failed test step to verify that after maintenance action has been performed and completed, the fault has been cleared.

L. The following table describes flight guidance circuit breakers and how they function and the importance to the operation of the aircraft. It gives the associated problems caused when these breakers fail.

Table 201

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-361	28VAC-L	J1B-12	Loss of power from this breaker, if the aircraft is on the ground, would cause loss of the Flight Guidance Control Panels Altitude window, Both #1 and #2 Flight Director Bars Bias Out of View (if in Takeoff mode). The Mach Trim Fault, Yaw Damper Off and Windshear Inop messages are displayed (AP1 selected).
DFGS-1	B10-351	115VAC-L	J2A-12	Loss of power from this breaker, on the ground will cause the entire Flight Guidance Control Panel and the Nav Control Panel Course window to go blank. The #1 Flight Director Bars Biased Out of View and the #1 Fast/Slow Indicator displayed a Fail Flag. The Mach Trim Fault and Yaw Damper Off messages were displayed (AP1 selected). In addition, #1 Auto- throttles became Inop, and the TRP had a NO MODE light on.
DFGS-1	B10-360	28VAC-R	J4B-12	Loss of power from this circuit breaker caused the NO AUTOLAND light to be displayed, with AP1 selected.
DFGS-1	B10-347	28VDC-R	J2A-1,2	No cockpit indications were present if this circuit breaker is inoperative.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
Yaw Damper-1	B10-345	28VDC-L	J3B-7	With the Yaw Damper Switch in the ON position and AP1 selected, the YAW DAMPER OFF message appeared. No messages were displayed if AP2 was selected.
AP-1	B10-353	28VDC-L	J4B-104 J1B-104 J1A-94 J4A-94	With AP1 selected, the NO AUTOLAND message was displayed.
DFGS-1	B10-349	28VDC-L	J1A-1 J3A-1,2, 3,4	The Flight Guidance Control Panel blanked if breaker power was lost and AP1 selected. In addition, both Nav Panels blanked. The TRP had a NO MODE light on. The #1 Flight Director Bars Bias Out of View and the #1 Slow/Fast Fail flag appeared.
DFGS-2	B10-362	28VAC-R	J4B-12	With the aircraft on the ground and AP2 selected, loss of this circuit breakers' power caused the NO AUTOLAND light to be displayed. In addition, The Flight Guidance Control Panels' Altitude was blank and the #2 Nav Panels CRS numbers were randomly cycling. Both Flight Director Bars Biased Out of View. On the overhead, the Mach Trim Fault and Yaw Damper OFF messages were displayed. #1 and #2 Slow/Fast Indicators became Inop (AP2 was selected).
DFGS-2	B10-352	115VAC-R	J2A-12	With AP2 selected the Flight Guidance Control Panel blanked, the Mach Trim Fault Yaw Damper Off message were displayed Both Nav Panels CRS windows blanked and the TRP had a NO MODE message displayed. Autothrottles were Inop.
DFGS-2	B10-363	28VAC-L	J1B-12	Loss of this breakers' power caused the NO AUTOLAND message to be displayed if AP2 was selected.
DFGS-2	B10-348	28VDC-L	J2A-1,2	There is no cockpit indication that DFGC#2 is not receiving power from this breaker. (On the ground, AP2 selected.)
Yaw Damper-2	B10-346	28VDC-R	J3B-7	With AP2 selected and this breaker not supplying power, the Yaw Damper OFF message was displayed.
AP-2	B10-354	28VDC-R	J4B-104 J1B-104	With AP2 selected the NO AUTOLAND light was displayed.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-2	B10-350	28VDC-L	J1A-94 J1A-1 J3A-1,2, 3,4	With AP2 selected and the aircraft on the ground, the AP TRIM, AP1 and AP2 annunciators on FMA#2 were illuminated. In addition, #2 Fast/Slow was Inop. The TRP had a NO MODE light displayed. On the overhead the Mach Trim Fault, Yaw Damper OFF and Windshear Inop messages displayed.
DFGS AP/AT Warning LTS "A"	B10-341	28VDC Xfer	FMA (J1-A)	With this circuit breaker not supplying power, both FMA'S A/T and AP OFF red warning lights "A" bulb was inop.
DFGS AP/AT Warning LTS "B"	B10-342	28VDC Xfer	FMA (J4A-1)	This circuit breaker supplies basic power for both DFGC's Channel "B" processor. Loss of power from this breaker will cause both #1 and #2 Flight Directors to fail. In addition, the Fast/Slow Indicators failed, the NO AUTOLAND light was displayed, the TRP had a NO MODE light, and the Flight Guidance Control Panels Altitude window went blank. (Breaker power was lost after initial power up.) The Nav Panels' CRS Windows also blanked. Loss of power from this breaker also affects Status Test Panel operation.

2. STP Test Functions

A. Procedures for Testing DFGS

Table 202

Paragraph	Test Function
Paragraph 3.A.	Continuous (Flight Fault Review) BIT
Paragraph 3.B.	Autoland Preflight Test
Paragraph 3.C.	Return to Service (RTS) BIT (DFGS)
Paragraph 3.D.	System Maintenance BIT (Maintenance Test)

B. Digital Flight Guidance System (DFGS) Power-Up Test Prior to STP Test

NOTE: Both Digital Flight Guidance Computers (DFGC's) may fail to come on line and halt STP testing procedures.

(1) When DFGS information is not displayed with side select switch in either position, proceed as follows:

(a) Check 115 VAC power and ground to each DFGC electrical connector. (PAGEBLOCK 22-16-00/101)

(b) Check no ground exists at DFGC jack connector pins J2A (36) and J3A (36). Remove ground(s) when ground(s) exist and check DFGS operation is normal. (PAGEBLOCK 22-14-00/101)

NOTE: A ground at the J2A (36) and J3A (36) points represents holding down of the autopilot disconnect (on control wheel) not allowing DFGC to begin internal checks.

(c) Check short to ground is not present at jack connector pins J1 (Z) and J3 (Z) on DFGS control panel. Should a ground exist, isolate ground source and repair. (PAGEBLOCK 22-01-03/101)

NOTE: Before incorporation of Service Bulletin 24-67, the auxiliary power unit (APU) generator field wiring can contact air conditioning piping resulting in malfunction of the APU generator and/or Digital Flight Guidance System-1 (DFGS-1). This can occur due to chafing wire.

(2) When partial DFGS displays such as one Flight Mode Annunciator (FMA) indicating HDG HLD, ALT HLD, and opposite FMA blank with both Flight Director (FD) switches on, proceed as follows:

(a) Check 28 VDC is available at jack pins J1A (1 and 60) and J4A (1) on each DFGC electrical connector. (PAGEBLOCK 22-17-00/101)

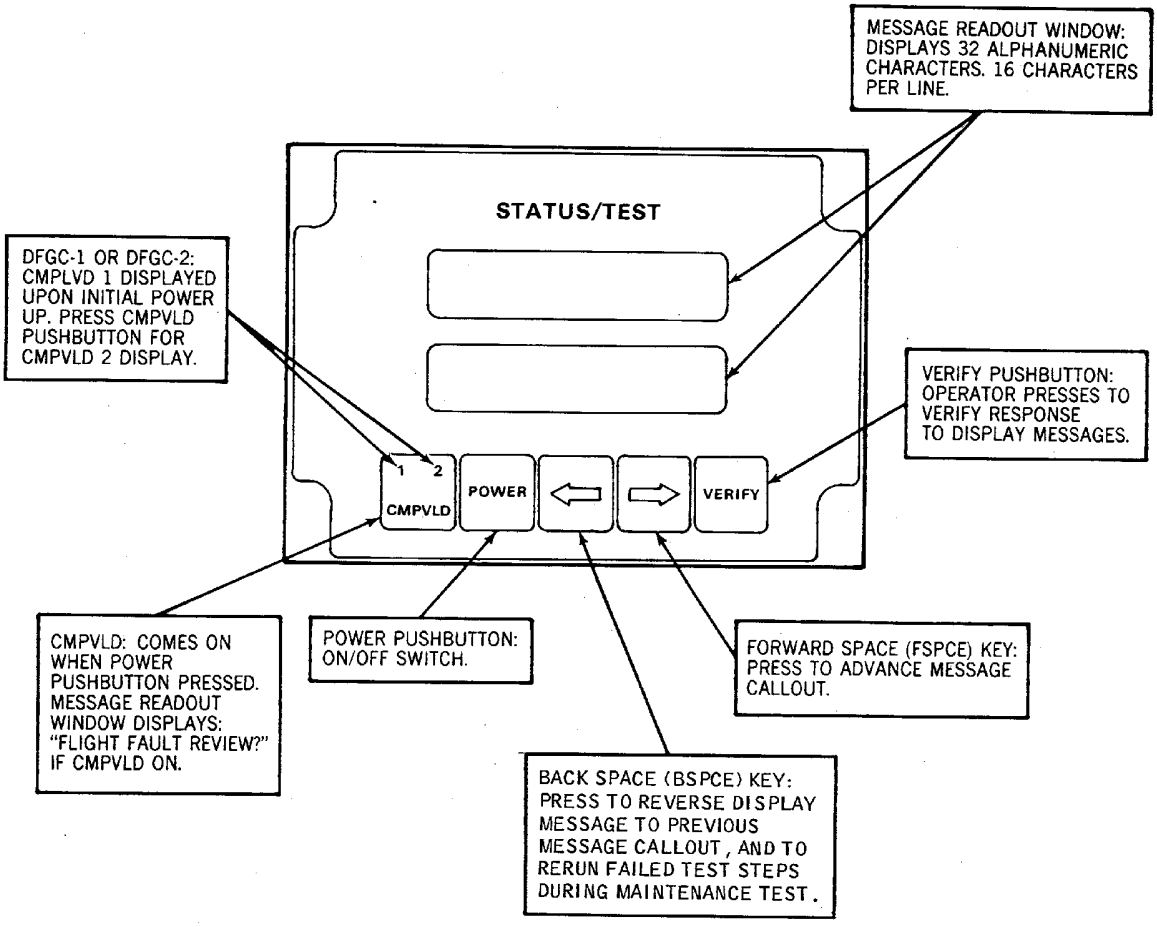
NOTE: This 28 VDC is source power for the "A" and "B" channels of the central processor.

C. On aircraft with Service Bulletin 22-85 (-920 DFGC) incorporated, following steps are necessary for completion of Maintenance and Return to Service testing:

(1) Right Ground Control Relay Sensing circuit breaker must be open to enable completion of Maintenance and Return to Service tests.

(2) During Maintenance Test, if failure message "GROUND SENSOR FAILURE" (diagnostic 124) is logged, test should be repeated with Right Ground Control relay sensing circuit breaker temporarily closed. Remainder of test can be run with Right Ground Control relay sensing circuit breaker open.

(3) During Return to Service test "GO" status may be assumed if only "GROUND SENSOR FAILURE" is logged and no other failures are logged.



Status/Test (STP) Panel
Figure 201/22-01-05-990-919

3. **STP Functional Tests**

A. Continuous (Flight Fault Review) BIT

NOTE: Continuous BIT is an internal monitor mode of the DFGC and is not controlled by the STP. Continuous BIT begins operation as soon as power is applied to the DFGS and operates continuously, even during Autoland Availability Preflight BIT, RTS BIT and System Maintenance BIT. If Continuous BIT recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel. If the autoland mode is affected, the "NO AUTOLAND" annunciator on each FMA will come on and flash to alert the flight crew that the autoland mode of operation is not available.

NOTE: Flight Fault Review Bit is provided from continuous Bit which is an internal monitor mode of the DFGC after airplane liftoff. Continuous Bit begins operation as soon as power is applied to the DFCS and operates continuously. If Continuous Bit recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel as Flight Fault Review Bit.

Table 203

Action	Desired Result
(1) On aircraft with EFIS, ensure DFGC/EFIS select switch is in the DFGC position.	
(1a) Verify DFGS switch is in same position 1, or 2 as used during flight.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
NOTE: If it is desired to interrogate DFGC 2, press and release CMPVLD pushbutton and number 2 will appear.	
(3) Press and release VERIFY pushbutton.	"NO FAULTS" displayed.
NOTE: If a failure has occurred, the number of flights and number of failures will appear. For example, if the airplane had five flights and two failures, the display message would read "5 FLIGHTS 2 FAILURES". Pressing and releasing the VERIFY pushbutton will display the most recent flight, i.e. "FLIGHT 1 1 FAILURE". Pressing and releasing the FSPCE key will display each flight and number of failures recorded for each flight. If zero failures have occurred, "NO FAULTS" will be the message displayed. Proceed to step (8) if "NO FAULTS" is the displayed message.	
(4) Press and release VERIFY pushbutton.	"FLIGHT 1 - XX FAILURE" displayed.
(5) Press and release FSPCE key.	"FLIGHT 2 - XX FAILURE" displayed.
(6) Read and record all flight faults by pressing and releasing VERIFY pushbutton until the message "FLIGHT FAULT REVIEW?" is displayed.	"FLIGHT FAULT REVIEW?" displayed.

Table 203 (Continued)

Action	Desired Result
NOTE: The in-flight logging system of the DFGS provides a feature that allows stored failures (maintenance memory) to be erased. This may be accomplished in one of two ways manually or automatically. MANUALLY: The STP may be used to erase the memory by use of the FSPCE key until the message "MAINTENANCE MEMORY ERASE?" is displayed. Pressing and releasing the VERIFY pushbutton will then display "VERIFY TO ERASE MEMORY?". Pressing and releasing the VERIFY pushbutton will then clear all of the stored failures. AUTOMATICALLY: If the maintenance memory is not period- ically cleared, it will eventually fill up. Each time the DFGC is powered up, the maintenance memory is checked. If the memory store is more than 80%, the DFGC saves the most recent 150 failures and clears the rest. The memory can store approximately 350 failures, thus leaving room for approximately 200 failures. The maintenance memory is dedicated for in-flight failure logging only. These failures are displayed only during "FLIGHT FAULT REVIEW?". This memory is entirely independent of the memory used by the Return To Service Test or the Maintenance Test. Failures logged while performing these tests are erased by exiting the respective test.	
(7) Press and release FSPCE key.	"RUN RETURN TO SERVICE TEST?" displayed.
NOTE: If a Return to Service (RTS) test is desired, press and release VERIFY pushbutton. If an RTS is not desired, proceed to step (8).	
(8) Press and release POWER pushbutton.	STP message display blank.
(9) Place aircraft in normal ground configuration.	No test.
NOTE: If maintenance action has been performed, proceed to either Paragraph 3.C. or Paragraph 3.D. as appropriate.	

B. Autoland Preflight Test

NOTE: The Autoland Availability Preflight BIT provides assurance to the flight crew that the autoland mode of operation is available. Both NAV receivers must be tuned to an identical ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control Panel must be pressed.

Table 204

Action	Desired Result
(1) Verify DFGS switch is placed in position 1, or 2 as appropriate for next flight.	No test.
NOTE: While performing the Autoland Preflight Test, if the Status/Test Panel is activated the Autoland Preflight Test cannot be initiated.	
(2) Tune both VHF/NAV Control panels to an identical ILS frequency.	Both NAV receivers tuned to an identical ILS frequency.
(2a) Set switches as follows:	No test.
(1) Both FD switches to OFF.	
(2) AP engage switch to OFF.	
(3) Overhead FLT DIR switch to NORM.	
NOTE: On later aircraft FLT DIR switch is FD CMD.	
(3) On Flight Guidance Control Panel, press and release AUTO LAND pushbutton.	Associated Flight Mode Annunciators (FMA) on instrument panel displays AUTO LND/PRE/FLT/TEST, and NO AUTOLAND appears flashing.

Table 204 (Continued)

Action	Desired Result
NOTE: On AHRS equipped aircraft, during test, both the ILS R/T's, both radio altimeters, both dual accelerometers self test, the elevator torque limit switches verified both agree for flap configuration, rudder unrestricted switches are tested and NAV receivers self test. AHRS is not checked by DFGC during preflight test. AHRS self test is initiated only so compass systems are set for same headings for test.	
(4) Wait approximately 45 seconds.	Both captain's and first officer's FMA's blank, if FD switches are in OFF position.
NOTE: On AHRS equipped aircraft, during test, all AHRS are tested resulting in headings going to 015 degrees. AHRS BASIC lights come on for 1 minute.	
(5) Observe both FMA's and verify that the NO AUTOLAND legend goes blank.	NO AUTOLAND legend blank on both FMA's.
NOTE: If the NO AUTOLAND legend remains on the FMA's, either the ILS, radio altimeters, dual accelerometers or Continuous BIT detected a failure that would inhibit the autoland mode of operation. Proceed to Paragraph 3.C. to isolate failure(s).	
NOTE: On AHRS equipped aircraft, at completion of test NO AUTOLAND light may light after 17 seconds while compasses resynch to actual heading. AHRS BASIC lights will go off. NO AUTOLAND light may remain on for up to 30 seconds after preflight test while compasses resynch.	
NOTE: For AHRS equipped aircraft, during the autoland preflight test the AHRS system preflight test is conducted. A steady "NO AUTOLAND" message on the FMA's is normal during the AHRS preflight test, and does not indicate a failed test unless it remains on after the AHRS test is complete and the AHRS has returned to the normal mode.	

C. Return to Service (RTS) BIT (DFGS)

NOTE: Refer to NAVIGATION DISPLAYS, SUBJECT 34-22-00, Page 201 for EFIS RTS.

NOTE: Return to Service (RTS) BIT is provided to place the aircraft back into a non-restricted (including autoland) service after maintenance action has been performed (i.e. LRU replacement). The STP is capable of performing ten sequences of tests 0 thru 9 (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201). Sequences 1, 2, 4, 6, 7, 8 and 9 are only performed during RTS. All sequences of tests are performed during System Maintenance BIT. RTS is run completely and failures are displayed at end of test.

NOTE: All switches such as CADC, NAV and Flight Director selector switches should be in the NORM position for the RTS test.

Table 205

Action	Desired Result
(1) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.
(1a) Place flap/slat handle to LAND EXT position.	No test.
(1b) Verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release FSPCE key until "RUN RETURN TO SERVICE TEST?" appears.	"RUN RETURN TO SERVICE TEST?" displayed.
(4) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE VERIFY" displayed.

Table 205 (Continued)

Action	Desired Result
NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.	
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.	
(5) Press and release VERIFY pushbutton.	"TURN ON AUX HYD PUMP VERIFY" displayed.
NOTE: The RTS test requires the aircraft to be in the landing configuration. Hydraulic power is required to properly set the flaps and rudder. Hydraulic power is not required if flaps are at 28 to 40 degrees and the rudder is centered (crosswinds may blow the rudder hardover causing the Rudder Servo test to fail).	
(6) Place HYD PUMPS - AUX and TRANS switches on F/O instrument panel to ON position. Press VERIFY.	"TURN ON RUDDER HYD - VERIFY" displayed.
(7) Turn on rudder hydraulics (on fwd pedestal). Press and release VERIFY pushbutton.	"FLAPS/SLAT TO 28/EXTEND VERIFY" displayed.
(7a) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
(8) Check A/P is disengaged then press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.
(9) Check A/T is disengaged. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.
(10) Disengage Y/D if engaged then press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.
(11) Detune receivers from ILS frequency (if tuned) then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
NOTE: Sequence two "PASSIVE DISCRETES" and sequence four "SENSOR VALUES" are checked automatically. Sequence three and sequence five tests are skipped and are performed during System Maintenance BIT. During the tests, the message "TEST IN PROGRESS" will be displayed.	
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
(12) When step (11) is complete, observe STP.	"ENGAGE A/P - VERIFY" displayed.
(13) Engage A/P then press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.
(14) Engage autothrottle then press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.
(15) Engage yaw damper then press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.
NOTE: Tune receivers to a valid ILS frequency.	
(16) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" followed by "RETARD THROTTLES - VERIFY" displayed.

Table 205 (Continued)

Action	Desired Result
NOTE: Verify both throttle levers are below the minimum authority switches.	
(17) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
SEQUENCE SEVEN - "SELF TESTS"	
NOTE: Sequence seven is an automatic self-test of the NAV receivers, R/A units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion. At end of sequence seven, the STP will display "WHEEL TURNS RWD - VERIFY".	
NOTE: On AHRS equipped aircraft, during test, all AHRS are tested resulting in headings going to 015 degrees. AHRS BASIC lights come on for 1 minute.	
SEQUENCE EIGHT - "SERVO TESTS"	
CAUTION: CONTROL WHEEL, COLUMN, PEDALS, STABILIZER, AUTOTHROTTLES, MACH TRIM AND Y/D ACTUATOR WILL MOVE DURING TEST EIGHT.	
NOTE: During this sequence, the operator will check control movement by cyling the verify pushbutton. A failure will be acknowledged by cycling the forward space pushbutton.	
NOTE: Failures as detected by the software will appear in the Failure Recap which can be displayed at the end of "RTS Tests".	
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed. While the servos are in operation, the message will display flashing.	
(18) Check control wheel is stationary and displaced in CW direction from neutral position.	
(19) Press and release VERIFY pushbutton.	Control wheel will move and during this test period, STP displays "TEST IN PROGRESS".
(20) At test completion STP displays new message.	"WHEEL TURNS LWD - VERIFY" is displayed.
(21) Check control wheel is stationary and displaced in CCW direction from neutral postion. Press and release VERIFY pushbutton.	Control column will move to neutral position. STP displays "TEST IN PROGRESS".
(22) At test completion STP displays new message.	"COLUMN MOVES FWD - VERIFY" is displayed.
(23) Check control column is stationary and forward of neutral position. Press and release VERIFY pushbutton.	Control column will move. STP displays "TEST IN PROGRESS".
(24) At test completion STP displays new message.	"COLUMN MOVES AFT - VERIFY" is displayed.
(25) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position and right rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(26) At test completion STP displays new message.	"RHT PEDAL MOVES FWD VERIFY" is displayed.
(27) Check right rudder pedal moved forward. Press and release VERIFY pushbutton.	Left rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(28) At test completion STP displays new message.	"LEFT PEDAL MOVES FWD VERIFY" is displayed.

Table 205 (Continued)

Action	Desired Result
(28a) Check left rudder pedal moves forward. Press and release VERIFY pushbutton.	During this test STP displays "TEST IN PROGRESS".
NOTE: Part of sequence eight and all of sequence nine test are done automatically.	
(28b) At test completion STP displays new message.	"FLAP/SLAT TO 0 RETRACT VERIFY" is displayed.
(28c) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"GO OR NO-GO SYSTEM AFFECTED" is displayed.
SEQUENCE NINE - "INTERNAL MONITORS"	
NOTE: Sequence nine is an automatic check of the real time internal monitors appropriate to ground testing. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of the test either "GO" or "NO GO - SYSTEM AFFECTED?" will be displayed.	
NOTE: If "GO" is displayed, proceed to step (33) to conclude testing. If "NO GO - SYSTEM AFFECTED?" is displayed, proceed to step (29).	
(29) Press and release VERIFY pushbutton.	One or more of the following faults may appear if a problem is detected in the system. "DFGC" "NO AUTOLAND" "AP/FD" "A/T" "S/C" "ART" "TRC" "M/T" "Y/D"
(30) Press and release FSPCE key.	"FAILURE RECAP?" displayed.
(31) Press and release VERIFY pushbutton.	The number of faults will be displayed momentarily (approx. 3 seconds), then the STP will momentarily flash VERIFY = DIAG NUM FWD = NEXT FAILURE and the first fault will be displayed.
(32) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" is displayed.	"FAILURE RECAP?" displayed.
NOTE: While failure is displayed, pressing VERIFY will display associated diagnostic number.	
(33) Press and release POWER pushbutton.	STP message display blank.
NOTE: Autothrottle and Autopilot will automatically disengage if the STP is turned off.	
(34) Hold control wheel (if wheel or column is displaced) and disengage autopilot. Press and release either AP disconnect switch.	Autopilot disengaged, AP red off warning lights on until either AP disconnect switch pressed.
(35) Disengage yaw damper. Place YAW DAMP switch to OFF at right of overhead panel.	Yaw damper disengaged.
(36) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.
(37) Place aircraft in normal ground configuration.	No test.

NOTE: Following is a list of failures and diagnostic numbers that may appear if a RTS "NO GO - SYSTEM AFFECTED?" message appears.

Table 206

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: On aircraft with -930 and subsequent DFGC, VERT GYRO is ATT.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34

Table 206 (Continued)

Failure	Diagnostic Number
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191

Table 206 (Continued)

Failure	Diagnostic Number
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP POS FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317

Table 206 (Continued)

Failure	Diagnostic Number
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQ SWITCH 1 FAILURE	332
ELEV MECH TORQ SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQ SWITCH 1 FAILURE	346
ELEV MECH TORQ SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349

Table 206 (Continued)

Failure	Diagnostic Number
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381

Table 206 (Continued)

Failure	Diagnostic Number
SEQUENCE EIGHT - SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414

Table 206 (Continued)

Failure	Diagnostic Number
NOTE: * An inoperative torque limit rheostat may prevent A/P engagement and cause an "AIL SERVO FAILURE" message to be logged if flaps are less than 26 degrees. With flaps greater than 26 degrees the torque limit rheostat will not prevent A/P engagement. Place flaps greater than 26 degrees to verify.	
NOTE: With Service Bulletin 22-111 incorporated and the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per aircraft KCN (K1123) Service Bulletin, the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443

Table 206 (Continued)

Failure	Diagnostic Number
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR FAILURE	461
CADC -N ALT BCR FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475

Table 206 (Continued)

Failure	Diagnostic Number
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
AIL SERVO FAILURE	520

Table 206 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528

D. System Maintenance BIT (Maintenance Test)

NOTE: System Maintenance BIT is a command response type test requiring operator interaction. All sequences can be tested by use of system Maintenance BIT. Hydraulic power is required during the use of this test only if the Flap/Slat tests and/or the rudder test is to be run. Failures detected during the Maintenance Test will be displayed immediately.

NOTE: Put RAM AIR TEMP & PROBE HEATER circuit breaker in lower electrical power center CPB (B1-62) Z29 to on when required.

Table 207

Action	Desired Result	Diagnostic Number
(1) On FGCP verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.	
NOTE: Each sequence of tests is called out during the test procedure. If a sequence or test step is to be bypassed, press and release the FSPCE key. Pressing the FSPCE key at the beginning of a sequence will automatically program the STP to the next sequence of tests. Pressing the FSPCE key during a test step or failed test-step will program the STP to the next test step. The FSPCE key may also be used for fast slew capabilities between test sequence steps. To repeat a failed-test step, press and release the BSPCE key. Pressing the BSPCE key twice in succession will program the test to the beginning of the test sequence if a test step failed.		
(2) Deleted.		
NOTE: If the main gear is not compressed then install main gear proximity switch target inhibitors on left and right weight-on-wheel sensors to place the DFGC system in the ground mode.		
(3) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.	
(4) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed.	"RUN MAINTENANCE TEST?" displayed.	
(4a) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	
NOTE: If DFGC switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.		
(5) Press and release VERIFY pushbutton.	"STP TESTS?" displayed.	

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: During System Maintenance BIT, the FMA associated with the DFGS switch, (i.e., DFGS in position 1 corresponds to captain's FMA), will display in ATS window RTS/MNT, and in pitch window TEST, while the test is being performed.		
SEQUENCE ZERO - "STP TESTS"		
(6) Press and release VERIFY pushbutton.	"CYCLE STP FWDSPACE PB" displayed.	1
(7) Press and release FSPCE key.	"CYCLE STP BACKSPACE PB" displayed.	2
(8) Press and release BSPCE key.	"STP SEGMENTS TEST - VERIFY" displayed.	3
(9) Press and release VERIFY pushbutton.	STAR bursts displayed.	
NOTE: The STP will display ALL STAR bursts for ten seconds. (Aircraft using the MCDU for an STP will display ALL diamonds.)		
NOTE: In order to increase the life of the message display lamps, the program only allows 10 seconds before resetting segments and reissuing the original dis play message. If segments are not to be checked, press and release FSPCE key. If FSPCE key is pressed while segments are displayed, a failure will be logged.		
(9a) After ten seconds are over see display.	"STP SEGMENT TEST - VERIFY" will be displayed.	
(10) Press and release FSPCE key.	"INITIAL SETUP INTERACTIVES?" displayed.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"		
(11) Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.	4 5 6 7 8 9 10 11
(12) Verify autopilot switch placed off. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE OFF - VERIFY" displayed.	12
(13) On captain's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE OFF - VERIFY" displayed.	13
(14) On first officer's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.	14 15

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(15) Verify AUTO THROT switch placed OFF. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.	16
(16) On overhead panel verify YAW DAMP switch placed OFF. Press and release VERIFY pushbutton.	"YAW DAMP OFF LITE ON - VERIFY" displayed.	17
(17) On overhead annunciator panel verify YAW DAMP OFF light is on. Press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.	18 19
(18) Verify that both NAV control panels are not tuned to an ILS frequency. Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.	20 21
(18a) "TEST IN PROGRESS" will display for approximately 5 seconds.	When test successful STP displays "ADVANCE THROTTLE VERIFY".	
(19) Advance throttle levers to mid range. Press and release VERIFY pushbutton.	"PASSIVE DISCRETES?" displayed.	
SEQUENCE TWO - "PASSIVE DISCRETES"		
NOTE: Sequence two is checked automatically. If a fault is recognized, the testing sequence will stop and the failure message will appear. Cycling VERIFY pushbutton provides diagnostic number for the failure. Press and release FSPCE key to initiate testing again.		
(20) Press and release VERIFY pushbutton. Wait approximately (.25) seconds.	"TRC OPTION PIN ABCD = XXXX VERIFY".	51
(20a) Upon completion of automatic testing, STP will display status of engine option pins for Thrust Rating.	TRC OPTION PIN ABCDE = XXXXX VERIFY displays.	51
NOTE: These option pins will be different for the type engine used as follows: -209 engine ABCDE = -GGG-, ABCD = -GGG- -217A/-217C engine ABCDE = --G--, ABCD = --G- -217 engine ABCDE = GG-G-, ABCD = GG-G -219 engine ABCDE = -GG-G		
NOTE: G = GROUND, - = OPEN. Reference Trouble Shooting section, Sequence Two - "PASSIVE DISCRETES" Diagnostic Number 51.		
(20b) Press and release VERIFY pushbutton.	Once all failures have been sequenced, STP will display "SWITCHES AND BUTTONS"	
SEQUENCE THREE - "SWITCHES AND BUTTONS"		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(21) Press and release VERIFY pushbutton.	"CYCLE EPR SEL PB" displayed.	73 74 75 76
(22) Press and release EPR SEL pushbutton.	"PRESS VERIFY" displayed.	77 78 79 80
(23) Press and release VERIFY pushbutton.	"CYCLE EPR SEL PB" displayed.	81 82 83 84
(24) Press and release EPR SEL pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	90
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 78 DEGREES - VERIFY" displayed.	93 94 95 96 97 98 99 100
(28) On Thrust Rating Panel (TRP), press T/O FLX pushbutton. ASSUMED TEMP will be displayed in offside FMA window. Set ASSUMED TEMP knob on TRP to 78°C. Press and release VERIFY pushbutton.	"TEMP SELECT 87 DEGREES - VERIFY" displayed.	101 102 103 104 105 106 107 108
(29) Adjust ASSUMED TEMP to 87 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
(30) On Thrust Rating Panel press and release T.O pushbutton. Press and release VERIFY pushbutton.	"TR MODE T/O FLX - VERIFY" displayed.	110

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: Steps applying to the TRP are only checking the buttons and their lights. Thrust Rating Mode is not checked during this step but is checked continuously by the DFGC.		
(31) Press and release T.O. FLX pushbutton. Press and release VERIFY pushbutton.	"TR MODE GA - VERIFY" displayed.	111
(32) Press and release GA pushbutton. Press and release VERIFY pushbutton.	"TR MODE MCT - VERIFY" displayed.	112
(33) Press and release MCT pushbutton. Press and release VERIFY pushbutton.	"TR MODE CL - VERIFY" displayed.	113
(34) Press and release CL pushbutton. Press and release VERIFY pushbutton.	"TR MODE CR - VERIFY" displayed.	114
(35) Press and release CR pushbutton. Press and release VERIFY pushbutton.	"CYCLE TO/GA SWITCH 1" displayed.	117
(36) On throttle lever press and release left TO/GA switch.	"CYCLE TO/GA SWITCH 2" displayed.	118
(37) Press and release right TO/GA switch.	"CYCLE A/P 1 DISCONNECT" displayed.	119
(38) Press and release captain's control wheel AP disconnect switch.	"CYCLE A/P 2 DISCONNECT" displayed.	120
(39) Press and release first officer's control wheel AP disconnect switch.	"CYCLE CAPT FMA RESET PB" displayed.	121
(40) Press and release RESET button on captain's FMA.	"CYCLE F/O FMA RESET PB" displayed.	122
(41) Press and release RESET button on first officer's FMA.	"PULL GND SENS BRKRS - VERIFY" displayed.	123 124
NOTE: If testing of the Bleed Inputs (steps (42) through (58)) is not desired, leave GND SENS BRKRS closed and cycle FSPCE key. Pressing the FSPCE key will skip the above mentioned tests and resume on step (59).		
(42) On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and RIGHT circuit breakers. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED OPEN - VERIFY" displayed.	125
NOTE: When pneumatic switches are opened, PNEU X FEED VALVE OPEN is displayed adjacent to the left and right pneumatic X-FEED lever.		
(43) On pedestal, place left pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	126
(51) On overhead panel place ICE PROTECT ENG L switch ON. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW OFF - VERIFY" displayed.	134

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(52) Place ICE PROTECT ENG L switch OFF. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW ON - VERIFY" displayed.	135
(53) Place ICE PROTECT ENG R switch ON. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW OFF - VERIFY" displayed.	136
(54) Place ICE PROTECT ENG R switch OFF. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW AUTO - VERIFY" displayed.	137
(55) On overhead panel place left AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW OFF - VERIFY" displayed.	138
(56) Place left AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW AUTO - VERIFY" displayed.	139
(57) Place right AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW OFF - VERIFY" displayed.	140
(58) Place right AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"CLOSE GND SENS BRKRS - VERIFY" displayed.	141 142
(59) On upper EPC close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers.	"SEL DFGC NON-TST SIDE - VERIFY" displayed.	143
(60) On FGCP place DFGS 1, 2, switch to opposite position. Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	144
(61) Place DFGS switch back to test side indicated by illuminated "1" or "2" legend of STP CMPVLD pushbutton. Press and release VERIFY pushbutton.	"CYCLE BACKCOURSE PB" displayed.	145
NOTE: The following test sequences verify that the pushbuttons and knobs on the FGCP will make and break contact. If the STP does not cycle to the next test, then the cycling was not detected by the DFGC. Pressing and releasing the VERIFY pushbutton will advise the DFGC of the failure. Pressing and releasing the FSPCE key will advance the STP to the next display message.		
NOTE: The ILS or autoland modes are not being tested during this sequence. Only the switch operation is checked.		
(61a) Press and release BACK CRS pushbutton.	"CYCLE SPEED SELECT PB" displayed.	146
NOTE: If BACK CRS pushbutton is not available, press and release FSPCE key.		
(62) Press and release SPD SEL pushbutton.	"CYCLE MACH SELECT PB" displayed.	147
(63) Press and release MACH SEL pushbutton.	"CYCLE EPR LIMIT PB" displayed.	148

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(64) Press and release EPR LIM pushbutton.	"CYCLE NAV PB" displayed.	149
(64a) Press and release NAV pushbutton. If NAV not installed, press and release FSPCE key.	"CYCLE VOR/LOC PB" displayed.	150
(65) Press and release VOR/LOC pushbutton.	"CYCLE ILS PB" displayed.	151
(66) Press and release ILS pushbutton.	"CYCLE AUTOLAND PB" displayed.	152
(67) Press and release AUTO LAND pushbutton.	"CYCLE VERT SPD PB" displayed.	153
(68) Press and release VERT SPD pushbutton.	"CYCLE IAS/MACH PB" displayed.	154
(69) Press and release IAS/MACH pushbutton.	"CYCLE PERF PB" displayed.	155
(70) Press and release PERF pushbutton.	"CYCLE ALT HOLD PB" displayed.	156
(71) Press and release ALT HOLD pushbutton.	"CYCLE TURB PB" displayed.	157
(72) Press and release TURB pushbutton.	"CYCLE SPEED KNOB (2ND DET IN)" displayed.	159
(73) Push SPD MACH knob full in and release.	"CYCLE HDG KNOB (OUT)" displayed.	160
(74) Pull H knob full out and release.	"CYCLE HDG KNOB (2ND DET IN)" displayed.	161
(75) Push H knob full in and release.	"CYCLE ALT KNOB (OUT)" displayed.	162
(76) Pull ALT knob full out and release.	"CYCLE ALT KNOB (IN)" displayed.	163
(77) Push ALT knob full in and release.	"BANK LIMIT 15 DEGREES - VERIFY" displayed.	164
(78) Rotate outer heading knob to 15 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 20 DEGREES - VERIFY" displayed.	165
(79) Rotate to 20 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 25 DEGREES - VERIFY" displayed.	166
(80) Rotate to 25 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 30 DEGREES - VERIFY" displayed.	167
(81) Rotate to 30 degrees. Press and release VERIFY pushbutton.	"SPEED REF OPER - VERIFY" displayed.	168
(82) Rotate SPD MACH knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"HEADING REF OPER - VERIFY" displayed.	169

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(83) Rotate H knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"VERT SPD REF OPER - VERIFY" displayed.	174
(84) Rotate pitch wheel full ANU and AND. Press and release VERIFY pushbutton.	"ALT REF OPER - VERIFY" displayed.	175
(85) Rotate ALT knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-1 REF OPER - VERIFY" displayed.	176
(86) Rotate captain's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-2 REF OPER - VERIFY" displayed.	177
(87) Rotate first officer's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"SENSOR VALUES?" displayed.	
NOTE: The DFGC is not testing the knobs in steps (82) through (87). They are prompter messages to have mechanic be sure knob turns freely and digital displays change.		
SEQUENCE FOUR - "SENSOR VALUES"		
(88) Press and release VERIFY pushbutton.	"DISPLAY OPTION?" displayed.	
NOTE: There are three testing options available when the message "DISPLAY OPTION " appears. FIRST: Pressing and releasing the FSPCE key will automatically null check the sensor values. The values are compared to a ground reference tolerance, and if out of tolerance a fault message will be displayed. SECOND: Pressing and releasing the VERIFY pushbutton will display the first sensor value. The FSPCE and BSPCE keys can be used at this time for slew capability. Failures are not recognized when this option is selected. THIRD: After pressing and releasing FSPCE key the automatic slewing of measurements occurs until the STP displays "COCKPIT DISPLAYS".		
(89) Press and release VERIFY pushbutton for display option, or FSPCE key.	"PITCH ANGLE 1 = XX.XX DEGREES" displayed.	180
(90) Press and release FSPCE key.	"PITCH ANGLE 2 = XX.XX DEGREES" displayed.	181
(91) Press and release FSPCE key.	"PITCH ANGLE 3 = XX.XX DEGREES" displayed.	182
(92) Press and release FSPCE key.	"BANK ANGLE 1 = XX.XX DEGREES" displayed.	183
(93) Press and release FSPCE key.	"BANK ANGLE 2 = XX.XX DEGREES" displayed.	184
(94) Press and release FSPCE key.	"BANK ANGLE 3 = XX.XX DEGREES" displayed.	185

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(95) Press and release FSPCE key.	"SPOILER POS 1 = (TED or TEU) XX.XX DEG" displayed.	186
(96) Press and release FSPCE key.	"SPOILER POS 2 = (TED or TEU) XX.XX DEG" displayed.	187
(97) Press and release FSPCE key.	"CRS RAD ALT 1 = XXXX. FEET" displayed.	188
(98) Press and release FSPCE key.	"CRS RAD ALT 2 = XXXX. FEET" displayed.	189
(99) Press and release FSPCE key.	"FINE RAD ALT 1 = XXXX. FEET" displayed.	190
(100) Press and release FSPCE key.	"FINE RAD ALT 2 = XXXX. FEET" displayed.	191
(101) Press and release FSPCE key.	"ELEV SYNC A = XX.XX DEGREES" displayed.	192
(102) Press and release FSPCE key.	"ELEV SYNC B = XX.XX DEGREES" displayed.	193
(103) Press and release FSPCE key.	"AIL SYNC A = XX.XX DEGREES" displayed.	194
(104) Press and release FSPCE key.	"AIL SYNC B = XX.XX DEGREES" displayed.	195
(105) Press and release FSPCE key.	"RUD SYNC A = XX.XX DEGREES" displayed.	196
(106) Press and release FSPCE key.	"RUD SYNC B = XX.XX DEGREES" displayed.	197
(107) Press and release FSPCE key.	"YAW DAMP POS = XX.XX DEGREES" displayed.	198
(108) Press and release FSPCE key.	"MACH TRIM POS = XX.XX INCH" displayed.	199
(109) Press and release FSPCE key.	"ELEV TACH A = XX.XX DEG/SEC" displayed.	200
(110) Press and release FSPCE key.	"ELEV TACH B = XX.XX DEG/SEC" displayed.	201
(111) Press and release FSPCE key.	"AIL TACH A = XX.XX DEG/SEC" displayed.	202
(112) Press and release FSPCE key.	"AIL TACH B = XX.XX DEG/SEC" displayed.	203
(113) Press and release FSPCE key.	"RUD TACH A = XX.XX DEG/SEC" displayed.	204
(114) Press and release FSPCE key.	"RUD TACH B = XX.XX DEG/SEC" displayed.	205

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(115) Press and release FSPCE key.	"A/T TACH = XX.XX DEG/SEC" displayed.	206
(116) Press and release FSPCE key.	"MACH TRIM TACH = XX.XX DEG/SEC" displayed.	207
(117) Press and release FSPCE key.	"YAW DAMP TACH = XX.XX DEG/SEC" displayed.	208
(118) Press and release FSPCE key.	"D3A-X ACCEL A = XX.XX FT/SEC*2" displayed.	209
(119) Press and release FSPCE key.	"D3A-X ACCEL B = XX.XX FT/SEC*2" displayed.	210
(120) Press and release FSPCE key.	"D3A-Y ACCEL A = XX.XX FT/SEC*2" displayed.	211
(121) Press and release FSPCE key.	"D3A Y ACCEL B = XX.XX FT/SEC*2" displayed.	212
(122) Press and release FSPCE key.	"D3A-Z ACCEL A = XX.XX FT/SEC*2" displayed.	213
(123) Press and release FSPCE key.	"D3A-Z ACCEL B = XX.XX FT/SEC*2" displayed.	214
(124) Press and release FSPCE key.	"DLA-Y ACCEL A = XX.XX FT/SEC*2" displayed.	215
(125) Press and release FSPCE key.	"DLA-Y ACCEL B = XX.XX FT/SEC*2" displayed.	216
(126) Press and release FSPCE key.	"G/S DEV A = X.XXX DEGREES" displayed.	217
(127) Press and release FSPCE key.	"G/S DEV B = X.XXX DEGREES" displayed.	218
(128) Press and release FSPCE key.	"VOR/LOC DEV A = X.XXX DEGREES" displayed.	219
(129) Press and release FSPCE key.	"VOR/LOC DEV B = X.XXX DEGREES" displayed.	220
(130) Press and release FSPCE key.	"LEFT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	221
(131) Press and release FSPCE key.	"RIGHT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	222
(132) Press and release FSPCE key.	"LEFT AILERON = (TEU or TED) XX.XX DEG" displayed.	223
(133) Press and release FSPCE key.	"RUDDER POS = (TEL or TER) XX.XX DEG" displayed.	224
(134) Press and release FSPCE key.	"HOR STAB = (TEU or TED) XX.XX DEG" displayed.	225

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(135) Press and release FSPCE key.	"ANGLE OF ATT 1 = XX.XX DEGREES" displayed.	226
(136) Press and release FSPCE key.	"ANGLE OF ATT 2 = XX.XX DEGREES" displayed.	227
(137) Press and release FSPCE key.	"EPR LEFT = XX.XX EPR" displayed.	228
(138) Press and release FSPCE key.	"EPR RIGHT = XX.XX EPR" displayed.	229
(139) Press and release FSPCE key.	"HEADING 1 = XX.XX DEGREES" displayed.	230
(140) Press and release FSPCE key.	"HEADING 2 = XX.XX DEGREES" displayed.	231
(141) Press and release FSPCE key.	"LEFT FLAPS POS = XX.XX DEGREES displayed.	232
(142) Press and release FSPCE key.	"RIGHT FLAP POS = XX.XX DEGREES" displayed.	233
(143) Press and release FSPCE key.	"FLAP HANDLE = XX.XX DEGREES" displayed.	234
NOTE: During CADC test, the letter T is displayed for CADC on test side and the letter N is for CADC on non test side.		
(144) Press and release FSPCE key.	"CADC-T ALT NCR = XXXX. FEET" displayed.	235
(145) Press and release FSPCE key.	"CADC-N ALT NCR = XXXX. FEET" displayed.	236
(146) Press and release FSPCE key.	"CADC-T TAT = XX.XX DEGREES" displayed.	237
(147) Press and release FSPCE key.	"CADC-N TAT = XX.XX DEGREES" displayed.	238
(148) Press and release FSPCE key.	"CADC-T ALT RATE = XX.XX FT/SEC" displayed.	239
(149) Press and release FSPCE key.	"CADC-N ALT RATE = XX.XX FT/SEC" displayed.	240
(150) Press and release FSPCE key.	"CADC-T SAT = XX.XX DEGREES" displayed.	241
(151) Press and release FSPCE key.	"CADC-N SAT = XX.XX DEGREES" displayed.	242
(152) Press and release FSPCE key.	"CADC-T CAS = XXX.X FT/SEC" displayed.	243
(153) Press and release FSPCE key.	"CADC-N CAS = XXX.X FT/SEC" displayed.	244
(154) Press and release FSPCE key.	"CADC-T MACH = X.XXXX FT/SEC" displayed.	245

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(155) Press and release FSPCE key.	"CADC-N MACH = X.XXXX FT/SEC" displayed.	246
(156) Press and release FSPCE key.	"COCKPIT DISPLAYS?" displayed.	
SEQUENCE FIVE - "COCKPIT DISPLAYS"		
(156a) Place both FD switches to ON.		
NOTE: "ART switch must be in the AUTO position prior to running this sequence."		
(157) Press and release VERIFY pushbutton.	"EPR SEL light A and B - VERIFY" displayed.	249
(157a) Press and release VERIFY pushbutton.	”ART INOP LITE - VERIFY” displayed.	250
(158) On overhead annunciator panel verify ART INOP light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 1 - VERIFY" displayed.	251
(159) On captain's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 2 - VERIFY" displayed.	252
(160) On first officer's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT SELECT APPR - VERIFY" displayed.	253
(161) Verify aural warning sounds. Press and release VERIFY pushbutton.	"ALT SELECT DEV - VERIFY" displayed.	254
(162) Verify aural warning sounds. Press and release VERIFY pushbutton.	"TR EPR VALID - VERIFY" displayed.	255
(163) On center instrument panel EPR flag out of view. If electronic engine display panel is installed, EPR limit is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR indicator/panel.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - VERIFY" displayed.	258
NOTE: The following steps (166) through (169) verify that the AUTOLAND and AP TRIM legends on each FMA have two operable bulbs. The "A" light refers to left light bulb and the "B" light refers to right light bulb.		
(166) Verify READY light on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE A VERIFY" displayed.	259
(167) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE B VERIFY" displayed.	260

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(168) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE A - VERIFY" displayed.	261
(169) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE B - VERIFY" displayed.	262
(170) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"VERT SPD DETENT - VERIFY" displayed.	263
(171) On FGCP verify pitch wheel detent (cycle) position. Press and release VERIFY pushbutton.	"IAS BUG 1 250 KIAS - VERIFY" displayed.	264
(172) On captain's Mach/ Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"IAS BUS 2 250 KIAS - VERIFY" displayed.	265
(173) On first officer's Mach/Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"EPR BUG LEFT 1.8 EPR - VERIFY" displayed.	266
NOTE: Care must be taken to be sure EPR bug manual set knobs on EPR indicators are in automatic (IN) position.		
(174) On center instrument panel verify left EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR BUG RIGHT 1.8 - VERIFY" displayed.	267
(175) Verify right EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR LIMIT CMD 1.8 EPR - VERIFY" displayed.	268
(176) On thrust rating indi- cator/EEDP verify EPR LIM reads 1.80(±0.014). Press and release VERIFY pushbutton.	"F/D CMD SW to TEST SIDE - VERIFY" displayed.	269
(176A) On overhead panel, set FD CMD switch to side under test. Press and release VERIFY pushbutton.	"CAPT F/D SW ON VERIFY" displayed.	
NOTE: Side under test corresponds to CMP VLD light number on STP.		
(177) On FGCP, place captain's FD switch to FD position. Press and release VERIFY pushbutton.	"CAPT F/D LITE ON - VERIFY" displayed.	270
(178) On captain's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"CAPT PITCH F/D CENTER - VERIFY" displayed.	271
(179) On captain's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"CAPT PITCH F/D NOSE UP - VERIFY" displayed.	272

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(180) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"CAPT ROLL F/D CENTER - VERIFY" displayed.	273
(181) Verify roll command centered. Press and release VERIFY pushbutton.	"CAPT ROLL F/D RIGHT - VERIFY" displayed.	274
(182) Verify roll command moves right. Press and release VERIFY pushbutton.	"CAPT F/D SW OFF - VERIFY displayed.	275
(183) On FGCP, place captain's FD switch to OFF position. Press and release VERIFY pushbutton.	"F/O F/D SW ON - VERIFY" displayed.	276
(184) On FGCP, place F/O's FD switch to FD position. Press and release VERIFY pushbutton.	"F/O F/D LITE ON - VERIFY" displayed.	277
(185) On F/O's FMA, verify blue FD light is flash- ing. Press and release VERIFY pushbutton.	"F/O PITCH F/D CENTER - VERIFY" displayed.	278
(186) On first officer's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"F/O PITCH F/D NOSE UP - VERIFY" displayed.	279
(187) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"F/O ROLL F/D CENTER - VERIFY" displayed.	280
(188) Verify roll command centered. Press and release VERIFY pushbutton.	"F/O ROLL F/D RIGHT - VERIFY" displayed.	281
(189) Verify roll command moves right. Press and release VERIFY pushbutton.	"F/O F/D SW OFF - VERIFY" displayed.	282
(190) On FGCP, place F/O's FD switch to OFF position. Press and release VERIFY pushbutton.	"FAST/SLOW 1 VALID - VERIFY" displayed.	283
(191) On captain's ADI/PFD verify SPD flag in and out of view and slow- fast pointer in and out of view. Press and release VERIFY pushbutton.	"FAST/SLOW 2 VALID - VERIFY" displayed.	284
(192) On first officer's ADI/PFD verify SPD flag in and out of view and slow-fast pointer in and out of view. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS CENTER - VERIFY" displayed.	285
(193) On captain's and first officer's ADI's/PFD's verify fast-slow pointers centered. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS UP - VERIFY" displayed.	286
(194) Verify both fast-slow pointers move to the fast side. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS DOWN - VERIFY" displayed.	287

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(195) Verify both fast-slow pointers move to the slow side. Press and release VERIFY pushbutton.	"FMA SEGMENTS TEST - VERIFY" displayed, then "FMA SEGMENTS ON - VERIFY" displayed.	288
(196) On captain's and first officer's FMA's verify all alpha-numeric characters display as a STARBURST for approxi- mately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"FGCP/NCP SGMENTS TEST - VERIFY" displayed, then "FGCP/NCP SGMENTS ON - VERIFY" displayed.	289
(197) On FGCP and NAV Control panels verify all numerical seven- segment digits are displayed for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"SECOND SETUP INTERACTIVES?" displayed.	
NOTE: After completion of sequence five, place FD CMD switch on overhead panel back to NORM position.		
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"		
(198) Press and release VERIFY pushbutton.	"ENGAGE A/P - VERIFY" displayed.	312 through 319
(199) On FGCP place AP switch to ON position. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE ON - VERIFY" displayed.	320
(200) On captain's FMA verify AP light on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE ON - VERIFY" displayed.	321
(201) On first officer's FMA verify AP light on. Press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.	322
(202) On FGCP place auto- throttle switch to AUTO THROT position. Press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.	323
(203) On overhead panel verify YAW DAMP switch placed ON. Press and release VERIFY pushbutton.	"Y/D OFF LITE OFF - VERIFY" displayed.	324
(204) On overhead annunciator panel verify YAW DAMP OFF light is not on. Press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.	325 326
(205) Tune both NAV control panels to a valid ILS frequency. Press and release VERIFY pushbutton.	"RETARD THROTTLE - VERIFY" displayed.	327 328
(206) Place both throttle levers to the aft mechanical stop. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/ RETRACT VERIFY" displayed.	329 through 337

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: After the FLAP/SLAT handle has been moved, and the VERIFY pushbutton has been pressed, the message "FLAP TEST IN PROGRESS" will be displayed for approximately 30 seconds.		
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.		
(206a) On center instrument panel, place HYD PUMPS AUX switch to ON, and ALT switch to ON.	Hydraulic pressure available.	
(207) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 11/ MID - VERIFY" displayed.	338 through 342
(208) Place flap/slat handle to 11 degrees. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/ EXTEND - VERIFY" displayed.	343 through 349
(209) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"SELF TESTS?" displayed.	
SEQUENCE SEVEN - "SELF TESTS"		
(209a) Press and release VERIFY pushbutton.	"RCVRS TO ILS VERIFY" displayed.	
NOTE: If testing of the ILS receivers is not desired, press and release FSPCE key and only the radio altimeters and accelerometers self-tests will be performed.		
NOTE: AHRS tested coincidently with ILS test.		
(210) Press and release VERIFY pushbutton. Wait approximately (30) seconds.	"SERVO TESTS?" displayed	350 through 381
NOTE: Sequence seven is an automatic self-test of the ILS receivers, R/T units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion.		
SEQUENCE EIGHT - "SERVO TESTS"		
NOTE: For convenience it is possible to selectively run portions of the servo test. For example, step (211) states "A/P ENGAGED - VERIFY"; if the autopilot is engaged and the VERIFY pushbutton is pressed, all 3 Dual Servo tests and the Auto Pitch Trim are performed. If these tests are not to be performed, disengage the autopilot and press and release the FSPCE key. The STP will then display "YAW DAMP ON - VERIFY" (step 220). Turning the YAW DAMP off and pressing the FSPCE key will result in the message "MACH TRIM NORM - VERIFY" without having run the yaw damp test. The same procedure also applies for the Mach Trim Actuator and the autothrottle.		
(211) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.	
(211a) Press and release VERIFY pushbutton.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed.		
(212) Verify autopilot switch ON. Press and release VERIFY pushbutton.	"A/P ENGAGED - VERIFY" displayed.	385
(213) Verify both control wheels turn right wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS RWD - VERIFY" displayed.	386 through 398
(214) Verify both control wheels turn left wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS LWD - VERIFY" displayed.	399 through 403
(215) Verify both control columns move forward. Press and release VERIFY pushbutton.	"COLUMN MOVES FWD - VERIFY" displayed.	404 through 416
(216) Verify both control columns move aft. Press and release VERIFY pushbutton.	"COLUMN MOVES AFT - VERIFY" displayed.	417 through 421
(217) Verify right rudder pedal moves forward. Press and release VERIFY pushbutton.	"RHT PEDAL MOVES FWD - VERIFY" displayed.	422 through 434
(218) Verify left rudder pedal moves forward. Press and release VERIFY pushbutton.	"LEFT PEDAL MOVES FWD - VERIFY" displayed.	435 through 439
(219) On pedestal verify trim indicator moves towards nose up. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE UP - VERIFY" displayed.	440
(220) On pedestal verify trim indicator moves towards nose down. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE DN - VERIFY" displayed.	441
(221) On overhead panel, verify YAW DAMP switch ON. Press and release VERIFY pushbutton.	"YAW DAMP ON - VERIFY" displayed.	442 443
NOTE: If ground power is being applied, verify correct voltage, or a failure may be recorded in the Mach Trim system.		
(222) On overhead panel, verify MACH TRIM COMP switch is in NORM position. Press and release VERIFY pushbutton.	"MACH TRIM NORM - VERIFY" displayed.	444
(223) On FGCP, verify AUTO THROT switch is ON. Press and release VERIFY pushbutton.	"A/T ENGAGED - VERIFY" displayed.	445 through 448
(223a) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/RETRACT VERIFY" displayed. "FLAP TEST IN PROGRESS" displayed.	449
NOTE: If a failure has not been detected, "INTERNAL MONITORS?" will be displayed.		
(223b) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.	

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
SEQUENCE NINE - "INTERNAL MONITORS"		
NOTE: Sequence nine is an automatic check of the validity of synchros, resolvers and performs a reasonableness test. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of testing, "FAILURE RECAP?" will be displayed.		
(224) Press and release VERIFY pushbutton.	The total number of faults will be displayed momentarily, then the first fault will be displayed.	
NOTE: Momentarily pressing the VERIFY pushbutton after each failure is recorded, will display the diag nostic number.		
(225) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" displayed.	"FAILURE RECAP?" displayed.	
NOTE: If a "FAILURE RECAP?" is desired, press and release VERIFY pushbutton and the total number of faults will again be displayed.		
(226) Press and release FSPCE key.	"MAINTENANCE MEMORY ERASE?" displayed.	
NOTE: At this time the autopilot and autothrottle automatically disengage. Turn off autopilot and autothrottle red warning lights by cycling the disconnect switches.		
(227) Press and release VERIFY pushbutton.	"VERIFY TO ERASE MEMORY?" displayed.	
NOTE: If Maintenance Memory is to be retained, press and release FSPCE key and "FLIGHT FAULT REVIEW?" will be displayed.		
(228) Press and release VERIFY pushbutton.	"FLIGHT FAULT REVIEW?" displayed.	
(229) Press and release POWER pushbutton.	STP message display blank.	
(230) Autopilot and Authrottle disengage automatically at the conclusion of System Maintenance BIT.	Autopilot disengaged. AP red off warning lights on until either AP disconnect switch pressed. Autothrottle disengaged. THROTTLE red off warning lights on until throttle disconnect switch pressed.	
(231) Place airplane in normal ground configuration.	No test.	

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. Reference DFGS STATUS/TEST, SUBJECT 22-01-05, page 101 for trouble shooting procedures corresponding to failure.

Table 208

Failure	Diagnostic Number
SEQUENCE ZERO - “STP TESTS”	
STP FWDSPACE PB FAILURE	1

Table 208 (Continued)

Failure	Diagnostic Number
STP BACKSPACE PB FAILURE	2
STP SGMENTS FAILURE	3
NOTE: In tests that multiple failures of a sensor occurs, such as servo failures, the fault will only be displayed once during the FAILURE RECAP.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
FMA-1 A/P LITE OFF FAILURE	12
FMA-2 A/P LITE OFF FAILURE	13
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
YAW DAMP OFF LITE ON FAILURE	17
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: For -930 and subsequent DFGC's, VERT GRYO is ATTITUDE.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29

Table 208 (Continued)

Failure	Diagnostic Number
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
ELEVATOR TORQUE LIMIT SWITCH 1 FAILURE	35
ELEVATOR TORQUE LIMIT SWITCH 2 FAILURE	36
NOTE: For -930 and subsequent DFGC's, ELEVATOR is AIL MECH.	
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"	
VG SW UNIT SWITCH FAILURE	73
VG SW UNIT SWITCH FAILURE	74
VG SW UNIT SWITCH FAILURE	75
VG SW UNIT SWITCH FAILURE	76
VG SW UNIT SWITCH FAILURE	77
VG SW UNIT SWITCH FAILURE	78

Table 208 (Continued)

Failure	Diagnostic Number
VG SW UNIT SWITCH FAILURE	79
VG SW UNIT SWITCH FAILURE	80
VG SW UNIT SWITCH FAILURE	81
VG SW UNIT SWITCH FAILURE	82
VG SW UNIT SWITCH FAILURE	83
VG SW UNIT SWITCH FAILURE	84
NOTE: For -930 and subsequent DFGC's, VG is ATT.	
CADC SWITCH FAILURE	85
CADC SWITCH FAILURE	86
CADC SWITCH FAILURE	87
CADC SWITCH FAILURE	88
CADC SWITCH FAILURE	89
CADC SWITCH FAILURE	90
CADC SWITCH FAILURE	91
CADC SWITCH FAILURE	92
TEMP SELECT PANEL FAILURE	93
TEMP SELECT PANEL FAILURE	94
TEMP SELECT PANEL FAILURE	95
TEMP SELECT PANEL FAILURE	96
TEMP SELECT PANEL FAILURE	97
TEMP SELECT PANEL FAILURE	98
TEMP SELECT PANEL FAILURE	99
TEMP SELECT PANEL FAILURE	100
TEMP SELECT PANEL FAILURE	101
TEMP SELECT PANEL FAILURE	102
TEMP SELECT PANEL FAILURE	103
TEMP SELECT PANEL FAILURE	104
TEMP SELECT PANEL FAILURE	105
TEMP SELECT PANEL FAILURE	106
TEMP SELECT PANEL FAILURE	107
TEMP SELECT PANEL FAILURE	108
TR MODE T/O FAILURE	109
TR MODE T/O FLEX FAILURE	110
TR MODE GA FAILURE	111

Table 208 (Continued)

Failure	Diagnostic Number
TR MODE MCT FAILURE	112
TR MODE CL FAILURE	113
TR MODE CR FAILURE	114
TO/GA SWITCH 1 FAILURE	117
TO/GA SWITCH 2 FAILURE	118
A/P 1 DISCONNECT FAILURE	119
A/P 2 DISCONNECT FAILURE	120
CAPT FMA RESET PB FAILURE	121
F/O FMA RESET PB FAILURE	122
GND SENSOR FAILURE	123
GND SENSOR FAILURE	124
LEFT PNEU X FEED OPEN FAILURE	125
ASOC AIRFOIL ICE ON FAILURE	126
ASOC AIRFOIL ICE OFF FAILURE	127
LEFT PNEU X FEED CLOSE FAILURE	128
RIGHT PNEU X FEED OPEN FAILURE	129
ASOC AIRFOIL ICE ON FAILURE	130
ASOC AIRFOIL ICE OFF FAILURE	131
RIGHT PNEU X FEED CLOSE FAILURE	132
L ENG ANTI-ICE SW ON FAILURE	133
L ENG ANTI-ICE SW OFF FAILURE	134
R ENG ANTI-ICE SW ON FAILURE	135
R ENG ANTI-ICE SW OFF FAILURE	136
LEFT A/C SUP SW AUTO FAILURE	137
LEFT A/C SUP SW OFF FAILURE	138
RIGHT A/C SUP SW AUTO FAILURE	139
RIGHT A/C SUP SW OFF FAILURE	140
GND SENSOR FAILURE	141
GND SENSOR FAILURE	142
SEL DFGC NON-TEST SIDE FAILURE	143
SEL DFGC TEST SIDE FAILURE	144
BACK COURSE PB FAILURE	145*
FMS OVRD PB FAILURE	145**
SPEED SELECT PB FAILURE	146

Table 208 (Continued)

Failure	Diagnostic Number
MACH SELECT PB FAILURE	147
EPR LIMIT PB FAILURE	148
NAV PB FAILURE	149
VOR/LOC PB FAILURE	150
ILS PB FAILURE	151
AUTOLAND PB FAILURE	152
VERT SPD PB FAILURE	153
MACH/IAS PB FAILURE	154
PERF PB FAILURE	155
PERF OR VNAV PB FAILURE	155***
ALT HOLD PB FAILURE	156
TURB PB FAILURE	157
SPEED KNOB (2ND DET IN) FAILURE	159
HDG KNOB (OUT) FAILURE	160
HDG KNOB (2ND DET IN) FAILURE	161
ALT KNOB (OUT) FAILURE	162
ALT KNOB (IN) FAILURE	163
NOTE: * Used for customers with back course option. ** Used for customers with FMS and -970 DFGC and subs. *** Used for customers with -970 DFGC and subs.	
BANK LIMIT 15 DEGREES FAILURE	164
BANK LIMIT 20 DEGREES FAILURE	165
BANK LIMIT 25 DEGREES FAILURE	166
BANK LIMIT 30 DEGREES FAILURE	167
SPEED REF OPER FAILURE	168
HEADING REF OPER FAILURE	169
CAPT HDG SEL REF FAILURE	173
VERT SPD REF OPER FAILURE	174
ALT REF OPER FAILURE	175
CRS-1 REF OPER FAILURE	176
CRS-2 REF OPER FAILURE	177
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181

Table 208 (Continued)

Failure	Diagnostic Number
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP SYNC FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215

Table 208 (Continued)

Failure	Diagnostic Number
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE FIVE - "COCKPIT DISPLAYS"	
EPR SEL LITE A AND B FAILURE	249
ART INOP LITE FAILURE	250
ALT ADV LITE 1 FAILURE	251
ALT ADV LITE 2 FAILURE	252
ALT SELECT APPR FAILURE	253
ALT SELECT DEV FAILURE	254
TR EPR VALID FAILURE	255
TR NO MODE LITE FAILURE	256
ART ON LITE FAILURE	257
ART READY LITE FAILURE	258
NO AUTOLAND LITE A FAILURE	259
NO AUTOLAND LITE B FAILURE	260
A/P TRIM LITE A FAILURE	261
A/P TRIM LITE B FAILURE	262
VERT SPD DETENT FAILURE	263
IAS BUG FAILURE	264
IAS BUG FAILURE	265
EPR BUG FAILURE	266
EPR BUG FAILURE	267
EPR LIMIT CMD FAILURE	268
CAPT F/D SW FAILURE	269
CAPT F/D LITE ON FAILURE	270
PITCH F/D FAILURE	271
PITCH F/D FAILURE	272
ROLL F/D FAILURE	273
ROLL F/D FAILURE	274
CAPT F/D SW FAILURE	275
F/O F/D SW FAILURE	276
F/O F/D LITE ON FAILURE	277
PITCH F/D FAILURE	278

Table 208 (Continued)

Failure	Diagnostic Number
PITCH F/D FAILURE	279
ROLL F/D FAILURE	280
ROLL F/D FAILURE	281
F/O F/D SWITCH FAILURE	282
FAST/SLOW 1 VALID FAILURE	283
FAST/SLOW 2 VALID FAILURE	284
FAST/SLOW CMD FAILURE	285
FAST/SLOW CMD FAILURE	286
FAST/SLOW CMD FAILURE	287
FMA SEGMENTS FAILURE	288
FGCP/NCP SEGMENTS FAILURE	289
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQUE SWITCH 1 FAILURE	332

Table 208 (Continued)

Failure	Diagnostic Number
ELEV MECH TORQUE SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQUE SWITCH 1 FAILURE	346
ELEV MECH TORQUE SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362

Table 208 (Continued)

Failure	Diagnostic Number
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - "SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
* An open Aileron Torque Limit Rheostat will prevent A/P engage with flaps above 26 degrees, but will not prevent engage when flaps are below 26 degrees.	

Table 208 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RIGHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430

Table 208 (Continued)

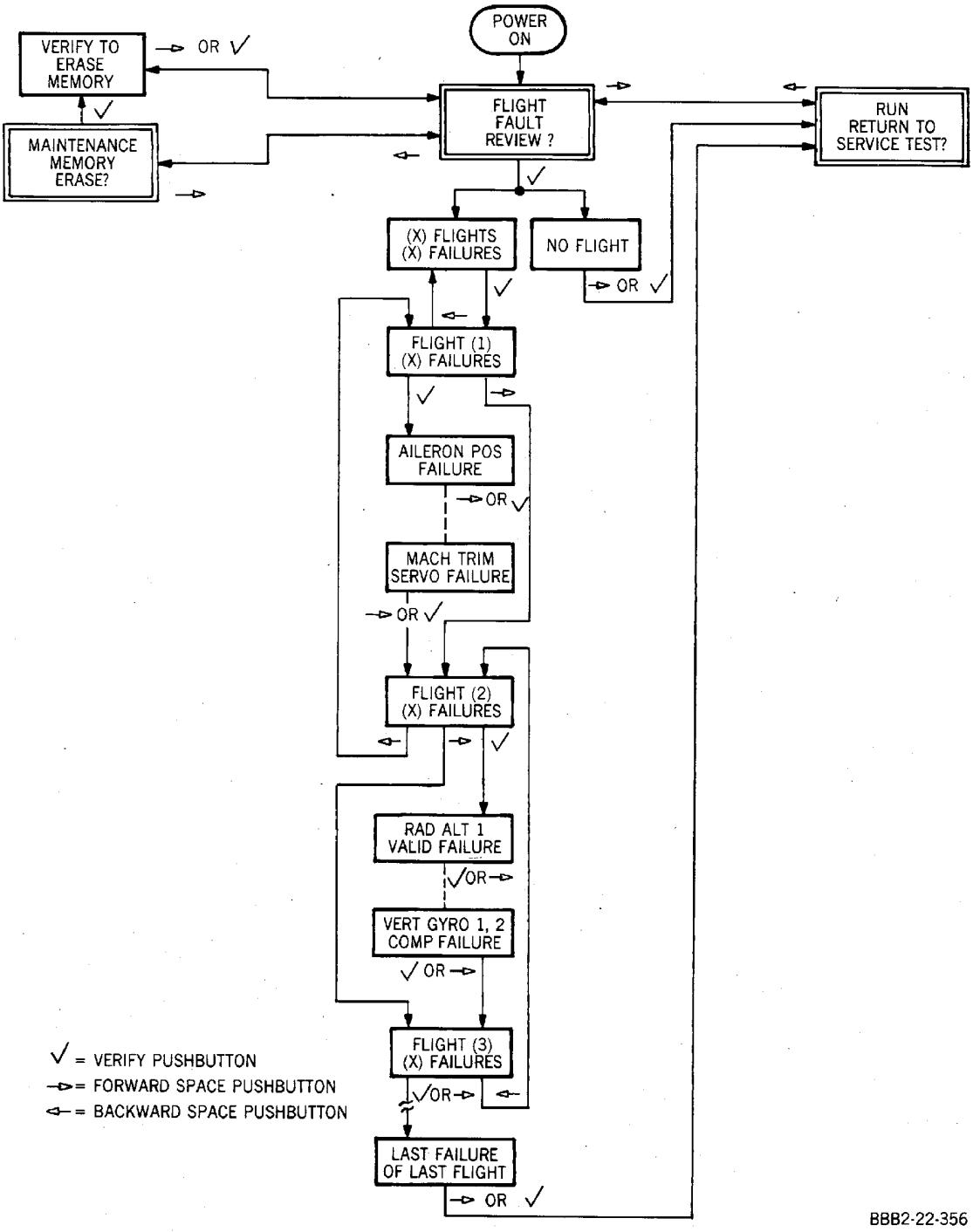
Failure	Diagnostic Number
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR RATE FAILURE	461
CADC -N ALT BCR RATE FAILURE	462

Table 208 (Continued)

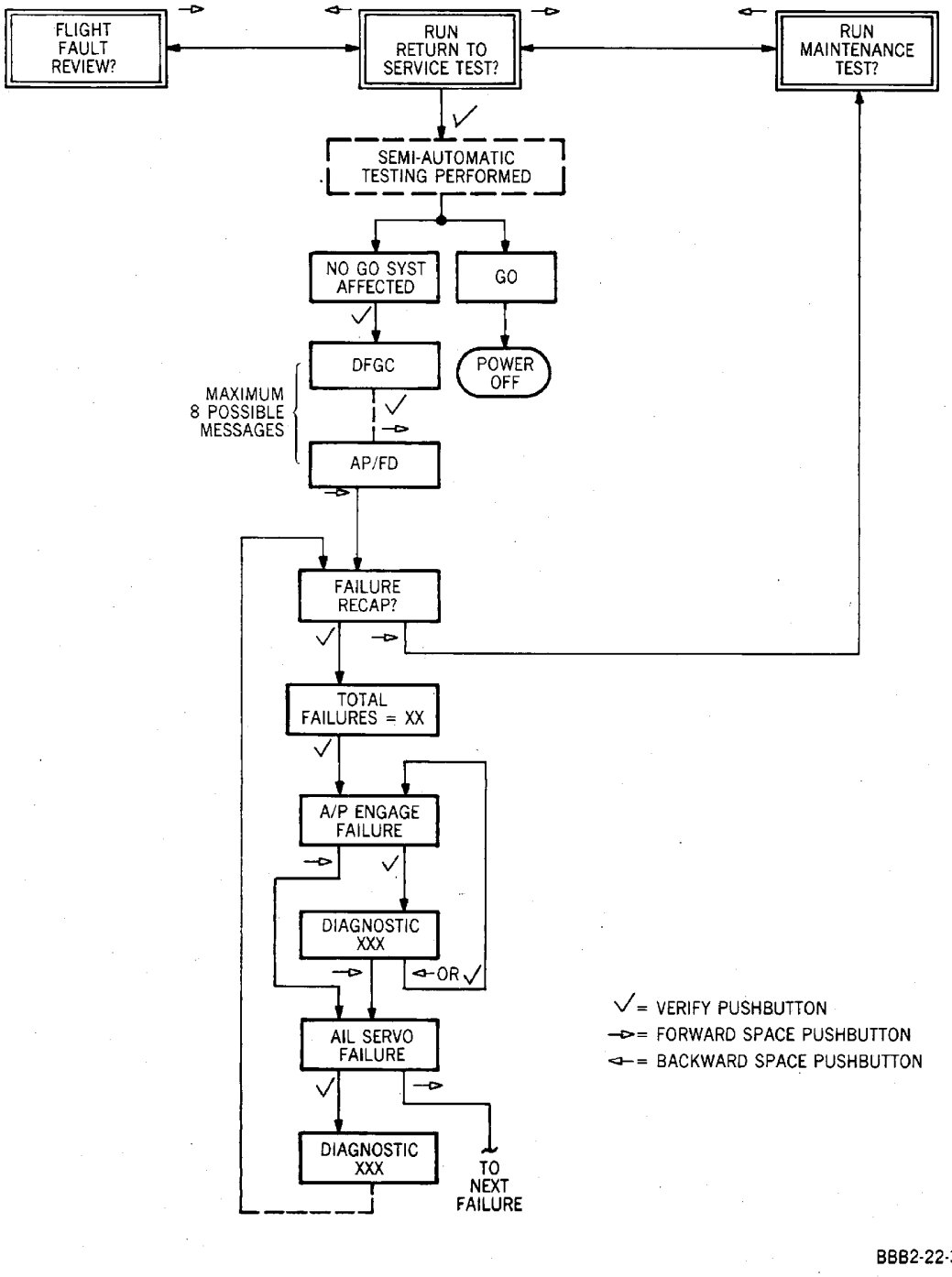
Failure	Diagnostic Number
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495

Table 208 (Continued)

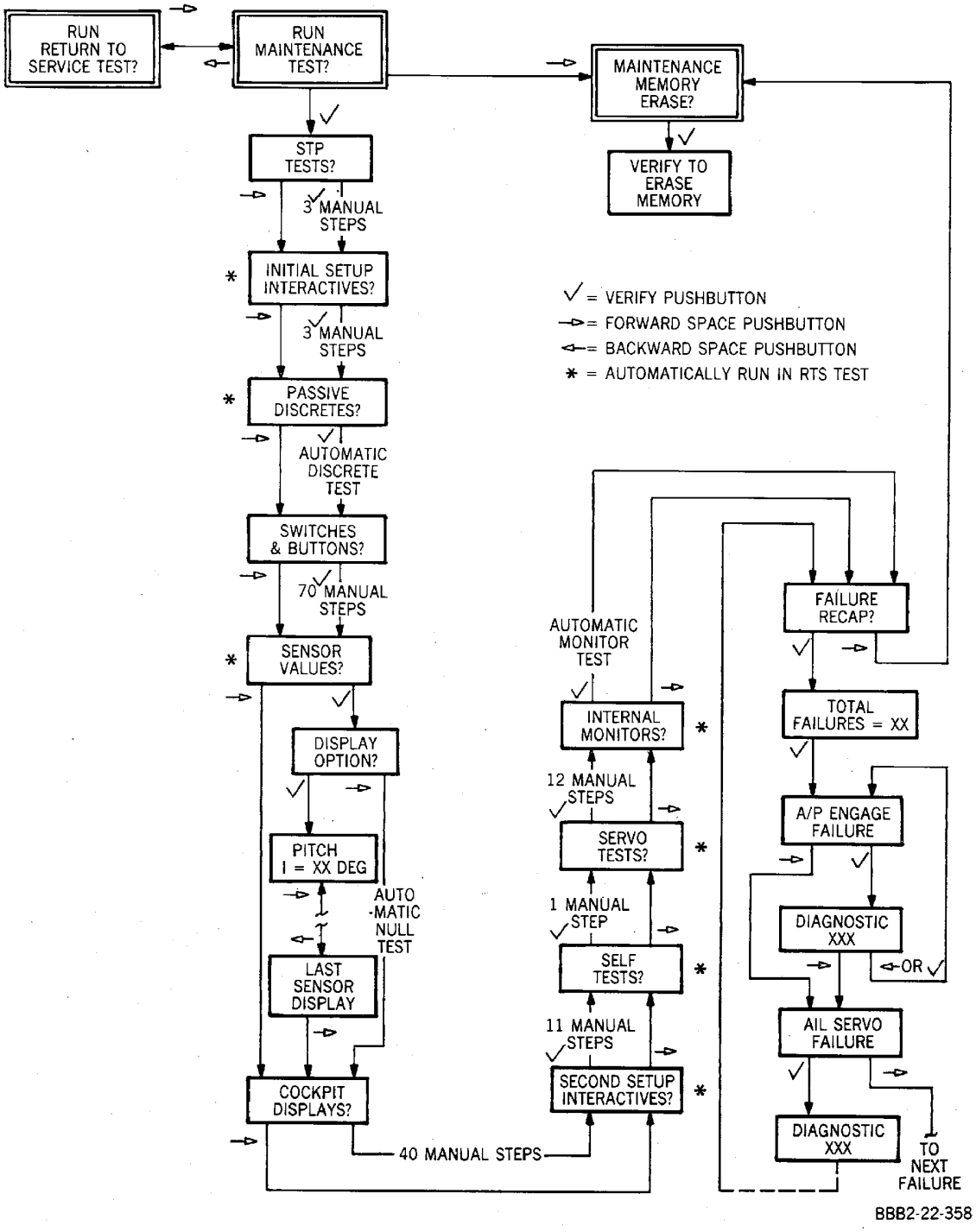
Failure	Diagnostic Number
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT/SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
PMS DATA FAILURE	508*
PMS/FMS DATA FAILURE	508**
WINDSHEAR DATA FAILURE	509***
NOTE: * For customers with PMS. ** For customers with FMS and -970 DFGC and subs. *** For customers equipped with windshear computers.	
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528



Status Test - Flight Fault Review Operation
Figure 202/22-01-05-990-920



STP - Run Return to Service Operation
Figure 203/22-01-05-990-921



STP - Run Maintenance Test Operation
Figure 204/22-01-05-990-922

DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

1. General

A. The DFGS Status/Test (STP) panel is located beneath the captain's briefcase compartment. The STP has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The STP provides the operator with a display of English language commands and questions.

B. BIT provides three modes of testing. Continuous (Flight Fault Review) BIT, Return to Service (RTS) BIT, and System Maintenance BIT. The Autoland Preflight Test is also provided in this section, since a failure during this test can be recalled and displayed on the STP. There is also an IRS/Autoland Inhibit Discrete Test for aircraft equipped with Inertial Reference Systems.

C. A self-test feature of the STP (during System Maintenance BIT) is provided to assure the operator that the STP is functional prior to test initiation. All keys and pushbuttons are checked and appropriate message displays are verified.

D. During System Maintenance BIT, pressing the Forward Space (FSPCE) key on the STP will automatically advance the STP to the next test step. If a complete sequence of tests are to be bypassed, pressing the FSPCE key at the beginning of a test sequence will automatically advance the test to the next test sequence.

E. During System Maintenance BIT, pressing the Back Space (BSPCE) key on the STP will automatically back the test to the previous test step if a failure has occurred. Pressing the BSPCE key twice in succession after a failure will program the test sequence over again.

F. During System Maintenance BIT, if a failure occurs, an English language message ending with the word "FAILURE" will appear. Pressing the VERIFY pushbutton on the STP will cause a diagnostic number to appear, then pressing the VERIFY pushbutton the second time will cause the message to reappear on the STP. If the failure is not corrected at that time, pressing the FSPCE key will log the failure and continue the test. At the conclusion of testing, the message "FAILURE RECAP?" will be displayed. At this time all failures can be recorded for correction. Once the test is exited, failures recorded are automatically erased.

G. During RTS BIT an interruption does not occur if a failure is detected during the test. If a failure is detected, "NO GO - SYSTEM AFFECTED?" will be displayed upon completion of the test. When "NO GO - SYSTEM AFFECTED?" is displayed, pressing the VERIFY pushbutton will display the function(s) that are affected, i.e. NO AUTOLAND, AP/FD, etc. If a system is listed it indicates only that a problem has been detected and not necessarily that the system is inoperative. After the function(s) is displayed, all failures can be recorded for correction. If no failures occur during RTS, GO is displayed.

H. Ten sequences of tests are provided to the STP during System Maintenance Bit. Each sequence has diagnostic numbers that accompanies each failure detected. Portions of the testing requires operator interaction, and portions of the testing are automatic. Any failures that occur during the Maintenance Test will be displayed immediately upon detection.

I. Seven sequences of tests are provided during RTS BIT. The diagnostic numbers and failures are called out at the conclusion of testing during "FAILURE RECAP?"

J. Personnel should be familiar with the functional use of all keys and pushbuttons on the STP prior to performing any tests that require operator interaction. (Figure 201)

WARNING: DURING SYSTEM MAINTENANCE BIT, THE USE OF HYDRAULIC POWER IS REQUIRED. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL, AND CONTROL SURFACE AREAS ARE CLEARED OF ALL PERSONNEL AND EQUIPMENT.

CAUTION: VERIFY METER SEL & HEAT SWITCH, LOCATED ON OVERHEAD PANEL IS IN THE OFF POSITION ANYTIME THE AIRPLANE IS IN THE FLIGHT MODE, (GROUND SENSING CIRCUIT BREAKERS OPENED, OR ON JACKS), TO PREVENT DAMAGE TO AIR DATA OR ANGLE-OF-ATTACK SENSORS.

CAUTION: WHENEVER UNIT(S) AND/OR COCKPIT INSTRUMENT(S) ARE POWERED ON THE GROUND, THE TWO AVIONICS COOLING FANS AND INSTRUMENT COOLING FAN MUST BE OPERATING. IN ADDITION, IF FLIGHT COMPARTMENT AIR TEMPERATURE IS ABOVE 85° F., AIR CONDITIONING SHOULD BE PROVIDED. IF AIR CONDITIONING IS NOT AVAILABLE, FLIGHT COMPARTMENT WINDOWS AND ELECTRICAL/ELECTRONICS ACCESS DOOR MUST BE OPEN TO PREVENT OVERHEAT OF EQUIPMENT.

K. Repeat any failed test step to verify that after maintenance action has been performed and completed, the fault has been cleared.

L. The following table describes flight guidance circuit breakers and how they function and the importance to the operation of the aircraft. It gives the associated problems caused when these breakers fail.

Table 201

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-361	28VAC-L	J1B-12	Loss of power from this breaker, if the aircraft is on the ground, would cause loss of the Flight Guidance Control Panels Altitude window, Both #1 and #2 Flight Director Bars Bias Out of View (if in Takeoff mode). The Mach Trim Fault, Yaw Damper Off and Windshear Inop messages are displayed (AP1 selected).
DFGS-1	B10-351	115VAC-L	J2A-12	Loss of power from this breaker, on the ground will cause the entire Flight Guidance Control Panel and the Nav Control Panel Course window to go blank. The #1 Flight Director Bars Biased Out of View and the #1 Fast/Slow Indicator displayed a Fail Flag. The Mach Trim Fault and Yaw Damper Off messages were displayed (AP1 selected). In addition, #1 Auto- throttles became Inop, and the TRP had a NO MODE light on.
DFGS-1	B10-360	28VAC-R	J4B-12	Loss of power from this circuit breaker caused the NO AUTOLAND light to be displayed, with AP1 selected.
DFGS-1	B10-347	28VDC-R	J2A-1,2	No cockpit indications were present if this circuit breaker is inoperative.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
Yaw Damper-1	B10-345	28VDC-L	J3B-7	With the Yaw Damper Switch in the ON position and AP1 selected, the YAW DAMPER OFF message appeared. No messages were displayed if AP2 was selected.
AP-1	B10-353	28VDC-L	J4B-104 J1B-104 J1A-94 J4A-94	With AP1 selected, the NO AUTOLAND message was displayed.
DFGS-1	B10-349	28VDC-L	J1A-1 J3A-1,2, 3,4	The Flight Guidance Control Panel blanked if breaker power was lost and AP1 selected. In addition, both Nav Panels blanked. The TRP had a NO MODE light on. The #1 Flight Director Bars Bias Out of View and the #1 Slow/Fast Fail flag appeared.
DFGS-2	B10-362	28VAC-R	J4B-12	With the aircraft on the ground and AP2 selected, loss of this circuit breakers' power caused the NO AUTOLAND light to be displayed. In addition, The Flight Guidance Control Panels' Altitude was blank and the #2 Nav Panels CRS numbers were randomly cycling. Both Flight Director Bars Biased Out of View. On the overhead, the Mach Trim Fault and Yaw Damper OFF messages were displayed. #1 and #2 Slow/Fast Indicators became Inop (AP2 was selected).
DFGS-2	B10-352	115VAC-R	J2A-12	With AP2 selected the Flight Guidance Control Panel blanked, the Mach Trim Fault Yaw Damper Off message were displayed Both Nav Panels CRS windows blanked and the TRP had a NO MODE message displayed. Autothrottles were Inop.
DFGS-2	B10-363	28VAC-L	J1B-12	Loss of this breakers' power caused the NO AUTOLAND message to be displayed if AP2 was selected.
DFGS-2	B10-348	28VDC-L	J2A-1,2	There is no cockpit indication that DFGC#2 is not receiving power from this breaker. (On the ground, AP2 selected.)
Yaw Damper-2	B10-346	28VDC-R	J3B-7	With AP2 selected and this breaker not supplying power, the Yaw Damper OFF message was displayed.
AP-2	B10-354	28VDC-R	J4B-104 J1B-104	With AP2 selected the NO AUTOLAND light was displayed.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-2	B10-350	28VDC-L	J1A-94 J1A-1 J3A-1,2, 3,4	With AP2 selected and the aircraft on the ground, the AP TRIM, AP1 and AP2 annunciators on FMA#2 were illuminated. In addition, #2 Fast/Slow was Inop. The TRP had a NO MODE light displayed. On the overhead the Mach Trim Fault, Yaw Damper OFF and Windshear Inop messages displayed.
DFGS AP/AT Warning LTS "A"	B10-341	28VDC Xfer	FMA (J1-A)	With this circuit breaker not supplying power, both FMA'S A/T and AP OFF red warning lights "A" bulb was inop.
DFGS AP/AT Warning LTS "B"	B10-342	28VDC Xfer	FMA (J4A-1)	This circuit breaker supplies basic power for both DFGC's Channel "B" processor. Loss of power from this breaker will cause both #1 and #2 Flight Directors to fail. In addition, the Fast/Slow Indicators failed, the NO AUTOLAND light was displayed, the TRP had a NO MODE light, and the Flight Guidance Control Panels Altitude window went blank. (Breaker power was lost after initial power up.) The Nav Panels' CRS Windows also blanked. Loss of power from this breaker also affects Status Test Panel operation.

2. STP Test Functions

A. Procedures for Testing DFGS

Table 202

Paragraph	Test Function
Paragraph 3.A.	Continuous (Flight Fault Review) BIT
Paragraph 3.B.	Autoland Preflight Test
Paragraph 3.C.	Return to Service (RTS) BIT (DFGS)
Paragraph 3.D.	System Maintenance BIT (Maintenance Test)

B. Digital Flight Guidance System (DFGS) Power-Up Test Prior to STP Test

NOTE: Both Digital Flight Guidance Computers (DFGC's) may fail to come on line and halt STP testing procedures.

(1) When DFGS information is not displayed with side select switch in either position, proceed as follows:

(a) Check 115 VAC power and ground to each DFGC electrical connector (PAGEBLOCK 22-16-00/101).

(b) Check no ground exists at DFGC jack connector pins J2A (36) and J3A (36) (PAGEBLOCK 22-14-00/101). Remove ground(s) when ground(s) exist and check DFGS operation is normal.

NOTE: A ground at the J2A (36) and J3A (36) points represents holding down of the autopilot disconnect (on control wheel) not allowing DFGC to begin internal checks.

(c) Check short to ground is not present at jack connector pins J1 (Z) and J3 (Z) on DFGS control panel (PAGEBLOCK 22-01-03/101). Should a ground exist, isolate ground source and repair.

NOTE: Before incorporation of Service Bulletin 24-67, the auxiliary power unit (APU) generator field wiring can contact air conditioning piping resulting in malfunction of the APU generator and/or Digital Flight Guidance System-1 (DFGS-1). This can occur due to chafing wire.

(2) When partial DFGS displays such as one Flight Mode Annunciator (FMA) indicating HDG HLD, ALT HLD, and opposite FMA blank with both Flight Director (FD) switches on, proceed as follows:

(a) Check 28 VDC is available at jack pins J1A (1 and 60) and J4A (1) on each DFGC electrical connector (PAGEBLOCK 22-17-00/101).

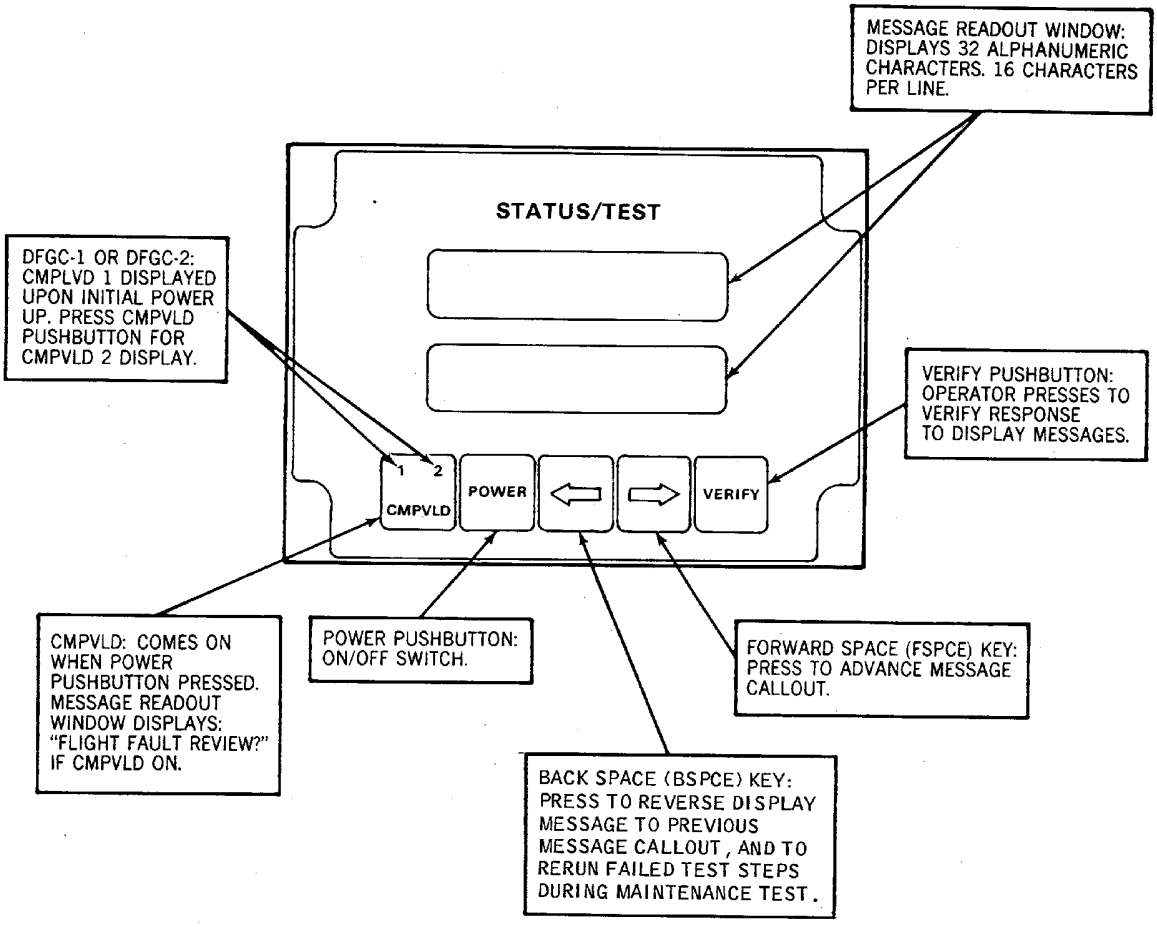
NOTE: This 28 VDC is source power for the "A" and "B" channels of the central processor.

C. On aircraft with Service Bulletin 22-85 (-920 DFGC) incorporated, following steps are necessary for completion of Maintenance and Return to Service testing:

(1) Right Ground Control Relay Sensing circuit breaker must be open to enable completion of Maintenance and Return to Service tests.

(2) During Maintenance Test, if failure message "GROUND SENSOR FAILURE" (diagnostic 124) is logged, test should be repeated with Right Ground Control relay sensing circuit breaker temporarily closed. Remainder of test can be run with Right Ground Control relay sensing circuit breaker open.

(3) During Return to Service test "GO" status may be assumed if only "GROUND SENSOR FAILURE" is logged and no other failures are logged.



Status/Test (STP) Panel
Figure 201/22-01-05-990-908

3. **STP Functional Tests**

A. Continuous (Flight Fault Review) BIT

NOTE: Continuous BIT is an internal monitor mode of the DFGC and is not controlled by the STP. Continuous BIT begins operation as soon as power is applied to the DFGS and operates continuously, even during Autoland Availability Preflight BIT, RTS BIT and System Maintenance BIT. If Continuous BIT recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel. If the autoland mode is affected, the "NO AUTOLAND" annunciator on each FMA will come on and flash to alert the flight crew that the autoland mode of operation is not available.

NOTE: Flight Fault Review Bit is provided from continuous Bit which is an internal monitor mode of the DFGC after airplane liftoff. Continuous Bit begins operation as soon as power is applied to the DFCS and operates continuously. If Continuous Bit recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel as Flight Fault Review Bit.

Table 203

Action	Desired Result
(1) On aircraft with EFIS, ensure DFGC/EFIS select switch is in the DFGC position.	
(1a) Verify DFGS switch is in same position 1, or 2 as used during flight.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
NOTE: If it is desired to interrogate DFGC 2, press and release CMPVLD pushbutton and number 2 will appear.	
(3) Press and release VERIFY pushbutton.	"NO FAULTS" displayed.
NOTE: If a failure has occurred, the number of flights and number of failures will appear. For example, if the airplane had five flights and two failures, the display message would read "5 FLIGHTS 2 FAILURES". Pressing and releasing the VERIFY pushbutton will display the most recent flight, i.e. "FLIGHT 1 1 FAILURE". Pressing and releasing the FSPCE key will display each flight and number of failures recorded for each flight. If zero failures have occurred, "NO FAULTS" will be the message displayed. Proceed to step (8) if "NO FAULTS" is the displayed message.	
(4) Press and release VERIFY pushbutton.	"FLIGHT 1 - XX FAILURE" displayed.
(5) Press and release FSPCE key.	"FLIGHT 2 - XX FAILURE" displayed.
(6) Read and record all flight faults by pressing and releasing VERIFY pushbutton until the message "FLIGHT FAULT REVIEW?" is displayed.	"FLIGHT FAULT REVIEW?" displayed.

Table 203 (Continued)

Action	Desired Result
NOTE: The in-flight logging system of the DFGS provides a feature that allows stored failures (maintenance memory) to be erased. This may be accomplished in one of two ways manually or automatically. MANUALLY: The STP may be used to erase the memory by use of the FSPCE key until the message "MAINTENANCE MEMORY ERASE?" is displayed. Pressing and releasing the VERIFY pushbutton will then display "VERIFY TO ERASE MEMORY?". Pressing and releasing the VERIFY pushbutton will then clear all of the stored failures. AUTOMATICALLY: If the maintenance memory is not period- ically cleared, it will eventually fill up. Each time the DFGC is powered up, the maintenance memory is checked. If the memory store is more than 80%, the DFGC saves the most recent 150 failures and clears the rest. The memory can store approximately 350 failures, thus leaving room for approximately 200 failures. The maintenance memory is dedicated for in-flight failure logging only. These failures are displayed only during "FLIGHT FAULT REVIEW?". This memory is entirely independent of the memory used by the Return To Service Test or the Maintenance Test. Failures logged while performing these tests are erased by exiting the respective test.	
(7) Press and release FSPCE key.	"RUN RETURN TO SERVICE TEST?" displayed.
NOTE: If a Return to Service (RTS) test is desired, press and release VERIFY pushbutton. If an RTS is not desired, proceed to step (8).	
(8) Press and release POWER pushbutton.	STP message display blank.
(9) Place aircraft in normal ground configuration.	No test.
NOTE: If maintenance action has been performed, proceed to either Paragraph 3.C. or Paragraph 3.D. as appropriate.	

B. Autoland Preflight Test

NOTE: The Autoland Availability Preflight BIT provides assurance to the flight crew that the autoland mode of operation is available. Both NAV receivers must be tuned to an identical ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control Panel must be pressed.

Table 204

Action	Desired Result
(1) Verify DFGS switch is placed in position 1, or 2 as appropriate for next flight.	No test.
NOTE: While performing the Autoland Preflight Test, if the Status/Test Panel is activated the Autoland Preflight Test cannot be initiated.	
(2) Tune both VHF/NAV Control panels to an identical ILS frequency.	Both NAV receivers tuned to an identical ILS frequency.
(2a) Set switches as follows:	No test.
(1) Both FD switches to OFF.	
(2) AP engage switch to OFF.	
(3) Overhead FLT DIR switch to NORM.	
NOTE: On later aircraft FLT DIR switch is FD CMD.	
(3) On Flight Guidance Control Panel, press and release AUTO LAND pushbutton.	Associated Flight Mode Annunciators (FMA) on instrument panel displays AUTO LND/PRE/FLT/TEST, and NO AUTOLAND appears flashing.

Table 204 (Continued)

Action	Desired Result
NOTE: On AHRS equipped aircraft, during test, both the ILS R/T's, both radio altimeters, both dual accelerometers self test, the elevator torque limit switches verified both agree for flap configuration, rudder unrestricted switches are tested and NAV receivers self test. AHRS is not checked by DFGC during preflight test. AHRS self test is initiated only so compass systems are set for same headings for test.	
(4) Wait approximately 45 seconds.	Both captain's and first officer's FMA's blank, if FD switches are in OFF position.
NOTE: On AHRS equipped aircraft, during test, all AHRS are tested resulting in headings going to 015 degrees. AHRS BASIC lights come on for 1 minute.	
NOTE: On aircraft equipped with 3 AHRS, AUX AHRS INOP light also comes on for 1 minute.	
(5) Observe both FMA's and verify that the NO AUTOLAND legend goes blank.	NO AUTOLAND legend blank on both FMA's.
NOTE: If the NO AUTOLAND legend remains on the FMA's, either the ILS, radio altimeters, dual accelerometers or Continuous BIT detected a failure that would inhibit the autoland mode of operation. Proceed to Paragraph 3.C. to isolate failure(s).	
NOTE: On AHRS equipped aircraft, at completion of test, NO AUTOLAND light may come on after 17 seconds while compasses resynch to actual heading. AHRS BASIC lights (and AUX AHRS INOP light on aircraft with 3 AHRS) will go off. NO AUTOLAND light may remain on for up to 30 seconds after preflight test while compasses resynch.	
NOTE: For AHRS equipped aircraft, during the autoland preflight test the AHRS system preflight test is conducted. A steady "NO AUTOLAND" message on the FMA's is normal during the AHRS preflight test, and does not indicate a failed test unless it remains on after the AHRS test is complete and the AHRS has returned to the normal mode.	

C. Return to Service (RTS) BIT (DFGS)

NOTE: Refer to NAVIGATION DISPLAYS, SUBJECT 34-22-00, Page 201, for EFIS RTS.

NOTE: Return to Service (RTS) BIT is provided to place the aircraft back into a non-restricted (including autoland) service after maintenance action has been performed (i.e. LRU replacement). The STP is capable of performing ten sequences of tests 0 thru 9 (DFGS STATUS/TEST, SUBJECT 22-01-05, page 201). Sequences 1, 2, 4, 6, 7, 8 and 9 are only performed during RTS. All sequences of tests are performed during System Maintenance BIT. RTS is run completely and failures are displayed at end of test.

NOTE: All switches such as CADC, NAV and Flight Director selector switches should be in the NORM position for the RTS test.

Table 205

Action	Desired Result
(1) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.
(1a) Place flap/slat handle to LAND EXT position.	No test.
(1b) Verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.
(2) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release FSPCE key until "RUN RETURN TO SERVICE TEST?" appears.	"RUN RETURN TO SERVICE TEST?" displayed.

Table 205 (Continued)

Action	Desired Result
(4) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE VERIFY" displayed.
NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.	
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.	
(5) Press and release VERIFY pushbutton.	"TURN ON AUX HYD PUMP VERIFY" displayed.
NOTE: The RTS test requires the aircraft to be in the landing configuration. Hydraulic power is required to properly set the flaps and rudder. Hydraulic power is not required if flaps are at 28 to 40 degrees and the rudder is centered (crosswinds may blow the rudder hardover causing the Rudder Servo test to fail).	
(6) Place HYD PUMPS - AUX and TRANS switches on F/O instrument panel to ON position. Press VERIFY.	"TURN ON RUDDER HYD - VERIFY" displayed.
(7) Turn on rudder hydraulics (on fwd pedestal). Press and release VERIFY pushbutton.	"FLAPS/SLAT TO 28/EXTEND VERIFY" displayed.
(7a) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
(8) Check A/P is disengaged then press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.
(9) Check A/T is disengaged. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.
(10) Disengage Y/D if engaged then press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.
(11) Detune receivers from ILS frequency (if tuned) then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
NOTE: Sequence two "PASSIVE DISCRETES" and sequence four "SENSOR VALUES" are checked automatically. Sequence three and sequence five tests are skipped and are performed during System Maintenance BIT. During the tests, the message "TEST IN PROGRESS" will be displayed.	
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
(12) When step (11) is complete, observe STP.	"ENGAGE A/P - VERIFY" displayed.
(13) Engage A/P then press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.
(14) Engage autothrottle then press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.
(15) Engage yaw damper then press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.
NOTE: Tune receivers to a valid ILS frequency.	

Table 205 (Continued)

Action	Desired Result
(16) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" followed by "RETARD THROTTLES - VERIFY" displayed.
NOTE: Verify both throttle levers are below the minimum authority switches.	
(17) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
SEQUENCE SEVEN - "SELF TESTS"	
NOTE: Sequence seven is an automatic self-test of the NAV receivers, R/A units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion. At end of sequence seven, the STP will display "WHEEL TURNS RWD - VERIFY".	
NOTE: On AHRS equipped aircraft, during test, all AHRS are tested resulting in headings going to 015 degrees. AHRS BASIC lights (and AUX AHRS INOP light on aircraft with 3 AHRS installed) come on for 1 minute.	
SEQUENCE EIGHT - "SERVO TESTS"	
CAUTION: CONTROL WHEEL, COLUMN, PEDALS, STABILIZER, AUTOTHROTTLES, MACH TRIM AND Y/D ACTUATOR WILL MOVE DURING TEST EIGHT.	
NOTE: During this sequence, the operator will check control movement by cyling the verify pushbutton. A failure will be acknowledged by cycling the forward space pushbutton.	
NOTE: Failures as detected by the software will appear in the Failure Recap which can be displayed at the end of "RTS Tests".	
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed. While the servos are in operation, the message will display flashing.	
(18) Check control wheel is stationary and displaced in CW direction from neutral position.	
(19) Press and release VERIFY pushbutton.	Control wheel will move and during this test period, STP displays "TEST IN PROGRESS".
(20) At test completion STP displays new message.	"WHEEL TURNS LWD - VERIFY" is displayed.
(21) Check control wheel is stationary and displaced in CCW direction from neutral postion. Press and release VERIFY pushbutton.	Control column will move to neutral position. STP displays "TEST IN PROGRESS".
(22) At test completion STP displays new message.	"COLUMN MOVES FWD - VERIFY" is displayed.
(23) Check control column is stationary and forward of neutral position. Press and release VERIFY pushbutton.	Control column will move. STP displays "TEST IN PROGRESS".
(24) At test completion STP displays new message.	"COLUMN MOVES AFT - VERIFY" is displayed.
(25) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position and right rudder pedal will move forward. STP displays "TEST IN PROGRESS".
(26) At test completion STP displays new message.	"RHT PEDAL MOVES FWD VERIFY" is displayed.
(27) Check right rudder pedal moved forward. Press and release VERIFY pushbutton.	Left rudder pedal will move forward. STP displays "TEST IN PROGRESS".

Table 205 (Continued)

Action	Desired Result
(28) At test completion STP displays new message.	"LEFT PEDAL MOVES FWD VERIFY" is displayed.
(28a) Check left rudder pedal moves forward. Press and release VERIFY pushbutton.	During this test STP displays "TEST IN PROGRESS".
NOTE: Part of sequence eight and all of sequence nine test are done automatically.	
(28b) At test completion STP displays new message.	"FLAP/SLAT TO 0 RETRACT VERIFY" is displayed.
(28c) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"GO OR NO-GO SYSTEM AFFECTED" is displayed.
SEQUENCE NINE - "INTERNAL MONITORS"	
NOTE: Sequence nine is an automatic check of the real time internal monitors appropriate to ground testing. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of the test either "GO" or "NO GO - SYSTEM AFFECTED?" will be displayed.	
NOTE: If "GO" is displayed, proceed to step (33) to conclude testing. If "NO GO - SYSTEM AFFECTED?" is displayed, proceed to step (29).	
(29) Press and release VERIFY pushbutton.	One or more of the following faults may appear if a problem is detected in the system. "DFGC" "NO AUTOLAND" "AP/FD" "A/T" "S/C" "ART" "TRC" "M/T" "Y/D"
(30) Press and release FSPCE key.	"FAILURE RECAP?" displayed.
(31) Press and release VERIFY pushbutton.	The number of faults will be displayed momentarily (approx. 3 seconds), then the STP will momentarily flash VERIFY = DIAG NUM FWD = NEXT FAILURE and the first fault will be displayed.
(32) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" is displayed.	"FAILURE RECAP?" displayed.
NOTE: While failure is displayed, pressing VERIFY will display associated diagnostic number.	
(33) Press and release POWER pushbutton.	STP message display blank.
NOTE: Autothrottle and Autopilot will automatically disengage if the STP is turned off.	
(34) Hold control wheel (if wheel or column is displaced) and disengage autopilot. Press and release either AP disconnect switch.	Autopilot disengaged, AP red off warning lights on until either AP disconnect switch pressed.
(35) Disengage yaw damper. Place YAW DAMP switch to OFF at right of overhead panel.	Yaw damper disengaged.
(36) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.

Table 205 (Continued)

Action	Desired Result
(37) Place aircraft in normal ground configuration.	No test.

NOTE: Following is a list of failures and diagnostic numbers that may appear if a RTS "NO GO - SYSTEM AFFECTED?" message appears.

Table 206

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: On aircraft with -930 and subsequent DFGC, VERT GYRO is ATT.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31

Table 206 (Continued)

Failure	Diagnostic Number
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188

Table 206 (Continued)

Failure	Diagnostic Number
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP POS FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314

Table 206 (Continued)

Failure	Diagnostic Number
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQ SWITCH 1 FAILURE	332
ELEV MECH TORQ SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
ELEV MECH TORQ SWITCH 1 FAILURE	346
ELEV MECH TORQ SWITCH 2 FAILURE	347

Table 206 (Continued)

Failure	Diagnostic Number
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378

Table 206 (Continued)

Failure	Diagnostic Number
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413

Table 206 (Continued)

Failure	Diagnostic Number
ELV SERVO FAILURE	414
NOTE: * An inoperative torque limit rheostat may prevent A/P engagement and cause an "AIL SERVO FAILURE" message to be logged if flaps are less than 26 degrees. With flaps greater than 26 degrees the torque limit rheostat will not prevent A/P engagement. Place flaps greater than 26 degrees to verify.	
NOTE: With Service Bulletin 22-111 incorporated and the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per aircraft KCN (K1123) Service Bulletin, the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442

Table 206 (Continued)

Failure	Diagnostic Number
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR FAILURE	461
CADC -N ALT BCR FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474

Table 206 (Continued)

Failure	Diagnostic Number
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507

Table 206 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528

D. System Maintenance BIT (Maintenance Test)

NOTE: System Maintenance BIT is a command response type test requiring operator interaction. All sequences can be tested by use of system Maintenance BIT. Hydraulic power is required during the use of this test only if the Flap/Slat tests and/or the rudder test is to be run. Failures detected during the Maintenance Test will be displayed immediately.

NOTE: Put RAM AIR TEMP & PROBE HEATER circuit breaker in lower electrical power center CPB (B1-62) Z29 to on when required.

Table 207

Action	Desired Result	Diagnostic Number
(1) On FGCP verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.	
NOTE: Each sequence of tests is called out during the test procedure. If a sequence or test step is to be bypassed, press and release the FSPCE key. Pressing the FSPCE key at the beginning of a sequence will automatically program the STP to the next sequence of tests. Pressing the FSPCE key during a test step or failed test-step will program the STP to the next test step. The FSPCE key may also be used for fast slew capabilities between test sequence steps. To repeat a failed-test step, press and release the BSPCE key. Pressing the BSPCE key twice in succession will program the test to the beginning of the test sequence if a test step failed.		
(2) Deleted.		
NOTE: If the main gear is not compressed then install main gear proximity switch target inhibitors on left and right weight-on-wheel sensors to place the DFGC system in the ground mode.		
(3) On STP press and release POWER pushbutton.	CMPVLD light on and number 1 appears. "FLIGHT FAULT REVIEW?" displayed.	
(4) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed.	"RUN MAINTENANCE TEST?" displayed.	
NOTE: Pressing VERIFY pushbutton after step (4) results in either "MD-87 OPTION VERIFY" or "MD-80 OPTION VERIFY" being displayed before step (4a) for MD-80 or MD-87 aircraft. On other aircraft pressing VERIFY pushbutton results in "SEL DFGC TEST SIDE - VERIFY" being displayed as in next step.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(4a) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	
NOTE: If DFGC switch is in position 2, press and release CMPVLD pushbutton and number 2 will appear.		
(5) Press and release VERIFY pushbutton.	"STP TESTS?" displayed.	
NOTE: During System Maintenance BIT, the FMA associated with the DFGS switch, (i.e., DFGS in position 1 corresponds to captain's FMA), will display in ATS window RTS/MNT, and in pitch window TEST, while the test is being performed.		
SEQUENCE ZERO - "STP TESTS"		
(6) Press and release VERIFY pushbutton.	"CYCLE STP FWDSPACE PB" displayed.	1
(7) Press and release FSPCE key.	"CYCLE STP BACKSPACE PB" displayed.	2
(8) Press and release BSPCE key.	"STP SEGMENTS TEST - VERIFY" displayed.	3
(9) Press and release VERIFY pushbutton.	STAR bursts displayed.	
NOTE: The STP will display ALL STAR bursts for ten seconds. (Aircraft using the MCDU for an STP will display ALL diamonds.)		
NOTE: In order to increase the life of the message display lamps, the program only allows 10 seconds before resetting segments and reissuing the original dis play message. If segments are not to be checked, press and release FSPCE key. If FSPCE key is pressed while segments are displayed, a failure will be logged.		
(9a) After ten seconds are over see display.	"STP SEGMENT TEST - VERIFY" will be displayed.	
(10) Press and release FSPCE key.	"INITIAL SETUP INTERACTIVES?" displayed.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"		
(11) Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.	4 5 6 7 8 9 10 11
(12) Verify autopilot switch placed off. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE OFF - VERIFY" displayed.	12

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(13) On captain's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE OFF - VERIFY" displayed.	13
(14) On first officer's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.	14 15
(15) Verify AUTO THROT switch placed OFF. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.	16
(16) On overhead panel verify YAW DAMP switch placed OFF. Press and release VERIFY pushbutton.	"YAW DAMP OFF LITE ON - VERIFY" displayed.	17
(17) On overhead annunciator panel verify YAW DAMP OFF light is on. Press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.	18 19
(18) Verify that both NAV control panels are not tuned to an ILS frequency. Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.	20 21
(18a) "TEST IN PROGRESS" will display for approximately 5 seconds.	When test successful STP displays "ADVANCE THROTTLE VERIFY".	
(19) Advance throttle levers to mid range. Press and release VERIFY pushbutton.	"PASSIVE DISCRETES?" displayed.	
SEQUENCE TWO - "PASSIVE DISCRETES"		
NOTE: Sequence two is checked automatically. If a fault is recognized, the testing sequence will stop and the failure message will appear. Cycling VERIFY pushbutton provides diagnostic number for the failure. Press and release FSPCE key to initiate testing again.		
(20) Press and release VERIFY pushbutton. Wait approximately (.25) seconds.	"TRC OPTION PIN ABCD = XXXX VERIFY".	51
(20a) Upon completion of automatic testing, STP will display status of engine option pins for Thrust Rating.	TRC OPTION PIN ABCDE = XXXXX VERIFY displays.	51
NOTE: These option pins will be different for the type engine used as follows: -209 engine ABCDE = -GGG-, ABCD = -GGG- -217A/-217C engine ABCDE = --G--, ABCD = --G- -217 engine ABCDE = GG-G-, ABCD = GG-G -219 engine ABCDE = -GG-G		
NOTE: G = GROUND, - = OPEN. Reference Trouble Shooting section, Sequence Two - "PASSIVE DISCRETES" Diagnostic Number 51.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(20b) Press and release VERIFY pushbutton.	Once all failures have been sequenced, STP will display "SWITCHES AND BUTTONS"	
SEQUENCE THREE - "SWITCHES AND BUTTONS"		
NOTE: Aircraft with -930 and subsequent DFGC, VG is ATT.		
NOTE: On aircraft with dual attitude systems, steps (21) through (24) do not apply.		
(21) Press and release VERIFY pushbutton.	"VG SW UNIT CAPT ON AUX - VERIFY" displayed.	73 74 75 76
(22) On overhead panel place AHRS or VERT GYRO switch to L ON AUX. Press and release VERIFY pushbutton.	"VG SW UNIT F/O ON AUX - VERIFY" displayed.	77 78 79
(23) Place AHRS or VERT GYRO switch to R ON AUX. Press and release VERIFY pushbutton.	"VG SW UNIT ON NORMAL - VERIFY" displayed.	81 82 83 84
(24) Place AHRS or VERT GYRO switch to NORM position. Press and release VERIFY pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	90
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 48 DEGREES - VERIFY" displayed.	93 94 95 96 97 98 99 100

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(28) Above center instrument panel adjust ASSUMED TEMP indicator to 48 degrees. Press and release VERIFY pushbutton.	"TEMP SELECT 37 DEGREES - VERIFY" displayed.	101 102 103 104 105 106 107 108
NOTE: On aircraft with Thrust Rating Panel (TRP), press T/O FLX pushbutton on TRP. ASSUMED TEMP will be displayed in offside FMA window. Set ASSUMED TEMP knob on TRP to 48°C. Press and release VERIFY pushbutton.		
(29) Adjust ASSUMED TEMP to 37 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
(30) On Thrust Rating Indicator press and release T.O. pushbutton. Press and release VERIFY pushbutton.	"TR MODE T/O FLX - VERIFY" displayed.	110
NOTE: Steps applying to the TRI are only checking the buttons and their lights. Thrust Rating Mode is not checked during this step but is checked continuously by the DFGC.		
(31) Press and release T.O. FLX pushbutton. Press and release VERIFY pushbutton.	"TR MODE GA - VERIFY" displayed.	111
(32) Press and release GA pushbutton. Press and release VERIFY pushbutton.	"TR MODE MCT - VERIFY" displayed.	112
(33) Press and release MCT pushbutton. Press and release VERIFY pushbutton.	"TR MODE CL - VERIFY" displayed.	113
(34) Press and release CL pushbutton. Press and release VERIFY pushbutton.	"TR MODE CR - VERIFY" displayed.	114
(35) Press and release CR pushbutton. Press and release VERIFY pushbutton.	"CYCLE TO/GA SWITCH 1" displayed.	117
(36) On throttle lever press and release left TO/GA switch.	"CYCLE TO/GA SWITCH 2" displayed.	118
(37) Press and release right TO/GA switch.	"CYCLE A/P 1 DISCONNECT" displayed.	119
(38) Press and release captain's control wheel AP disconnect switch.	"CYCLE A/P 2 DISCONNECT" displayed.	120
(39) Press and release first officer's control wheel AP disconnect switch.	"CYCLE CAPT FMA RESET PB" displayed.	121
(40) Press and release RESET button on captain's FMA.	"CYCLE F/O FMA RESET PB" displayed.	122
(41) Press and release RESET button on first officer's FMA.	"PULL GND SENS BRKRS - VERIFY" displayed.	123 124

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: If testing of the Bleed Inputs (steps (42) through (58)) is not desired, leave GND SENS BRKRS closed and cycle FSPCE key. Pressing the FSPCE key will skip the above mentioned tests and resume on step (59).		
(42) On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and RIGHT circuit breakers. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED OPEN - VERIFY" displayed.	125
NOTE: When pneumatic switches are opened, PNEU X FEED VALVE OPEN is displayed adjacent to the left and right pneumatic X-FEED lever.		
(43) On pedestal, place left pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	126
(44) On overhead panel, place AIR FOIL L SYS switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
(45) On overhead panel, place AIR FOIL L SYS switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
(46) On pedestal, close left pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED OPEN - VERIFY" displayed.	129
(47) On pedestal, place right pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	130
(48) On overhead panel, place AIR FOIL R SYS switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	131
(49) On overhead panel, place ICE PROTECT AIR FOIL R SYS switch OFF. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132
(50) On pedestal, close right pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW ON - VERIFY" displayed.	133
NOTE: Open TAIL DE-ICE TIMER circuit breaker, or a failure may be logged due to a 2.5 minute timer.		
(44) On overhead panel, place AIR FOIL switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
(45) On overhead panel, place AIR FOIL switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
(46) On pedestal, close left pneumatic switch. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED OPEN - VERIFY" displayed.	129

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(47) On pedestal, place right pneumatic switch to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	130
(48) On overhead panel, place AIR FOIL switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	131
(49) On overhead panel, place ICE PROTECT AIR FOIL switch OFF. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132
NOTE: Close TAIL DE-ICE TIMER circuit breaker.		
(50) On pedestal, close right pneumatic switch. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW ON - VERIFY" displayed.	133
(51) On overhead panel place ICE PROTECT ENG L switch ON. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW OFF - VERIFY" displayed.	134
(52) Place ICE PROTECT ENG L switch OFF. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW ON - VERIFY" displayed.	135
(53) Place ICE PROTECT ENG R switch ON. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW OFF - VERIFY" displayed.	136
(54) Place ICE PROTECT ENG R switch OFF. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW AUTO - VERIFY" displayed.	137
(55) On overhead panel place left AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW OFF - VERIFY" displayed.	138
(56) Place left AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW AUTO - VERIFY" displayed.	139
(57) Place right AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW OFF - VERIFY" displayed.	140
(58) Place right AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"CLOSE GND SENS BRKRS - VERIFY" displayed.	141 142
(59) On upper EPC close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers.	"SEL DFGC NON-TST SIDE - VERIFY" displayed.	143
(60) On FGCP place DFGS 1, 2, switch to opposite position. Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	144

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(61) Place DFGS switch back to test side indicated by illuminated "1" or "2" legend of STP CMPVLD pushbutton. Press and release VERIFY pushbutton.	"CYCLE BACKCOURSE PB" displayed.	145
NOTE: The following test sequences verify that the pushbuttons and knobs on the FGCP will make and break contact. If the STP does not cycle to the next test, then the cycling was not detected by the DFGC. Pressing and releasing the VERIFY pushbutton will advise the DFGC of the failure. Pressing and releasing the FSPCE key will advance the STP to the next display message.		
NOTE: The ILS or autoland modes are not being tested during this sequence. Only the switch operation is checked.		
(61a) Press and release NAV pushbutton.	"CYCLE SPEED SELECT PB" displayed.	146
NOTE: If NAV pushbutton is not available, press and release FSPCE key.		
(62) Press and release SPD SEL pushbutton.	"CYCLE MACH SELECT PB" displayed.	147
(63) Press and release MACH SEL pushbutton.	"CYCLE EPR LIMIT PB" displayed.	148
(64) Press and release EPR LIM pushbutton.	"CYCLE NAV PB" displayed.	149
(64a) Press and release NAV pushbutton. If NAV not installed, press and release FSPCE key.	"CYCLE VOR/LOC PB" displayed.	150
(65) Press and release VOR/LOC pushbutton.	"CYCLE ILS PB" displayed.	151
(66) Press and release ILS pushbutton.	"CYCLE AUTOLAND PB" displayed.	152
(67) Press and release AUTO LAND pushbutton.	"CYCLE VERT SPD PB" displayed.	153
(68) Press and release VERT SPD pushbutton.	"CYCLE IAS/MACH PB" displayed.	154
(69) Press and release IAS/MACH pushbutton.	"CYCLE PERF PB" displayed.	155
(70) Press and release PERF pushbutton.	"CYCLE ALT HOLD PB" displayed.	156
(71) Press and release ALT HOLD pushbutton.	"CYCLE TURB PB" displayed.	157
(72) Press and release TURB pushbutton.	"CYCLE SPEED KNOB (2ND DET IN)" displayed.	159
(73) Push SPD MACH knob full in and release.	"CYCLE HDG KNOB (OUT)" displayed.	160
(74) Pull H knob full out and release.	"CYCLE HDG KNOB (2ND DET IN)" displayed.	161
(75) Push H knob full in and release.	"CYCLE ALT KNOB (OUT)" displayed.	162

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(76) Pull ALT knob full out and release.	"CYCLE ALT KNOB (IN)" displayed.	163
(77) Push ALT knob full in and release.	"BANK LIMIT 15 DEGREES - VERIFY" displayed.	164
(78) Rotate outer heading knob to 15 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 20 DEGREES - VERIFY" displayed.	165
(79) Rotate to 20 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 25 DEGREES - VERIFY" displayed.	166
(80) Rotate to 25 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 30 DEGREES - VERIFY" displayed.	167
(81) Rotate to 30 degrees. Press and release VERIFY pushbutton.	"SPEED REF OPER - VERIFY" displayed.	168
(82) Rotate SPD MACH knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"HEADING REF OPER - VERIFY" displayed.	169
(83) Rotate H knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"VERT SPD REF OPER - VERIFY" displayed.	174
(84) Rotate pitch wheel full ANU and AND. Press and release VERIFY pushbutton.	"ALT REF OPER - VERIFY" displayed.	175
(85) Rotate ALT knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-1 REF OPER - VERIFY" displayed.	176
(86) Rotate captain's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-2 REF OPER - VERIFY" displayed.	177
(87) Rotate first officer's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"SENSOR VALUES?" displayed.	
NOTE: The DFGC is not testing the knobs in steps (82) through (87). They are prompter messages to have mechanic be sure knob turns freely and digital displays change.		
SEQUENCE FOUR - "SENSOR VALUES"		
(88) Press and release VERIFY pushbutton.	"DISPLAY OPTION?" displayed.	

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: There are three testing options available when the message "DISPLAY OPTION " appears. FIRST: Pressing and releasing the FSPCE key will automatically null check the sensor values. The values are compared to a ground reference tolerance, and if out of tolerance a fault message will be displayed. SECOND: Pressing and releasing the VERIFY pushbutton will display the first sensor value. The FSPCE and BSPCE keys can be used at this time for slew capability. Failures are not recognized when this option is selected. THIRD: After pressing and releasing FSPCE key the automatic slewing of measurements occurs until the STP displays "COCKPIT DISPLAYS".		
(89) Press and release VERIFY pushbutton for display option, or FSPCE key.	"PITCH ANGLE 1 = XX.XX DEGREES" displayed.	180
(90) Press and release FSPCE key.	"PITCH ANGLE 2 = XX.XX DEGREES" displayed.	181
(91) Press and release FSPCE key.	"PITCH ANGLE 3 = XX.XX DEGREES" displayed.	182
NOTE: Applicable to aircraft with three attitude reference systems.		
(92) Press and release FSPCE key.	"BANK ANGLE 1 = XX.XX DEGREES" displayed.	183
(93) Press and release FSPCE key.	"BANK ANGLE 2 = XX.XX DEGREES" displayed.	184
(94) Press and release FSPCE key.	"BANK ANGLE 3 = XX.XX DEGREES" displayed.	185
(95) Press and release FSPCE key.	"SPOILER POS 1 = (TED or TEU) XX.XX DEG" displayed.	186
(96) Press and release FSPCE key.	"SPOILER POS 2 = (TED or TEU) XX.XX DEG" displayed.	187
(97) Press and release FSPCE key.	"CRS RAD ALT 1 = XXXX. FEET" displayed.	188
(98) Press and release FSPCE key.	"CRS RAD ALT 2 = XXXX. FEET" displayed.	189
(99) Press and release FSPCE key.	"FINE RAD ALT 1 = XXXX. FEET" displayed.	190
(100) Press and release FSPCE key.	"FINE RAD ALT 2 = XXXX. FEET" displayed.	191
(101) Press and release FSPCE key.	"ELEV SYNC A = XX.XX DEGREES" displayed.	192
(102) Press and release FSPCE key.	"ELEV SYNC B = XX.XX DEGREES" displayed.	193
(103) Press and release FSPCE key.	"AIL SYNC A = XX.XX DEGREES" displayed.	194
(104) Press and release FSPCE key.	"AIL SYNC B = XX.XX DEGREES" displayed.	195
(105) Press and release FSPCE key.	"RUD SYNC A = XX.XX DEGREES" displayed.	196

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(106) Press and release FSPCE key.	"RUD SYNC B = XX.XX DEGREES" displayed.	197
(107) Press and release FSPCE key.	"YAW DAMP POS = XX.XX DEGREES" displayed.	198
(108) Press and release FSPCE key.	"MACH TRIM POS = XX.XX INCH" displayed.	199
(109) Press and release FSPCE key.	"ELEV TACH A = XX.XX DEG/SEC" displayed.	200
(110) Press and release FSPCE key.	"ELEV TACH B = XX.XX DEG/SEC" displayed.	201
(111) Press and release FSPCE key.	"AIL TACH A = XX.XX DEG/SEC" displayed.	202
(112) Press and release FSPCE key.	"AIL TACH B = XX.XX DEG/SEC" displayed.	203
(113) Press and release FSPCE key.	"RUD TACH A = XX.XX DEG/SEC" displayed.	204
(114) Press and release FSPCE key.	"RUD TACH B = XX.XX DEG/SEC" displayed.	205
(115) Press and release FSPCE key.	"A/T TACH = XX.XX DEG/SEC" displayed.	206
(116) Press and release FSPCE key.	"MACH TRIM TACH = XX.XX DEG/SEC" displayed.	207
(117) Press and release FSPCE key.	"YAW DAMP TACH = XX.XX DEG/SEC" displayed.	208
(118) Press and release FSPCE key.	"D3A-X ACCEL A = XX.XX FT/SEC*2" displayed.	209
(119) Press and release FSPCE key.	"D3A-X ACCEL B = XX.XX FT/SEC*2" displayed.	210
(120) Press and release FSPCE key.	"D3A-Y ACCEL A = XX.XX FT/SEC*2" displayed.	211
(121) Press and release FSPCE key.	"D3A Y ACCEL B = XX.XX FT/SEC*2" displayed.	212
(122) Press and release FSPCE key.	"D3A-Z ACCEL A = XX.XX FT/SEC*2" displayed.	213
(123) Press and release FSPCE key.	"D3A-Z ACCEL B = XX.XX FT/SEC*2" displayed.	214
(124) Press and release FSPCE key.	"DLA-Y ACCEL A = XX.XX FT/SEC*2" displayed.	215
(125) Press and release FSPCE key.	"DLA-Y ACCEL B = XX.XX FT/SEC*2" displayed.	216

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(126) Press and release FSPCE key.	"G/S DEV A = X.XXX DEGREES" displayed.	217
(127) Press and release FSPCE key.	"G/S DEV B = X.XXX DEGREES" displayed.	218
(128) Press and release FSPCE key.	"VOR/LOC DEV A = X.XXX DEGREES" displayed.	219
(129) Press and release FSPCE key.	"VOR/LOC DEV B = X.XXX DEGREES" displayed.	220
(130) Press and release FSPCE key.	"LEFT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	221
(131) Press and release FSPCE key.	"RIGHT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	222
(132) Press and release FSPCE key.	"LEFT AILERON = (TEU or TED) XX.XX DEG" displayed.	223
(133) Press and release FSPCE key.	"RUDDER POS = (TEL or TER) XX.XX DEG" displayed.	224
(134) Press and release FSPCE key.	"HOR STAB = (TEU or TED) XX.XX DEG" displayed.	225
(135) Press and release FSPCE key.	"ANGLE OF ATT 1 = XX.XX DEGREES" displayed.	226
(136) Press and release FSPCE key.	"ANGLE OF ATT 2 = XX.XX DEGREES" displayed.	227
(137) Press and release FSPCE key.	"EPR LEFT = XX.XX EPR" displayed.	228
(138) Press and release FSPCE key.	"EPR RIGHT = XX.XX EPR" displayed.	229
(139) Press and release FSPCE key.	"HEADING 1 = XX.XX DEGREES" displayed.	230
(140) Press and release FSPCE key.	"HEADING 2 = XX.XX DEGREES" displayed.	231
(141) Press and release FSPCE key.	"LEFT FLAPS POS = XX.XX DEGREES displayed.	232
(142) Press and release FSPCE key.	"RIGHT FLAP POS = XX.XX DEGREES" displayed.	233
(143) Press and release FSPCE key.	"FLAP HANDLE = XX.XX DEGREES" displayed.	234
NOTE: During CADC test, the letter T is displayed for CADC on test side and the letter N is for CADC on non test side.		
(144) Press and release FSPCE key.	"CADC-T ALT NCR = XXXX. FEET" displayed.	235
(145) Press and release FSPCE key.	"CADC-N ALT NCR = XXXX. FEET" displayed.	236

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(146) Press and release FSPCE key.	"CADC-T TAT = XX.XX DEGREES" displayed.	237
(147) Press and release FSPCE key.	"CADC-N TAT = XX.XX DEGREES" displayed.	238
(148) Press and release FSPCE key.	"CADC-T ALT RATE = XX.XX FT/SEC" displayed.	239
(149) Press and release FSPCE key.	"CADC-N ALT RATE = XX.XX FT/SEC" displayed.	240
(150) Press and release FSPCE key.	"CADC-T SAT = XX.XX DEGREES" displayed.	241
(151) Press and release FSPCE key.	"CADC-N SAT = XX.XX DEGREES" displayed.	242
(152) Press and release FSPCE key.	"CADC-T CAS = XXX.X FT/SEC" displayed.	243
(153) Press and release FSPCE key.	"CADC-N CAS = XXX.X FT/SEC" displayed.	244
(154) Press and release FSPCE key.	"CADC-T MACH = X.XXXX FT/SEC" displayed.	245
(155) Press and release FSPCE key.	"CADC-N MACH = X.XXXX FT/SEC" displayed.	246
(156) Press and release FSPCE key.	"COCKPIT DISPLAYS?" displayed.	
SEQUENCE FIVE - "COCKPIT DISPLAYS"		
(156a) Place both FD switches to ON.		
NOTE: "ART switch must be in the AUTO position prior to running this sequence."		
(157) Press and release VERIFY pushbutton.	"ART INOP LITE - VERIFY" displayed.	250
(158) On overhead annunciator panel verify ART INOP light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 1 - VERIFY" displayed.	251
(159) On captain's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 2 - VERIFY" displayed.	252
(160) On first officer's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT SELECT APPR - VERIFY" displayed.	253
(161) Verify aural warning sounds. Press and release VERIFY pushbutton.	"ALT SELECT DEV - VERIFY" displayed.	254
(162) Verify aural warning sounds. Press and release VERIFY pushbutton.	"TR EPR VALID - VERIFY" displayed.	255

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(163) On center instrument panel EPR flag out of view. If electronic engine display panel is installed, EPR limit is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR indicator/panel.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - VERIFY" displayed.	258
NOTE: The following steps (166) through (169) verify that the AUTOLAND and AP TRIM legends on each FMA have two operable bulbs. The "A" light refers to left light bulb and the "B" light refers to right light bulb.		
(166) Verify READY light on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE A VERIFY" displayed.	259
(167) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE B VERIFY" displayed.	260
(168) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE A - VERIFY" displayed.	261
(169) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE B - VERIFY" displayed.	262
(170) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"VERT SPD DETENT - VERIFY" displayed.	263
(171) On FGCP verify pitch wheel detent (cycle) position. Press and release VERIFY pushbutton.	"IAS BUG 1 250 KIAS - VERIFY" displayed.	264
(172) On captain's Mach/ Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"IAS BUS 2 250 KIAS - VERIFY" displayed.	265
(173) On first officer's Mach/Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"EPR BUG LEFT 1.8 EPR - VERIFY" displayed.	266
NOTE: Care must be taken to be sure EPR bug manual set knobs on EPR indicators are in automatic (IN) position.		
(174) On center instrument panel verify left EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR BUG RIGHT 1.8 - VERIFY" displayed.	267

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(175) Verify right EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR LIMIT CMD 1.8 EPR - VERIFY" displayed.	268
(176) On thrust rating indi- cator/EEDP verify EPR LIM reads 1.80(±0.014). Press and release VERIFY pushbutton.	"F/D CMD SW to TEST SIDE - VERIFY" displayed.	269
(176A) On overhead panel, set FD CMD switch to side under test. Press and release VERIFY pushbutton.	"CAPT F/D SW ON VERIFY" displayed.	
NOTE: Side under test corresponds to CMP VLD light number on STP.		
(177) On FGCP, place captain's FD switch to FD position. Press and release VERIFY pushbutton.	"CAPT F/D LITE ON - VERIFY" displayed.	270
(178) On captain's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"CAPT PITCH F/D CENTER - VERIFY" displayed.	271
NOTE: Captain's F/D light has been deactivated.		
(179) On captain's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"CAPT PITCH F/D NOSE UP - VERIFY" displayed.	272
(180) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"CAPT ROLL F/D CENTER - VERIFY" displayed.	273
(181) Verify roll command centered. Press and release VERIFY pushbutton.	"CAPT ROLL F/D RIGHT - VERIFY" displayed.	274
(182) Verify roll command moves right. Press and release VERIFY pushbutton.	"CAPT F/D SW OFF - VERIFY displayed.	275
(183) On FGCP, place captain's FD switch to OFF position. Press and release VERIFY pushbutton.	"F/O F/D SW ON - VERIFY" displayed.	276
(184) On FGCP, place F/O's FD switch to FD position. Press and release VERIFY pushbutton.	"F/O F/D LITE ON - VERIFY" displayed.	277
(185) On F/O's FMA, verify blue FD light is flash- ing. Press and release VERIFY pushbutton.	"F/O PITCH F/D CENTER - VERIFY" displayed.	278
NOTE: First Officer's F/D light has been deactivated.		
(186) On first officer's ADI/PFD verify pitch command centered. Press and release VERIFY pushbutton.	"F/O PITCH F/D NOSE UP - VERIFY" displayed.	279
(187) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"F/O ROLL F/D CENTER - VERIFY" displayed.	280

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(188) Verify roll command centered. Press and release VERIFY pushbutton.	"F/O ROLL F/D RIGHT - VERIFY" displayed.	281
(189) Verify roll command moves right. Press and release VERIFY pushbutton.	"F/O F/D SW OFF - VERIFY" displayed.	282
(190) On FGCP, place F/O's FD switch to OFF position. Press and release VERIFY pushbutton.	"FAST/SLOW 1 VALID - VERIFY" displayed.	283
(191) On captain's ADI/PFD verify SPD flag in and out of view and slow- fast pointer in and out of view. Press and release VERIFY pushbutton.	"FAST/SLOW 2 VALID - VERIFY" displayed.	284
(192) On first officer's ADI/PFD verify SPD flag in and out of view and slow-fast pointer in and out of view. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS CENTER - VERIFY" displayed.	285
(193) On captain's and first officer's ADI's/PFD's verify fast-slow pointers centered. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS UP - VERIFY" displayed.	286
(194) Verify both fast-slow pointers move to the fast side. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS DOWN - VERIFY" displayed.	287
(195) Verify both fast-slow pointers move to the slow side. Press and release VERIFY pushbutton.	"FMA SEGMENTS TEST - VERIFY" displayed, then "FMA SEGMENTS ON - VERIFY" displayed.	288
(196) On captain's and first officer's FMA's verify all alpha-numeric characters display as a STARBURST for approxi- mately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"FGCP/NCP SGMENTS TEST - VERIFY" displayed, then "FGCP/NCP SGMENTS ON - VERIFY" displayed.	289
(197) On FGCP and NAV Control panels verify all numerical seven- segment digits are displayed for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"SECOND SETUP INTERACTIVES?" displayed.	
NOTE: After completion of sequence five, place FD CMD switch on overhead panel back to NORM position.		
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"		
(198) Press and release VERIFY pushbutton.	"ENGAGE A/P - VERIFY" displayed.	312 through 319
(199) On FGCP place AP switch to ON position. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE ON - VERIFY" displayed.	320

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(200) On captain's FMA verify AP light on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE ON - VERIFY" displayed.	321
(201) On first officer's FMA verify AP light on. Press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.	322
(202) On FGCP place auto- throttle switch to AUTO THROT position. Press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.	323
(203) On overhead panel verify YAW DAMP switch placed ON. Press and release VERIFY pushbutton.	"Y/D OFF LITE OFF - VERIFY" displayed.	324
(204) On overhead annunciator panel verify YAW DAMP OFF light is not on. Press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.	325 326
(205) Tune both NAV control panels to a valid ILS frequency. Press and release VERIFY pushbutton.	"RETARD THROTTLE - VERIFY" displayed.	327 328
(206) Place both throttle levers to the aft mechanical stop. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/ RETRACT VERIFY" displayed.	329 through 337
NOTE: After the FLAP/SLAT handle has been moved, and the VERIFY pushbutton has been pressed, the message "FLAP TEST IN PROGRESS" will be displayed for approximately 30 seconds.		
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.		
(206a) On center instrument panel, place HYD PUMPS AUX switch to ON, and ALT switch to ON.	Hydraulic pressure available.	
(207) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 11/ MID - VERIFY" displayed.	338 through 342
(208) Place flap/slat handle to 11 degrees. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/ EXTEND - VERIFY" displayed.	343 through 349
(209) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"SELF TESTS?" displayed.	
SEQUENCE SEVEN - "SELF TESTS"		
(209a) Press and release VERIFY pushbutton.	"RCVRS TO ILS VERIFY" displayed.	

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: If testing of the ILS receivers is not desired, press and release FSPCE key and only the radio altimeters and accelerometers self-tests will be performed.		
NOTE: AHRS tested coincidently with ILS test.		
(210) Press and release VERIFY pushbutton. Wait approximately (30) seconds.	"SERVO TESTS?" displayed	350 through 381
NOTE: Sequence seven is an automatic self-test of the ILS receivers, R/T units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the STP will flash to advise of test completion.		
SEQUENCE EIGHT - "SERVO TESTS"		
NOTE: For convenience it is possible to selectively run portions of the servo test. For example, step (211) states "A/P ENGAGED - VERIFY"; if the autopilot is engaged and the VERIFY pushbutton is pressed, all 3 Dual Servo tests and the Auto Pitch Trim are performed. If these tests are not to be performed, disengage the autopilot and press and release the FSPCE key. The STP will then display "YAW DAMP ON - VERIFY" (step 220). Turning the YAW DAMP off and pressing the FSPCE key will result in the message "MACH TRIM NORM - VERIFY" without having run the yaw damp test. The same procedure also applies for the Mach Trim Actuator and the autothrottle.		
(211) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.	
(211a) Press and release VERIFY pushbutton.		
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed.		
(212) Verify autopilot switch ON. Press and release VERIFY pushbutton.	"A/P ENGAGED - VERIFY" displayed.	385
(213) Verify both control wheels turn right wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS RWD - VERIFY" displayed.	386 through 398
(214) Verify both control wheels turn left wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS LWD - VERIFY" displayed.	399 through 403
(215) Verify both control columns move forward. Press and release VERIFY pushbutton.	"COLUMN MOVES FWD - VERIFY" displayed.	404 through 416
(216) Verify both control columns move aft. Press and release VERIFY pushbutton.	"COLUMN MOVES AFT - VERIFY" displayed.	417 through 421
(217) Verify right rudder pedal moves forward. Press and release VERIFY pushbutton.	"RHT PEDAL MOVES FWD - VERIFY" displayed.	422 through 434
(218) Verify left rudder pedal moves forward. Press and release VERIFY pushbutton.	"LEFT PEDAL MOVES FWD - VERIFY" displayed.	435 through 439

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(219) On pedestal verify trim indicator moves towards nose up. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE UP - VERIFY" displayed.	440
(220) On pedestal verify trim indicator moves towards nose down. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE DN - VERIFY" displayed.	441
(221) On overhead panel, verify YAW DAMP switch ON. Press and release VERIFY pushbutton.	"YAW DAMP ON - VERIFY" displayed.	442 443
NOTE: If ground power is being applied, verify correct voltage, or a failure may be recorded in the Mach Trim system.		
(222) On overhead panel, verify MACH TRIM COMP switch is in NORM position. Press and release VERIFY pushbutton.	"MACH TRIM NORM - VERIFY" displayed.	444
(223) On FGCP, verify AUTO THROT switch is ON. Press and release VERIFY pushbutton.	"A/T ENGAGED - VERIFY" displayed.	445 through 448
(223a) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/RETRACT VERIFY" displayed. "FLAP TEST IN PROGRESS" displayed.	449
NOTE: If a failure has not been detected, "INTERNAL MONITORS?" will be displayed.		
(223b) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.	
SEQUENCE NINE - "INTERNAL MONITORS"		
NOTE: Sequence nine is an automatic check of the validity of synchros, resolvers and performs a reasonableness test. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of testing, "FAILURE RECAP?" will be displayed.		
(224) Press and release VERIFY pushbutton.	The total number of faults will be displayed momentarily, then the first fault will be displayed.	
NOTE: Momentarily pressing the VERIFY pushbutton after each failure is recorded, will display the diag nostic number.		
(225) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" displayed.	"FAILURE RECAP?" displayed.	
NOTE: If a "FAILURE RECAP?" is desired, press and release VERIFY pushbutton and the total number of faults will again be displayed.		
(226) Press and release FSPCE key.	"MAINTENANCE MEMORY ERASE?" displayed.	
NOTE: At this time the autopilot and autothrottle automatically disengage. Turn off autopilot and autothrottle red warning lights by cycling the disconnect switches.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(227) Press and release VERIFY pushbutton.	"VERIFY TO ERASE MEMORY?" displayed.	
NOTE: If Maintenance Memory is to be retained, press and release FSPCE key and "FLIGHT FAULT REVIEW?" will be displayed.		
(228) Press and release VERIFY pushbutton.	"FLIGHT FAULT REVIEW?" displayed.	
(229) Press and release POWER pushbutton.	STP message display blank.	
(230) Autopilot and Authrottle disengage automatically at the conclusion of System Maintenance BIT.	Autopilot disengaged. AP red off warning lights on until either AP disconnect switch pressed. Autothrottle disengaged. THROTTLE red off warning lights on until throttle disconnect switch pressed.	
(231) Place airplane in normal ground configuration.	No test.	

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. Reference DFGS STATUS/TEST, SUBJECT 22-01-05, page 101 for trouble shooting procedures corresponding to failure.

Table 208

Failure	Diagnostic Number
SEQUENCE ZERO - “STP TESTS”	
STP FWDSPACE PB FAILURE	1
STP BACKSPACE PB FAILURE	2
STP SGMENTS FAILURE	3
NOTE: In tests that multiple failures of a sensor occurs, such as servo failures, the fault will only be displayed once during the FAILURE RECAP.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
FMA-1 A/P LITE OFF FAILURE	12

Table 208 (Continued)

Failure	Diagnostic Number
FMA-2 A/P LITE OFF FAILURE	13
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
YAW DAMP OFF LITE ON FAILURE	17
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
VERT GYRO VALID 3 FAILURE	24
NOTE: For -930 and subsequent DFGC's, VERT GRYO is ATTITUDE.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
ELEVATOR TORQUE LIMIT SWITCH 1 FAILURE	35
ELEVATOR TORQUE LIMIT SWITCH 2 FAILURE	36
NOTE: For -930 and subsequent DFGC's, ELEVATOR is AIL MECH.	
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42

Table 208 (Continued)

Failure	Diagnostic Number
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"	
VG SW UNIT SWITCH FAILURE	73
VG SW UNIT SWITCH FAILURE	74
VG SW UNIT SWITCH FAILURE	75
VG SW UNIT SWITCH FAILURE	76
VG SW UNIT SWITCH FAILURE	77
VG SW UNIT SWITCH FAILURE	78
VG SW UNIT SWITCH FAILURE	79
VG SW UNIT SWITCH FAILURE	80
VG SW UNIT SWITCH FAILURE	81
VG SW UNIT SWITCH FAILURE	82
VG SW UNIT SWITCH FAILURE	83
VG SW UNIT SWITCH FAILURE	84
NOTE: For -930 and subsequent DFGC's, VG is ATT.	
CADC SWITCH FAILURE	85
CADC SWITCH FAILURE	86
CADC SWITCH FAILURE	87
CADC SWITCH FAILURE	88
CADC SWITCH FAILURE	89
CADC SWITCH FAILURE	90
CADC SWITCH FAILURE	91

Table 208 (Continued)

Failure	Diagnostic Number
CADC SWITCH FAILURE	92
TEMP SELECT PANEL FAILURE	93
TEMP SELECT PANEL FAILURE	94
TEMP SELECT PANEL FAILURE	95
TEMP SELECT PANEL FAILURE	96
TEMP SELECT PANEL FAILURE	97
TEMP SELECT PANEL FAILURE	98
TEMP SELECT PANEL FAILURE	99
TEMP SELECT PANEL FAILURE	100
TEMP SELECT PANEL FAILURE	101
TEMP SELECT PANEL FAILURE	102
TEMP SELECT PANEL FAILURE	103
TEMP SELECT PANEL FAILURE	104
TEMP SELECT PANEL FAILURE	105
TEMP SELECT PANEL FAILURE	106
TEMP SELECT PANEL FAILURE	107
TEMP SELECT PANEL FAILURE	108
TR MODE T/O FAILURE	109
TR MODE T/O FLEX FAILURE	110
TR MODE GA FAILURE	111
TR MODE MCT FAILURE	112
TR MODE CL FAILURE	113
TR MODE CR FAILURE	114
TO/GA SWITCH 1 FAILURE	117
TO/GA SWITCH 2 FAILURE	118
A/P 1 DISCONNECT FAILURE	119
A/P 2 DISCONNECT FAILURE	120
CAPT FMA RESET PB FAILURE	121
F/O FMA RESET PB FAILURE	122
GND SENSOR FAILURE	123
GND SENSOR FAILURE	124
LEFT PNEU X FEED OPEN FAILURE	125
ASOC AIRFOIL ICE ON FAILURE	126
ASOC AIRFOIL ICE OFF FAILURE	127

Table 208 (Continued)

Failure	Diagnostic Number
LEFT PNEU X FEED CLOSE FAILURE	128
RIGHT PNEU X FEED OPEN FAILURE	129
ASOC AIRFOIL ICE ON FAILURE	130
ASOC AIRFOIL ICE OFF FAILURE	131
RIGHT PNEU X FEED CLOSE FAILURE	132
L ENG ANTI-ICE SW ON FAILURE	133
L ENG ANTI-ICE SW OFF FAILURE	134
R ENG ANTI-ICE SW ON FAILURE	135
R ENG ANTI-ICE SW OFF FAILURE	136
LEFT A/C SUP SW AUTO FAILURE	137
LEFT A/C SUP SW OFF FAILURE	138
RIGHT A/C SUP SW AUTO FAILURE	139
RIGHT A/C SUP SW OFF FAILURE	140
GND SENSOR FAILURE	141
GND SENSOR FAILURE	142
SEL DFGC NON-TEST SIDE FAILURE	143
SEL DFGC TEST SIDE FAILURE	144
BACK COURSE PB FAILURE	145*
FMS OVRD PB FAILURE	145**
SPEED SELECT PB FAILURE	146
MACH SELECT PB FAILURE	147
EPR LIMIT PB FAILURE	148
NAV PB FAILURE	149
VOR/LOC PB FAILURE	150
ILS PB FAILURE	151
AUTOLAND PB FAILURE	152
VERT SPD PB FAILURE	153
MACH/IAS PB FAILURE	154
PERF PB FAILURE	155
PERF OR VNAV PB FAILURE	155***
ALT HOLD PB FAILURE	156
TURB PB FAILURE	157
SPEED KNOB (2ND DET IN) FAILURE	159
HDG KNOB (OUT) FAILURE	160

Table 208 (Continued)

Failure	Diagnostic Number
HDG KNOB (2ND DET IN) FAILURE	161
ALT KNOB (OUT) FAILURE	162
ALT KNOB (IN) FAILURE	163
NOTE: * Used for customers with back course option. ** Used for customers with FMS and -970 DFGC and subs. *** Used for customers with -970 DFGC and subs.	
BANK LIMIT 15 DEGREES FAILURE	164
BANK LIMIT 20 DEGREES FAILURE	165
BANK LIMIT 25 DEGREES FAILURE	166
BANK LIMIT 30 DEGREES FAILURE	167
SPEED REF OPER FAILURE	168
HEADING REF OPER FAILURE	169
CAPT HDG SEL REF FAILURE	173
VERT SPD REF OPER FAILURE	174
ALT REF OPER FAILURE	175
CRS-1 REF OPER FAILURE	176
CRS-2 REF OPER FAILURE	177
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
PITCH ANGLE 3 FAILURE	182
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
BANK ANGLE 3 FAILURE	185
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195

Table 208 (Continued)

Failure	Diagnostic Number
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP SYNC FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE FIVE - "COCKPIT DISPLAYS"	
EPR SEL LITE A AND B FAILURE	249
ART INOP LITE FAILURE	250
ALT ADV LITE 1 FAILURE	251
ALT ADV LITE 2 FAILURE	252
ALT SELECT APPR FAILURE	253
ALT SELECT DEV FAILURE	254
TR EPR VALID FAILURE	255
TR NO MODE LITE FAILURE	256
ART ON LITE FAILURE	257
ART READY LITE FAILURE	258

Table 208 (Continued)

Failure	Diagnostic Number
NO AUTOLAND LITE A FAILURE	259
NO AUTOLAND LITE B FAILURE	260
A/P TRIM LITE A FAILURE	261
A/P TRIM LITE B FAILURE	262
VERT SPD DETENT FAILURE	263
IAS BUG FAILURE	264
IAS BUG FAILURE	265
EPR BUG FAILURE	266
EPR BUG FAILURE	267
EPR LIMIT CMD FAILURE	268
CAPT F/D SW FAILURE	269
CAPT F/D LITE ON FAILURE	270
PITCH F/D FAILURE	271
PITCH F/D FAILURE	272
ROLL F/D FAILURE	273
ROLL F/D FAILURE	274
CAPT F/D SW FAILURE	275
F/O F/D SW FAILURE	276
F/O F/D LITE ON FAILURE	277
PITCH F/D FAILURE	278
PITCH F/D FAILURE	279
ROLL F/D FAILURE	280
ROLL F/D FAILURE	281
F/O F/D SWITCH FAILURE	282
FAST/SLOW 1 VALID FAILURE	283
FAST/SLOW 2 VALID FAILURE	284
FAST/SLOW CMD FAILURE	285
FAST/SLOW CMD FAILURE	286
FAST/SLOW CMD FAILURE	287
FMA SEGMENTS FAILURE	288
FGCP/NCP SEGMENTS FAILURE	289
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312

Table 208 (Continued)

Failure	Diagnostic Number
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
ELEV MECH TORQUE SWITCH 1 FAILURE	332
ELEV MECH TORQUE SWITCH 2 FAILURE	333
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345

Table 208 (Continued)

Failure	Diagnostic Number
ELEV MECH TORQUE SWITCH 1 FAILURE	346
ELEV MECH TORQUE SWITCH 2 FAILURE	347
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376

Table 208 (Continued)

Failure	Diagnostic Number
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - "SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
* An open Aileron Torque Limit Rheostat will prevent A/P engage with flaps above 26 degrees, but will not prevent engage when flaps are below 26 degrees.	
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410

Table 208 (Continued)

Failure	Diagnostic Number
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RIGHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444

Table 208 (Continued)

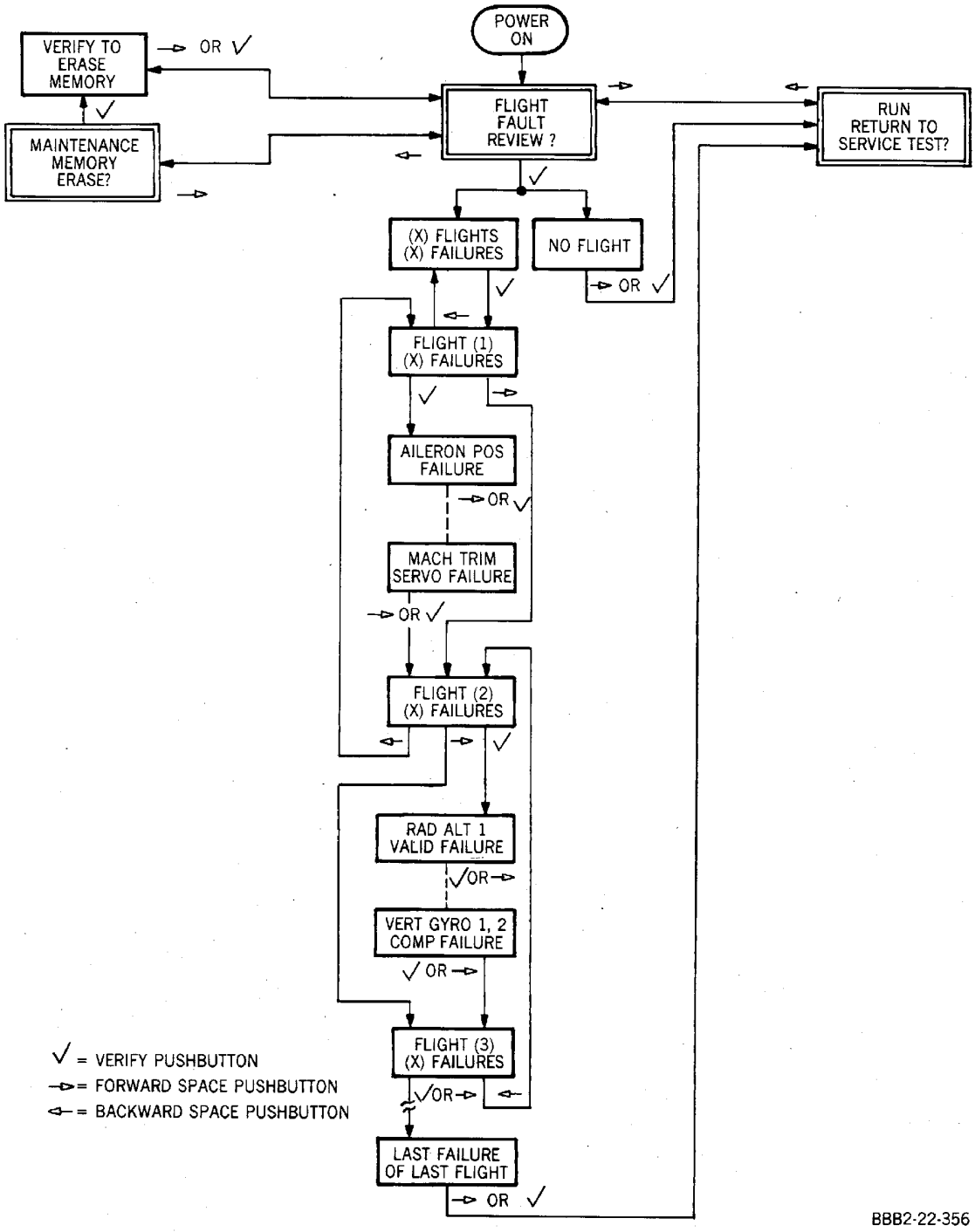
Failure	Diagnostic Number
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
ELV MECH TORQ SWITCH 1 FAILURE	452
ELV MECH TORQ SWITCH 2 FAILURE	453
NOTE: For -930 and subsequent DFGC's, ELEV MECH TORQ is AIL MECH TORQ.	
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR RATE FAILURE	461
CADC -N ALT BCR RATE FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476

Table 208 (Continued)

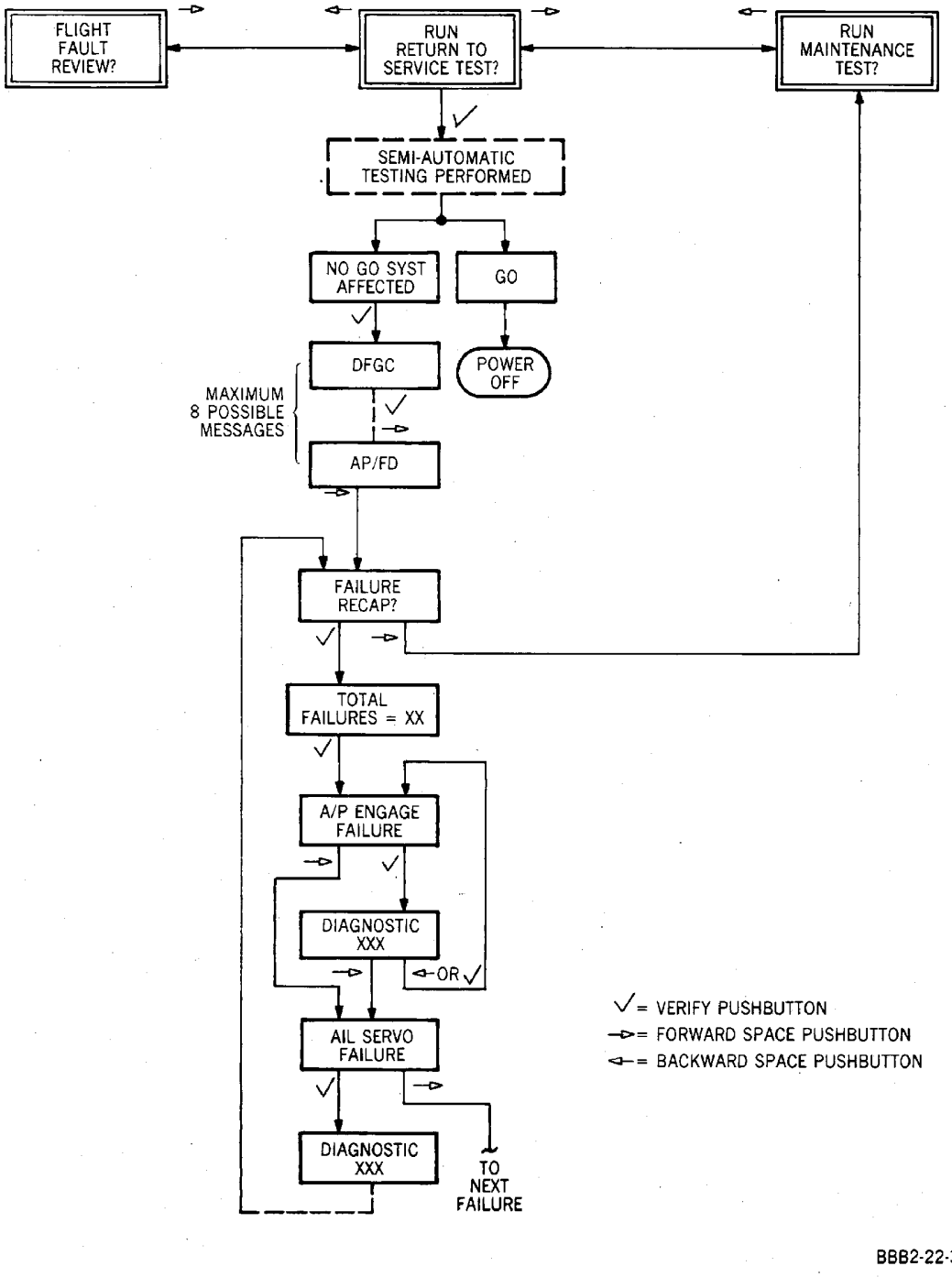
Failure	Diagnostic Number
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
VERT GYRO 1 FAILURE	481
VERT GYRO 2 FAILURE	482
VERT GYRO 3 FAILURE	483
NOTE: For -930 and subsequent DFGC's, VERT GYRO is ATTITUDE.	
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
PITCH RATE 3 FAILURE	486
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ROLL RATE 3 FAILURE	489
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT/SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
PMS DATA FAILURE	508*
PMS/FMS DATA FAILURE	508**

Table 208 (Continued)

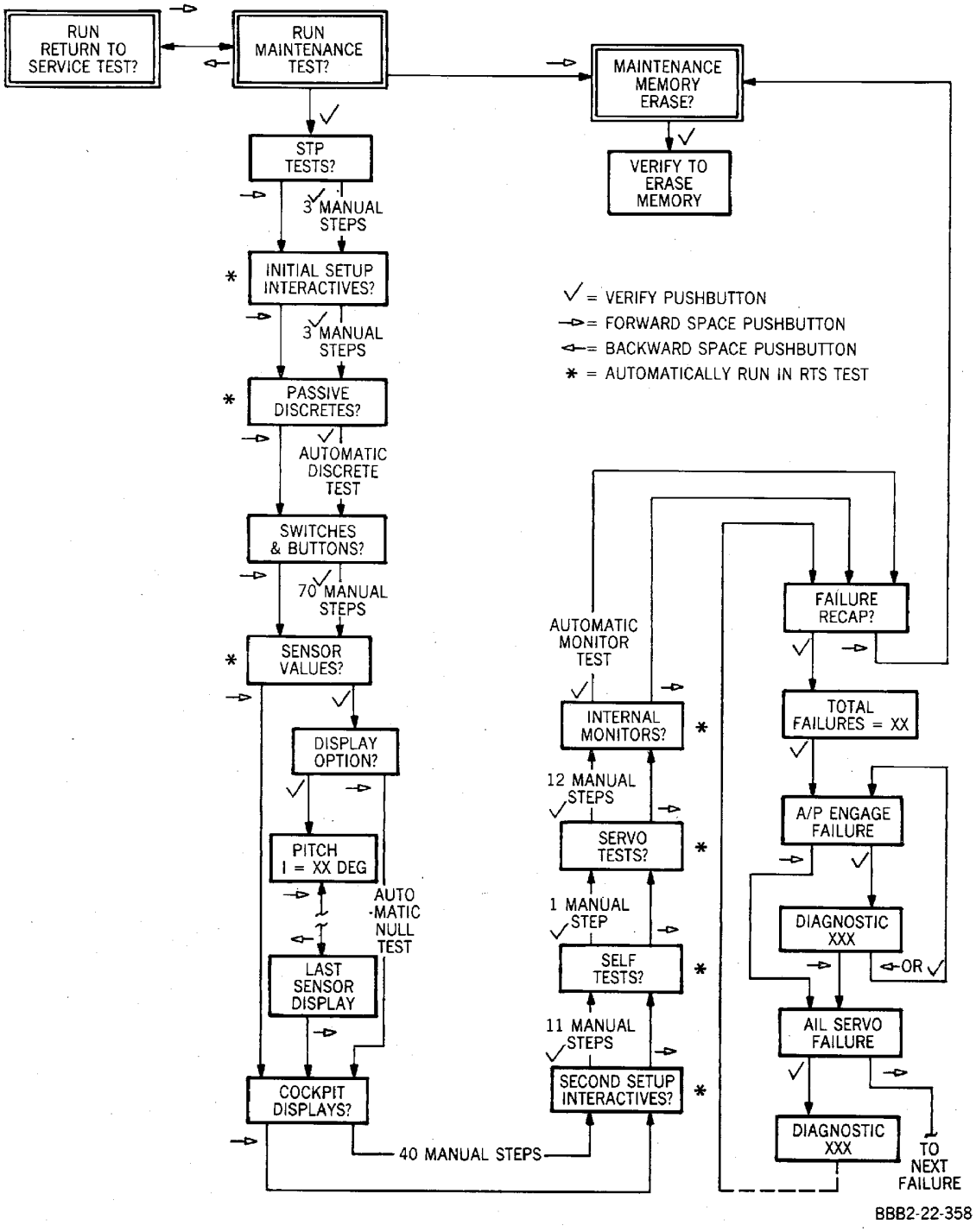
Failure	Diagnostic Number
WINDSHEAR DATA FAILURE	509***
NOTE: * For customers with PMS. ** For customers with FMS and -970 DFGC and subs. *** For customers equipped with windshear computers.	
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528



Status Test - Flight Fault Review Operation
Figure 202/22-01-05-990-909



STP - Run Return to Service Operation
Figure 203/22-01-05-990-910



STP - Run Maintenance Test Operation
Figure 204/22-01-05-990-911

DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

1. General

A. The MCDU has the capability of accessing, monitoring, and displaying BIT (Built-In-Test) information provided from the Digital Flight Guidance System (DFGS). The MCDU provides the operator with a display of English language commands and questions.

B. The Test Panel page of the FMS MCDU allows the MCDU to be used for the DFGS Status/Test. Each MCDU serves as a test panel for only the onside systems. MCDU-1 on the left side of the pedestal serves as the test panel for DFGC-1, and MCDU-2 on the right side of the pedestal serves as the test panel for DFGC-2. To use the MCDU select the MENU pushbutton and the "MCDU MENU" page will appear. Selecting the "TEST PANEL" pushbutton 6L will produce the TEST PANEL page. Refer to Figure 201 for operation of the MCDU.

C. BIT provides three modes of testing. Continuous (Flight Fault Review) BIT, Return to Service (RTS) BIT, and System Maintenance BIT. The Autoland Preflight Test is also provided in this section, since a failure during this test can be recalled and displayed on the MCDU. There is also an IRS/Autoland Discrete Test.

D. A self-test feature of the MCDU (during System Maintenance BIT) is provided to assure the operator that the MCDU is functional prior to test initiation. All keys and pushbuttons are checked and appropriate message displays are verified.

E. During System Maintenance BIT, pressing the forward space (FWD) key on the MCDU will automatically advance the MCDU to the next test step. If a complete sequence of tests are to be bypassed, pressing the FWD key at the beginning of a test sequence will automatically advance the test to the next test sequence.

F. During System Maintenance BIT, pressing the back space (BACK) key on the MCDU will automatically back the test to the previous test step if a failure has occurred. Pressing the BACK key twice in succession after a failure will program the test sequence over again.

G. During System Maintenance BIT, if a failure occurs, an English language message ending with the word "FAILURE" will appear. Pressing the VERIFY pushbutton on the MCDU will cause a diagnostic number to appear, then pressing the VERIFY pushbutton the second time will cause the message to reappear on the MCDU. If the failure is not corrected at that time, pressing the FWD key will log the failure and continue the test. At the conclusion of testing, the message "FAILURE RECAP?" will be displayed. At this time all failures can be recorded for correction. Once the test is exited, failures recorded are automatically erased.

H. During RTS BIT an interruption does not occur if a failure is detected during the test. If a failure is detected, "NO GO - SYSTEM AFFECTED?" will be displayed upon completion of the test. When "NO GO - SYSTEM AFFECTED?" is displayed, pressing the VERIFY pushbutton will display the function(s) that are affected, i.e. NO AUTOLAND, AP/FD, etc. If a system is listed it indicates only that a problem has been detected and not necessarily that the system is inoperative. After the function(s) is displayed, all failures can be recorded for correction. If no failures occur during RTS, GO is displayed.

I. Ten sequences of tests are provided on the MCDU during System Maintenance Bit. Each sequence has diagnostic numbers that accompanies each failure detected. Portions of the testing requires operator interaction, and portions of the testing are automatic. Any failures that occur during the Maintenance Test will be displayed immediately upon detection.

J. Seven sequences of tests are provided during RTS BIT. The diagnostic numbers and failures are called out at the conclusion of testing during "FAILURE RECAP?"

K. Personnel should be familiar with the functional use of all keys and pushbuttons on the MCDU prior to performing any tests that require operator interaction. (Figure 201)

L. The following table describes flight guidance circuit breakers and how they function and the importance to the operation of the aircraft. It gives the associated problems caused when these breakers fail.

Table 201

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-1	B10-361	28VAC-L	J1B-12	Loss of power from this breaker, if the aircraft is on the ground, would cause loss of the Flight Guidance Control Panels Altitude window, Both #1 and #2 Flight Director Bars Bias Out of View (if in Takeoff mode). The Mach Trim Fault, Yaw Damper Off and Windshear Inop messages are displayed (AP1 selected).
DFGS-1	B10-351	115VAC-L	J2A-12	Loss of power from this breaker, on the ground will cause the entire Flight Guidance Control Panel and the Nav Control Panel Course window to go blank. The #1 Flight Director Bars Biased Out of View and the #1 Fast/Slow Indicator displayed a Fail Flag. The Mach Trim Fault and Yaw Damper Off messages were displayed (AP1 selected). In addition, #1 Auto- throttles became Inop, and the TRP had a NO MODE light on.
DFGS-1	B10-360	28VAC-R	J4B-12	Loss of power from this circuit breaker caused the NO AUTOLAND light to be displayed, with AP1 selected.
DFGS-1	B10-347	28VDC-R	J2A-1,2	No cockpit indications were present if this circuit breaker is inoperative. No messages were displayed if AP2 was selected.
Yaw Damper-1	B10-345	28VDC-L	J3B-7	With the Yaw Damper Switch in the ON position and AP1 selected, the YAW DAMPER OFF message appeared.
AP-1	B10-353	28VDC-L	J4B-104 J1B-104 J1A-94 J4A-94	With AP1 selected, the NO AUTOLAND message was displayed.
DFGS-1	B10-349	28VDC-L	J1A-1 J3A-1,2, 3,4	The Flight Guidance Control Panel blanked if breaker power was lost and AP1 selected. In addition, both Nav Panels blanked. The TRP had a NO MODE light on. The #1 Flight Director Bars Bias Out of View and the #1 Slow/Fast Fail flag appeared.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS-2	B10-362	28VAC-R	J4B-12	With the aircraft on the ground and AP2 selected, loss of this circuit breakers' power caused the NO AUTOLAND light to be displayed. In addition, The Flight Guidance Control Panels' Altitude was blank and the #2 Nav Panels CRS numbers were randomly cycling. Both Flight Director Bars Biased Out of View. On the overhead, the Mach Trim Fault and Yaw Damper OFF messages were displayed. #1 and #2 Slow/Fast Indicators became Inop (AP2 was selected).
DFGS-2	B10-352	115VAC-R	J2A-12	With AP2 selected the Flight Guidance Control Panel blanked, the Mach Trim Fault Yaw Damper Off message were displayed Both Nav Panels CRS windows blanked and the TRP had a NO MODE message displayed. Autothrottles were Inop.
DFGS-2	B10-363	28VAC-L	J1B-12	Loss of this breakers' power caused the NO AUTOLAND message to be displayed if AP2 was selected.
DFGS-2	B10-348	28VDC-L	J2A-1,2	There is no cockpit indication that DFGC#2 is not receiving power from this breaker. (On the ground, AP2 selected.)
Yaw Damper-2	B10-346	28VDC-R	J3B-7	With AP2 selected and this breaker not supplying power, the Yaw Damper OFF message was displayed.
AP-2	B10-354	28VDC-R	J4B-104 J1B-104	With AP2 selected the NO AUTOLAND light was displayed.
DFGS-2	B10-350	28VDC-L	J1A-94 J1A-1 J3A-1,2, 3,4	With AP2 selected and the aircraft on the ground, the AP TRIM, AP1 and AP2 annunciators on FMA#2 were illuminated. In addition, #2 Fast/Slow was Inop. The TRP had a NO MODE light displayed. On the overhead the Mach Trim Fault, Yaw Damper OFF and Windshear Inop messages displayed.
DFGS AP/AT Warning LTS "A"	B10-341	28VDC Xfer	FMA (J1-A)	With this circuit breaker not supply ing power, both FMA'S A/T and AP OFF red warning lights "A" bulb was inop.

Table 201 (Continued)

Circuit Breaker	Number	Source	MD-80	Comments
DFGS AP/AT Warning LTS "B"	B10-342	28VDC Xfer	FMA (J4A-1)	This circuit breaker supplies basic power for both DFGC's Channel "B" processor. Loss of power from this breaker will cause both #1 and #2 Flight Directors to fail. In addition, the Fast/Slow Indicators failed, the NO AUTOLAND light was displayed, the TRP had a NO MODE light, and the Flight Guidance Control Panels Altitude window went blank. (Breaker power was lost after initial power up.) The Nav Panels' CRS Windows also blanked. Loss of power from this breaker also affects Status Test Panel operation.

WARNING: DURING SYSTEM MAINTENANCE BIT, THE USE OF HYDRAULIC POWER IS REQUIRED. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL, AND CONTROL SURFACE AREAS ARE CLEARED OF ALL PERSONNEL AND EQUIPMENT.

CAUTION: VERIFY METER SEL & HEAT SWITCH, LOCATED ON OVERHEAD PANEL IS IN THE OFF POSITION ANYTIME THE AIRPLANE IS IN THE FLIGHT MODE, (GROUND SENSING CIRCUIT BREAKERS OPENED, OR ON JACKS), TO PREVENT DAMAGE TO AIR DATA OR ANGLE-OF-ATTACK SENSORS.

CAUTION: WHENEVER UNIT(S) AND/OR COCKPIT INSTRUMENT(S) ARE POWERED ON THE GROUND, THE TWO AVIONICS COOLING FANS AND INSTRUMENT COOLING FAN MUST BE OPERATING. IN ADDITION, IF FLIGHT COMPARTMENT AIR TEMPERATURE IS ABOVE 85° F., AIR CONDITIONING SHOULD BE PROVIDED. IF AIR CONDITIONING IS NOT AVAILABLE, FLIGHT COMPARTMENT WINDOWS AND ELECTRICAL/ELECTRONICS ACCESS DOOR MUST BE OPEN TO PREVENT OVERHEAT OF EQUIPMENT.

M. Repeat any failed test step to verify that after maintenance action has been performed and completed, the fault has been cleared.

2. **MCDU Test Functions**

A. Procedures for Testing DFGS

Table 202

Paragraph	Test Function
Paragraph 3.A.	Continuous (Flight Fault Review) BIT
Paragraph 3.B.	Autoland Preflight Test
Paragraph 3.C.	Return to Service (RTS) BIT (DFGS)
Paragraph 3.D.	System Maintenance BIT (Maintenance Test)

B. Digital Flight Guidance System (DFGS) Power-Up Test Prior to MCDU Test

NOTE: Both Digital Flight Guidance Computers (DFGC's) may fail to come on line and halt MCDU testing procedures.

(1) When DFGS information is not displayed with side select switch in either position, proceed as follows:

(a) Check 115 VAC power and ground to each DFGC electrical connector. (PAGEBLOCK 22-16-00/101)

(b) Check no ground exists at DFGC jack connector pins J2A (36) and J3A (36). Remove ground(s) when ground(s) exist and check DFGS operation is normal. (PAGEBLOCK 22-14-00/101)

NOTE: A ground at the J2A (36) and J3A (36) points represents holding down of the autopilot disconnect (on control wheel) not allowing DFGC to begin internal checks.

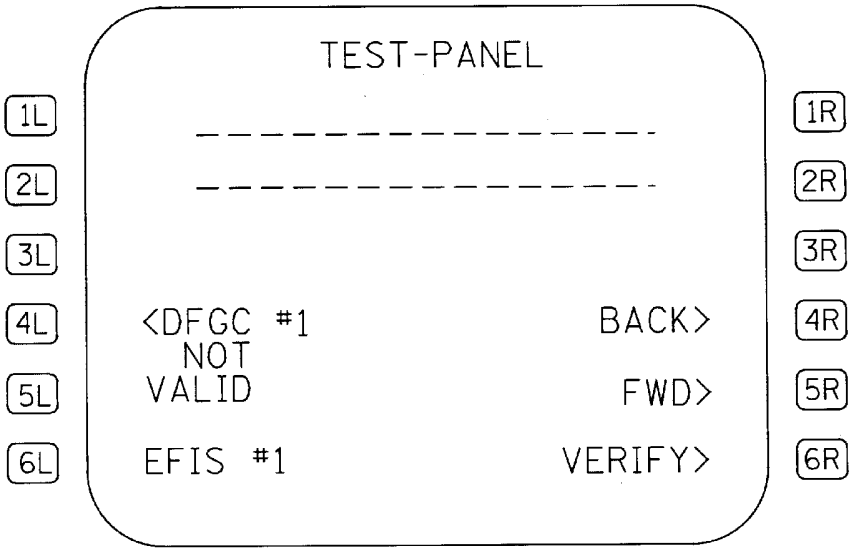
(c) Check short to ground is not present at jack connector pins J1 (Z) and J3 (Z) on DFGS control panel. Should a ground exist, isolate ground source and repair. (PAGEBLOCK 22-01-03/101)

NOTE: Before incorporation of Service Bulletin 24-67, the auxiliary power unit (APU) generator field wiring can contact air conditioning piping resulting in malfunction of the APU generator and/or Digital Flight Guidance System-1 (DFGS-1). This can occur due to chafing wire.

(2) When partial DFGS displays such as one Flight Mode Annunciator (FMA) indicating HDG HLD, ALT HLD, and opposite FMA blank with both Flight Director (FD) switches on, proceed as follows:

(a) Check 28 VDC is available at jack pins J1A (1 and 60) and J4A (1) on each DFGC electrical connector. (PAGEBLOCK 22-17-00/101)

NOTE: This 28 VDC is source power for the "A" and "B" channels of the central processor.



NOTE: THE DASHES SHOWN IN THIS ILLUSTRATION ARE ONLY PROVIDED AS AN INDICATION OF THE LOCATION OF DFGC FURNISHED DATA. IF THE DFGC IS NOT FURNISHING DATA, THE INDICATED FIELDS ON THE ACTUAL MCDU PAGE DISPLAY BLANKS.

NOTE: DEPRESSING LINE SELECT KEY 4L INFORMS THE MCDU THAT IT IS FUNCTIONING AS A DFGC STP AND SUPPLIES A SELECT SIGNAL TO THE ONSIDE DFGC.

CAG(IGDS)

BBB2-22-656

MCDU Test Panel Page
Figure 201/22-01-05-990-912

EFFECTIVITY
WJE 405-411, 880, 881, 883, 884; AFTER AVIONICS UPGRADE MOD

3. MCDU Functional Tests

A. Continuous (Flight Fault Review) BIT

NOTE: Continuous BIT is an internal monitor mode of the DFGC and is not controlled by the MCDU. Continuous BIT begins operation as soon as power is applied to the DFGS and operates continuously, even during Autoland Availability Preflight BIT, RTS BIT and System Maintenance BIT. If Continuous BIT recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel. If the autoland mode is affected, the "NO AUTOLAND" annunciator on each FMA will come on and flash to alert the flight crew that the autoland mode of operation is not available.

NOTE: Flight Fault Review Bit is provided from continuous Bit which is an internal monitor mode of the DFGC after airplane liftoff. Continuous Bit begins operation as soon as power is applied to the DFCS and operates continuously. If Continuous Bit recognizes a fault during flight, the fault will be logged into memory within the DFGC for subsequent recall by ground maintenance personnel as Flight Fault Review Bit.

Table 203

Action	Desired Result
(1) Verify DFGS switch is in same position 1, or 2 as used during flight.	No test.
(2) On MCDU, press MENU pushbutton.	MCDU MENU page displayed.
(2a) Press TEST PANEL key 6L.	TEST PANEL page displayed. DFGS VALID status displayed adjacent to key 5L. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release VERIFY pushbutton.	"NO FAULTS" displayed.
NOTE: If a failure has occurred, the number of flights and number of failures will appear. For example, if the airplane had five flights and two failures, the display message would read "5 FLIGHTS 2 FAILURES". Pressing and releasing the VERIFY pushbutton will display the most recent flight, i.e. "FLIGHT 1 1 FAILURE". Pressing and releasing the FSPCE key will display each flight and number of failures recorded for each flight. If zero failures have occurred, "NO FAULTS" will be the message displayed. Proceed to step (8) if "NO FAULTS" is the displayed message.	
(4) Press and release VERIFY pushbutton.	"FLIGHT 1 - XX FAILURE" displayed.
(5) Press and release FSPCE key.	"FLIGHT 2 - XX FAILURE" displayed.
(6) Read and record all flight faults by pressing and releasing VERIFY pushbutton until the message "FLIGHT FAULT REVIEW?" is displayed.	"FLIGHT FAULT REVIEW?" displayed.
NOTE: The in-flight logging system of the DFGS provides a feature that allows stored failures (maintenance memory) to be erased. This may be accomplished in one of two ways manually or automatically. MANUALLY: The MCDU may be used to erase the memory by use of the FWD key until the message "MAINTENANCE MEMORY ERASE?" is displayed. Pressing and releasing the VERIFY pushbutton will then display "VERIFY TO ERASE MEMORY?". Pressing and releasing the VERIFY pushbutton will then clear all of the stored failures. AUTOMATICALLY: If the maintenance memory is not period- ically cleared, it will eventually fill up. Each time the DFGC is powered up, the maintenance memory is checked. If the memory store is more than 80%, the DFGC saves the most recent 150 failures and clears the rest. The memory can store approximately 350 failures, thus leaving room for approximately 200 failures. The maintenance memory is dedicated for in-flight failure logging only. These failures are displayed only during "FLIGHT FAULT REVIEW?". This memory is entirely independent of the memory used by the Return To Service Test or the Maintenance Test. Failures logged while performing these tests are erased by exiting the respective test.	

Table 203 (Continued)

Action	Desired Result
(7) Press and release FWD key.	"RUN RETURN TO SERVICE TEST?" displayed.
NOTE: If a Return to Service (RTS) test is desired, press and release VERIFY pushbutton. If an RTS is not desired, proceed to step (8).	
(8) Press and release MENU pushbutton.	MCDU MENU displayed.
(9) Place aircraft in normal ground configuration.	No test.
NOTE: If maintenance action has been performed, proceed to either Paragraph 3.C. orParagraph 3.D. as appropriate.	

B. Autoland Preflight Test

NOTE: The Autoland Availability Preflight BIT provides assurance to the flight crew that the autoland mode of operation is available. Both NAV receivers must be tuned to an identical ILS frequency and the AUTO LAND pushbutton on the Flight Guidance Control Panel must be pressed.

Table 204

Action	Desired Result
(1) Verify DFGS switch is placed in position 1, or 2 as appropriate for next flight.	No test.
NOTE: While performing the Autoland Preflight Test, if the Status/Test Panel is activated the Autoland Preflight Test cannot be initiated.	
(2) Tune both VHF/NAV Control panels to an identical ILS frequency.	Both NAV receivers tuned to an identical ILS frequency.
(2a) Set switches as follows:	No test.
(1) Both FD switches to OFF. (2) AP engage switch to OFF. (3) Overhead FLT DIR switch to NORM.	
NOTE: On later aircraft FLT DIR switch is FD CMD.	
(3) On Flight Guidance Control Panel, press and release AUTO LAND pushbutton.	Associated Flight Mode Annunciators (FMA) on instrument panel displays AUTO LND/PRE/FLT/TEST, and NO AUTOLAND appears flashing.
NOTE: During test, both the ILS R/T's (UP/LEFT, DOWN/RIGHT), both radio altimeters, both Dual accelerometers self test, the elevator torque limit switches verified both agree for flap configuration, rudder unrestricted switches are tested and NAV receivers self test. AHRS is not checked by DFGC during preflight test. AHRS self test is initiated only so compass systems are set for same headings for test.	
(4) Wait approximately 45 seconds.	Both captain's and first officer's FMA's blank, if FD switches are in OFF position.
NOTE: During test, all AHRS are tested resulting in headings going to 015 degrees. AHRS BASIC and AUX AHRS INOP lights come on for 1 minute.	
(5) Observe both FMA's and verify that the NO AUTOLAND legend goes blank.	NO AUTOLAND legend blank on both FMA's.
NOTE: If the NO AUTOLAND legend remains on the FMA's, either the ILS, radio altimeters, dual acceler ometers or Continuous BIT detected a failure that would inhibit the autoland mode of operation. Proceed to Paragraph 3.C. to isolate failure(s).	

Table 204 (Continued)

Action	Desired Result
NOTE: At completion of test NO AUTOLAND light may light after 17 seconds while compasses resynch to actual heading. AHRS BASIC and AUX AHRS INOP lights will go off. NO AUTOLAND light may remain on for up to 30 seconds after preflight test while compasses resynch.	
NOTE: For AHRS equipped aircraft, during the autoland preflight test the AHRS system preflight test is conducted. A steady "NO AUTOLAND" message on the FMA's is normal during the AHRS preflight test, and does not indicate a failed test unless it remains on after the AHRS test is complete and the AHRS has returned to the normal mode.	

C. Return to Service (RTS) BIT (DFGS)

NOTE: Refer to NAVIGATION DISPLAYS, SUBJECT 34-22-00, Page 201, for EFIS RTS.

NOTE: Return to Service (RTS) BIT is provided to place the airplane back into a non-restricted (including autoland) service after maintenance action has been performed (i.e. LRU replacement). The MCDU is capable of performing ten sequences of tests 0 thru 9. Sequences 1, 2, 4, 6, 7, 8 and 9 are only performed during RTS. All sequences of tests are performed during System Maintenance BIT. The RTS is run completely and failures are displayed at the end of test.

NOTE: All switches such as CADC, NAV and Flight Director switches should be in the NORM position for the Return To Service test.

Table 205

Action	Desired Result
(1) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.
(1a) Place FLAP/SLAT handle to LAND EXT position.	No test.
(1b) Verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.
(2) On MCDU, press MENU push- button then TEST PANEL key 6L.	TEST PANEL page displayed. "FLIGHT FAULT REVIEW?" displayed.
(3) Press and release FWD key until "RUN RETURN TO SERVICE TEST?" appears.	"RUN RETURN TO SERVICE TEST?" displayed.
(4) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE VERIFY" displayed.
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.	
(5) Press and release VERIFY pushbutton.	"TURN ON AUX HYD PUMP VERIFY" displayed.
NOTE: The RTS test requires the aircraft to be in the landing configuration. Hydraulic power is required to properly set the flaps and rudder. Hydraulic power is not required if flaps are at 28 to 40 degrees and the rudder is centered (crosswinds may blow the rudder hardover causing the Rudder Servo test to fail).	
(6) Place HYD PUMPS - AUX and TRANS switches on F/O instrument panel to ON position. Press VERIFY.	"TURN ON RUDDER HYD - VERIFY" displayed.
(7) Turn on rudder hydraulics (on fwd pedestal). Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/EXTEND - VERIFY" displayed.

Table 205 (Continued)

Action	Desired Result
(7a) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
(8) Check A/P is disengaged then press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.
(9) Check A/T is disengaged. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.
(10) Disengage Y/D if engaged then "RCVRS NOT ILS - VERIFY" press and release VERIFY pushbutton.	displayed.
(11) Detune receivers from ILS frequency (if tuned) then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
NOTE: Sequence two "PASSIVE DISCRETES" and sequence four "SENSOR VALUES" are checked automatically. Sequence three and sequence five tests are skipped and are performed during System Maintenance BIT. During the tests, the message "TEST IN PROGRESS" will be displayed.	
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
(12) When step (11) is complete, observe MDCU.	"ENGAGE A/P - VERIFY" displayed.
(13) Engage A/P then press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.
(14) Engage autothrottle then press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.
(15) Engage Yaw Damper then press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.
NOTE: Tune receivers to a valid ILS frequency.	
(16) Press and release VERIFY pushbutton.	"TEST IN PROGRESS" followed by "RETARD THROTTLES - VERIFY" displayed.
NOTE: Verify both throttle levers are below the minimum authority switches.	
(17) Retard throttles then press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.
SEQUENCE SEVEN - "SELF TESTS"	
NOTE: Sequence seven is an automatic self-test of the NAV receivers, R/A units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the MCDU will flash to advise of test completion. At end of sequence seven, the MCDU will display "WHEEL TURNS RWD - VERIFY".	
NOTE: On AHRS equipped aircraft, during test, all AHRS are tested resulting in headings going to 015 degrees. AHRS basic and AHRS INOP lights come on for 1 minute.	
SEQUENCE EIGHT - "SERVO TESTS"	
CAUTION: CONTROL WHEEL, COLUMN, PEDALS, STABILIZER, AUTOTHROTTLES, MACH TRIM AND Y/D ACTUATOR WILL MOVE DURING TEST EIGHT.	
NOTE: During this sequence, the operator will check control movement by cycling the verify pushbutton. A failure will be acknowledged by cycling the forward space pushbutton.	

Table 205 (Continued)

Action	Desired Result
NOTE: Failures as detected by the software will appear in the Failure Recap which can be displayed at the end of "RTS Tests".	
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed. While the servos are in operation, the message will display flashing.	
(18) Check control wheel is stationary and displaced in CW direction from neutral position.	
(19) Press and release VERIFY pushbutton.	Control wheel will move and during this test period, MCDU displays "TEST IN PROGRESS".
(20) At test completion MCDU displays new message.	"WHEEL TURNS LWD - VERIFY" is displayed.
(21) Check control wheel is stationary and displaced in CCW direction from neu- tral position. Press and release VERIFY pushbutton.	Control column will move to neutral position. MCDU displays "TEST IN PROGRESS".
(22) At test completion MCDU displays new message.	"COLUMN MOVES FWD - VERIFY" is displayed.
(23) Check control column is stationary and forward of neutral position. Press and release VERIFY pushbutton.	Control column will move. MCDU displays "TEST" IN PROGRESS".
(24) At test completion MCDU displays new message.	"COLUMN MOVES AFT VERIFY" is displayed.
(25) Check control column is stationary and aft of neutral position. Press and release VERIFY pushbutton.	Control column will move to neutral position and right rudder pedal will move forward. MCDU displays "TEST IN PROGRESS".
(26) At test completion MCDU displays new message.	"RHT PEDAL MOVES FWD VERIFY" is displayed.
(27) Check right rudder pedal moved forward. Press and release VERIFY pushbutton.	Left rudder pedal will move forward. MCDU displays "TEST IN PROGRESS".
(28) At test completion MCDU displays new message.	"LEFT PEDAL MOVES FWD VERIFY" is displayed.
(28a) Check left rudder pedal moves forward. Press and release VERIFY pushbutton.	During this test MCDU displays "TEST IN PROGRESS".
NOTE: Part of sequence eight and all of sequence nine tests are done automatically.	
(28b) At test completion MCDU displays new message.	"FLAP/SLAT TO 0 RETRACT VERIFY" is displayed.
(28c) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"GO OR NO-GO SYSTEM AFFECTED" is displayed.
SEQUENCE NINE - "INTERNAL MONITORS"	
NOTE: Sequence nine is an automatic check of the real time internal monitors appropriate to ground testing. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of the test either "GO" or "NO GO - SYSTEM AFFECTED?" will be displayed.	
NOTE: If "GO" is displayed, proceed to step (33) to conclude testing. If "NO GO - SYSTEM AFFECTED?" is displayed, proceed to step (29).	
(29) Press and release VERIFY pushbutton.	One or more of the following faults may appear if a fault is detected in the system. "DFGC" "NO AUTOLAND" "AP/FD" "A/T" "S/C" "ART" "TRC" "M/T" "Y/D"

Table 205 (Continued)

Action	Desired Result
(30) Press and release FSPCE key.	"FAILURE RECAP?" displayed.
(31) Press and release VERIFY pushbutton.	The number of faults will be displayed momentarily (approx. 3 seconds), then the MCDU will momentarily flash VERIFY = DIAG NUM FWD = NEXT FAILURE and the first fault will be displayed.
(32) Read and record all faults by pressing and releasing FSPCE pushbutton, until the message "FAILURE RECAP?" is displayed.	"FAILURE RECAP?" displayed.
NOTE: While failure is displayed, pressing VERIFY will display associated diagnostic number.	
(33) Press and release MENU pushbutton.	MCDU MENU displayed.
(34) Hold control wheel (if wheel or column is dis- placed) and disengage autopilot. Press and release either AP disconnect switch.	Autopilot disengaged, AP red off warning lights on until either AP disconnect switch pressed.
(35) Disengage yaw damper. Place YAW DAMP switch to OFF at right of overhead panel.	Yaw damper disengaged.
(36) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.
(37) Place aircraft in normal ground configuration.	No test.

NOTE: Following is a list of failures and diagnostic numbers that may appear if a RTS "NO GO - SYSTEM AFFECTED?" message appears.

Table 206

Failure	Diagnostic Number
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20

Table 206 (Continued)

Failure	Diagnostic Number
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
VERT GYRO VALID 1 FAILURE	22
VERT GYRO VALID 2 FAILURE	23
NOTE: On aircraft with -930 and subsequent DFGC, VERT GYRO is ATT.	
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52

Table 206 (Continued)

Failure	Diagnostic Number
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP POS FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211

Table 206 (Continued)

Failure	Diagnostic Number
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW/DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
AIL MECH TORQ SWITCH 1 FAILURE	332
AIL MECH TORQ SWITCH 2 FAILURE	333
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337

Table 206 (Continued)

Failure	Diagnostic Number
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344
FLAP POS FAILURE	345
AIL MECH TORQ SWITCH 1 FAILURE	346
AIL MECH TORQ SWITCH 2 FAILURE	347
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369

Table 206 (Continued)

Failure	Diagnostic Number
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404

Table 206 (Continued)

Failure	Diagnostic Number
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
NOTE: * An inoperative torque limit rheostat may prevent A/P engagement and can cause an "AIL SERVO FAILURE" message to be logged if flaps are less than 26 degrees. With flaps greater than 26 degrees the torque limit rheostat will not prevent A/P engagement. Place flaps greater than 26 degrees to verify.	
NOTE: With Service Bulletin 22-111 incorporated and the DFGC reidentified 4034241-972; if the aileron torque limiter activated option is not installed per aircraft KCN (K1123) Service Bulletin, the aircraft flaps must be lowered to greater than 26 degrees for the RTS to pass satisfactorily.	
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434

Table 206 (Continued)

Failure	Diagnostic Number
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
AIL MECH TORQ SWITCH 1 FAILURE	452
AIL MECH TORQ SWITCH 2 FAILURE	453
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR FAILURE	461
CADC -N ALT BCR FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467

Table 206 (Continued)

Failure	Diagnostic Number
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
ATTITUDE GYRO 1 FAILURE	481
ATTITUDE GYRO 2 FAILURE	482
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504

Table 206 (Continued)

Failure	Diagnostic Number
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528

D. System Maintenance BIT

Table 207

Action	Desired Result	Diagnostic Number
NOTE: System Maintenance BIT is a command response type test requiring operator interaction. All sequences can be tested by use of system Maintenance BIT. Failures detected during the Maintenance test will be displayed immediately. Hydraulic power is required during the use of this test only if the Flap/Slat tests and/or the rudder test is to be run.		
NOTE: Put RAM AIR TEMP & PROBE HEATER circuit breaker in lower electrical power center CPB (B1-62) Z29 to on.		
(1) On FGCP verify DFGS switch is in same position 1, or 2 as applicable for test.	No test.	
(2) Deleted.		
NOTE: Each sequence of tests is called out during the test procedure. If a sequence or test step is to be bypassed, press and release the FWD key. Pressing the FWD key at the beginning of a sequence will automatically program the MCDU to the next sequence of tests. Pressing the FWD key during a test step or failed test-step will program the MCDU to the next test step. The FWD key may also be used for fast slew capabilities between test sequence steps. To repeat a failed-test step, press and release the BACK key. Pressing the BACK key twice in succession will program the test to the beginning of the test sequence if a test step failed.		
NOTE: If the main gear is not compressed then install main gear proximity switch target inhibitors on left and right weight-on-wheel sensors to place the DFGC system in the ground mode.		
(3) On MCDU, press MENU pushbutton then TEST PANEL key 6L.	TEST PANEL page displayed. "FLIGHT FAULT REVIEW?" displayed.	
(4) Press and release FWD key until "RUN MAINTENANCE TEST?" is displayed.	"RUN MAINTENANCE TEST?" displayed.	
NOTE: Pressing VERIFY pushbutton after step (4) results in either "MD-87 OPTION VERIFY" or "MD-80 OPTION VERIFY" being displayed before step (4a) for MD-80 or MD-87 aircraft. On other aircraft pressing VERIFY pushbutton results in "SEL DFGC TEST SIDE - VERIFY" being displayed as in next step.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(4a) Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	
(5) Press and release VERIFY pushbutton.	"STP TESTS?" displayed.	
NOTE: During System Maintenance BIT, the FMA associated with the DFGS switch, (i.e., DFGS in position 1 corresponds to captain's FMA), will display in ATS window RTS/MNT, and in pitch window TEST, while the test is being performed.		
SEQUENCE ZERO - "MCDU TESTS"		
(6) Press and release VERIFY pushbutton.	"CYCLE STP FWDSPACE PB" displayed.	1
(7) Press and release FWD key.	"CYCLE STP BACKSPACE PB" displayed.	2
(8) Press and release BACK key.	"STP SEGMENTS TEST - VERIFY" displayed.	3
(9) Press and release VERIFY pushbutton.	MCDU displays all diamonds.	
NOTE: In order to increase the life of the message display lamps, the program only allows 10 seconds before resetting segments and reissuing the original dis play message. If segments are not to be checked, press and release FWD key. If FWD key is pressed while segments are displayed, a failure will be logged.		
(9a) After ten seconds are over see display.	"STP SEGMENT TEST - VERIFY" will be displayed.	
(10) Press and release FWD key.	"INITIAL SETUP INTERACTIVES?" displayed.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"		
(11) Press and release VERIFY pushbutton.	"DISENGAGE A/P - VERIFY" displayed.	4 through 11
(12) Verify autopilot switch placed off. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE OFF - VERIFY" displayed.	12
(13) On captain's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE OFF - VERIFY" displayed.	13
(14) On first officer's FMA verify AP light is not on. Press and release VERIFY pushbutton.	"DISENGAGE A/T - VERIFY" displayed.	14 15
(15) Verify AUTO THROT switch placed OFF. Press and release VERIFY pushbutton.	"DISENGAGE YAW DAMP - VERIFY" displayed.	16
(16) On overhead panel verify YAW DAMP switch placed OFF. Press and release VERIFY pushbutton.	"YAW DAMP OFF LITE ON - VERIFY" displayed.	17
(17) On overhead annunciator panel verify YAW DAMP OFF light is on. Press and release VERIFY pushbutton.	"RCVRS NOT ILS - VERIFY" displayed.	18 19

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(18) Verify that both NAV control panels are not tuned to an ILS frequency. Press and release VERIFY pushbutton.	"TEST IN PROGRESS" displayed.	20 21
(18a) "TEST IN PROGRESS" will display for approximately 5 seconds.	When test successful MCDU displays "ADVANCE THROTTLE - VERIFY".	
(19) Advance throttle levers to mid range. Press and release VERIFY pushbutton.	"PASSIVE DISCRETES?" displayed.	
SEQUENCE TWO - “PASSIVE DISCRETES”		
NOTE: Sequence two is checked automatically. If a fault is recognized, the testing sequence will stop and the failure message will appear. Cycling VERIFY pushbutton provides diagnostic number for the failure. Press and release FWD key to initiate testing again.		
(20) Press and release VERIFY pushbutton. Wait approximately (.25) seconds.	"TRC OPTION PIN ABCD = XXXX VERIFY".	51
(20a) Upon completion of automatic testing, MCDU will display status of engine option pins for Thrust Rating.	TRC OPTION PIN ABCDE = XXXX VERIFY displays.	51
NOTE: These option pins will be different for the type engine used as follows: -209 engine ABCDE = -GGG-, ABCD = -GGG -217A engine ABCDE = --G-- -217A/-217C engine ABCD = --G- -217 engine ABCDE = GG-G-, ABCD = GG-G -219 engine ABCDE = -GG-G		
NOTE: G = GROUND, - = OPEN. Reference Trouble Shooting section, Sequence Two - "PASSIVE DISCRETES" Diagnostic Number 51.		
(20b) Press and release VERIFY pushbutton.	"SWITCHES AND BUTTONS?" displayed.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"		
NOTE: On aircraft with a dual attitude system, steps (21) through (24) do not apply.		
(21) Press and release VERIFY pushbutton.	"ATT SW UNIT CAPT ON AUX - VERIFY" displayed.	73 74 75 76
(22) On overhead panel place AHRS or VERT GYRO switch to L ON AUX. Press and release VERIFY pushbutton.	"ATT SW UNIT F/O ON AUX - VERIFY" displayed.	77 78 79 80
(23) Place AHRS or VERT GYRO switch to R ON AUX. Press and release VERIFY pushbutton.	"ATT SW UNIT ON NORMAL - VERIFY" displayed.	81 82 83 84

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(24) Place AHRS or VERT GYRO switch to NORM position. Press and release VERIFY pushbutton.	"CADC ON TEST SIDE - VERIFY" displayed.	85
(25) On overhead panel place CADC switch to same side as DFGS switch (BOTH ON 1 or BOTH ON 2). Press and release VERIFY pushbutton.	"CADC ON NON-TEST SIDE - VERIFY" displayed.	90
(26) Place CADC switch to opposite side. Press and release VERIFY pushbutton.	"CADC ON NORM - VERIFY" displayed.	91
(27) Place CADC switch to NORM. Press and release VERIFY pushbutton.	"TEMP SELECT 48 DEGREES - VERIFY" displayed.	93 through 100
NOTE: Aircraft with -930 and subsequent DFGC and EPR select option, TEMP SELECT is 87.		
(28) On Thrust Rating Panel (TRP), press T/O FLX pushbutton on TRP. ASSUMED TEMP will be displayed in offside FMA window. Set ASSUMED TEMP knob on TRP to 48°C. Press and release VERIFY pushbutton.	"TEMP SELECT 37 DEGREES - VERIFY" displayed.	101 through 108
(29) Adjust ASSUMED TEMP to 37 degrees. Press and release VERIFY pushbutton.	"TR MODE T/O - VERIFY" displayed.	109
(30) On Thrust Rating Panel press and release T.O. pushbutton. Press and release VERIFY pushbutton.	"TR MODE T/O FLX - VERIFY" displayed.	110
NOTE: The steps applying to TRP are only checking the buttons and their lights. The Thrust Rating Mode is not checked during this step. It is done continuously by the DFGC.		
(31) Press and release T.O. FLX pushbutton. Press and release VERIFY pushbutton.	"TR MODE GA - VERIFY" displayed.	111
(32) Press and release GA pushbutton. Press and release VERIFY pushbutton.	"TR MODE MCT - VERIFY" displayed.	112
(33) Press and release MCT pushbutton. Press and release VERIFY pushbutton.	"TR MODE CL - VERIFY" displayed.	113
(34) Press and release CL pushbutton. Press and release VERIFY pushbutton.	"TR MODE CR - VERIFY" displayed.	114
(35) Press and release CR pushbutton. Press and release VERIFY pushbutton.	"CYCLE TO/GA SWITCH 1" displayed.	117
(36) On throttle lever press and release left TO/GA switch.	"CYCLE TO/GA SWITCH 2" displayed.	118
(37) Press and release right TO/GA switch.	"CYCLE A/P 1 DISCONNECT" displayed.	119
(38) Press and release captain's control wheel AP disconnect switch.	"CYCLE A/P 2 DISCONNECT" displayed.	120
(39) Press and release first officer's control wheel AP disconnect switch.	"CYCLE CAPT FMA RESET PB" displayed.	121

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(40) Press and release RESET button on captain's FMA.	"CYCLE F/O FMA RESET PB" displayed.	122
(41) Press and release RESET button on first officer's FMA.	"PULL GND SENS BRKRS - VERIFY" displayed.	123 124
NOTE: If testing of the Bleed Inputs (steps (42) through (58)) is not desired, leave GND SENS BRKRS closed and cycle FWD key. Pressing the FWD key will skip the above mentioned tests and resume on step (59).		
(42) On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and RIGHT circuit breakers. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED OPEN - VERIFY" displayed.	125
NOTE: When pneumatic switches are opened, PNEU X FEED VALVE OPEN is displayed adjacent to the left and right pneumatic X-FEED lever.		
(43) On pedestal, place left pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	126
(44) On overhead panel, place AIR FOIL switch ON. Open TAIL DE-ICE TIMER circuit breaker. Press and re lease VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY" displayed.	127
(45) On overhead panel, place AIR FOIL switch OFF. Press and release VERIFY pushbutton.	"LEFT PNEU X FEED CLOSE - VERIFY" displayed.	128
(46) On pedestal, close left pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"RIGHT PNEU X FEED OPEN - VERIFY" displayed.	129
(47) On pedestal, place right pneumatic X-FEED lever to open position. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW ON - VERIFY" displayed.	130
(48) On overhead panel, place AIR FOIL switch ON. Press and release VERIFY pushbutton.	"ASOC AIRFOIL ICE SW OFF - VERIFY displayed.	131
(49) On overhead panel, place AIR FOIL switch OFF. Press and release VERIFY pushbutton. Close TAIL DE-ICE TIMER circuit breaker.	"RIGHT PNEU X FEED CLOSE - VERIFY" displayed.	132
(50) On pedestal, close right pneumatic X-FEED lever. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW ON - VERIFY" displayed.	133
(51) On overhead panel place ICE PROTECT ENG L switch ON. Press and release VERIFY pushbutton.	"L ENG ANTI-ICE SW OFF - VERIFY" displayed.	134
(52) Place ICE PROTECT ENG L switch OFF. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW ON - VERIFY" displayed.	135

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(53) Place ICE PROTECT ENG R switch ON. Press and release VERIFY pushbutton.	"R ENG ANTI-ICE SW OFF - VERIFY" displayed.	136
(54) Place ICE PROTECT ENG R switch OFF. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW AUTO - VERIFY" displayed.	137
(55) On overhead panel place left AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"LEFT A/C SUPPLY SW OFF - VERIFY" displayed.	138
(56) Place left AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW AUTO - VERIFY" displayed.	139
(57) Place right AIR CONDITIONING SUPPLY switch to AUTO. Press and release VERIFY pushbutton.	"RIGHT A/C SUPPLY SW OFF - VERIFY" displayed.	140
(58) Place right AIR CONDITIONING SUPPLY switch to OFF. Press and release VERIFY pushbutton.	"CLOSE GND SENS BRKRS - VERIFY" displayed.	141
(59) On upper EPC close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers.	"SEL DFGC NON-TST SIDE - VERIFY" displayed.	143
(60) On FGCP place DFGS 1, 2, switch to opposite position. Press and release VERIFY pushbutton.	"SEL DFGC TEST SIDE - VERIFY" displayed.	144
(61) Place DFGS switch back to test side indicated by DFGC VALID status line on MCDU. Press and release VERIFY pushbutton.	"CYCLE FMS OVRD PB" displayed.	145
NOTE: The following test sequences verify that the pushbuttons and knobs on the FGCP will make and break contact. If the MCDU does not cycle to the next test, then the cycling was not detected by the DFGC. Pressing and releasing the VERIFY pushbutton will advise the DFGC of the failure. Pressing and releasing the FWD key will advance the MCDU to the next display message.		
NOTE: The ILS or Autoland modes are not being tested during this sequence. Only the switch operation is checked.		
(61a) Press and release FMS OVRD pushbutton.	"CYCLE SPEED SELECT PB" displayed.	146
(62) Press and release SPD SEL pushbutton.	"CYCLE MACH SELECT PB" displayed.	147
(63) Press and release MACH SEL pushbutton.	"CYCLE EPR LIMIT PB" displayed.	148
(64) Press and release EPR LIM pushbutton.	"CYCLE NAV PB" displayed.	149
(64a) Press and release NAV pushbutton	"CYCLE VOR/LOC PB" displayed.	150
(65) Press and release VOR/LOC pushbutton.	"CYCLE ILS PB" displayed.	151
(66) Press and release ILS pushbutton.	"CYCLE AUTOLAND PB" displayed.	152

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(67) Press and release AUTO LAND pushbutton.	"CYCLE VERT SPD PB" displayed.	153
(68) Press and release FWD key.	"CYCLE IAS/MACH PB" displayed.	154
(69) Press and release IAS/MACH pushbutton.	"CYCLE PERF or VNAV PB" displayed.	155
(70) Press and release PERF or VNAV pushbutton.	"CYCLE ALT HOLD PB" displayed.	156
(71) Press and release ALT HOLD pushbutton.	"CYCLE TURB PB" displayed.	157
(72) Press and release TURB pushbutton.	"CYCLE SPEED KNOB (2ND DET IN)" displayed.	159
(73) Push SPD MACH knob full in and release.	"CYCLE HDG KNOB (OUT)" displayed.	160
(74) Pull H knob full out and release.	"CYCLE HDG KNOB (2ND DET IN)" displayed.	161
(75) Push H knob full in and release.	"CYCLE ALT KNOB (OUT)" displayed.	162
(76) Pull ALT knob full out and release.	"CYCLE ALT KNOB (IN)" displayed.	163
(77) Push ALT knob full in and release.	"BANK LIMIT 15 DEGREES - VERIFY" displayed.	164
(78) Rotate outer heading knob to 15 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 20 DEGREES - VERIFY" displayed.	165
(79) Rotate to 20 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 25 DEGREES - VERIFY" displayed.	166
(80) Rotate to 25 degrees. Press and release VERIFY pushbutton.	"BANK LIMIT 30 DEGREES - VERIFY" displayed.	167
(81) Rotate to 30 degrees. Press and release VERIFY pushbutton.	"SPEED REF OPER - VERIFY" displayed.	168
(82) Rotate SPD MACH knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"HEADING REF OPER - VERIFY" displayed.	169
(83) Rotate H knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"VERT SPD REF OPER - VERIFY" displayed.	174
(84) Rotate pitch wheel full ANU and AND. Press and release VERIFY pushbutton.	"ALT REF OPER - VERIFY" displayed.	175
(85) Rotate ALT knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-1 REF OPER - VERIFY" displayed.	176

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(86) Rotate captain's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"CRS-2 REF OPER - VERIFY" displayed.	177
(87) Rotate first officer's CRS knob CW and CCW and verify display changes in readout window. Press and release VERIFY pushbutton.	"SENSOR VALUES?" displayed.	
NOTE: The DFGC is not testing the knobs in steps (82) through (87). These are messages to have mechanic be sure knobs turn freely and digital displays change.		
SEQUENCE FOUR - "SENSOR VALUES"		
(88) Press and release VERIFY pushbutton.	"DISPLAY OPTION?" displayed.	
NOTE: There are three testing options available when the message "DISPLAY OPTION " appears. FIRST: Pressing and releasing the FWD key will automatically null check the sensor values. The values are compared to a ground reference tolerance, and if out of tolerance a fault message will be displayed. SECOND: Pressing and releasing the VERIFY pushbutton will display the first sensor value. The FWD and BACK keys can be used at this time for slew capability. Failures are not recognized when this option is selected. THIRD: After pressing and releasing FWD key the automatic slewing of measurements occurs until the MCDU displays "COCKPIT DISPLAYS".		
(89) Press and release VERIFY pushbutton, for display option, or FWD key.	"PITCH ANGLE 1 = XX.XX DEGREES" displayed.	180
(90) Press and release FWD key.	"PITCH ANGLE 2 = XX.XX DEGREES" displayed.	181
(91) Deleted.		
(92) Press and release FWD key.	"BANK ANGLE 1 = XX.XX DEGREES" displayed.	183
(93) Press and release FWD key.	"BANK ANGLE 2 = XX.XX DEGREES" displayed.	184
(94) Deleted.		
(95) Press and release FWD key.	"SPOILER POS 1 = (TED or TEU) XX.XX DEG" displayed.	186
(96) Press and release FWD key.	"SPOILER POS 2 = (TED or TEU) XX.XX DEG" displayed.	187
(97) Press and release FWD key.	"CRS RAD ALT 1 = XXXX. FEET" displayed.	188
(98) Press and release FWD key.	"CRS RAD ALT 2 = XXXX. FEET" displayed.	189
(99) Press and release FWD key.	"FINE RAD ALT 1 = XXXX. FEET" displayed.	190
(100) Press and release FWD key.	"FINE RAD ALT 2 = XXXX. FEET" displayed.	191
(101) Press and release FWD key.	"ELEV SYNC A = XX.XX DEGREES" displayed.	192

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(102) Press and release FWD key.	"ELEV SYNC B = XX.XX DEGREES" displayed.	193
(103) Press and release FWD key.	"AIL SYNC A = XX.XX DEGREES" displayed.	194
(104) Press and release FWD key.	"AIL SYNC B = XX.XX DEGREES" displayed.	195
(105) Press and release FWD key.	"RUD SYNC A = XX.XX DEGREES" displayed.	196
(106) Press and release FWD key.	"RUD SYNC B = XX.XX DEGREES" displayed.	197
(107) Press and release FWD key.	"YAW DAMP POS = XX.XX DEGREES" displayed.	198
(108) Press and release FWD key.	"MACH TRIM POS = XX.XX INCH" displayed.	199
(109) Press and release FWD key.	"ELEV TACH A = XX.XX DEG/SEC" displayed.	200
(110) Press and release FWD key.	"ELEV TACH B = XX.XX DEG/SEC" displayed.	201
(111) Press and release FWD key.	"AIL TACH A = XX.XX DEG/SEC" displayed.	202
(112) Press and release FWD key.	"AIL TACH B = XX.XX DEG/SEC" displayed.	203
(113) Press and release FWD key.	"RUD TACH A = XX.XX DEG/SEC" displayed.	204
(114) Press and release FWD key.	"RUD TACH B = XX.XX DEG/SEC" displayed.	205
(115) Press and release FWD key.	"A/T TACH = XX.XX DEG/SEC" displayed.	206
(116) Press and release FWD key.	"MACH TRIM TACH = XX.XX DEG/SEC" displayed.	207
(117) Press and release FWD key.	"YAW DAMP TACH = XX.XX DEG/SEC" displayed.	208
(118) Press and release FWD key.	"D3A-X ACCEL A = XX.XX FT/SEC*2" displayed.	209
(119) Press and release FWD key.	"D3A-X ACCEL B = XX.XX FT/SEC*2" displayed.	210
(120) Press and release FWD key.	"D3A-Y ACCEL A = XX.XX FT/SEC*2" displayed.	211
(121) Press and release FWD key.	"D3A Y ACCEL B = XX.XX FT/SEC*2" displayed.	212
(122) Press and release FWD key.	"D3A-Z ACCEL A = XX.XX FT/SEC*2" displayed.	213

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(123) Press and release FWD key.	"D3A-Z ACCEL B = XX.XX FT/SEC*2" displayed.	214
(124) Press and release FWD key.	"DLA-Y ACCEL A = XX.XX FT/SEC*2" displayed.	215
(125) Press and release FWD key.	"DLA-Y ACCEL B = XX.XX FT/SEC*2" displayed.	216
(126) Press and release FWD key.	"G/S DEV A = X.XXX DEGREES" displayed.	217
(127) Press and release FWD key.	"G/S DEV B = X.XXX DEGREES" displayed.	218
(128) Press and release FWD key.	"VOR/LOC DEV A = X.XXX DEGREES" displayed.	219
(129) Press and release FWD key.	"VOR/LOC DEV B = X.XXX DEGREES" displayed.	220
(130) Press and release FWD key.	"LEFT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	221
(131) Press and release FWD key.	"RIGHT ELEVATOR = (TEU or TED) XX.XX DEG" displayed.	222
(132) Press and release FWD key.	"LEFT AILERON = (TEU or TED) XX.XX DEG" displayed.	223
(133) Press and release FWD key.	"RUDDER POS = (TEL or TER) XX.XX DEG" displayed.	224
(134) Press and release FWD key.	"HOR STAB = (TEU or TED) XX.XX DEG" displayed.	225
(135) Press and release FWD key.	"ANGLE OF ATT 1 = XX.XX DEGREES" displayed.	226
(136) Press and release FWD key.	"ANGLE OF ATT 2 = X.XXX DEGREES" displayed.	227
(137) Press and release FWD key.	"EPR LEFT = X.XXX EPR" displayed.	228
(138) Press and release FWD key.	"EPR RIGHT = X.XXX EPR" displayed.	229
(139) Press and release FWD key.	"HEADING 1 = XXX.X DEGREES" displayed.	230
(140) Press and release FWD key.	"HEADING 2 = XXX.X DEGREES" displayed.	231
(141) Press and release FWD key.	"LEFT FLAPS POS = XX.XX DEGREES displayed.	232
(142) Press and release FWD key.	"RIGHT FLAP POS = XX.XX DEGREES" displayed.	233
(143) Press and release FWD key.	"FLAP HANDLE = XX.XX DEGREES" displayed.	234

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
NOTE: During CADC test, the letter T is displayed for CADC on test side and the letter N is for CADC on non test side.		
(144) Press and release FWD key.	"CADC-T ALT NCR = XXXX. FEET" displayed.	235
(145) Press and release FWD key.	"CADC-N ALT NCR = XXXX. FEET" displayed.	236
(146) Press and release FWD key.	"CADC-T TAT = XX.XX DEGREES" displayed.	237
(147) Press and release FWD key.	"CADC-N TAT = XX.XX DEGREES" displayed.	238
(148) Press and release FWD key.	"CADC-T ALT RATE = XX.XX FT/SEC" displayed.	239
(149) Press and release FWD key.	"CADC-N ALT RATE = XX.XX FT/SEC" displayed.	240
(150) Press and release FWD key.	"CADC-T SAT = XX.XX DEGREES" displayed.	241
(151) Press and release FWD key.	"CADC-N SAT = XX.XX DEGREES" displayed.	242
(152) Press and release FWD key.	"CADC-T CAS = XXX.X KNOT" displayed.	243
(153) Press and release FWD key.	"CADC-N CAS = XXX.X KNOT" displayed.	244
(154) Press and release FWD key.	"CADC-T MACH = X.XXXX MACH" displayed.	245
(155) Press and release FWD key.	"CADC-N MACH = X.XXXX MACH" displayed.	246
(156) Press and release FWD key.	"COCKPIT DISPLAYS?" displayed.	
SEQUENCE FIVE - "COCKPIT DISPLAYS"		
(156a) Place both FD switches to ON.		
NOTE: "ART switch must be in the AUTO position prior to running this sequence."		
(157) Press and release VERIFY pushbutton.	"ART INOP LITE - VERIFY" displayed.	250
(158) On overhead annunciator panel verify ART INOP light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 1 - VERIFY" displayed.	251
(159) On captain's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT ADV LITE 2 - VERIFY" displayed.	252
(160) On first officer's altimeter verify amber A light flashes. Press and release VERIFY pushbutton.	"ALT SELECT APPR - VERIFY" displayed.	253
(161) Verify aural warning sounds. Press and release VERIFY pushbutton.	"ALT SELECT DEV - VERIFY" displayed.	254

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(162) Verify aural warning sounds. Press and release VERIFY pushbutton.	"TR EPR VALID - VERIFY" displayed.	255
(163) On EDP, EPR limit is in view. Press and release VERIFY pushbutton.	"TR NO MODE LITE - VERIFY" displayed.	256
(164) On center instrument panel NO MODE flashes on TR panel.	"ART ON LITE - VERIFY" displayed.	257
(165) On center instrument panel verify ART light on flashing. Press and release VERIFY pushbutton.	"ART READY LITE - displayed.	258
NOTE: The following steps (166) through (169) verify that the AUTOLAND and AP TRIM legends on each FMA have two operable bulbs. The "A" light refers to left light bulb and "B" light refers to right light bulb.		
(166) Verify READY light on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE A VERIFY" displayed.	259
(167) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"NO AUTOLAND LITE B VERIFY" displayed.	260
(168) On captain's and first officer's FMA's verify NO AUTOLAND light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE A - VERIFY" displayed.	261
(169) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"A/P TRIM LITE B - VERIFY" displayed.	262
(170) On captain's and first officer's FMA's verify AP TRIM light is on flashing. Press and release VERIFY pushbutton.	"VERT SPD DETENT - VERIFY" displayed.	263
(171) On FGCP verify pitch wheel detent (cycle) position. Press and release VERIFY pushbutton.	"IAS BUG 1 250 KIAS - VERIFY" displayed.	264
(172) On captain's Mach/ Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"IAS BUS 2 250 KIAS - VERIFY" displayed.	265
(173) On first officer's Mach/Airspeed indicator verify IAS bug reads 250 KIAS. Press and release VERIFY pushbutton.	"EPR BUG LEFT 1.8 EPR - VERIFY" displayed.	266
NOTE: Care must be taken to be sure EPR bug manual set knobs on EPR indicators are in the automatic (IN) position.		
(174) On center instrument panel verify left EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR BUG RIGHT 1.8 - VERIFY" displayed.	267
(175) Verify right EPR bug reads 1.8. Press and release VERIFY pushbutton.	"EPR LIMIT CMD 1.8 EPR - VERIFY" displayed.	268
(176) On EEDP verify EPR LIM reads 1.80(±0.014). Press and release VERIFY pushbutton.	"F/D CMD SW to TEST SIDE - VERIFY" displayed.	269

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(176a) On overhead panel, set FD CMD switch to side under test. Press and release VERIFY pushbutton.	"CAPT F/D SW ON VERIFY" displayed.	
(177) On FGCP, place captain's FD switch to FD position. Press and release VERIFY pushbutton.	"CAPT F/D LITE ON - VERIFY" displayed.	270
(178) On captain's FMA, verify blue FD light is flashing. Press and release VERIFY pushbutton.	"CAPT PITCH F/D CENTER - VERIFY" displayed.	271
(179) On captain's PFD verify pitch command centered. Press and release VERIFY pushbutton.	"CAPT PITCH F/D NOSE UP - VERIFY" displayed.	272
(180) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"CAPT ROLL F/D CENTER - VERIFY" displayed.	273
(181) Verify roll command centered. Press and release VERIFY pushbutton.	"CAPT ROLL F/D RIGHT - VERIFY displayed.	274
(182) Verify roll command moves right. Press and release VERIFY pushbutton.	"CAPT F/D SW OFF - VERIFY displayed.	275
(183) On FGCP, place captain's FD switch to OFF position. Press and release VERIFY pushbutton.	"F/O F/D SW ON - VERIFY" displayed.	276
(184) On FGCP, place F/O's FD switch to FD position. Press and release VERIFY pushbutton.	"F/O F/D LITE ON - VERIFY" displayed.	277
(185) On F/O's FMA, verify blue FD light is flash- ing. Press and release VERIFY pushbutton.	"F/O PITCH F/D CENTER - VERIFY" displayed.	278
(186) On first officer's PFD verify pitch command centered. Press and release VERIFY pushbutton.	"F/O PITCH F/D NOSE UP - VERIFY" displayed.	279
(187) Verify pitch command moves nose up. Press and release VERIFY pushbutton.	"F/O ROLL F/D CENTER - VERIFY" displayed.	280
(188) Verify roll command centered. Press and release VERIFY pushbutton.	"F/O ROLL F/D RIGHT - VERIFY" displayed.	281
(189) Verify roll command moves right. Press and release VERIFY pushbutton.	"F/O F/D SW OFF - VERIFY" displayed.	282
(190) On FGCP, place F/O's FD switch to OFF position. Press and release VERIFY pushbutton.	"FAST/SLOW 1 VALID - VERIFY" displayed.	283
(191) On captain's PFD verify SPD flag in and out of view and slow-fast pointer in and out of view. Press and release VERIFY pushbutton.	"FAST/SLOW 2 VALID - VERIFY" displayed.	284

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(192) On first officer's PFD verify SPD flag in and out of view and slow- fast pointer in and out of view. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS CENTER - VERIFY" displayed.	285
(193) On captain's and first officer's PFD's verify fast-slow pointers centered. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS UP - VERIFY" displayed.	286
(194) Verify both fast-slow pointers move to the fast side. Press and release VERIFY pushbutton.	"BOTH SPEED CMDS DOWN - VERIFY" displayed.	287
(195) Verify both fast-slow pointers move to the slow side. Press and release VERIFY pushbutton.	"FMA SEGMENTS TEST - VERIFY" displayed, then "FMA SEGMENTS ON - VERIFY" displayed.	288
(196) On captain's and first officer's FMA's verify all alpha-numeric characters display as a STARBURST for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"FGCP/NCP SGMENTS" TEST" displayed, then "FGCP/NCP SGMENTS ON - VERIFY" displayed.	289
(197) On FGCP and NAV Control panels verify all numerical seven- segment digits are displayed for approximately 10 seconds. Press and release VERIFY pushbutton if all segments are good.	"SECOND SETUP INTERACTIVES?" displayed.	
NOTE: After completion of sequence five, place FD CMD switch on overhead panel back to NORM position.		
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"		
(198) Press and release VERIFY pushbutton.	"ENGAGE A/P - VERIFY" displayed.	312 through 319
(199) On FGCP place AP switch to ON position. Press and release VERIFY pushbutton.	"FMA-1 A/P LITE ON - VERIFY" displayed.	320
(200) On captain's FMA verify AP light on. Press and release VERIFY pushbutton.	"FMA-2 A/P LITE ON - VERIFY" displayed.	321
(201) On first officer's FMA verify AP light on. Press and release VERIFY pushbutton.	"ENGAGE A/T - VERIFY" displayed.	322
(202) On FGCP place auto- throttle switch to AUTO THROT position. Press and release VERIFY pushbutton.	"ENGAGE YAW DAMP - VERIFY" displayed.	323
(203) On overhead panel verify YAW DAMP switch placed ON. Press and release VERIFY pushbutton.	"Y/D OFF LITE OFF - VERIFY" displayed.	324
(204) On overhead annunciator panel verify YAW DAMP OFF light is not on. Press and release VERIFY pushbutton.	"RCVRS TO ILS - VERIFY" displayed.	325 326

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(205) Tune both NAV control panels to a valid ILS frequency. Press and release VERIFY pushbutton.	"RETARD THROTTLE - VERIFY" displayed.	327 328
(206) Place both throttle levers to the aft mechanical stop. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/ RETRACT VERIFY" displayed.	329 through 337
NOTE: After the FLAP/SLAT handle has been moved, and the VERIFY pushbutton has been pressed, the message "FLAP TEST IN PROGRESS" will be displayed for approximately 30 seconds.		
WARNING: PRIOR TO PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED, FLIGHT CONTROL SYSTEMS ARE IN NEUTRAL POSITION, AND CONTROL SURFACE AREAS ARE CLEAR OF ALL PERSONNEL AND EQUIPMENT.		
(206a) On center instrument panel, place HYD PUMPS AUX switch to ON, and ALT switch to ON.	Hydraulic pressure available.	
(207) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 11/ MID - VERIFY" displayed.	338 through 342
(208) Place flap/slat handle to 11 degrees. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 28/ EXTEND - VERIFY" displayed.	343 through 349
(209) Place flap/slat handle to 28 degrees. Press and release VERIFY pushbutton.	"SELF TESTS?" displayed.	
SEQUENCE SEVEN - "SELF TESTS"		
(209a) Press and release VERIFY pushbutton.	"RCVRS TO ILS VERIFY" displayed.	
NOTE: If testing of the ILS receivers is not desired, press and release FWD key and only the radio altimeters and accelerometers self-tests will be performed.		
(210) Press and release VERIFY pushbutton. Wait approximately (30) seconds.	"TEST IN PROGRESS" displayed.	350 through 381
NOTE: Sequence seven is an automatic self-test of the ILS receivers, R/T units and accelerometers. "TEST IN PROGRESS" will be displayed during the self-tests. At the conclusion of each self-test the MCDU will flash to advise of test completion.		
SEQUENCE EIGHT - "SERVO TESTS"		
NOTE: For convenience it is possible to selectively run portions of the servo test. For example, step (211) states "A/P ENGAGED - VERIFY"; if the autopilot is engaged and the VERIFY pushbutton is pressed, all 3 Dual Servo tests and the Auto Pitch Trim are performed. If these tests are not to be performed, disengage the autopilot and press and release the FWD key. The MCDU will then display "YAW DAMP ON - VERIFY" (step 220). Turning the YAW DAMP off and pressing the FWD key will result in the message "MACH TRIM NORM - VERIFY" without having run the yaw damp test. The same procedure also applies for the Mach Trim Actuator and the autothrottle.		
(211) Place nosewheel steering bypass valve in BYPASS position, and install BYPASS VALVE lockpin.	No test.	

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(211a) Press and release VERIFY pushbutton.		
NOTE: During each of the servo tests, the message "TEST IN PROGRESS" will be displayed.		
(212) Verify autopilot switch ON. Press and release VERIFY pushbutton.	"A/P ENGAGED - VERIFY" displayed.	385
(213) Verify both control wheels turn right wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS RWD - VERIFY" displayed.	386 through 398
(214) Verify both control wheels turn left wing down. Press and release VERIFY pushbutton.	"WHEEL TURNS LWD - VERIFY" displayed.	399 through 403
(215) Verify both control columns move forward. Press and release VERIFY pushbutton.	"COLUMN MOVES FWD - VERIFY" displayed.	404 through 416
(216) Verify both control columns move aft. Press and release	"COLUMN MOVES AFT - VERIFY" displayed.	417 through 421
(217) Verify right rudder pedal moves forward. Press and release VERIFY pushbutton.	"RHT PEDAL MOVES FWD - VERIFY" displayed.	422 through 434
(218) Verify left rudder pedal moves forward. Press and release VERIFY pushbutton.	"LEFT PEDAL MOVES FWD - VERIFY" displayed.	435 through 439
(219) On pedestal verify trim indicator moves towards nose up. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE UP - VERIFY" displayed.	440
(220) On pedestal verify trim indicator moves towards nose down. Press and release VERIFY pushbutton.	"PITCH TRIM NOSE DN - VERIFY" displayed.	441
(221) On overhead panel, verify YAW DAMP switch ON. Press and release VERIFY pushbutton.	"YAW DAMP ON - VERIFY" displayed.	442 443
NOTE: If ground power is being applied, verify correct voltage, or a failure may be recorded in the Mach Trim system.		
(222) On overhead panel, verify MACH TRIM COMP switch is in NORM position. Press and release VERIFY pushbutton.	"MACH TRIM NORM - VERIFY" displayed.	444
(223) On FGCP, verify AUTO THROT switch is ON. Press and release VERIFY pushbutton.	"A/T ENGAGED - VERIFY" displayed.	445 through 448
(223a) Place FLAP/SLAT handle to UP/RET position. Press and release VERIFY pushbutton.	"FLAP/SLAT TO 0/RETRACT VERIFY" displayed. "FLAP TEST IN PROGRESS" displayed.	449
NOTE: If a failure has not been detected, "INTERNAL MONITORS?" will be displayed.		

Table 207 (Continued)

Action	Desired Result	Diagnostic Number
(223b) Remove lockpin from nosewheel BYPASS VALVE.	Handle returns to normal position.	
SEQUENCE NINE - "INTERNAL MONITORS"		
NOTE: Sequence nine is an automatic check of the validity of synchro, resolvers and also performs a reasonableness test. "TEST IN PROGRESS" will be displayed during this test. At the conclusion of testing, "FAILURE RECAP?" will be displayed.		
(224) Press and release VERIFY pushbutton.	The total number of faults will be dis played momentarily, then the first fault will be displayed.	
NOTE: Momentarily pressing the VERIFY pushbutton after each failure is recorded, will display the diag nostic number.		
(225) Read and record all faults by pressing and releasing FWD pushbutton, until the message "FAILURE RECAP?" displayed.	"FAILURE RECAP?" displayed.	
NOTE: If a "FAILURE RECAP?" is desired, press and release VERIFY pushbutton and the total number of faults will again be displayed.		
(226) Press and release FWD key.	"MAINTENANCE MEMORY ERASE?" displayed.	
NOTE: At this time the autopilot and autothrottle automatically disengage. Turn off autopilot and autothrottle red warning lights by cycling the disconnect switches.		
(227) Press and release VERIFY pushbutton.	"VERIFY TO ERASE MEMORY?" displayed.	
NOTE: If Maintenance Memory is to be retained, press and release FWD key and "FLIGHT FAULT REVIEW?" will be displayed.		
(228) Press and release VERIFY pushbutton.	"FLIGHT FAULT REVIEW?" displayed.	
(229) Press and release MENU pushbutton.	MCDU MENU displayed.	
(230) Autopilot and Authrottle disengage automatically at the conclusion of System Maintenance BIT.	Autopilot disen gaged. AP red off warning lights on until either AP disconnect switch pressed. Auto throttle disen gaged. THROTTLE red off warning lights on until throttle disconnect switch pressed.	
(231) Place airplane in normal ground configuration.	No test.	

NOTE: Following is a list of failures and diagnostic numbers that may appear if a System Maintenance BIT "FAILURE" message appears. DFGS STATUS/TEST, SUBJECT 22-01-05, Page 101, for trouble shooting procedures corresponding to failure.

Table 208

Failure	Diagnostic Number
SEQUENCE ZERO - "STP TESTS"	
STP FWDSPACE PB FAILURE	1
STP BACKSPACE PB FAILURE	2
STP SGMENTS FAILURE	3

Table 208 (Continued)

Failure	Diagnostic Number
NOTE: In tests that multiple failures of a sensor occurs, such as servo failures, the fault will only be displayed once during the FAILURE RECAP.	
SEQUENCE ONE - "INITIAL SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	4
A/P OFF FAILURE	5
AILERON CLUTCH FAILURE	6
AILERON CLUTCH FAILURE	7
ELEVATOR CLUTCH FAILURE	8
ELEVATOR CLUTCH FAILURE	9
RUDDER CLUTCH FAILURE	10
RUDDER CLUTCH FAILURE	11
FMA-1 A/P LITE OFF FAILURE	12
FMA-2 A/P LITE OFF FAILURE	13
A/T ENGMNT FAILURE	14
A/T CLAMP FAILURE	15
YAW DAMP ENGMNT FAILURE	16
YAW DAMP OFF LITE ON FAILURE	17
NAV 1 TUNING FAILURE	18
NAV 2 TUNING FAILURE	19
LEFT MIN SWITCH FAILURE	20
RIGHT MIN SWITCH FAILURE	21
SEQUENCE TWO - "PASSIVE DISCRETES"	
ATTITUDE VALID 1 FAILURE	22
ATTITUDE VALID 2 FAILURE	23
HDG 1 VALID FAILURE	25
HDG 2 VALID FAILURE	26
DLA-A VALID FAILURE	27
DLA-B VALID FAILURE	28
D3A-A VALID FAILURE	29
D3A-B VALID FAILURE	30
GND CNTL RELAY 1 FAILURE	31
GND CNTL RELAY 2 FAILURE	32

Table 208 (Continued)

Failure	Diagnostic Number
LEFT SLAT VALID FAILURE	33
RIGHT SLAT VALID FAILURE	34
AIL MECH TORQUE LIMIT SWITCH 1 FAILURE	35
AIL MECH TORQUE LIMIT SWITCH 2 FAILURE	36
RUD UNRESTRICTED SWITCH 1 FAILURE	37
RUD UNRESTRICTED SWITCH 2 FAILURE	38
D3A NORM ACCEL VALID FAILURE	39
TR-EPR DISPLAY VALID FAILURE	40
RAD DSP 1 VALID FAILURE	41
RAD DSP 2 VALID FAILURE	42
RAD ALT 1 VALID FAILURE	43
RAD ALT 2 VALID FAILURE	44
ART OPTION PIN FAILURE	45
AUTO G/A OPTION PIN FAILURE	46
R/A OPTION PIN FAILURE	47
OPTION PIN PARITY FAILURE	48
WHEEL SPIN-UP FAILURE	49
WHEEL SPIN-UP FAILURE	50
TRC OPTION PIN FAILURE	51
EPR SEL PB1 FAILURE	52
EPR SEL PB2 FAILURE	53
NOTE: Diagnostics 52 and 53 for EPR select pushbutton installed with -930 and subsequent DFGC's.	
SEQUENCE THREE - "SWITCHES AND BUTTONS"	
VG SW UNIT SWITCH FAILURE	73
VG SW UNIT SWITCH FAILURE	74
VG SW UNIT SWITCH FAILURE	75
VG SW UNIT SWITCH FAILURE	76
VG SW UNIT SWITCH FAILURE	77
VG SW UNIT SWITCH FAILURE	78
VG SW UNIT SWITCH FAILURE	79
VG SW UNIT SWITCH FAILURE	80
VG SW UNIT SWITCH FAILURE	81
VG SW UNIT SWITCH FAILURE	82

Table 208 (Continued)

Failure	Diagnostic Number
VG SW UNIT SWITCH FAILURE	83
VG SW UNIT SWITCH FAILURE	84
CADC SWITCH FAILURE	85
CADC SWITCH FAILURE	86
CADC SWITCH FAILURE	87
CADC SWITCH FAILURE	88
CADC SWITCH FAILURE	89
CADC SWITCH FAILURE	90
CADC SWITCH FAILURE	91
CADC SWITCH FAILURE	92
TEMP SELECT PANEL FAILURE	93
TEMP SELECT PANEL FAILURE	94
TEMP SELECT PANEL FAILURE	95
TEMP SELECT PANEL FAILURE	96
TEMP SELECT PANEL FAILURE	97
TEMP SELECT PANEL FAILURE	98
TEMP SELECT PANEL FAILURE	99
TEMP SELECT PANEL FAILURE	100
TEMP SELECT PANEL FAILURE	101
TEMP SELECT PANEL FAILURE	102
TEMP SELECT PANEL FAILURE	103
TEMP SELECT PANEL FAILURE	104
TEMP SELECT PANEL FAILURE	105
TEMP SELECT PANEL FAILURE	106
TEMP SELECT PANEL FAILURE	107
TEMP SELECT PANEL FAILURE	108
TR MODE T/O FAILURE	109
TR MODE T/O FLEX FAILURE	110
TR MODE GA FAILURE	111
TR MODE MCT FAILURE	112
TR MODE CL FAILURE	113
TR MODE CR FAILURE	114
TO/GA SWITCH 1 FAILURE	117
TO/GA SWITCH 2 FAILURE	118

Table 208 (Continued)

Failure	Diagnostic Number
F/O FMA RESET PB FAILURE	122
GND SENSOR FAILURE	123
GND SENSOR FAILURE	124
LEFT PNEU X FEED OPEN FAILURE	125
ASOC AIRFOIL ICE ON FAILURE	126
ASOC AIRFOIL ICE OFF FAILURE	127
LEFT PNEU X FEED CLOSE FAILURE	128
RIGHT PNEU X FEED OPEN FAILURE	129
ASOC AIRFOIL ICE ON FAILURE	130
ASOC AIRFOIL ICE OFF FAILURE	131
RIGHT PNEU X FEED CLOSE FAILURE	132
L ANTI-ICE SW ON FAILURE	133
L ANTI-ICE SW OFF FAILURE	134
R ANTI-ICE SW ON FAILURE	135
R ANTI-ICE SW OFF FAILURE	136
LEFT A/C SUP SW AUTO FAILURE	137
LEFT A/C SUP SW OFF FAILURE	138
RIGHT A/C SUP SW AUTO FAILURE	139
RIGHT A/C SUP SW OFF FAILURE	140
GND SENSOR FAILURE	141
GND SENSOR FAILURE	142
SEL DFGC NON-TEST SIDE FAILURE	143
SEL DFGC TEST SIDE FAILURE	144
FMS OVRD PB FAILURE	145**
SPEED SELECT PB FAILURE	146
MACH SELECT PB FAILURE	147
EPR LIMIT PB FAILURE	148
NAV PB FAILURE	149
VOR/LOC PB FAILURE	150
ILS PB FAILURE	151
AUTOLAND PB FAILURE	152
VERT SPD PB FAILURE	153
MACH/IAS PB FAILURE	154
PERF OR VNAV PB FAILURE	155***

Table 208 (Continued)

Failure	Diagnostic Number
ALT HOLD PB FAILURE	156
TURB PB FAILURE	157
SPEED KNOB (2ND DET IN) FAILURE	159
HDG KNOB (OUT) FAILURE	160
HDG KNOB (2ND DET IN) FAILURE	161
ALT KNOB (OUT) FAILURE	162
ALT KNOB (IN) FAILURE	163
NOTE: ** Used for customers with FMS and -970 DFGC and subs. *** Used for customers with -970 DFGC and subs.	
BANK LIMIT 15 DEGREES FAILURE	164
BANK LIMIT 20 DEGREES FAILURE	165
BANK LIMIT 25 DEGREES FAILURE	166
BANK LIMIT 30 DEGREES FAILURE	167
SPEED REF OPER FAILURE	168
HEADING REF OPER FAILURE	169
CAPT HDG SEL REF FAILURE	173
VERT SPD REF OPER FAILURE	174
ALT REF OPER FAILURE	175
CRS-1 REF OPER FAILURE	176
CRS-2 REF OPER FAILURE	177
SEQUENCE FOUR - "SENSOR VALUES"	
PITCH ANGLE 1 FAILURE	180
PITCH ANGLE 2 FAILURE	181
BANK ANGLE 1 FAILURE	183
BANK ANGLE 2 FAILURE	184
SPOILER POS 1 FAILURE	186
SPOILER POS 2 FAILURE	187
CRS RAD ALT 1 FAILURE	188
CRS RAD ALT 2 FAILURE	189
FINE RAD ALT 1 FAILURE	190
FINE RAD ALT 2 FAILURE	191
ELEV SYNC A FAILURE	192
ELEV SYNC B FAILURE	193

Table 208 (Continued)

Failure	Diagnostic Number
AIL SYNC A FAILURE	194
AIL SYNC B FAILURE	195
RUD SYNC A FAILURE	196
RUD SYNC B FAILURE	197
YAW DAMP SYNC FAILURE	198
MACH TRIM POS FAILURE	199
ELEV TACH A FAILURE	200
ELEV TACH B FAILURE	201
AIL TACH A FAILURE	202
AIL TACH B FAILURE	203
RUD TACH A FAILURE	204
RUD TACH B FAILURE	205
A/T TACH FAILURE	206
MACH TRIM TACH FAILURE	207
YAW DAMP TACH FAILURE	208
D3A-X ACCEL A FAILURE	209
D3A-X ACCEL B FAILURE	210
D3A-Y ACCEL A FAILURE	211
D3A-Y ACCEL B FAILURE	212
D3A-Z ACCEL A FAILURE	213
D3A-Z ACCEL B FAILURE	214
DLA-Y ACCEL A FAILURE	215
DLA-Y ACCEL B FAILURE	216
ALT CORRECTION FAILURE	247
SEQUENCE FIVE - "COCKPIT DISPLAYS"	
EPR SEL LITE A AND B FAILURE	249
ART INOP LITE FAILURE	250
ALT ADV LITE 1 FAILURE	251
ALT ADV LITE 2 FAILURE	252
ALT SELECT APPR FAILURE	253
ALT SELECT DEV FAILURE	254
TR EPR VALID FAILURE	255
TR NO MODE LITE FAILURE	256

Table 208 (Continued)

Failure	Diagnostic Number
ART ON LITE FAILURE	257
ART READY LITE FAILURE	258
NO AUTOLAND LITE A FAILURE	259
NO AUTOLAND LITE B FAILURE	260
A/P TRIM LITE A FAILURE	261
A/P TRIM LITE B FAILURE	262
VERT SPD DETENT FAILURE	263
IAS BUG FAILURE	264
IAS BUG FAILURE	265
EPR BUG FAILURE	266
EPR BUG FAILURE	267
EPR LIMIT CMD FAILURE	268
CAPT F/D SW FAILURE	269
CAPT F/D LITE ON FAILURE	270
PITCH F/D FAILURE	271
PITCH F/D FAILURE	272
ROLL F/D FAILURE	273
ROLL F/D FAILURE	274
CAPT F/D SW FAILURE	275
F/O F/D SW FAILURE	276
F/O F/D LITE ON FAILURE	277
PITCH F/D FAILURE	278
PITCH F/D FAILURE	279
ROLL F/D FAILURE	280
ROLL F/D FAILURE	281
F/O F/D SWITCH FAILURE	282
FAST/SLOW 1 VALID FAILURE	283
FAST/SLOW 2 VALID FAILURE	284
FAST/SLOW CMD FAILURE	285
FAST/SLOW CMD FAILURE	286
FAST/SLOW CMD FAILURE	287
FMA SEGMENTS FAILURE	288
FGCP/NCP SEGMENTS FAILURE	289

Table 208 (Continued)

Failure	Diagnostic Number
SEQUENCE SIX - "SECOND SETUP INTERACTIVES"	
A/P ENGMNT FAILURE	312
A/P OFF FAILURE	313
AILERON CLUTCH FAILURE	314
AILERON CLUTCH FAILURE	315
ELEVATOR CLUTCH FAILURE	316
ELEVATOR CLUTCH FAILURE	317
RUDDER CLUTCH FAILURE	318
RUDDER CLUTCH FAILURE	319
FMA-1 A/P LITE ON FAILURE	320
FMA-2 A/P LITE ON FAILURE	321
A/T ENGMNT FAILURE	322
YAW DAMP ENGMNT FAILURE	323
Y/D OFF LITE OFF FAILURE	324
NAV 1 TUNING FAILURE	325
NAV 2 TUNING FAILURE	326
LEFT MIN SWITCH FAILURE	327
RIGHT MIN SWITCH FAILURE	328
FLAP RETRACT FAILURE	329
FLAP RETRACT FAILURE	330
FLAP RETRACT FAILURE	331
AIL MECH TORQUE SWITCH 1 FAILURE	332
AIL MECH TORQUE SWITCH 2 FAILURE	333
SLATS RETRACT FAILURE	334
SLATS RETRACT FAILURE	335
RTS SLATS FAILURE	336
RTS FLAPS FAILURE	337
FLAP POS FAILURE	338
FLAP POS FAILURE	339
FLAP POS FAILURE	340
SLAT POS FAILURE	341
SLAT POS FAILURE	342
FLAP POS FAILURE	343
FLAP POS FAILURE	344

Table 208 (Continued)

Failure	Diagnostic Number
FLAP POS FAILURE	345
AIL MECH TORQUE SWITCH 1 FAILURE	346
AIL MECH TORQUE SWITCH 2 FAILURE	347
SLAT POS FAILURE	348
SLAT POS FAILURE	349
SEQUENCE SEVEN - "SELF TESTS"	
NAV 1 SELF-TEST FAILURE	350
NAV 1 SELF-TEST FAILURE	351
NAV 2 SELF-TEST FAILURE	352
NAV 2 SELF-TEST FAILURE	353
NAV 1 SELF-TEST FAILURE	354
NAV 1 SELF-TEST FAILURE	355
NAV 2 SELF-TEST FAILURE	356
NAV 2 SELF-TEST FAILURE	357
D3A-A SELF-TEST FAILURE	358
D3A-A SELF-TEST FAILURE	359
D3A-A SELF-TEST FAILURE	360
D3A-A SELF-TEST FAILURE	361
D3A-A SELF-TEST FAILURE	362
D3A-A SELF-TEST FAILURE	363
DLA-A SELF-TEST FAILURE	364
DLA-A SELF-TEST FAILURE	365
D3A-B SELF-TEST FAILURE	366
D3A-B SELF-TEST FAILURE	367
D3A-B SELF-TEST FAILURE	368
D3A-B SELF-TEST FAILURE	369
D3A-B SELF-TEST FAILURE	370
D3A-B SELF-TEST FAILURE	371
DLA-B SELF-TEST FAILURE	372
DLA-B SELF-TEST FAILURE	373
R/A 1 SELF-TEST FAILURE	374
R/A 1 SELF-TEST FAILURE	375
R/A 1 SELF-TEST FAILURE	376

Table 208 (Continued)

Failure	Diagnostic Number
R/A 1 SELF-TEST FAILURE	377
R/A 2 SELF-TEST FAILURE	378
R/A 2 SELF-TEST FAILURE	379
R/A 2 SELF-TEST FAILURE	380
R/A 2 SELF-TEST FAILURE	381
SEQUENCE EIGHT - "SERVO TESTS"	
* A/P ENGMNT FAILURE	385
AIL SERVO FAILURE	386
AIL SERVO FAILURE	387
AIL SERVO FAILURE	388
AIL SERVO FAILURE	389
WHEEL RWD FAILURE	390
AIL SERVO FAILURE	391
AIL SERVO FAILURE	392
AIL SERVO FAILURE	393
AIL SERVO FAILURE	394
AIL SERVO FAILURE	395
AIL SERVO FAILURE	396
NOTE: * An open Aileron Torque Limit Rheostat will prevent A/P engage with flaps above 26 degrees, but will not prevent engage when flaps are below 26 degrees.	
AIL SERVO FAILURE	397
AIL SERVO FAILURE	398
AIL SERVO FAILURE	399
AIL SERVO FAILURE	400
AIL SERVO FAILURE	401
AIL SERVO FAILURE	402
WHEEL LWD FAILURE	403
ELV SERVO FAILURE	404
ELV SERVO FAILURE	405
ELV SERVO FAILURE	406
ELV SERVO FAILURE	407
COLUMN FWD FAILURE	408
ELV SERVO FAILURE	409

Table 208 (Continued)

Failure	Diagnostic Number
ELV SERVO FAILURE	410
ELV SERVO FAILURE	411
ELV SERVO FAILURE	412
ELV SERVO FAILURE	413
ELV SERVO FAILURE	414
ELV SERVO FAILURE	415
ELV SERVO FAILURE	416
ELV SERVO FAILURE	417
ELV SERVO FAILURE	418
ELV SERVO FAILURE	419
ELV SERVO FAILURE	420
COLUMN AFT FAILURE	421
PARALLEL RUD SERVO FAILURE	422
PARALLEL RUD SERVO FAILURE	423
PARALLEL RUD SERVO FAILURE	424
PARALLEL RUD SERVO FAILURE	425
RIGHT PEDAL FAILURE	426
PARALLEL RUD SERVO FAILURE	427
PARALLEL RUD SERVO FAILURE	428
PARALLEL RUD SERVO FAILURE	429
PARALLEL RUD SERVO FAILURE	430
PARALLEL RUD SERVO FAILURE	431
PARALLEL RUD SERVO FAILURE	432
PARALLEL RUD SERVO FAILURE	433
PARALLEL RUD SERVO FAILURE	434
PARALLEL RUD SERVO FAILURE	435
PARALLEL RUD SERVO FAILURE	436
PARALLEL RUD SERVO FAILURE	437
PARALLEL RUD SERVO FAILURE	438
LEFT PEDAL FAILURE	439
PITCH TRIM FAILURE	440
PITCH TRIM FAILURE	441
YAW DAMP SERVO FAILURE	442
YAW DAMP SERVO FAILURE	443

Table 208 (Continued)

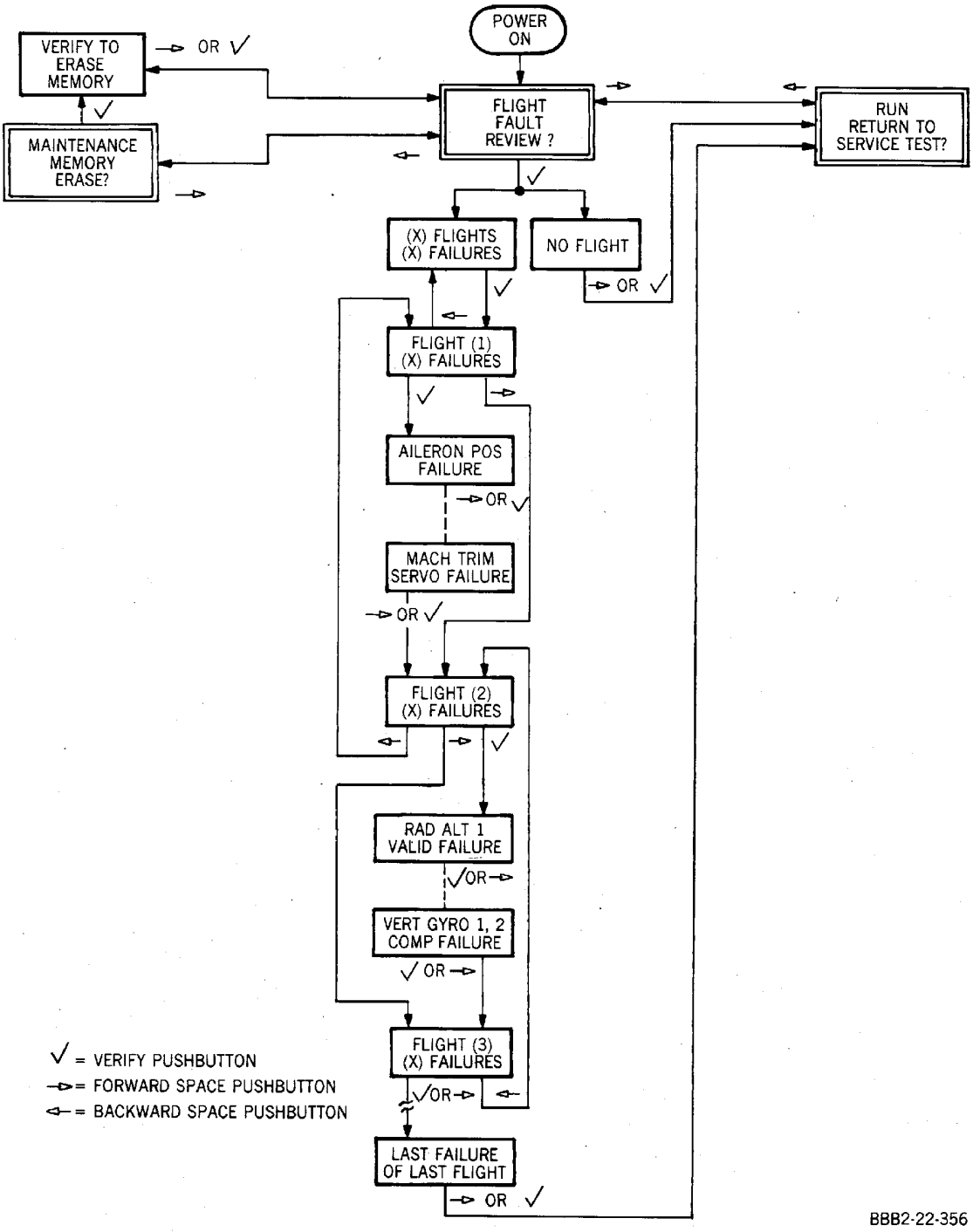
Failure	Diagnostic Number
MACH TRIM SERVO FAILURE	444
A/T FAILURE	445
A/T FAILURE	446
A/T FAILURE	447
A/T FAILURE	448
FLAP RETRACT FAILURE	449
FLAP RETRACT FAILURE	450
FLAP RETRACT FAILURE	451
AIL MECH TORQ SWITCH 1 FAILURE	452
AIL MECH TORQ SWITCH 2 FAILURE	453
SEQUENCE NINE - "INTERNAL MONITORS "	
HEADING 1 FAILURE	455
HEADING 2 FAILURE	456
LEFT ELEVATOR FAILURE	457
RIGHT ELEVATOR FAILURE	458
CADC -T ALT NCR FAILURE	459
CADC -N ALT NCR FAILURE	460
CADC -T ALT BCR RATE FAILURE	461
CADC -N ALT BCR RATE FAILURE	462
CADC -T MACH FAILURE	463
CADC -N MACH FAILURE	464
CADC -T CAS FAILURE	465
CADC -N CAS FAILURE	466
CADC -T VMO FAILURE	467
CADC -N VMO FAILURE	468
CADC -T TAS FAILURE	469
CADC -N TAS FAILURE	470
CADC -T TAT FAILURE	471
CADC -N TAT FAILURE	472
CADC -T ALT RATE FAILURE	473
CADC -N ALT RATE FAILURE	474
CADC -T SAT FAILURE	475
CADC -N SAT FAILURE	476

Table 208 (Continued)

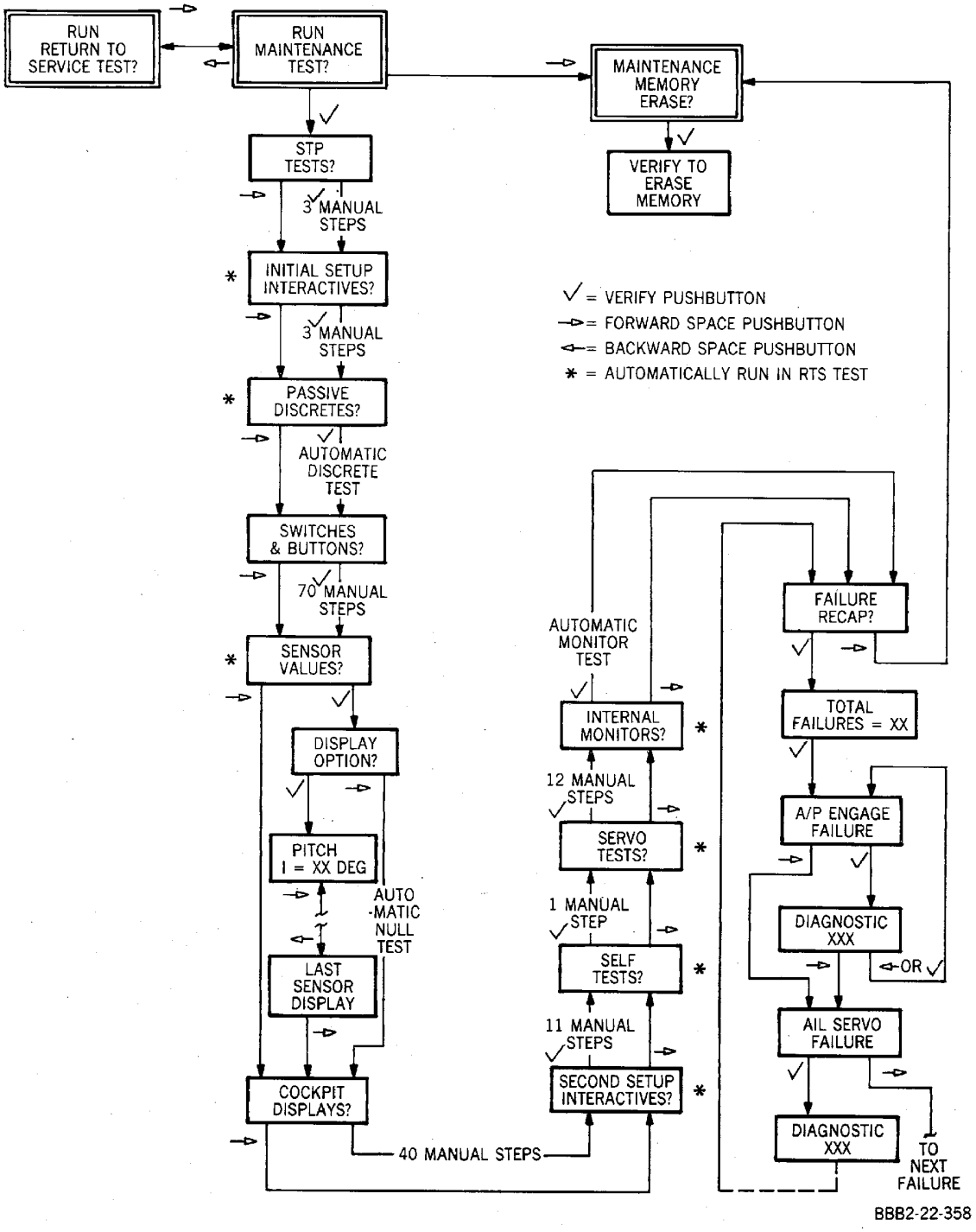
Failure	Diagnostic Number
AIL TACH FAILURE	477
ELEV TACH FAILURE	478
RUD TACH FAILURE	479
SPD REF KNOB FAILURE	480
ATTITUDE GYRO 1 FAILURE	481
ATTITUDE GYRO 2 FAILURE	482
PITCH RATE 1 FAILURE	484
PITCH RATE 2 FAILURE	485
ROLL RATE 1 FAILURE	487
ROLL RATE 2 FAILURE	488
ANGLE OF ATT 1 FAILURE	490
ANGLE OF ATT 2 FAILURE	491
SPOILER POS 1 FAILURE	492
SPOILER POS 2 FAILURE	493
EPR LEFT FAILURE	494
EPR RIGHT FAILURE	495
LEFT AILERON FAILURE	496
HOR STAB FAILURE	497
ALT SEL KNOB FAILURE	498
RUDDER POS FAILURE	499
FLAP HANDLE FAILURE	500
FLAP POS FAILURE	501
FLAP POS FAILURE	502
VERT SPD SEL KNOB FAILURE	503
CRS ERROR LEFT FAILURE	504
CRS ERROR RIGHT FAILURE	505
HDG ERROR LEFT FAILURE	506
HDG ERROR RIGHT FAILURE	507
PMS/FMS DATA FAILURE	508**
WINDSHEAR DATA FAILURE	509***
NOTE: ** For customers with FMS and -970 DFGC and subs. *** For customers equipped with windshear computers	
AIL SERVO FAILURE	520
AIL SERVO FAILURE	521

Table 208 (Continued)

Failure	Diagnostic Number
AIL SERVO FAILURE	522
AIL SERVO FAILURE	523
AIL SERVO FAILURE	524
AIL SERVO FAILURE	525
AIL SERVO FAILURE	526
AIL SERVO FAILURE	527
MACH TRIM SERVO FAILURE	528



STP - Flight Fault Review Operation
Figure 202/22-01-05-990-913



STP - Run Maintenance Test Operation
Figure 203/22-01-05-990-914

DFGS STATUS/TEST (STP) PANEL - REMOVAL/INSTALLATION

1. General

A. The following instructions provide removal/installation of the DFGS Status/Test (STP) panel located on the left console beneath the captain's briefcase compartment.

2. Removal/Installation DFGS Status/Test (STP) Panel

A. Remove STP (Figure 401)

WARNING: TAG AND SAFETY CIRCUIT BREAKER.

(1) Open this circuit breaker and install safety tag:

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
G	25	B10-359	FLIGHT GUIDANCE STATUS & MAINT PNL

(2) Loosen (4) Dzeus fasteners.

(3) Lift STP from console to gain access to electrical connector located on back side of unit.

(4) Disconnect electrical connector from STP.

(5) Remove STP.

B. Install STP

WARNING: TAG AND SAFETY CIRCUIT BREAKER.

(1) Make sure that this circuit breaker is open and has safety tag:

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
G	25	B10-359	FLIGHT GUIDANCE STATUS & MAINT PNL

(2) Check connector for damage and unwanted material.

(3) Connect electrical connector to STP.

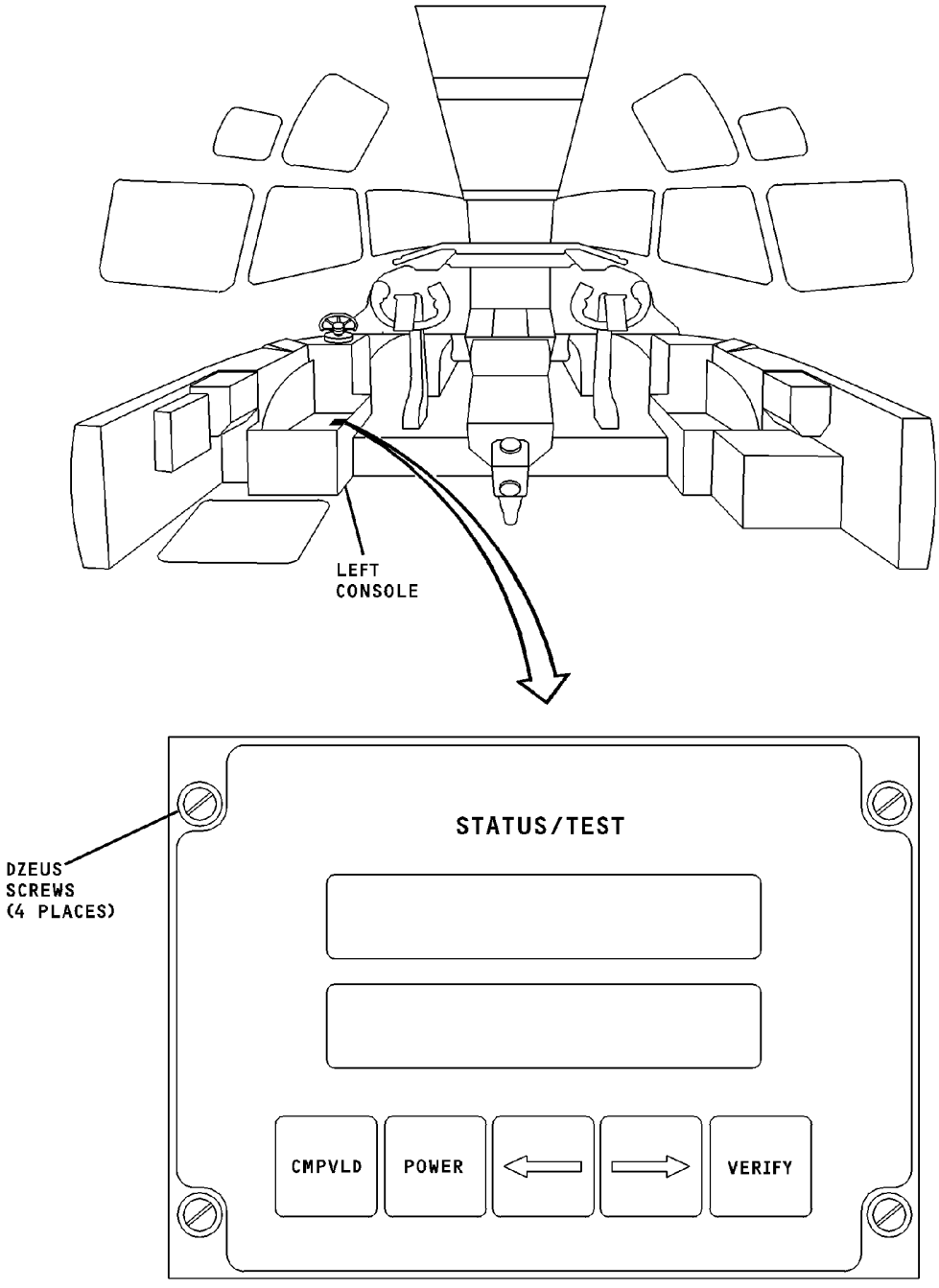
(4) Install STP and tighten (4) Dzeus fasteners.

(5) Make sure that this circuit breaker is open and has safety tag:

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
G	25	B10-359	FLIGHT GUIDANCE STATUS & MAINT PNL

(6) Test STP as required. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201, Continuous (Flight Fault Review) BIT))



DFGS Status/Test (STP) Panel - Removal/Installation
Figure 401/22-01-05-990-820

DFGS STATUS TEST PANEL (STP) - ADJUSTMENT/TEST

1. General

A. This procedure contains task card data.

B. Refer to DC-9-80 Fixed Maintenance Intervals Report MDC-J1271, CMR No 22-1 (paragraph a.).

TASK 22-01-05-741-801

2. Return-To-Service Test of the DFGS

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure is a CMR task.

NOTE: Refer to DC-9-80 Fixed Maintenance Intervals Report MDC-J1271, CMR No 22-1 (paragraph a.).

B. References

Reference	Title
22-01-05 P/B 201 Config 1	DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES
22-01-05 P/B 201 Config 10	DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES
22-01-05 P/B 201 Config 11	DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES
22-01-05 P/B 201 Config 3	DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES
22-01-05 P/B 201 Config 4	DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES
22-01-05 P/B 201 Config 5	DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES
22-01-05 P/B 201 Config 6	DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES

C. DFGS Return-To-Service Test

SUBTASK 22-01-05-741-001

(1) Do the Return-To-Test BIT. (DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 1 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 3 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 6 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 4 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 5 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 10 or DFGS STATUS/TEST (STP) PANEL - MAINTENANCE PRACTICES, PAGEBLOCK 22-01-05/201 Config 11)

D. Job Close-up

SUBTASK 22-01-05-942-001

(1) Remove all the tools and equipment from the work area. Make sure the area is clean.

END OF TASK

ALTITUDE PRESELECT CONTROLLER (APC) - DESCRIPTION AND OPERATION

1. General

A. The Altitude Preselect Controller (APC) is located on the pedestal. The APC provides automatic capture of a pre-set barometric altitude which is selected by the altitude set knob located on the APC.

B. The altitude set knob is connected by a gear train to a control transmitter, and also controls as a 3-position axial switch.

The APC also contains an altitude display readout window.

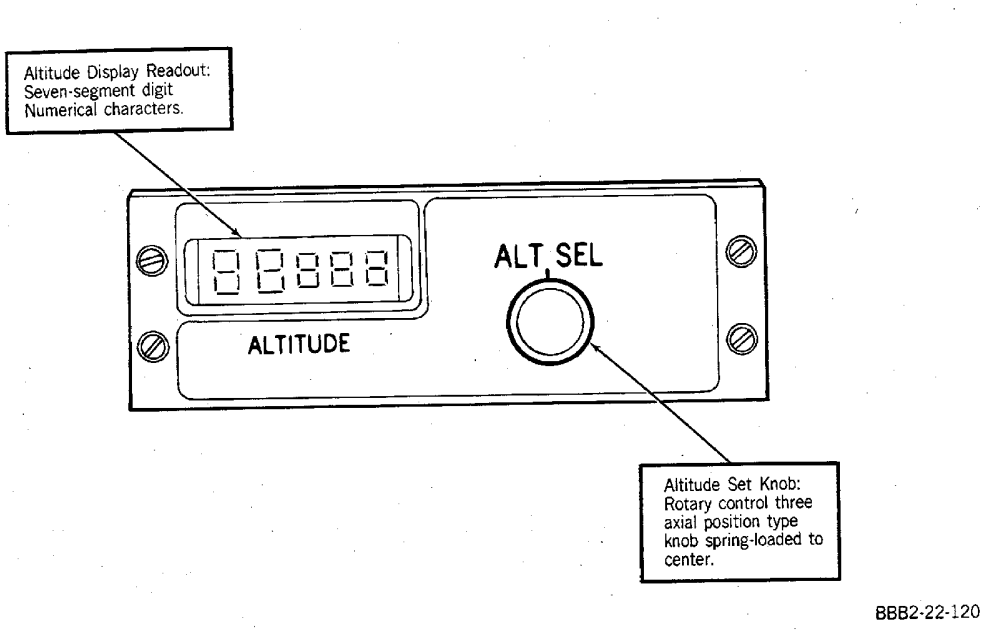
2. Description

A. APC Interface

(1) When the altitude set knob is turned, a synchro rotor produces a 3-wire output signal from the control transmitter to the Digital Flight Guidance Computer (DFGC). The signal is then processed by the DFGC and returned as serial data to the Digital Flight Guidance Control Panel (DFGCP), where DRIVERS provide the serial data information to the APC for altitude display. The altitude display readout consists of seven-segment digit numerical characters.

3. Operation

A. The altitude set knob has three positions, spring-loaded to center. Rotating the knob in the center position provides 1000 feet increment altitude adjustments, the momentarily pull-out position arms the system for preselected altitude capture, and rotating the knob in the push-in position provides 100 feet increment adjustments, and cancels the altitude preselect mode.



Altitude Preselect Controller (APC)
Figure 1/22-01-06-990-802

ALTITUDE PRESELECT CONTROLLER (APC) - MAINTENANCE PRACTICES

1. General

A. The Altitude Preselect Controller (APC) is located on the pedestal. The APC provides automatic capture of a pre-set barometric altitude which is selected by use of the altitude set knob located on the controller.

B. After removal/installation procedures, or any time the APC has been disturbed, an operational test should be performed on the APC to verify operating status by use of the Status/Test Panel (STP).

2. Removal/Installation Altitude Preselect Controller (APC)

A. Remove APC

WARNING: TAG AND SAFETY THE FOLLOWING CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Loosen fasteners (4) on APC.

(3) Remove APC sufficiently from pedestal to disconnect electrical connector. Remove APC.

(4) If APC is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install APC

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Connect electrical connector to corresponding mating plug on APC.

(3) Install APC and secure fasteners (4).

(4) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1

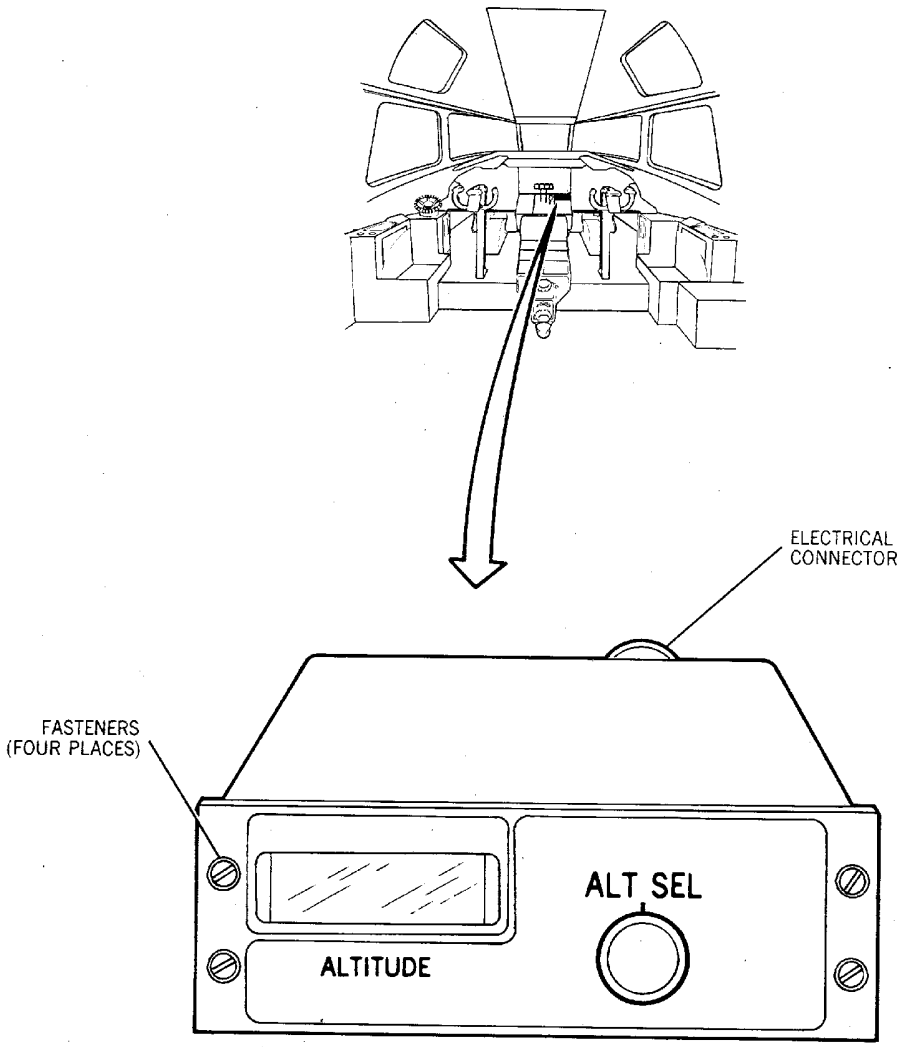
UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(5) Perform System Maintenance BIT ("SEQUENCE THREE - SWITCHES AND BUTTONS") by use of the STP (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).



Altitude Preselect Controller (APC) -- Removal/Installation
Figure 201/22-01-06-990-801

AUTOPILOT - DESCRIPTION AND OPERATION

1. General

A. The autopilot system provides yaw damping and flight path control of the airplane. Autopilot consists of pitch and roll channels, and when coupled with the yaw damper, automatically controls the three maneuvering axis of the airplane.

B. Computed pitch, roll and yaw channels are packaged into two identical Digital Flight Guidance Computers (DFGC's), and are controlled by an AP engage switch located on the Flight Guidance Control panel. A switch located below the AP engage switch labled 1, 2, provides the capability of selection for either DFGC-1 or DFGC-2.

C. During autopilot operation, including autoland, only one DFGC is in command. The off-side DFGC (in-standby) is continuously receiving and processing parallel input signals in event selection is required.

D. Flight director pitch and roll attitude signals are also processed within the DFGC's. These signals provide the flight crew steering commands for manual operation of the airplane.

E. Dual inputs/outputs are processed through the DFGC's during autoland operation, to provide a Fail Passive Flight Guidance system.

2. Pitch and Roll Axis

A. Airplane maneuvering about the pitch and roll axis is con-trolled by elevator and aileron movement. Elevator movement is controlled by pitch axis, and aileron movement is controlled by roll axis.

B. When autopilot is engaged for operation, elevator and aileron movement will automatically be controlled by the autopilot. Pitch and roll signal information is induced into the DFGC where computed signals are processed and transmitted to duplex elevator and aileron servo drives. The signals command servo drive movement to execute the pitch and roll maneuvers.

3. Pitch and Roll Modes

A. Autopilot pitch and roll modes of operation are selected through a Flight Guidance Control panel, located on the glare-shield in the flight compartment. The autopilot operating modes provided through the Flight Guidance Control panel are as follows:

(1) Selected Heading (HDG HOLD, HDG SELECT)

(2) VHF Omnirange (VOR) Capture and Tracking

(3) ILS

(a) Localizer Capture and Tracking

(b) Glideslope Capture and Tracking

(4) Autoland

(a) Flare

(b) Runway Alignment

(c) Nose Lowering (Wheel Spin-Up)

(5) Vertical Speed Control

(6) Indicated Airspeed (IAS) Control

(7) Mach Control

(8) Altitude Hold

(9) Preselected Altitude Capture

(10) Turbulence Penetration

WJE 405-411, 880, 881, 883, 884

(11) Performance Management

WJE 873, 874, 886, 887, 892, 893

(12) Performance Management

WJE 401-404, 412, 414-427, 429, 861-866, 868, 869, 871, 872, 875-879, 891

(13) Flight Management System

WJE ALL

(14) Go-Around

•

(15) Take Off (after liftoff).

B. The pitch and roll modes are engaged for autopilot operation by placing the AP switch located on the Flight Guidance Control panel to ON position. Autopilot pitch and roll modes can be selected and operated only after autopilot engagement.

WJE 405, 406, 409, 410, 416, 420, 422, 424-427, 429, 868, 873, 874, 880, 881, 883, 884, 886, 887, 891-893

C. Autopilot pitch and roll modes of operation are disengaged by autopilot release buttons, one each located on the captain's and first officer's control wheel, or by manually placing the AP switch to off. After autopilot disengagement, AP lights located in the Flight Mode and Instrument Warning annunciators on the captain's and first officer's instrument panels will come on red and flash. Also, during autoland an aural warning tone will sound. The lights and aural warning tone can be reset by pressing either autopilot release button.

WJE 405, 406, 409, 881, 883, 884

NOTE: On either CAA or DGAC certified aircraft, an aural warning will sound any time autopilot is disconnected.

WJE 401-404, 407, 408, 411, 412, 414, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 875-879

D. Autopilot pitch and roll modes of operation are disengaged by autopilot release buttons, one each located on the captain's and first officer's control wheel, or by manually placing the AP switch to off. After autopilot disengagement, AP lights located in the Flight Mode and Instrument Warning annunciators on the captain's and first officer's instrument panels will come on red and flash. Also, an aural warning tone will sound. The lights and aural warning tone can be reset by pressing either autopilot release button.

WJE ALL

E. Disengaging pitch and roll modes will have no effect on yaw damper operation if the YAW DAMP switch is in the ON position.

4. Automatic Pitch Trim

A. Automatic pitch trim function is provided to transfer steady-state elevator loads to the stabilizer by moving the horizontal stabilizer up or down. If an out-of-trim condition develops in the pitch axis, the horizontal stabilizer will move up or down as commanded by the automatic pitch trim system to correct the out-of-trim condition. AP TRIM lights, located in the Flight Mode and Instrument Warning annunciators may come on during automatic pitch trim compensating action, if the magnitude and time duration of the signal is great enough. The lights will go off when the out-of-trim condition has been corrected.

5. Yaw Damper

A. Yaw damper operation provides airplane yaw-rate damping and turn coordination by automatically controlling rudder movements. Yaw damper is a full-time authority operation and can be engaged at any time with or without any other portion of the autopilot system functioning.

B. Rudder movements during cruise conditions are provided by a yaw damper actuator installed in the rudder control system. The actuator receives command signals for actuation from the DFGC. Rudder movements commanded for yaw damping will not cause the rudder pedals to move, and manual operation of the rudder pedals at any time will not affect yaw damper operation.

C. During an automatic landing, command signals to the yaw damper actuator are removed. Command signals to the rudder is then provided by a duplex rudder servo drive. The rudder pedals will move during autoland operation.

D. A YAW DAMP switch located on the flight compartment overhead panel is provided to engage yaw damper operation manually. When the autopilot is engaged, the yaw damper will automatically be engaged, unless the switch is in the OVRD position.

6. Flight Director

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

NOTE: On aircraft equipped with EFIS, flight director steering commands are displayed on the Primary Flight Displays (PFD's).

A. Flight director steering commands are computed within the digital flight guidance computers and are processed as pitch and roll steering command signals to both the captain's and first officer's ADI's. The steering command signals provide pitch and roll attitude commands for the flight crew to manually control the aircraft.

WJE 401-404, 412, 414

B. Flight director steering commands are computed within the digital flight guidance computers and are processed as pitch and roll steering command signals to both the captain's and first officer's PFD's. The steering command signals provide pitch and roll attitude commands for the flight crew to manually control the aircraft.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

C. Two flight director switches are located on the Flight Guidance Control panel, one for the captain's ADI and one for the first officer's ADI. When the FD CMD switch on the overhead panel is in the NORM position, and both flight director switches are on, inputs to the captain's ADI is from DFGC-1 and inputs to the first officer's ADI is from DFGC-2. If the FD CMD switch is moved to either BOTH ON 1 or BOTH ON 2, both flight directors are controlled from the selected DFGC.

WJE 401-404, 412, 414

D. Two flight director switches are located on the Flight Guidance Control panel, one for the captain's PFD and one for the first officer's PFD. When the FD CMD switch on the overhead panel is in the NORM position, and both flight director switches are on, inputs to the captain's PFD is from DFGC-1 and inputs to the first officer's PFD is from DFGC-2. If the FD CMD switch is moved to either BOTH ON 1 or BOTH ON 2, both flight directors are controlled from the selected DFGC.

WJE ALL

E. The flight director provides various modes of operation. The following functions are available for flight director selection:

(1) Selected Heading (HDG HOLD, HDG SELECT)

(2) VHF Omnirange (VOR) Capture and Tracking

(3) ILS
  (a) Localizer Capture and Tracking
  (b) Glideslope Capture and Tracking
(4) Vertical Speed Control
(5) Indicated Airspeed (IAS) Control
(6) Mach Control
(7) Altitude Hold
(8) Preselected Altitude Capture
(9) Takeoff
(10) Turbulence Penetration
(11) Go-Around.

F. When the aircraft is operating in the flight director mode of operation, and autopilot is engaged, the autopilot engages into the flight director mode (the exception is takeoff mode which is flight director only; if on the ground autopilot will not engage). If both autopilot and flight director are engaged, the blue AP1 or AP2 (depending on which DFGC is selected), and FD lights will be on. If only the FD light is on, it will denote the autopilot is not engaged. The FD and AP advisory lights are located on both the captain's and first officer's Flight Mode and Instrument Failure Warning annunciator panels.

WJE ALL POST AOL MD80-9-1627A

NOTE: The FD blue lamp on the Flight Mode Annunciator is no longer required for dispatch. Therefore, there will be no FD blue light indication.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

G. When the flight director switches are off, and the autopilot is disengaged, flight director command bars are biased out of view on both the captain's and first officer's ADI's (PFD's).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

H. When the flight director switches are off, and the autopilot is disengaged, flight director command bars are biased out of view on both the captain's and first officer's PFD's.

WJE ALL

7. Autoland

A. A Fail Passive automatic landing autopilot system is provided. After localizer and glideslope track, and autoland mode has been established, the autopilot portion of the DFGC supplies dual output controls to the elevator, aileron, and rudder servo drives. Monitors within the DFGC verify the outputs are substantially the same, and any mismatch between computed signals within the DFGC will result in immediate disengagement of the autopilot. In addition, if any of the system sensors sustain a failure that could result in airplane upset, screening within the DFGC will prevent the upset during the short period prior to autopilot disengagement. Autoland failures will have no significant affect on the flight path, stability or trim condition of the airplane. Failures detected will be logged as Flight Fault Review for ground maintenance personnel.

8. Autopilot Testing

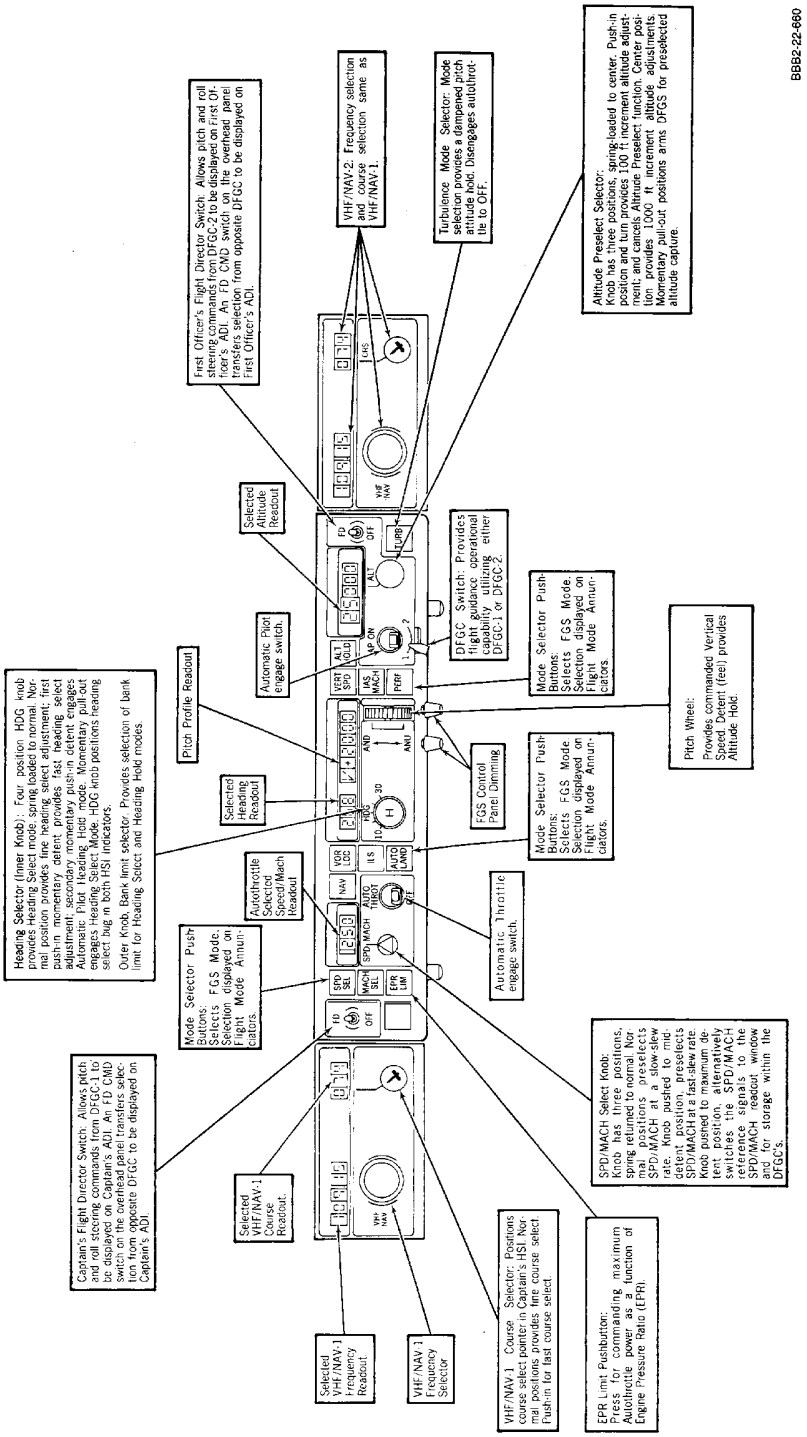
A. Autopilot testing is provided in flight by a continuous Built-In-Test (BIT). On ground, the selected DFGC manages a central integrated BIT of the complete Digital Flight Guidance System (DFGS). BIT accomplishes on-airplane failure detection and isolation to Line Replaceable Units (LRU's) of the DFGS. In addition, BIT provides the capability to assess the DFGS equipment functional performance and identify failed modes in order to determine operational readiness.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

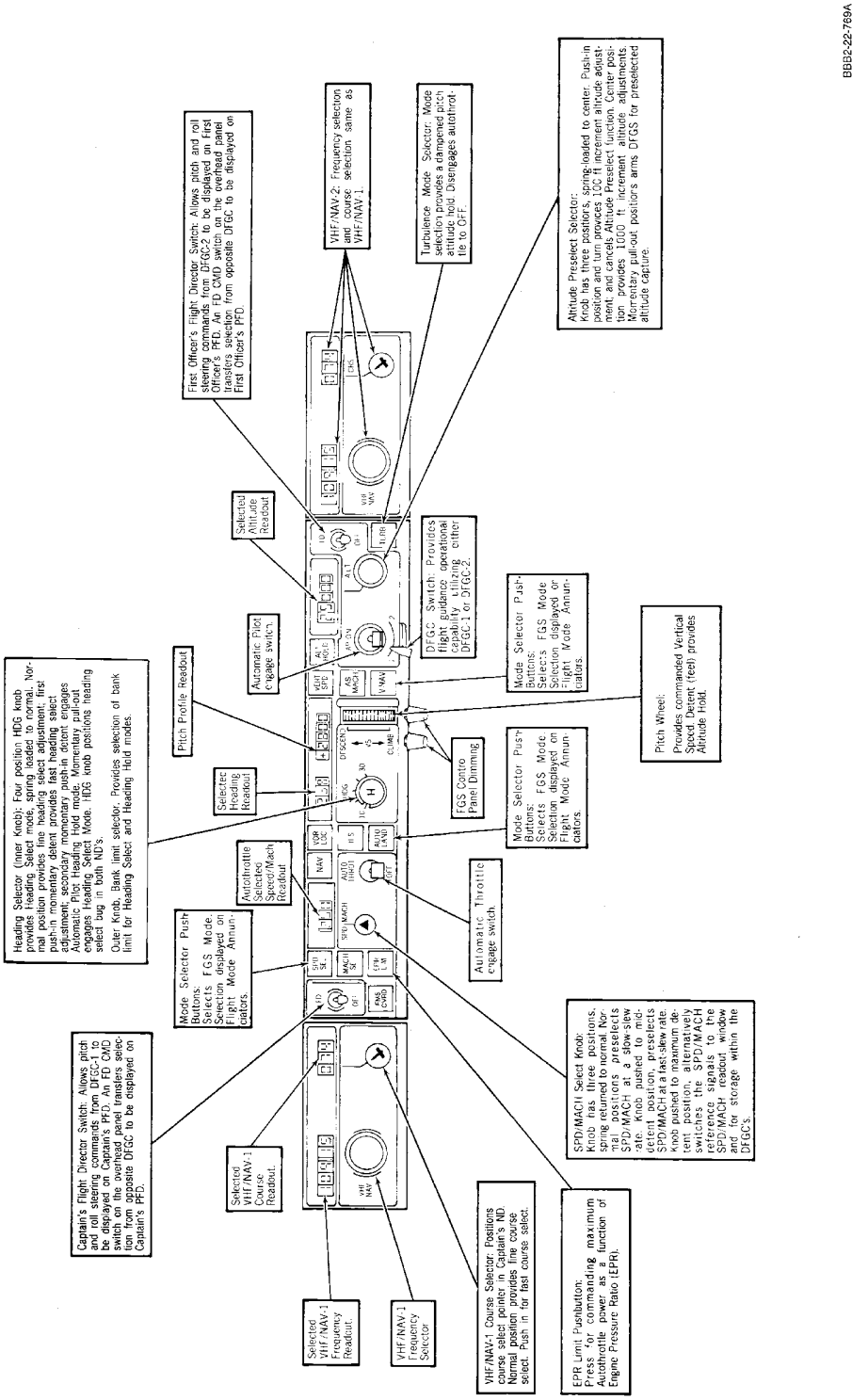
B. BIT is displayed on a Status/Test panel (STP) located below the captain's briefcase compartment. Three major tests are available from the STP; Flight Fault Review, Return-To-Service, and Maintenance Test. BIT descriptive and maintenance material is provided in DFGS STATUS/TEST, SUBJECT 22-01-05.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

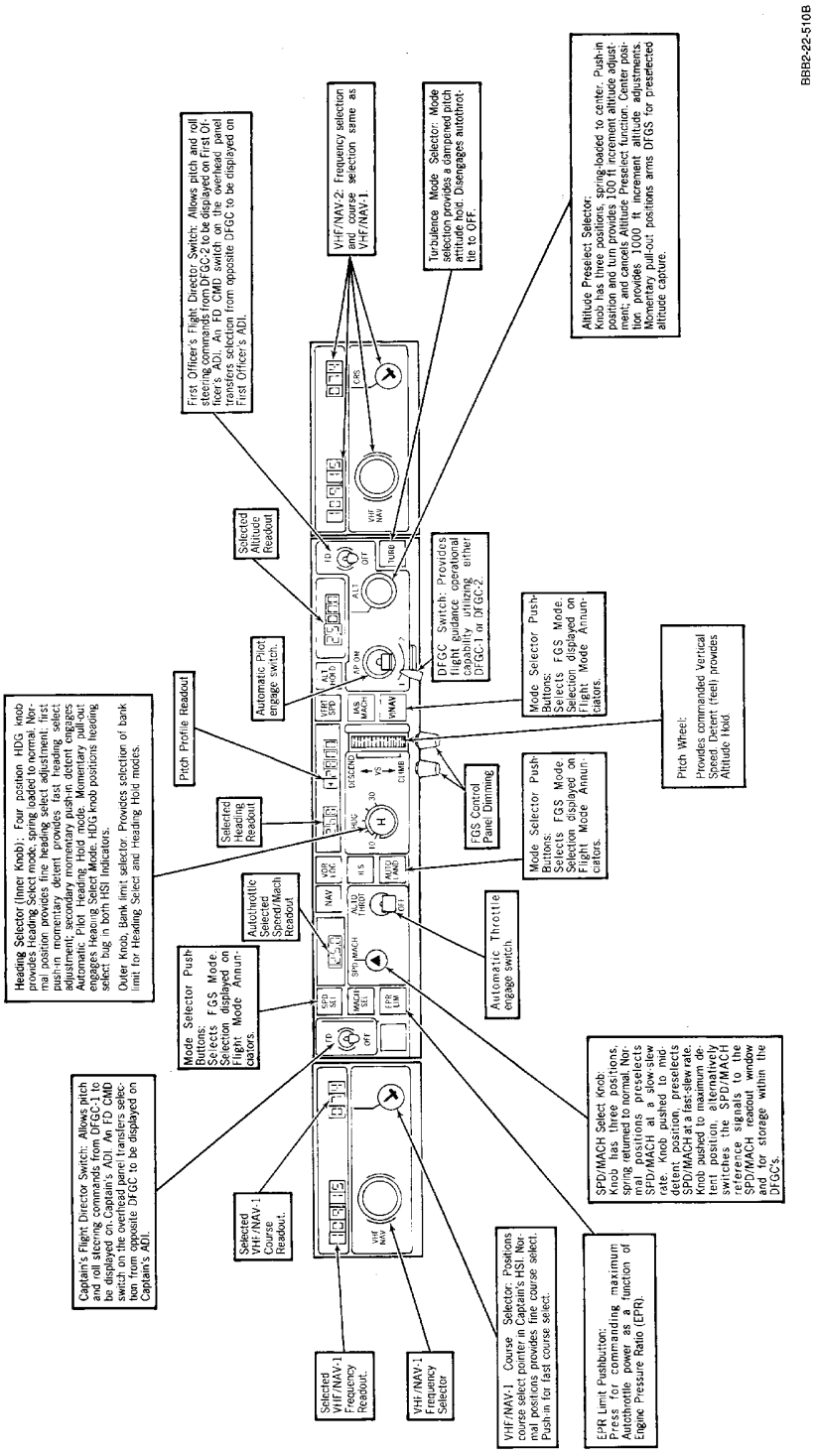
C. BIT is displayed on the FMS MCDU, located on the pedestal. Three major tests are available from the MCDU; Flight Fault Review, Return-To-Service, and Maintenance Test. BIT descriptive and maintenance material is provided in DFGS STATUS/TEST, SUBJECT 22-01-05.



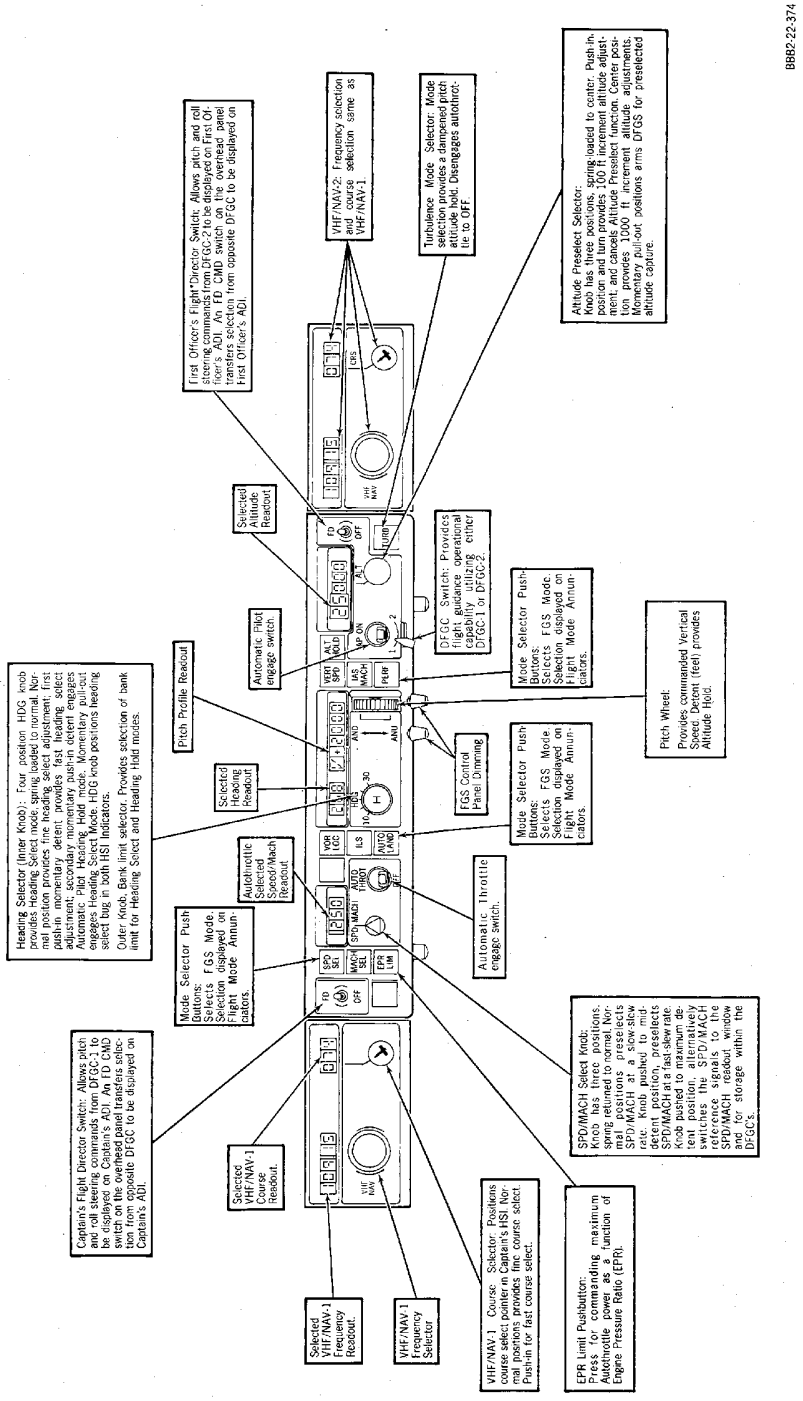
Flight Guidance Control Panel
Figure 1/22-10-00-990-801



Flight Guidance Control Panel
Figure 2/22-10-00-990-802



Flight Guidance Control Panel
Figure 3/22-10-00-990-805



Flight Guidance Control Panel
Figure 4/22-10-00-990-806

AUTOPILOT - MAINTENANCE PRACTICES

1. General

A. The tests in this section provide the operational capability of the autopilot/flight director modes that are provided from within the Digital Flight Guidance System (DFGS). The major portion of testing is provided from the Flight Guidance Control Panel.

NOTE: If an autopilot mode is suspected of being inoperative, run the Maintenance Test Sequence Three (switches and buttons) to check for correct control panel interface to the DFGC.

B. Prior to performing any autopilot operational tests, it is assumed that all autopilot components (i.e. yaw damper, mach trim, etc.), interfacing LRU's (i.e. CADC's, VG's, etc.), and instrumentation are in proper operating condition (passed the Return to Service test). Also, all circuit breakers as called out in AUTO FLIGHT, SUBJECT 22-00-00 are closed.

C. Tests are given for the DFGC in command as selected by the switch labeled 1, 2 below the AP engage switch on the Flight Guidance Control Panel. If testing for the off-side DFGC is desired, then the switch must be manually moved to the side selected, and the complete test rerun.

D. The tests are provided as individual modes. The tests included in this section may require the activation of other modes for test setup, and in some cases the use of test equipment.

WARNING: PORTIONS OF THE TEST REQUIRE THE USE OF HYDRAULIC POWER. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED AND CLEAR CONTROL SURFACE AREAS OF ALL PERSONNEL AND EQUIPMENT.

E. If a test fails, repeat the test step prior to performing any maintenance action. Perform Return to Service or Maintenance test to verify the integrity of a failed mode test step. (DFGS STATUS/TEST, SUBJECT 22-01-05)

F. If the A/P engage switch does not disengage as required in the normal manner, (failed in the ON position), then the A/P engage switch exhibits the cockpit indications for this failure as follows:

(1) The A/P will temporarily disconnect when the A/P yoke disconnect push button is pressed (the A/P engage lever may or may not drop to the disengaged "A/P OFF" position).

(2) When the disconnect push button is released, the A/P will reengage with the A/P engage lever in the "ON" or "OFF" position.

(3) The A/P will also disconnect if the primary trim is activated, but will reengage when the primary trim switches are released.

(4) A single push of the A/P disconnect push button will result in three flashes of the red Flight Mode Annunciator (FMA) A/P disconnect warning.

(5) Multiple presses may cause prolonged flashing of the disconnect warning and associated aural autopilot warning if applicable.

NOTE: The A/T engage switch and the A/P engage switch are the same part number and may experience the same type failure.

WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893 POST MD80-22-122

NOTE: This Service Bulletin replaces the defective switches this will eliminate the above failures. Please use the above as a guideline in determining whether the switches are defective. Perform the test procedures that follow to establish that the aircraft will operate correctly.

WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name	Manufacture
Signal Generator, 479-T2 or TIC T30-A	Collins, TEL Instruments
CAUTION: DAMAGE TO RADIO ALTIMETER WILL OCCUR IF PROPER TEST SET IS NOT UTILIZED.	
Radio Altimeter Test Set 980 N-1 or TRT SIM-530 as applicable to system installation	Collins Telecommunications Radioelectriques et Telephoniques Paris, France
Proximity Switch P/N 4952969-1	McDonnell Douglas

3. Autopilot/Flight Director Index

A. Procedures for testing the various autopilot/flight director functions are indexed as follows:

Table 202

Paragraph	Test Functions
Paragraph 4.A.	Autopilot/Engage Disengage
Paragraph 4.B.	Altitude Preselect/Advisory
Paragraph 4.C.	Automatic Pitch Trim
Paragraph 4.D.	VOR
Paragraph 4.E.	LOC
Paragraph 4.F.	ILS
Paragraph 4.G.	Yaw Damper Off/Mach Trim INOP Lights
Paragraph 4.H.	Operational Check of Go-Around Selection of TO/GA Switches

4. Operational Tests

NOTE: Opening Ground Control Relay Circuit Breakers will cause the DFGS to log a flight in Flight Fault Review. Many faults may be logged depending upon current aircraft configuration. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

NOTE: On EFIS equipped aircraft, substitute Primary Flight Director (PFD) for ADI and Navigation Display (ND) for HSI during the operational tests.

WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

A. Autopilot Engage/Disengage

Table 203 Autopilot Engage/Disengage Test

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test.	No test.
(2)	Verify flags are out of view in the following indicators: (a) Mach/Airspeed - Mach, Airspeed.	Flags out of view.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
	(b) ADI - Attitude, Speed, Flight Director. (c) HSI - Compass. (d) Compass Indicator - OFF.	
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(3)	On flight guidance control panel, place AP switch to ON position.	AP switch holds.
(4)	Press and release Capt's control wheel A/P disconnect button.	AP switch drops off. AP warning light comes on and flashes red in both FMA's.
WJE 405, 406, 409, 412, 414, 881, 883, 884		
NOTE: During autoland an aural warning tone will sound. On either CAA or DGAC certified aircraft, an aural warning will sound any time autopilot is disconnected.		
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873-880, 886, 887, 891-893		
NOTE: During autoland an aural warning tone will sound.		
WJE 401-404, 407, 408, 410-412, 414, 875-879		
NOTE: An aural warning will sound any time the autopilot is disconnected.		
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
NOTE: If DFGC option program pin J102B/87 grounded, an aural warning will sound for all A/P disconnects in lieu of aural warnings for autoland mode disconnects only.		
(5)	Press and release Capt's control wheel A/P disconnect button (or autopilot release button).	AP red warning lights go off. Aural warning tone reset.
(6)	Place AP switch to ON position.	AP switch holds.
(7)	Press and release F/O's control wheel A/P disconnect button.	AP switch drops off. AP warning light comes on and flashes red in both FMA's.
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873-880, 886, 887, 891-893		
NOTE: During autoland an aural warning tone will sound.		
WJE 405, 406, 409, 412, 414, 881, 883, 884		
NOTE: During autoland an aural warning tone will sound. On either CAA or DGAC certified aircraft, an aural warning will sound any time autopilot is disconnected.		

WJE 405, 406, 409, 412, 414, 881, 883, 884 (Continued)

Table 203 Autopilot Engage/Disengage Test (Continued)

Step	Action	Desired Result
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(8)	Press and release F/O's control wheel A/P disconnect button (or autopilot release button).	AP red warning lights go off. Aural warning tone reset.
NOTE: During the remainder of the test, placing the AP switch to ON position will turn off the AP warning lights.		
WJE 873, 874, 880, 892, 893		
NOTE: During autoland an aural warning tone will sound.		
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(9)	Place AP switch to ON position. Below AP switch, place DFGS switch to opposite side.	AP switch drops off.
(10)	Place DFGS switch to original side and place AP switch to ON position. On Capt's control wheel, actuate the primary trim switch for noseup.	AP switch drops off.
(11)	Place AP switch to ON position. On F/O's control wheel, actuate the primary trim switch for nosedown.	AP switch drops off.
(12)	Place AP switch to ON position. On pedestal operate primary trim handles for noseup.	AP switch drops off.
(13)	Place AP switch to ON position. On pedestal operate primary trim handles for nosedown.	AP switch drops off.

B. Altitude Preselect/Advisory

Table 204 Altitude Preselect/Advisory Test

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test, and flaps are not in LAND position.	No test.
(2)	On altimeter, adjust BARO to a reading of zero feet or minimum reading.	Test setup.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(3)	On Flight Guidance Control Panel, place desired flight director switch to FD.	FMA reads HDG HOLD, ALT HOLD. Command bar centered on ADI.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(3a)	On overhead panel, select CADC switch to BOTH ON 1 or BOTH ON 2 as applicable.	No test.
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891 POST MD80-22-108		
(3b)	On the overhead panel set CADC switch to NORM position.	

WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891 POST MD80-22-108 (Continued)

Table 204 Altitude Preselect/Advisory Test (Continued)

Step	Action	Desired Result
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(4)	On Flight Guidance Control Panel, set ALT window (target altitude), to 1,000 feet greater than ALT reading and rotate pitch wheel to 1000 FPM climb.	Pitch command for noseup. Selected ALT at 1,000 feet greater than ALT reading.
(5)	Momentarily pull out on ALT knob.	Related FMA arm mode annunciators display ALT.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
NOTE: With the DFGC program pin J101A/70 is grounded the following applies: Once altitude preselected captive function is armed, any change to the selected altitude will cause the arm function (as if pulling the ALT SEL knob to the pull position) to initiate automatically. This is also true when the G/A mode is selected. If pin J104A/69, Armed Flight Level, is grounded the armed altitude (selected altitude divided by 100) will be displayed on Capt's and F/O's FMA annunciators in lieu of "ALT".		
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891 POST MD80-22-108		
NOTE: Slowly rotate BARO set knob on captain's altimeter to increase altitude. When captain's altitude approaches 750 feet of the preselected altitude, aural altitude alert should sound. Momentarily push ALT preselect knob on Flight Guidance Control Panel to cancel altitude alerting. This enables altitude alert aural warning at initial penetration of 750-foot outer band.		
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(6)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750 ±25 feet from target altitude. Altitude advisory light on steady and alert tone sounds.
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891 POST MD80-22-108		
NOTE: When the altimeter reaches 750 feet from the desired altitude the aural tone is heard. This simulates what happens when aircraft approaches 750(±25) feet of selected altitude.		
WJE 412, 414 POST MD80-34-208		
NOTE: The altitude advisory light and aural tone will come on 750 feet prior to selected altitude when performing step (6).		
WJE 412, 414		
(6)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750 ±25 feet from target altitude. Altitude advisory light on steady.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(7)	Rotate BARO setting to decrease altimeter reading until altitude advisory light flashes.	At greater than 750 ±25 feet (from target altitude) altitude advisory light flashes, alert tone and vocal warning "ALTITUDE" sounds.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(8)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750 ±25 feet (from target altitude) altitude advisory light comes on steady and alert tone sounds.

Table 204 Altitude Preselect/Advisory Test (Continued)

Step	Action	Desired Result
WJE 412, 414		
(8)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750 ±25 feet (from target altitude) altitude advisory light comes on steady.
WJE 405-412, 414, 873-880, 884, 886, 887, 892, 893		
(9)	Continue to increase BARO readout to increase altimeter reading toward target; stop when advisory light goes off.	At 250(±25) feet (from target altitude) altitude advisory light goes off.
WJE 401-404, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 881, 883, 891-893		
(9)	Continue to increase BARO readout to increase altimeter reading toward target; stop when advisory light goes off.	At 250(±25) feet (from target altitude) altitude advisory light goes off.
WJE 405-412, 414, 873-880, 884, 886, 887, 892, 893		
(10)	Rotate BARO readout to decrease altimeter reading; stop when altitude advisory light flashes.	At greater than 250(±25) feet (from target altitude) altitude advisory light flashes, alert tone sounds and vocal warning word "ALTITUDE" sounds.
(11)	Select new altitude which is greater than 750 feet from existing altitude.	Altitude advisory light, alert tone and vocal warning go off.
WJE 401-404, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 881, 883, 891-893		
(11)	Rotate BARO readout to decrease altimeter reading; stop when altitude advisory light flashes.	At greater than 250 ±25 feet (from target altitude) altitude advisory light flashes and alert tone sounds.
(11)	Select new altitude which is greater than 750 feet from existing altitude.	Altitude advisory light goes off.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 875-881, 883, 884, 886, 887, 891-893; WJE 873, 874 PRE MD80-22-103		
NOTE: Altitude advisory will come on and go off at 250(±25) feet from target altitude.		
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(12)	Set BARO readout to field barometric pressure.	No test.
(13)	Return aircraft to required configuration.	No test.

C. Automatic Pitch Trim

Table 205 Automatic Pitch Trim Test

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test. Ensure A/P, A/T, and FD switches are OFF.	No Test.

Table 205 Automatic Pitch Trim Test (Continued)

Step	Action	Desired Result
WARNING:	TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.	
(2)	Open and tag these circuit breakers:	Test Setup.
WARNING:	NORMAL ELECTRICAL POWER TO VARIOUS SYSTEMS MAY BE INTERRUPTED WHEN GROUND CONTROL RELAY CIRCUIT BREAKERS ARE OPENED. IF GROUND CONTROL RELAY CIRCUIT BREAKERS ARE TO BE OPENED WHILE PERFORMING PROCEDURES, MAKE CERTAIN SWITCHES AND CONTROLS OF AFFECTED SYSTEMS ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF EQUIPMENT.	

	REF DES	CIRCUIT BRREAKER	LOCATION	PANEL AREA	ROW/COL
	B1-23	LEFT GROUND CONTROL RELAY	UPPER EPC	L AC BUS	K/33
	B1-24	RIGHT GROUND CONTROL RELAY	UPPER EPC	R AC BUS	L/33

(2a)	Install dummy targets over main gear Weight-On-Wheels (WOW) proximity sensors to place the DFGS in flight mode. (SPOILER - ADJUSTMENT/TEST, PAGEBLOCK 27-60-00/501 or SPOILER - ADJUSTMENT/TEST, PAGEBLOCK 27-60-00/501 Config 2)	Test setup.
(2b)	Move horizontal stabilizer position indicator to near 4° Aircraft-Nose-Up (ANU), using alternate longitudinal trim switches located on pedestal.	Test setup.
(2c)	Move primary trim switch on Captain's or First Officer's control wheel to aircraft nose up position.	Switch activated to ANU.
	Observe stabilizer position indicator on center pedestal is moving toward ANU.	Horizontal stabilizer moves 0.33°/second toward ANU.
	Horizontal stabilizer in motion warning sounds.	Horizontal stabilizer aural warning should actuate within 1.5° of stabilizer motion. At least 5 aural warnings should sound within 4° of movement.
(2d)	Release primary trim switch on control wheel after approximately six aural warnings.	Horizontal stabilizer stops moving and horizontal stabilizer in motion aural warning silences.
(2e)	Move stabilizer position indicator toward Aircraft-Nose-Down (AND) using alternate trim switch.	
	Observe stabilizer position indicator is moving toward AND.	Horizontal stabilizer moves 0.1°/ sec toward AND.

Table 205 Automatic Pitch Trim Test (Continued)

Step	Action		Desired Result		
	Horizontal stabilizer in motion warning sounds. Continue motion for six aural warnings. Return to 4° ANU position.		Horizontal stabilizer aural warning should actuate within 1.5° of stabilizer motion. At least 5 aural warnings should sound within 4° of movement (tone only).		
(3)	On Flight Guidance Control Panel, place AP switch to ON.		Both FMA's display HDG HLD, ALT HLD.		
(4)	Rotate pitch wheel for 500 FPM DESCEND. On pedestal, observe LONG TRIM indicator.		Vertical speed command reads 500 FPM DESCEND. LONG TRIM indicator moves for nosedown in approximately 6 seconds.		
(5)	Rotate pitch wheel for 500 FPM CLIMB. On pedestal observe LONG TRIM indicator.		Vertical speed command reads 500 FPM CLIMB. LONG TRIM indicator moves for noseup in approximately 6 seconds.		
(6)	Press AP wheel disconnect button twice.		AP disengages, AP warning lights off.		
(7)	Remove tags and close these circuit breakers:		No test.		
	REF DES	CIRCUIT BRREAKER	LOCATION	PANEL AREA	ROW/COL
	B1-23	LEFT GROUND CONTROL RELAY	UPPER EPC	L AC BUS	K/33
	B1-24	RIGHT GROUND CONTROL RELAY	UPPER EPC	R AC BUS	L/33
7(a)	Remove dummy targets over main gear WOW) proximity sensors to place the DFGS in flight mode. (SPOILER - ADJUSTMENT/TEST, PAGEBLOCK 27-60-00/501 or SPOILER - ADJUSTMENT/TEST, PAGEBLOCK 27-60-00/501 Config 2)				
(8)	Return aircraft to required configuration.		No test.		
(9)	Verify DFGS switch is in position 1, or 2 as desired for test. Make sure A/P, A/T, and FD switches are OFF.		Test setup.		
(10)	Move horizontal stabilizer position indicator to near 4° ANU, using alternate longitudinal trim switches located on pedestal.		Test setup.		
(11)	Move primary trim switch on Captain's or First Officer's control wheel to ANU position.		Switch activated to ANU.		
	Observe stabilizer position indicator on center pedestal is moving toward ANU.		Horizontal stabilizer moves 0.33°/second toward ANU.		
	Horizontal stabilizer in motion warning sounds.		Horizontal stabilizer aural warning should be heard within 1.5° of stabilizer motion. At least 5 aural warnings should be heard within 4° of movement.		

Table 205 Automatic Pitch Trim Test (Continued)

Step	Action	Desired Result
(12)	Release primary trim switch on control wheel after approximately six aural warnings.	Horizontal stabilizer stops moving and horizontal stabilizer in motion aural warning is not heard.
(13)	Move stabilizer position indicator toward AND using alternate trim switch. Observe stabilizer position indicator is moving toward AND. Horizontal stabilizer in motion warning is heard. Continue motion for six aural warnings. Return to 4°ANU position.	Horizontal stabilizer moves 0.1°/second toward AND. Horizontal stabilizer aural warning should actuate within 1.5° of stabilizer motion. At least 5 aural warnings should be heard within 4° of movement (tone only).
(14)	Select DFGC MAINT Test and step FWD to flight compartment displays. Step FWD to the “A/P TRIM LITE A” test. Continue to the next test “A/P TRIM LITE B” Exit flight compartment display tests.	FMA A/P TRIM LITE A works. FMA A/P TRIM LITE B works.
(15)	FWD step to SERVO tests. Step FWD to “PITCH TRIM NOSE UP” Continue to next test “PITCH TRIM NOSE DN” Exit Servo tests. Exit MAINT test.	Verify ANU trim works. Verify AND trim works.
(16)	Return aircraft to required configuration.	

D. VOR

Table 206 VOR Test

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test.	No test.
(2)	On Flight Guidance Control Panel, place desired flight director switch to FD.	Selected FMA displays HDG HLD, ALT HLD.
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891		
(3)	Deleted.	
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(4)	Set up signal generator to transmit synthetic VOR signal. On VHF NAV control panel, tune to signal generator frequency.	Related HSI flag out of view. Compass pointers move to VOR station bearing.

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

Table 206 VOR Test (Continued)

Step	Action	Desired Result
(5)	Adjust appropriate CRS knob on VHF NAV panel until HSI deviation is greater than 2 dots.	HSI shows greater than 2 dots beam deviation.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(6)	On Flight Guidance Control Panel, press and release VOR LOC push-button.	FMA displays VOR in arm mode annunciator.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(7)	Adjust CRS knob to move course deviation bar on HSI towards VOR bearing until VOR CAP is displayed (approximately 2 dots).	FMA displays VOR CAP in roll mode annunciator. Arm mode annunciator blank.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(8)	Adjust CRS knob to move course deviation bar to center.	VOR TRK in roll mode annunciator.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(9)	Observe ADI command bar for several minutes.	Command bar moves slowly towards center.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(10)	Push in and release H knob.	HDG HLD in roll mode annunciator.
(11)	Press and release VOR LOC push-button.	VOR TRK in roll mode annunciator.
(12)	Pull out and release H knob.	HDG SEL in roll mode annunciator.
(13)	Press and release VOR LOC push-button.	VOR TRK in roll mode annunciator.
(13a)	Turn off signal generator.	VOR CRS in roll mode annunciator.
(13b)	Wait 30 seconds.	HDG HLD in roll mode annunciator.
(13c)	Turn back on signal generator. Press and release VOR/LOC push-button.	VOR TRK in roll mode annunciator.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(14)	Rotate CRS knob to left, then to right of existing heading.	Roll mode annunciator displays VOR CAP/TRK/CRS in relation to position of HSI course deviation bar. Command bar follows VOR course change.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(15)	Turn signal generator to OFF. Push H knob in and release.	HDG HLD in roll mode annunciator.
(16)	Return aircraft to required configuration.	No test.

E. LOC

Table 207 LOC Test

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test.	No test.

Table 207 LOC Test (Continued)

Step	Action	Desired Result
(2)	Connect radio altimeter test set to appropriate radio altimeter R/T unit. Adjust simulated radio altitude to 2000 feet.	Test setup.
WARNING:	TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.	
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
	Open and tag the circuit breaker for radio altimeter not used:	No test.

REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
B10-105	RADIO ALTIMETER-1	UPPER EPC	LEFT RADIO AC BUS	F/17
B10-106	RADIO ALTIMETER-2	UPPER EPC	RIGHT RADIO AC BUS	F/3

WARNING:	TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.	
	Open and tag these circuit breakers:	No test.
WARNING:	NORMAL ELECTRICAL POWER TO VARIOUS SYSTEMS MAY BE INTERRUPTED WHEN GROUND CONTROL RELAY CIRCUIT BREAKERS ARE OPENED. IF GROUND CONTROL RELAY CIRCUIT BREAKERS ARE TO BE OPENED WHILE PERFORMING PROCEDURES, MAKE CERTAIN SWITCHES AND CONTROLS OF AFFECTED SYSTEMS ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF EQUIPMENT.	

REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
B1-23	LEFT GROUND CONTROL RELAY	UPPER EPC	L AC BUS	K/33
B1-24	RGHT GROUND CONTROL RELAY	UPPER EPC	R AC BUS	L/33

	(c) If main gear is compressed, then install main gear proximity switch targets (P/N 4952969-1) on left and right weight on wheel main gear sensors, to place DFGC system in flight mode.	No test.
(3)	Set up signal generator to transmit synthetic localizer signal. On VHF NAV control panel tune to signal generator frequency.	NAV flag out of view on HSI.
(4)	Adjust signal generator to 2 dots left deflection.	HSI course deviation bar greater than 2 dots to left of center.

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

Table 207 LOC Test (Continued)

Step	Action		Desired Result		
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
(5)	On Flight Guidance Control Panel, place desired flight director switch to FD.		FMA displays HDG HLD, ALT HLD.		
(6)	On Flight Guidance Control Panel, press and release VOR LOC push-button.		FMA displays LOC in arm mode annunciator.		
(7)	Open and and close the applicable circuit breakers:		Arm mode annunciator blank. VHF NAV frequency window blank.		
	REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
WJE 410					
	B10-22	VHF NAV-1	OVERHEAD	EMERGENCY DC BUS	B/10
WJE 401-409, 411, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
	B10-22	VHF NAV-1	OVERHEAD	EMERGENCY DC BUS	B/9
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
	B10-24	VHF NAV-2	UPPER EPC	RIGHT RADIO DC BUS	G/7
WJE 401-409, 411, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
	B10-77	VHF NAV-1	OVERHEAD	EMERGENCY AC BUS	A/4
WJE 410					
	B10-77	VHF NAV-1 28 VAC	OVERHEAD	EMERGENCY AC BUS	A/5
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
	B10-78	VHF NAV-2	UPPER EPC	RIGHT RADIO BUS	B/5
(8)	Press and release VOR LOC push-button. .		LOC in arm mode annunciator		
(9)	Tune VHF NAV control panel to VOR frequency.		Arm mode annunciator blank.		
(10)	Tune VHF NAV control panel to original ILS frequency. Press and release VOR LOC push-button.		LOC in arm mode annunciator.		
(11)	Slowly adjust signal generator to center HSI course deviation bar.		At approximately 2 dots deviation, roll mode annunciator displays LOC CAP. Arm mode annunciator blank. Command bar moves slowly towards center.		

Table 207 LOC Test (Continued)

Step	Action	Desired Result
(12)	Observe Flight Director command bar for several minutes.	Command bar moves closer to center. Roll mode annunciator displays LOC TRK.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(13)	Position HSI course pointer to existing aircraft heading. Adjust localizer deviation to position course bar to 2 dots left of center.	ADI command bar moves left.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(14)	Smoothly reduce radio altitude to zero feet.	No test.
(15)	Adjust localizer course deviation bar to center.	No test.
(16)	Adjust simulated radio altitude to 1000 feet.	Test setup.
(17)	Place AP switch to ON.	Both FMA's display LOC TRK.
(18)	Slowly move localizer deviation to the left, then right, and return to 0 deviation.	Command bars and control wheels follow localizer deviation smoothly.
(19)	Reduce simulated radio altitude to zero feet.	No test.
(20)	Push in and release H knob.	HDG HLD replaces LOC TRK in FMA's.
(21)	Press AP wheel disconnect button twice.	AP disengages, AP warning lights off.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(22)	Close these circuit breaker and remove safety tags:	No test.

	REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
	B10-105	RADIO ALTIMETER-1	UPPER EPC	LEFT RADIO AC BUS	F/17
	B10-106	RADIO ALTIMETER-2	UPPER EPC	RIGHT RADIO AC BUS	F/3
	B1-23	LEFT GROUND CONTROL RELAY	UPPER EPC	L AC BUS	K/33
	B1-24	RGHT GROUND CONTROL RELAY	UPPER EPC	R AC BUS	L/33

(23)	Remove main gear proximity switch targets.	No test.
(24)	Return aircraft to required configuration.	No test.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		

F. ILS

Table 208 ILS Test

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test.	No test.
(2)	Connect radio altimeter test set to appropriate radio altimeter R/T unit. Adjust simulated radio altitude to 2000 feet.	Test setup.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.		
	(a) Open and tag the circuit breaker for radio altimeter not used:	No test.

	REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
	B10–105	RADIO ALTIMETER-1	UPPER EPC	LEFT RADIO AC BUS	F/17
	B10–106	RADIO ALTIMETER-2	UPPER EPC	RIGHT RADIO AC BUS	F/3

(3)	Set up signal generator to transmit synthetic localizer and glideslope signals. On VHF NAV control panel tune to signal generator frequency.	NAV flag out of view on HSI. Localizer and glideslope pointers in view on HSI and ADI.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.		
(4)	Open and tag these circuit breakers:	Test setup.
WARNING: NORMAL ELECTRICAL POWER TO VARIOUS SYSTEMS MAY BE INTERRUPTED WHEN GROUND CONTROL RELAY CIRCUIT BREAKERS ARE OPENED. IF GROUND CONTROL RELAY CIRCUIT BREAKERS ARE TO BE OPENED WHILE PERFORMING PROCEDURES, MAKE CERTAIN SWITCHES AND CONTROLS OF AFFECTED SYSTEMS ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF EQUIPMENT.		

	REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
	B1–23	LEFT GROUND CONTROL RELAY	UPPER EPC	L AC BUS	K-33
	B1–24	RIGHT GROUND CONTROL RELAY	UPPER EPC	R AC BUS	L/33

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893
NOTE: If main gear is compressed, then install main gear proximity switch targets (P/N 4952969-1) on left and right weight on wheel main gear sensors, to place DFGC systems in flight mode.

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

Table 208 ILS Test (Continued)

Step	Action	Desired Result
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(5)	Place flap/slat handle to LAND.	Test setup.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(6)	Adjust signal generator to 2 dots left deflection.	HSI course deviation bar greater than 2 dots to left of center.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(7)	On Flight Guidance Control Panel, place desired flight director switch to FD.	FMA displays HDG HLD, ALT HLD.
(8)	Adjust glideslope pointers to more than 2 dots flyup and verify localizer deviation more than 2 dots fly left.	Test setup.
(9)	Press and release ILS push-button.	FMA displays ILS in arm mode annunciator.
(10)	On VHF NAV control panel tune to a VOR frequency.	Arm mode annunciator blank. Glideslope pointers out of view.
(11)	Tune VHF NAV panel to original ILS frequency. Press and release ILS push-button.	ILS arm displayed. Glide slope pointers back in view.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(12)	Slowly adjust signal generator to center HSI course deviation bar.	At approximately 2 dots deviation, roll mode annunciator displays LOC CAP. Command bar moves slowly towards center. Roll mode annunciator displays LOC TRK (after approximately 25 seconds).
(13)	Position HSI course pointer to existing aircraft heading. Adjust localizer deviation to position course bar to 2 dots left of center.	ADI command bar moves left.
(15)	Adjust signal generator to center glideslope pointers on ADI and HSI.	Pitch mode annunciator displays G/S CAP, then after approximately 20 seconds G/S TRK. Pitch command towards center.
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893		
(18)	Place AP switch to ON.	Both FMA's display ILS, LOC TRK, G/S TRK.
WJE	**WJE 416, 420, 422, 424-427, 429**	
WJE (19)	Place AP switch to ON.	Both FMA's display goes to HDG HLD, ALT HLD.
WJE	(a) Press and release ILS push-button.	
WJE	(b) Slowly adjust signal generator to	At approximately 2 dots deviation, annunciator displays LOC CAP /
WJE	center glideslope and localizer pointer.	GS CAP. Command bar moves slowly towards center. Annunciator
WJE		displays LOC TRK / GS TRK (after approximately 25 seconds).

WJE **WJE 416, 420, 422, 424-427, 429 (Continued)**
WJE

Table 208 ILS Test (Continued)

WJE Step	Action		Desired Result		
WJE	**WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893**				
(20)	Vary localizer and glideslope commands for left/right and up and down indications.		Control wheels and control columns follow smoothly.		
(21)	Smoothly reduce simulated radio altitude to 300 feet; observe command bar.		No test.		
NOTE: After the DFGS verifies all approach conditions are satisfied, and radio altitude less than 1500 feet, AUT GA will be displayed in the arm mode annunciator. If auto go-around logic is not available, FD GA will be displayed. If no go-around logic is available, than MAN GA will be annunciated.					
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
(22)	Turn off signal generator power.		ADI and HSI glideslope flags in view. AP disengages.		
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
(23)	Press AP wheel disconnect button.		AP warning lights off.		
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
(24)	Remove safety tag and close circuit breakers:		No test.		
	REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
	B10–105	RADIO ALTIMETER-1	UPPER EPC	LEFT RADIO AC BUS	F/17
	B10–106	RADIO ALTIMETER-2	UPPER EPC	RIGHT RADIO AC BUS	F/3
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893					
	Remove safety tag and close circuit breakers:		No test.		
(24)	REF DES	CIRCUIT BREAKER	LOCATION	PANEL AREA	ROW/COL
	B1–23	LEFT GROUND CONTROL RELAY	UPPER EPC	L AC BUS	K-33
	B1–24	RIGHT GROUND CONTROL RELAY	UPPER EPC	R AC BUS	L/33
(25)	Remove main gear proximity switch targets.		No test.		
(26)	Return aircraft to required configuration.		No test.		

G. Yaw Damper Off/Mach Trim INOP Lights

Table 209 Yaw Damper Off/Mach Trim INOP Lights Test

Step	Action	Desired Result
(1)	Place switches to positions as follows: (a) MACH TRIM COMP switch (overhead panel) to OVRD position. (b) YAW DAMP switch (overhead panel) to OVRD position.	
(2)	Check MACH TRIM INOP and YAW DAMP OFF are annunciated on overhead panel.	MACH TRIM INOP and YAW DAMP OFF are illuminated.
(3)	Place DFGS side select switch to "1" on Flight Guidance Control Panel.	DFGC-1 selected.
(4)	Place AP paddle switch to ON above DFGS side select switch.	Autopilot engaged on DFGC 1.
(5)	Check MACH TRIM INOP and YAW DAMP OFF lights are on.	MACH TRIM INOP and YAW DAMP OFF are illuminated.
(6)	Place DFGS side select switch to "2".	DFGS-2 selected. AP paddle switch disengages.
(7)	Place AP paddle switch to engage position.	Autopilot engaged on DFGC 2.
(8)	Check MACH TRIM INOP and YAW DAMP OFF lights are on.	MACH TRIM INOP and YAW DAMP OFF lights are illuminated.
(9)	Press Autopilot disconnect button on control wheel.	AP paddle switch drops to disengaged position.
(10)	Check MACH TRIM INOP and YAW DAMP OFF lights are on.	MACHTRIM INOP and YAW DAMP OFF lights are illuminated.
(11)	Place switches as follows: (a) MACH TRIM COMP switch to NORM. (b) YAW DAMP switch to ON.	
(12)	Check MACH TRIM INOP and YAW DAMP OFF lights are off.	MACH TRIM INOP and YAW DAMP OFF lights are extinguished.

H. Perform an Operational Check of Go-Around Selection of TO/GA Switches as follows:

(1) On flight guidance control panel, place flight director switch to FD position.

(2) On Flight guidance control panel, place 1-2 switch to 1 position.

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

(a) Check FMA annunciators read HDG HLD and ALT HLD.

(b) Iinstall dummy targets over main gear WOW proximity sensors. (SPOILER - ADJUSTMENT/TEST, PAGEBLOCK 27-60-00/501).

NOTE: The use of WOW dummy targets is the preferred method. Opening ground control relay circuit breakers will cause avionics cooling fan to go off.

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

WARNING: NORMAL ELECTRICAL POWER TO VARIOUS SYSTEMS MAY BE INTERRUPTED WHEN GROUND CONTROL RELAY CIRCUIT BREAKERS ARE OPENED. IF GROUND CONTROL RELAY CIRCUIT BREAKERS ARE TO BE OPENED WHILE PERFORMING PROCEDURES, MAKE CERTAIN SWITCHES AND CONTROLS OF AFFECTED SYSTEMS ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF EQUIPMENT.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open these circuit breakers:

UPPER EPC, L AC BUS

Row	Col	Number	Name
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, R AC BUS

Row	Col	Number	Name
L	33	B1-24	RIGHT GROUND CONTROL RELAY

WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

(3) On number 1 throttle lever press and release TO/GA switch.

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

(a) Check both FMA's display GO RND.

(4) On flight guidance control panel, place 1-2 switch to 2 position.

(a) Press HDG (Heading) knob in for the Flight Mode Annunciator (FMA) to display HDG HOLD (Heading Hold).

(b) Press the ALT HOLD (Altitude Hold) pushbutton in for the FMA to display ALT HOLD.

(5) Repeat Paragraph 4.H.(2) thru Paragraph 4.H.(4).

(a) Close these circuit breakers:

UPPER EPC, L AC BUS

Row	Col	Number	Name
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, R AC BUS

Row	Col	Number	Name
L	33	B1-24	RIGHT GROUND CONTROL RELAY

Or remove WOW dummy targets.

WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

(6) Return aircraft to required configuration.

AUTOPILOT - MAINTENANCE PRACTICES

1. General

A. The tests in this section provide the operational capability of the autopilot/flight director modes that are provided from within the Digital Flight Guidance System (DFGS). The major portion of testing is provided from the Flight Guidance Control Panel (FGCP).

NOTE: If an autopilot mode is suspected of being inoperative, run the Maintenance Test Sequence Three (switches and buttons) to check for correct control panel interface to the DFGC.

B. Prior to performing any autopilot operational tests, it is assumed that all autopilot components (i.e. yaw damper, mach trim, etc.), interfacing LRU's (i.e. CADC's, Thrust Rating Panel, etc.), and instrumentation are in proper operating condition (passed the Return to Service test). Also, all circuit breakers as called out in AUTO FLIGHT, SUBJECT 22-00-00 are closed.

C. Tests are given for the DFGC in command as selected by the switch (labeled 1, 2) below the AP engage switch on the FGCP. If testing for the off-side DFGC is desired, then the switch must be manually moved to the side selected, and the complete test rerun.

D. The tests are provided as individual modes. The tests included in this section may require the activation of other modes for test setup, and in some cases the use of test equipment.

WARNING: PORTIONS OF THE TEST REQUIRE THE USE OF HYDRAULIC POWER. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED AND CLEAR CONTROL SURFACE AREAS OF ALL PERSONNEL AND EQUIPMENT.

E. If a test fails, repeat the test step prior to performing any maintenance action. Perform Return to Service or Maintenance test to verify the integrity of a failed mode test step DFGS STATUS/TEST, SUBJECT 22-01-05

F. If the A/P engage switch does not disengage as required in the normal manner, (failed in the ON position), then the A/P engage switch exhibits the cockpit indications for this failure as follows:

(1) The A/P will temporarily disconnect when the A/P yoke disconnect push button is pressed (the A/P engage lever may or may not drop to the disengaged "A/P OFF" position).

(2) When the disconnect push button is released, the A/P will reengage with the A/P engage lever in the "ON" or "OFF" position.

(3) The A/P will also disconnect if the primary trim is activated, but will reengage when the primary trim switches are released.

(4) A single push of the A/P disconnect push button will result in three flashes of the red Flight Mode Annunciator (FMA) A/P disconnect warning.

(5) Multiple presses may cause prolonged flashing of the disconnect warning and associated aural autopilot warning if applicable.

NOTE: The A/T engage switch and the A/P engage switch are the same part number and may experience the same type failure.

NOTE: With Service Bulletin 22-122 incorporated, the above failures will be eliminated. This Service Bulletin replaces the defective switches. Please use the above as a guideline in determining whether the switches are defective. Perform the test procedures that follow to establish that the aircraft will operate correctly.

2. Operational Tests

A. Autopilot Engage/Disengage

Table 201

Step	Action	Desired Result
(1)	Make sure electrical power is off.	Test set up.
(2)	Install temporary jumper at terminal strip S30-117 pin 20x located at sta. 110 in the forward right radio rack shelf 2 to Ground.	Test set up.
(3)	Install temporary jumper at terminal strip S30-118 pin 43x located at sta. 218L aft left radio rack shelf 1 to Ground.	Test set up.
(4)	Make sure electrical power is available and all necessary circuit breakers are closed.	Test set up.
(5)	Align both IRU (if installed) and place to NAV.	Test set up.
NOTE: An aural warning will sound during autoland only on some aircraft and any time the autopilot is disconnected on other aircraft.		
NOTE: With Service Bulletin 22-109 (KCN K743) installed or DFGC option program pin J102B/87 grounded, an aural warning will sound for all A/P disconnects in lieu of aural warnings for autoland mode disconnects only.		
(6)	Press and release Capt's control wheel A/P disconnect button.	AP red warning lights go off. Aural warning tone resets.
(7)	Place AP switch to ON position.	AP switch holds.
(8)	Press and release F/O's control wheel A/P disconnect button.	AP switch drops off. AP warning light comes on and flashes red in both FMA's.
(9)	Press and release F/O's control wheel A/P disconnect button.	AP red warning lights go off. Aural warning tone resets.
NOTE: During the remainder of the test, placing the AP switch to ON position will turn off the AP warning lights.		
(10)	Place AP switch to ON position. Below AP switch, place DFGS switch to opposite side.	AP switch drops off
(11)	Place DFGS switch to original side and place AP switch to ON position. On Capt's control wheel, actuate the primary trim switch for noseup.	AP switch drops off.
(12)	Place AP switch to ON position. On F/O's control wheel, actuate the primary trim switch for nosedown.	AP switch drops off.
(13)	Place AP switch to ON position. On pedestal operate primary trim handles for noseup.	AP switch drops off.
(14)	Place AP switch to ON position. On pedestal operate primary trim handles for nosedown.	AP switch drops off.
CAUTION: THE FOLLOWING STEP ACTUATES THE STICK PUSHER, THE CONTROL COLUMNS WILL MOVE FORWARD RAPIDLY. MAKE CERTAIN THERE IS NOT ANY EQUIPMENT OBSTRUCTING THE CONTROL COLUMNS PATH OF MOVEMENT.		

Table 201 (Continued)

Step	Action	Desired Result
(15a)	Verify SLATS to MID position (FLAPS between 0° and 13°).	
(16)	Place AP switch to ON position. In E&E compartment, place and hold the test switch on both Stall Warning computers in the NORMAL TEST position.	AP switch drops off. Control column moves forward. STICK PUSHER lights on glareshield come on.
(17)	Release both test switches on Stall Warning computers.	Control columns return to neutral position.
(18)	Press and release either Capt's or F/O's control wheel A/P disconnect button.	AP red warning lights go off.
(19)	Return aircraft to required configuration.	

B. Altitude Preselect/Advisory

Table 202

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test, and flaps are not in LAND position.	
(2)	On altimeter, adjust BARO to a reading of zero feet or minimum reading.	
(3)	On Flight Guidance Control Panel, place desired flight director switch to FD.	FMA reads HDG HOLD, ALT HOLD. Command bar centered on PFD.
(3a)	On overhead panel, select CADC switch to BOTH ON 1 or BOTH ON 2 as applicable.	
(4)	On Flight Guidance Control Panel, set ALT window (target altitude), to 1,000 feet greater than ALT reading and rotate pitch wheel to 1000 FPM climb.	Pitch command for noseup. Selected ALT at 1,000 feet greater than ALT reading.
(5)	Momentarily pull out on ALT knob.	Related FMA arm mode annunciators display ALT.
NOTE: On aircraft with Service Bulletin 22-110 (KCN K804) installed, or DFGC program pin J101A/70 is grounded the following applies: Once altitude preselected captive function is armed, any change to the selected altitude will cause the arm function (as if pulling the ALT SEL knob to the pull position) to initiate automatically. This is also true when the G/A mode is selected. If pin J104A/69, Armed Flight Level, is grounded the armed altitude (selected altitude divided by 100) will be displayed on Capt's and F/O's FMA annunciators in lieu of "ALT".		
(6)	Deleted.	
(7)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750(±25) feet from target altitude. Altitude advisory light on steady and aural tone sounds.
(8)	Rotate BARO setting to decrease altimeter reading until altitude advisory light flashes.	At greater than 750(±25) feet (from target altitude), altitude advisory light flashes, alert tone and vocal warning "ALTITUDE" sounds.
(9)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750(±25) feet (from target altitude), altitude advisory light comes on steady and alert tone sounds.
(7)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750(±25) feet from target altitude. Altitude advisory light on steady.

Table 202 (Continued)

Step	Action	Desired Result
NOTE: With Service Bulletin 22-108 incorporated, when the altimeter reaches 750 feet from the desired altitude, the aural tone is heard. This simulates what happens when aircraft approaches 750(±25) feet of selected altitude.		
(8)	Rotate BARO setting to decrease altimeter reading until altitude advisory light flashes.	At greater than 750(±25) feet (from target altitude), altitude advisory light flashes.
(9)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750(±25) feet (from target altitude), altitude advisory light comes on steady.
(10)	Continue to increase BARO readout to increase altimeter reading toward target; stop when advisory light goes off.	At 250(±25) feet (from target altitude), altitude advisory light goes off.
(11)	Rotate BARO readout to decrease altimeter reading; stop when altitude advisory light flashes.	At greater than 250(±25) feet (from target altitude), altitude advisory light flashes and alert tone sounds.
(12)	Select new altitude which is greater than 750 feet from existing altitude.	Altitude advisory light goes off.
(13)	Set BARO readout to field barometric pressure.	
(14)	Return aircraft to required configuration.	

C. Automatic Pitch Trim

Table 203

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test. Ensure A/P, A/T, and FD switches are OFF	
(2)	On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and GROUND CONTROL RELAY RIGHT circuit breakers.	
(3)	Install dummy targets over main gear weight-on-wheels (WOW) proximity sensors. (SPOILER, SUBJECT 27-60-00, figure 504)	Test setup. Simulate DFGS in flight mode.
(4)	Move horizontal stabilizer position indicator to near 4° ANU, using alternate longitudinal trim switches located on pedestal.	
(5)	Move primary trim switch on Captain's or First Officer's control wheel to aircraft nose up position. Observe stabilizer position indicator on center pedestal is moving toward ANU. Horizontal stabilizer in motion warning sounds.	Switch activated to ANU. Horizontal stabilizer moves 0.33°/second toward ANU. Horizontal stabilizer aural warning should actuate within 1.5° (1.75° for MD-87) of stabilizer motion. At least 5 aural warnings should sound within 4° of movement.
(6)	Release primary trim switch on control wheel after approximately six aural warnings.	Horizontal stabilizer stops moving and horizontal stabilizer in motion aural warning silences.
(7)	Move stabilizer position indicator toward AND using alternate trim switch. Observe stabilizer position indicator is moving toward AND. Horizontal stabilizer in motion warning sounds. Continue motion for six aural warnings. Return to 4° ANU position.	Horizontal stabilizer moves 0.1°/ sec toward AND. Horizontal stabilizer aural warning should actuate within 1.5° (1.75° for MD-87) of stabilizer motion. At least 5 aural warnings should sound within 4° of movement (tone only).

Table 203 (Continued)

Step	Action	Desired Result
(8)	On Flight Guidance Control Panel, place AP switch to ON.	Both FMA's display HDG HLD, ALT HLD.
(9)	Rotate pitch wheel for 500 FPM DESCEND. On pedestal, observe LONG TRIM indicator.	Vertical speed command reads 500 FPM DESCEND. LONG TRIM indicator moves for nosedown in approximately 6 seconds.
(10)	Rotate pitch wheel for 500 FPM CLIMB. On pedestal, observe LONG TRIM indicator.	Vertical speed command reads 500 FPM CLIMB. LONG TRIM indicator moves for noseup in approximately 6 seconds.
(11)	Press AP wheel disconnect button twice.	AP disengages, AP warning lights off.
(12)	Close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers. Remove WOW dummy targets.	
(13)	Return aircraft to required configuration.	
(14)	Verify DFGS switch is in position 1, or 2 as desired for test. Make sure A/P, A/T, and FD switches are OFF.	Test setup.
(15)	Move horizontal stabilizer position indicator to near 4° ANU, using alternate longitudinal trim switches located on pedestal.	Test setup.
(16)	Move primary trim switch on Captain's or First Officer's control wheel to aircraft nose up position. Observe stabilizer position indicator on center pedestal is moving toward ANU. Horizontal stabilizer in motion warning sounds.	Switch activated to ANU. Horizontal stabilizer moves 0.33°/second toward ANU. Horizontal stabilizer aural warning should be heard within 1.5° (1.75° for MD-87) of stabilizer motion. At least 5 aural warnings should be heard within 4° of movement.
(17)	Release primary trim switch on control wheel after approximately six aural warnings.	Horizontal stabilizer stops moving and horizontal stabilizer in motion aural warning is not heard.
(18)	Move stabilizer position indicator toward AND using alternate trim switch. Observe stabilizer position indicator is moving toward AND. Horizontal stabilizer in motion warning is heard. Continue motion for six aural warnings. Return to 4° ANU position.	 Horizontal stabilizer moves 0.1°/second toward AND. Horizontal stabilizer aural warning should actuate within 1.5° (1.75° for MD-87) of stabilizer motion. At least 5 aural warnings should be heard within 4° of movement (tone only).
(19)	Select DFGC MAINT Test and step FWD to flight compartment displays. Step FWD to the “A/P TRIM LITE A” test. Continue to the next test “A/P TRIM LITE B” Exit flight compartment display tests.	 FMA A/P TRIM LITE A works. FMA A/P TRIM LITE B works.

Table 203 (Continued)

Step	Action	Desired Result
(20)	FWD step to SERVO tests. Step FWD to “PITCH TRIM NOSE UP” Continue to next test “PITCH TRIM NOSE DN” Exit Servo tests. Exit MAINT test.	Verify ANU trim works. Verify AND trim works.
(21)	Return aircraft to required configuration.	

D. VOR

Table 204

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test.	
(2)	On Flight Guidance Control Panel, place desired flight director switch to FD.	Selected FMA displays HDG HLD, ALT HLD.
(3)	Deleted.	
(4)	Set up signal generator to transmit synthetic VOR signal. On VHF NAV control panel, tune to signal generator frequency.	Related ND flag out of view. Compass pointers move to VOR station bearing.
(5)	Adjust appropriate CRS knob on VHF NAV panel until ND deviation is greater than 2 dots.	ND shows greater than 2 dots beam deviation.
(6)	On Flight Guidance Control Panel, press and release VOR LOC pushbutton.	FMA displays VOR in arm mode annunciator.
(7)	Adjust CRS knob to move course deviation bar on ND towards VOR bearing until VOR CAP is displayed (approximately 2 dots).	FMA displays VOR CAP in roll mode annunciator. Arm mode annunciator blank.
(8)	Adjust CRS knob to move course deviation bar to center.	VOR TRK in roll mode annunciator.
(9)	Observe PFD command bar for several minutes.	Command bar moves slowly towards center.
(10)	Push in and release H knob.	HDG HLD in roll mode annunciator.
(11)	Press and release VOR LOC pushbutton.	VOR TRK in roll mode annunciator.
(12)	Pull out and release H knob.	HDG SEL in roll mode annunciator.
(13)	Press and release VOR LOC pushbutton.	VOR TRK in roll mode annunciator.
(13a)	Turn off signal generator.	VOR CRS in roll mode annunciator.
(13b)	Wait 30 seconds.	HDG HLD in roll mode annunciator.
(13c)	Turn back on signal generator. Press and release VOR/LOC pushbutton.	VOR TRK in roll mode annunciator.
(14)	Rotate CRS knob to left, then to right of existing heading.	Roll mode annunciator displays VOR CAP/TRK/CRS in relation to position of ND course deviation bar. Command bar follows VOR course change.

Table 204 (Continued)

Step	Action	Desired Result
(15)	Turn signal generator to OFF. Push H knob in and release.	HDG HLD in roll mode annunciator.
(16)	Return aircraft to required configuration.	

E. LOC

Table 205

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test.	
(2)	Connect radio altimeter test set to appropriate radio altimeter R/T unit. Adjust simulated radio altitude to 2000 feet.	
(2a)	Open RADIO ALTIMETER circuit breaker that is not in use. (a) Open GROUND CONTROL RELAY LEFT and RIGHT circuit breakers. (b) Install main gear proximity switch targets.	
(3)	Set up signal generator to transmit synthetic localizer signal. On VHF NAV control panel tune to signal generator frequency.	NAV flag out of view on ND.
(4)	Adjust signal generator to a 2 dots left deflection.	ND course deviation bar greater than 2 dots to left of center.
(5)	On Flight Guidance Control Panel, place desired flight director switch to FD.	FMA displays HDG HLD, ALT HLD.
(6)	On Flight Guidance Control Panel, press and release VOR LOC pushbutton.	FMA displays LOC in arm mode annunciator.
(7)	Open appropriate VHF NAV circuit breaker.	Arm mode annunciator blank. VHF NAV frequency window blank.
NOTE: VHF NAV 1, Overhead, EMERGENCY DC BUS, and VHF NAV 2, Upper EPC, RIGHT RADIO DC BUS.		
(8)	Close VHF NAV circuit breaker. Press and release VOR LOC pushbutton.	LOC in arm mode annunciator.
(9)	Tune VHF NAV control panel to VOR frequency.	Arm mode annunciator blank.
(10)	Tune VHF NAV control panel to original ILS frequency. Press and release VOR LOC pushbutton.	LOC in arm mode annunciator.
(11)	Slowly adjust signal generator to center ND course deviation bar.	At approximately 2 dots deviation, roll mode annunciator displays LOC CAP. Arm mode annunciator blank. Command bar moves slowly towards center.
(12)	Observe Flight Director command bar for several minutes.	Command bar moves closer to center. Roll mode annunciator displays LOC TRK.

Table 205 (Continued)

Step	Action	Desired Result
(13)	Position ND course pointer to existing airplane heading. Adjust localizer deviation to position course bar 2 dots left of center.	ND command bar moves left.
(14)	Smoothly reduce radio altitude to zero feet.	
(15)	Adjust localizer course deviation bar to center.	
(16)	Adjust simulated radio altitude to 1000 feet.	
(17)	Place AP switch to ON.	Both FMA's display LOC TRK.
(18)	Slowly move localizer deviation to the left, then right, and then to 0° deviation.	Command bars and control wheels follow localizer deviation smoothly.
(19)	Reduce simulated radio altitude to zero feet.	
(20)	Push in and release H knob.	HDG HLD replaces LOC TRK in FMA's.
(21)	Press AP wheel disconnect button twice.	AP disengages, AP warning lights off.
(21a)	Close circuit breaker opened in step (2a). (a) Close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers. (b) Remove main gear proximity switch targets.	
(22)	Return aircraft to required configuration.	

F. ILS

Table 206

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test.	
(2)	Connect radio altimeter test set to appropriate radio altimeter R/T unit. Adjust simulated radio altitude to 2000 feet. (a) Open RADIO ALTIMETER circuit breaker that is not in use.	
(3)	Set up signal generator to transmit synthetic localizer and glideslope signals. On VHF NAV control panel, tune to signal generator frequency.	NAV flag out of view on ND. Localizer and glideslope pointers in view on ND and PFD.
(4)	On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and GROUND CONTROL RELAY RIGHT circuit breakers.	
NOTE: If main gear is compressed, then install main gear proximity switch targets (P/N 4952969-1) on left and right weight on wheel main gear sensors, to place DFGC systems in flight mode.		
(5)	Place FLAP/SLAT handle to LAND.	
(6)	Adjust signal generator to a 2 dots left deflection.	ND course deviation bar greater than 2 dots to left of center.

Table 206 (Continued)

Step	Action	Desired Result
(7)	On Flight Guidance Control Panel, place desired flight director switch to FD.	FMA displays HDG HLD, ALT HLD.
(8)	Adjust glideslope pointers to more than 2 dots flyup and verify localizer deviation more than 2 dots fly left.	
(9)	Press and release ILS pushbutton.	FMA displays ILS in arm mode annunciator.
(10)	On VHF NAV control panel tune to a VOR frequency.	Arm mode annunciator blank. Glideslope pointers out of view.
(11)	Tune VHF NAV panel to original ILS frequency. Press and release ILS pushbutton.	ILS arm displayed. Glide slope pointers back in view.
(12)	Slowly adjust signal generator to center ND course deviation bar.	At approximately 2 dots deviation, roll mode annunciator displays LOC CAP. Command bar moves slowly towards center. Roll mode annunciator displays LOC TRK (after approximately 25 seconds).
(13)	Position ND course pointer to existing aircraft heading. Adjust localizer deviation to position course bar to 2 dots left of center.	PFD FD command bar moves left.
(14)	Adjust signal generator to center glideslope pointers on PFD and ND.	Pitch mode annunciator displays G/S CAP, then after approximately 20 seconds G/S TRK. Pitch command towards center.
(15)	Adjust signal generator to position glideslope pointer to 2 dots above center and localizer to 2 dots to right of center.	Pitch command for noseup and roll command to right of center.
(16)	Place AP switch to ON.	Both FMA's display ILS, LOC TRK, G/S TRK.
(17)	Vary localizer and glideslope commands for left/right and up/down indications.	Control wheels and control columns follow smoothly.
(18)	Smoothly reduce simulated radio altitude to 300 feet; observe command bar.	
NOTE: After the DFGS verifies all approach conditions are satisfied, and radio altitude less than 1500 feet, AUT GA will be displayed in the arm mode annunciator. If auto go-around logic is not available, FD GA will be displayed. If no go-around logic is available, than MAN GA will be annunciated.		
(19)	Turn off signal generator power.	PFD and ND glideslope flags in view. AP disengages.
(20)	Press AP wheel disconnect button.	AP warning lights off.
(21)	Close GROUND CONTROL RELAY LEFT and RIGHT circuit breakers.	
(22)	Remove main gear proximity switch targets.	
(23)	Return aircraft to required configuration.	

G. Yaw Damper Off/Mach Trim INOP Lights

NOTE: The following test will only work on aircraft that have Service Bulletin 22-83 or its production equivalent incorporated.

Table 207

Step	Action	Desired Result
(1)	Place switches to positions as follow: (a) MACH TRIM COMP switch (overhead panel) to OVRD position. (b) YAW DAMP switch (overhead panel) to OVRD position. (c) Check MACH TRIM INOP and YAW DAMP OFF are annunciated on overhead panel.	MACH TRIM INOP and YAW DAMP OFF lights are illuminated.
(2)	Place DFGS side select switch to "1" on Flight Guidance Control Panel.	DFGC-1 selected.
(3)	Place AP paddle switch to ON above DFGS side select switch.	Autopilot engaged on DFGC 1.
(4)	Check MACH TRIM INOP and YAW DAMP OFF lights are on.	MACH TRIM INOP and YAW DAMP OFF are illuminated.
(5)	Place DFGS side select switch to "2".	DFGS-2 selected. AP paddle switch disengages.
(6)	Place AP paddle switch to engage position.	Autopilot engaged on DFGC 2.
(7)	Check MACH TRIM INOP and YAW DAMP OFF lights are on.	MACH TRIM INOP and YAW DAMP OFF lights are illuminated.
(8)	Press Autopilot disconnect button on control wheel.	AP paddle switch drops to disengaged position.
(9)	Check MACH TRIM INOP and YAW DAMP OFF lights are on.	MACH TRIM INOP and YAW DAMP OFF lights are illuminated.
(10)	Place switches as follows: (a) MACH TRIM COMP switch to NORM. (b) YAW DAMP switch to ON.	Check MACH TRIM INOP and YAW DAMP OFF lights are off.

H. Perform an Operational Check of Go-Around Selection of TO/GA Switches as follows:

(1) On flight guidance control panel, place flight director switch to FD position.

(2) On Flight guidance control panel, place 1-2 switch to 1 position.

(a) Check FMA annunciators read HDG HLD and ALT HLD.

(b) On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and GROUND CONTROL RELAY RIGHT circuit breakers or install dummy targets over main gear weight-on-wheels (WOW) proximity sensors. (SPOILER, SUBJECT 27-60-00, figure 504)

NOTE: Opening ground control relay circuit breakers will cause avionics cooling fan to go off. The use of WOW dummy targets is the preferred method.

(3) On number 1 throttle lever press and release TO/GA switch.

(a) Check both FMA's display GO RND.

(4) On flight guidance control panel, place 1-2 switch to 2 position.

(a) Press theHDG knob in for the FMA to display the HDG HOLD.

(b) Press the ALT HOLD pushbutton in for the FMA to display the ALT HOLD.

(5) Repeat Paragraph 2.H.(2) thru Paragraph 2.H.(4).

(a) Close GROUND CONTROL RELAY LEFT and GROUND CONTROL RELAY RIGHT circuit breakers or remove WOW dummy targets.

(6) Return aircraft to required configuration.

AUTOPILOT - ADJUSTMENT/TEST

1. General

A. This procedure contains MSG-3 task card data.

TASK 22-10-00-710-801

2. Operational Check of the Autopilot Aural Disengage Warning

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
22-10-00 P/B 201 Config 1	AUTOPILOT - MAINTENANCE PRACTICES
22-10-00 P/B 201 Config 3	AUTOPILOT - MAINTENANCE PRACTICES

B. Operational Check of the Autopilot Aural Disengage Warning

SUBTASK 22-10-00-710-009

(1) Do the Operational Check of the Autopilot Aural Disengage Warning. (AUTOPILOT - MAINTENANCE PRACTICES, PAGEBLOCK 22-10-00/201 Config 1 or AUTOPILOT - MAINTENANCE PRACTICES, PAGEBLOCK 22-10-00/201 Config 3

——— END OF TASK ———

TASK 22-10-00-710-802

3. Operational Check of the Go-Around Selection (Single TO/GA Switch Operation)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
24-00-00 P/B 001	GENERAL - DESCRIPTION AND OPERATION
24-40-00 P/B 001	EXTERNAL POWER - DESCRIPTION AND OPERATION

B. Prepare for the Operational Check of the Go-Around Selection (Single TO/GA Switch Operation)

SUBTASK 22-10-00-861-002

(1) Energize the aircraft electrical power system. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 24-00-00/001)

C. Operational Check of the Go-Around Selection (Single TO/GA Switch Operation)

SUBTASK 22-10-00-710-003

(1) Do an operational check of the go-around selection (single TO/GA switch operation) position 1.

(a) On flight guidance control panel, place flight director switch to FD position.

(b) On the flight guidance control panel, place 1-2 switch to 1 position.

1) Check FMA annunciators read HDG HLD and ALT HLD.

(c) On upper EPC circuit breaker panel, open GROUND CONTROL RELAY LEFT and GROUND CONTROL RELAY RIGHT circuit breakers OR install dummy targets over main gear weight-on-wheels (WOW) proximity sensors.

NOTE: Opening ground control relay circuit breakers will cause avionics cooling fan to go off. The use of WOW dummy targets is the preferred method.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Open these circuit breakers and install safety tags:

UPPER EPC, L AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
K	30	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, R AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
L	30	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	33	B1-24	RIGHT GROUND CONTROL RELAY

WJE ALL

(e) On number 1 throttle lever press and release TO/GA switch.

1) Verify both FMA's display GO RND.

SUBTASK 22-10-00-710-004

(2) Do an operational check of the go-around selection (single TO/GA switch operation) position 2.

(a) On flight guidance control panel, place 1-2 switch to 2 position.

1) Press HDG knob into HDG HOLD position and ALT hold button in for ALT HOLD position.

2) Check FMA annunciators read HDG HLD and ALT HLD.

(b) On number 2 throttle lever press and release TO/GA switch.

1) Check both FMA's display GO RND.

SUBTASK 22-10-00-865-002

(3) Close left and right ground control relay circuit breakers (if alternate method was used).

Remove the safety tags and close these circuit breakers:

UPPER EPC, L AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
K	30	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	33	B1-23	LEFT GROUND CONTROL RELAY

WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

UPPER EPC, R AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
L	30	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	33	B1-24	RIGHT GROUND CONTROL RELAY

WJE ALL

SUBTASK 22-10-00-080-003

(4) Remove WOW dummy targets (if preferred method was used).

SUBTASK 22-10-00-862-003

(5) De-energize the aircraft electrical power system. (EXTERNAL POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 24-40-00/001)

——— END OF TASK ———

WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

TASK 22-10-00-710-807

4. Operational Check of the Altitude Alert System (If 750 FT Aural Warning Enable Not Installed)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
24-00-00 P/B 001	GENERAL - DESCRIPTION AND OPERATION
24-40-00 P/B 001	EXTERNAL POWER - DESCRIPTION AND OPERATION

B. Prepare for the Operational Check of the Altitude Alert System (If 750 FT Aural Warning Enable Not Installed)

SUBTASK 22-10-00-861-003

(1) Energize the aircraft electrical power system. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 24-00-00/001)

C. Operational Check of the Altitude Alert System (If 750 FT Aural Warning Enable Not Installed)

SUBTASK 22-10-00-710-005

(1) Do an operational check of the altitude alert system (if 750 FT aural warning enable not installed), altitude preselect/advisory.

Table 501

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test, and flaps are not in LAND position.	No test.
(2)	On altimeter, adjust BARO to a reading of zero feet or minimum reading.	Test setup.

WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

Table 501 (Continued)

Step	Action	Desired Result
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(3)	On Flight Guidance Control Panel, place desired flight director switch to FD.	FMA reads HDG HOLD, ALT HOLD. Command bar centered on ADI.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(3a)	On overhead panel, select CADC switch to BOTH ON 1 or BOTH ON 2 as applicable.	No test.
(4)	On Flight Guidance Control Panel, set ALT window (target altitude), to 1,000 feet greater than ALT reading and rotate pitch wheel to 1000 FPM climb.	Pitch command for noseup. Selected ALT at 1,000 feet greater than ALT reading.
(5)	Momentarily pull out on ALT knob.	Related FMA arm mode annunciators display ALT.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
NOTE: On aircraft with Service Bulletin 22-110 (KCN K804) installed, or DFGC program pin J101A/70 is grounded the following applies: Once altitude preselected captive function is armed, any change to the selected altitude will cause the arm function (as if pulling the ALT SEL knob to the pull position) to initiate automatically. This is also true when the G/A mode is selected. If pin J104A/69, Armed Flight Level, is grounded the armed altitude (selected altitude divided by 100) will be displayed on Capt's and F/O's FMA annunciators in lieu of "ALT".		
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(6)	Deleted.	
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(7)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750 ±25 feet from target altitude. Altitude advisory light on steady and alert tone sounds.
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891		
NOTE: With Service Bulletin 22-108 incorporated, when the altimeter reaches 750 feet from the desired altitude the aural tone is heard. This simulates what happens when aircraft approaches 750(±25) feet of selected altitude.		
WJE 412, 414		
(7)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750 ±25 feet from target altitude. Altitude advisory light on steady.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(8)	Rotate BARO setting to decrease altimeter reading until altitude advisory light flashes.	At greater than 750 ±25 feet (from target altitude) altitude advisory light flashes, alert tone and vocal warning "ALTITUDE" sounds.
WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(9)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750 ±25 feet (from target altitude) altitude advisory light comes on steady and alert tone sounds.

WJE 401-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

Table 501 (Continued)

Step	Action	Desired Result
WJE 412, 414		
(9)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750 ±25 feet (from target altitude) altitude advisory light comes on steady.
WJE 405-412, 414, 873-880, 884, 886, 887, 892, 893		
(10)	Continue to increase BARO readout to increase altimeter reading toward target; stop when advisory light goes off.	At 250(±25) feet (from target altitude) altitude advisory light goes off.
(11)	Rotate BARO readout to decrease altimeter reading; stop when altitude advisory light flashes.	At greater than 250(±25) feet (from target altitude) altitude advisory light flashes, alert tone sounds and vocal warning word "ALTITUDE" sounds.
(12)	Select new altitude which is greater than 750 feet from existing altitude.	Altitude advisory light, alert tone and vocal warning go off.
WJE 401-404, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 881, 883, 891-893		
(10)	Continue to increase BARO readout to increase altimeter reading toward target; stop when advisory light goes off.	At 250(±25) feet (from target altitude) altitude advisory light goes off.
(11)	Rotate BARO readout to decrease altimeter reading; stop when altitude advisory light flashes.	At greater than 250 ±25 feet (from target altitude) altitude advisory light flashes and alert tone sounds.
(12)	Select new altitude which is greater than 750 feet from existing altitude.	Altitude advisory light goes off.
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893		
(13)	Set BARO readout to field barometric pressure.	No test.
(14)	Return aircraft to required configuration.	No test.

D. Job Close-up

SUBTASK 22-10-00-862-004

(1) De-energize the aircraft electrical power system. (EXTERNAL POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 24-40-00/001)

——— END OF TASK ———

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

TASK 22-10-00-710-812

5. Operational Check of the Altitude Alert System (If 750 FT Aural Warning Enable Not Installed)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
24-00-00 P/B 001	GENERAL - DESCRIPTION AND OPERATION
24-40-00 P/B 001	EXTERNAL POWER - DESCRIPTION AND OPERATION

B. Prepare for the Operational Check of the Altitude Alert System (If 750 FT Aural Warning Enable Not Installed)

SUBTASK 22-10-00-861-005

(1) Energize the aircraft electrical power system. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 24-00-00/001)

C. Operational Check of the Altitude Alert System (If 750 FT Aural Warning Enable Not Installed)

SUBTASK 22-10-00-710-007

(1) Do an operational check of the altitude alert system (if 750 FT aural warning enable not installed), altitude preselect/advisory.

Table 502

Step	Action	Desired Result
(1)	Verify DFGS switch is in position 1, or 2 as desired for test, and flaps are not in LAND position.	
(2)	On altimeter, adjust BARO to a reading of zero feet or minimum reading.	
(3)	On Flight Guidance Control Panel, place desired flight director switch to FD.	FMA reads HDG HOLD, ALT HOLD. Command bar centered on PFD.
(3a)	On overhead panel, select CADC switch to BOTH ON 1 or BOTH ON 2 as applicable.	
(4)	On Flight Guidance Control Panel, set ALT window (target altitude), to 1,000 feet greater than ALT reading and rotate pitch wheel to 1000 FPM climb.	Pitch command for noseup. Selected ALT at 1,000 feet greater than ALT reading.
(5)	Momentarily pull out on ALT knob.	Related FMA arm mode annunciators display ALT.
NOTE: On aircraft with Service Bulletin 22-110 (KCN K804) installed, or DFGC program pin J101A/70 is grounded the following applies: Once altitude preselected captive function is armed, any change to the selected altitude will cause the arm function (as if pulling the ALT SEL knob to the pull position) to initiate automatically. This is also true when the G/A mode is selected. If pin J104A/69, Armed Flight Level, is grounded the armed altitude (selected altitude divided by 100) will be displayed on Capt's and F/O's FMA annunciators in lieu of "ALT".		
(6)	Deleted.	
(7)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750(±25) feet from target altitude. Altitude advisory light on steady and aural tone sounds.
(8)	Rotate BARO setting to decrease altimeter reading until altitude advisory light flashes.	At greater than 750(±25) feet (from target altitude), altitude advisory light flashes, alert tone and vocal warning "ALTITUDE" sounds.
(9)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750(±25) feet (from target altitude), altitude advisory light comes on steady and alert tone sounds.
(7)	Rotate appropriate BARO knob to increase altimeter reading; stop when altitude advisory light comes on.	Altimeter reads 750(±25) feet from target altitude. Altitude advisory light on steady.
NOTE: With Service Bulletin 22-108 incorporated, when the altimeter reaches 750 feet from the desired altitude, the aural tone is heard. This simulates what happens when aircraft approaches 750(±25) feet of selected altitude.		
(8)	Rotate BARO setting to decrease altimeter reading until altitude advisory light flashes.	At greater than 750(±25) feet (from target altitude), altitude advisory light flashes.

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872 (Continued)

Table 502 (Continued)

Step	Action	Desired Result
(9)	Rotate BARO setting to increase altimeter reading until altitude advisory light comes on steady.	At less than 750(±25) feet (from target altitude), altitude advisory light comes on steady.
(10)	Continue to increase BARO readout to increase altimeter reading toward target; stop when advisory light goes off.	At 250(±25) feet (from target altitude), altitude advisory light goes off.
(11)	Rotate BARO readout to decrease altimeter reading; stop when altitude advisory light flashes.	At greater than 250(±25) feet (from target altitude), altitude advisory light flashes and alert tone sounds.
(12)	Select new altitude which is greater than 750 feet from existing altitude.	Altitude advisory light goes off.
(13)	Set BARO readout to field barometric pressure.	
(14)	Return aircraft to required configuration.	

D. Job Close-up

SUBTASK 22-10-00-862-006

(1) De-energize the aircraft electrical power system. (EXTERNAL POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 24-40-00/001)

——— END OF TASK ———

AUTOPILOT DUPLEX SERVO DRIVE - DESCRIPTION AND OPERATION

1. General

A. There are three autopilot duplex servodrives installed on the aircraft, one each for aileron, elevator and rudder. The servodrives are identical and completely interchangeable with the other.

B. The aileron and elevator servodrives operate anytime the auto-pilot is engaged to provide the proper movement of aileron and elevator control tabs for execution of commanded pitch and roll control. A rheostat is installed on the aileron servodrive to limit the torque of the aileron servo as a function of control wheel (bank angle).

C. The rudder servodrive only comes on the line during ILS or autoland operation after localizer and glideslope track to provide the rudder authority required for the align mode, automatic go-around maneuver and takeoff for aircraft equipped with -930 and subsequent DFGC's.

D. Each servodrive consists of two major parts, a servo bracket and dual servo assembly.

2. Description

A. Duplex Servodrives

(1) The Digital Flight Guidance Computer (DFGC) provides commanded signals to the servodrives. The servodrives then convert the electrical signals into rotory mechanical diaplacement to provide mechanical control to the aileron, elevator and rudder control tabs.

(2) The dual servo assembly consists of two identical dc torque motors coupled through a differential power gear train. Each motor has an integral tachometer. The output of the differential power gear train is coupled to an electro-mechanical engage clutch, through another gear pass, to an output spline that is coupled to a spline in the servo bracket, which drives the servo cable drum.

(3) A dc signal is provided from the DFGC at the torque motor inputs. The magnitude of the signal determines the amount the motors are to be driven. The motors drive the tachometer and gear train to drive their respective control transmitter (CX) synchros. When 26 vac, 400 Hz is applied to the synchro rotors, the gear train turns, and the rotors induce a voltage change at the stators. The gear train also drives the cable drum, causing the cabling around the drum to mechanically control its surface tab.

(4) The tachometers and synchro outputs are fed back to the DFGC servo amplifier for servo loop stabilization, and to the multiplexer for software monitoring of servodrive operation. Also, all other servo outputs are fed back around to the multiplexer to perform "end around" testing. These "end around" signals are processed as separate inputs to the appropriate multiplexers and then compared at a digital level in software with the original command.

B. Servo Bracket

(1) The servo bracket serves as a mounting for the servoassembly and provides the mechanical coupling between the servo output spline and the aircraft control cables.

(2) The servo bracket consists of a cast aluminum housing, bearings, and a cable drum assembly. The cable drum is a 2-7/8 inch pitch diameter capstan configured for 1/8-inch cables. The drum and bracket has a ball detent slip clutch mechanically in series with the servo output spline and cable drum. The servo mates to the servo bracket.

(3) A rheostat is coupled to the aileron cable drum assembly to attenuate servodrive force during a large airplane aileron maneuver. The rheostat is actuated to a value to reduce the servodrive action by movement of the cable drum. The rheostat is inhibited during landing maneuvers when the flaps are extended greater than 26 degrees. Also, an elevator drum bumper is installed on the elevator cable drum, to limit control of the elevator tab.

(4) Since each servo/bracket assembly is identical, and completely interchangeable, installation of the aileron rheostat, and elevator drum assembly are separate to the installation of the servo/bracket assembly.

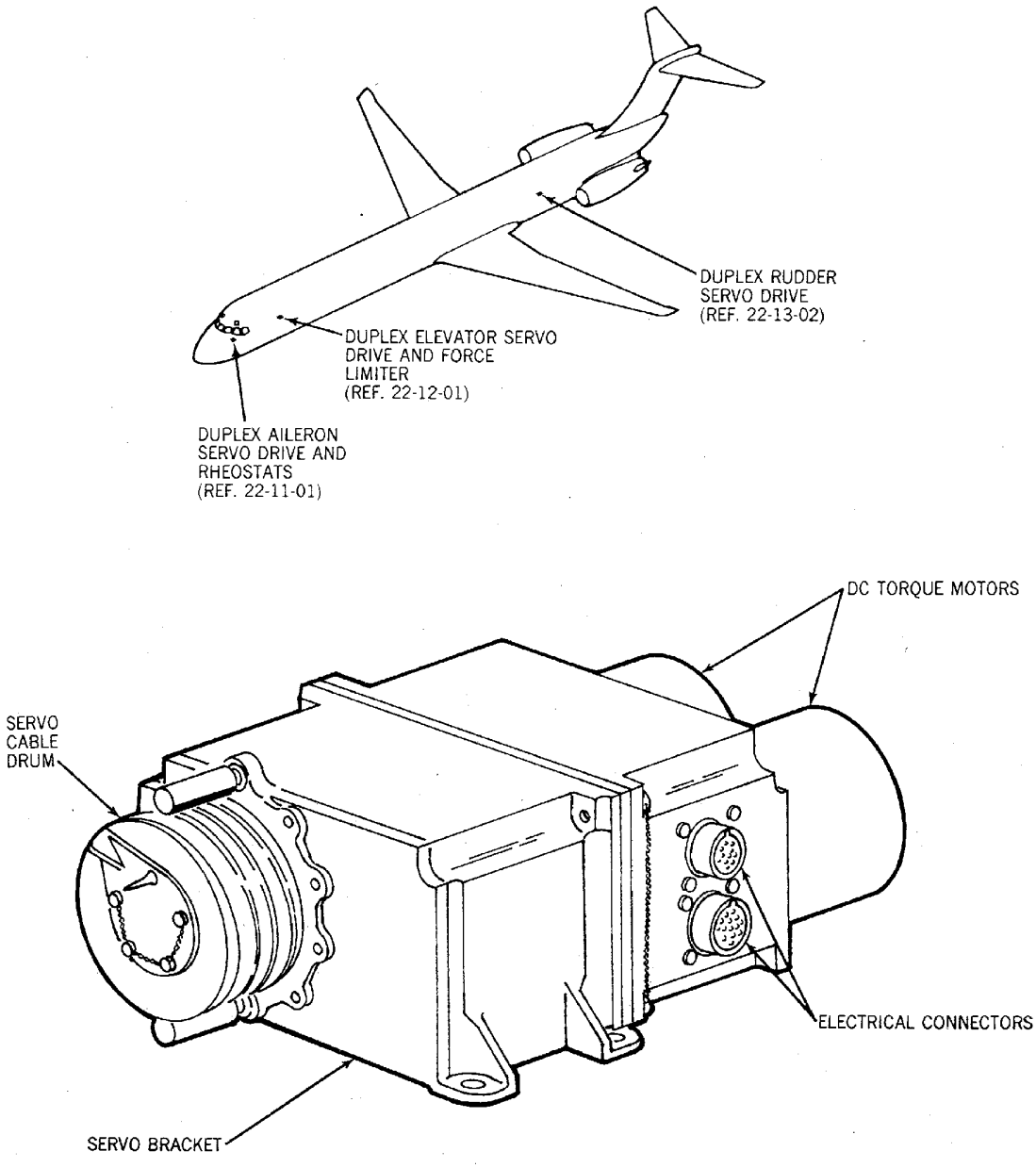
C. Autopilot Servo Torque Limiter

(1) The autopilot servo torque limiter is a mechanical dual-concentric-spring assembly attached between the elevator servo bracket and the horizontal stabilizer cockpit cable followup system. The normal tension in the spring varies according to stabilizer position, and acquires maximum tension at full noseup airplane trim (stabilizer leading edge down). Another set of springs in the force limiter varies as a function of flap position. The spring tension is maximum when the flaps are fully retracted. This provides a method of limiting the torque applied to the elevator system, with reference to position of the horizontal stabilizer and flap position. When flap position changes are greater than 26 degrees, the aileron torque limiter rheostat is bypassed by activation of the aileron mechanical torque limit switches. Problems in this area are recorded as aileron mechanical torque limit failures on the STP (MCDU). (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 101, Diagnostic numbers 452-453)

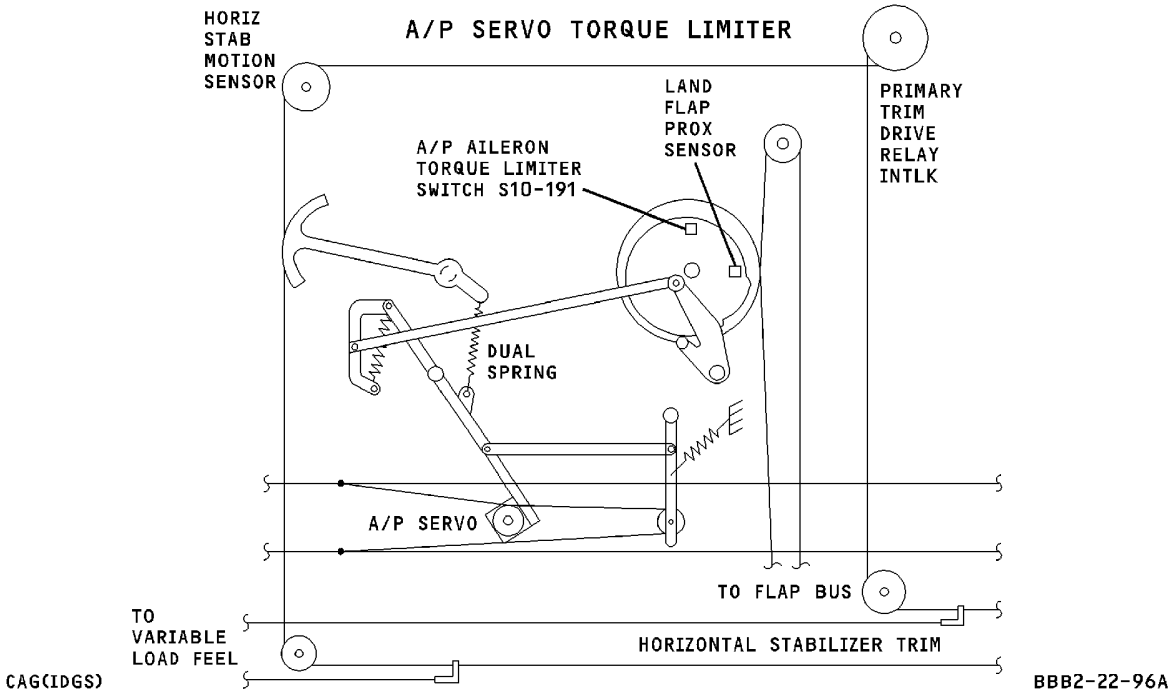
(2) The mechanical force limiting mechanism permits the elevator servodrive to operate normally until the torque output of the motors exceed the spring normal tension force (breakout force). Whenever the servo output exceeds the breakout force of the springs, for a given flight condition, the servo output torque is converted to a force that stretches the springs and causes a walking effect of the cable drum along the bridle cable. The drum will wind along the cable until either the mechanical stop on the servo is reached, or the servo torque is balanced by the spring force. Overall affect of this action results in limiting a possible hard-over output from the servo and preventing any large amplitude output to the elevator tabs.

(3) Servodrive output torque restriction is greatest under cruise conditions, when the stabilizer leading edge is at approximately neutral and the flaps are fully retracted. The restriction effectiveness drops off as the horizontal stabilizer moves towards noseup, and the tension springs increase. This is necessary during low speed coupled approach, or at extended forward cg, when stick force per "g" of a given airplane is high.

(4) An augmenter installed in conjunction with the autopilot servo torque limiter allows a bridle cable to be routed from the same side of the elevator cable drum. This routing acts to equalize the breakout force of the bridle cables. It also acts to prevent slack in the bridle cables when the servo has reached a hard over condition.



Duplex Servo Drives
Figure 1/22-10-01-990-822



Autopilot Servo Torque Limiter
Figure 2/22-10-01-990-823

AUTOPILOT DUPLEX SERVO DRIVE - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing duplex servodrive trouble shooting procedures, the Status Test Panel (STP) located beneath the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The servo drives may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing duplex servodrive trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on the forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The servo drives may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

C. Trouble shooting procedures

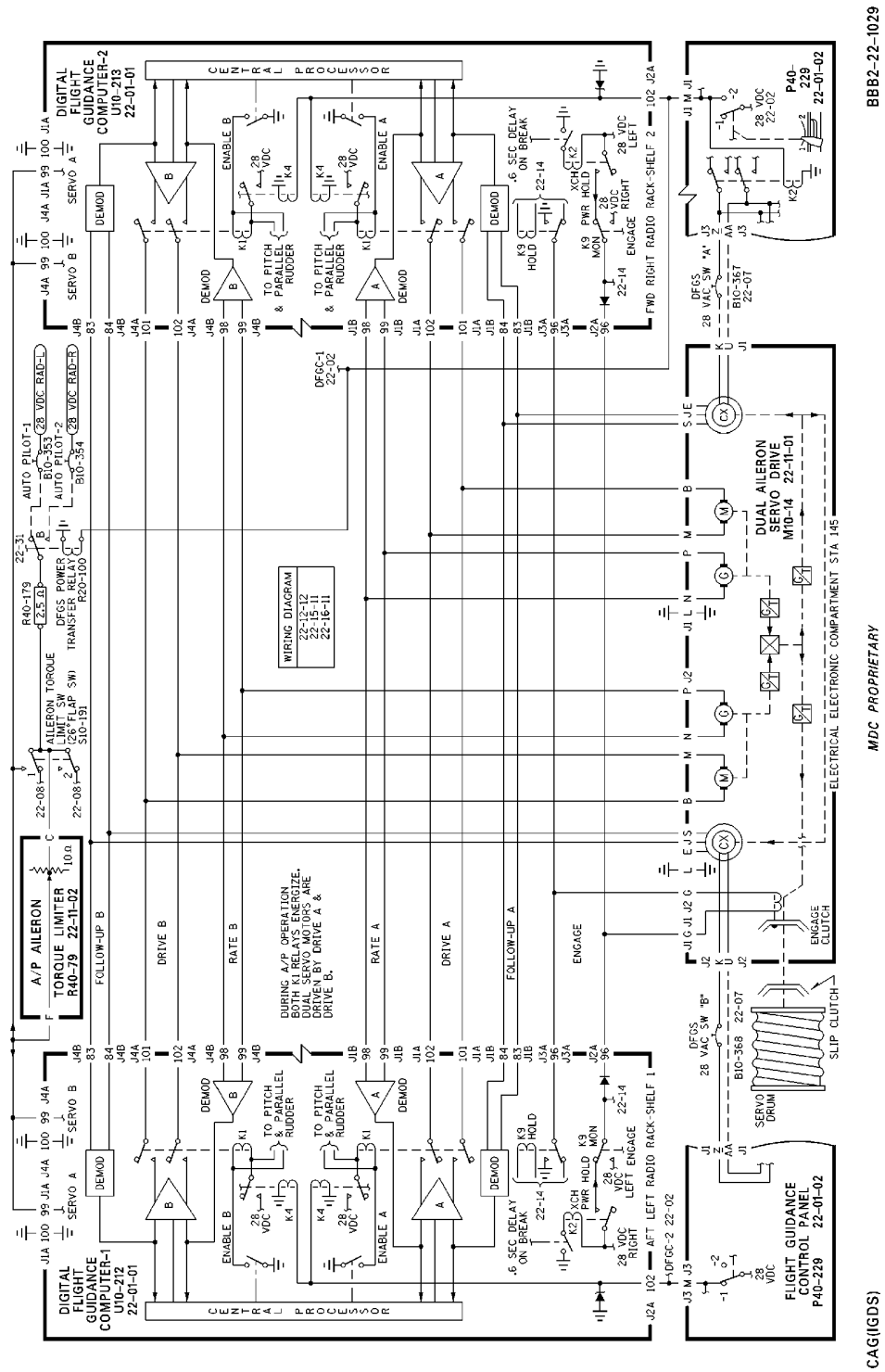
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing to the servo drives is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to the aileron, elevator and yaw damper duplex servo drives and associated system interface.

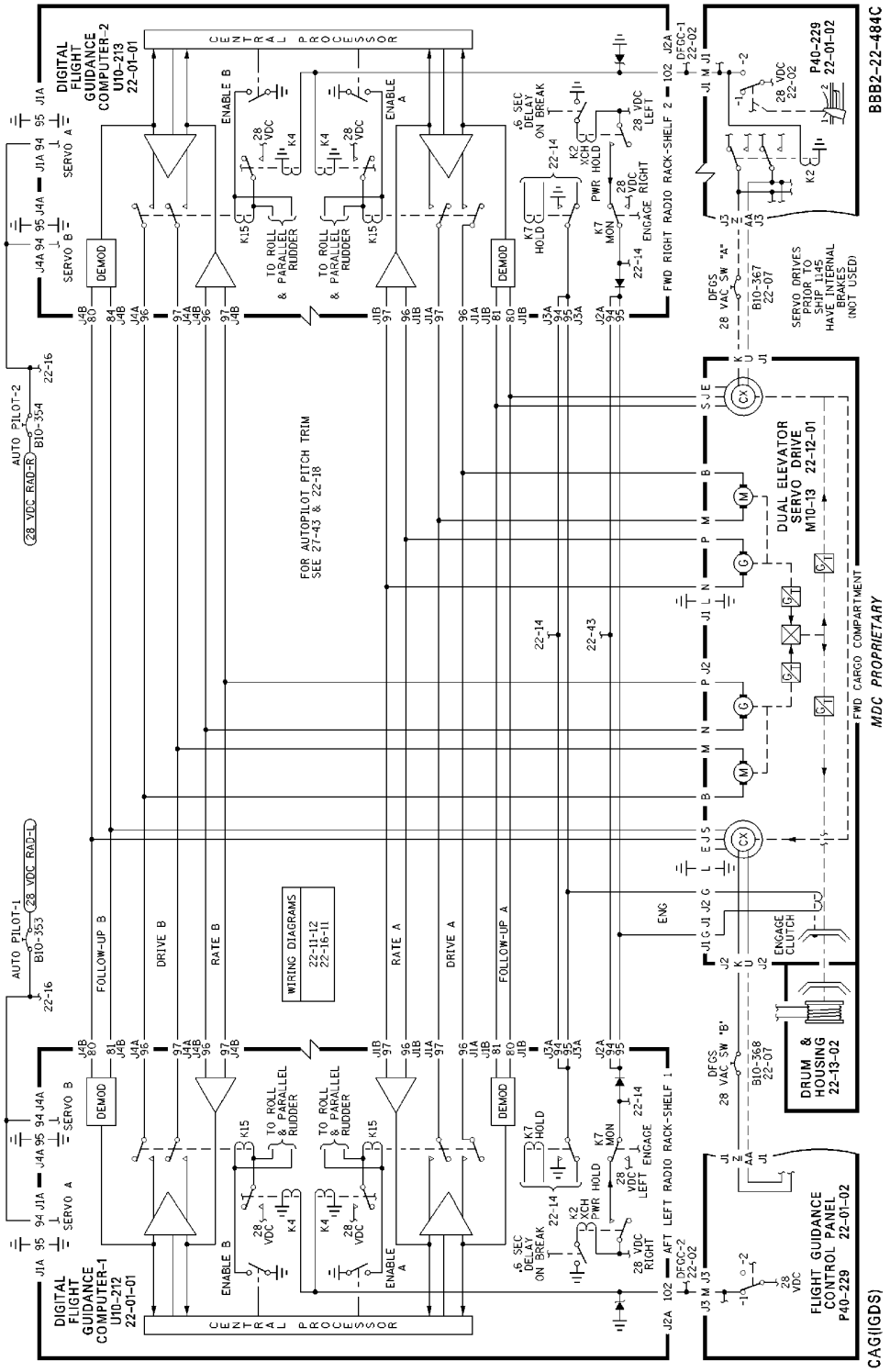
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing to the servo drives is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to the aileron, elevator and yaw damper duplex servo drives and associated system interface.

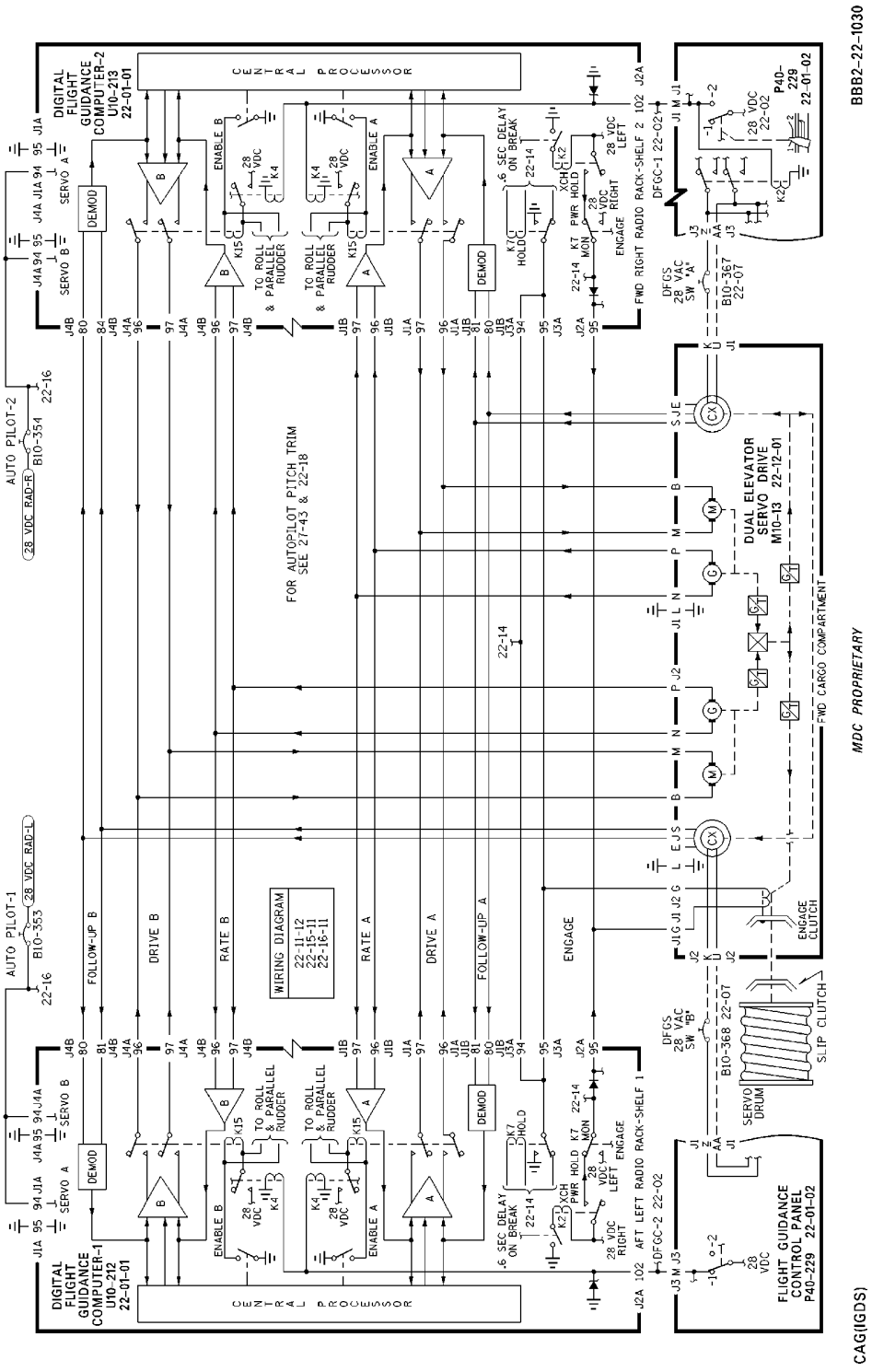
WJE ALL



Dual Aileron Servo Drive
Figure 101/22-10-01-990-803

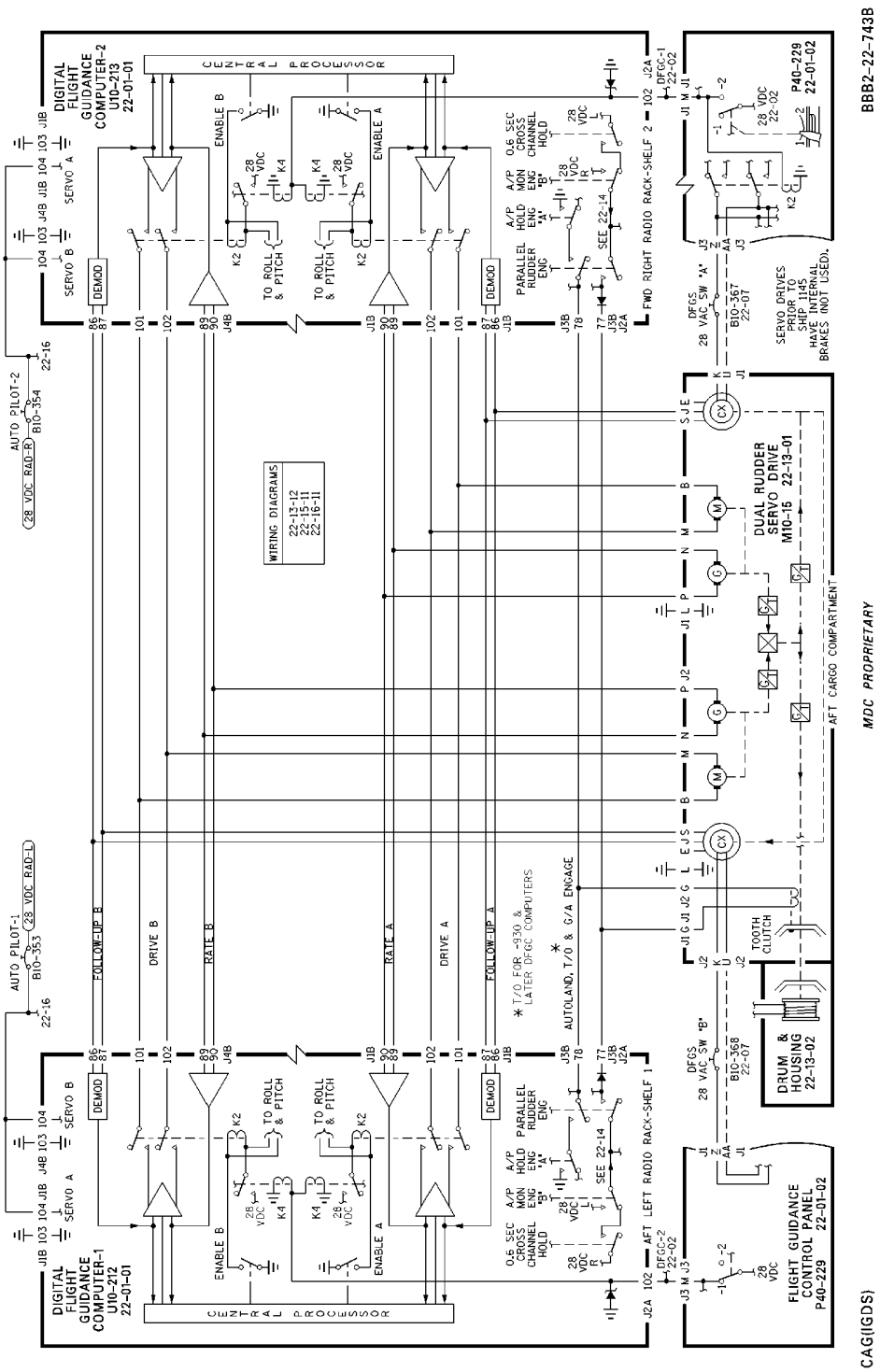


Dual Elevator Servo Drive
Figure 102/22-10-01-990-808



Dual Elevator Servo Drive
Figure 103/22-10-01-990-809

EFFECTIVITY
WJE 401-412, 414-419, 421, 423, 425, 426, 861-866, 868, 869, 871-874, 880, 881, 883, 884, 886, 887, 892, 893



Dual Rudder Servo Drive
Figure 104/22-10-01-990-814

AUTOPILOT DUPLEX SERVO DRIVE - INSPECTION/CHECK

1. General

A. This procedure contains task card data.

B. Refer to DC-9-80 Fixed Maintenance Intervals Report MDC-J1271, CMR No 22-1 (paragraph b.1.).

TASK 22-10-01-210-801

2. General Visual Inspection of the Elevator Auto Pilot Servo Torque Limiter

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure is a CMR task.

NOTE: Refer to DC-9-80 Fixed Maintenance Intervals Report MDC-J1271, CMR No 22-1 (paragraph b.1.).

B. Elevator Auto Pilot Servo Torque Limiter General Visual Inspection

SUBTASK 22-10-01-210-001

(1) Do a general visual inspection of the dual spring for corrosion, broken springs, and adjacent areas for general condition and security.

C. Job Close-up

SUBTASK 22-10-01-942-001

(1) Remove all the tools and equipment from the work area. Make sure the area is clean.

——— END OF TASK ———

TASK 22-10-01-211-801

3. Detailed Visual Inspection of the of the Elevator Auto Pilot Servo Torque Limiter Pushrod

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure is a CMR task.

NOTE: Refer to DC-9-80 Fixed Maintenance Intervals Report MDC-J1271, CMR No 22-1 (paragraph b.2.).

B. Elevator Auto Pilot Servo Torque Limiter Pushrod Detailed Visual Inspection

SUBTASK 22-10-01-211-001

(1) Do a detailed visual inspection of the pushrod for corrosion, damage, and security.

C. Job Close-up

SUBTASK 22-10-01-942-002

(1) Remove all the tools and equipment from the work area. Make sure the area is clean.

——— END OF TASK ———

DIRECTIONAL (ROLL) CONTROL - DESCRIPTION AND OPERATION

1. General

A. The directional (roll) control modes of the Flight Guidance system operate through the aileron-spoiler system. Roll control maneuvers may be executed automatically when the autopilot is engaged or manually by following flight director commands when the flight director system is engaged.

B. Automatic roll control is provided by autopilot engagement. Selection of roll control modes of operation is provided through the Flight Guidance Control panel, located on the glareshield. Roll control signal information is induced into the Digital Flight Guidance Computer (DFGC), where computed signals are processed and transmitted to a duplex aileron servodrive. The aileron servodrive is coupled to the aileron control system, and when commanded signals from the DFGC cause the servodrive to move, the aileron control tabs are moved the proper amount to execute the commanded roll maneuver.

C. Manual roll control guidance commands are provided when the flight director switches (2), located on the Flight Guidance Control Panel are placed to FD. Flight director modes of operation are also selected through the Flight Guidance Control Panel. When the flight director switches are on, each DFGC provides roll attitude command information to its respective ADI (i.e. DFGC-1 to captain's ADI). On aircraft equipped with EFIS, roll command information is displayed on the Primary Flight Directors (PFD's). These roll steering commands are provided for the flight crew to manually follow and make corrections as necessary to maintain proper airplane roll attitude.

D. Roll control is useable throughout the entire flight envelope including automatic landing, where roll control executes automatic runway alignment.

E. Roll control provides various autopilot and flight director modes of operation. Autopilot roll control modes of operation are as follows:

- Synchronization
- Takeoff (After Lift Off)
- Heading Hold
- Heading Select
- VOR Capture and Tracking
- Localizer Capture and Tracking
- Turbulence Penetration
- Go-Around
- Autoland
- Runway Alignment

F. Flight Director roll control modes are as follows:

- Takeoff
- Heading Hold
- Heading Select
- Turbulence Penetration (wings level)
- VOR Capture and Tracking
- Localizer Capture and Tracking
- Go-Around

WJE 401-404, 412, 414

- Back course

WJE ALL

G. Windshear data for directional (roll) control is sent from the DFGC -1 and -2. This roll data with the vertical speed, pitch rate, pitch and roll angle, longitudinal and vertical acceleration, flap position, alpha and ground speed, radio altitude, F/D active, valids, and modes is used by the windshear computer to alert the pilot during NAV mode of the presence of windshear and give appropriate commands to retrieve aircraft maneuverability out of the windshear zone.

2. Autopilot Directional Modes

A. Synchronization

(1) Prior to autopilot engagement, the DFGC provides a continuous synchronization to existing roll attitude and heading. The DFGC verifies roll control sensors are operational and output commands to the aileron servo are in a null condition prior to autopilot engagement. This continuous synchronization is provided to ensure that autopilot engage transients do not occur through the aileron-spoiler control system at time of autopilot engagement. At time of autopilot and/or mode engagement, the synch values become the initial reference for subsequent control or adjustment.

B. Takeoff (After Lift-Off)

(1) The takeoff mode after lift-off is compatible with autopilot engagement. Engaging the autopilot after lift-off will have no affect on the takeoff mode. The roll mode annunciators will continue to display TAK OFF (or HDG SEL if previously selected) and maintain wings level.

(2) The autopilot takeoff mode will become terminated when another pitch control mode has been selected, or an altitude has been captured.

WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871-879, 881, 883, 884, 886, 887, 891-893

C. Heading Hold

WJE 406-408, 411, 412, 414, 873, 874, 881, 883, 884, 886, 887, 892, 893

(1) Heading Hold mode is the primary initial engage mode of the autopilot if flight directors are not operating in a selected roll mode. The primary heading reference of the heading hold mode is from the AHRS units (existing compass heading).

WJE 410, 875-879

(2) Heading Hold mode is the primary initial engage mode of the autopilot if flight directors are not operating in a selected roll mode. The primary heading reference of the heading hold mode is from the Integrated Instrument Amplifiers (existing compass heading).

WJE 401-404, 412, 414

(3) Heading Hold mode is the primary initial engage mode of the autopilot if flight directors are not operating in a selected roll mode. The primary heading reference of the heading hold mode is from the Inertial Reference Units.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(4) Heading Hold mode is the primary initial engage mode of the autopilot if flight directors are not operating in a selected roll mode. The primary heading reference of the heading hold mode is from the Integrated Instrument Amplifiers (existing compass heading) or Inertial Reference Units (if installed).

WJE 401-404, 406-408, 410-412, 414-427, 429, 861-866, 868, 869, 871-879, 881, 883, 884, 886, 887, 891-893

(5) When the autopilot is engaged, the aircraft is automatically rolled to wings level. When the aircraft is within 5 degrees of wings level, HDG HLD will be displayed on the flight mode annunciators. The autopilot monitors any deviation from existing heading and combines the information with existing attitude to develop corrective action through the aileron servodrive to reestablish the existing heading within wings level. The amount of command signals to the aileron servodrive is modified as a function of existing speed (TAS Gain Programming).

(6) While operating in the heading hold mode, the roll control system can be armed for radio navigational modes. Heading hold will remain the primary operating mode until intercept of the selected navigational beam.

(7) If the autopilot is engaged in any cruise roll mode other than heading hold, pushing in the H knob on the Flight Guidance Control panel to the second detent position will automatically reestablish the heading hold mode. If the aircraft is in the LAND mode, the action of the H knob is inhibited after glideslope capture.

(8) During a final approach phase, flaps extended, pressing the TO/GA switch on the throttle levers will establish the go-around mode. Wings level (HDG HOLD) is the basic roll control during go-around.

WJE ALL

D. Heading Select

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

(1) In the heading select mode the autopilot maneuvers the aircraft to acquire and maintain a selected heading. Desired heading is established by setting the heading (H) knob, located on the Flight Guidance Control panel, to the desired magnetic heading. Selected heading is displayed in the window directly over the H knob and on the Horizontal Situation Indicator (HSI). On aircraft equipped with EFIS, selected heading is displayed on the Navigation Display (ND). The first push-in momentary detent position of the H knob provides fast selected heading adjustment, and the normal position of the H knob provides fine selected heading adjustment.

WJE 401-404, 412, 414

(2) In the heading select mode the autopilot maneuvers the aircraft to acquire and maintain a selected heading. Desired heading is established by setting the heading (H) knob, located on the Flight Guidance Control panel, to the desired magnetic heading. Selected heading is displayed in the window directly over the H knob and on the Navigation Display (ND). The first push-in momentary detent position of the H knob provides fast selected heading adjustment, and the normal position of the H knob provides fine selected heading adjustment.

WJE ALL

(3) When the heading select mode of operation is desired, momentarily pulling out on the H knob will establish the heading select mode. HDG SEL will be displayed in the flight mode annunciators roll window, and the airplane will automatically roll to the heading selected, determined by the selected maximum bank angle.

(4) Automatic control in the heading select mode is terminated when a directional radio mode is captured, the heading hold mode is established, turbulence mode is selected, or autopilot is disengaged with flight directors switches off.

E. VOR Capture and Tracking

(1) Arm Phase

(a) The arm phase of the VOR mode of operation allows the airplane to be directed to a VOR radial at an intercept angle. VOR mode is armed when the VHF NAV receivers are tuned to a VOR frequency, the VOR LOC pushbutton is pressed, and if the autopilot is engaged, automatic capture of the VOR radial will occur. At time of VOR arm, VOR will be displayed in the arm windows of the flight mode annunciators.

(b) VOR arm phase will become disabled if the autopilot is disengaged with flight director switches off, another roll mode has been selected, or the VHF NAV receivers are tuned to an ILS frequency.

(2) Capture Phase

(a) The capture phase of the VOR mode is automatically initiated when the airplane arrives at the VOR beam capture threshold. If a roll mode i.e. heading hold, was used during the arm phase to intercept the VOR beam, the mode disengages and VOR CAP is displayed in the roll window of the flight mode annunciators.

(b) VOR capture phase will be disabled if the autopilot is disengaged with flight director switches off, another roll mode has been selected, or the VHF NAV receivers have been tuned to a different frequency.

(3) Track Phase

(a) The track phase of VOR operation is automatically initiated when the airplane is established on the center of the selected VOR radial. When the airplane is in the track phase, the roll window in the flight mode annunciator will change from VOR CAP to VOR TRK, verifying the airplane is tracking the selected VOR radial beam. VOR crosswind correction and over-the-station passage is provided during the VOR track phase.

(b) During over-the-station (zone of confusion) passage, the roll mode annunciators will cycle from VOR TRK to VOR CRS, and a new VOR radial may be selected without disengaging the VOR mode. VOR CRS normally will be annunciated for three to four minutes depending upon aircraft altitude and speed. However, if the NAV valid from the NAV receiver is lost for 30 seconds during station crossing, the FMA will cycle from VOR CRS to HDG HLD. The loss of NAV valid should appear as a NAV flag in view on the HSI/PFD.

(c) VOR track phase will be disabled if the autopilot is disengaged with flight director switches off, another roll mode has been selected, the VHF NAV receivers tuned to a different frequency, or the VOR CRS mode has been established for more than 3 minutes.

F. Localizer Capture and Tracking

(1) Arm Phase

(a) The arm phase of the localizer operation allows the airplane to be directed toward the localizer beam at an intercept angle. Automatic localizer mode is armed when the autopilot is engaged, the VHF NAV receivers are tuned to an ILS frequency, front inbound ILS course is set, and the VOR LOC, ILS or AUTO LAND pushbutton is pressed. LOC, ILS or LND, depending on which pushbutton was pressed, will be displayed in the arm window of the flight mode annunciators.

(b) Localizer arm phase will be disabled if the autopilot is disengaged with flight director switches off, another roll mode has been selected, the VHF NAV receivers are detuned from the ILS frequency, one LOC VALID signal is lost during autoland, or both LOC VALIDS are lost during VOR LOC or ILS modes.

(2) Capture Phase

(a) The capture phase of the localizer operation is automatically initiated when the airplane arrives at the localizer beam threshold. If a roll mode i.e. heading hold, was used during the arm phase to intercept the localizer beam, the mode disengages and LOC CAP is displayed in the roll window of the flight mode annunciator.

(b) Localizer capture phase will be disabled if the autopilot is disengaged with flight director switches off, the autopilot is disengaged after AUTO LAND pushbutton is pressed, another roll mode has been selected, the VHF NAV receivers are detuned from the ILS frequency, one LOC VALID signal is lost during autoland, or both LOC VALIDS are lost during VOR LOC or ILS modes.

(3) Track Phase

(a) The localizer on-course or track phase of operation is automatically initiated when the airplane is established on the center of the localizer beam. Automatic gain programming is provided during the on-course phase to compensate for localizer beam convergence. When the airplane is in the track phase, the roll window in the flight mode annunciator will change from LOC CAP to LOC TRK, verifying the airplane is tracking the localizer beam.

(b) Localizer track phase will be disabled if autopilot is disengaged with flight director switches off, the autopilot is disengaged after AUTO LAND pushbutton is pressed, the VHF NAV receivers are detuned from the ILS frequency, one LOC VALID signal is lost during autoland, or both LOC VALIDS are lost during VOR LOC or ILS modes.

G. Turbulence Penetration

(1) Turbulence penetration provides roll attitude hold and control during turbulent atmospheric conditions. The mode is established when the autopilot is engaged, and the TURB pushbutton on the Flight Guidance Control panel is pressed.

(2) When the TURB pushbutton is pressed, any control mode previously selected is automatically disengaged including arm modes. The DFGC automatically reduces the gains in the autopilot roll and pitch control logic. The roll window in the flight mode annunciator displays WNG LVL. If the autothrottle is engaged, the autothrottle will automatically disengage when the TURB pushbutton is pressed. Automatic pitch trim is also disabled during the turbulence mode of operation.

(3) The turbulence penetration mode becomes disengaged when any other control mode is selected, or the autopilot is disengaged.

H. Go-Around

(1) Automatic go-around mode of operation provides commands to the DFGC roll control logic to roll the airplane to wings level and maintain existing heading when the airplane bankangle is reduced to less than 3 degrees. Go-Around mode disables any previously selected approach function.

(2) Go-Around mode of operation is initiated when the airplane is in the flight mode and flaps are extended in land configuration (28 to 40 degrees). Pressing the TO/GA switch on the throttle lever establishes the Go-Around mode of operation. The roll and pitch mode annunciators display GO RND. The rudder parallel servo must be operational for the go-around mode (in a single engine configuration only).

(3) Automatic control in the go-around mode is terminated when the autopilot is disengaged, or when a pitch command, other than altitude preselect, is activated.

I. Autoland

(1) Runway Alignment

(a) During an automatic landing, prior to touchdown, the autopilot automatically executes a runway alignment maneuver. Runway alignment is provided to remove any crab angle from the airplane caused by crosswinds. The autopilot performs a forward slip maneuver to provide the alignment which is accomplished by yaw (rudder) control.

(b) Course error signals (difference between existing airplane heading and runway heading) are computed in the DFGC, together with localizer beam displacement and raw data. The DFGC integrates and processes these signals, and transmits the computed data to the rudder servodrive for yaw control, and the aileron servodrive for cross control to perform the forward slip maneuver.

(c) The runway alignment maneuver begins at approximately 145 feet radio altitude. The turning moment generated by the rudder is opposed by a limited aileron cross control to afford a turn toward the localizer beam center. The roll annunciator will change from LOC TRK to ALN, verifying the airplane is in the runway alignment mode of operation.

Table 1 Autopilot Roll Attitude Limits

Control Mode	Roll Attitude (degrees)	Roll Rate (deg/sec)
Turbulence Penetration	28(±2)	5(±1)
Heading Hold	Selectable from 10 to 30 degrees	3(±.3)
Heading Select	10(±1) to 30(+0,-4)	
VOR Capture	10(±1) to 30 (plus 0, minus 4)	
VOR Track	10(±1)	1.5(±.2)
Localizer Capture	28(±2)	5(±1)
Localizer Track	10(±1) to 5(±1) as a function of radio altitude	5(±1)
Runway Alignment	5(±1)	5(±1)

3. Flight Director Directional Modes

A. Takeoff

(1) The flight director takeoff steering mode is activated when either or both flight director switches are placed to FD, the airplane is on the ground, and the throttle TO/GA switch is pressed. TAK OFF is displayed in the roll window of the flight mode annunciator. During takeoff, the roll control system provides a wings level reference generated through the DFGC(s), by roll attitude signals.

(2) After nose gear lift-off, the roll bar in the ADI provides steering commands to maintain the existing heading. Takeoff is a flight director mode only. If desired, the heading select mode of operation may be selected after the takeoff mode is established. HDG SEL will be displayed in the roll mode annunciator, and TAKE OFF will be displayed in the pitch mode annunciator.

(3) After nose gear lift-off, the roll steering commands within the ADI are provided to maintain the existing heading. Takeoff is a flight director mode only. If desired, the heading select mode of operation may be selected after the takeoff mode is established. HDG SEL will be displayed in the roll mode annunciator, and TAKE OFF will be displayed in the pitch mode annunciator.

(4) The flight director takeoff mode becomes terminated when both flight director control switches are placed off, or when another pitch command has been selected.

B. Heading Hold

(1) Heading hold is the primary turn on mode of the flight director. If the airplane is in a bank angle when the flight director(s) are turned on, the DFGC will provide roll attitude commands for wings level. HDG HLD will be annunciated in the roll window of the flight mode annunciator only after the bank angle has been decreased less than 5 degrees.

(2) When operating in a flight director roll mode of operation, i.e. heading select, pushing in the H knob on the Flight Guidance Control panel to the second detent position will automatically establish the heading hold mode. Heading hold mode takes precedence over any flight director mode, including localizer track.

C. Heading Select

(1) Flight director heading select mode of operation is established when either or both flight director switches are placed to FD, and the H knob on the Flight Guidance Control panel is pulled out.

(2) Heading select mode provides roll steering commands to maneuver the airplane to acquire and maintain a selected heading. The mode commands a turn in the direction of the smallest radial angle between existing airplane heading and the selected heading. Roll steering commands provide roll attitude to maintain the selected heading. A heading may be selected before or after mode activation.

(3) Heading select mode will be terminated when a directional radio beam is captured, or the H knob is pushed full in.

D. Turbulence Penetration

(1) Turbulence penetration provides flight director roll attitude hold and control during turbulent atmospheric conditions. The mode is established when either flight director is engaged, and the TURB pushbutton on the Flight Guidance Control panel is pressed.

(2) When the TURB pushbutton is pressed, any flight director mode previously selected is automatically disengaged including arm modes. The DFGC automatically reduces the gains in the flight director roll and pitch control logic. The roll window in the flight mode annunciator displays WNG LVL. If the autothrottle is engaged, the autothrottle will automatically disengage when the TURB pushbutton is pressed.

(3) The turbulence penetration mode becomes disengaged when any other pitch control mode is selected, or both flight directors are turned OFF.

E. VOR Capture and Tracking

(1) Arm Phase

(a) The flight director VOR mode is armed when either or both flight director switches are placed to FD, VHF NAV receivers are tuned to a VOR frequency, and the VOR LOC pushbutton is pressed. VOR will be displayed in the arm window of the flight mode annunciator.

(b) The flight director VOR arm phase of operation allows the airplane to be directed to the selected VOR radial while flying manually. Roll steering commands are followed for selected heading to intercept and capture the VOR beam.

(2) Capture Phase

(a) The flight director VOR capture phase is automatically initiated when the airplane arrives at the beam capture threshold. At time of capture, VOR CAP is displayed in the roll window of the flight mode annunciator.

(b) VOR capture phase will be disabled if both flight director switches are placed off, another roll mode has been selected, or VHF NAV receivers are detuned from the selected VOR frequency.

(3) Track Phase

(a) The track phase of VOR operation is automatically initiated when the airplane is established on the center of the VOR radial. When the airplane is in the track phase, the roll mode annunciator will automatically display VOR TRK. VOR crosswind correction and over-the-station passage is provided during VOR track phase.

(b) During over-the-station (zone of confusion) passage, the roll mode annunciators will display VOR CRS, and a new VOR radial may be selected without disengaging the VOR mode. If the airplane is in the VOR CRS mode for more than 3 minutes, the roll mode annunciator will automatically switch to flight director basic roll control mode HDG HLD.

(c) VOR track phase will be disabled if both flight director switches are placed off, another roll mode has been selected, the VHF NAV receivers are tuned to a different frequency, or VOR CRS mode has been established for more than 3 minutes.

F. Localizer Capture and Tracking

(1) Arm Phase

(a) The flight director localizer mode is in the arm phase when either or both flight director switches are placed to FD, VHF NAV receivers are tuned to an ILS frequency, and either the VOR LOC or ILS pushbutton is pressed. LOC or ILS, depending which pushbutton is pressed, will be displayed in the arm window of the flight mode annunciator.

(b) The flight director localizer arm phase of operation, allows the airplane to be directed to the localizer beam while flying manually. Roll steering commands are followed for selected heading to intercept and capture the localizer beam.

(c) Localizer arm phase will be disabled if both flight director switches are placed off, another roll mode has been selected, or the VHF NAV receivers are detuned from the selected ILS frequency.

(2) Capture Phase

(a) Localizer capture phase is automatically initiated when the airplane arrives at the localizer beam threshold. At time of capture, LOC CAP is displayed in the roll window of the flight mode annunciator.

(b) Localizer capture phase will be disabled if both flight director switches are placed off, another roll mode has been selected, or VHF NAV receivers are detuned from the selected ILS frequency.

(3) Track Phase

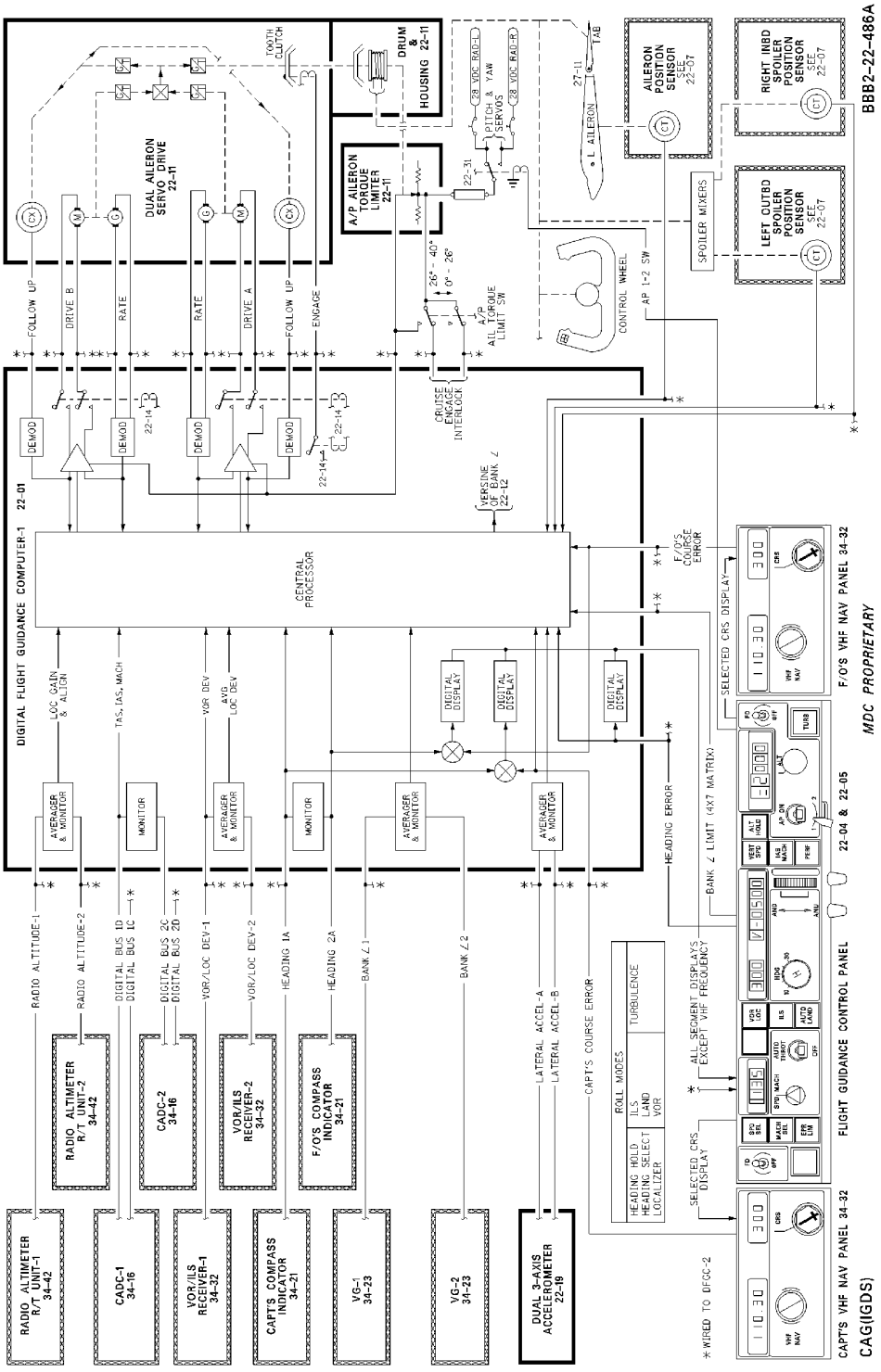
(a) The on-course or tracking phase of operation is automatically initiated when the airplane is established on the center of the localizer beam. When in the track phase, the roll mode annunciator will display LOC TRK. Automatic gain programming is provided during the on-course phase to compensate for localizer beam convergence.

(b) Localizer track phase will be disabled if both flight director switches are placed off, another roll mode is selected, or VHF NAV receivers are detuned from the selected ILS frequency.

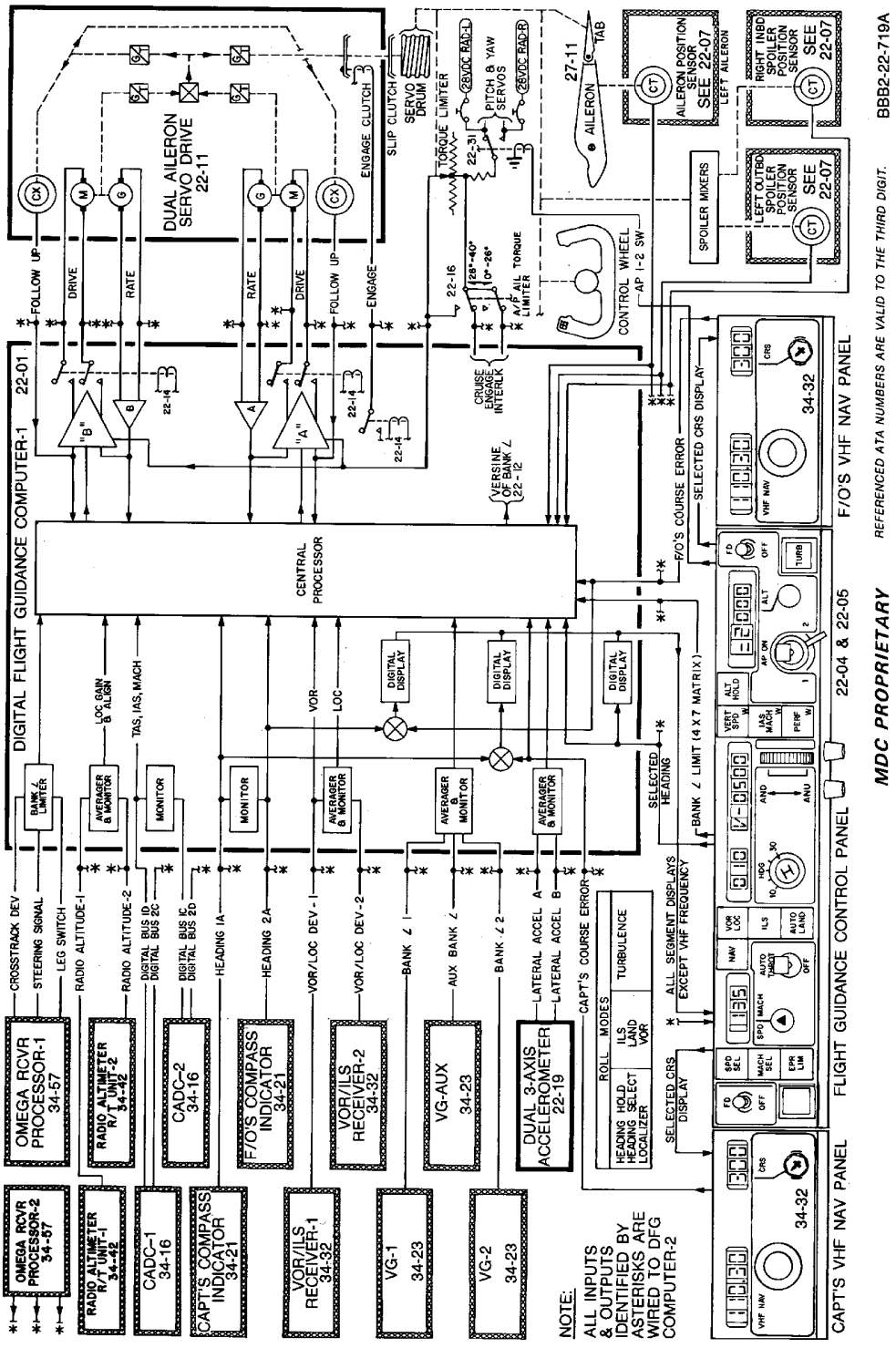
G. Go-Around

(1) Flight director go-around mode provides roll commands to manually roll the airplane to wings level, and to maintain the existing heading when the airplane bank-angle is reduced to less that 3 degrees. Go-around mode disables any previously selected approach function.

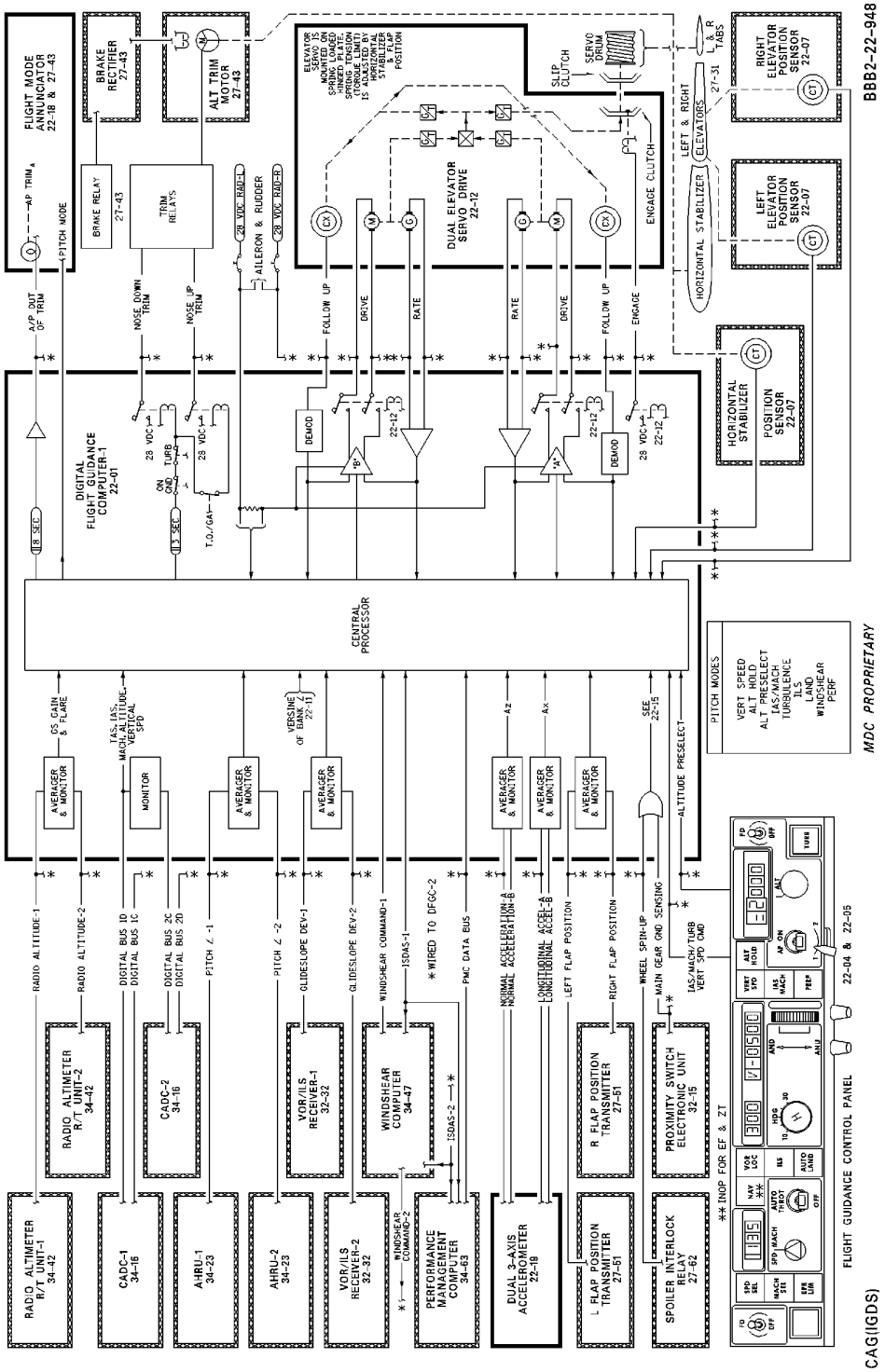
(2) Go-around mode is initiated when the airplane is in the flight mode and flaps are extended in land configuration (28 to 40 degrees). Pressing the TO/GA switch on the throttle lever, establishes the go-around mode. The roll and pitch mode annunciators display GO RND. The rudder parallel servo must be operational for the go-around mode (single engine configuration only).



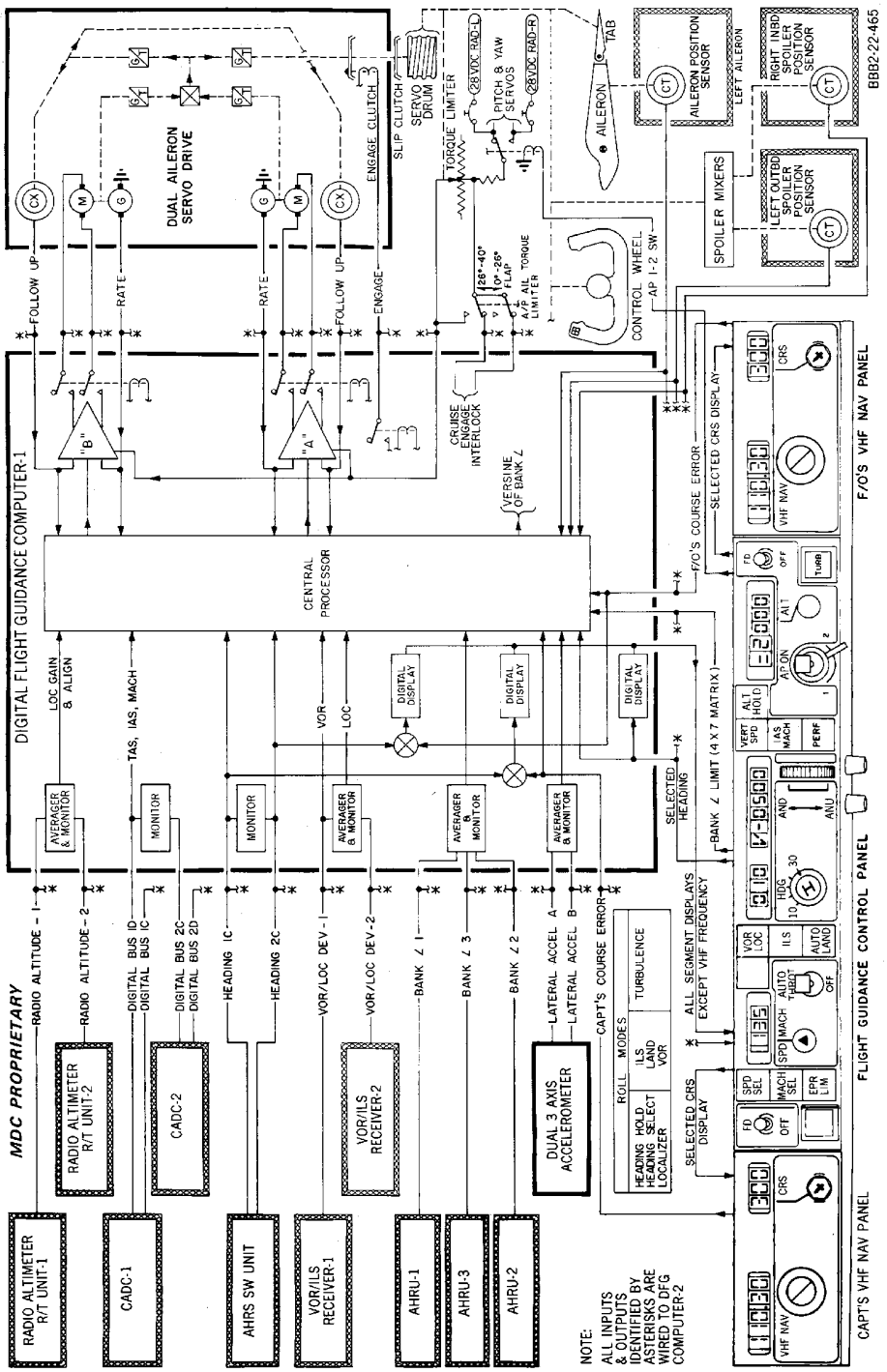
Autopilot Roll Axis
Figure 1/22-11-00-990-802



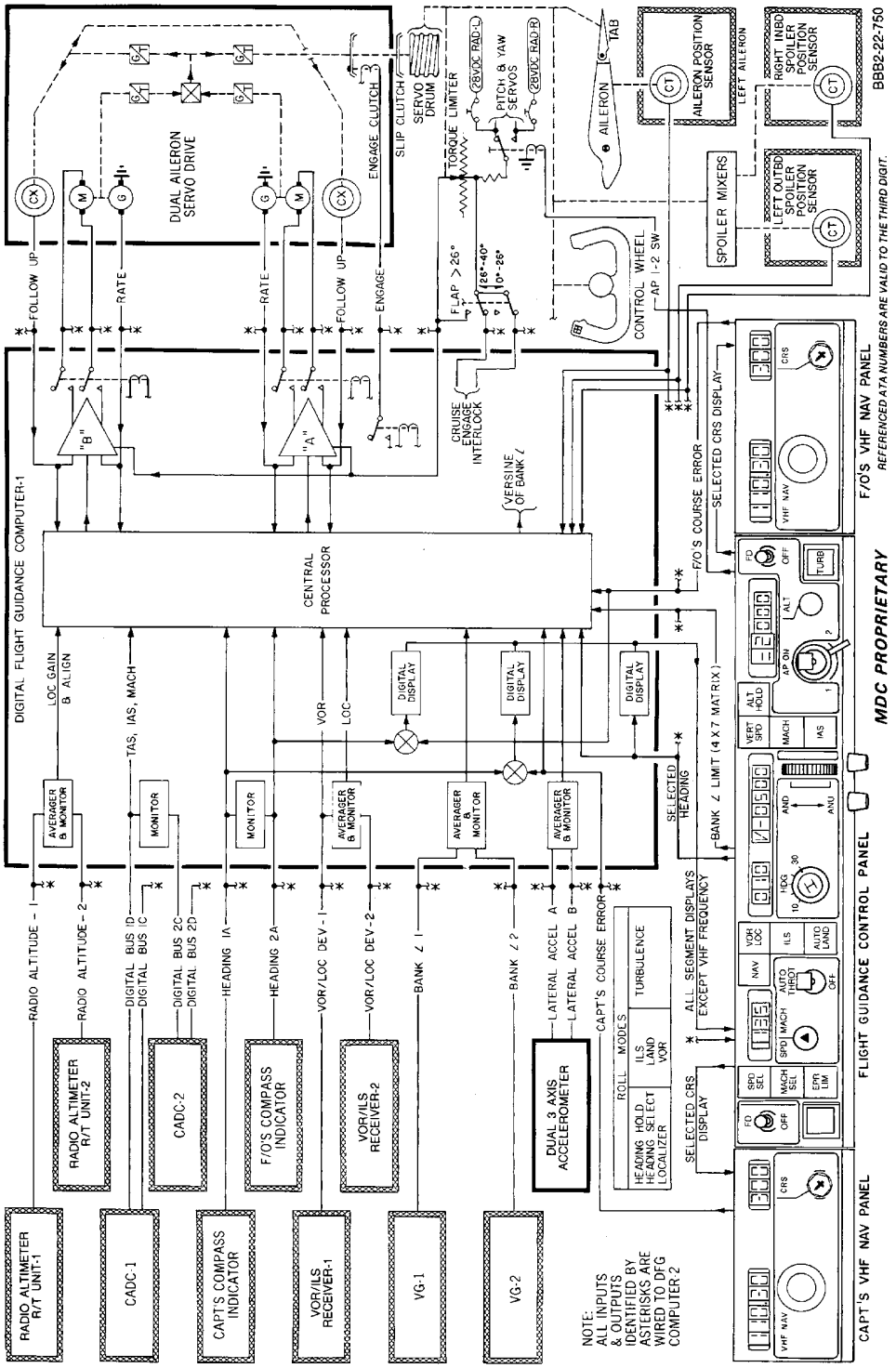
Autopilot Roll Axis
Figure 2/22-11-00-990-808



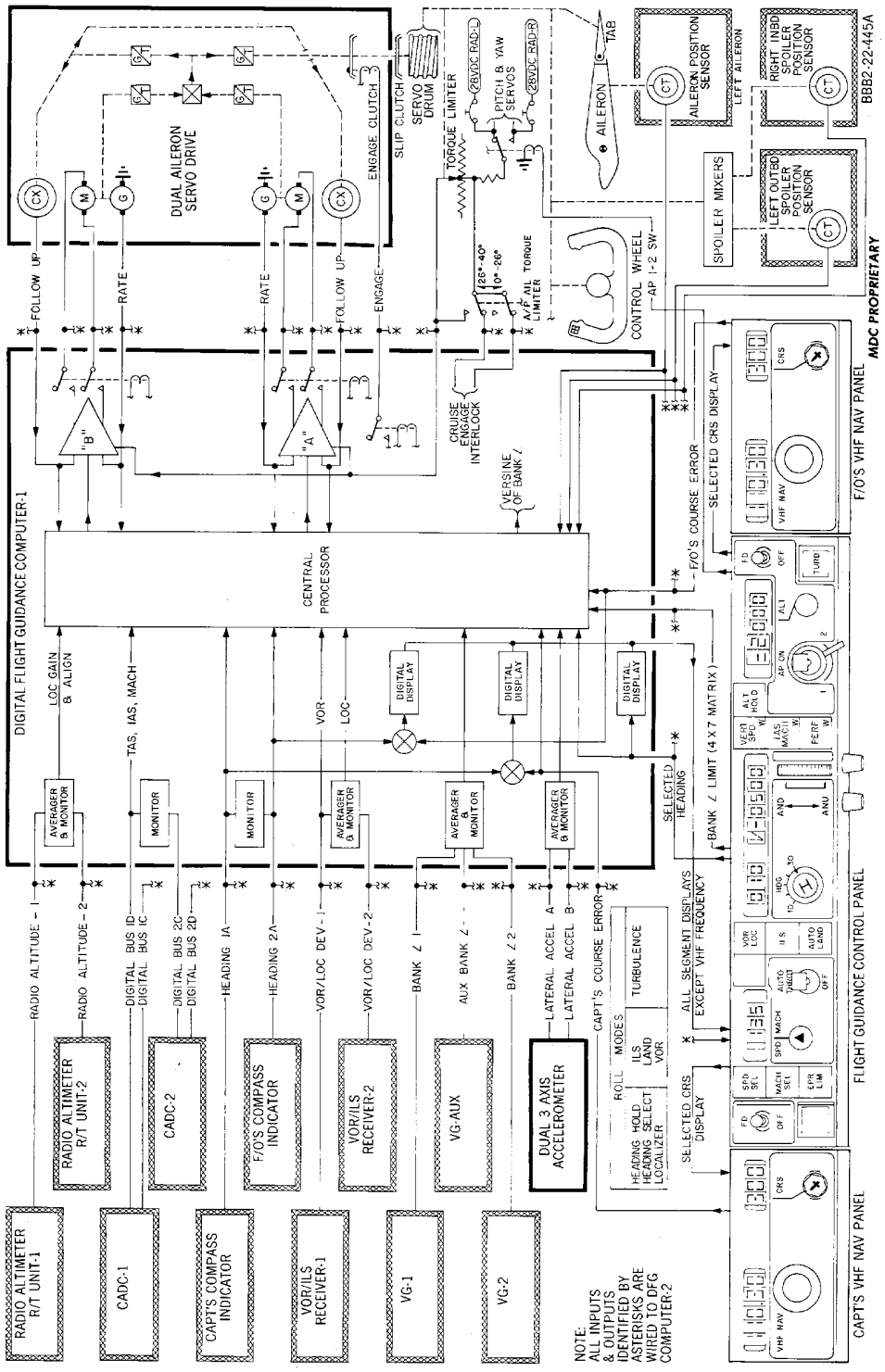
Autopilot Roll Axis
Figure 3/22-11-00-990-809



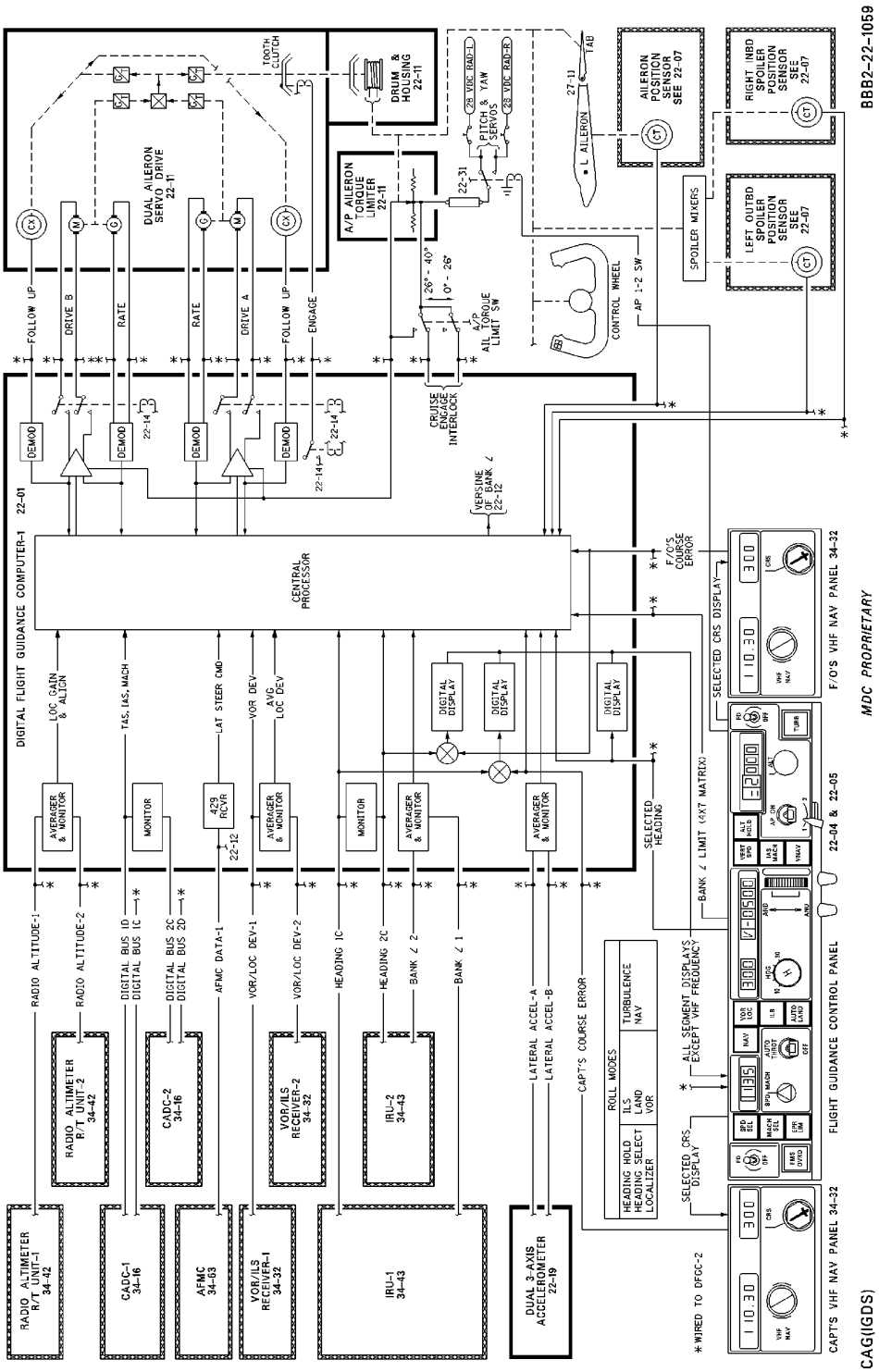
Autopilot Roll Axis
Figure 4/22-11-00-990-811



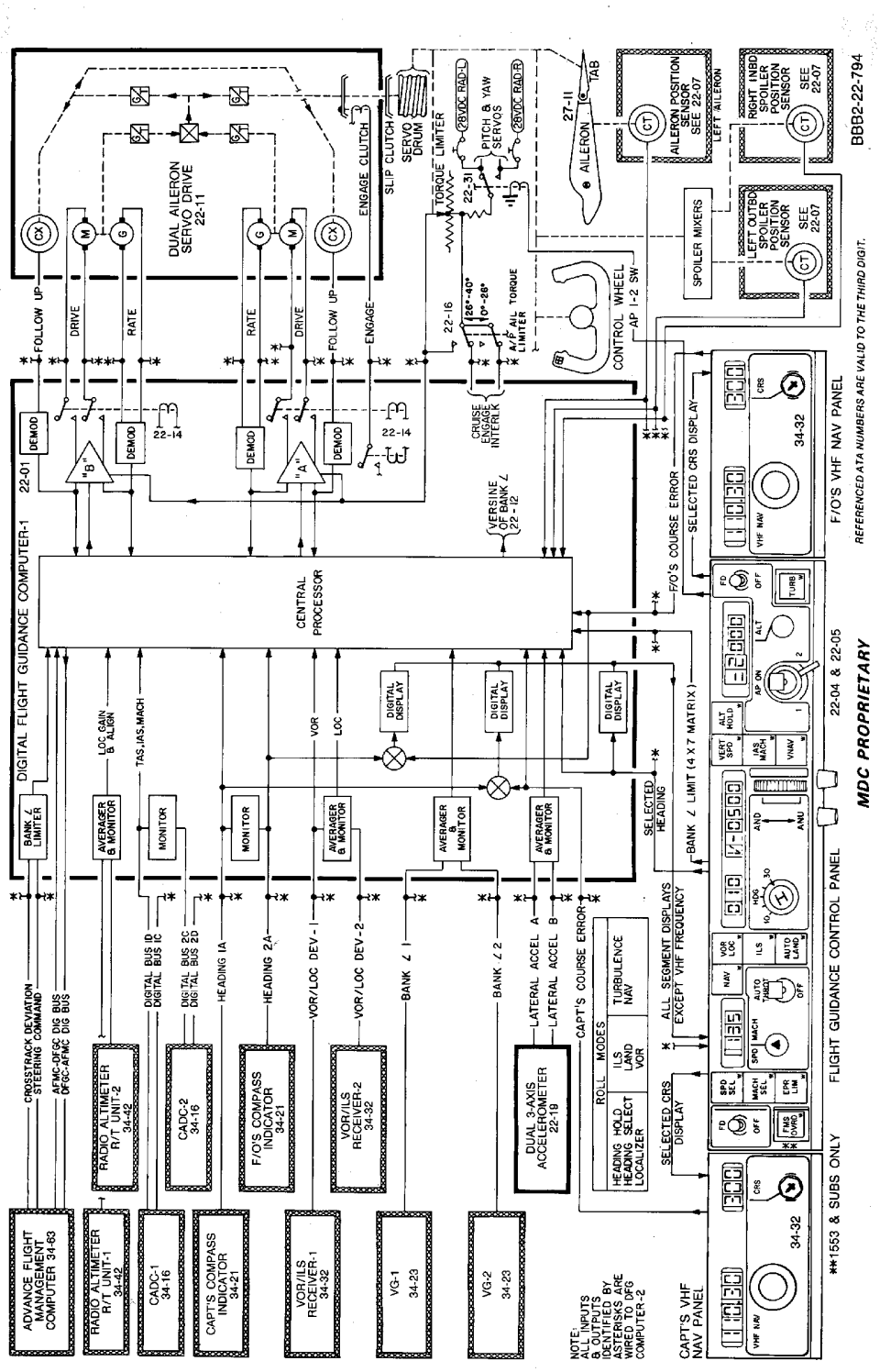
Autopilot Roll Axis
Figure 5/22-11-00-990-813



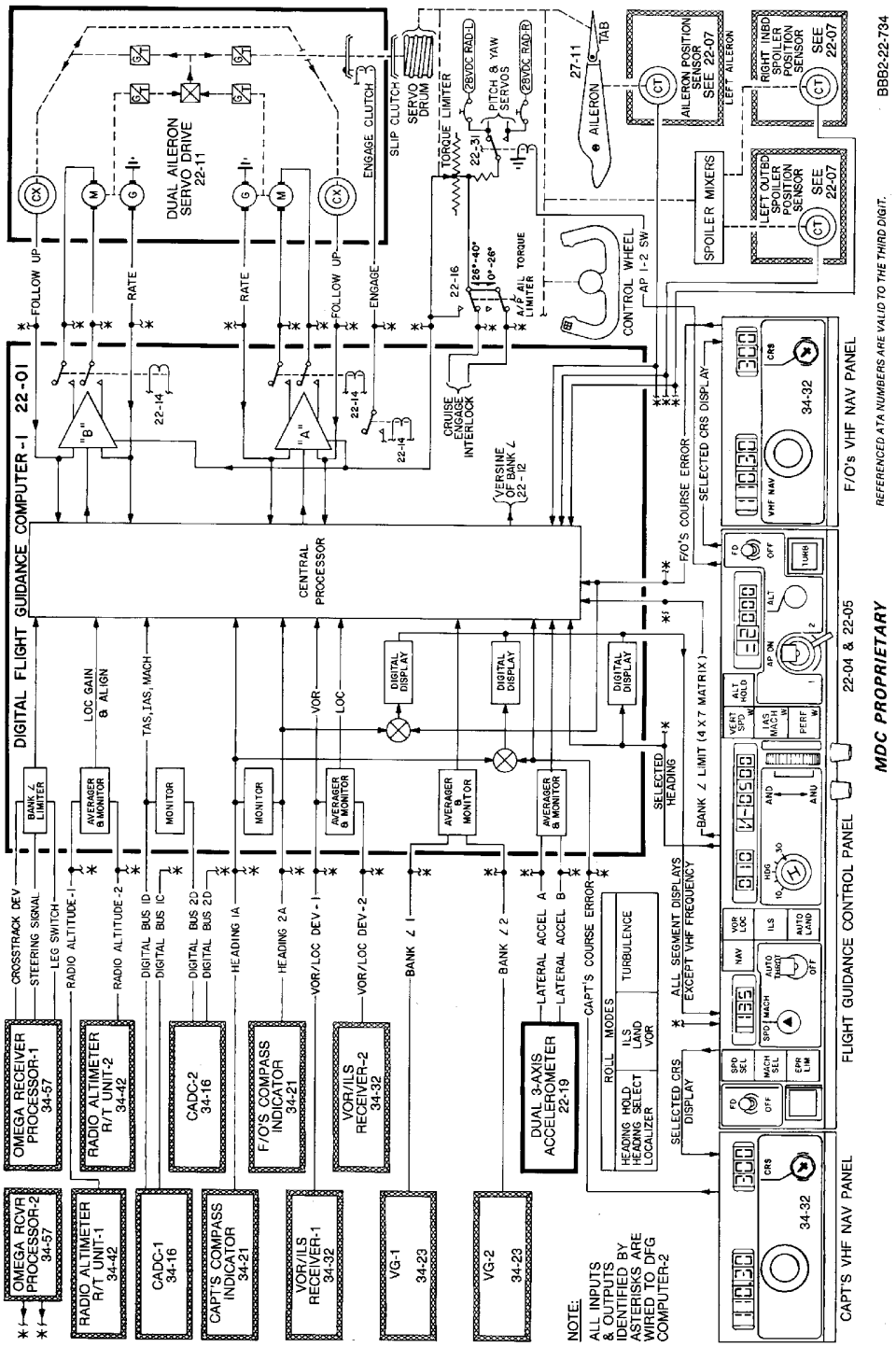
Autopilot Roll Axis
Figure 6/22-11-00-990-817



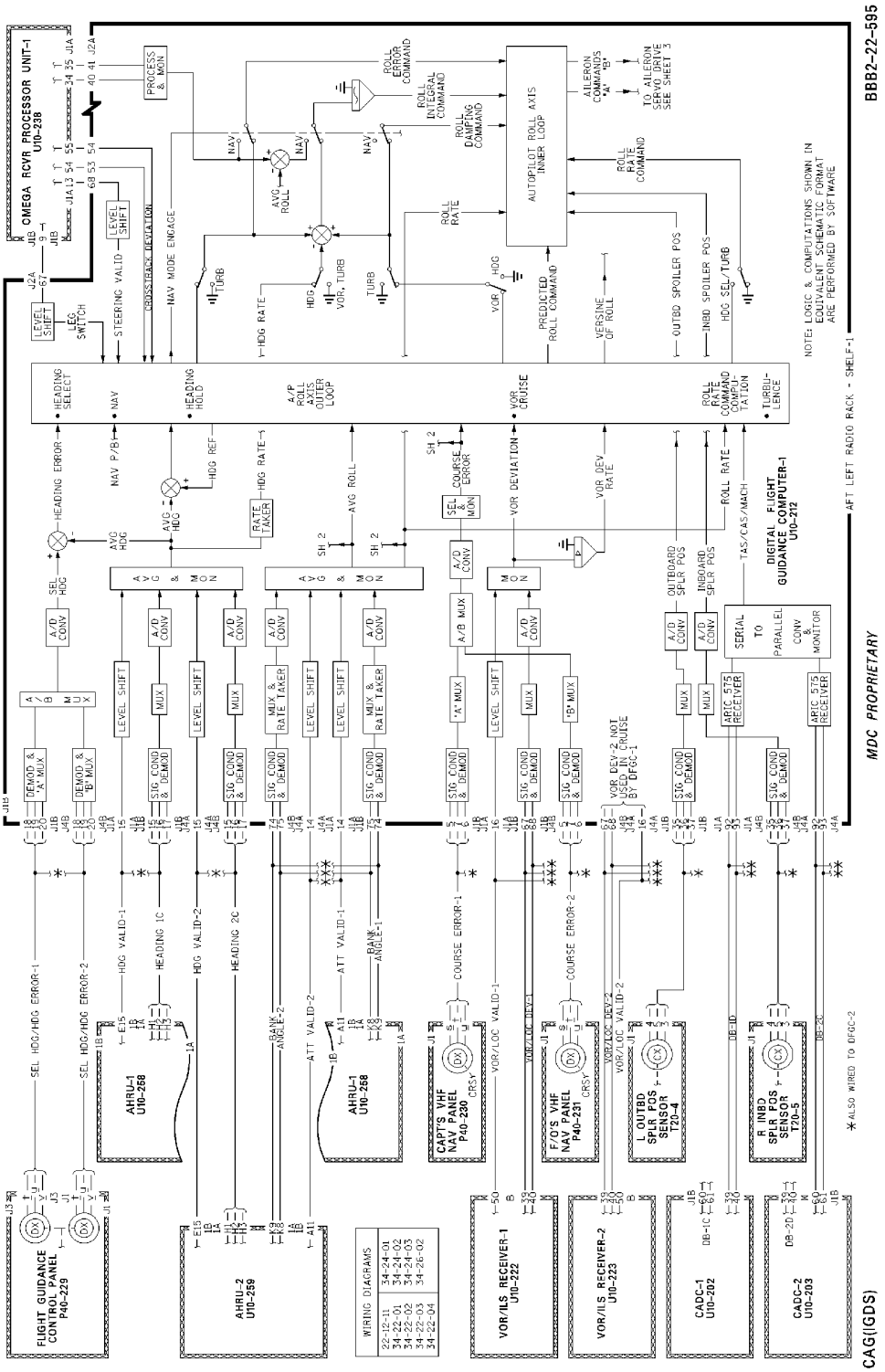
Autopilot Roll Axis
Figure 7/22-11-00-990-818



Autopilot Roll Axis
Figure 8/22-11-00-990-842



Autopilot Roll Axis
Figure 9/22-11-00-990-844



Autopilot Roll Axis (VOR/Cruise)
Figure 10/22-11-00-990-851

DIRECTIONAL (ROLL) CONTROL - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing roll control trouble shooting procedures, the Status Test Panel (STP) located beneath the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. Roll Control may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing roll control trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. Roll Control may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

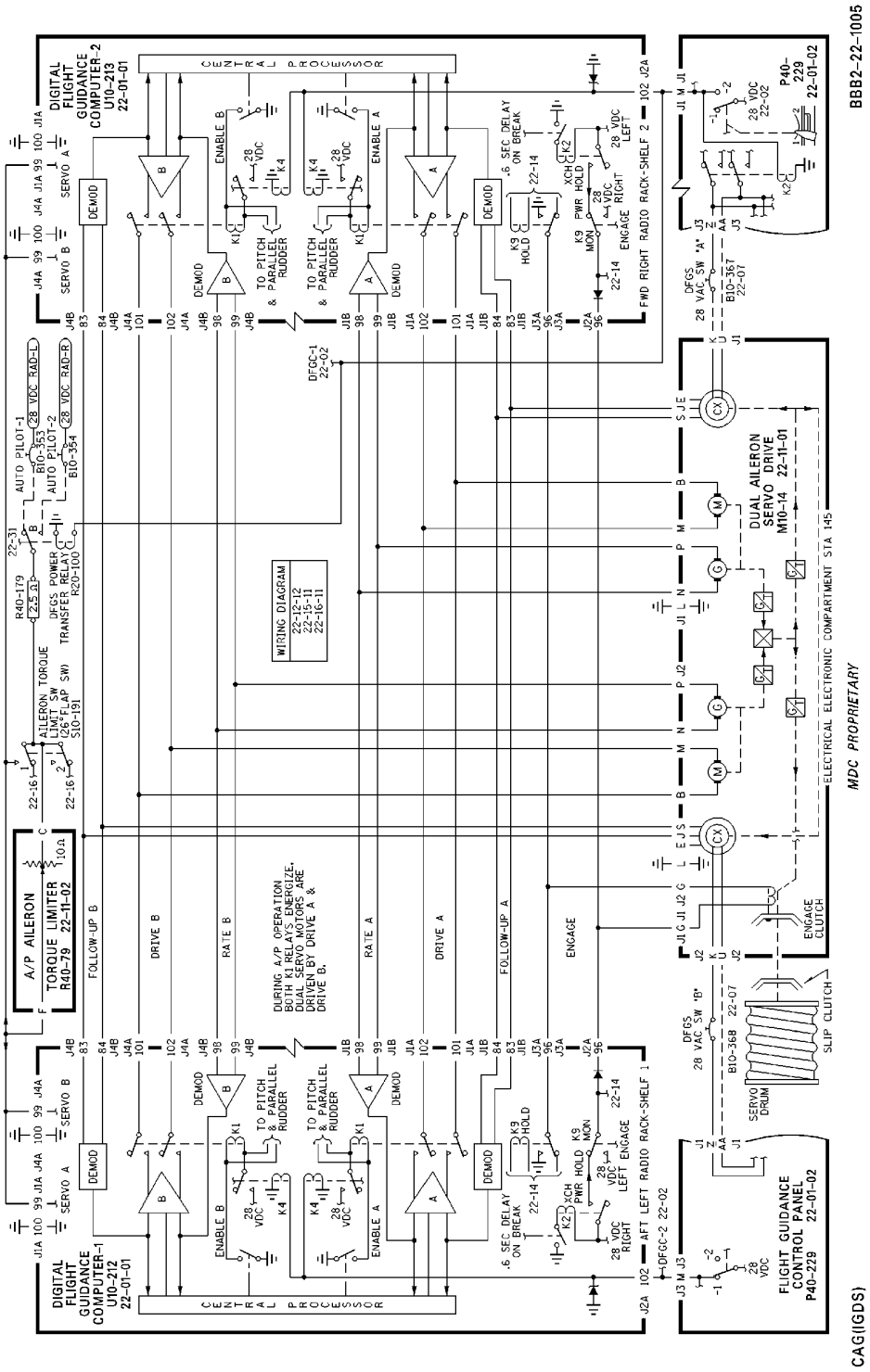
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on roll control is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to roll control and associated system interface.

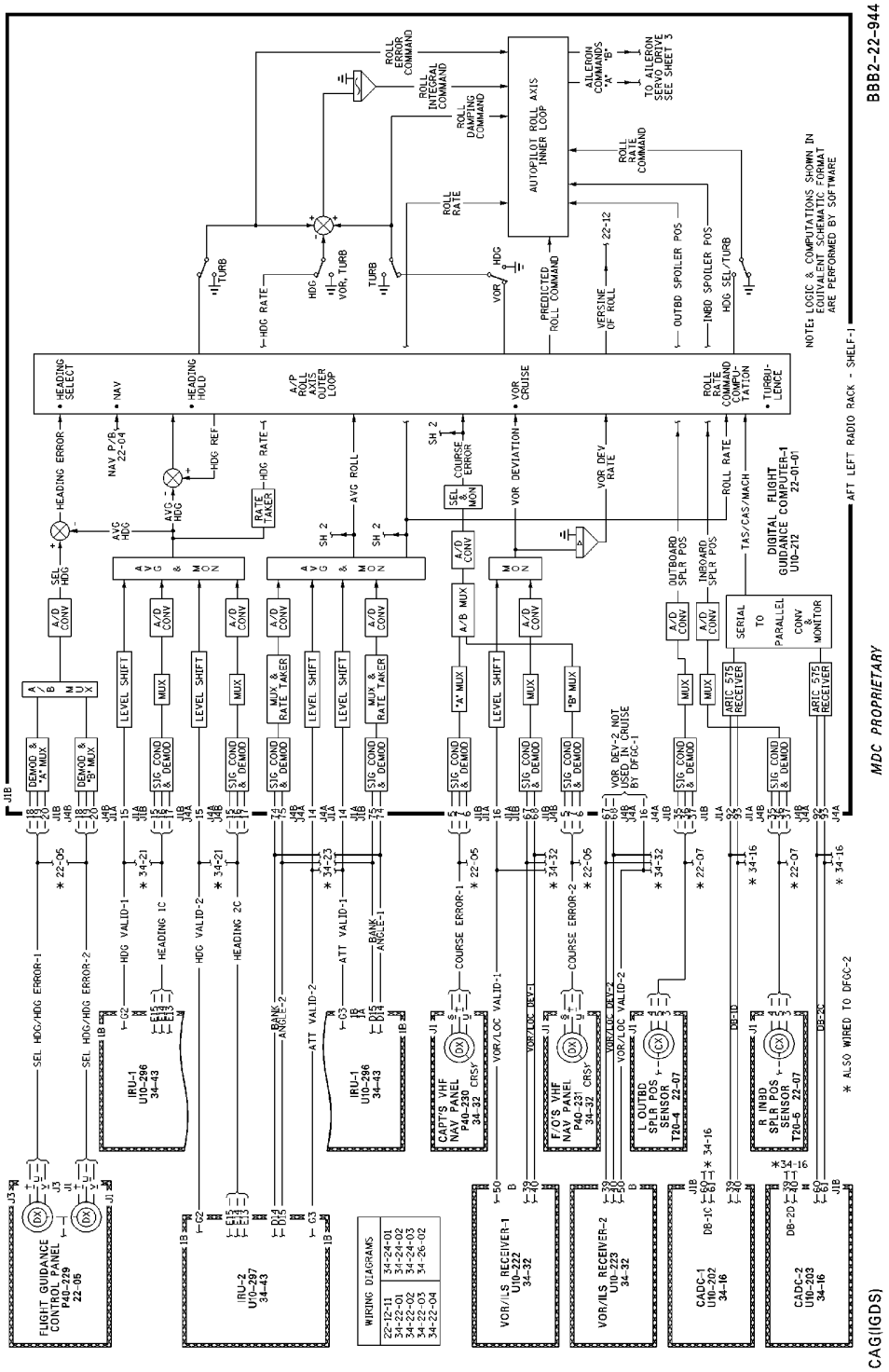
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on roll control is essential for meaningful trouble shooting. For this reason, the following schematics are grouped into this section for quick reference to roll control and associated system interface.

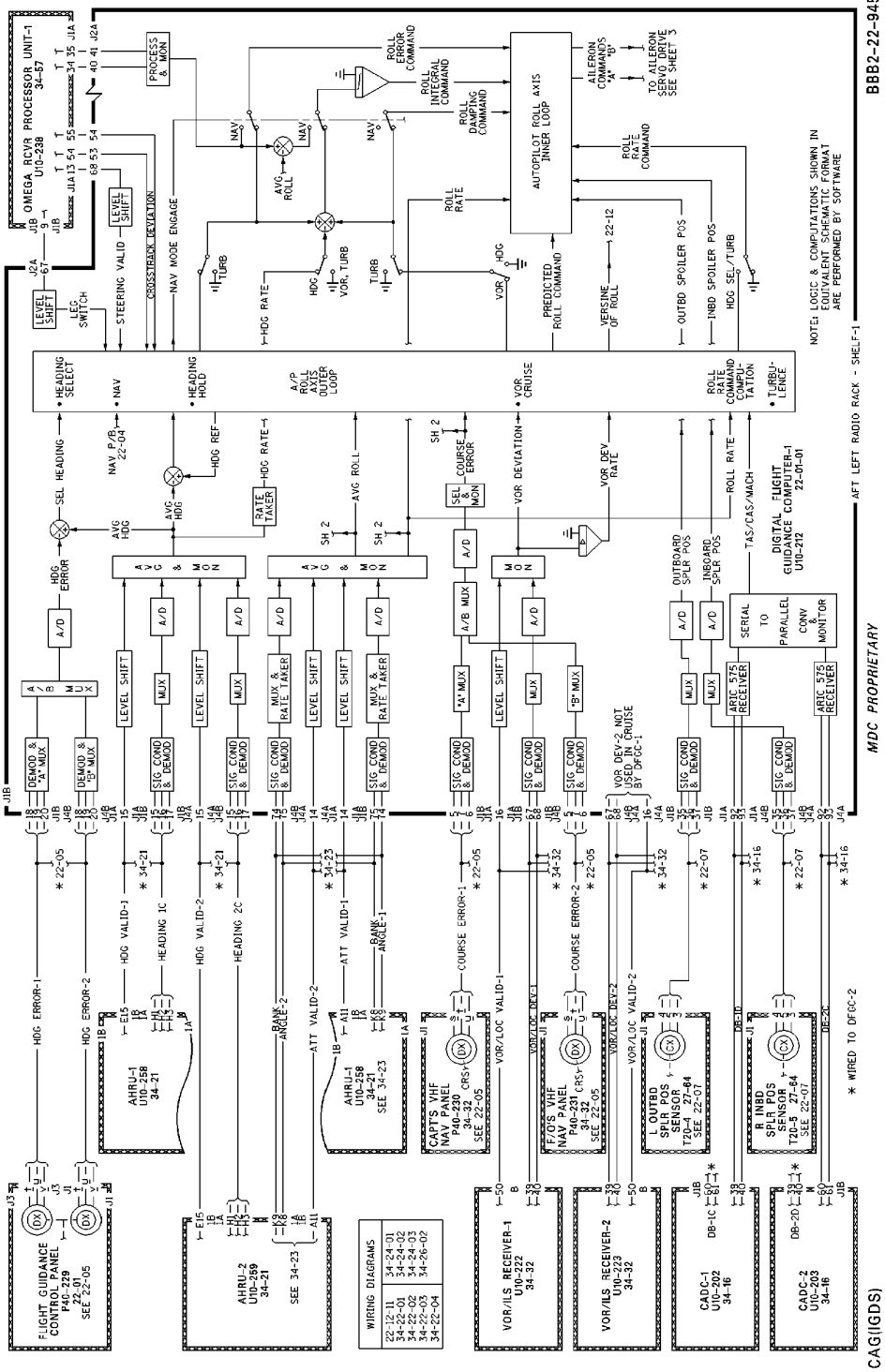
WJE ALL



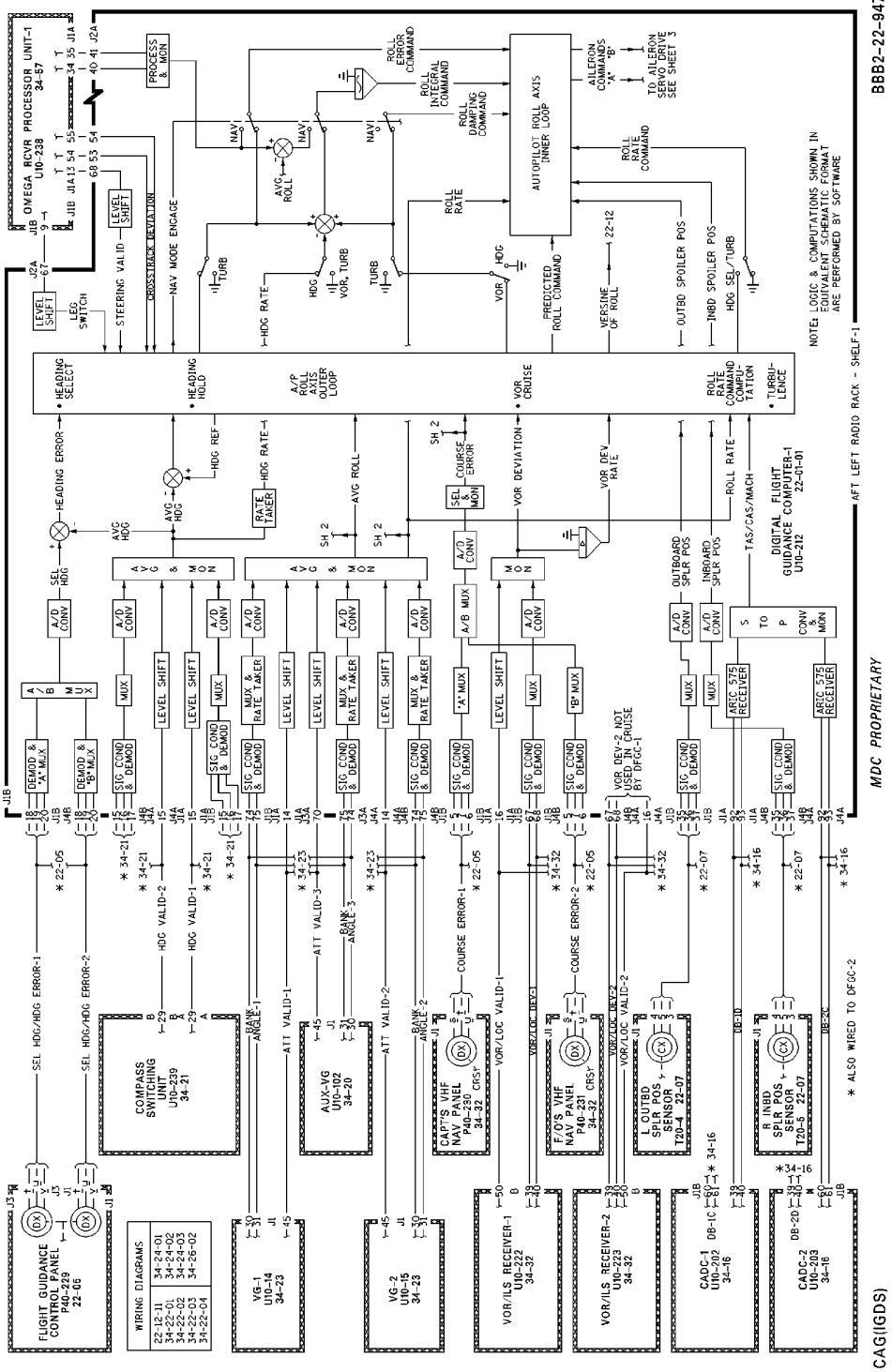
Dual Aileron Servo Drive
Figure 101/22-11-00-990-853



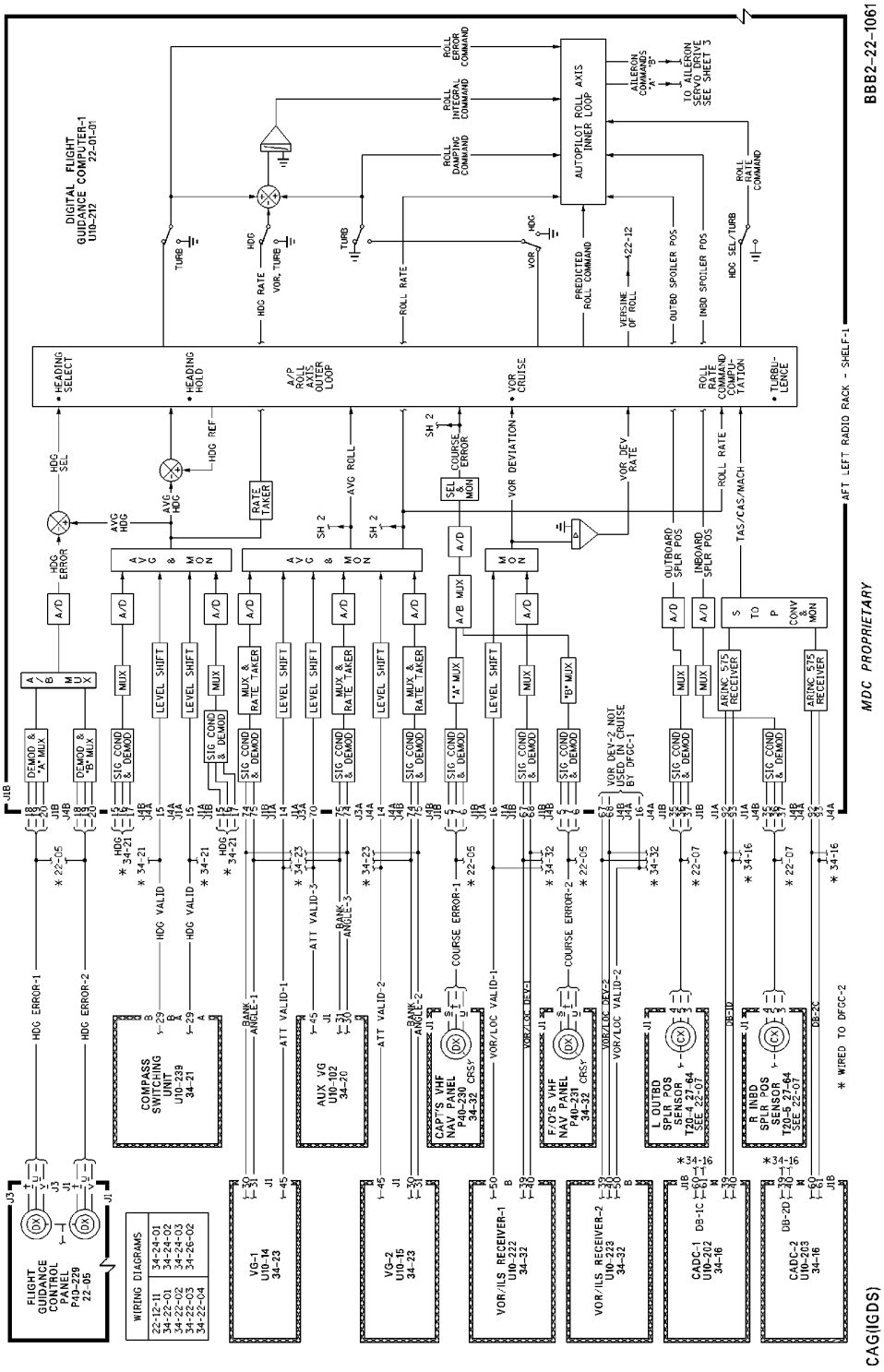
Autopilot Roll Axis (VOR/CRUISE)
Figure 102/22-11-00-990-856



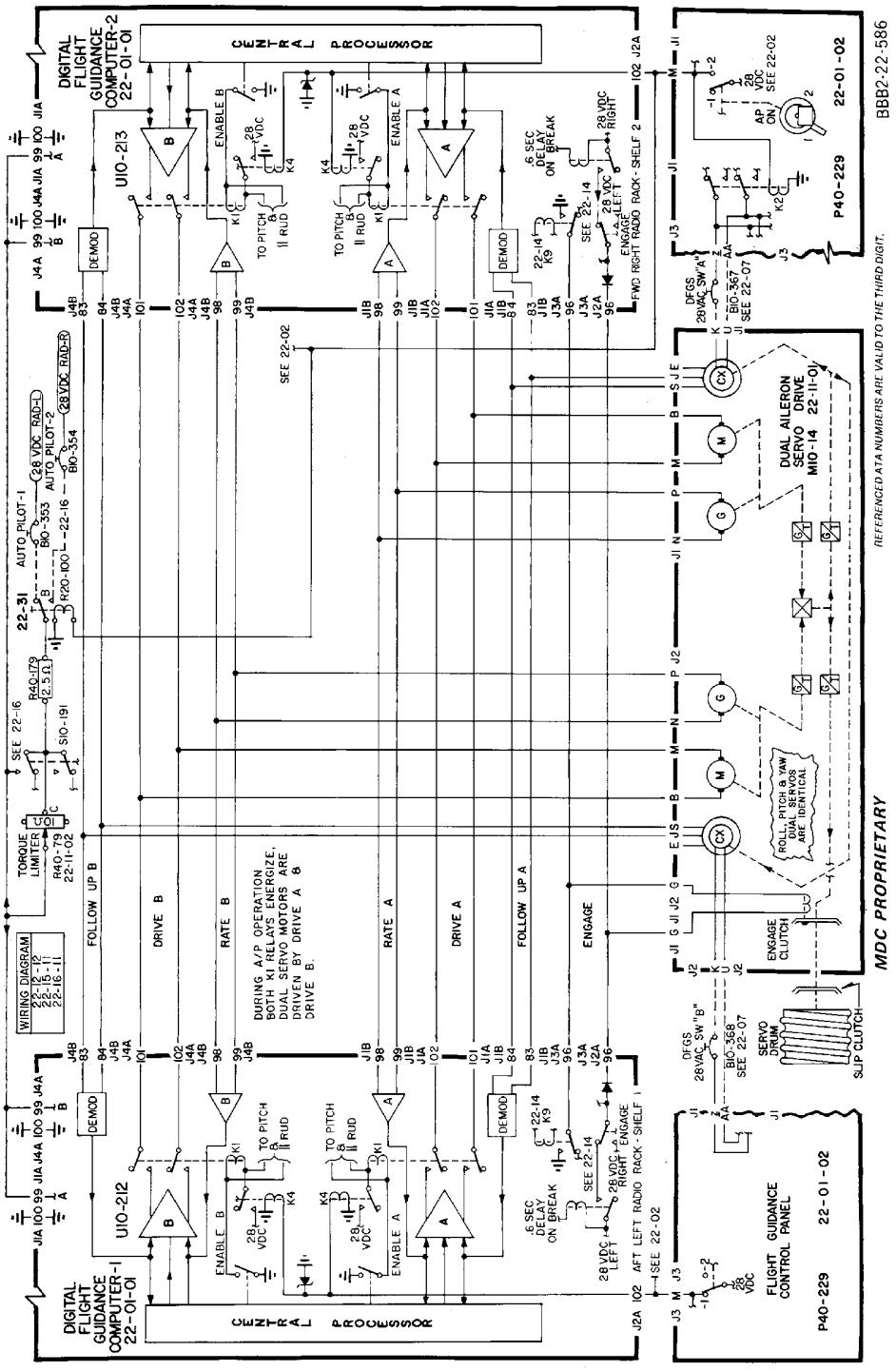
Autopilot Roll Axis (VOR/CRUISE)
Figure 103/22-11-00-990-858



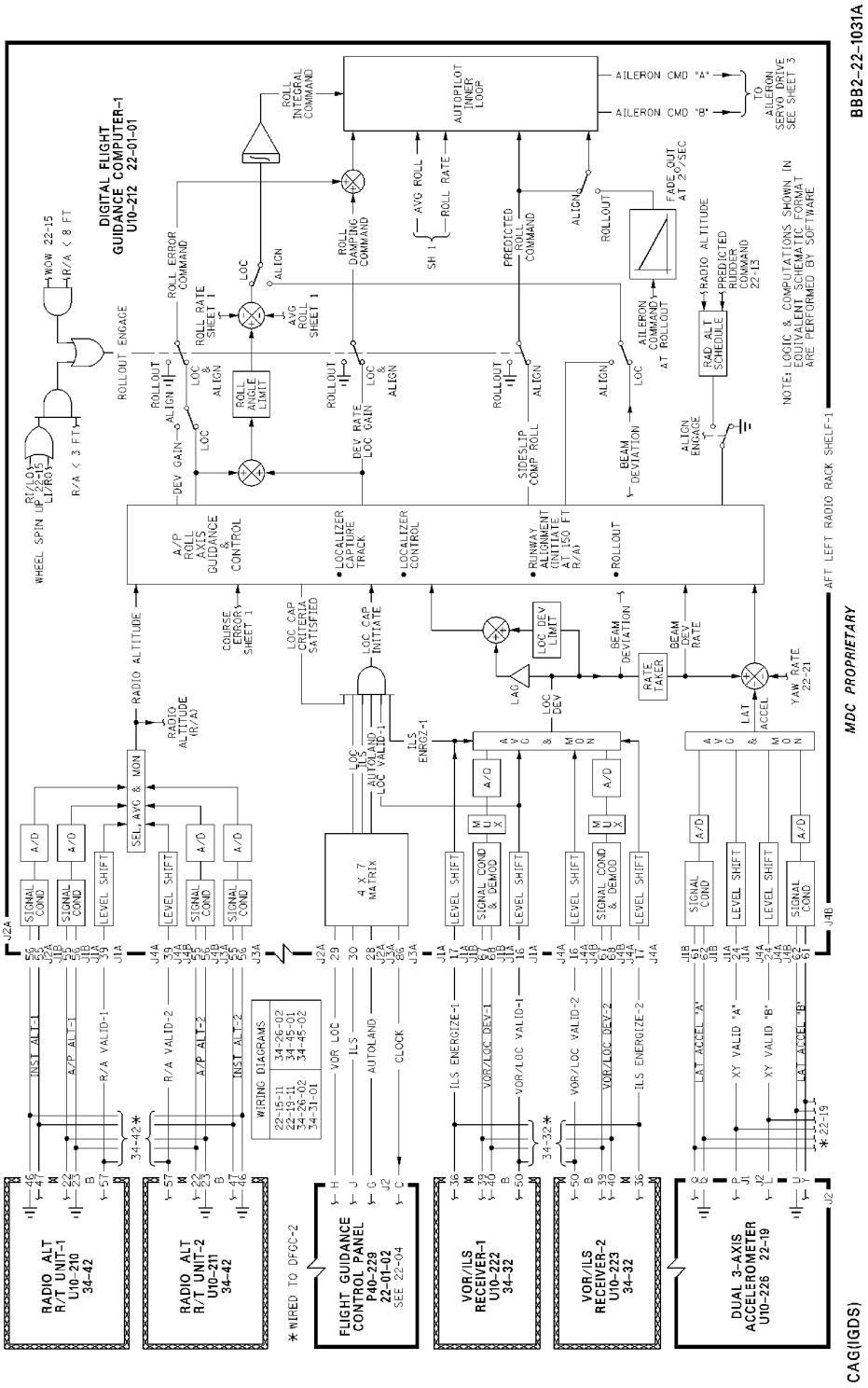
Autopilot Roll Axis (VOR/CRUISE) F
Figure 104/22-11-00-990-859



Autopilot Roll Axis (VOR/CRUISE)
Figure 105/22-11-00-990-860



Autopilot Roll Axis (VOR/CRUISE)
Figure 106/22-11-00-990-862



Autopilot Roll Axis (APPROACH)
Figure 107/22-11-00-990-864

DUPLEX AILERON SERVO DRIVE - MAINTENANCE PRACTICES

1. General

A. The Duplex Aileron Servo Drive and Servo Bracket are located in the left forward section of the Electrical/Electronics (E/E) compartment and are accessible through the compartment access door.

B. After removal/installation of the servo drive and/or servo bracket, systems and components associated with servo drive operation should be in proper operating condition for servo drive testing.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Servo drive testing is by use of the Status Test Panel. (DFGS STATUS/TEST, SUBJECT 22-01-05)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

D. Servo drive testing is by use of the MCDU. (DFGS STATUS/TEST, SUBJECT 22-01-05)

WJE ALL

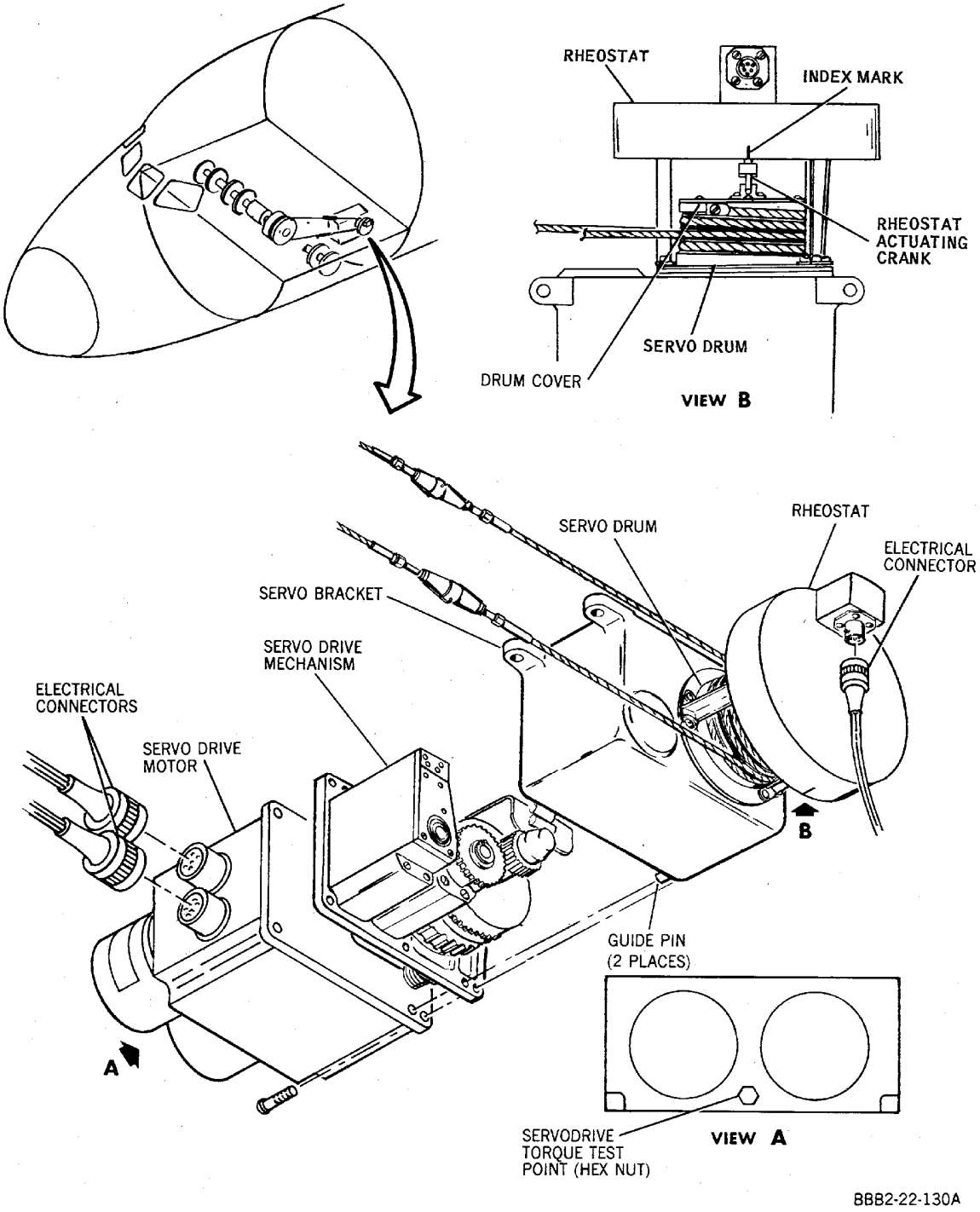
2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Lockwire, Inconel, NASM20995N20, DPM 684	Not Specified
Lockwire, Corrosion Resistant Steel, NASM20995C20, DPM 5865	Not Specified
Torque Wrench, TQ-4 (capable of 0 to 75 inch pounds)	Snap On
Rig Pin (4-4)	



Duplex Aileron Servo Drive -- Removal/Installation
Figure 201/22-11-01-990-801

3. **Removal/Installation Duplex Aileron Servo Drive**

A. Remove Servo Drive. (Figure 201)

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Disconnect servo drive electrical connectors.

(3) Remove lockwire and screws attaching servo drive to servo bracket.

(4) Carefully slide servo drive motor assembly straight out of servo drive mechanism.

(5) Carefully slide servo drive mechanism straight out of servo bracket.

(6) If servo drive motor and/or servo drive mechanism is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install Servo Drive. (Figure 201)

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

(Continued)

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Carefully slide servo drive mechanism into servo bracket engaging spline shaft with servo bracket drum splines, and properly mate guide pins.

(3) Carefully slide servo motor assembly onto servo drive mechanism.

(4) Install attaching screws and safety with lockwire. (LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201)

(5) Connect electrical connectors.

(6) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
E	12	B10-354	AUTOPILOT-2

WJE ALL

(7) Perform Adjustment/Test Duplex Aileron Servo Drive. (Paragraph 6.)

4. Removal/Installation Duplex Aileron Servo Bracket

A. Remove Servo Bracket. (Figure 202)

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

NOTE: Removal of the servo drive prior to removal of servo bracket provides a lighter weight factor. (Paragraph 3.A.)

(2) Disconnect servo drive electrical connectors.

(3) Disconnect electrical connector from rheostat.

(4) Secure cables against unraveling from servo drum and cable drum on aileron torque tube, and disconnect cable turnbuckles.

(5) Remove servo bracket and cable alignment guard.

(6) Remove rheostat from servo bracket.

B. Install Servo Bracket. (Figure 202)

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Install servo drum, cables and rheostat on servo bracket.

(3) Install servo bracket and cable alignment guard.

(4) Connect both aileron servo drive turnbuckles. Rotate control wheel fully clockwise to position turnbuckles.

(5) Insert rig pin (4-4) in rig hole (R-3) in aileron torque tube (AA).

NOTE: Aileron torque tube, aileron servo, and turnbuckles, located below flight compartment floor, are accessible through electrical/electronics compartment.

(6) Adjust turnbuckles (3) until tension is between minimum and maximum load per cable tension table for 1/8-inch (3.175mm) cables. (Figure 203)

NOTE: To check cable tension, remove rig pin (4-4) and rotate control wheel fully clockwise. Check tension at approximate midspan of cables 19B and 20A. Return control wheel to neutral and reinstall rig pin (4-4).

(7) Differentially adjust turnbuckles (3) until index mark on rheostat case is aligned within width of rheostat actuating crank tip.

(8) Remove rig pin (4-4) from aileron torque tube.

(9) Safety turnbuckles (3) with clips.

(10) Install servo drive if removed. (Paragraph 3.B.)

(11) Connect electrical connectors to servo drive and safety with lockwire. (LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201)

(12) Connect electrical connector to rheostat.

(13) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

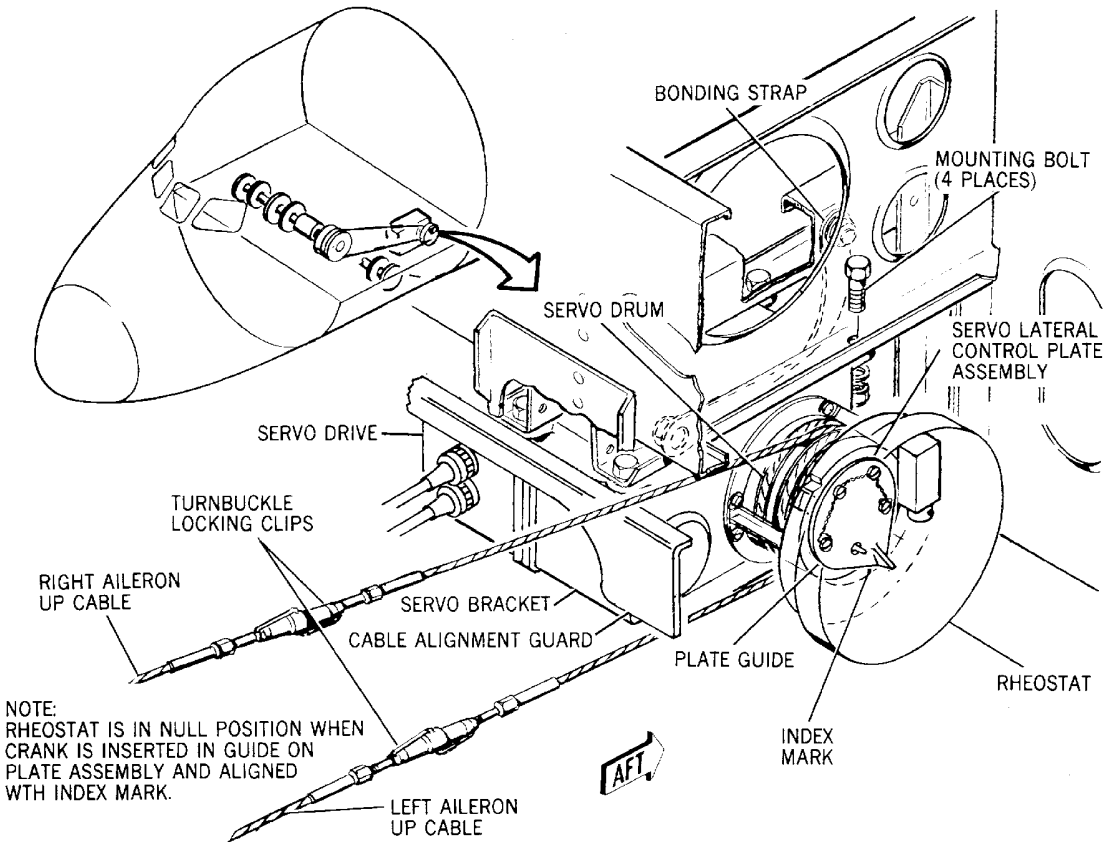
Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(14) Perform Adjustment/Test Duplex Aileron Servo Drive. (Paragraph 6.)



BBB2-22-131A

Duplex Aileron Servo Bracket -- Removal/Installation
Figure 202/22-11-01-990-803

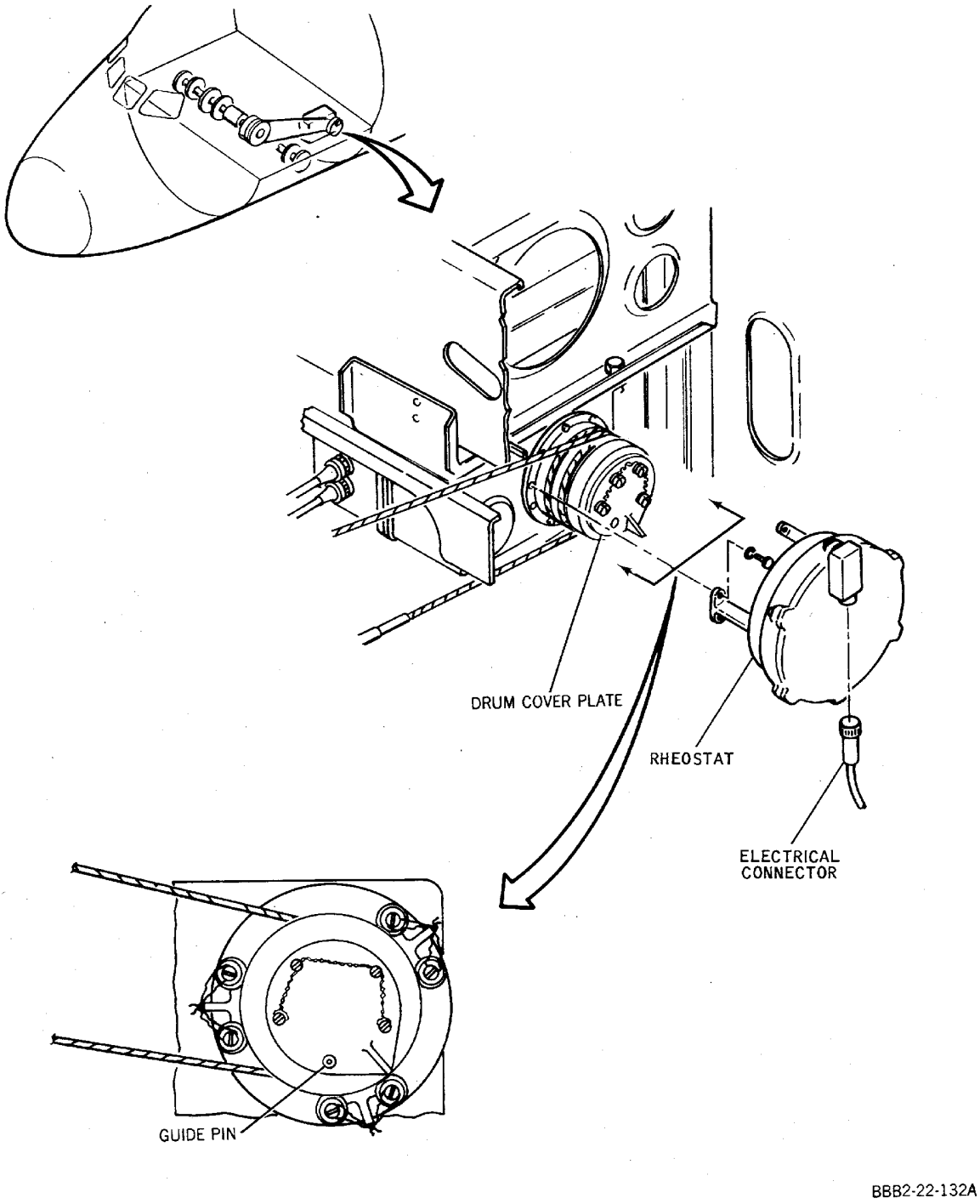
CABLE TENSION TABLE – 1/8 DIAMETER

TEMP deg F	MAX. PROD. RIG LOAD	MIN. PROD. RIG LOAD	MIN. ALLOW. SERV. LOAD	TEMP deg F	MAX. PROD. RIG LOAD	MIN. PROD. RIG LOAD	MIN. ALLOW. SERV. LOAD
–60	10	9	6	42	55	51	35
–58	11	10	7	44	56	52	36
–56	12	11	7	46	57	53	36
–54	12	12	8	48	58	54	37
–52	13	12	9	50	59	54	38
–50	14	13	9	52	60	55	38
–48	15	14	10	54	61	56	39
–46	16	15	10	56	61	57	40
–44	17	16	11	58	62	58	40
–42	18	16	11	60	63	59	41
–40	19	17	12	62	64	60	41
–38	20	18	13	64	65	61	42
–36	20	19	13	66	66	62	43
–34	21	20	14	68	67	63	43
–32	22	21	14	70	68	64	44
–30	23	21	15	72	69	64	45
–28	24	22	15	74	70	65	45
–26	25	23	16	76	71	66	46
–24	26	24	16	78	72	67	47
–22	26	25	17	80	74	68	47
–20	27	25	18	82	75	69	48
–18	28	26	18	84	76	70	49
–16	29	27	19	86	77	71	49
–14	30	28	19	88	78	72	50
–12	31	29	20	90	79	73	51
–10	32	29	20	92	80	74	51
–8	33	30	21	94	81	75	52
–6	33	31	21	96	82	76	53
–4	34	32	22	98	83	77	53
–2	35	33	23	100	84	78	54
0	36	33	23	102	85	79	55
2	37	34	24	104	87	80	56
4	38	35	24	106	88	81	56
6	39	36	25	108	89	83	57
8	40	37	25	110	90	84	58
10	40	38	26	112	91	85	59
12	41	38	27	114	92	86	59
14	42	39	27	116	94	87	60
16	43	40	28	118	95	88	61
18	44	41	28	120	96	89	62
20	45	42	29	122	97	90	62
22	46	42	29	124	98	91	63
24	47	43	30	126	100	93	64
26	48	44	31	128	101	94	65
28	48	45	31	130	102	95	66
30	49	46	32	132	103	96	67
32	50	47	32	134	105	97	67
34	51	48	33	136	106	98	68
36	52	48	33	138	107	100	69
38	53	49	34	140	109	101	70
40	54	50	35				

NOTE: The minimum allowable service load is the minimum cable loads acceptable before tensioning is required. When tensioning is required, tension cable until the final rig load is between maximum rig load and minimum rig load.

CAG(IGDS) BBB2–22–849A

Aileron Cable Tension Table
Figure 203/22-11-01-990-804



Duplex Aileron Servo Bracket Rheostat -- Removal/Installation
Figure 204/22-11-01-990-805

5. Removal/Installation Duplex Aileron Servo Bracket Rheostat

A. Remove Rheostat. (Figure 204)

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Disconnect electrical connector from rheostat.

(3) Remove rheostat from servo bracket.

B. Install Rheostat. (Figure 204)

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
E	12	B10-354	AUTOPILOT-2

WJE ALL

CAUTION: PRIOR TO INSTALLING WASHERS, VERIFY WASHERS ARE CORRECT OUTSIDE DIAMETER. OVERSIZED WASHERS MAY PRODUCE BINDING IN THE FLIGHT CONTROL SYSTEM.

(2) Install rheostat on servo bracket and safety the attaching screws with lockwire. (LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201)

NOTE: Rheostat should be in null position with rheostat crank insert in plate guide and index marks aligned within one index line.

(3) Connect electrical connector to rheostat.

(4) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

6. Adjustment/Test Duplex Aileron Servo Drive

A. Adjustment/Test Servo Drive

NOTE: Verify servo drive is installed and servo bracket properly rigged for the following test.

NOTE: If the main gear is not compressed then install main gear proximity switch target inhibitors on left and right weight on wheels sensors to place the DFGC system in the ground mode.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

(1) On STP press and release POWER pushbutton. CMPVLD light comes on and the number 1 should appear. If -970 DFGC is installed, then "DIGITAL FLIGHT GUIDANCE COMPTR?" should be displayed. Cycle VERIFY pushbutton. "FLIGHT FAULT REVIEW?" should be displayed.

(2) On FGCP, place DFGS switch to position 1 or position 2 as desired for test.

NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton on STP and number 2 should appear.

(3) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(4) On MCDU, select TEST PANEL page. Selected DFGC and DFGC VALID STATUS will be displayed on lines 4L and 5L. "FLIGHT FAULT REVIEW?" should be displayed.

(5) On FGCP, place DFGS switch to position 1 or position 2 as desired for test. Make certain that selected DFGC on MCDU line 4L corresponds to DFGS switch.

(6) Press and release FWD key until "RUN MAINTENANCE TEST?" is displayed.

WJE ALL

(7) If -970 DFGC is installed then "MD-80 VERIFY" or "MD-87 VERIFY" will be displayed. Press and release VERIFY pushbutton and "SEL DFGC TEST SIDE - VERIFY" should be displayed.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

NOTE: To obtain correct torque values STP must be in "MAINTENANCE TEST" with autopilot disengaged. DO NOT attempt to run STP test.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

NOTE: To obtain correct torque values MCDU must be in "MAINTENANCE TEST" with autopilot disengaged. DO NOT attempt to run MCDU test.

WJE ALL

(8) Verify autopilot is disengaged, and flap/slat handle to UP/RET position.

(9) Center control wheel and verify index mark on torque limiting rheostat crank arm lines up with index mark on rheostat case.

NOTE: If index marks do not line up, differentially adjust servo drive cable turnbuckles until index marks are coincident.

(10) Attach torque wrench to aileron servo drive torque test point. (Figure 201)

(11) Turn torque wrench in clockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 43 to 60 inch-pounds (4.86 to 6.78 N·m). Allow torque wrench to slowly return to neutral.

(12) Turn torque wrench in counterclockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 43 to 60 inch-pounds (4.86 to 6.78 N·m). Allow torque wrench to slowly return to neutral.

(13) Turn control wheel to at least 45 degrees from neutral. Turn torque wrench in clockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 26 to 33 inch-pounds (2.94 to 3.73 N·m). Allow torque wrench to slowly return to neutral.

(14) With control wheel still at 45 degrees position, turn torque wrench in counterclockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 26 to 33 inch-pounds (2.94 to 3.73 N·m). Allow torque wrench to slowly return to neutral. Then return control wheel to neutral position.

(15) Place flap/slat handle to 28 degrees detent position.

(16) Turn control wheel to at least 45 degrees from neutral. Turn torque wrench in clockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 43 to 60 inch-pounds (4.86 to 6.78 N·m). Allow torque wrench to slowly return to neutral.

(17) Return control wheel to neutral position, and remove torque wrench.

(18) Perform Return to Service (RTS) test. (DFGS STATUS/TEST, SUBJECT 22-01-05)

PROFILE (PITCH) CONTROL - DESCRIPTION AND OPERATION

1. General

A. The profile (pitch) control modes of the Flight Guidance system operate through the elevator system. Pitch control maneuvers may be executed automatically when the autopilot is engaged, or manually by following flight director steering commands when the flight director system is engaged.

B. Automatic pitch control is provided by autopilot engagement. Selection of pitch control modes of operation is provided through the Flight Guidance Control panel, located on the glareshield. Pitch control signal information is induced into the Digital Flight Guidance Computer (DFGC), where computed signals are processed and transmitted to a duplex elevator servo drive. The elevator servo drive is coupled to the elevator control system, and when commanded signals from the DFGC cause the servo drive to move, the elevator control tabs are moved the proper amount to execute the commanded pitch maneuver. Whenever a signal to the elevator control tabs is sustained for more than 5-seconds, the autopitch trim moves the stabilizer in a direction to relieve the elevator deflection.

C. Manual pitch control guidance commands are provided when the flight director switches (2), located on the Flight Guidance Control panel are placed to FD. Flight director modes of operation are also selected through the Flight Guidance Control panel. When the flight director switches are on, each DFGC provides pitch attitude command information to its respective ADI (i.e. DFGC-1 to captain's ADI). On aircraft equipped with EFIS, pitch command information is sent to the Primary Flight Displays (PFD's). These pitch steering commands are provided for the flight crew to manually follow and make corrections as necessary to maintain proper aircraft pitch attitude.

D. Manual pitch control guidance commands are provided when the flight director switches (2), located on the Flight Guidance Control panel are placed to FD and the autopilot is disengaged. Flight director modes of operation are also selected through the Flight Guidance Control panel. When the flight director switches are on, each DFGC provides pitch attitude command information to its respective ADI (i.e. DFGC-1 to captain's ADI). On aircraft equipped with EFIS, pitch command information is sent to the Primary Flight Displays (PFD's). These pitch steering commands are provided for the flight crew to manually follow and make corrections as necessary to maintain proper aircraft pitch attitude.

E. The Flight Guidance Control panel provides a pitch profile readout located above the pitch wheel. The readout displays vertical speed reference, indicated airspeed reference, Mach airspeed reference, and pitch attitude reference during turbulence penetration depending upon the mode that is selected. The pitch wheel can be used to adjust these reference values as required. The pitch profile window is a six window display. The first window displays the operating mode, i.e., V vertical speed, M mach, S indicated airspeed and P for turbulence. The second window displays the polarity of the pitch reference i.e. + or -, and the last four windows display the operating numeric values.

F. Pitch control is usable throughout the entire flight envelope including automatic landing, where pitch control executes an automatic flare maneuver and nose lowering at main gear wheel spin-up. Pitch control provides various autopilot and flight director modes of operation. Autopilot pitch control modes of operation are as follows:

(1) Synchronization

(2) Takeoff (After Lift-Off)

(3) Vertical Speed Control

(4) Altitude Hold

(5) Altitude Preselect and Advisory

(6) Indicated Airspeed Control

(7) Mach Control

(8) Turbulence Penetration

WJE 415-427, 429, 861-866, 868, 869, 871-874, 886, 887, 891-893

(9) Performance Management

WJE 405-411, 880, 881, 883, 884

(10) Performance Management

WJE ALL

(11) Glideslope Capture and Tracking

WJE 401-404, 412, 414

(12) Vertical Navigation (VNAV)

WJE ALL

(13) Lift Compensation

(14) Go-Around

(15) Autoland

WJE 405-412, 414-427, 429, 861-866, 868, 869, 871-874, 880, 881, 883, 884, 886, 887, 891-893

(a) Flare

(b) Nose Lowering.

WJE ALL

G. Flight Director pitch control modes are as follows:

(1) Takeoff

(2) Vertical Speed Control

(3) Altitude Hold

(4) Altitude Preselect and Advisory

(5) Indicated Airspeed Control

(6) Mach Control

(7) Turbulence Penetration

(8) Glideslope Capture and Tracking

(9) Go-Around.

2. Autopilot Profile Modes

A. Synchronization

(1) Prior to autopilot engagement, the DFGC provides continuous synchronization to existing pitch attitude, vertical speed, and altitude. The DFGC verifies pitch control sensors are operational and output commands to the elevator servo are in a null condition prior to autopilot engagement. This continuous synchronization is provided to ensure that autopilot engage transients do not occur through the elevator control system at time of autopilot engagement. At time of auto-pilot and/or mode engagement, the synch values become the initial reference for subsequent control or adjustment.

B. Takeoff (After Lift-Off)

(1) After lift-off, with the flight director takeoff mode established, engaging the autopilot will have no effect on the takeoff mode of operation. The pitch mode annunciators will continue to display TAKE OFF, and the autopilot will adjust as required to maintain the existing vertical speed of the aircraft.

(2) The autopilot takeoff mode will become terminated when another pitch mode has been selected, or an altitude has been captured.

C. Vertical Speed Control

(1) Vertical speed control is provided by the VERT SPD push-button or a pitch wheel located on the Flight Guidance Control panel. The pitch wheel has a detent feel which provides altitude hold mode of operation. Manually rotating the pitch wheel for less than 100 feet per minute readout in the increase or decrease position engages the autopilot into the altitude hold mode.

(2) With autopilot engaged in VERT SPD mode, and moving the pitch wheel, the aircraft will automatically assume (adjust as required) a pitch attitude to hold the selected vertical speed. Observing the pitch profile readout, along with the vertical speed indicators, the pitch wheel can be adjusted as necessary to obtain the desired vertical speed. VERT SPD is displayed in the pitch window on the flight mode annunciators when the mode is engaged. The pitch profile window displays V, + or - (depending on the polarity of the reference), and the numeric value of the vertical speed.

(3) The autopilot will always engage into the vertical speed mode if the aircraft is in a climb or descent greater than 100 ft/min. The exception is if flight directors were previously operating in an IAS or Mach mode (at this time the autopilot will automatically engage into these operating modes), or during an automatic landing when glideslope capture has been initiated. The pitch wheel is inhibited after glideslope capture.

D. Altitude Hold

(1) Altitude hold mode of operation is provided by the ALT HOLD pushbutton, or by rotating the pitch wheel to the detent feel (zero vertical speed position). The pitch profile readout indicates that vertical speed is less than 100 feet. Engaging the autopilot into the altitude hold mode, or rotating the pitch wheel to the detent position with auto-pilot engaged, will automatically provide altitude control to the barometric altitude reference existing at time of altitude hold mode engagement to within ±50 feet. The altitude hold mode function is accomplished by commanding pitch attitude proportional to altitude displacement.

NOTE: If problems arise in the ALT HLD mode it is important to check elevator cable tensions and ensure they are within Maintenance Manual specifications. (PAGEBLOCK 27-30-00/501)

(2) When the altitude hold mode is engaged, ALT HLD will be displayed in the pitch window on the flight mode annunciators. The pitch profile readout will display V, blank, and the last four windows will display zeros. During an ILS or autoland approach maneuver, the altitude hold function will automatically be disabled when the glideslope beam is intercepted.

(3) If the flight director has been operating in the altitude hold mode, and an altitude error from reference altitude exists, when the autopilot is engaged the reference altitude will sync to the altitude existing at time of autopilot engagement.

E. Altitude Preselect and Advisory

(1) The altitude preselect mode provides automatic capture of a preset barometric altitude, which is selected by an altitude set knob located on the Flight Guidance Control panel. The altitude set knob has three positions, spring-loaded to center. The center position provides 1000 feet increment altitude adjustments that are read on a selected altitude readout window directly above the altitude set knob. The momentary pull-out position arms the system for a preselected altitude capture, and for altitude advisory. The push-in position provides 100 feet increment adjustments, and cancels the altitude preselect mode.

NOTE: Altitude Advisory System is independent of Flight Director or Autopilot systems.

(2) The altitude advisory function is provided to alert the flight crew that the aircraft is approaching a preselected altitude, or the aircraft is deviating from the preselected altitude. The altitude advisory lights are located in the upper left hand corner of the altimeters.

WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 875-881, 883, 884, 886, 887, 891

(3) Arm Phase

(a) The arm phase of the altitude preselect mode allows the aircraft to be directed to a preselected altitude. Altitude preselect mode is armed when the altitude set knob is momentarily pulled out. At time of altitude preselect arm, ALT will be displayed in the arm window of the flight mode annunciators.

(b) Altitude preselect arm phase will become disabled if the autopilot is disengaged with flight directors not operating, or when the glideslope beam is intercepted.

WJE ALL

(4) Capture Phase

(a) The automatic capture phase of the altitude preselect mode is variable and is a function of existing vertical speed. With the autopilot engaged, and the aircraft arrives at approximately 750 feet from the selected altitude, a steady altitude advisory light will come on in the altimeters. At the capture threshold, the pitch mode (i.e. vertical speed) provided to capture the preselected altitude, will be terminated and ALT CAP will be displayed on the flight mode annunciators pitch window, and the arm mode annunciator will go blank. If the aircraft deviates from the altitude capture threshold, the altitude advisory lights will come and flash, and a 2-second aural warning tone will sound and voice warning.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 POST MD80-22-108

NOTE: As the aircraft approaches and reaches 750 feet from the desired altitude, the one-second aural tone is heard.

WJE ALL

(b) As the aircraft arrives at the capture threshold, the autopilot will automatically make a smooth capture maneuver to the preselected altitude. At approximately 250 feet from the preselected altitude, the steady altitude advisory lights will go off, advising the flight crew that the preselected altitude capture function has been accomplished.

(c) Altitude preselect capture phase will become disabled if the autopilot is disengaged with flight directors not operating, another pitch mode has been selected, the glideslope beam is intercepted, or the ALT knob is rotated.

(5) Track Phase

(a) As the aircraft levels off at the preselected altitude, the flight mode annunciators pitch window will display ALT HLD. The aircraft will remain in the preselected altitude hold mode as long as ALT HOLD mode is engaged. If the aircraft deviates from the selected altitude ±250 feet, the altitude advisory lights will come on and flash, and a 2-second aural warning tone and voice warning will sound, to alert the flight crew that the aircraft has deviated from the selected altitude. The flashing advisory lights can only be turned off by selecting an altitude change greater than 750 feet from existing altitude, or reestablishing the selected altitude.

F. Indicated Airspeed Control

(1) The indicated airspeed (IAS) control mode is selected by pressing the IAS pushbutton located on the flight Guidance Control panel. The autopilot will automatically adjust the pitch attitude of the aircraft to maintain the indicated airspeed, and the flight mode annunciator pitch window will display IAS.

(2) The pitch profile readout will display an S and the indicated airspeed at time of mode engagement. The airspeed reference can be adjusted as required by use of the pitch wheel to select a different value indicated airspeed. The pitch profile readout will display the new value, as the pitch wheel is adjusted.

(3) If the autothrottle is operating in either the SPD SEL or MACH SEL mode, and the autopilot IAS mode is engaged, the ATS mode annunicators will display CLMP and flash for approximately 3 seconds. CLMP will remain displayed in the ATS mode annunciators as long as the autopilot is operating in the indicated airspeed control mode of operation. If the SPD SEL or MACH SEL autothrottle modes are reestablished: the autopilot indicated airspeed hold mode will automatically be overridden, and the pitch window will flash for approximately 3 seconds, displaying either VERT SPD or ALT HLD depending on the rate of climb of the aircraft. This mode will remain displayed until another pitch mode is selected.

(4) The indicated airspeed control mode of operation will also become disabled by selecting another pitch mode, or when the glideslope beam is intercepted.

G. Mach Control

(1) The Mach Control mode is selected by pressing the MACH push-button located on the Flight Guidance Control panel. The autopilot will automatically adjust the pitch attitude of the aircraft to maintain the mach existing at time of mode engagement, and the flight mode annunciators pitch window will display MACH.

(2) The pitch profile readout will display an M and the mach at time of mode engagement. The mach reference can be adjusted as required by use of the pitch wheel to select a different value mach. The pitch profile readout will display the new value, as the pitch wheel is adjusted.

(3) If the autothrottle is operating in either SPD SEL or MACH SEL mode, and the autopilot MACH control mode is engaged, the ATS mode annunciators will display CLMP and flash for approximately 3 seconds. CLMP will remain displayed in the ATS mode annunciators as long as the autopilot is operating in the Mach Hold mode of operation. If the SPD SEL or MACH SEL autothrottle modes are reestablished: the autopilot Mach Control mode will automatically be overridden, and the pitch window will flash for approximately 3 seconds, displaying either VERT SPD or ALT HLD depending on the speed of the aircraft. This mode will remain displayed until another pitch mode is selected.

(4) The Mach Control mode of operation will also become disabled by selecting another pitch mode, or when the glideslope beam is intercepted.

H. Glideslope Capture and Tracking

(1) Arm Phase

(a) The arm phase of the glideslope operation allows the aircraft to be directed to the glideslope beam at an intercept angle. The arm phase of the glideslope is established when the VHF NAV receivers are tuned to an ILS frequency, and ILS or AUTO LAND mode has been established.

(b) Glideslope arm phase will be disabled if the autopilot is disengaged with flight directors not operating, the VHF NAV receivers are detuned from the ILS frequency, or the glideslope or localizer validity signals are lost.

(2) Capture Phase

(a) The capture phase of the glideslope operation is automatically initiated when the aircraft arrives at the glide-slope beam threshold. Monitors within the DFGC continuously compute beam deviation and closure rate to initiate the glideslope capture phase. The autopilot provides a smooth transition to beam center, using inertially complemented beam and beam rate estimates to provide an asymptotic capture of the glideslope beam. The flight guidance mode annunciators pitch window will change from the existing pitch mode of operation to G/S CAP.

(b) After glideslope capture, pitch gain programming, as a function of radio altitude, is used to compensate for beam convergence.

(c) Glideslope capture phase will be disabled if the autopilot is disengaged with flight directors not operating, or the glideslope or localizer validity signals are lost.

(3) Track Phase

(a) The glideslope tracking phase begins when the aircraft arrives at beam center. Beam guidance is based on inertially complemented beam and beam rate estimates, with vertical acceleration and pitch rate short period damping. The pitch windows will change from G/S CAP to G/S TRK.

(b) Glideslope track phase will be disabled if the autopilot is disengaged with flight directors not operating, or the glideslope or localizer validity signals are lost.

I. Turbulence Penetration

(1) Turbulence penetration provides dampened pitch response during turbulent atmospheric conditions. The mode is established when the autopilot is engaged, and the TURB pushbutton on the Flight Guidance Control panel is pressed.

(2) When the TURB pushbutton is pressed, any control mode previously selected is automatically disengaged, including arm modes. The DFGC automatically reduces the gains and increases the damping ratio in the pitch and roll control logic. The pitch command bar will respond to existing pitch attitude, and the roll bar will remain approximately centered. The pitch window in the flight mode annunciators display TURB and the roll window displays WNG LVL. If the autothrottle is engaged, the autothrottle will automatically disengage when the TURB pushbutton is pressed.

(3) The pitch profile readout will display P, + or -, and the existing pitch attitude at time of mode engagement. The pitch attitude reference can be adjusted as required by use of the pitch wheel to select a different value pitch attitude. Automatic pitch trim functions are inhibited during TURB mode of operation.

(4) The turbulence penetration mode becomes disengaged when any other control mode is selected, or the autopilot is disengaged.

WJE 873, 874, 886, 887, 892, 893

J. Performance Management Control

WJE 873, 874, 886, 887, 892, 893 (Continued)

(1) The performance management (PERF) control mode is operational when both autopilot and autothrottle are engaged, the proper mode is selected on the Thrust Rating Indicator, and the PERF pushbutton on the Flight Guidance Control panel is pressed. The autopilot will then automatically adjust the pitch attitude of the aircraft in accordance with the Control Display Unit (CDU) commands for climb, cruise and descent. The flight mode annunciator pitch window will display PERF and the displayed CDU operating mode.

(2) Performance management control mode will become disabled by selecting another pitch mode, or when the glideslope beam is intercepted.

WJE 405-411, 880, 881, 883, 884

K. Performance Management Control

(1) The performance management (PERF) control mode is operational when both autopilot and autothrottle are engaged, the proper mode is selected on the Thrust Rating Indicator, and the PERF pushbutton on the Flight Guidance Control panel is pressed. The autopilot will then automatically adjust the pitch attitude of the aircraft in accordance with the Control Display Unit (CDU) commands for climb, cruise and descent. The flight mode annunciator pitch window will display PERF and the displayed CDU operating mode.

(2) Performance management control mode will become disabled by selecting another pitch mode, or when the glideslope beam is intercepted.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

L. Performance Management Control

(1) The performance management (PERF) control mode is operational when both autopilot and autothrottle are engaged, the proper mode is selected on the Thrust Rating Indicator, and the PERF pushbutton on the Flight Guidance Control panel is pressed. The autopilot will then automatically adjust the pitch attitude of the aircraft in accordance with the Control Display Unit (CDU) commands for climb, cruise and descent. The flight mode annunciator pitch window will display PERF and the displayed CDU operating mode.

(2) Performance management control mode will become disabled by selecting another pitch mode, or when the glideslope beam is intercepted.

WJE 401-404, 412, 414

M. Flight Management System

(1) The Flight Management System (FMS) control mode, which is a fully selectable mode of the Flight Guidance System (FGS), is fully operational in vertical navigation (VNAV) when all of the following items are present: required sensor inputs to the DFGC are present and valid, data required by the FMS for VNAV engagement are present and valid, either autopilot 1 or 2, or flight director 1 or 2 or both are engaged, VNAV select button on the FGCP is pressed, flap setting is 26 degrees or less and the autothrottle is already engaged or will be engaged within 5 seconds of selecting the VNAV mode on the FGCP. The VNAV mode is not available without an autothrottle engaged. The autopilot, via commands from the Advanced Flight Management Computer (AFMC), will automatically adjust pitch attitude of the aircraft in accordance with the vertical flight plan inputted by the flight crew to the Multipurpose Control Display Unit (MCDU). The Flight Mode Annunciator pitch window will display VNAV CLB for normal climb case, VNAV cap for normal capture to altitude hold, VNAV LVL for normal altitude hold and VNAV DES for a normal descent case.

WJE 401-404, 412, 414 (Continued)

(2) Flight management system pitch control mode (VNAV) will become disabled by selecting another pitch mode, when the glideslope beam is captured, if loss of sensor or navigation data, or if either autopilot, both flight directors or autothrottle is deselected.

WJE ALL

N. Lift Compensation

(1) Lift compensation provides automatic nose-up elevator lift control during turns combined with speed/angle-of-attack to compensate for change in lift. During turns an increase in aircraft load factor requires an increase in aircraft angle-of-attack to prevent the loss of altitude.

(2) Lift compensation includes a versine roll command signal and a flap compensated angle-of-attack signal. Lift compensation is provided in all flight operating modes, except Mach, IAS and glideslope track modes of operation.

O. Go-Around

(1) Go-around mode of operation may be initiated when the aircraft in the flight mode and flaps are extended. Pressing the TO/GA switch on the throttle lever establishes the go-around mode of operation. The pitch and roll mode annunciators display GO RND. Go-around mode disables any previously selected approach functions. The rudder parallel servo must be operational for the go-around mode (single engine configuration only).

(2) Automatic go-around mode provides flight director steering commands and elevator control to provide a climb-out at a safe margin above stall airspeed, consistent with engine thrust settings.

(3) The DFGC processes speed control information combined with elevator control to maintain an optimum airspeed. This information represents V_2 +10 for two engine operation, or V_2 for one engine operation speed, V_2 to V_2 +10 for engine out or hold existing speed, above V_2 +10 for engine out to V_2 +10, to allow engine loss without approaching a stall condition. The pitch command and slow-fast pointer on the ADI's, provide speed reference to the flight crew to monitor autopilot performance.

(4) Automatic control in the go-around mode is terminated when the autopilot is disengaged, or when a pitch command, other than altitude preselect, is activated.

P. Autoland

(1) Flare

(a) During an automatic landing when the aircraft arrives at approximately 50 feet radio altitude, the pitch window will change from AUT LND to FLR and the automatic flare maneuver is initiated. The aircraft descent is slowed by means of a nose-up pitch attitude elevator command from the DFGC. This command allows the aircraft to touchdown at a low sink rate.

(2) Nose Lowering

(a) At main gear wheel spin-up, the autopilot commands aircraft nosedown until nosegear touchdown, where the aircraft then enters the ground roll phase of operation. At nosegear touchdown the pitch and roll windows will go blank, and the pitch and roll command bars will bias out of view.

Table 1

Autopilot Pitch Attitude Limits	
Control Mode	**Pitch Attitude (degrees)**
Vertical Speed	+20(±2) -10(±1)
Altitude Hold	+20(±2) -10(±1)
IAS Hold	+20(±2) -10(±1)
Mach Hold	+20(±2) -10(±1)
Altitude Preselect	+20(±2) -10(±1)
Turbulence Penetration	+20(±2) -10(±1)
Glideslope Capture	+20(±2) -10(±1)
Glideslope Track	+20(±2) -10(±1)
Flare	+20(±2) -10(±1)

3. Flight Director Profile Modes

A. Takeoff

(1) The flight director takeoff mode is activated when either or both flight director switches are placed to FD, the aircraft is on the ground, and either throttle TO/GA switch is pressed. TAKE OFF is displayed in the pitch window of the flight mode annunciator.

(2) After nosegear lift-off, the pitch command bar and slow-fast pointer in the ADI/PFD provides the flight crew visual indication to maintain a climb path within safe limits to prevent stall. Takeoff is a flight director mode only.

(3) The flight director takeoff mode becomes terminated when both flight director control switches are placed off, or when another pitch command has been selected.

B. Vertical Speed Control

(1) Vertical speed control is provided by the VERT SPD push-button or a pitch wheel located on the Flight Guidance Control panel. Directly above the pitch wheel is a pitch profile readout that provides vertical speed readout reference. The pitch wheel has a detent feel which provides altitude hold mode of operation. Manually rotating the vertical speed wheel for less than 100 feet per minute readout in the increase or decrease position engages the pitch wheel into the altitude hold mode position and provides the detent feel.

(2) Placing either or both flight director switches to FD, will establish the flight director vertical speed mode. The pitch command bar in the ADI/PFD will provide the flight crew the pitch attitude reference for the flight crew to follow. The pitch window in the flight mode annunciator will display VERT SPD. The pitch profile readout displays V, + or - (depending on the polarity of the pitch response), and the numeric value of the vertical speed. When glideslope track is initiated, the output from the pitch wheel is inhibited. The vertical speed mode of operation will become disabled when another pitch mode is selected, an altitude has been captured, or at glideslope capture.

C. Altitude Hold

(1) The flight director altitude hold mode is provided by the ALT HOLD pushbutton or by rotating the pitch wheel to detent feel (zero vertical speed). The pitch profile readout indicates that zero vertical speed is established by displaying a V, blank, and the last four windows display zeros. Manually rotating the pitch wheel to the detent feel position, will automatically provide altitude control to the barometric altitude reference existing at time of altitude mode engagement. ALT HLD will be displayed in the pitch window on the flight mode annunciator.

(2) The altitude hold mode will become disabled when another pitch mode is selected, an altitude has been captured, or at glideslope capture.

D. Altitude Preselect and Advisory

(1) The flight director altitude preselect mode provides manual capture of a preset barometric altitude, which is selected by an altitude set knob located on the Flight Guidance Control panel. The altitude set knob has three positions, spring-loaded to center. The center position provides 1000 feet increment altitude adjustments that are read on a selected altitude readout window directly above the altitude set knob. The momentary pull-out position arms the system for a preselected altitude capture, and for altitude advisory. The push-in position provides 100 feet increment adjustments, and cancels the altitude preselect mode.

(2) The altitude advisory function is provided to alert the flight crew that the aircraft is approaching a preselected altitude, or the aircraft is deviating from the preselected altitude. The altitude advisory lights are located in the upper left hand corner of the altimeters.

(3) Arm Phase

(a) The arm phase of the altitude preselect mode allows the aircraft to be directed to a preselected altitude. Altitude preselect mode is armed when the altitude set knob is momentarily pulled out. At time of altitude preselect arm, ALT will be displayed in the arm window of the flight mode annunciators.

(b) Altitude preselect arm phase will become disabled if the altitude set knob is pushed-in, or when the glideslope beam is intercepted.

(4) Capture Phase

(a) The automatic capture phase of the altitude preselect mode is variable and is a function of existing vertical speed. As the aircraft arrives at approximately 750 feet from the selected altitude a steady altitude advisory light will come on in the altimeters. At the capture threshold, the pitch mode (i.e. vertical speed) provided to capture the preselected altitude, will be terminated and ALT CAP will be displayed on the flight mode annunciators pitch window. If the aircraft deviates from the altitude capture threshold, the altitude advisory lights will come on and flash, and a one second aural warning tone will sound.

WJE 412, 414 POST MD80-34-208

NOTE: The altitude advisory light and one second aural tone will come on 750 feet prior to selected altitude.

WJE ALL

(b) Altitude preselect capture phase will become disabled if the altitude set knob is pushed-in, another pitch mode has been selected, or when the glideslope beam is intercepted.

(5) Track Phase

(a) As the aircraft is leveled off at the preselected altitude, the flight mode annunciators pitch window will display ALT HLD. The aircraft will remain in the preselected altitude hold mode as long as ALT HOLD mode is engaged. If the aircraft deviates from the selected altitude ±250 feet, the altitude advisory lights will come on and flash, and a 2-second aural warning tone will sound, to alert the flight crew that the aircraft has deviated from the selected altitude. The flashing advisory lights can only be turned off by selecting a new altitude greater than 750 feet or reestablishing the existing altitude.

E. Indicated Airspeed Control

(1) The indicated airspeed (IAS) control mode is established when either or both flight director switches are in the FD position, and the IAS pushbutton located on the Flight Guidance Control panel is pressed. The flight director pitch command bars provide the proper pitch command to maintain existing indicated airspeed by controlling pitch attitude. The flight mode annunciator(s) pitch window will display IAS.

(2) The pitch profile readout will display an S, + or -, and the indicated airspeed at time of mode engagement. The airspeed reference can be adjusted as required by use of the pitch wheel to select a different value indicated airspeed. The pitch profile readout will display the new value, as the pitch wheel is adjusted.

(3) If the autothrottle is operating in either the SPD SEL or MACH SEL mode, and the flight director IAS mode is established, the ATS mode annunciators will display CLMP and flash for approximately 3 seconds. CLMP will remain dis-played in the ATS mode annunciators as long as the flight director is operating in the indicated airspeed control mode of operation. If the SPD SEL or MACH SEL autothrottle modes are reestablished: the flight director indicated airspeed hold mode will automatically be overridden, and the pitch window will flash for approximately 3 seconds, displaying either VERT SPD or ALT HLD depending on the rate of climb of the aircraft. This mode will remain displayed until another pitch mode is selected.

(4) The indicated airspeed control mode of operation will also become disabled when the glideslope beam is intercepted.

F. Mach Control

(1) The Mach Control mode is established when either or both flight director switches are in the FD position, and the MACH pushbutton on the Flight Guidance Control panel is pressed. The Mach Control mode provides flight director pitch commands to maintain the Mach number existing at time of mode selection. The flight mode annunciator(s) pitch window will display MACH.

(2) The pitch profile readout will display an M, + or -, and the mach airspeed at time of mode engagement. The mach airspeed reference can be adjusted as required by use of the pitch wheel to select a different value mach airspeed. The pitch profile readout will display the new value, as the pitch wheel is adjusted.

(3) If the autothrottle is operating in either the SPD SEL or MACH SEL mode, and the flight director MACH mode is established, the ATS mode annunciators will display CLMP and flash for approximately 3 seconds. CLMP will remain dis-played in the ATS mode annunciators as long as the flight director is operating in the Mach Control mode of operation. If the SPD SEL or MACH SEL autothrottle modes are restab-lished: the flight director Mach Control mode will automatically be overridden, and the pitch window will flash for approximately 3 seconds, displaying either VERT SPD or ALT HLD depending on the speed of the aircraft. This mode will remain displayed until another pitch mode is selected.

(4) The Mach Control mode of operation will also become disabled when the glideslope beam is intercepted.

G. Turbulence Penetration

(1) Turbulence penetration provides dampened pitch response during turbulent atmospheric conditions. The mode is established when either flight director is engaged, and the TURB pushbutton on the Flight Guidance Control panel is pressed.

(2) When the TURB pushbutton is pressed, any control mode previously selected is automatically disengaged, including arm modes. The DFGC automatically reduces the gains and increases the damping ratio in the pitch and roll control logic. The pitch command bar will respond to existing pitch attitude, and the roll bar will remain approximately centered. The pitch window in the flight mode annunciators display TURB and the roll window displays WNG LVL. If the autothrottle is engaged, the autothrottle will automatically disengage when the TURB pushbutton is pressed.

(3) The pitch profile readout will display P, + or -, and the existing pitch attitude at time of mode engagement. The pitch attitude reference can be adjusted as required by use of the pitch wheel to select a different value pitch attitude.

(4) The turbulence penetration mode becomes disengaged when any other control mode is selected, or both flight director switches are placed OFF.

H. Glideslope Capture and Tracking

(1) Arm Phase

(a) The arm phase of the glideslope operation allows the aircraft to be directed to the glideslope beam at an intercept angle. The arm phase of the glideslope is established when the VHF NAV receivers are tuned to an ILS frequency, and ILS mode has been established.

(b) Glideslope arm phase will be disabled if both flight director switches are placed off, or the VHF NAV receivers are detuned from the ILS frequency.

(2) Capture Phase

(a) The capture phase of the flight director glideslope operation is initiated when the aircraft is directed to the glideslope beam threshold. Monitors within the DFGC continuously compute beam deviation and closure rate to initiate the glideslope capture phase. The flight director command bar displays pitch commands to enable a smooth capture above or below the beam. the flight guidance mode annunciators pitch window will change from the existing pitch mode to G/S CAP. After glideslope capture, pitch gain programming as a function of radio altitude, is used to compensate for beam convergence.

(b) Glideslope capture phase will become disabled if both flight director switches are placed off, or the VHF NAV receivers are detuned from the ILS frequency.

(3) Track Phase

(a) The flight director glideslope tracking phase begins when the aircraft arrives at beam center. Pitch command guidance for the flight crew to follow is computed as a function of glideslope deviation and rate estimates and summed with pitch acceleration and pitch rate. The pitch windows will change from G/S CAP to G/S TRK.

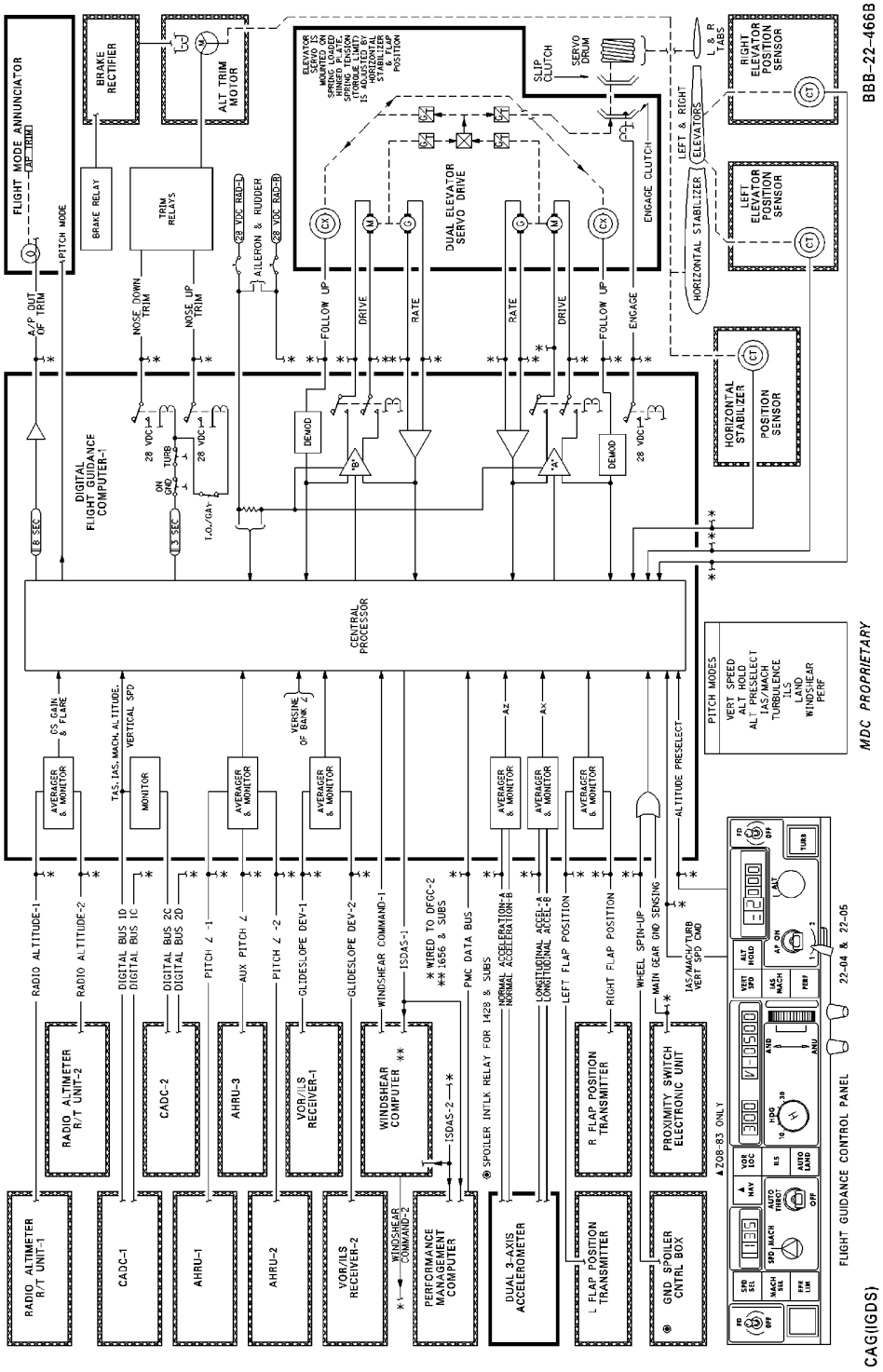
I. Go-Around

(1) Flight director go-around mode provides the flight crew pitch steering commands to climb-out at a safe margin above stall airspeed, consistent with engine thrust settings. Go-around mode disables any previously selected approach function.

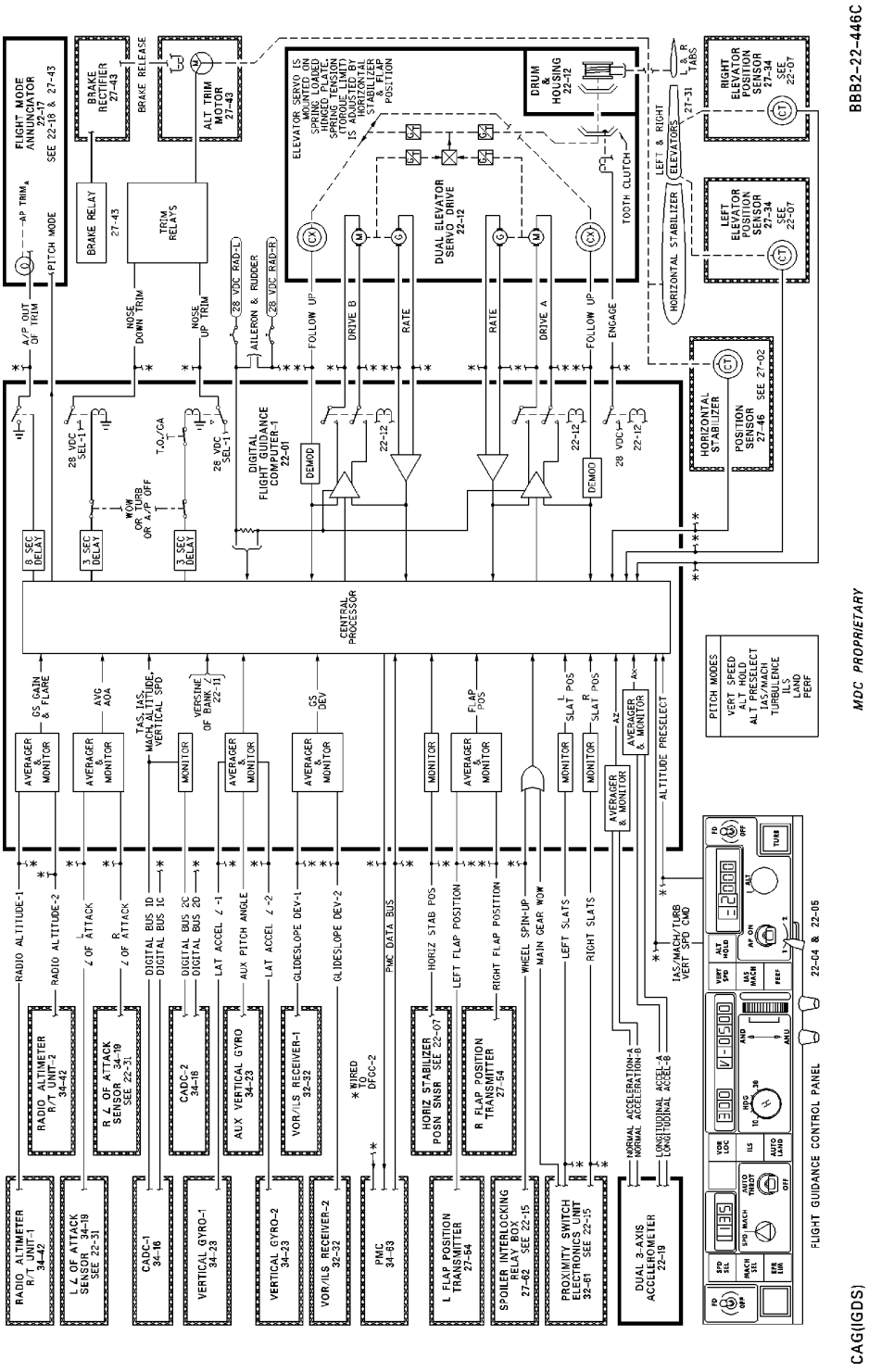
(2) Go-around mode of operation is initiated when the aircraft is in the flight mode and flaps are extended. Pressing the TO/GA switch on the throttle lever establishes the go-around mode of operation. The pitch and roll mode annunciators display GO RND.

(3) The DFGC processes speed control information combined with pitch control information to maintain an optimum airspeed. This information represents a constant value times the aircraft stall speed, plus an increment to allow for engine loss without approaching a stall condition. The pitch command and slow-fast pointer on the ADI's/PFD's, provide computed angle-of-attack reference to the flight crew to climb-out at a maximum rate.

(4) Flight director control in the go-around mode is terminated when both flight director switches are placed off, or when a pitch command, other than altitude preselect, is activated.



Autopilot Pitch Axis
Figure 1/22-12-00-990-898



Autopilot Pitch Axis
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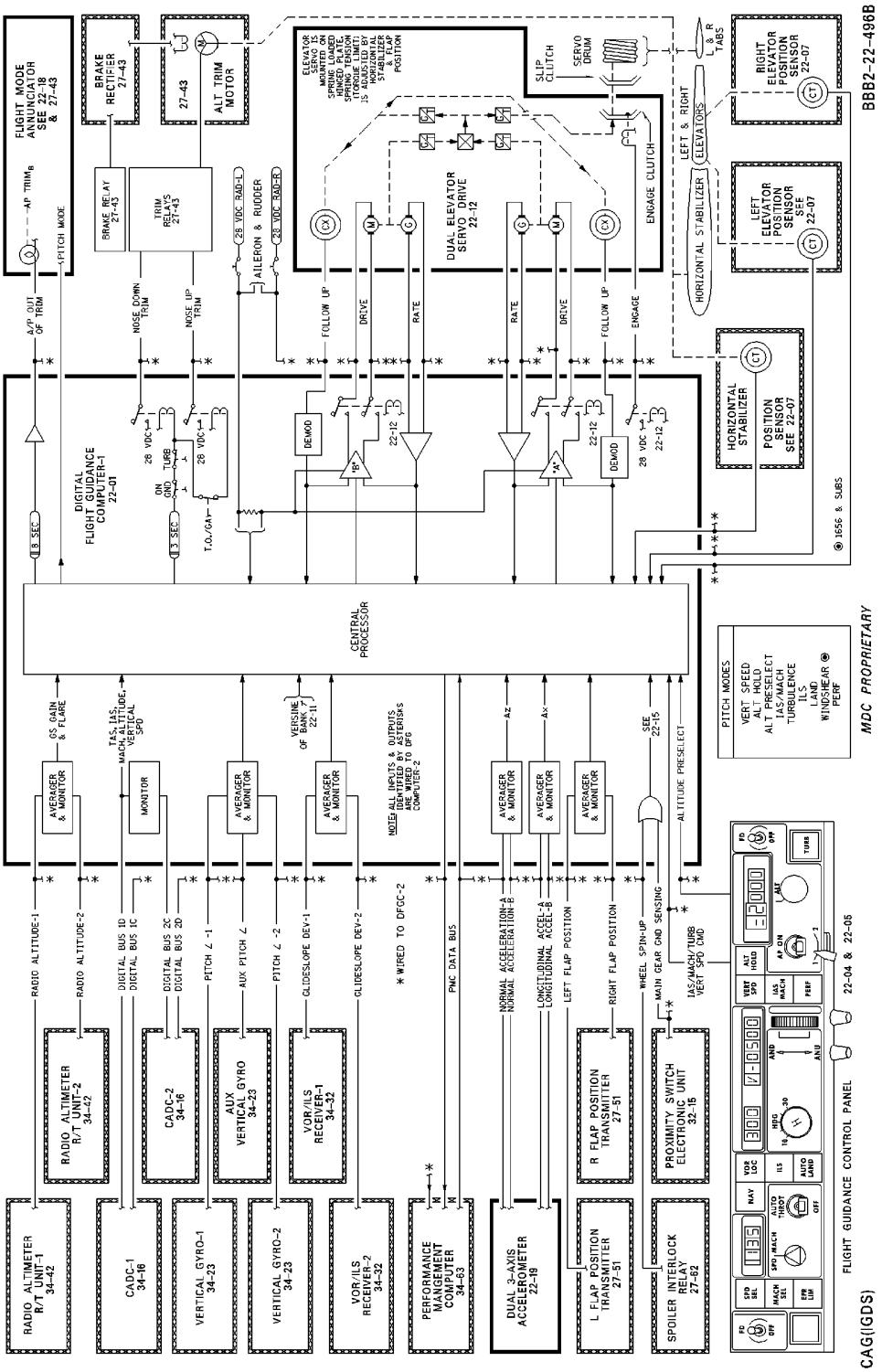
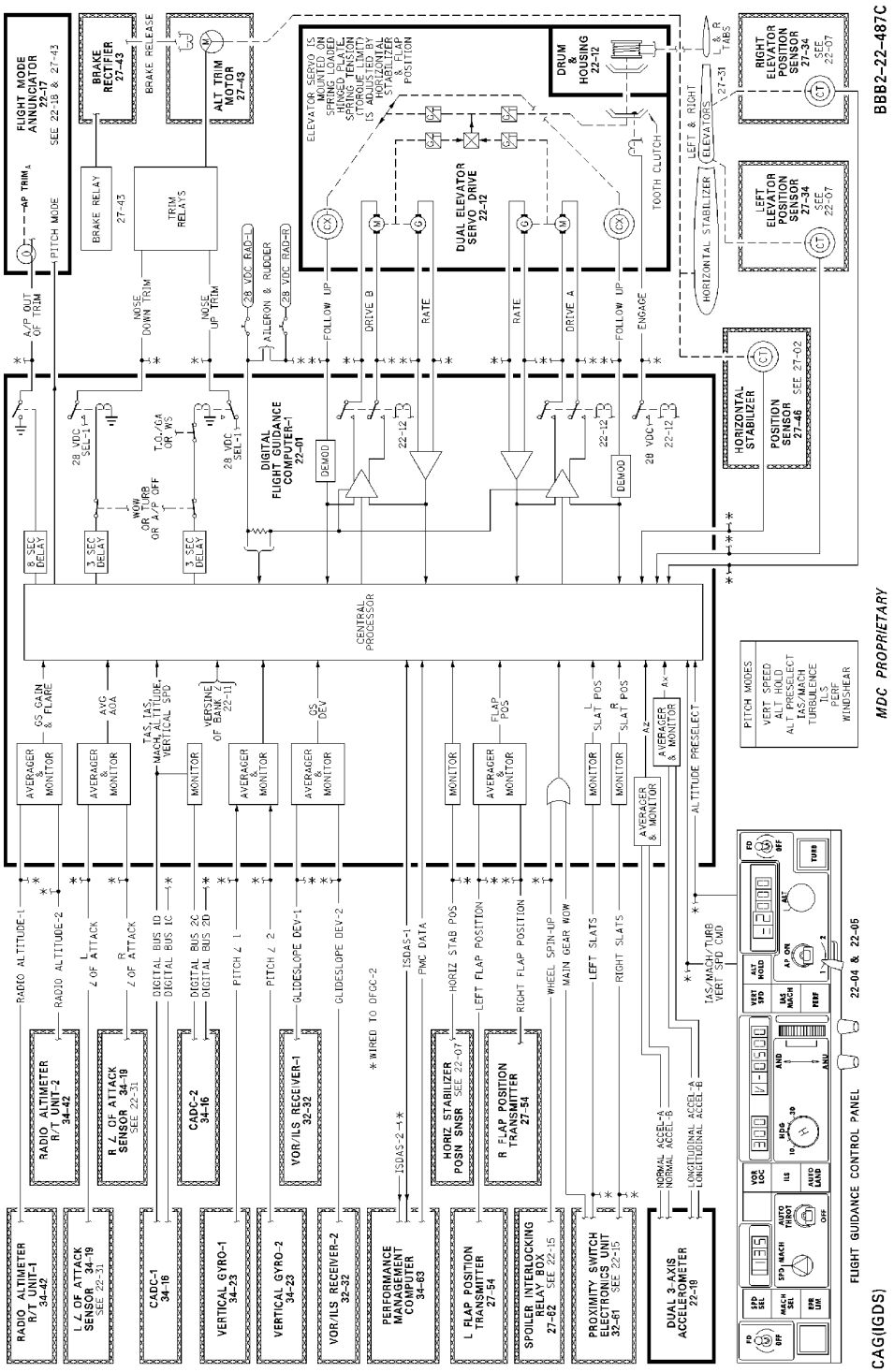
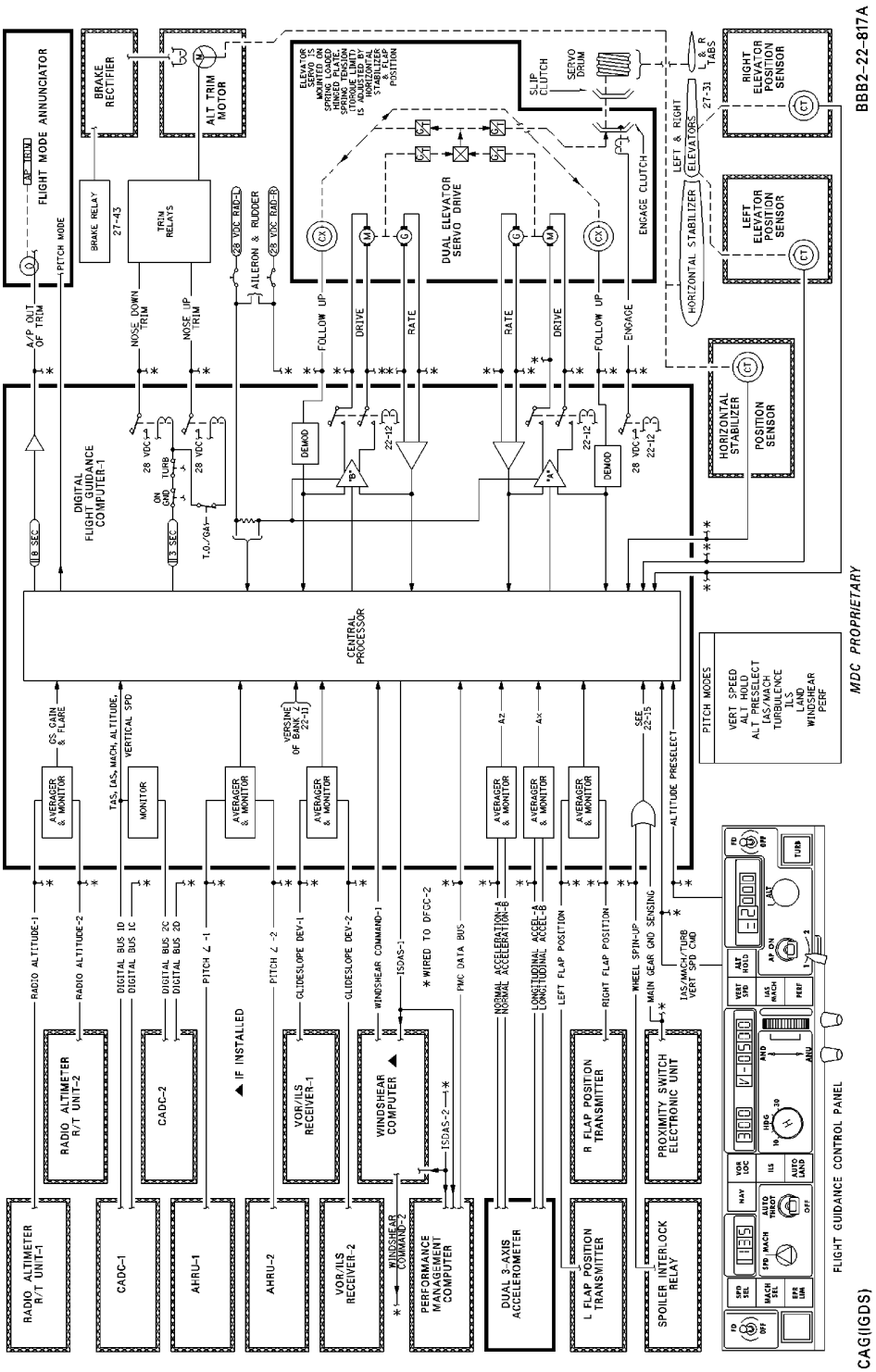


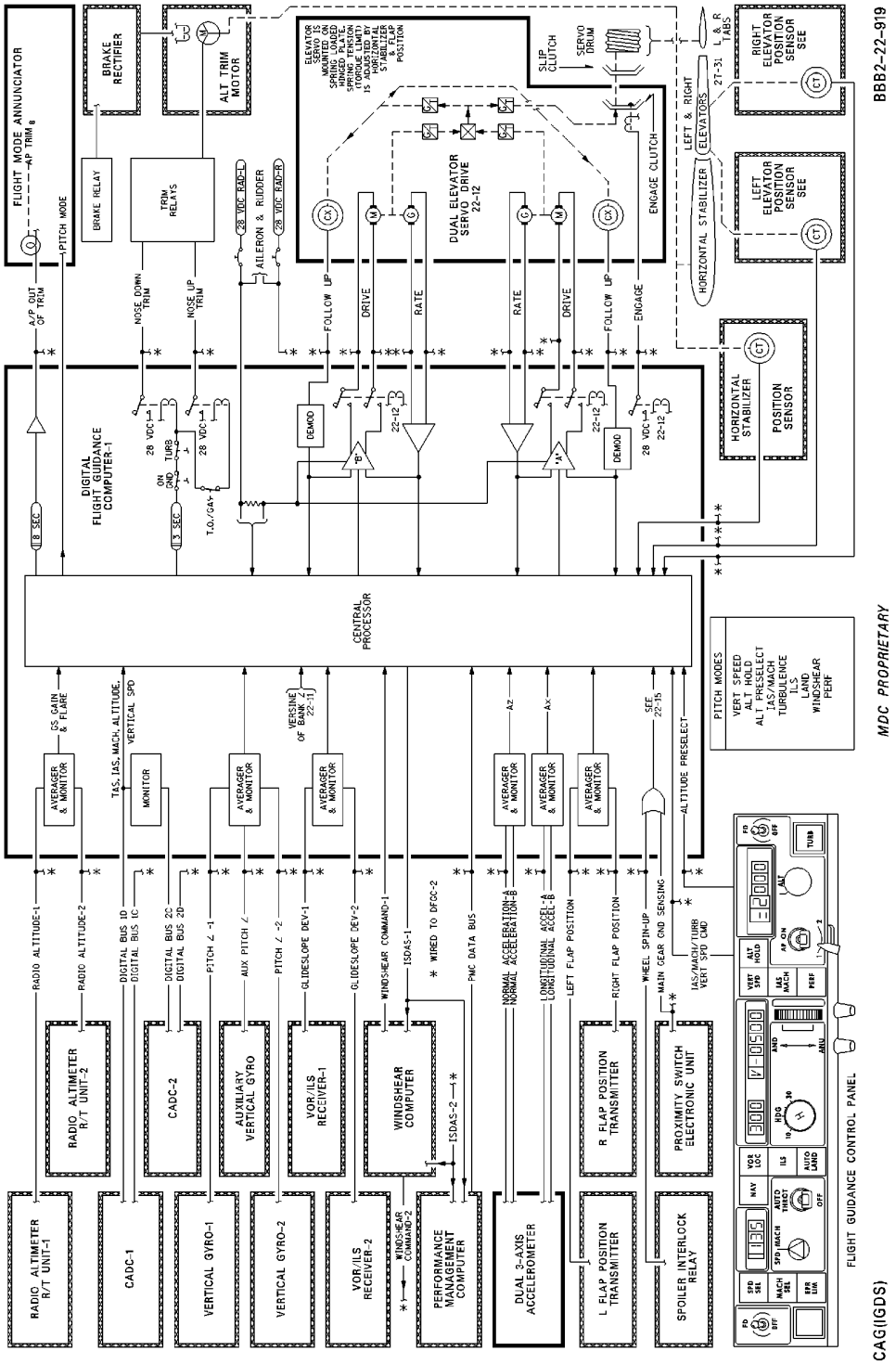
Autopilot Pitch Axis
Figure 3/22-12-00-990-901



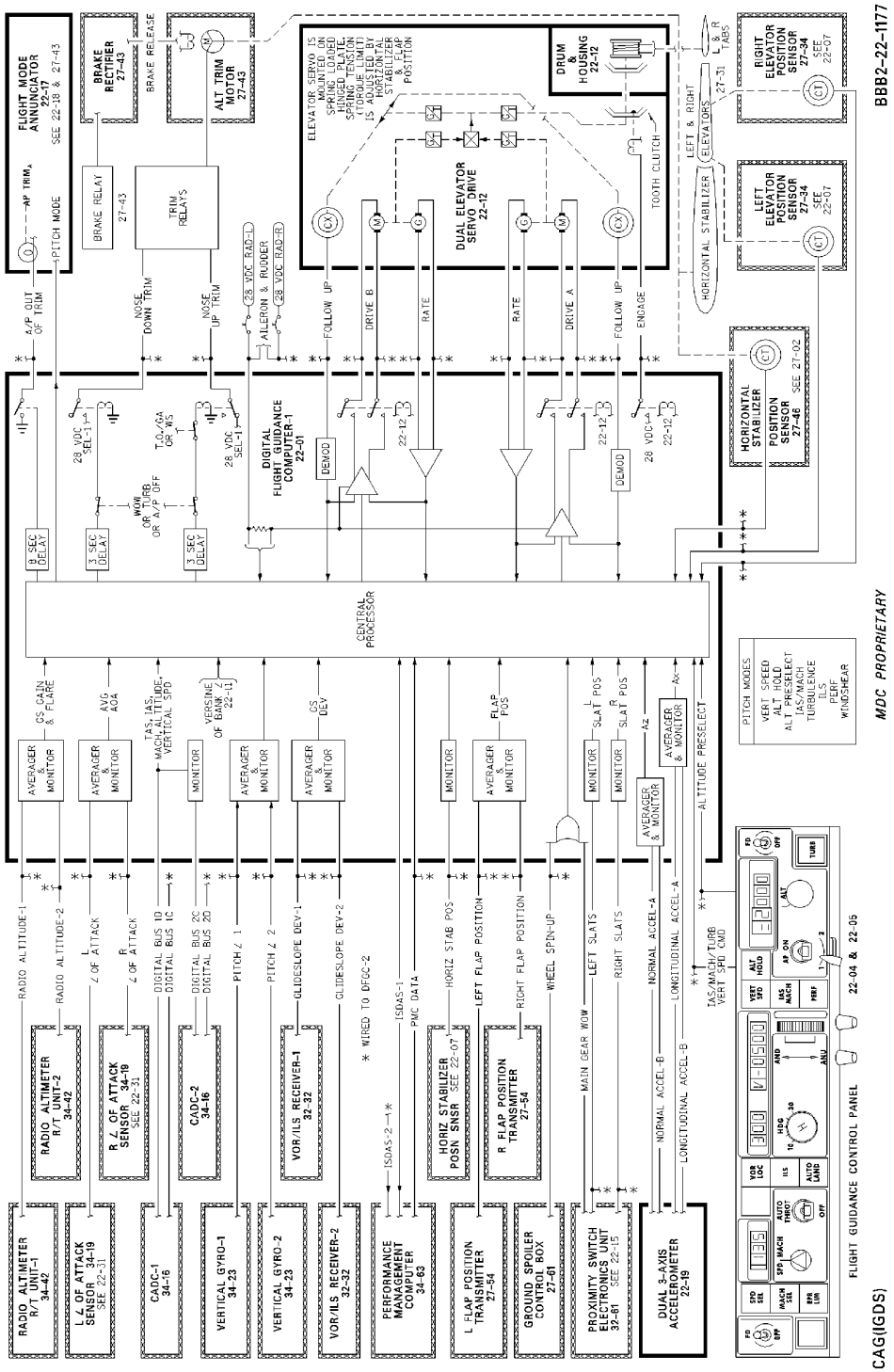
Autopilot Pitch Axis
Figure 4/22-12-00-990-902



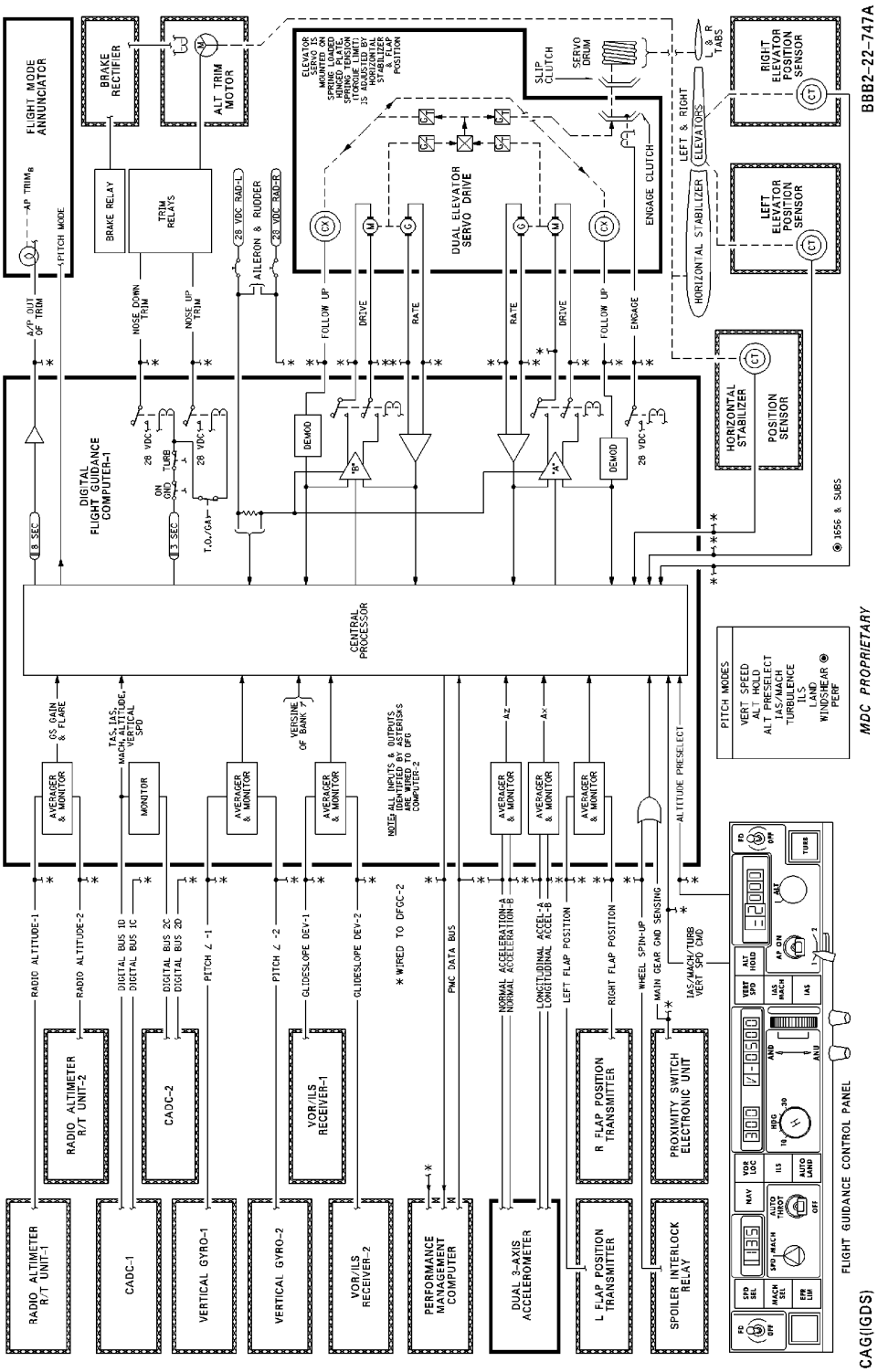
Autopilot Pitch Axis
Figure 5/22-12-00-990-903



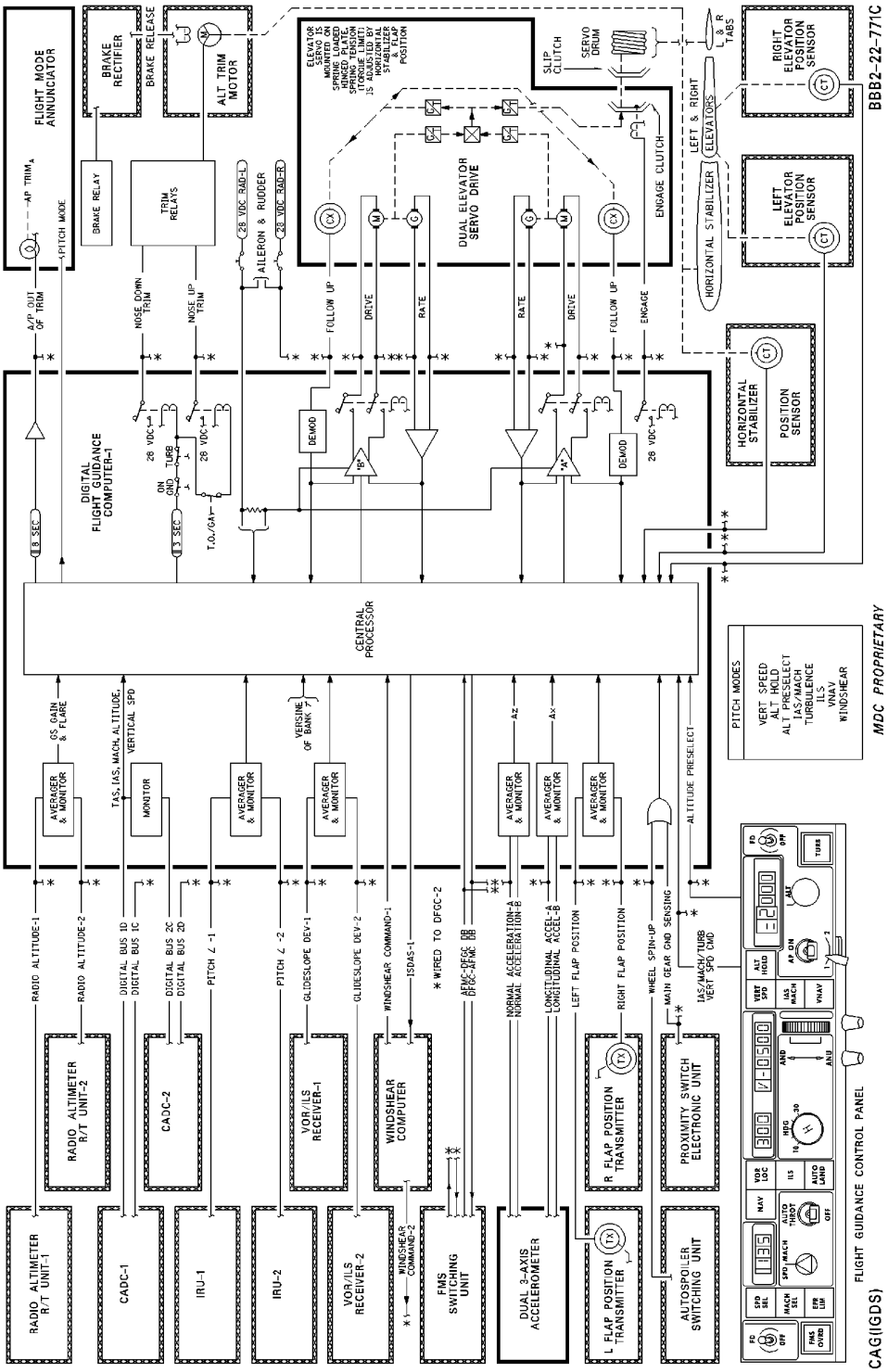
Autopilot Pitch Axis
Figure 6/22-12-00-990-904



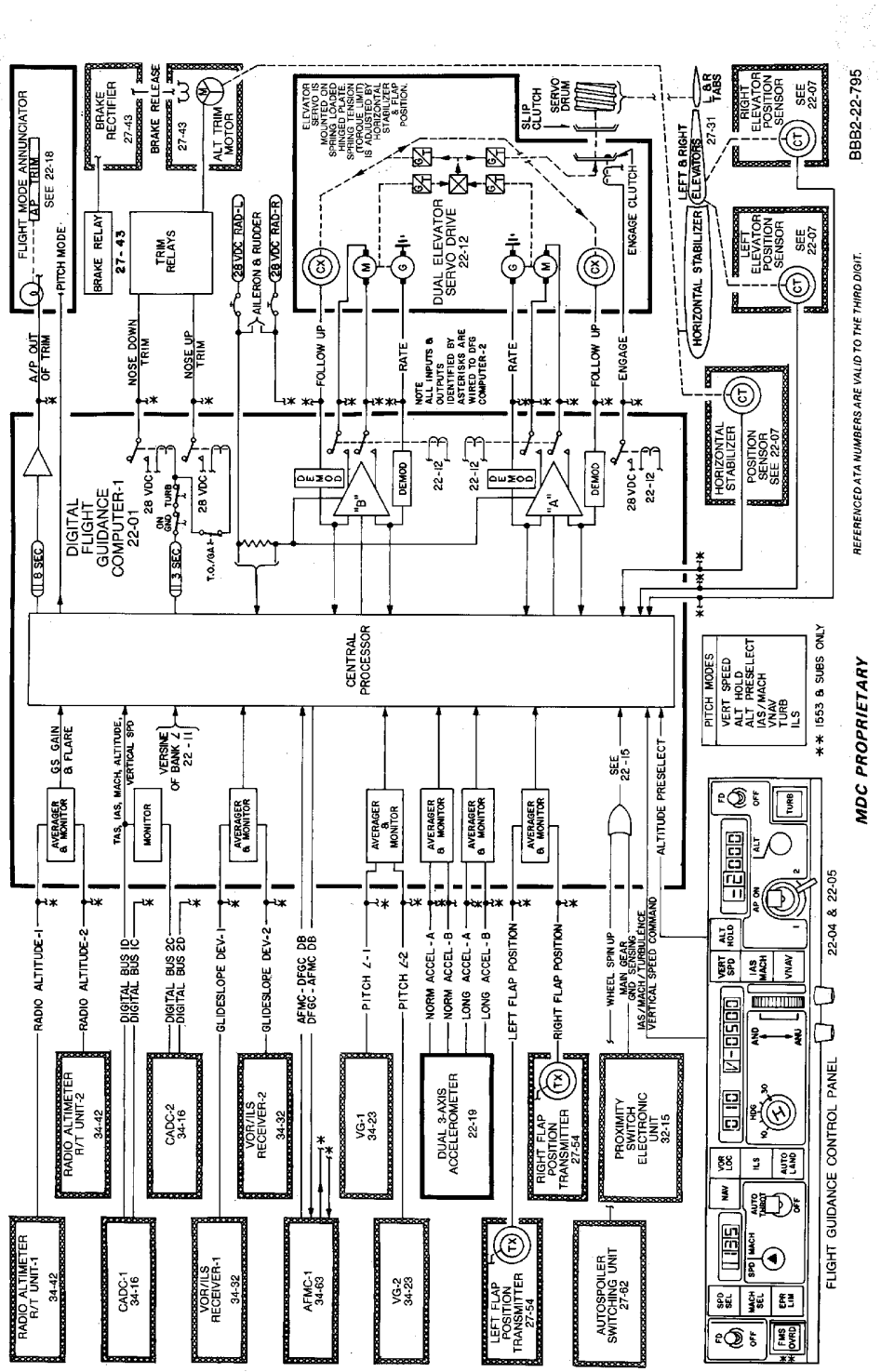
Autopilot Pitch Axis
Figure 7/22-12-00-990-906



Autopilot Pitch Axis
Figure 8/22-12-00-990-907



Autopilot Pitch Axis
Figure 9/22-12-00-990-909



Autopilot Pitch Axis
Figure 10/22-12-00-990-911

PROFILE (PITCH) CONTROL - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

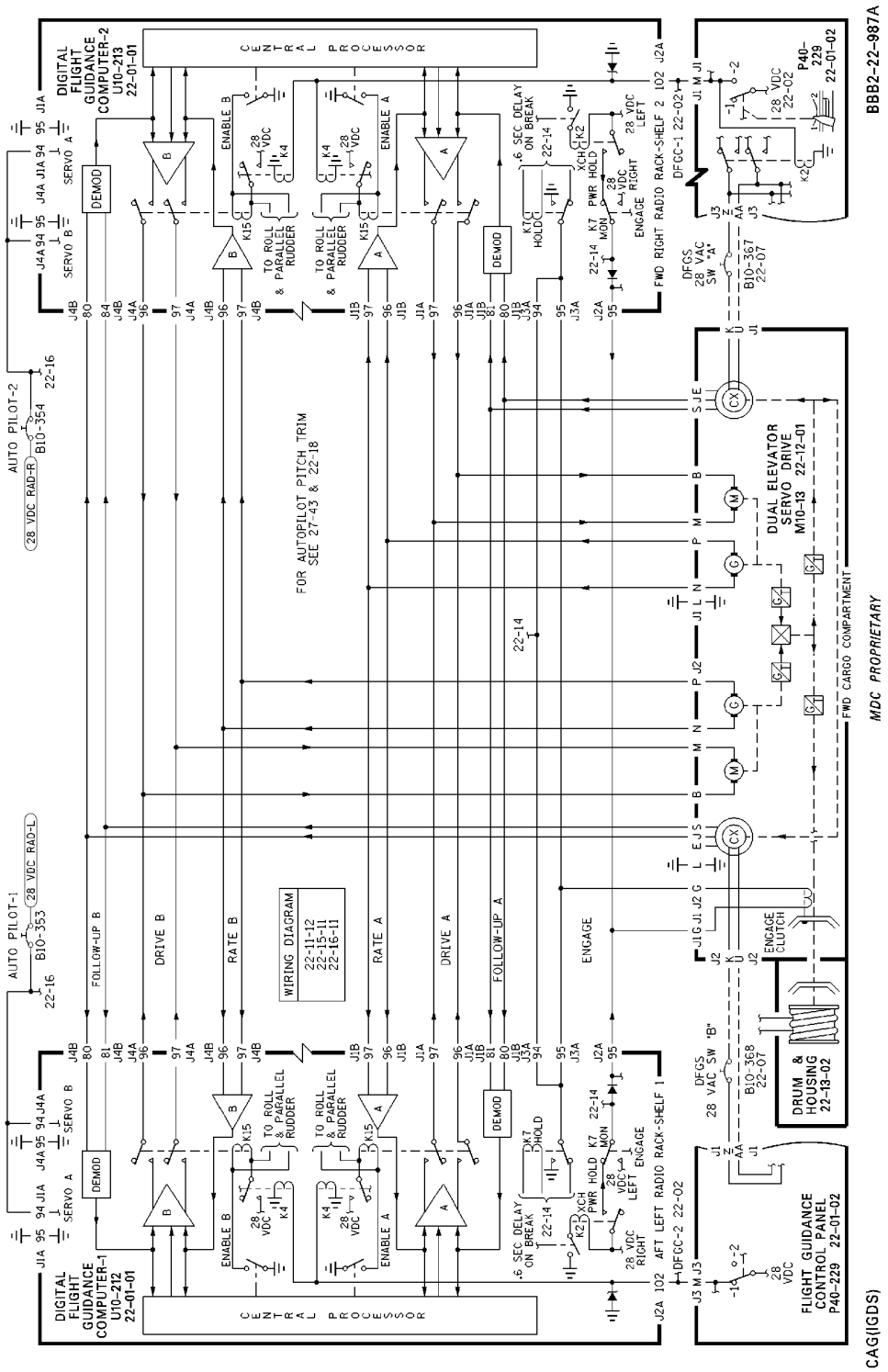
A. Prior to performing pitch control trouble shooting procedures, the Status Test Panel (STP) located below the captain's brief-case compartment should be utilized to log all faults that may exist within the parameters of the Digital Flight Guidance System (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing pitch control trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to log all faults that may exist within the parameters of the Digital Flight Guidance System (DFGS STATUS/TEST, SUBJECT 22-01-05DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

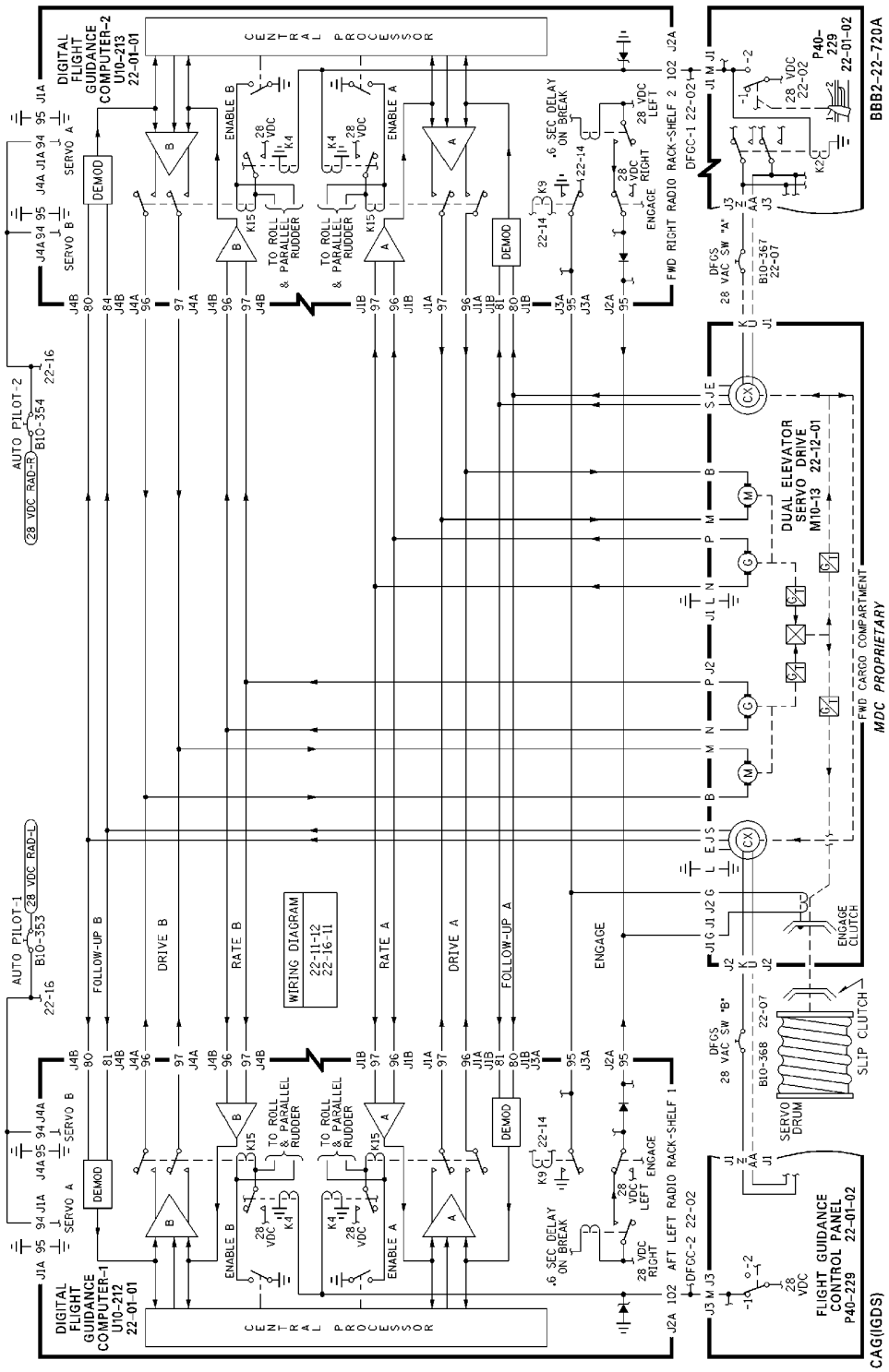
WJE ALL

C. Trouble shooting procedures consist primarily of faulty component replacement. A thorough knowledge of the interrelation-ship of components that have a direct bearing on pitch control is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to pitch control and associated system interface.

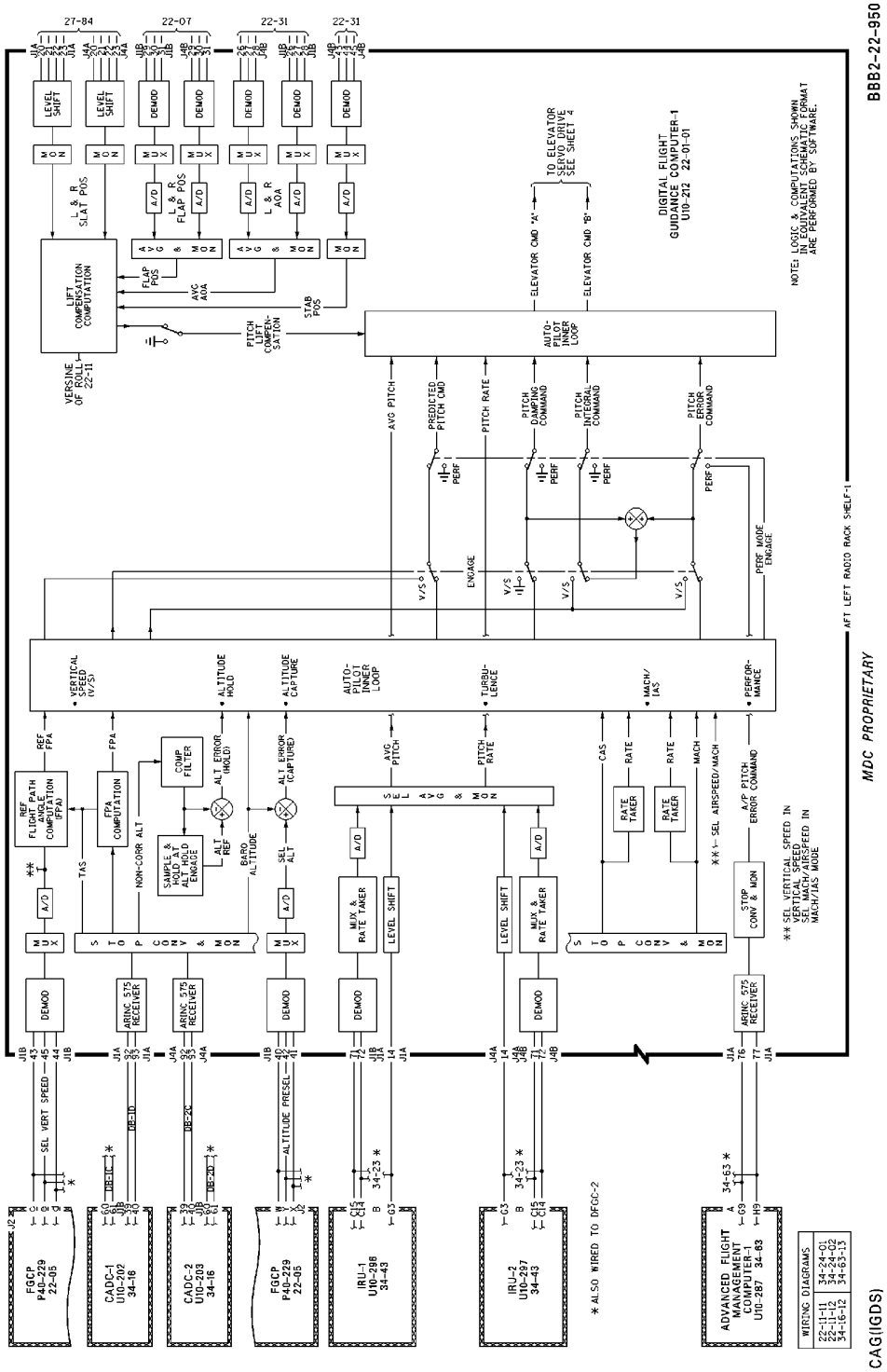


Dual Elevator Servo Drive
Figure 101/22-12-00-990-858

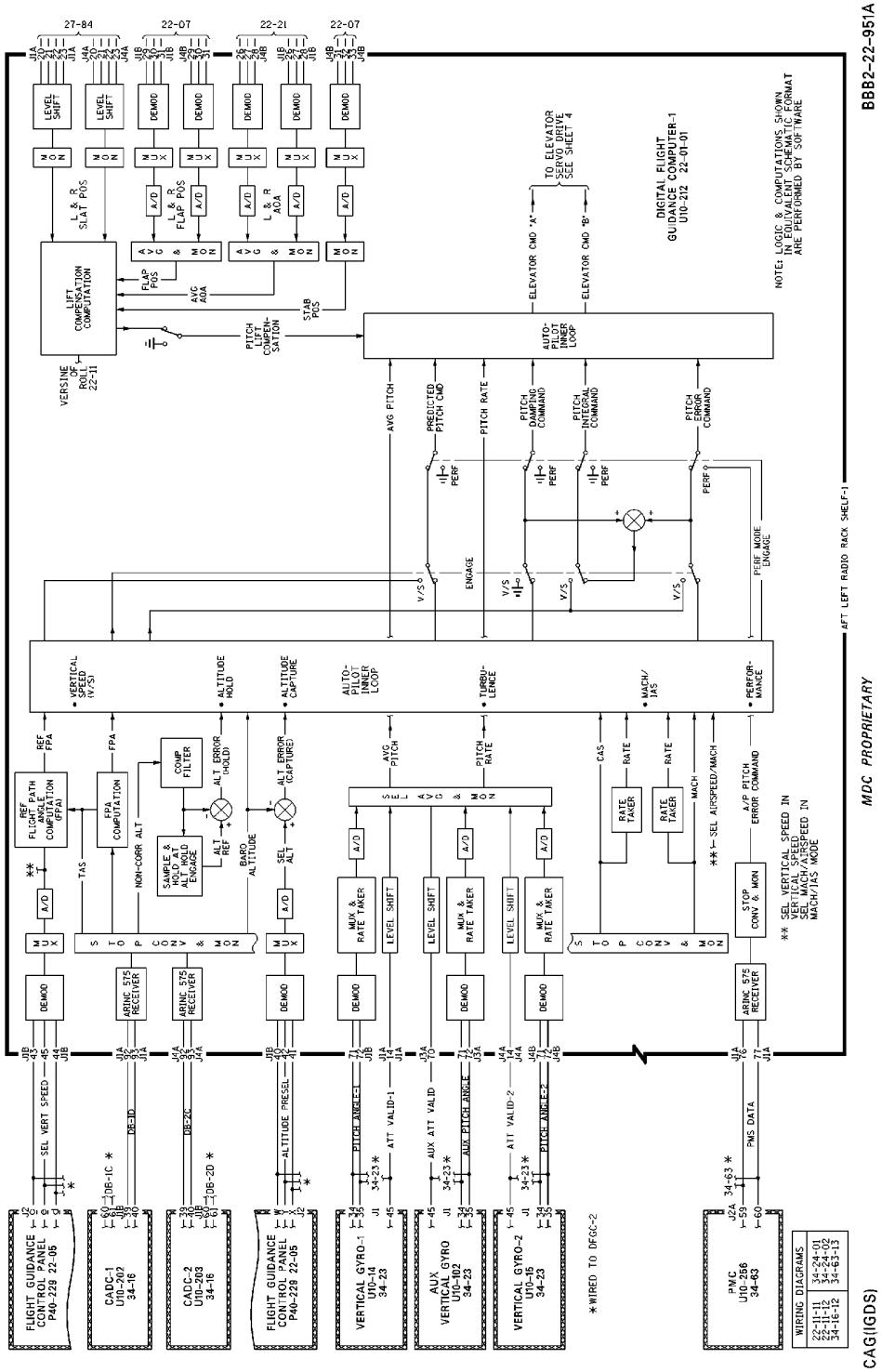
EFFECTIVITY
WJE 401-412, 414-419, 421, 423, 425, 426, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 892, 893



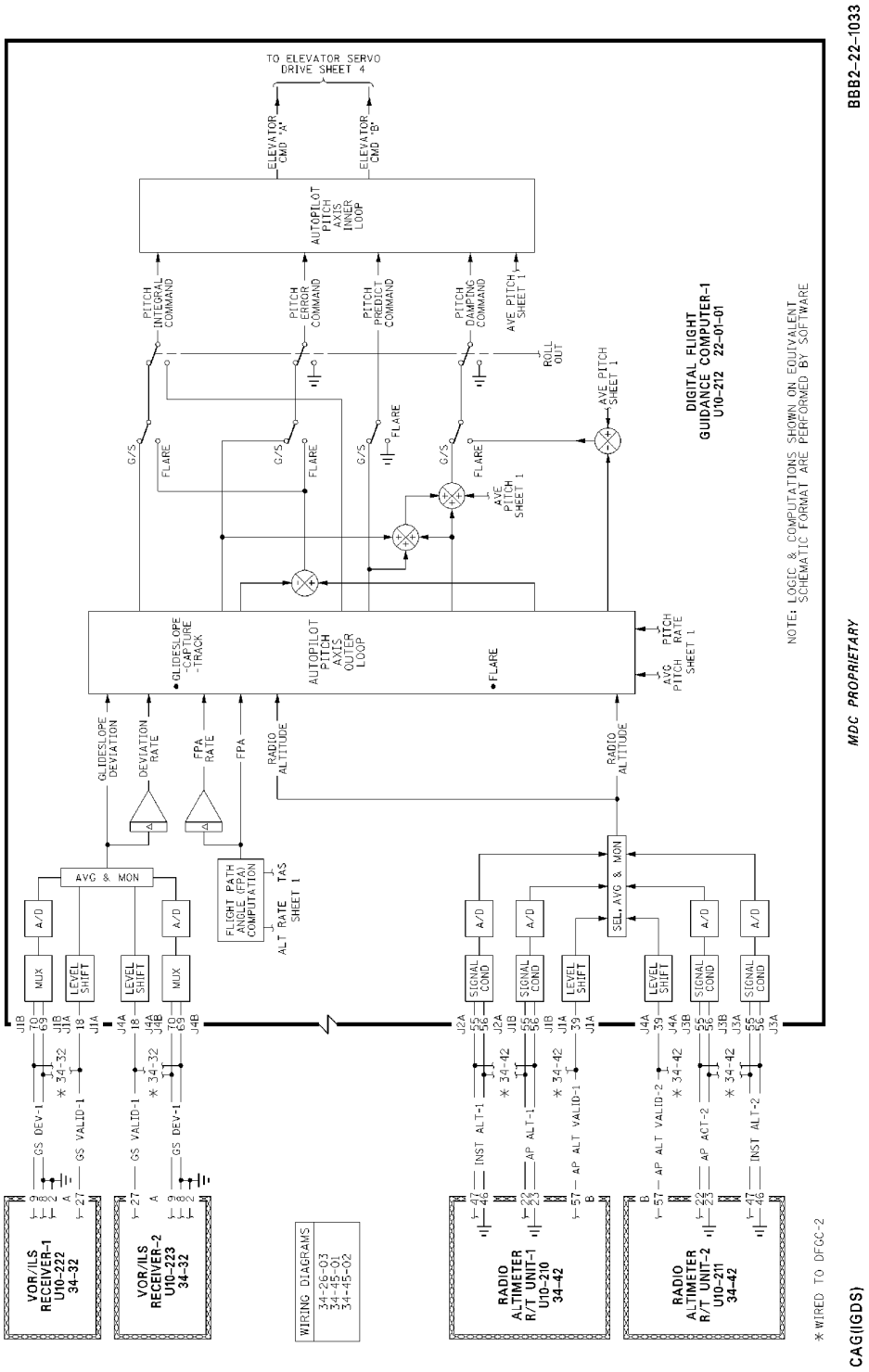
Dual Elevator Servo Drive
Figure 102/22-12-00-990-859



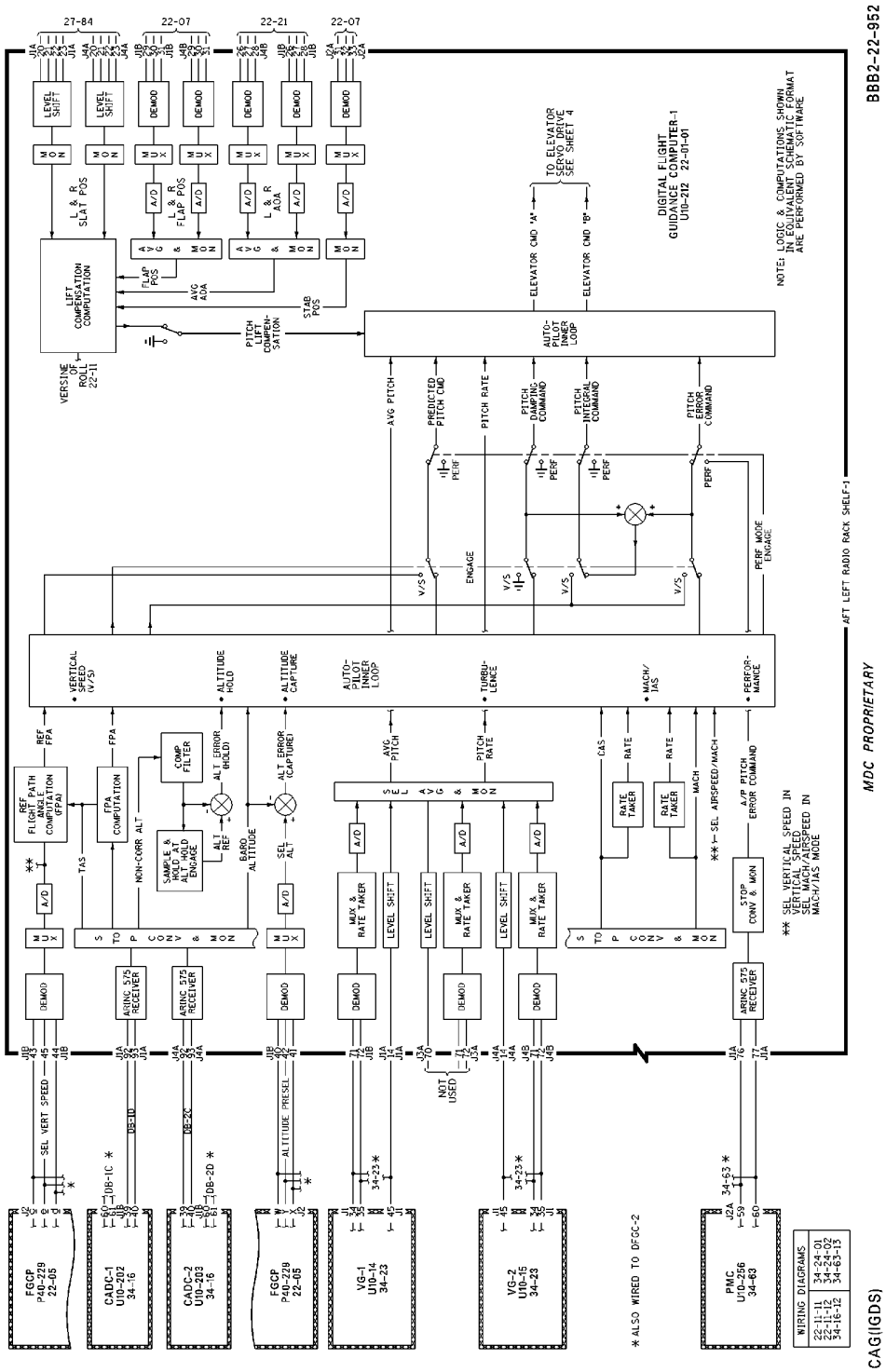
Autopilot Pitch Axis - Cruise
Figure 103/22-12-00-990-860



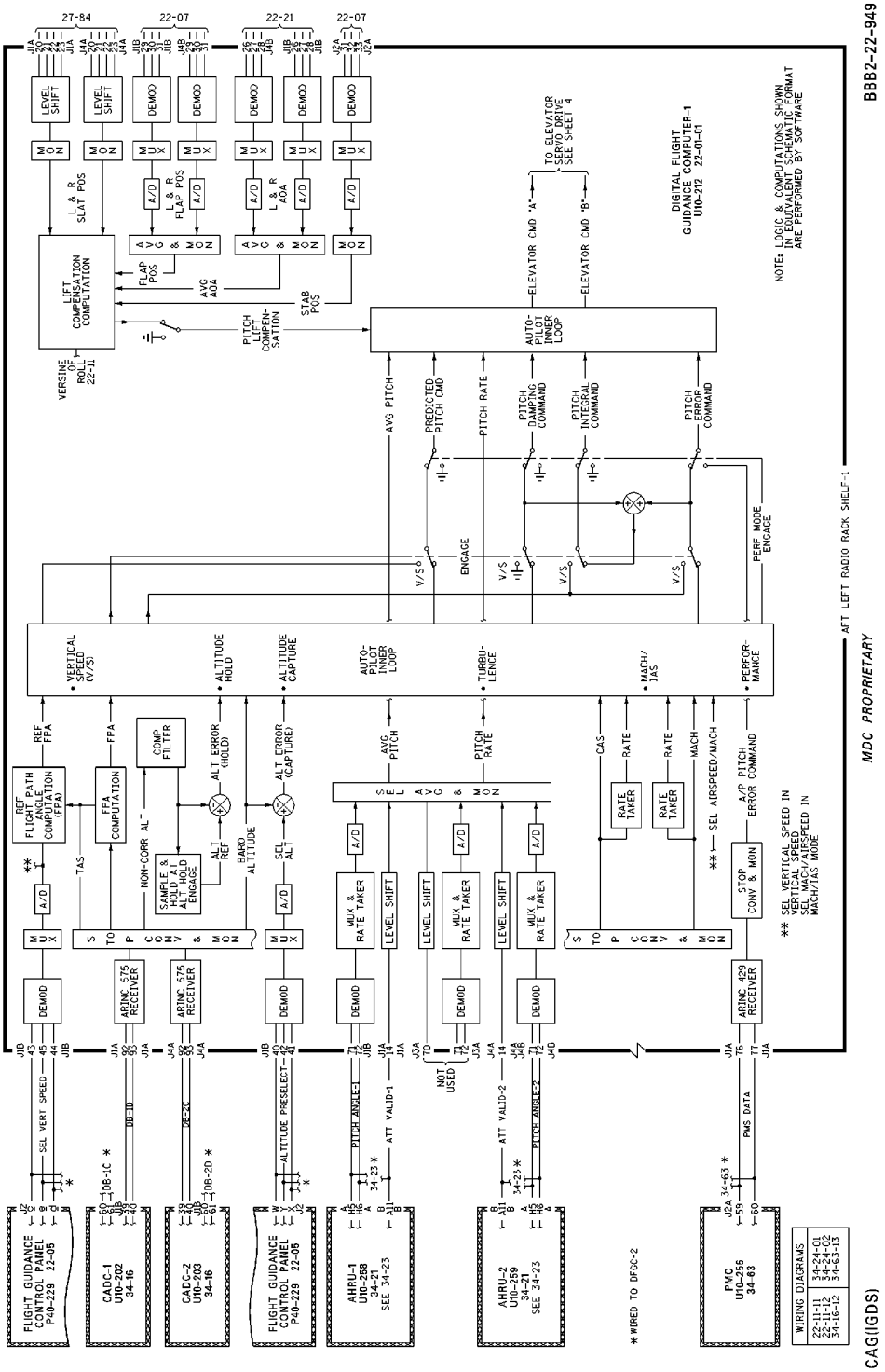
Autopilot Pitch Axis - Cruise
Figure 104/22-12-00-990-861



Autopilot Pitch Axis - Approach
Figure 105/22-12-00-990-862



Autopilot Pitch Axis - Cruise
Figure 106/22-12-00-990-864



Autopilot Pitch Axis
Figure 107/22-12-00-990-868

DUPLEX ELEVATOR SERVO DRIVE - MAINTENANCE PRACTICES

1. General

A. The Duplex Elevator Servo Drive is located in the forward right ceiling in the forward cargo compartment and is accessible through the forward compartment loading door.

B. After removal/installation of the servo drive, systems and components associated with servo drive operation should be in proper operating condition for servo drive testing.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Servo drive testing is by use of the Status Test Panel. (DFGS STATUS/TEST, SUBJECT 22-01-05)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

D. Servo drive testing is by use of the MCDU. (DFGS STATUS/TEST, SUBJECT 22-01-05)

WJE ALL

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Lockwire, Inconel, NASM20995N20, DPM 684	Not Specified
Lockwire, Corrosion Resistant Steel, NASM20995N20, DPM 5865	Not Specified
Torque Wrench, TQ-4 (capable of 0 to 75 inch pounds)	Snap On
Rig Pin (6-5)	

3. Removal/Installation Duplex Elevator Servo Drive

A. Remove Servo Drive

WARNING: TAG AND SAFETY THE FOLLOWING CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Remove ceiling panel cover enough to expose elevator servo drive.

(3) Disconnect servo drive electrical connectors.

CAUTION: PROVIDE SUPPORT FOR SERVO DRIVE MOTORS AND SERVO DRIVE MECHANISM WHILE REMOVING SCREWS. SPLINES AND GEARS MAY DISENGAGE PERMITTING SERVO DRIVES TO FALL CAUSING DAMAGE TO EQUIPMENT AND AIRPLANE.

(4) Remove lockwire and screws attaching servo drive motors and servo drive mechanism to servo drive bracket.

(5) While supporting servo drive mechanism carefully slide servo drive motor straight out of servo drive mechanism.

(6) Install attaching screws to hold servo drive mechanism in place.

(7) If servo drive motors are being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install Servo Drive

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) While supporting servo drive mechanism, remove attaching screws.

(3) Carefully slide servo motor assembly onto servo drive mechanism.

(4) Install servo drive motors and servo drive mechanism onto servo drive bracket. Install attaching screws and safety with lockwire.

(5) Connect electrical connectors.

(6) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(7) Perform Adjustment/Test Duplex Elevator Servo Drive. (Paragraph 6.)

(8) Install ceiling panel cover.

4. Removal/Installation Duplex Elevator Servo Drive Mechanism

A. Remove Servo Drive Mechanism

(1) Remove servo drive motors. (Paragraph 3.A.)

(2) Carefully remove servo drive mechanism from servo drive bracket.

(3) If servo drive mechanism is being replaced, carefully package deflective unit into carton that originally contained new unit.

B. Install Servo Drive Mechanism

(1) Install servo drive motors and servo drive mechanism onto servo drive bracket. (Paragraph 3.B.)

5. Removal/Installation Duplex Elevator Servo Bracket

A. Remove Servo Bracket

WARNING: TAG AND SAFETY THE FOLLOWING CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

(Continued)

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

NOTE: Removal of the servo drive motors and servo drive mechanism prior to removal of servo drive bracket provides a lighter weight factor. (Paragraph 3.A. and Paragraph 4.A.)

(2) Disconnect servo drive electrical connectors.

(3) Secure bridle cables to drum to prevent unraveling.

(4) Disconnect right elevator up and right elevator down bridle cable turnbuckles.

(5) Remove servo drive bracket.

NOTE: If servo drive bracket is being replaced, remove bridle cables and drum bumper from drum, teflon cable guide, and cable guard roller for use on replacement unit.

B. Install Servo Bracket

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(Continued)

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893			
E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Install following parts on new servo drive bracket.

(a) Install bridle cables on drum and safety the attaching screws with lockwire.

(b) Install teflon cable guide and safety the attaching screws with lockwire.

(c) Install drum bumper and safety the attaching screws with lockwire.

(d) Install cable guard roller and safety with lockwire.

(3) Install servo bracket.

(4) Route the long bridle cable through elevator servo force augmenter and connect to right elevator up turnbuckle.

(5) Connect short bridle cable to right elevator down turnbuckle.

(6) Place control column in neutral position and install rig pin 6-5 into rig pin hole R-1 in lower end of left control column.

NOTE: Access to lower end of control column for rig pin installation is through the Electrical/Electronics (E/E) compartment.

(7) Adjust turnbuckles to position the edge of the lower inboard mounting surface of the servo drive housing 1 13/16(±1/8) inches from station 237.

(8) Remove rig pin.

(9) Manually hold elevator against elevator trailing edge up stops, pull right elevator control column aft until right elevator control tab trailing edge down stops are contacted.

(10) Differentially adjust turnbuckles to obtain a gap of 3/32(±1/32) inch between drum bumper and stop. (PAGEBLOCK 27-30-00/501)

NOTE: Tension in bridle cables is determined by servo override springs attached to servo drive bracket arm and elevator servo force augmenter. Adjustment of elevator servo force augmenter is not required. The augmenter is provided to increase elevator servo authority and to eliminate cable slack conditions during servo actuation.

(11) Install turnbuckle clips.

(12) Install servo drive if removed. (Paragraph 3.B.)

(13) Connect electrical connectors.

(14) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(Continued)

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(15) Perform Adjustment/Test Duplex Elevator Servo Drive. (Paragraph 6.)

6. Adjustment/Test Duplex Elevator Servo Drive

A. Adjustment/Test Servo Drive

NOTE: Verify servo drive is installed and servo bracket properly rigged for the following test.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

(1) On STP press and release POWER pushbutton. CMPVLD light comes on and the number 1 should appear. "FLIGHT FAULT REVIEW?" should be displayed.

(2) On FGCP, place DFGS switch to position 1 or position 2 as desired for test.

NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton on STP and number 2 should appear.

(3) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed. Press and release VERIFY pushbutton and "SEL DFGC TEST SIDE - VERIFY" should be displayed.

NOTE: To obtain correct torque values STP must be in "MAINTENANCE TEST" with autopilot disengaged. DO NOT attempt to run STP test.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(4) On MCDU, select TEST PANEL page. Selected DFGC and DFGC VALID STATUS will be displayed on lines 4L and 5L. "FLIGHT FAULT REVIEW?" should be displayed.

(5) On FGCP, place DFGS switch to position 1 or position 2 as desired for test. Make certain that selected DFGC on MCDU line 4L corresponds to DFGS switch.

(6) Press and release FWD key until "RUN MAINTENANCE TEST?" is displayed. Press and release VERIFY pushbutton and "SEL DFGC TEST SIDE - VERIFY" should be displayed.

NOTE: To obtain correct torque values, MCDU must be in "MAINTENANCE TEST" with autopilot disengaged. DO NOT attempt to run MCDU test.

WJE ALL

(7) Verify autopilot is disengaged.

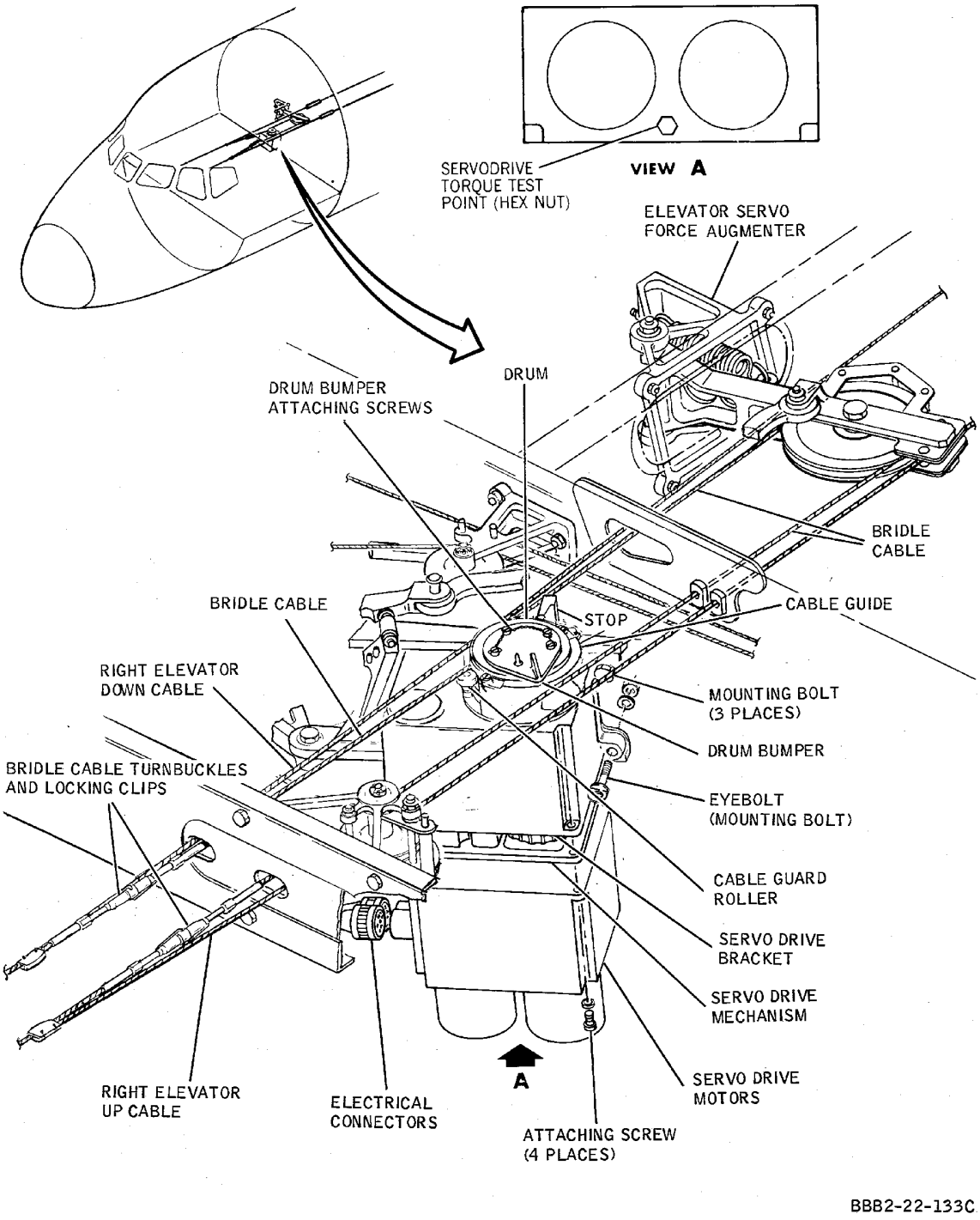
(8) Attach torque wrench to elevator servo drive torque test point. (Figure 201)

(9) Turn torque wrench in clockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 51 and 72 inch-pounds. Allow torque wrench to slowly return to neutral.

(10) Turn torque wrench in counterclockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 51 and 72 inch-pounds. Allow torque wrench to slowly return to neutral.

(11) Remove torque wrench.

(12) Perform Return to Service (RTS) test. (DFGS STATUS/TEST, SUBJECT 22-01-05)



Duplex Elevator Servo Drive and Servo Bracket -- Removal/Installation
Figure 201/22-12-01-990-801

YAW CONTROL - DESCRIPTION AND OPERATION

1. General

A. Yaw damper operation provides airplane yaw-rate damping by automatically controlling rudder movements. Yaw damper is a full-time authority operation and can be engaged at any time with or without any other portion of the autopilot system functioning.

B. Rudder movements during cruise conditions are provided by a yaw damper actuator installed in series with the rudder control system. The actuator receives command signals from the DFGC. Rudder movements commanded for yaw damping will not cause the rudder pedals to move, and manual operation of the rudder pedals at any time will not affect yaw damper operation.

C. During an automatic landing, after glideslope and localizer track is established, and radio altitude is less than 1500 feet, command signals to the yaw damper series actuator are removed. Command signals to the rudder is then provided by a duplex rudder servodrive, which is in parallel with rudder pedals and provides the rudder authority needed during land operation, and if a single engine go-around maneuver must be accomplished.

D. A YAW DAMP switch located on the flight compartment overhead panel is provided to engage yaw damper operation. When the autopilot is engaged, the yaw damper will automatically be engaged, unless the switch is in the OVRD position.

2. Operation

A. Yaw Damp Switch

(1) A YAW DAMP switch is located on the flight compartment overhead panel. The switch is a lever locked three-position type switch. The switch positions provided are OFF, ON and OVRD.

(2) The OFF position of the switch disables yaw damper operation and the yaw damper actuator is centered. The amber YAW DAMP OFF light on the overhead annunciator panel will come on. The ON position provides yaw damper and turn coordination irrespective of autopilot engagement.

NOTE: Yaw damper will be engaged when the autopilot is engaged if switch in OFF position.

NOTE: In the -930 and subsequent DFGC's parallel rudder will automatically engage when the autopilot is engaged in the takeoff mode.

(3) The OVRD position removes power from the linear yaw damper actuator to disable the actuator in the event of an oscillatory failure. The actuator remains in the position existing at the time OVRD is selected. The amber YAW DAMP OFF light on the overhead annunciator will come on.

B. Yaw Control Mode

WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 875-881, 883, 884, 886, 887, 891

(1) Yaw control is provided to dampen airplane dutch roll characteristics. Yaw control is a full-time authority for takeoff, flight, and landing. Accelerometer sensors provide signals used to command rudder deflection to oppose airplane angular yaw rate. Roll rate information is processed within the DFGC and applied to yaw control, to provide turn entry and exit coordination maneuvers.

WJE ALL

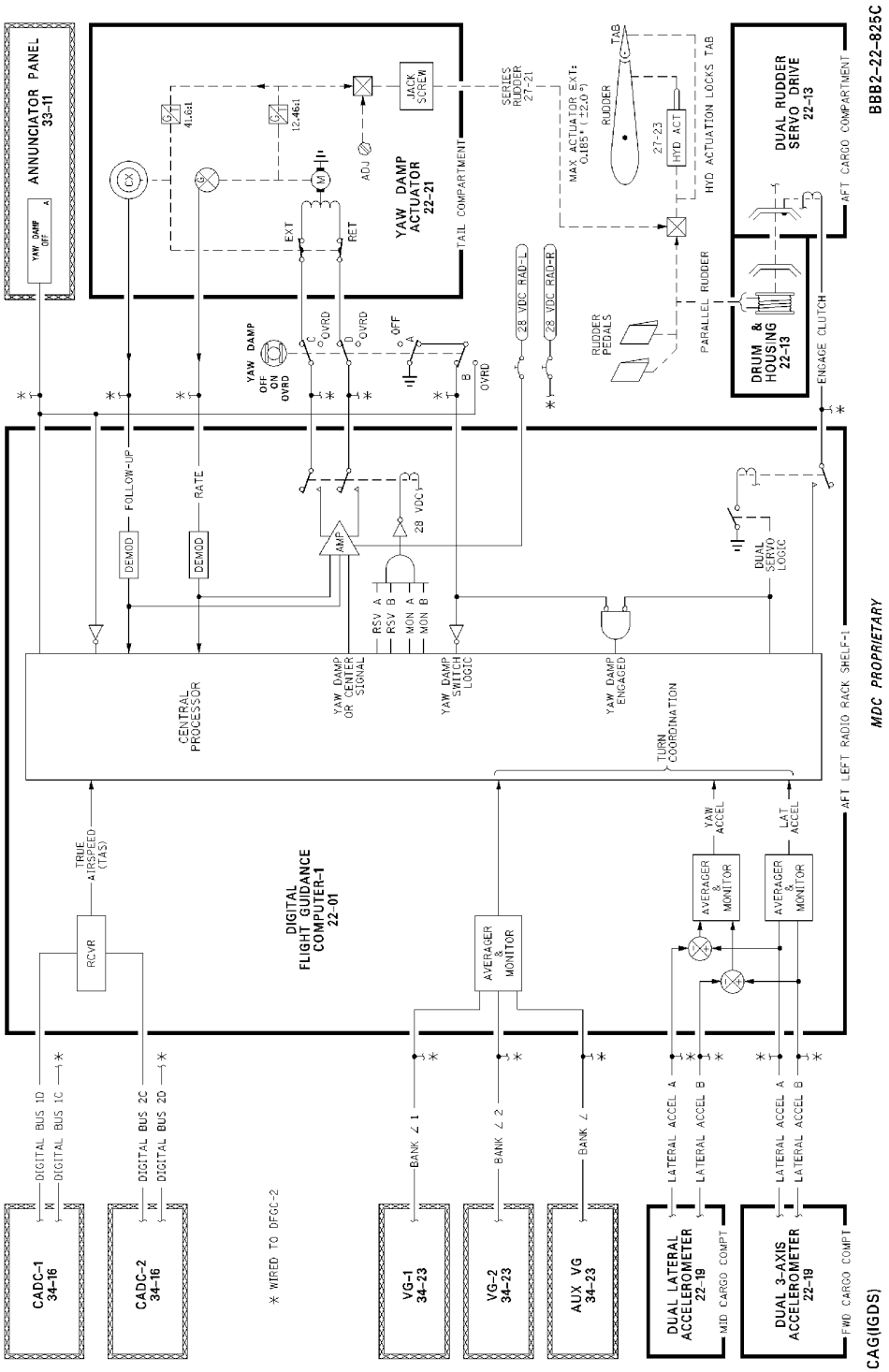
(2) Rudder movement is affected by a yaw damper actuator installed in series with the rudder control system. The actuator provides yaw control in all modes of operation, except during an automatic landing or takeoff with the A/P engaged in T/O mode. During an automatic landing the series command signals are removed, and the increased authority required is provided by a parallel duplex rudder servodrive.

(3) Airplane yaw acceleration is sensed by separate accelerometers that are integrated to provide yaw rate. The computed yaw rate is gain programmed with true airspeed, combined with turn coordination signals (except during LOC TRK) and are applied to the yaw damper actuator. The actuator provides a mechanical (geartrain) output. The geartrain drives a jackscrew within the actuator to a hydraulic powered rudder control system. The jackscrew rotates, allowing the hydraulic actuator to position the rudder to provide yaw damping.

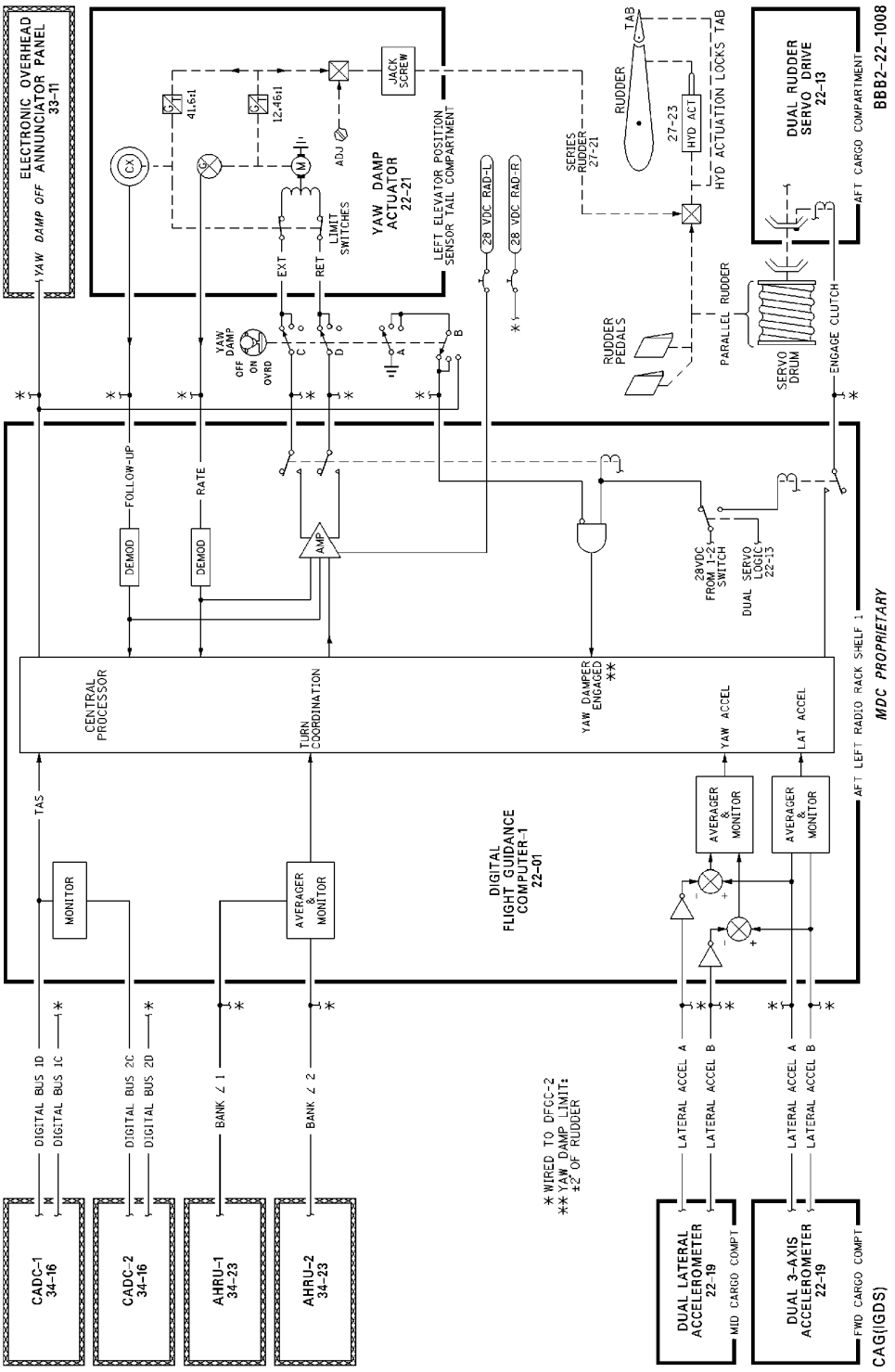
(4) The mechanical motion of the jackscrew is monitored by a yaw damper actuator transmitter. The transmitter applies a feedback signal to a summing point within the DFGC, until the error signal is cancelled. When the error signal is cancelled, the jackscrew stops moving.

(5) The rudder control system is a hydraulically powered positioning system. The rudder hydraulic powered unit is com-prised of a hydraulic valve and actuator. Yaw damper actuator inputs and rudder pedal inputs are summed in series at a summing point outside the actuator. Rudder movements commanded for yaw damping will not cause the rudder pedals to move, and manual operation of the rudder pedals will not affect yaw damper operation.

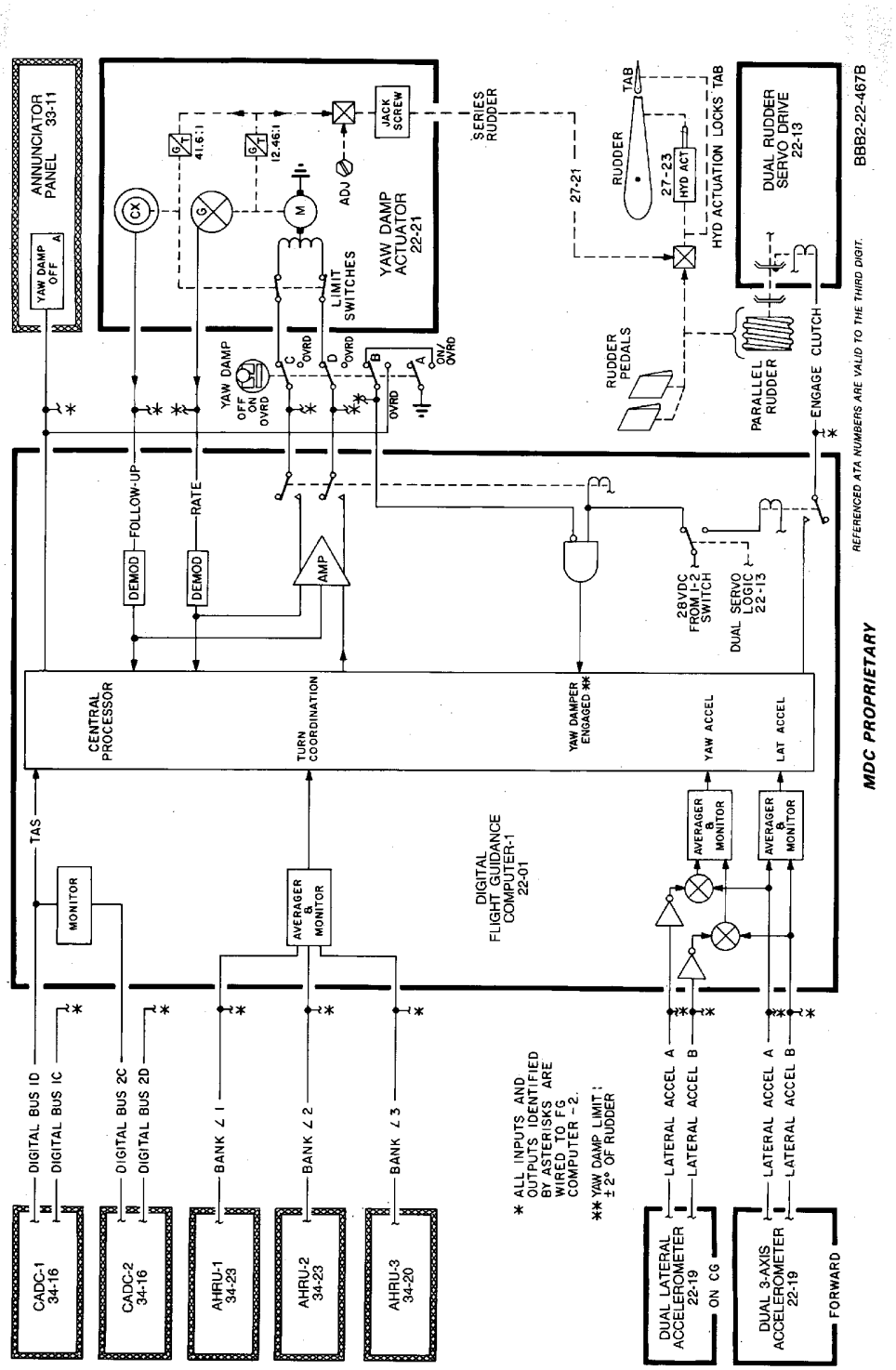
(6) When the AUTO LAND track modes are engaged (localizer and glideslope), and radio altitude is less than 1500 feet, command signals to the series yaw damper actuator are removed. Rudder command signals are then provided by a duplex rudder servodrive for parallel operation. The DFGC provides dual output control to the servodrive. The dual output control provides two purposes, to ensure that a single failure will not affect the Fail Passive Autoland system, and provide the rudder authority required in event a single engine go-around maneuver must be accomplished. In addition, a rudder position sensor provides the rudder position follow-up information to be monitored and corrected within the DFGC. If the DFGC monitors detect any rudder failures that could result in an airplane upset, the autopilot will automatically be disengaged before an upset can occur.



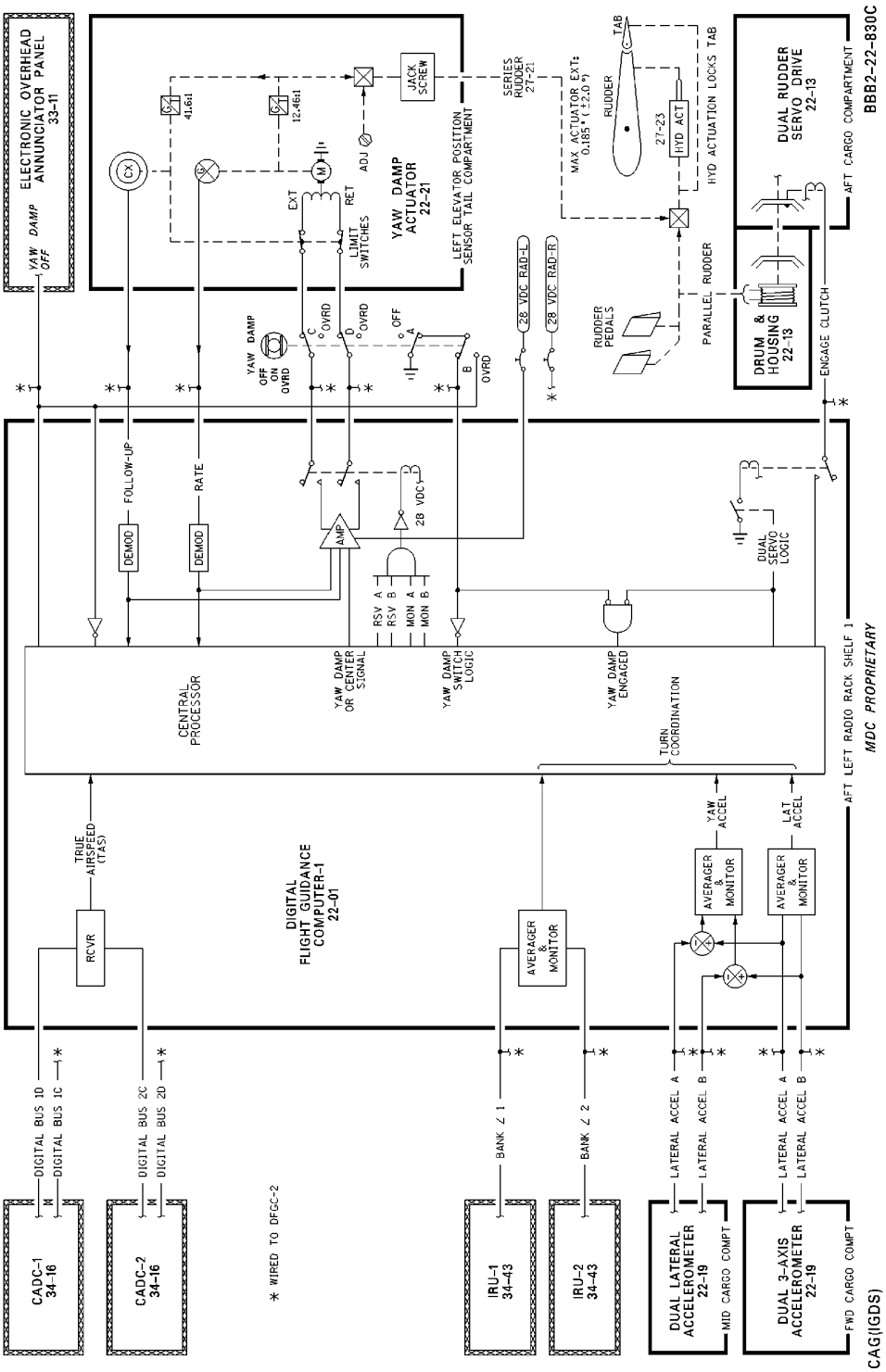
Autopilot Yaw Damper (Series Rudder)
Figure 1/22-13-00-990-801



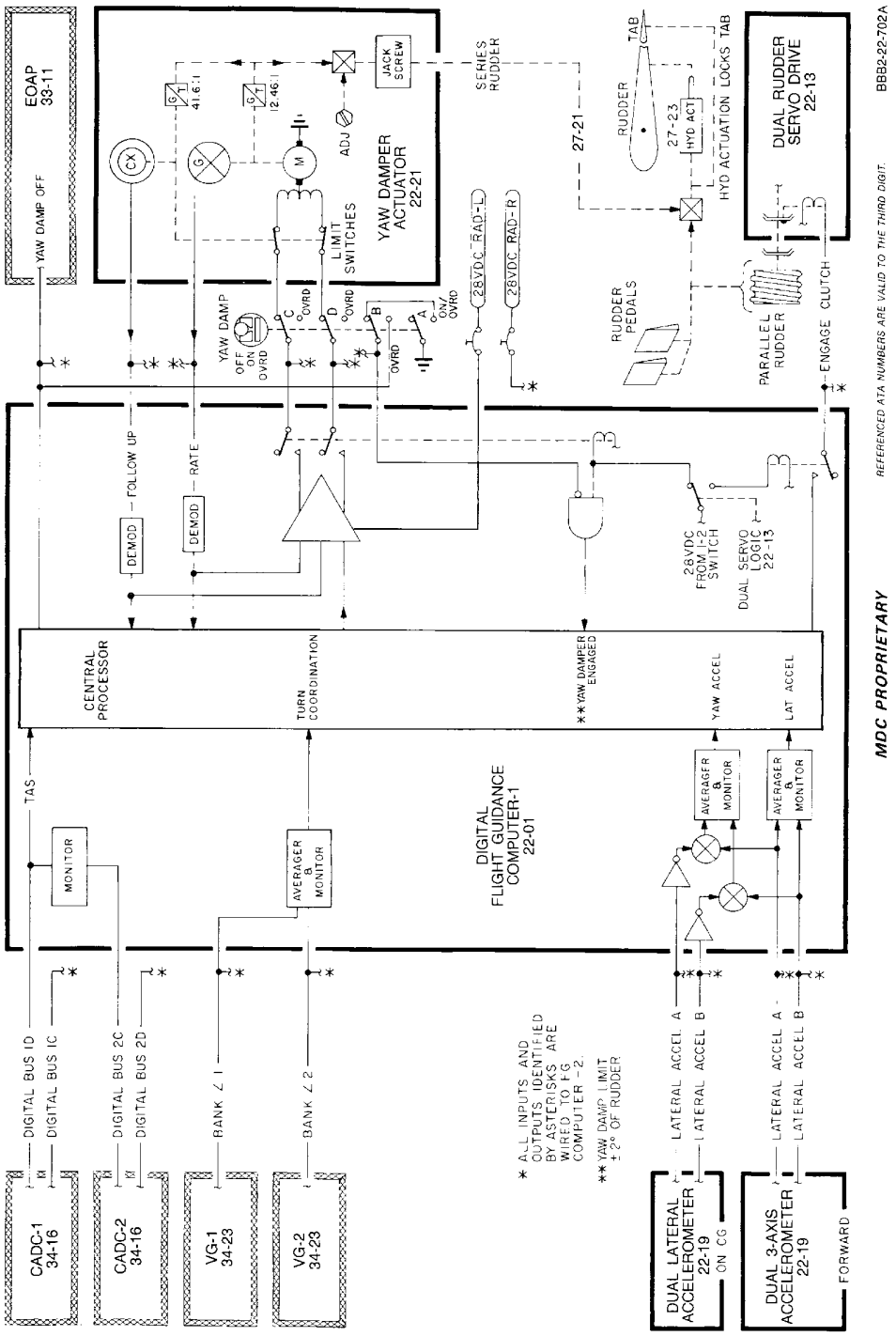
Autopilot Yaw Damper (Series Rudder)
Figure 2/22-13-00-990-803



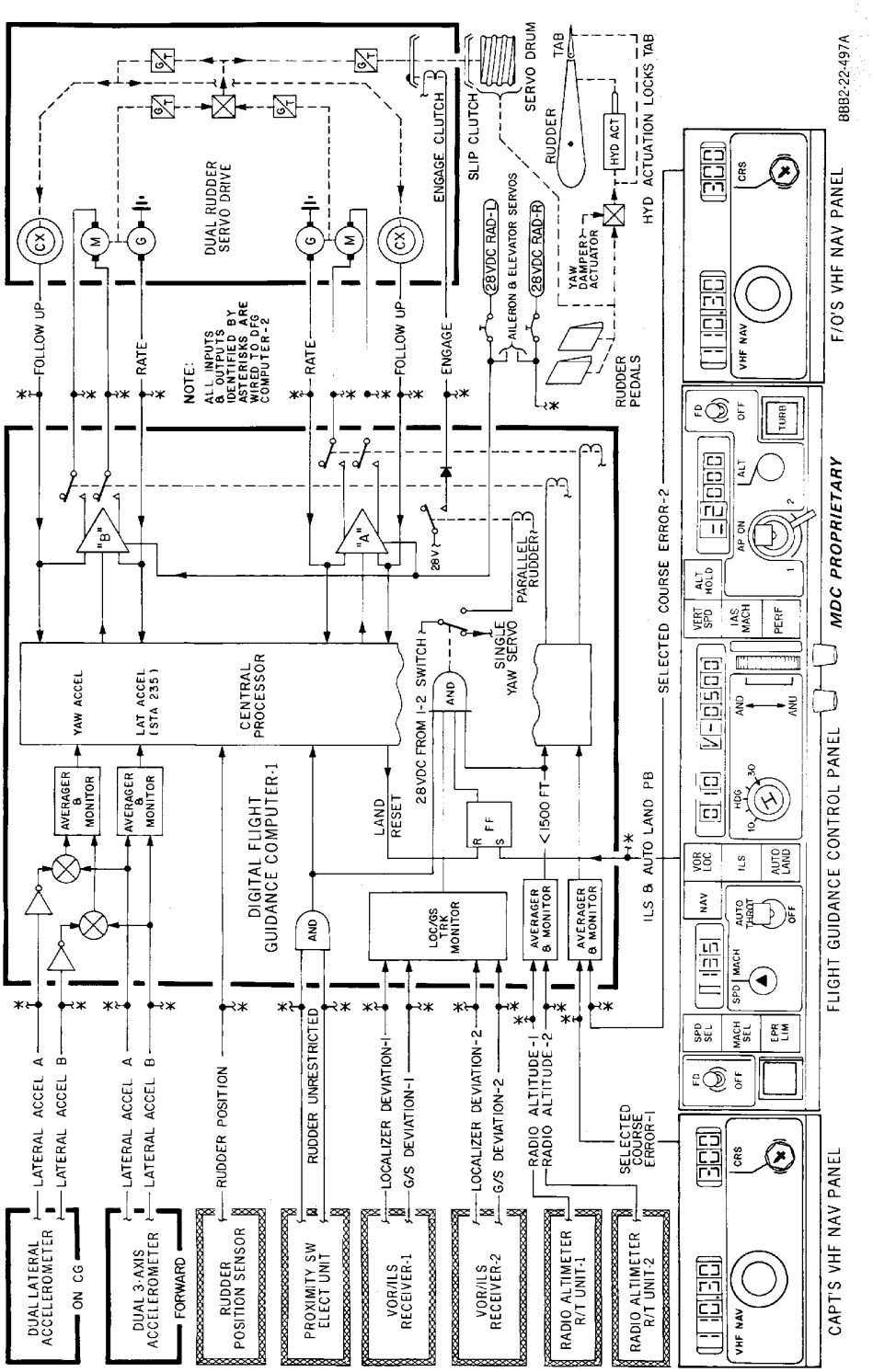
Autopilot Yaw Damper (Series Rudder)
Figure 3/22-13-00-990-804



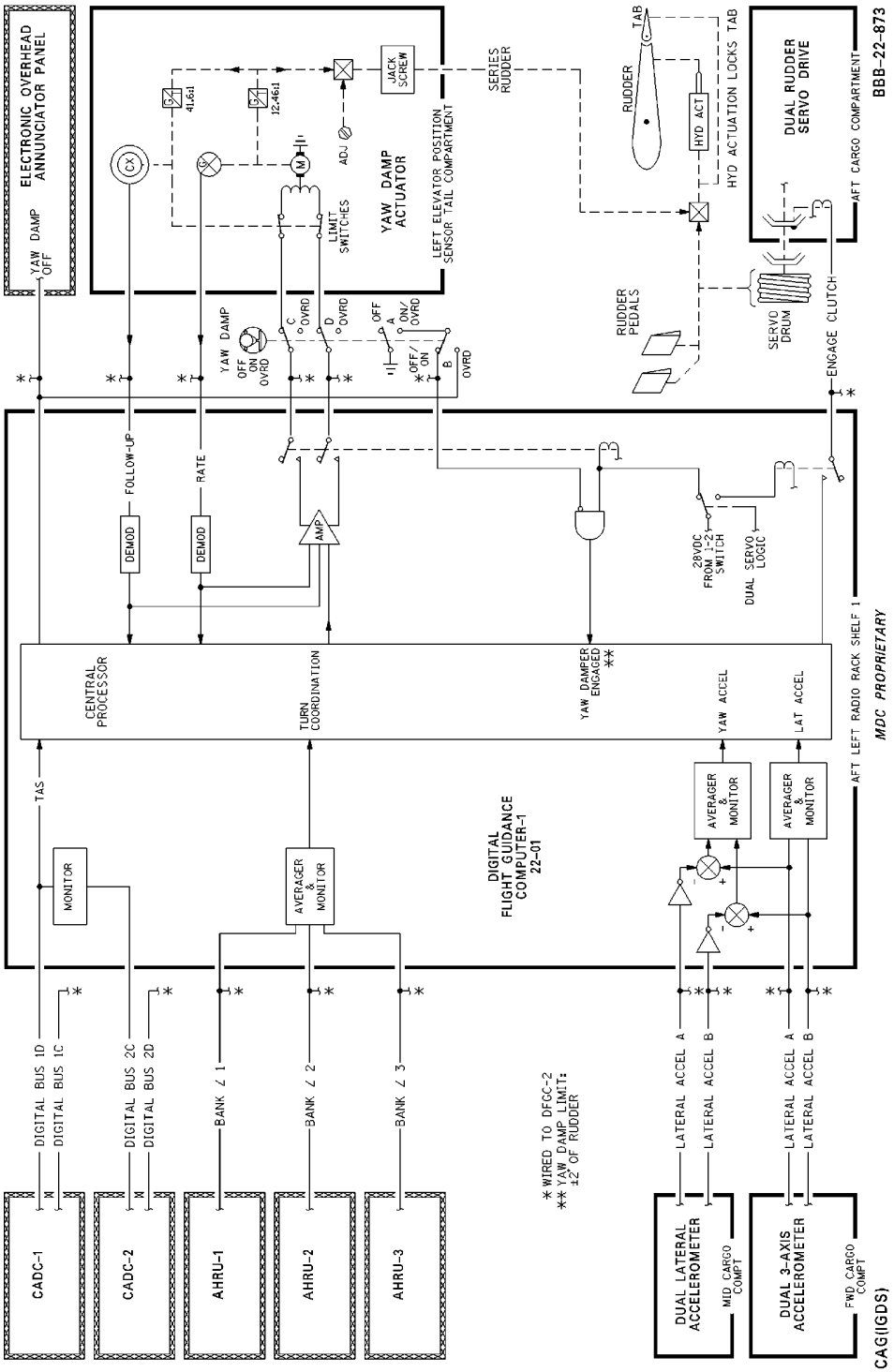
Autopilot Yaw Damper (Series Rudder)
Figure 4/22-13-00-990-805



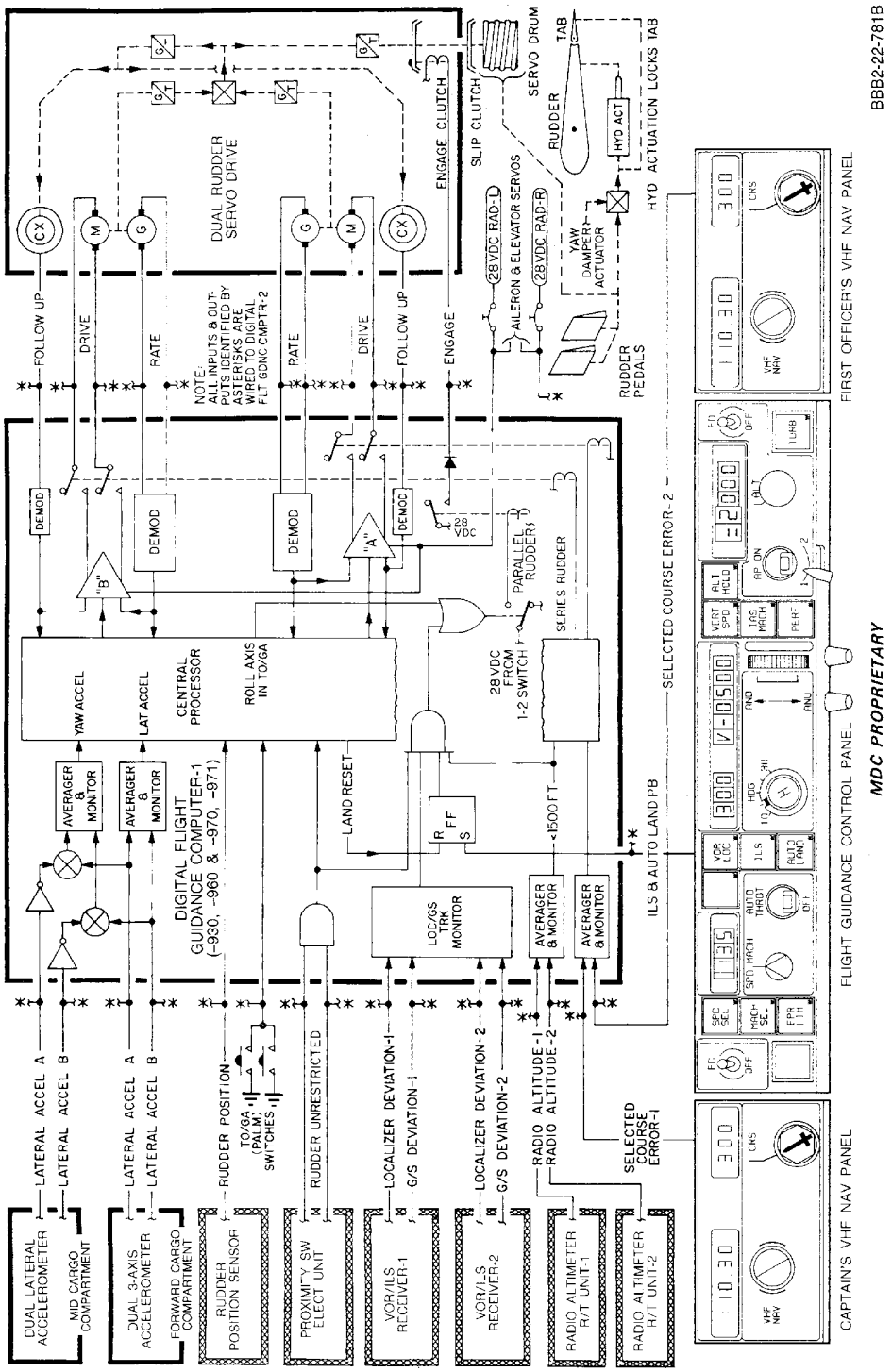
Autopilot Yaw Damper (Series Rudder)
Figure 5/22-13-00-990-806



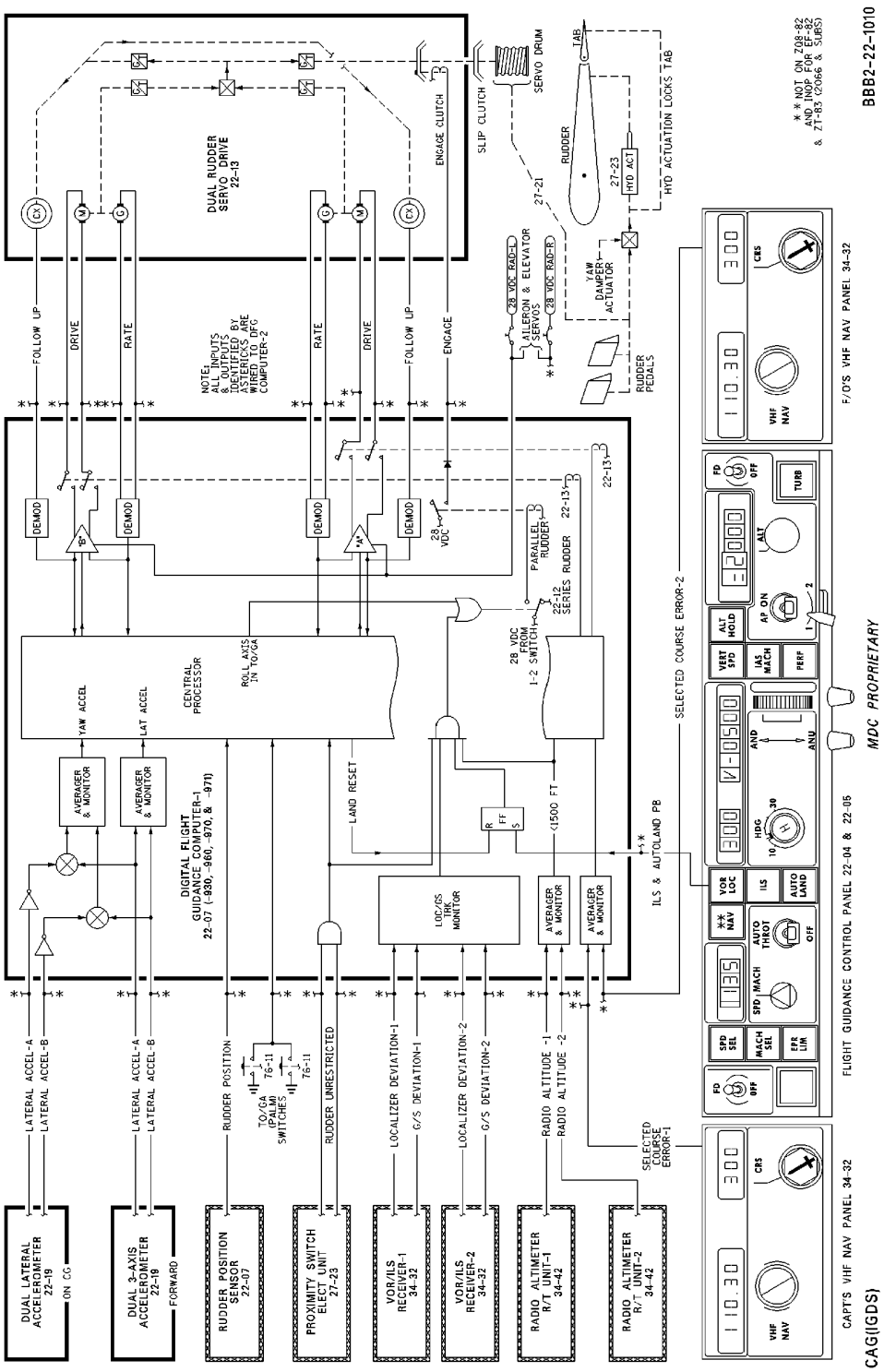
Autopilot Yaw Axis (Land & G/A Modes)
Figure 6/22-13-00-990-807



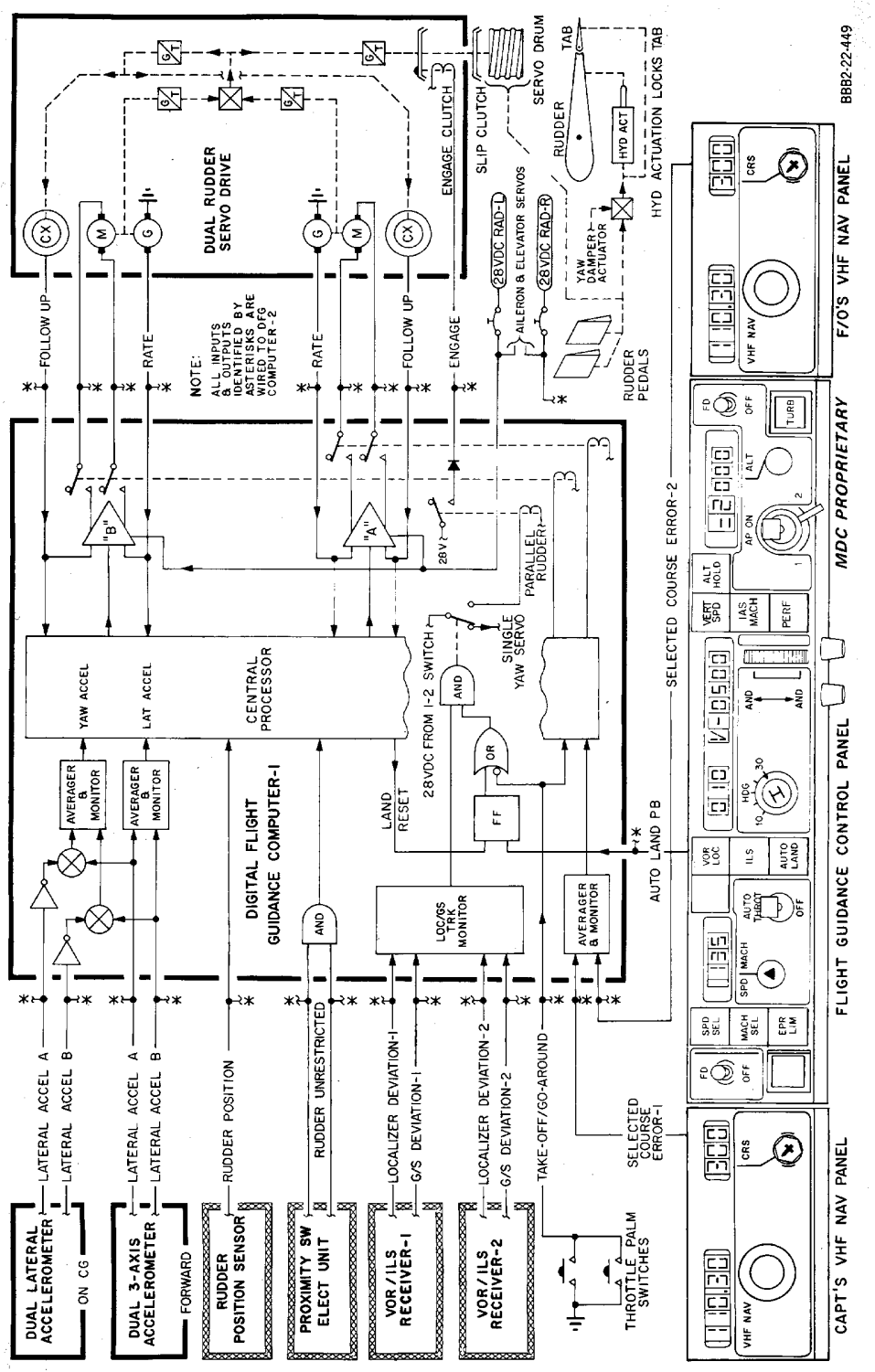
Autopilot Yaw Damper (Series Rudder)
Figure 7/22-13-00-990-809



Autopilot Yaw Axis (Land, T/O & G/A Modes)
Figure 8/22-13-00-990-813

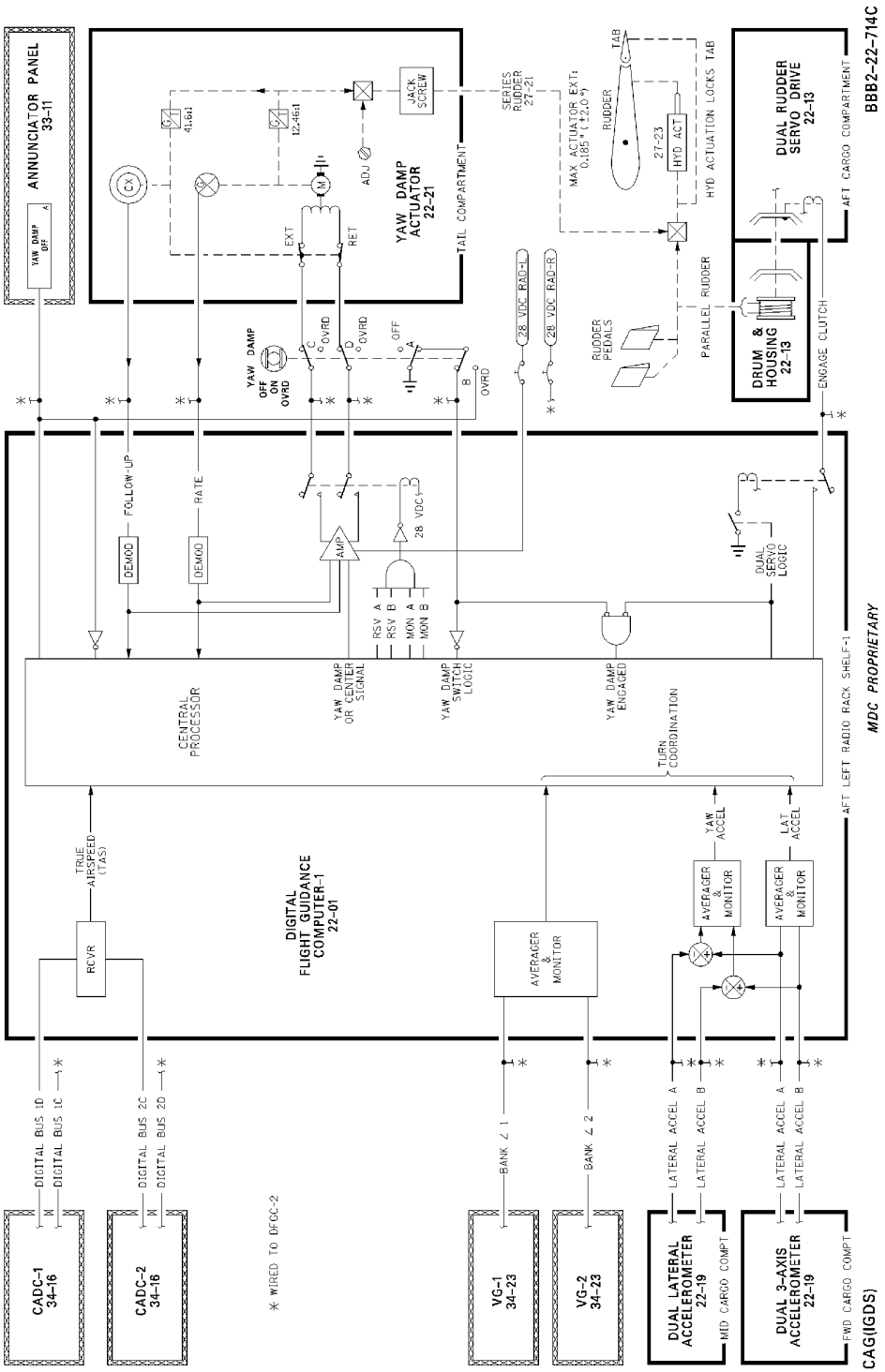


Autopilot Yaw Axis (Land, T/O & G/A Modes)
Figure 9/22-13-00-990-814

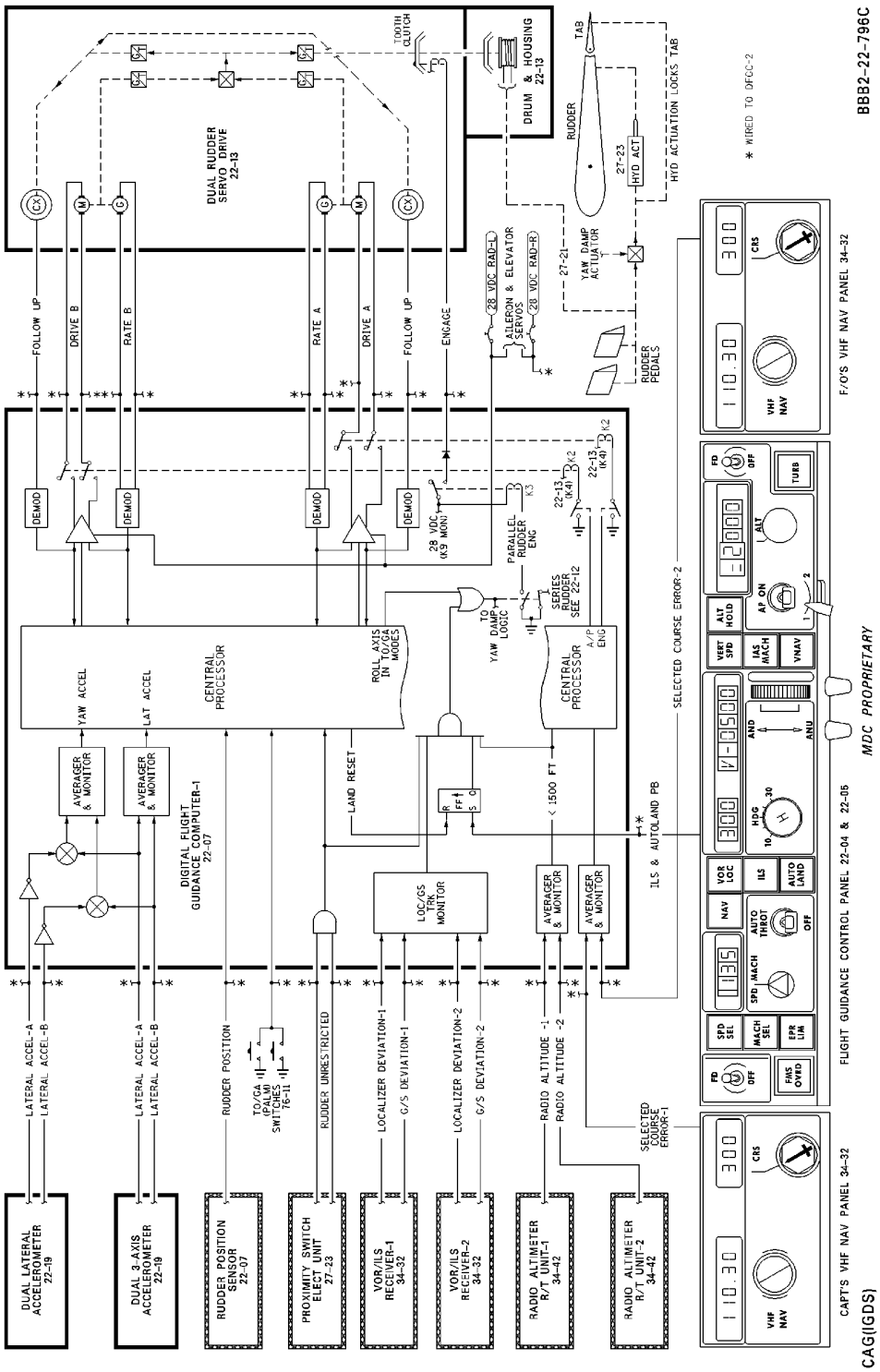


Autopilot Yaw Axis (Land & G/A Modes)
Figure 10/22-13-00-990-815

EFFECTIVITY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891



Autopilot Yaw Damper (Series Rudder)
Figure 11/22-13-00-990-819



Autopilot Yaw Axis (Land, T/O & G/A Modes)
Figure 12/22-13-00-990-829

YAW CONTROL - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing yaw control trouble shooting procedures, the Status Test Panel (STP) located beneath the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. Yaw Control may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing yaw control trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. Yaw Control may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

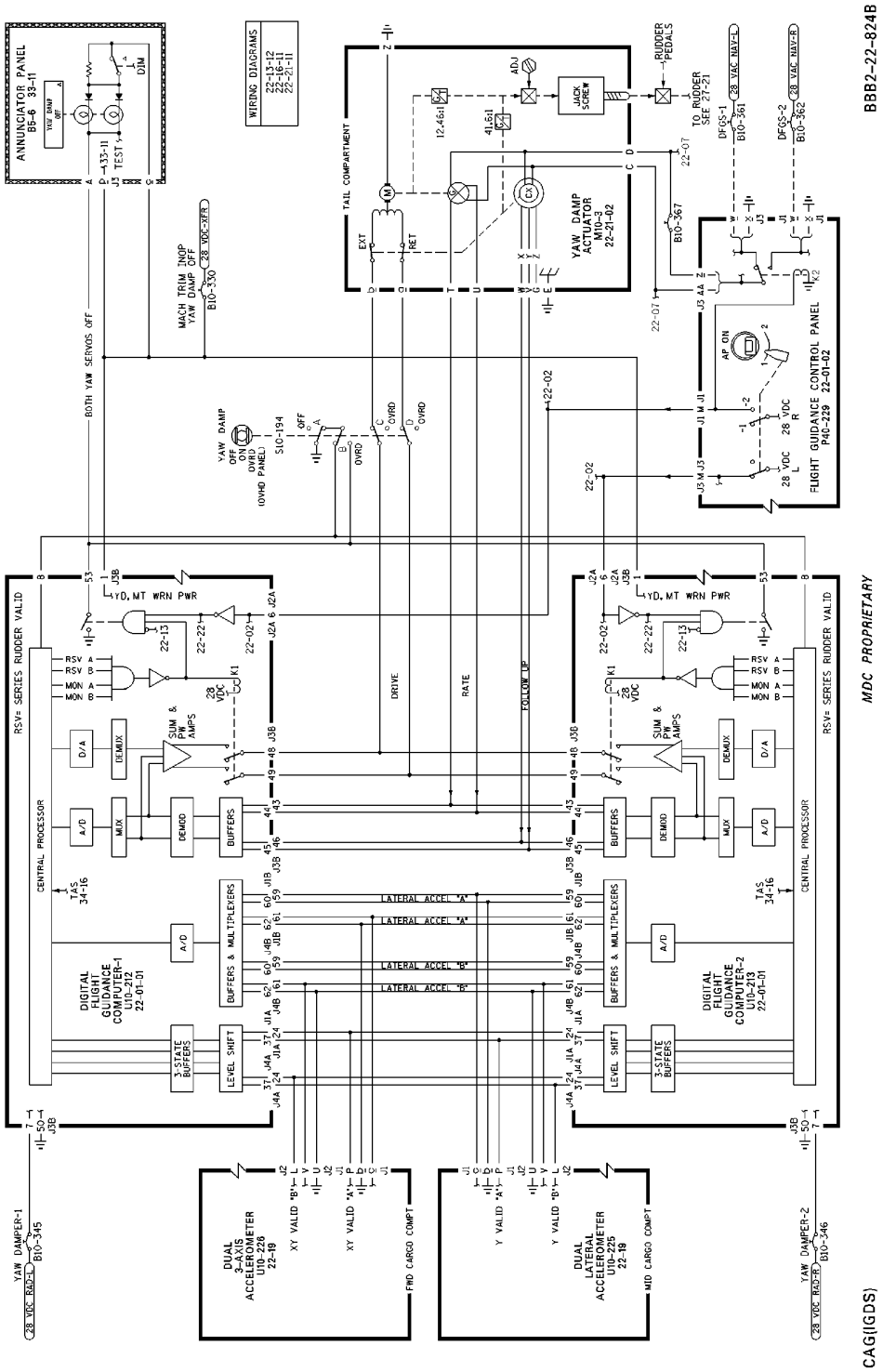
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on yaw control is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to yaw control and associated system interface.

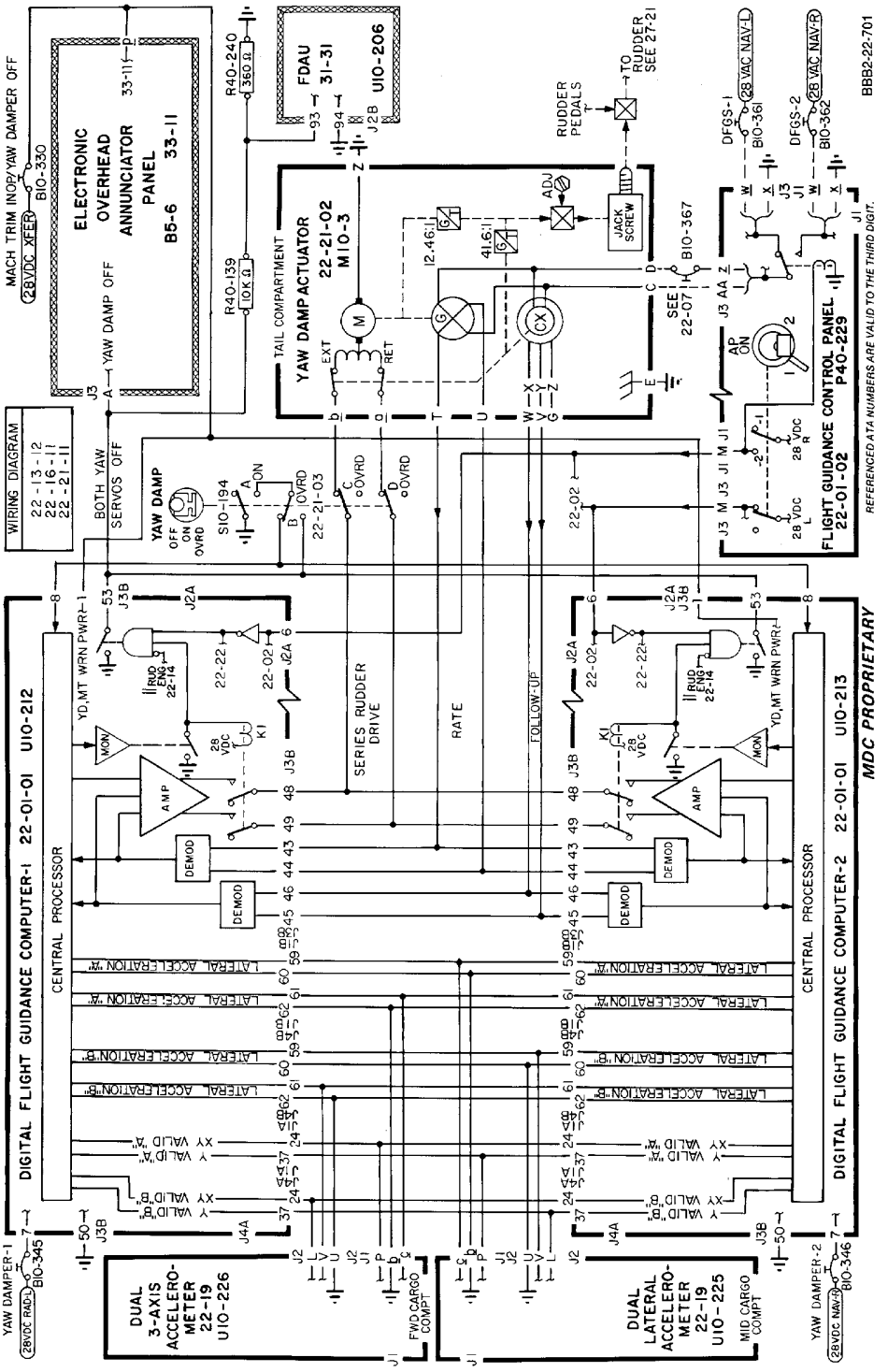
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on yaw control is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to yaw control and associated system interface.

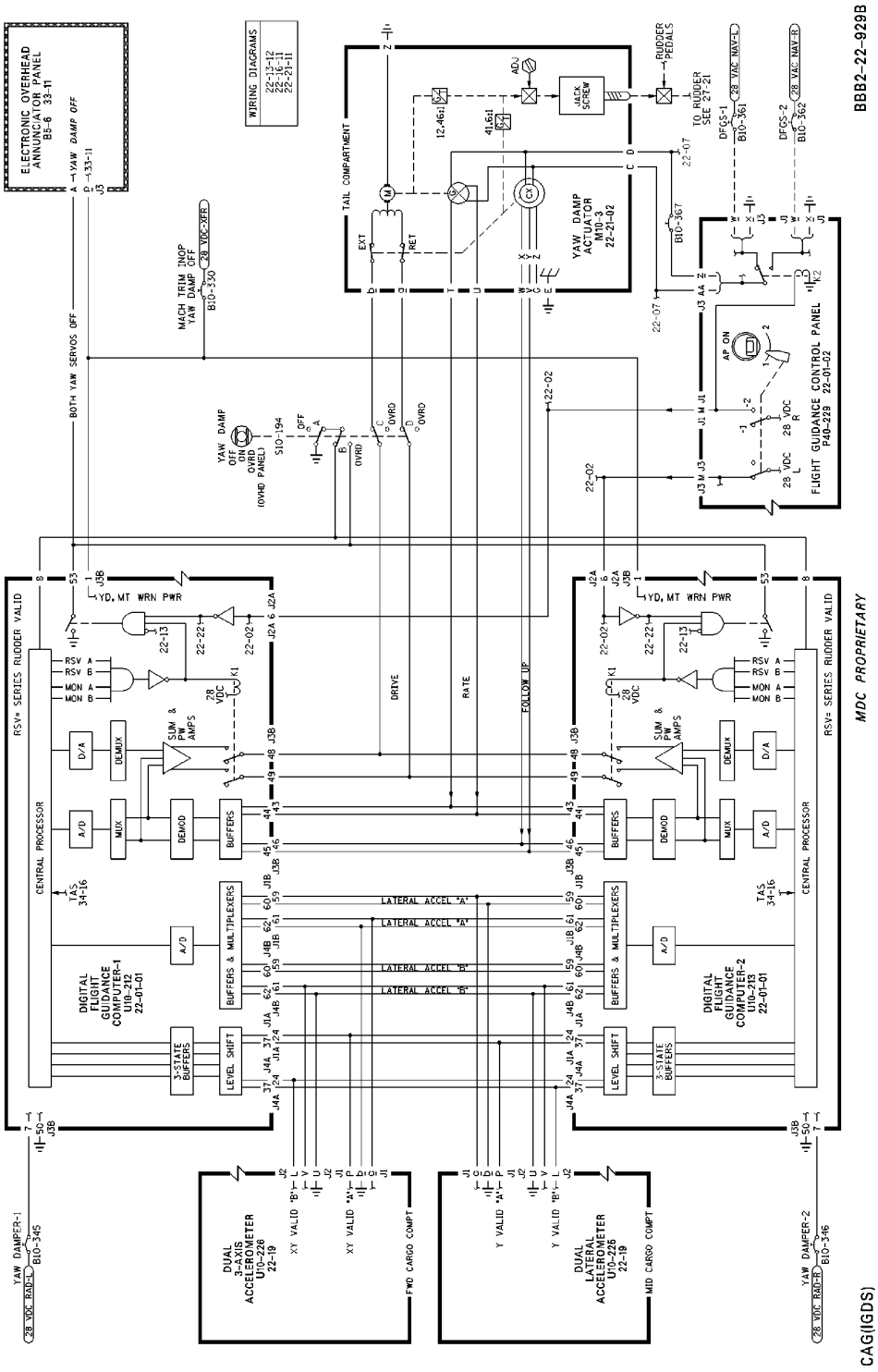
WJE ALL



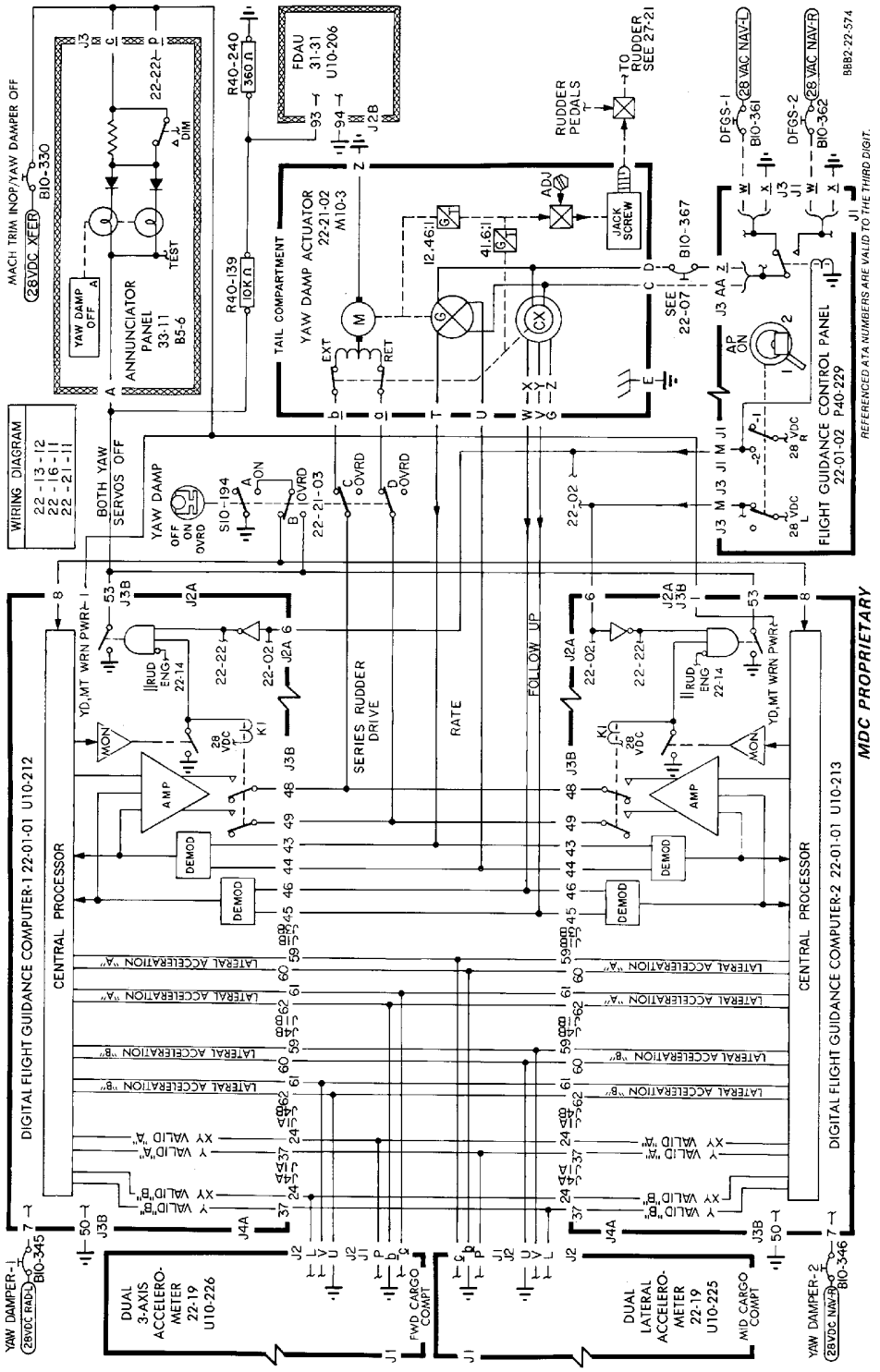
Yaw Damp Actuation
Figure 101/22-13-00-990-854



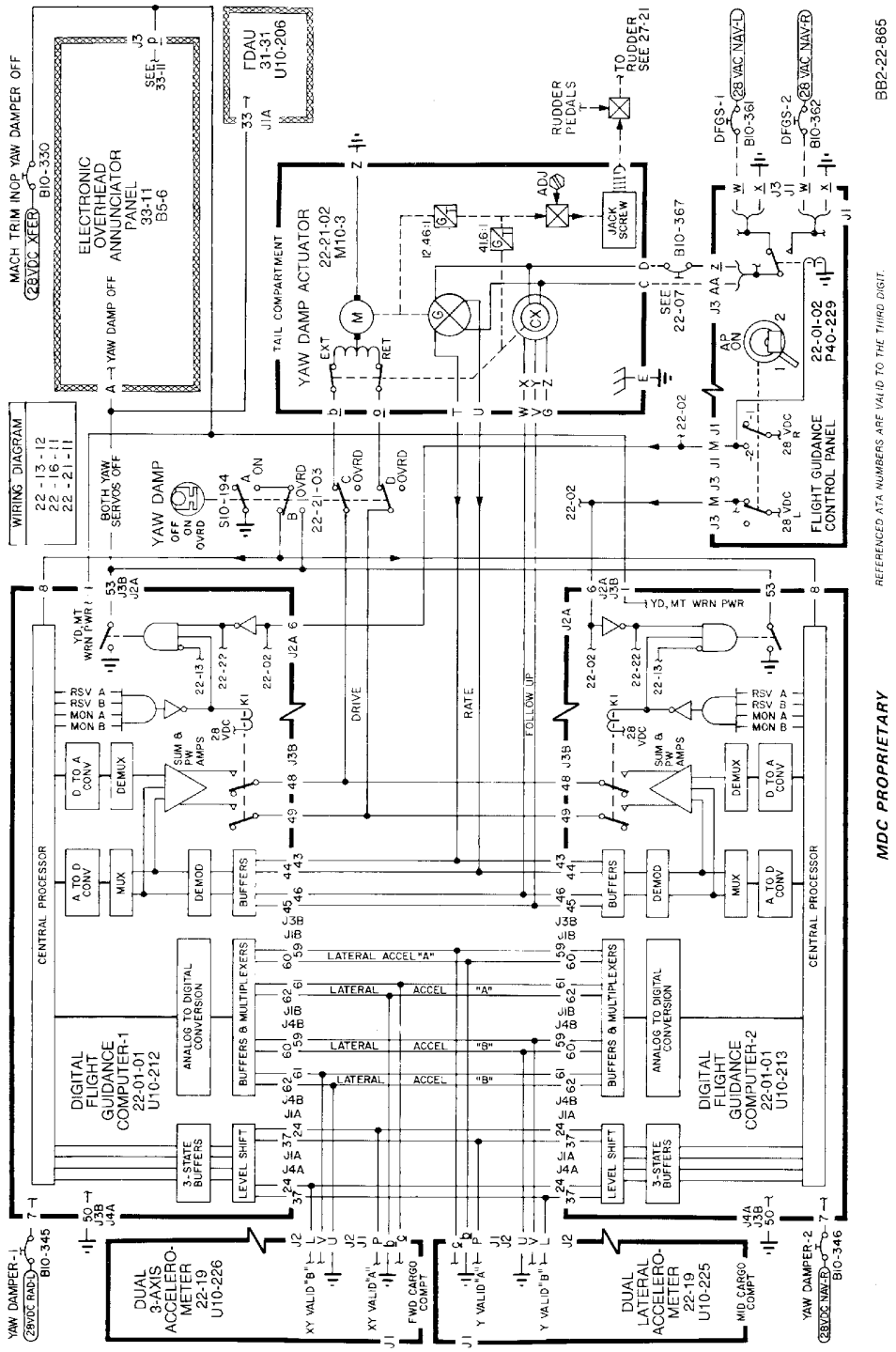
Yaw Damp Actuation
Figure 102/22-13-00-990-855



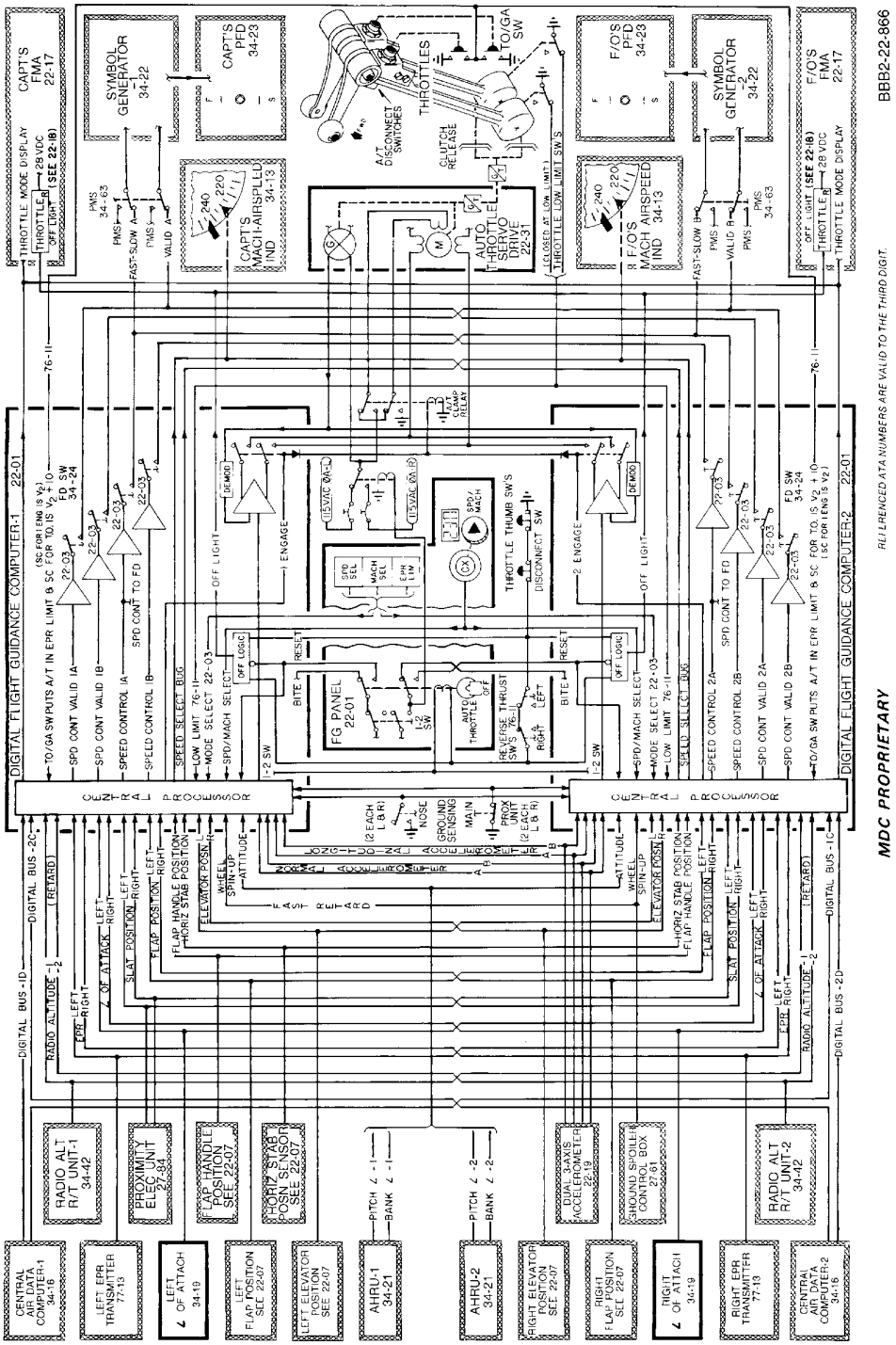
Yaw Damp Actuation
Figure 103/22-13-00-990-856



Yaw Damp Actuation
Figure 104/22-13-00-990-857



Yaw Damp Actuation
Figure 105/22-13-00-990-862



Yaw Damp Actuation
Figure 106/22-13-00-990-868

YAW DAMPER ACTUATOR - MAINTENANCE PRACTICES

1. General

A. The yaw damper actuator is located on the aft canted bulkhead in the aft accessory compartment and is accessible through the tailcone access door.

B. After replacement of an actuator, verify null position and perform test which determines acceptable operation of the yaw damper actuator as installed in the airplane.

C. During the test, systems associated with operation of the yaw damper actuator should be in proper operating condition.

2. Equipment and Materials

WARNING: ENSURE AIRPLANE HYDRAULIC SYSTEM IS DEPRESSURIZED.

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Rig pins 6-4(2)	The Boeing Company
Linear servo actuator line test set 5916816	Douglas Aircraft Co.
Lockwire, Inconel, NASM20995N32, DPM 684	Not Specified
Lockwire, Corrosion Resistant Steel, NASM20995N32, DPM 5865	Not Specified
Torque wrench (Capable of 0 to 60 inch-pounds)	

3. Removal/Installation Yaw Damper Actuator

A. Remove Yaw Damper Actuator

(1) On Flight Guidance Control Panel, place AP switch to 1 position.

(2) Verify AP ON switch and YAW DAMP switch are placed OFF.

WARNING: TAG AND SAFETY THE FOLLOWING CIRCUIT BREAKERS.

(3) Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WARNING: THE FOLLOWING STEP REQUIRES RUDDER HYDRAULIC POWER TO BE TURNED OFF. TAG CONTROL LEVER. IF HYDRAULIC POWER IS INADVERTENTLY TURNED ON, INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT COULD RESULT.

(4) Move rudder hydraulic power shutoff valve control lever, located on control pedestal, to off position.

(5) Install rig pins in rudder drive sector. (Figure 201)

(6) Disconnect electrical connector from yaw damper actuator.

(7) Remove bolt connecting eyebolt to drive sector pushrod clevis.

NOTE: If difficulty is encountered in removing bolt due to pressure on bolt, remove jackscrew access cap on actuator and turn jackscrew with a screwdriver or spintite to relieve pressure.

(8) Loosen two mounting bolts at slotted holes in actuator mounting bracket.

(9) Remove remaining mounting bolt and slide actuator from bracket.

B. Install Yaw Damper Actuator

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Verify rig pins are installed in rudder sector.

NOTE: Before installing yaw damper actuator, make certain limit switches have been adjusted and bench checked and yaw damper actuator feedback synchro is nulled.

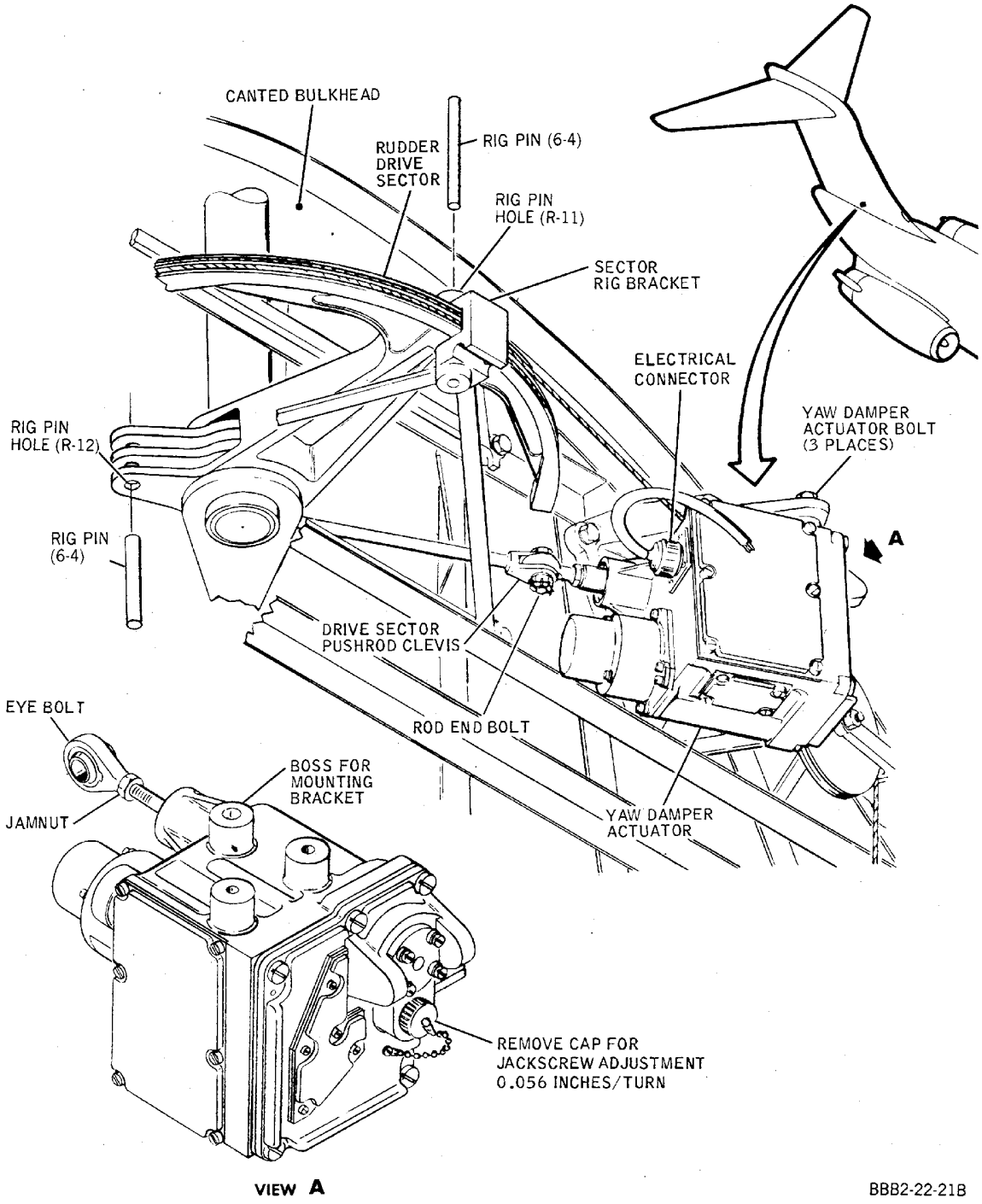
(3) Start two mounting bolts and washers in actuator mounting holes which mate with slotted holes in mounting bracket.

(4) Engage mounting bolts with slotted holes in bracket and slide actuator into place.

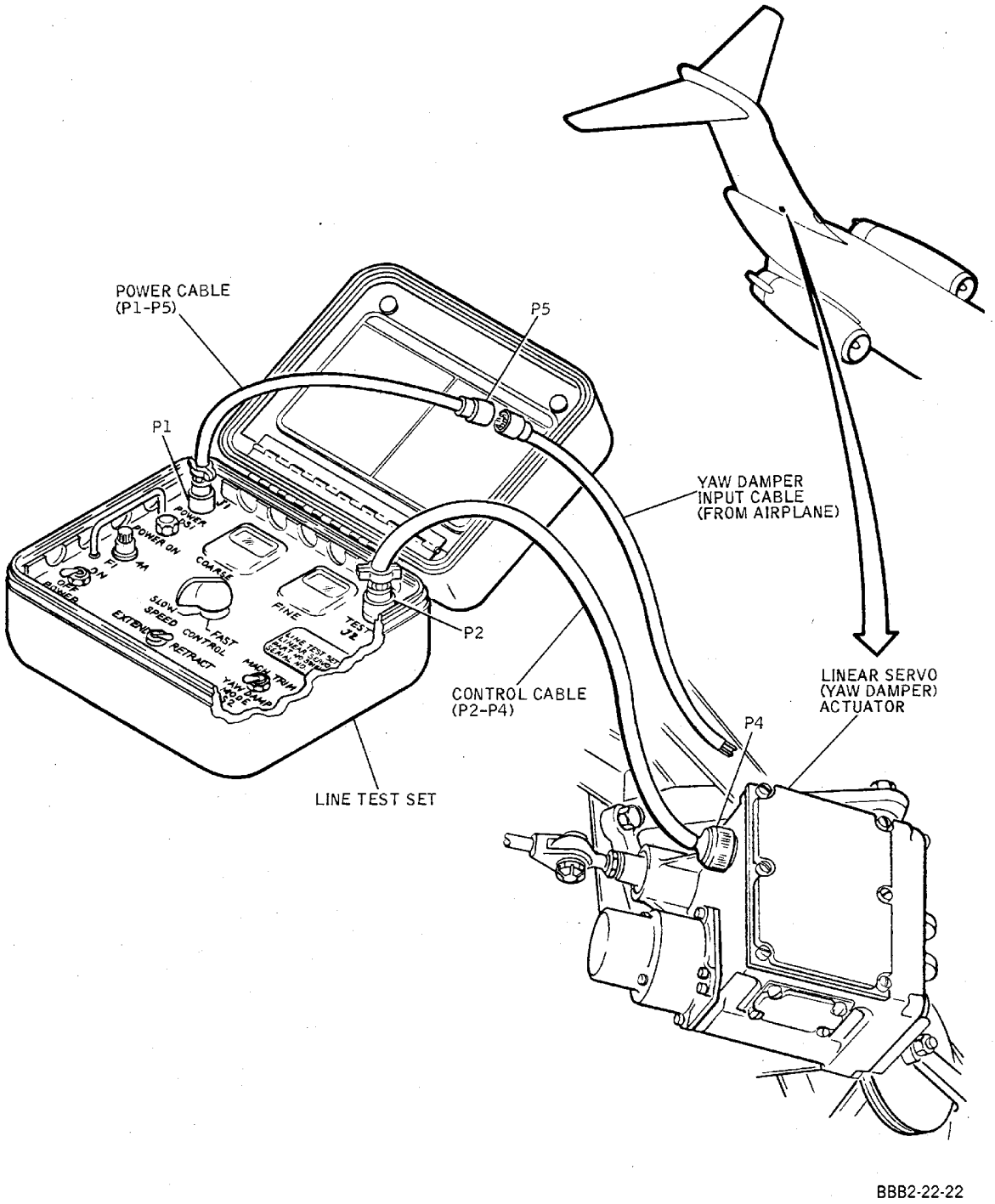
(5) Install remaining bolt and washer and tighten all mounting bolts.

NOTE: Use additional washers between yaw damper actuator and mounting bracket (1/8 inch maximum) to shim for proper alignment between eyebolt and drive sector pushrod clevis. Do not shim bolt associated with boss on mounting bracket.

(6) Verify yaw damper actuator null position.



Yaw Damper Actuator -- Removal/Installation
Figure 201/22-13-01-990-801



Linear Servo (Yaw Damper) Actuator Line Test Set
Figure 202/22-13-01-990-802

4. Adjust Yaw Damper Actuator

A. Adjust/Verify Yaw Damper Actuator Null Position Using Test Set

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

NOTE: The methods in either Paragraph 4.A. or Paragraph 4.B. may be used.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

NOTE: The methods in either Paragraph 4.A. or Paragraph 4.C. may be used.

WJE ALL

(1) Set up linear servo (yaw damper) actuator line test set. (Figure 202) and preset test set as follows:

(a) Power switch (S1) to OFF position

(b) Speed control (R1) to SLOW position

(c) Mode switch (S2) to YAW DAMPER position.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

CAUTION: THE FOLLOWING STEPS WILL PRODUCE VALID READINGS ONLY IF THE EYEBOLT IS DISCONNECTED FROM THE DRIVE SECTOR PUSHROD CLEVIS.

(3) Connect test set to yaw damper actuator as follows:

(a) Disconnect input cable from yaw damper actuator and attach to power input cable (P1-P5) of test set.

(b) Connect test set control cable (P2-P4) to electrical connector on yaw damper actuator.

(4) Remove knurled cover from yaw damper actuator for access to 3/16-inch hex-end gear shaft that is used to adjust jackscrew. (Figure 201)

(5) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(6) Place test set power switch in ON position; allow at least one minute for test set to warm up.

(7) Note reading on test set coarse indicator. If reading is at zero, proceed to Paragraph 4.A.(10).

(8) If test set coarse indicator does not read zero, place and hold EXTEND/RETRACT switch in either of its positions and slowly rotate speed control knob away from SLOW position until actuator gear train begins to rotate very slowly.

NOTE: Gear train rotation can be verified by observing exposed 3/16 hex-end gear shaft or retraction of actuator jackscrew shaft.

(9) Note reading on test set coarse indicator; place EXTEND/ RETRACT switch in position that causes indicator to move toward zero position. When zero is reached, rotate speed control to SLOW position.

(10) Note reading on test set fine indicator; minimum null indication should be 40 or less. Use 3/16 hex-nut driver to rotate gear train to obtain null reading of 0(±40) on fine indicator.

NOTE: Failure to obtain a minimum indication of 40 or less shall be cause for rejection of yaw damper actuator.

(11) Open these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(12) Remove test set from airplane.

(13) Install knurled cover on yaw damper actuator.

(14) Connect yaw damper input electrical cable to yaw damper actuator.

(15) With both rig pins installed in rudder sector , install bolt, nut, and cotter pin connecting eyebolt and drive sector pushrod clevis; if holes align proceed to Paragraph 4.A.(18), if holes do not align proceed to Paragraph 4.A.(16). (Figure 201)

(16) Remove lockwire from actuator jamnut and eyebolt locking washer. Hold eyebolt firmly with wrench, loosen jamnut and run out as far as it will go. As jamnut is turned out, pull eyebolt locking washer out with it. Holding washer against jamnut, adjust eyebolt to the proper alignment with drive sector pushrod clevis.

CAUTION: WITH EITHER JACKSCREW, EYEBOLT THREADS MUST EXTEND BEYOND THE WITNESS HOLE.

(17) Using witness hole, check eyebolt thread engagement.

CAUTION: WHEN EYEBOLT JAMNUT IS SECURED, CHECK ALIGNMENT OF DRIVE SECTOR PUSHROD. ANY MISALIGNMENT WILL CAUSE ROD TO COCK THE BEARING SURFACE ON THE FAR END OF THE SECTOR ASSEMBLY.

(18) Align slot in eyebolt with slot in jackscrew. Slide locking washer down eyebolt until it contacts jackscrew. Make certain that locking washer tab fits into both groove of eye-bolt and groove of jackscrew. Tighten jamnut to torque of 50 in-lb (6 N·m) to 55 in-lb (6 N·m) and safety lockwire to hole in locking washer. (LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201)

(19) Remove rig pins.

(20) Close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(21) Perform Return to Service (RTS) test. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

B. Adjust/Verify Yaw Damper Actuator Null Position Using DFGS Status Test Panel (if installed)

(1) Connect yaw damper electrical connectors.

(2) Close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

NOTE: Aircraft must be stationary and completely free of movement during this adjustment/test. Power must be off status test panel when yaw damper switch is placed in the "ON" position. (Paragraph 4.B.(3))

(3) Place yaw damper switch located on cockpit overhead to "ON" position. This should place the actuator to the null position.

(4) Energize status test panel. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

NOTE: DFGS selected on Status Test Panel must agree with DFGS selected on the Flight Guidance Control Panel.

(5) Initiate the "Maintenance Test" and enter "Sensor Values" section.

NOTE: DO NOT attempt to run complete Maintenance Test.

(6) Advance to "Yaw Damper Pos = XX.XX degrees".

(7) If yaw damper position displayed is 0(±00.05) degrees, advance to Paragraph 4.B.(11). If yaw damper position is not within ±00.05 degrees, proceed to Paragraph 4.B.(8).

(8) Remove dust cover to gain access to the gear shaft adjustment screw that will vary the actuator null. (Figure 201)

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893 (Continued)

(9) Place yaw damper switch located on the cockpit overhead to the "override" position.

(10) Slowly rotate the adjustment screw on the back of the yaw damper until the status test panel shows a yaw damper position of 0(±00.05) degrees.

(11) Replace dust cover.

(12) With both rig pins installed in rudder sector , install bolt, nut and cotter pin connecting eyebolt and drive sector pushrod clevis. If holes align proceed to Paragraph 4.B.(15), if holes do not align proceed to Paragraph 4.B.(13). (Figure 201)

(13) Remove lockwire from actuator jamnut and eyebolt locking washer. Hold eyebolt firmly with wrench, loosen jamnut and run out as far as it will go. As jamnut is turned out, pull eyebolt locking washer out with it. Holding washer against jamnut, adjust eyebolt to the proper alignment with drive sector pushrod clevis.

CAUTION: WITH EITHER JACKSCREW, EYEBOLT THREADS MUST EXTEND BEYOND THE WITNESS HOLE.

(14) Using witness hole, check eyebolt thread engagement.

CAUTION: WHEN EYEBOLT JAMNUT IS SECURED, CHECK ALIGNMENT OF DRIVE SECTOR PUSHROD. ANY MISALIGNMENT WILL CAUSE ROD TO COCK THE BEARING SURFACE ON THE FAR END OF THE SECTOR ASSEMBLY.

(15) Align slot in eyebolt with slot in jackscrew. Slide locking washer down eyebolt until it contacts jackscrew. Make certain that locking washer tab fits into both groove of eyebolt and groove of jackscrew. Tighten jamnut to torque of 50 in-lb (6 N·m) to 55 in-lb (6 N·m) and safety lockwire to hole in locking washer. LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201

(16) Remove rig pins.

(17) Perform Return to Service (RTS) test and verify that no yaw damper failures are recorded. (DFGS STATUS/TEST, SUBJECT 22-01-05).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

C. Adjust/Verify Yaw Damper Actuator Null Position Using MCDU

(1) Connect yaw damper electrical connectors.

(2) Close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 (Continued)

(Continued)

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
G	27	B10-345	YAW DAMPER-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

NOTE: Aircraft must be stationary and completely free of movement during this adjustment/test. MCDU power must be off when yaw damper switch is placed in the "ON" position. (Paragraph 4.C.(3))

(3) Place yaw damper switch located on cockpit overhead to "ON" position. This should place the actuator to the null position.

(4) On MCDU, select TEST PANEL page. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

NOTE: DFGS selected on MCDU must agree with DFGS selected on the Flight Guidance Control Panel.

(5) Initiate the "Maintenance Test" and enter "Sensor Values" section.

NOTE: DO NOT attempt to run complete Maintenance Test.

(6) Advance to "Yaw Damper Pos = XX.XX degrees".

(7) If yaw damper position displayed is 0(±00.05) degrees, advance to Paragraph 4.C.(11). If yaw damper position is not within ±00.05 degrees, proceed to Paragraph 4.C.(8).

(8) Remove dust cover to gain access to the gear shaft adjustment screw that will vary the actuator null. (Figure 201)

(9) Place yaw damper switch located on the cockpit overhead to the "override" position.

(10) Slowly rotate the adjustment screw on the back of the yaw damper until the MCDU shows a yaw damper position of 0(±00.05) degrees.

(11) Replace dust cover.

(12) With both rig pins installed in rudder sector , install bolt, nut and cotter pin connecting eyebolt and drive sector pushrod clevis. If holes align proceed to Paragraph 4.C.(15), if holes do not align proceed to Paragraph 4.C.(13). (Figure 201)

(13) Remove lockwire from actuator jamnut and eyebolt locking washer. Hold eyebolt firmly with wrench, loosen jamnut and run out as far as it will go. As jamnut is turned out, pull eyebolt locking washer out with it. Holding washer against jamnut, adjust eyebolt to the proper alignment with drive sector pushrod clevis.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 (Continued)

CAUTION: WITH EITHER JACKSCREW, EYEBOLT THREADS MUST EXTEND BEYOND THE WITNESS HOLE.

(14) Using witness hole, check eyebolt thread engagement.

CAUTION: WHEN EYEBOLT JAMNUT IS SECURED, CHECK ALIGNMENT OF DRIVE SECTOR PUSHROD. ANY MISALIGNMENT WILL CAUSE ROD TO COCK THE BEARING SURFACE ON THE FAR END OF THE SECTOR ASSEMBLY.

(15) Align slot in eyebolt with slot in jackscrew. Slide locking washer down eyebolt until it contacts jackscrew. Make certain that locking washer tab fits into both groove of eyebolt and groove of jackscrew. Tighten jamnut to torque of 50 in-lb (6 N·m) to 55 in-lb (6 N·m) and sfety lockwire to hole in locking washer. (LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201)

(16) Remove rig pins.

(17) Perform Return to Service (RTS) test and verify that no yaw damper failures are recorded. (DFGS STATUS/TEST, SUBJECT 22-01-05).

DUPLEX RUDDER SERVO DRIVE - MAINTENANCE PRACTICES

1. General

A. The Duplex Rudder Servo Drive and Servo Bracket are located overhead of the aft cargo compartment. The servo and bracket are accessible through the aft cargo bay loading door and then through access door 5726C located on the overhead.

B. On aircraft with auxiliary fuel tanks in the aft cargo compartment, access to the rudder servo drive is through the aft cargo bay loading door and then through access door 5726C located on the overhead. The servo drive is approximately 15 inches left of the center line at station 1124. Access door is 5726C.

C. After removal/installation of the servo drive and/or servo bracket, systems and components associated with servo drive operation should be in proper operating condition for servo drive testing.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

D. Servo drive testing is accomplished by performing a Return-To-Service test from the Status Test Panel (STP) (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

E. Servo drive testing is accomplished by performing a Return-To-Service test from the Multipurpose Control Display Unit (MCDU) (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

Table 201

Name and Number	Manufacturer
Lockwire, Inconel, NASM20995N20, DPM 684	Not Specified
Lockwire, Corrosion Resistant Steel, NASM20995C20, DPM 5865	Not Specified
Locking Clip, Turmbuckle (MS21256)	Not Specified
Torque wrench, (0 to 75 inch pounds range)	
Rig pin (6-4)	

3. Removal/Installation Duplex Rudder Servo Drive

A. Remove Servo Drive

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Disconnect servo drive electrical connectors.

(3) Remove lockwire and screws attaching servo drive to servo bracket.

(4) Carefully slide servo drive motor assembly straight out of servo drive mechanism.

(5) Carefully slide servo drive mechanism straight out of servo bracket.

(6) If servo drive motor and/or servo drive mechanism is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install Servo Drive

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Carefully slide servo drive mechanism into servo bracket engaging spline shaft with servo bracket drum splines, and properly mate guide pins.

(3) Carefully slide servo motor assembly onto servo drive mechanism.

(4) Install attaching screws and safety with lockwire. (LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201)

(5) Connect electrical connectors.

(6) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

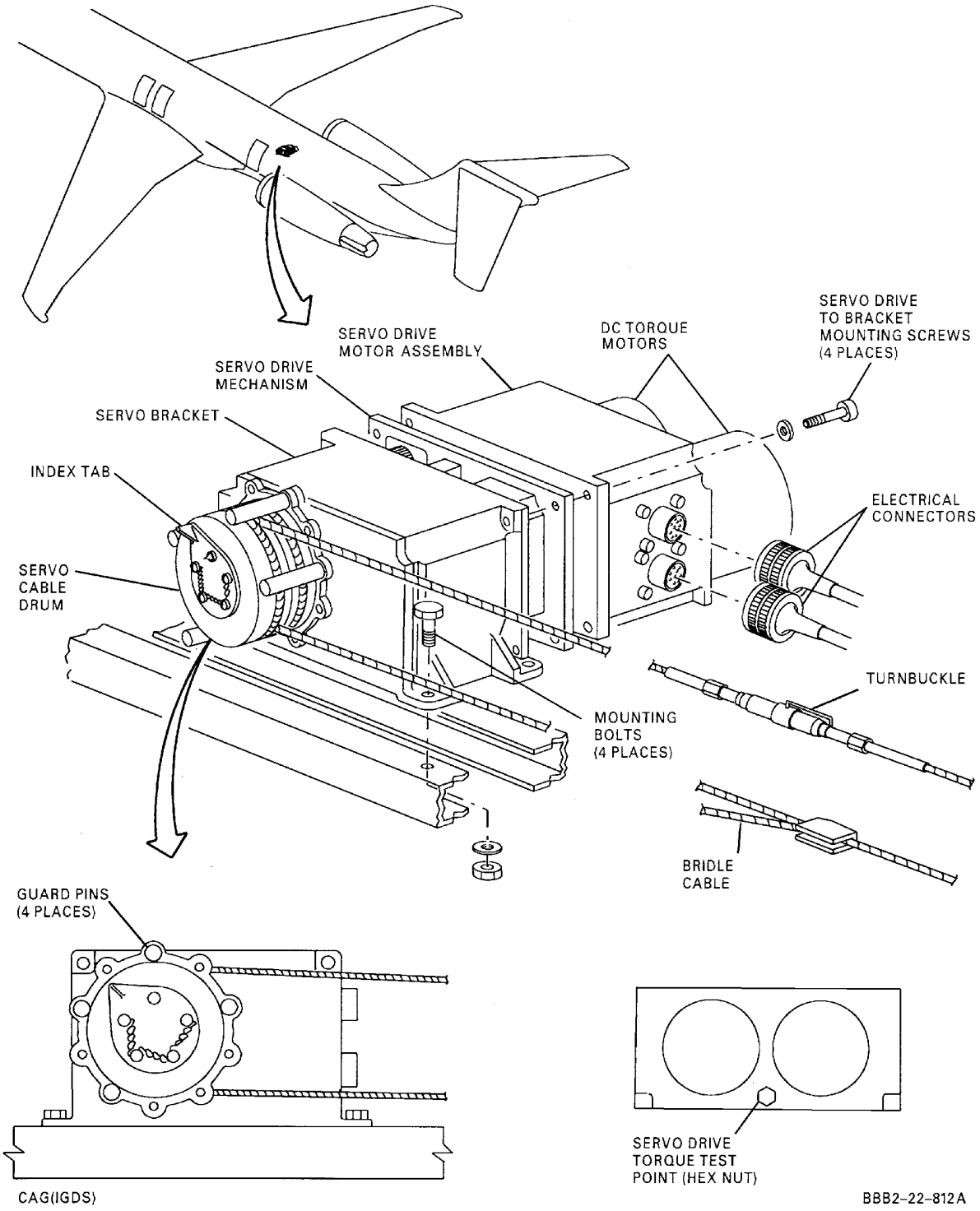
Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(7) Perform Adjustment/Test Duplex Rudder Servo Drive. (Paragraph 5.)



Rudder Servo Drive and Servo Bracket -- Removal/Installation
Figure 201/22-13-02-990-801

4. **Removal/Installation Duplex Rudder Servo Bracket**

A. Remove Servo Bracket

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

NOTE: Removal of the servo drive prior to removal of the servo bracket provides a lighter weight factor. (Paragraph 3.A.)

(2) Disconnect servo drive electrical connectors.

(3) Secure cables to servo drum to prevent unraveling, and disconnect turnbuckles.

(4) Remove servo bracket.

B. Install Servo Bracket

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

E	12	B10-354	AUTOPILOT-2

WJE ALL

(2) Install servo bracket and connect turnbuckles.

(3) Install rig pin 6-4 into rig pin hole R-11 in rudder sector.

NOTE: Access to the rudder sector is through the tailcone access door.

(4) Adjust turnbuckles for proper tension. (PAGEBLOCK 27-20-00/501)

(5) Remove rig pin.

(6) Install turnbuckle clips.

(7) Install servo drive if removed. (Paragraph 3.B.)

(8) Connect electrical connectors to servo drive.

(9) Remove the safety tags and close these circuit breakers:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	17	B10-367	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH A
C	18	B10-368	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH B

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	24	B10-353	AUTOPILOT-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

Row	Col	Number	Name
E	12	B10-354	AUTOPILOT-2

WJE ALL

(10) Perform Adjustment/Test Duplex Rudder Servo Drive.(Paragraph 5.)

5. Adjustment/Test Duplex Rudder Servo Drive

A. Adjustment/Test Servo Drive

NOTE: Verify servo drive is installed and servo bracket properly rigged for the following test.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

(1) On STP press and release POWER pushbutton. CMPVLD light comes on and the number 1 should appear. "FLIGHT FAULT REVIEW?" should be displayed.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893 (Continued)

(2) On FGCP, place DFGS switch to position 1 or position 2 as desired for test.

NOTE: If DFGS switch is in position 2, press and release CMPVLD pushbutton on STP and number 2 should appear.

(3) Press and release FSPCE key until "RUN MAINTENANCE TEST?" is displayed. Press and release VERIFY pushbutton and "SEL DFGC TEST SIDE - VERIFY" should be displayed.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(4) On MCDU, select TEST PANEL page. Selected DFGC and DFGC VALID STATUS will be displayed on lines 4L and 5L. "FLIGHT FAULT REVIEW?" should be displayed.

(5) On FGCP, place DFGS switch to position 1 or position 2 as desired for test. Make certain that selected DFGC on MCDU line 4L corresponds to DFGS switch.

(6) Press and release FWD key until "RUN MAINTENANCE TEST?" is displayed. Press and release VERIFY pushbutton and "SEL DFGC TEST SIDE - VERIFY" should be displayed.

WJE ALL

(7) Verify autopilot is disengaged.

(8) Attach torque wrench to rudder servo drive torque test point (Figure 201).

(9) Turn torque wrench in clockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 50 in-lb (6 N·m) and 70 in-lb (8 N·m). Allow torque wrench to slowly return to neutral.

(10) Turn torque wrench in counterclockwise direction of shaft rotation until reading is maximum, then hold steady. Torque reading should be between 50 in-lb (6 N·m) and 70 in-lb (8 N·m). Allow torque wrench to slowly return to neutral.

(11) Remove torque wrench.

(12) Perform Return to Service (RTS) test (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

AUTOPILOT ENGAGE INTERLOCKS - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing Autopilot Engage Interlock trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The Engage Interlocks may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing Autopilot Engage Interlock trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The Engage Interlocks may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

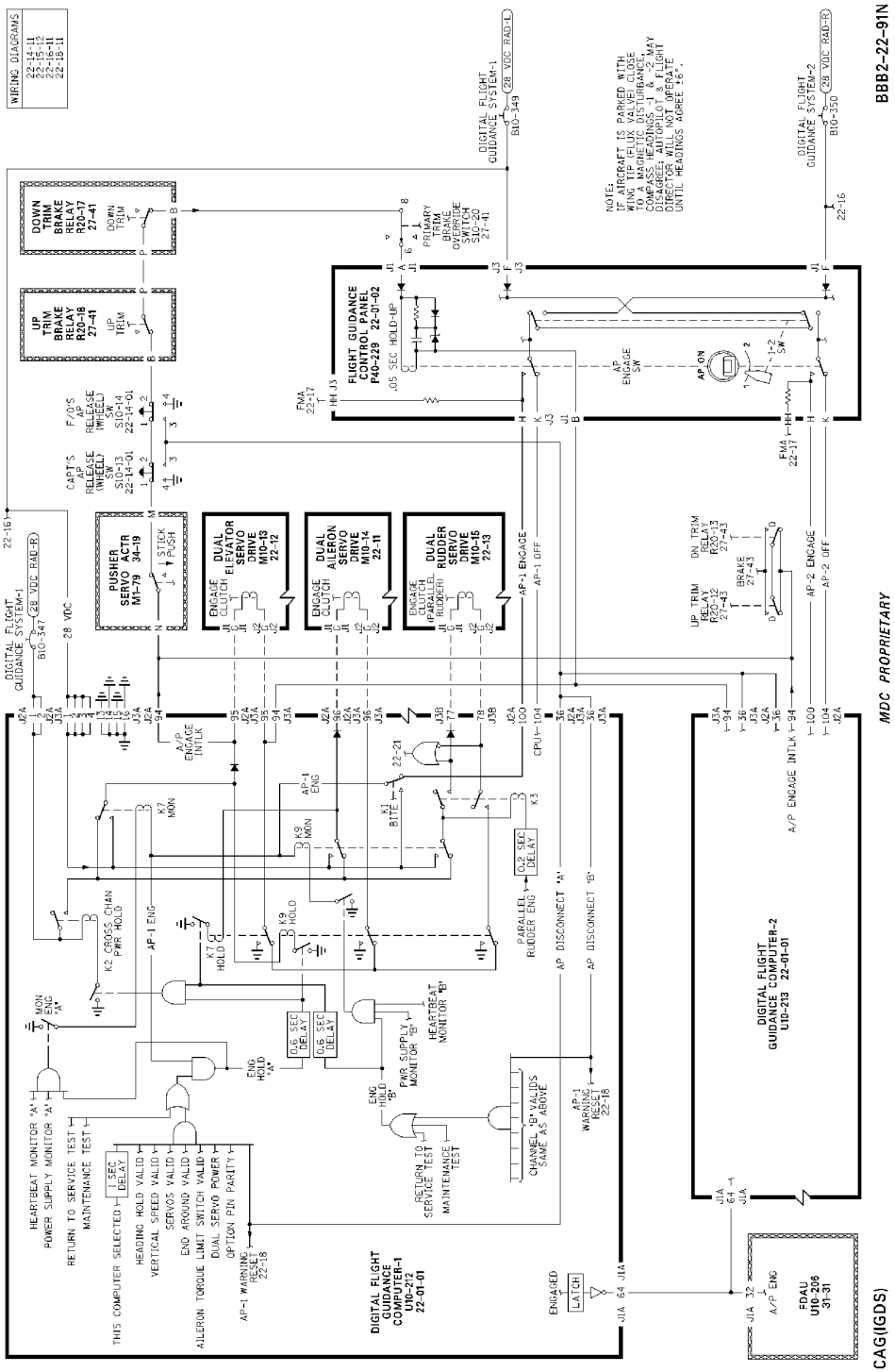
C. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on engage interlocks is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to engage interlocks and associated system interface.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

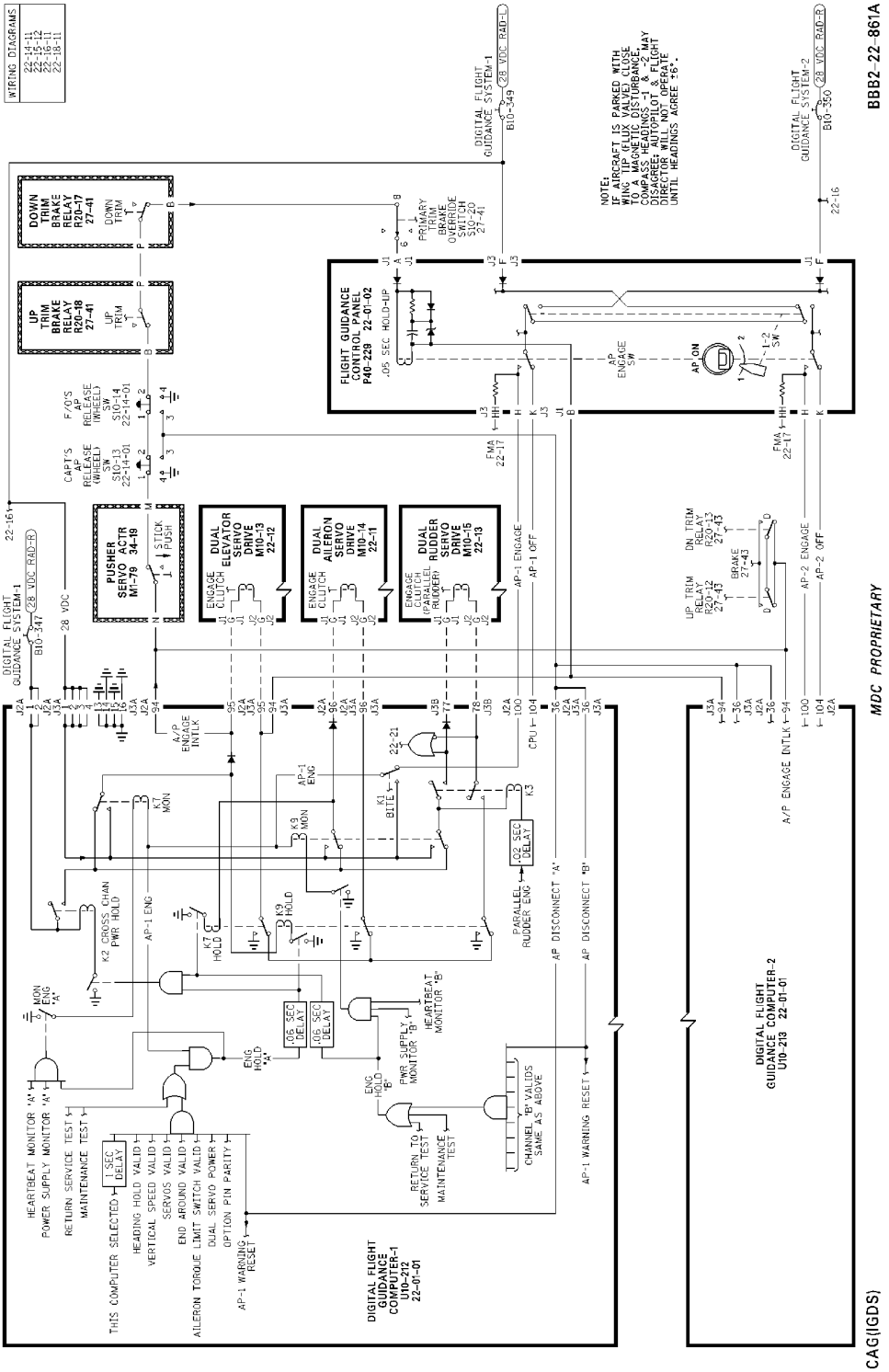
Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on engage interlocks is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to engage interlocks and associated system interface.

WJE ALL

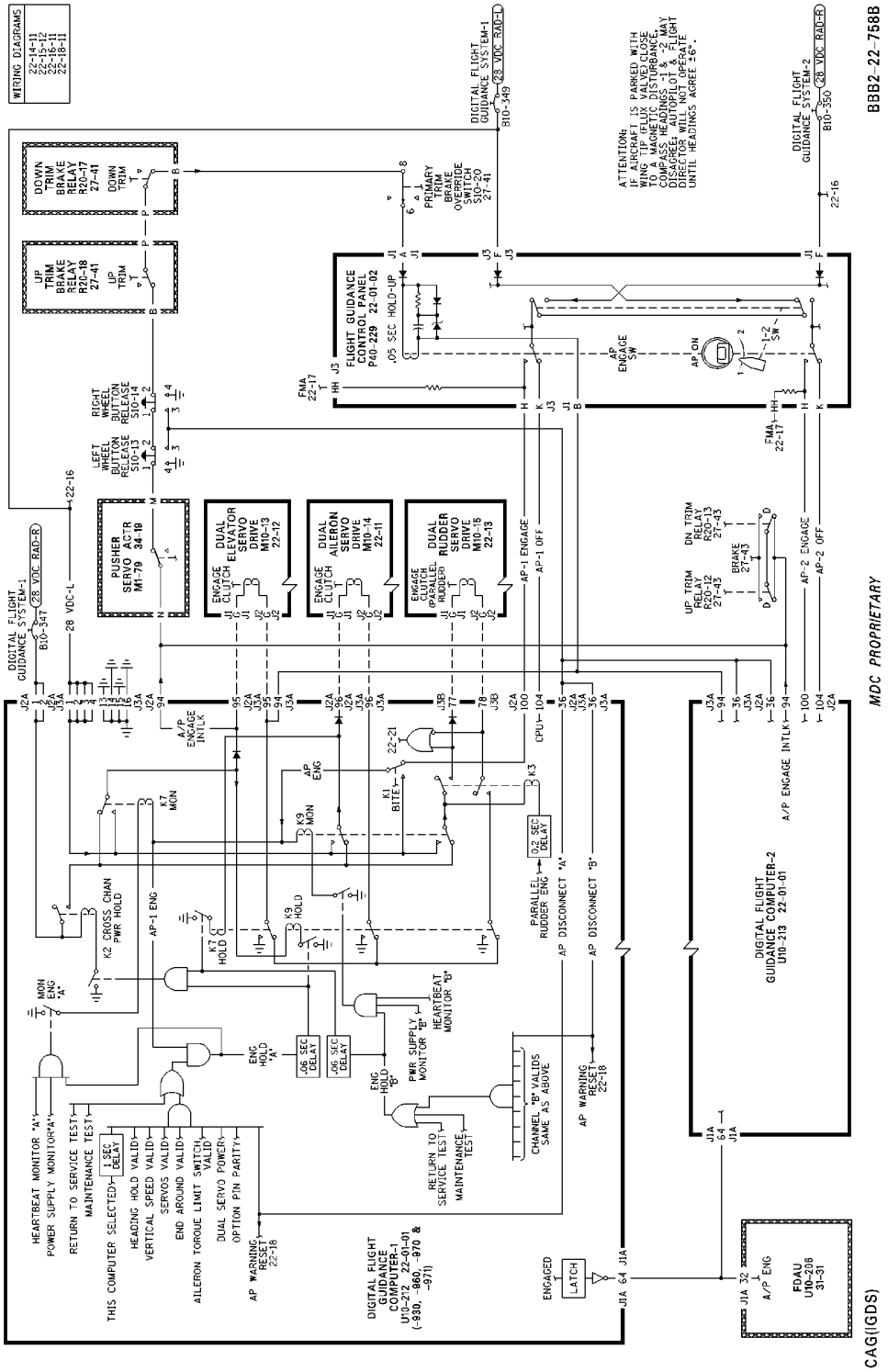
D. If disconnect occurs in icing conditions, trouble shoot possible EPR problems. (ENGINE PRESSURE RATIO (EPR) INDICATION SYSTEM - TROUBLE SHOOTING, PAGEBLOCK 77-11-01/101 Config 1 or ENGINE PRESSURE RATIO (EPR) INDICATION SYSTEM - TROUBLE SHOOTING, PAGEBLOCK 77-11-01/101 Config 2)



AP Engage Interlocks
Figure 101/22-14-00-990-801



AP Engage Interlocks
Figure 102/22-14-00-990-803



AP Engage Interlocks
Figure 103/22-14-00-990-807

SWITCH, AUTOPILOT RELEASE - REMOVAL/INSTALLATION

1. General

A. This procedure has the removal and installation instructions for the autopilot release switch.

B. The autopilot release switch is located on the outboard side of each control wheel.

C. Removal and installation procedures are identical for left and right autopilot release switches.

2. Removal/Installation Autopilot Release Switch

A. Remove Autopilot Release Switch

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Remove set screw (2) that holds autopilot release switch (1) to receptacle (3). (Figure 401)

(3) Pull release switch (1) straight out from the receptacle (3).

(4) Tag switch wires for installation.

(5) Remove four nuts (4), washers (5) and screws (6) that hold the four terminal lugs (7) to the release switch (1).

B. Install Autopilot Release Switch

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Connect four terminal lugs (7) to release switch (1) using four screws (6), washers (5) and nuts (4). (Figure 401)

(3) Remove tags from wires.

(4) Insert release switch (1) into receptacle (3).

(5) Align screw holes and install set screw (2).

(6) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

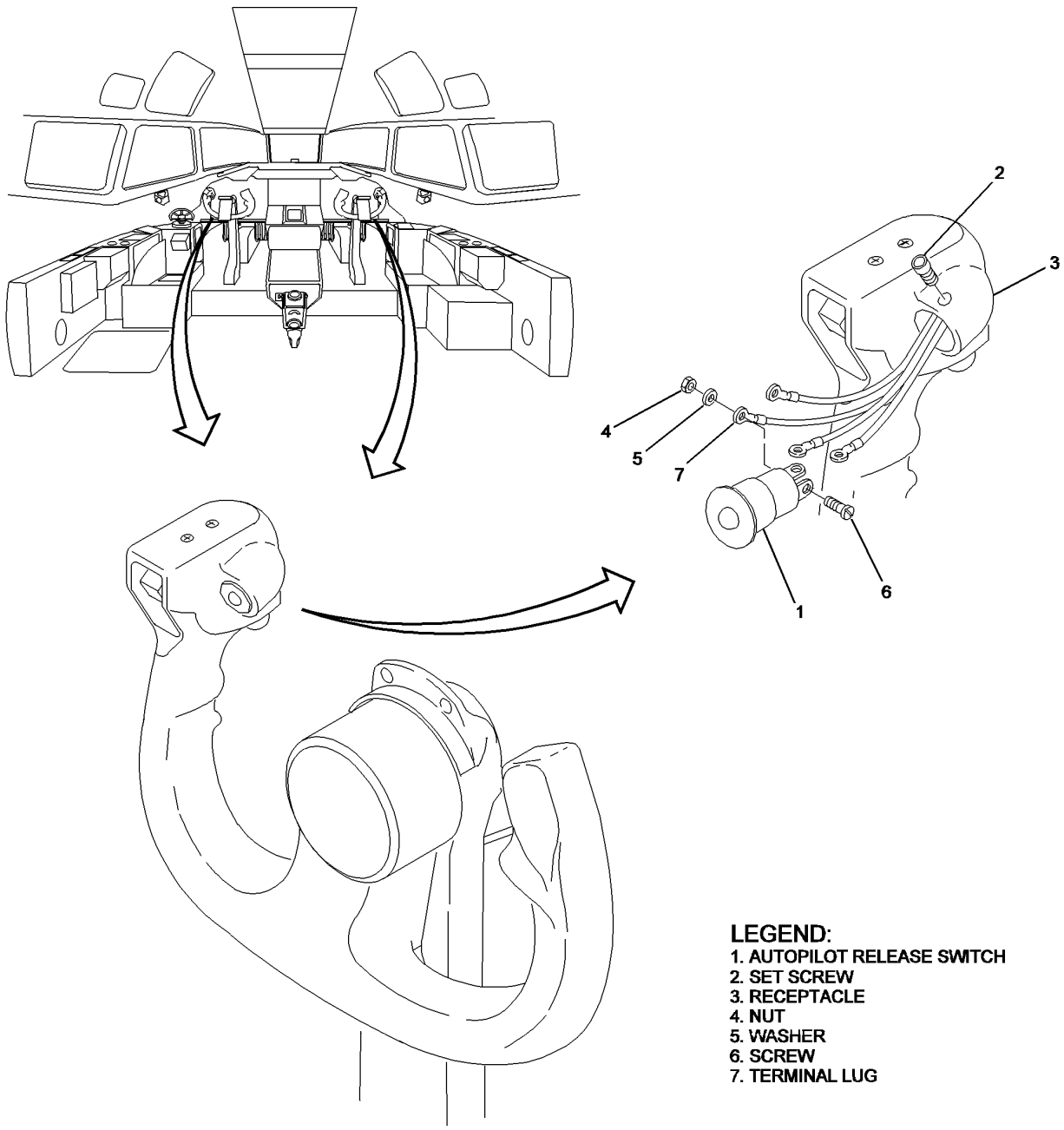
WJE 401-412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-881, 883, 884, 886, 887, 891-893

(7) Check operation of autopilot release switch. (AUTOPILOT - MAINTENANCE PRACTICES, PAGEBLOCK 22-10-00/201 Config 1)

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

(8) Check operation of autopilot release switch. (AUTOPILOT - MAINTENANCE PRACTICES, PAGEBLOCK 22-10-00/201 Config 3)

WJE ALL



Autopilot Release Switch - Removal/Installation
Figure 401/22-14-01-990-801

FLIGHT GUIDANCE POWER - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing Flight Guidance Power trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. Flight Guidance Power may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/ TEST, SUBJECT 22-01-05, Page 201).

B. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on Flight Guidance Power is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to Flight Guidance Power and associated system interface.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

C. Prior to performing Flight Guidance Power trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. Flight Guidance Power may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/ TEST, SUBJECT 22-01-05, Page 201).

D. Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on Flight Guidance Power is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to Flight Guidance Power and associated system interface.

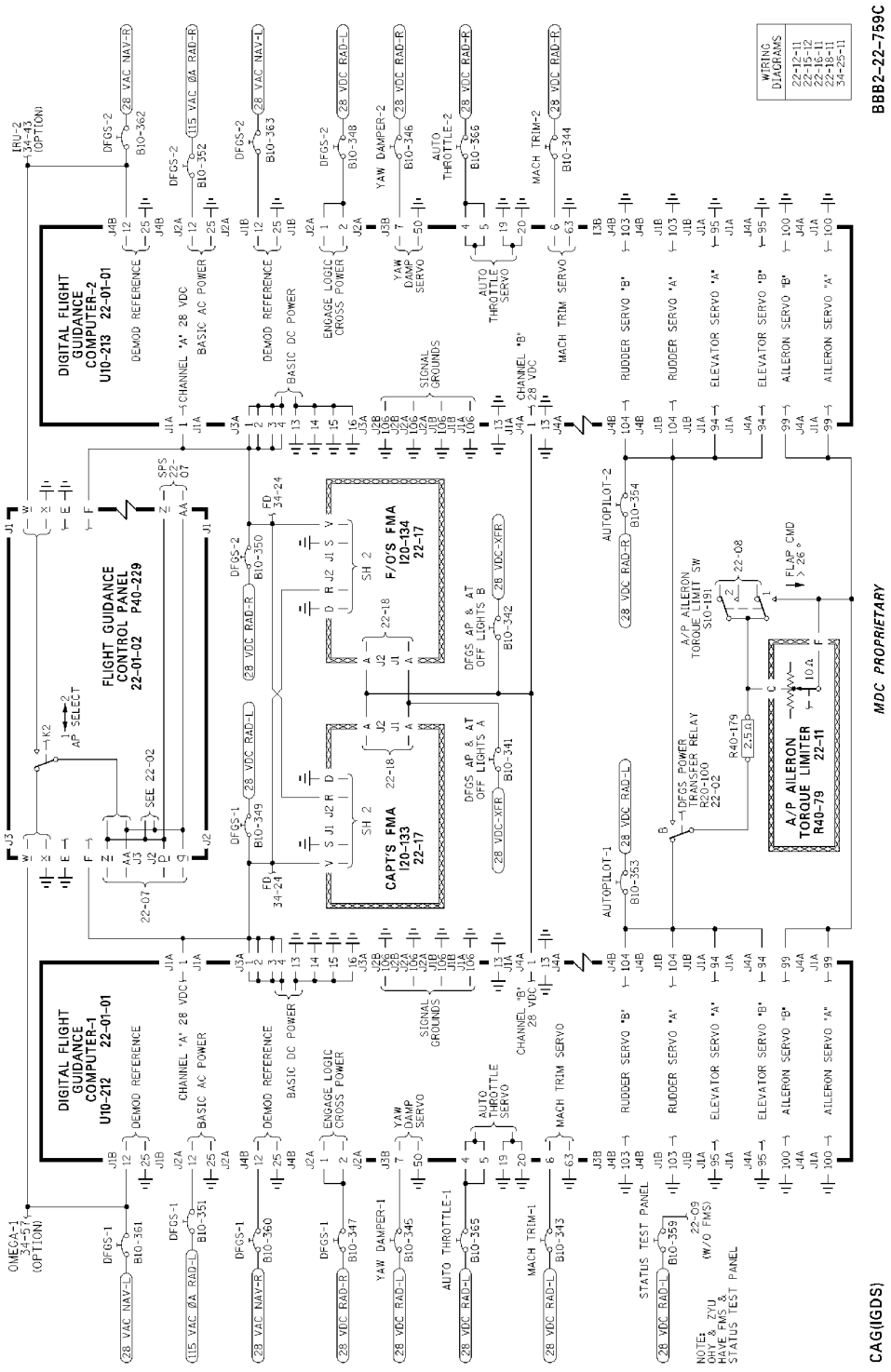
E. Depending on which source of power is missing, the MCDU functions might not be available. Should the DFGC fail power-up test (for input power), the message "PWR UP TST BOX 1 (or 2)" will remain displayed in the FMA.

F. If the DFGC can detect what input power is missing during the power-up test, the following message will be appear in the FMA: "FAIL PWR TEST BOX 1 (or 2)". The FMA will then display below this message one of the following failure messages:

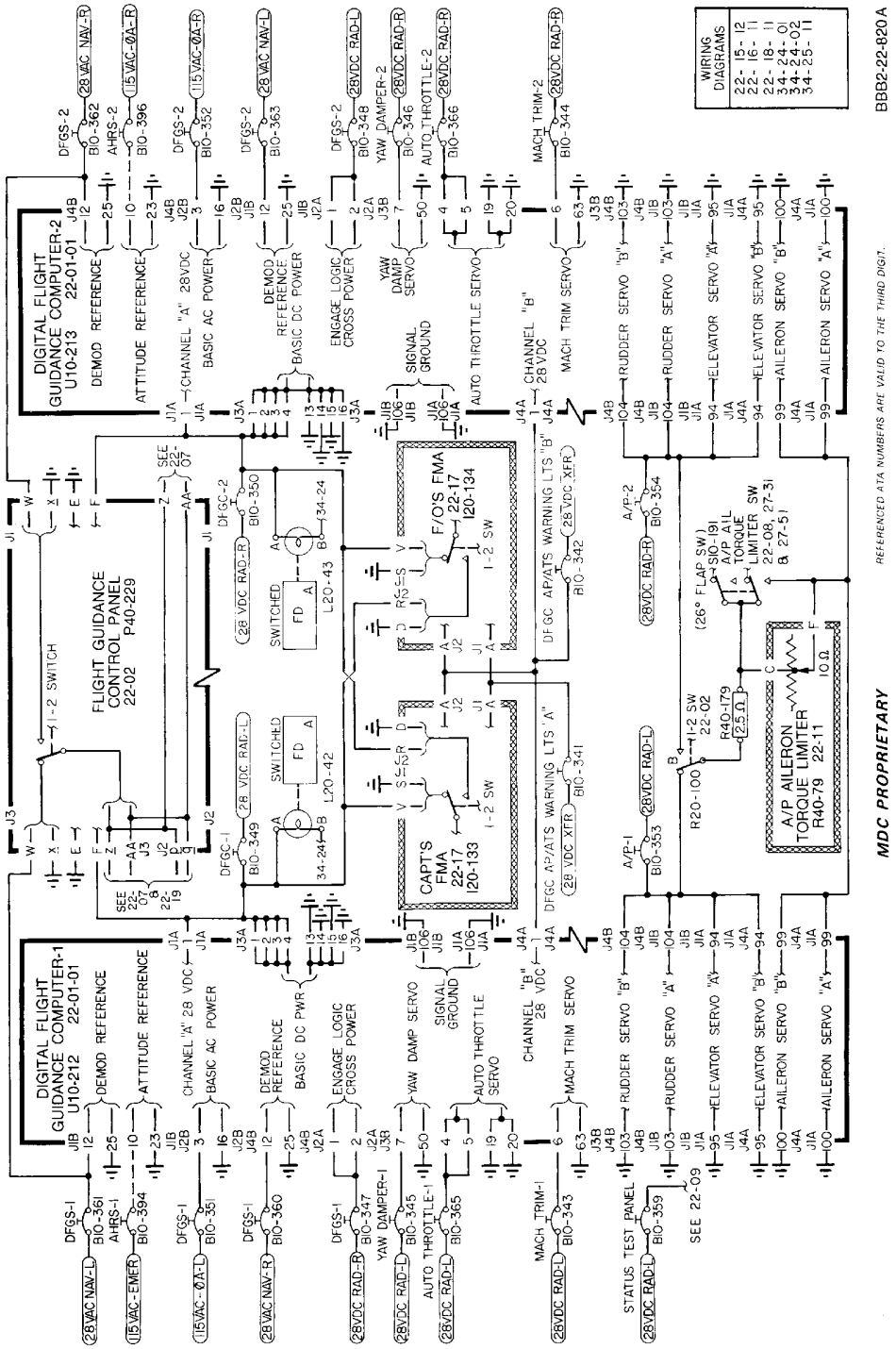
28 VDC - for loss of 28 vdc (left for DFGC #1) (right for DFGC #2) 28 VAC LEFT - for loss of 26 vac switched "A" power 28 VAC RGT - for loss of 26 vac switched "B" power 28 VAC REF - for loss of both 26 vac left and right bus power

NOTE: Failure of the DFGC to power up might be caused by a stuck ground (GND) input from the control yoke, AP disconnect switches. DFGC jack J3B pin 36 and J2A pin 36 should be checked for a continuous ground.

NOTE: Failure of the DFGC to come on line might also be cause for failure of the input power from circuit breaker B10-342 (DFGC AP/ATS WARNING LTS "B").



Flight Guidance Power
Figure 101/22-16-00-990-803 (Sheet 1 of 2)



Flight Guidance Power
Figure 101/22-16-00-990-803 (Sheet 2 of 2)

FLIGHT MODE ANNUNCIATORS - DESCRIPTION AND OPERATION

1. General

A. The Flight Mode Annunciators (FMA's) are provided to display AP/FD and Autothrottle modal/arm annunciations, comparator/failure legends and autopilot/autothrottle off warning. There are two FMA's, one located on the captain's instrument panel, and the other located on the first officer's instrument panel.

B. The FMA's are separated into three functional areas, Flight Mode displays, fixed legend Comparator/Failure displays and fixed legend FD-AP operating displays. The FMA's also have a RESET switch for the Comparator/Failure displays. (Figure 1)

C. The FMA's have three electronic printed wire board (PWB) sub-assemblies, a power supply and character driver, a control/segment driver, and an alphanumeric display assembly.

2. Functional Description

(Figure 2)

A. Flight Mode Displays

(1) Flight Mode Displays are comprised of four sections. The four sections present Autothrottle operating modes in green color, AP/FD armed modes in yellow color, and AP/FD roll and pitch axis operating modes in green color. The autothrottle and pitch sections consist of 7 characters each, and the armed and roll sections consist of 6 characters each. The characters are comprised of 16 segment alphanumeric incandescent displays.

(2) Display logic to each of the four sections is provided by means of selected DFGC serial data input. The serial data input is processed through a DECODER/MEMORY where the signal is decoded and stored in memory. One bit of information is stored for each of the 16 segments of the 26 display characters. A multiplexer picks up the stored bits and determines which segments are to receive power and which segments are to remain grounded to provide the proper alphanumeric display.

(3) A DROPOUT DETECTOR blanks all four sections until 26 serial data words are received after the system is turned on (i.e. placing flight director switch on). If any serial data is lost for more than 1 1/2 seconds, or a malfunction or failure occurs within the on-side DFGC, the DROPOUT DETECTOR will not retrigger and all four sections will be blank until 26 serial data words are again received.

B. Fixed Legend Displays

(1) There are eleven fixed legend displays located on the upper portion of each FMA . Each legend is back lighted by two incandescent lamps. (Figure 1)

(2) AP and THROTTLE Warning Displays - The AP and THROTTLE Warning lights receive power from the DFGS AP and AT OFF LIGHTS A and B circuit breakers. The AP light will come on and flash red whenever either autopilot release button on the captain's or first officer's control wheel is pressed with the autopilot engaged, the AP switch on the Flight Guidance Control panel is placed off or by a failure detected by the DFGC causing autopilot disengagement. This provides a ground to AP WARN A and B. Circuitry within the DFGC causes an interruption of the ground providing a flashing warning light. The AP light can be reset by pressing either autopilot release button or reengaging the autopilot.

(3) When the autothrottle is disengaged either by use of the throttle disconnect buttons, manually placed off or by a failure detected by the DFGC, the THROTTLE light will come on and flash red. The exception is when reverse thrust is applied, the autothrottle then automatically disengages, and the THROTTLE Warning light is inhibited. When the autothrottle is disengaged, THROT WARN A and B power is grounded, and circuitry within the DFGC causes an interruption of the ground providing a flashing warning light. The light can be reset by pressing either autothrottle disconnect switch, or reengaging the autothrottle.

(4) Comparator/Failure Displays - ILS/HOR/HDG/MON WARN PWR is applied to the Comparator/Failure legends or monitor circuitry when aircraft power is applied and the system is turned on. An out of tolerance comparison or failure will ground the appropriate input (i.e. HEADING WARN), causing the light to come on. The lights will come on amber, and can be turned off by pressing the RESET switch.

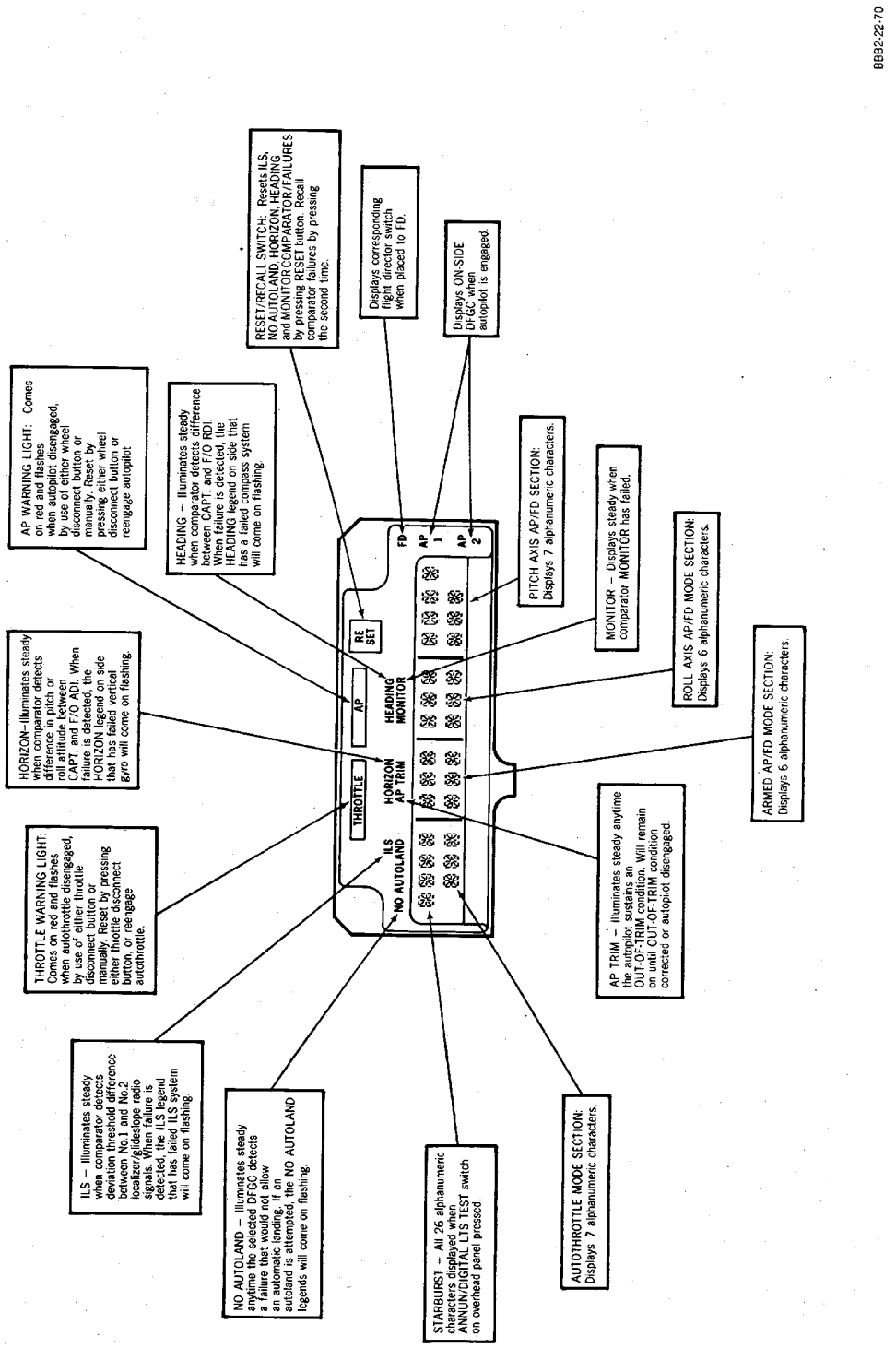
(5) NO AUTOLAND Display - A failure in the Autoland circuitry will ground the NO AUTOLAND WARN A and B inputs and the NO AUTOLAND lights will come on. The NO AUTOLAND light can be turned off by use of the RESET switch. However, if the AUTO LAND pushbutton of the Flight Guidance Control panel is subsequently pressed, the NO AUTOLAND legend will again annunciate by flashing.

(6) AP TRIM Display - A sustained out-of-trim condition will ground the AP TRIM WARN A and B inputs and the AP TRIM lights will come on. The AP TRIM lights cannot be reset, unless the out-of-trim condition is corrected, or the autopilot is disengaged.

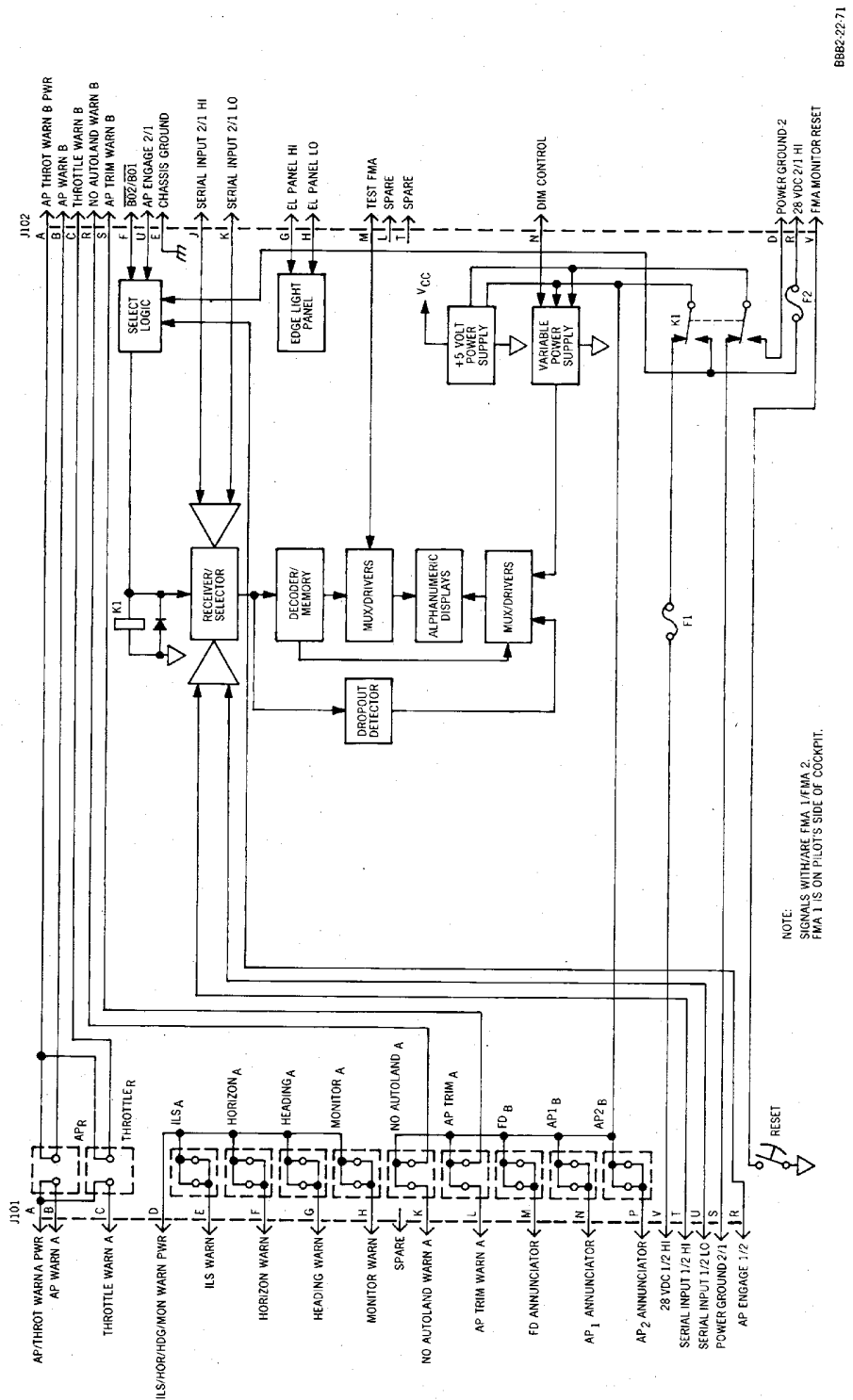
(7) FD, AP 1, AP 2 Displays - When a FD switch on the Flight Guidance Control panel is placed on, the blue FD light on the associated FMA will be grounded and annunciated. When the autopilot is engaged, and the DFGC selector switch is set to 1 or 2, the corresponding AP 1 or AP 2 blue light will be grounded and annunciated on both FMA's.

C. FMA Select Logic

(1) During flight director operation with the FD CMD switch on the overhead panel placed in BOTH ON 1 or BOTH ON 2, or when the autopilot is engaged, a signal is sent to FMA Select Logic. The logic determines which DFGC to monitor, and the resultant signal is fed to the select relay and receiver/selector. 28 VDC is received from the selected power bus and fed through the K1 relay contacts to the VARIABLE POWER SUPPLY and +5 VOLT POWER SUPPLY to turn on the appropriate annunciator and legends.



Flight Mode Annunciator
Figure 1/22-17-00-990-801



FMA Functional Block Diagram
Figure 2/22-17-00-990-802

3. Operation

A. Fixed Legend Displays

(1) ILS Comparator/Failure Display - The ILS legend will illuminate steady on both FMA's when the comparator detects a deviation difference between No. 1 and No. 2 localizer/glideslope radio signals that exceed a predetermined threshold. When a failure affects localizer or glideslope validity (flag in view), the ILS system that has failed, will illuminate flashing on the failed side. The ILS legend on the other side will remain on steady.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(2) HORIZON Comparator/Failure Display - The HORIZON legend will illuminate steady on both FMA's when the comparator detects a difference in pitch and/or roll attitude between the captain's and first officer's ADI's or Primary Flight Displays (PFD's) that exceed a predetermined threshold. When a failure affects the HORIZON (ADI attitude) validity i.e. flag in view, the horizon system that has failed will illuminate the HORIZON display flashing on the failed side. The HORIZON legend on the other side will remain on steady.

NOTE: If the HORIZON legend comes on steady, due to comparator error resulting from turn error effects on the vertical gyro, the comparator will reset automatically, and the HORIZON legends will go off when the error drops below the set threshold.

WJE ALL

(3) HORIZON Comparator/Failure Display - The HORIZON legend will illuminate steady on both FMA's when the comparator detects a difference in pitch and/or roll attitude between the captain's and first officer's ADI's that exceed a predetermined threshold. When a failure affects the HORIZON (ADI attitude) validity i.e. flag in view, the horizon system that has failed will illuminate the HORIZON display flashing on the failed side. The HORIZON legend on the other side will remain on steady.

NOTE: If the HORIZON legend comes on steady, due to comparator error resulting from turn error effects on the vertical gyro, the comparator will reset automatically, and the HORIZON legends will go off when the error drops below the set threshold.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(4) HEADING Comparator/Failure Display - The HEADING legend will illuminate steady on both FMA's when the comparator detects a difference between the captain's and first officer's HSI's or Navigation Displays (ND's) that exceed a predetermined threshold. When a failure affects the heading validity (flag in view), the compass system that has failed will illuminate the HEADING legend flashing on the failed side. The HEADING legend on the other side will remain on steady.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

(5) HEADING Comparator/Failure Display - The HEADING legend will illuminate steady on both FMA's when the comparator detects a difference between the captain's and first officer's HSI's that exceed a predetermined threshold. When a failure affects the heading validity (flag in view), the compass system that has failed will illuminate the HEADING legend flashing on the failed side. The HEADING legend on the other side will remain on steady.

WJE ALL

(6) MONITOR Display - The MONITOR legend on both FMA's will come on steady anytime a failure affects the validity of the comparator monitor.

(7) NO AUTOLAND Display - The NO AUTOLAND legend will illuminate steady anytime the selected DFGC detects a failure that would affect the DFGS from successfully completing a full fail passive autoland maneuver. If during an autoland maneuver, the DFGC detects a degradation of the system, i.e. one ILS receiver invalid, the NO AUTOLAND legend will illuminate flashing and the autopilot will disengage.

(8) AP TRIM Display - The AP TRIM legend will illuminate steady on both FMA's anytime a sustained out-of-trim condition exists (approximately 5 seconds). The AP TRIM legends will remain on until the out-of-trim condition is corrected, or the autopilot is disengaged.

(9) FD, AP 1, AP 2 Displays - FD, AP 1 or AP 2 operating legends provide the flight crew with a visual indication to the operating status of the Flight Guidance system. Placing the flight director switch on, will illuminate the FD legend on the corresponding FMA. Engaging the autopilot, will illuminate either the AP 1 or AP 2 legend that corresponds with the selected DFGC (1 or 2) on the Flight Guidance Control panel. At this time, with flight director on, the legends will display FD and the selected DFGC, AP 1 or AP 2.

WJE ALL PRE DC9-AOL-1627A

NOTE: The FD Lights are active.

WJE ALL

(10) RESET Switch - The ILS, HORIZON, HEADING, MONITOR and NO AUTOLAND legends can be reset by pressing the RESET switch on either FMA. The legend will remain reset as long as the comparator or failure remains. Any comparator or failure that has been reset can be recalled by pressing the reset switch and will remain displayed as long as the switch is pressed.

NOTE: The comparator and failure monitor circuit will automatically reset if the comparator error is again within the operating threshold or the system validity is restored (flag out of view).

(11) AP Display - The AP legend will come on red and flash any time the autopilot is disengaged, either manually or by system interlocks. An additional aural warning tone will sound when the autopilot is disengaged during or after an automatic landing. The AP lights can be reset by pressing either control wheel AP disconnect switch or reengaging the autopilot.

(12) THROTTLE Display - The THROTTLE legend will come on red and flash anytime the autothrottle is disengaged either manually or by system interlocks. The exception is during landing rollout, when the autothrottle is disengaged by placing the throttle levers in reverse thrust. The throttle lights can be reset by pressing either autothrottle disconnect button, or reengaging the autothrottle.

NOTE: Pressing the RESET switch will have no affect on the AP or THROTTLE warning lights.

B. Flight Mode Displays

(1) All four sections of the FMA are blank when the flight director, autopilot, and autothrottle are disengaged (off). The FMA's display the armed and operating modes of their respective flight director except when the autopilot is engaged, then both FMA's display the autopilot operating modes. If there is a modes mismatch between DFGC-1 and DFGC-2, the command display of the flight director not associated with the engaged autopilot will bias out of view. Engaging the autothrottle, activates the autothrottle mode annunciators.

(2) The following is a list and meaning of annunciators that may appear in the four sections of the FMA:

(a) Autothrottle Annunciations.

Table 1 Autothrottle Annunciations

AUTO LND	Appears for approximately 20 seconds while auto land preflight ground test is in progress.
CLMP	Indicates power removed from throttle servo (throttle servo remains stationary but normal pilot control not affected).
RETD	Indicates controlled throttles are automatically being retarded during the flare maneuver.
ALFA SPD	Indicates controlled throttles to safe reference speed (greater than selected speed).
MACH 784	Indicates controlled throttles to automatically maintain mach selected on SPD/MACH readout window.
SPD 250	Indicates controlled throttles to automatically maintain speed selected on SPD/MACH readout window.
FLAP LIM	Indicates controlled throttles being limited because selected speed or mach is greater than flap placard reference speed.
SLAT LIM	Indicates controlled throttles being limited because selected speed or mach is greater than slat design limit.
ATS LIM	Indicates controlled throttle being limited because required thrust is greater or less than authority limits.
LOW LIM	Indicates throttles are being limited for "retard" autothrottle commands because both throttles are aft of the low limit switch position.
SPD ATL	Indicates speed limited to EPR.
MACH ATL	Indicates mach limited to EPR.
EPR TO	Indicates controlled throttles to automatically maintain EPR takeoff limit.
EPR FLX	Indicates controlled throttles to automatically maintain EPR derated takeoff thrust limit.
EPR ATO	Indicates controlled throttles to maintain EPR alternate takeoff limit.
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893	
EPR 23	Indicates ATS in EPR mode with 23° selected on ASSUMED TEMP selector and TO FLX thrust selected.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
EPR 23	Indicates ATS in EPR LIM mode with 23° selected on ASSUMED TEMP selector and TO FLX thrust selected.
WJE ALL	
EPR G/A	Indicates controlled throttles to automatically maintain go-around limit.
EPR MCT	Indicates controlled throttles to maintain EPR maximum continuous thrust limit.
EPR CL	Indicates controlled throttles to maintain EPR climb thrust limit.
EPR CR	Indicates controlled throttles to maintain EPR cruise thrust limit.
VMO LIM	Indicates controlled throttles to maintain IAS below the Vmo limit.
MMO LIM	Indicates controlled throttles to maintain Mach number below the Mmo limit.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
PERF CLB	Indicates controlled throttles to maintain commanded performance climb EPR (aircraft with PMS).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 (Continued)

Table 1 Autothrottle Annunciations (Continued)

PERF CRZ	Indicates controlled throttles to maintain commanded performance cruise EPR (aircraft with PMS).
PERF DES	Indicates controlled throttles to maintain commanded performance climb EPR (aircraft with PMS).
WJE 405-411, 880, 881, 883, 884	
PERF CLB	Indicates controlled throttles to maintain commanded performance climb EPR.
PERF CRZ	Indicates controlled throttles to maintain commanded performance cruise EPR .
PERF DES	Indicates controlled throttles to maintain commanded performance idle EPR (aircraft with PMS). .
WJE 873, 874, 886, 887, 892, 893	
PERF CLB	Indicates controlled throttles to maintain commanded performance climb EPR.
PERF CRZ	Indicates controlled throttles to maintain commanded performance cruise EPR.
PERF DES	Indicates controlled throttles to maintain commanded performance idle EPR.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
ATS OFF	Indicates PERF mode selected and autothrottle not engaged (aircraft with PMS).
WJE 401-404, 412, 414, 875-879	
FMS EPR	Displayed when FMS is engaged and controlling the throttles to a computed thrust setting.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
FMS EPR	Displayed when FMS is engaged and controlling the throttles to a computed thrust setting (aircraft with FMS)
FMS SPD	Displayed when FMS is engaged and controlling the throttles to maintain a target airspeed (aircraft with FMS).
FMS SPD	Displayed when FMS is engaged and controlling the throttles to maintain a target airspeed.
FMS IDL	Displayed when FMS is engaged and controlling the throttles to idle thrust (aircraft with FMS).
WJE 401-404, 412, 414, 875-879	
FMS IDL	Displayed when FMS is engaged and controlling the throttles to idle thrust.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
MNT/RTS	Indicates Maintenance or Return-To-Service test is being performed by use of the Status Test Panel (STP) or FMS MCDU.
WJE 405-411, 873, 874, 880, 881, 883, 884, 886, 887, 892, 893	
ATS OFF	Indicates PERF mode selected and autothrottle not engaged.
WJE ALL	
MNT/RTS	Indicates Maintenance or Return-To-Service test is being performed by use of the Status Test Panel (STP).

(b) Armed Annunciations.

Table 2 Armed Annunciations

PRE	Appears for approximately 20 seconds while auto land preflight ground test is in progress.
LND	Indicates AUTO LAND mode is armed for automatic capture of the selected ILS for automatic landing.
ILS	Indicates ILS mode is armed for automatic capture of localizer and glideslope of the selected ILS.
LOC	Indicates LOC mode is armed for automatic capture of selected localizer course.
VOR	Indicates VOR mode is armed for automatic capture of VHF omni-range radial.
ALT	Indicates altitude preselect is armed for automatic capture of preset altitude.
LND ALT	Indicates AUTO LAND mode is armed for automatic capture of the selected ILS and altitude pre select is armed for selected altitude.
ILS ALT	Indicates ILS mode is armed for automatic capture of the selected ILS and altitude preselect is armed for selected altitude.
LOC ALT	Indicates LOC mode is armed for automatic capture of selected localizer and altitude pre select is armed for selected altitude.
VOR ALT	Indicates VOR mode is armed for automatic capture of VHF omni-range radial and altitude pre select is armed for selected altitude.
WJE 401-411, 873-881, 883, 884, 886, 887, 892, 893	
NAV	Displayed when NAV is selected and the FMS is ready for engagement but waiting for all necessary capture criteria to be satisfied.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
NAV	Displayed when NAV is selected and the FMS is ready for engagement but waiting for all necessary capture criteria to be satisfied (aircraft with FMS).
WJE ALL	
AUT GA	Indicates dual rudder servo on line after localizer and glideslope track, radio altitude less than 1500 feet and the FGS has the capability for an automatic go-around.
FD GA	Indicates that after localizer and glideslope track that flight crew must manually follow flight director pitch commands if go-around is selected.
MAN GA	Indicates after localizer and glideslope track that flight crew must manually perform go-around maneuver, using the fixed pitch attitude procedure.

(c) Roll Mode Annunciations.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

Table 3 Roll Mode Annunciations

VOR CRS	Indicates the VOR mode is engaged and over-station passage is occurring. The VOR magnetic course being held during VOR TRK is being maintained.
LOC CAP	Indicates LOC, ILS, or AUTO LAND mode is engaged and capture of the selected ILS localizer has been initiated.
LOC TRK	Indicates LOC, ILS, or AUTO LAND mode is engaged and the localizer of the selected ILS is being tracked.
TAK OFF	Indicates the flight director takeoff mode is engaged. After lift-off the existing magnetic heading is maintained.
WNG LVL	Indicates turbulence mode engaged, and flight director roll commands for wings level are being displayed.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893 (Continued)

Table 3 Roll Mode Annunciations (Continued)

GO RND	Indicates go-around mode is engaged, and the existing magnetic heading is being maintained.
AUT LND	Indicates the AUTO LAND mode is engaged, radio altitude less than 1500 feet, and all logic is satisfied for a complete automatic landing.
ALN	Indicates the align mode is engaged, and the airplane is being maneuvered to maintain runway alignment. Occurs approximately at 145 feet.
ROL OUT	Indicates that main gear wheel spin-up has occurred, and remains annunciated until nosegear touchdown.
WJE 401-404, 412, 414, 875-879	
NAV CAP	Displayed when FMS NAV is engaged and capturing a new lateral course or when bank angles exceeding 10 degrees are required.
NAV TRK	Displayed when FMS NAV is engaged and has captured and is now tracking the desired course.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

Table 4 Roll Mode Annunciations

FLT	Appears for approximately 20 seconds while auto land preflight ground test is in progress.
HDG HLD	Indicates heading hold (basic roll mode) engaged and existing magnetic heading is being maintained.
HDG SEL	Indicates heading select mode engaged, and head ing selected on readout window is the heading reference.
VOR CAP	Indicates VOR mode is engaged and automatic capture of the VHF omni-range radial has been initiated.
VOR TRK	Indicates VOR mode is engaged and the airplane is tracking the selected VOR radial.
VOR CRS	Indicates the VOR mode is engaged and over-station passage is occurring. The VOR magnetic course being held during VOR TRK is being maintained.
LOC CAP	Indicates LOC, ILS, or AUTO LAND mode is engaged and capture of the selected ILS localizer has been initiated.
LOK TRK	Indicates LOC, ILS, or AUTO LAND mode is engaged and the localizer of the selected ILS is being tracked.
TAK OFF	Indicates the flight director takeoff mode is engaged. After lift-off the existing magnetic heading is maintained.
WNG LVL	Indicates turbulence mode engaged, and flight director roll commands for wings level are being displayed.
GO RND	Indicates go-around mode is engaged, and the existing magnetic heading is being maintained.
AUT LND	Indicates the AUTO LAND mode is engaged, radio altitude less than 1500 feet, and all logic is satisfied for a complete automatic landing.
ALN	Indicates the align mode is engaged, and the airplane is being maneuvered to maintain runway alignment. Occurs approximately at 145 feet.
ROL OUT	Indicates that main gear wheel spin-up has occurred, and remains annunciated until nosegear touchdown.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 (Continued)

Table 4 Roll Mode Annunciations (Continued)

NAV CAP	Displayed when FMS NAV is engaged and capturing a new lateral course or when bank angles exceed ing 10 degrees are required (aircraft with FMS).
NAV TRK	Displayed when FMS NAV is engaged and has cap tured and is now tracking the desired course (aircraft with FMS).

WJE ALL

(d) Pitch Mode Annunciations.

Table 5 Pitch Mode Annunciations.

TEST	Appears for approximately 20 seconds while autoland preflight ground test is in progress.
VERT SPD	Indicates vertical speed mode is engaged, and airplane vertical speed is being maintained by pitch attitude.
ALT CAP	Indicates altitude preselect mode is engaged, and altitude capture phase has been initiated.
ALT HLD	Indicates altitude hold mode is engaged, and barometric altitude is being maintained by pitch attitude.
IAS	Indicates selected indicated airspeed is being maintained and is being controlled by use of pitch (the pitch wheel).
MACH	Indicates selected mach is being maintained and is being controlled by use of pitch (the pitch wheel).
TURB	Indicates selected pitch attitude is being con trolled by use of the pitch wheel, and turbulence mode has been selected.
TAK OFF	Indicates flight director takeoff mode is engaged. After lift off, flight director pitch commands to maintain V_2 + 10 KIAS.
G/S CAP	Indicates ILS or AUTO LAND mode is engaged and glideslope capture has been initiated to the selected ILS.
G/S TRK	Indicates ILS or AUTO LAND mode is engaged, and glideslope track mode has been initiated to the selected ILS.
GO RND	Indicates the go-around mode is engaged, and the airplane pitch attitude is being controlled to maintain a safe margin above stall airspeed while establishing a climb attitude.
AUT LND	Indicates the AUTO LAND mode is engaged, radio altitude less than 1500 feet, and all logic is satisfied for a complete automatic landing.
FLAR	Indicates AUTO LAND mode is engaged, and the flare mode has been initiated. Occurs at 50 feet radio altitude.
NO FLR	Indicates ILS mode is engaged, and the autopilot remains engaged at a radio altitude of less than 100 feet (flashing).
ROL OUT	Indicates that main gear wheel spin-up has occurred, and remains annunciated until nosegear touchdown.
SPD LOW	Indicates engaged pitch mode is commanding pitch attitude that results in airspeed below alpha reference speed.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
PERF CLB	Indicates climb pitch attitude limit controlled by commanded performance inputs (aircraft with PMS).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 (Continued)

Table 5 Pitch Mode Annunciations. (Continued)

PERF CRZ	Indicates cruise pitch attitude limits con trolled by commanded performance inputs (aircraft with PMS).
PERF DES	Indicates descent pitch attitude limits con trolled by commanded performance inputs (aircraft with PMS).
WJE 405-411, 880, 881, 883, 884	
PERF CLB	Indicates climb pitch attitude limit controlled by commanded performance inputs .
PERF CRZ	Indicates cruise pitch attitude limits controlled by commanded performance inputs.
PERF DES	Indicates descent pitch attitude limits controlled by commanded performance inputs.
WJE 873, 874, 886, 887, 892, 893	
PERF CLB	Indicates climb pitch attitude limit controlled by commanded performance inputs.
PERF CRZ	Indicates cruise pitch attitude limits con trolled by commanded performance inputs.
PERF DES	Indicates descent pitch attitude limits con trolled by commanded performance inputs.
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891	
VNAV CAP	Displayed when FMS VNAV is engaged and in the path capture mode (aircraft with FMS)
VNAV CLB	Displayed when FMS VNAV is engaged in climb (aircraft with FMS).
VNAV DES	Displayed when FMS VNAV is engaged in descent (aircraft with FMS).
VNAV LVL	Displayed when FMS VNAV is engaged in cruise (aircraft with FMS).
WJE 401-404, 412, 414, 875-879	
VNAV CAP	Displayed when FMS VNAV is engaged and in the path capture mode.
VNAV CLB	Displayed when FMS VNAV is engaged in climb.
VNAV DES	Displayed when FMS VNAV is engaged in descent.
VNAV LVL	Displayed when FMS VNAV is engaged in cruise.

WJE ALL

C. FMA Test.

(1) All test functions of the FMA are initiated by use of the ANNUN/DIGITAL LTS TEST button on the overhead panel.

(2) Pressing the ANNUN/DIGITAL LTS TEST button will display on the FMA the following information:

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-874, 880, 881, 883, 884, 886, 887, 891-893

(a) The red THROTTLE and AP warning legends, the blue AP1 and AP2 engage legends and the amber ILS, NO AUTOLAND, HORIZON, AP TRIM, HEADING, and MONITOR legends will illuminate steady until approximately 5 seconds after release of the ANNUN/DIGITAL LTS TEST button.

NOTE: If a Comparator/Failure legend was illuminated prior to the test, the Comparator/Failure monitor recall function is enabled, and any Comparator/Failure legend will remain illuminated if the fault still exists. These legends may be reset by use of the FMA RESET switch.

WJE 401-404, 412, 414, 875-879

(b) The red THROTTLE and AP warning legends, the blue FD, AP1 and AP2 engage legends and the amber ILS, NO AUTOLAND, HORIZON, AP TRIM, HEADING, and MONITOR legends will illuminate steady until approximately 5 seconds after release of the ANNUN/DIGITAL LTS TEST button.

NOTE: If a Comparator/Failure legend was illuminated prior to the test, the Comparator/Failure monitor recall function is enabled, and any Comparator/Failure legend will remain illuminated if the fault still exists. These legends may be reset by use of the FMA RESET switch.

WJE ALL

(c) Each of the 26 characters (20 green, 6 amber) will illuminate simultaneously with each of the 16 light segments to form a "STARBURST" until approximately 5 seconds after release of the ANNUN/DIGITAL LTS TEST button.

FLIGHT MODE ANNUNCIATORS - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing Flight Mode Annunciation (FMA) trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. FMA's may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

B. Prior to performing Flight Mode Annunciation (FMA) trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. FMA's may be also verified by use of the Maintenance or Return-To-Service tests (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

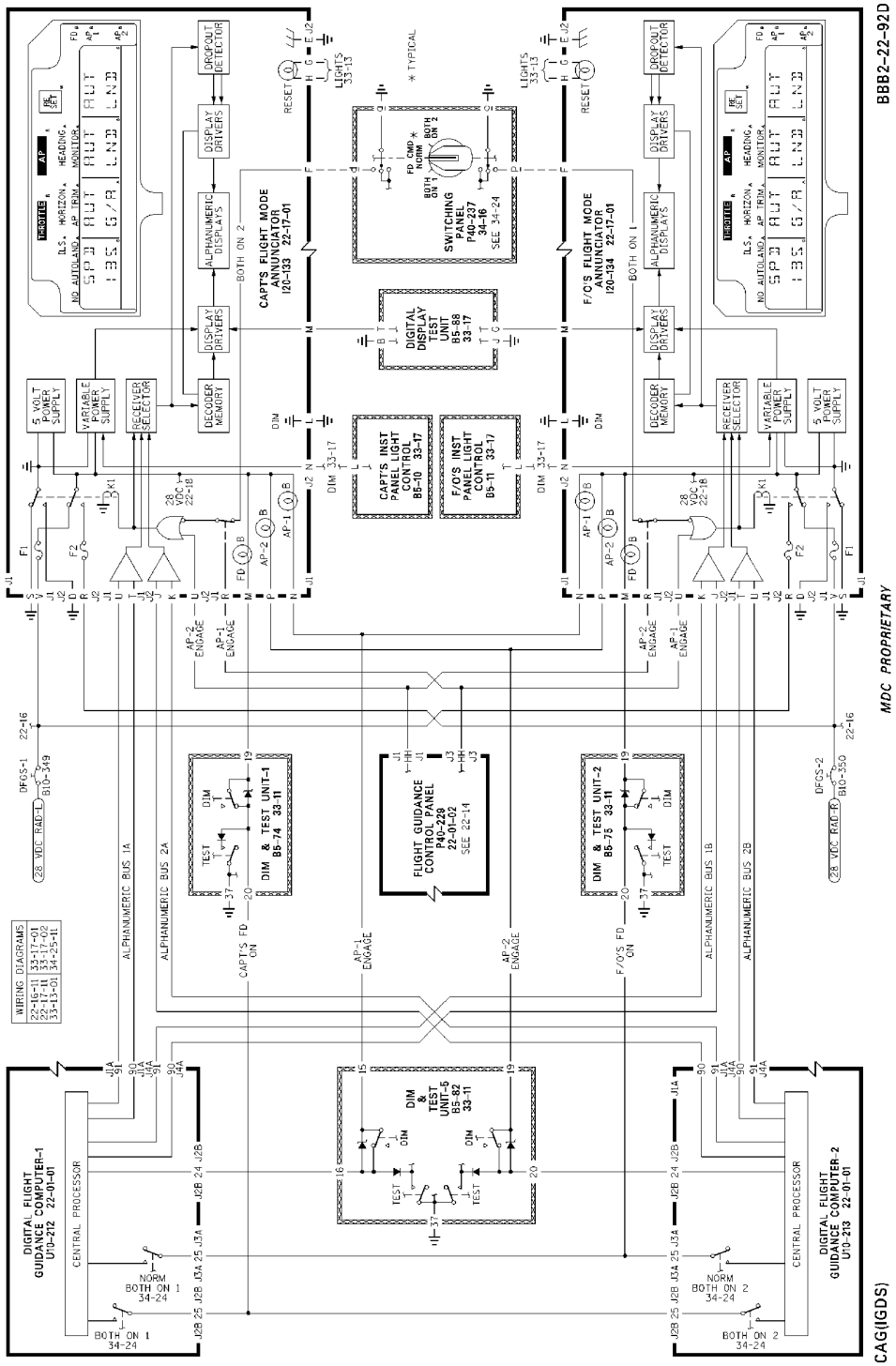
WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on Flight Mode Annunciators is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to Flight Mode Annunciators and associated system interface.

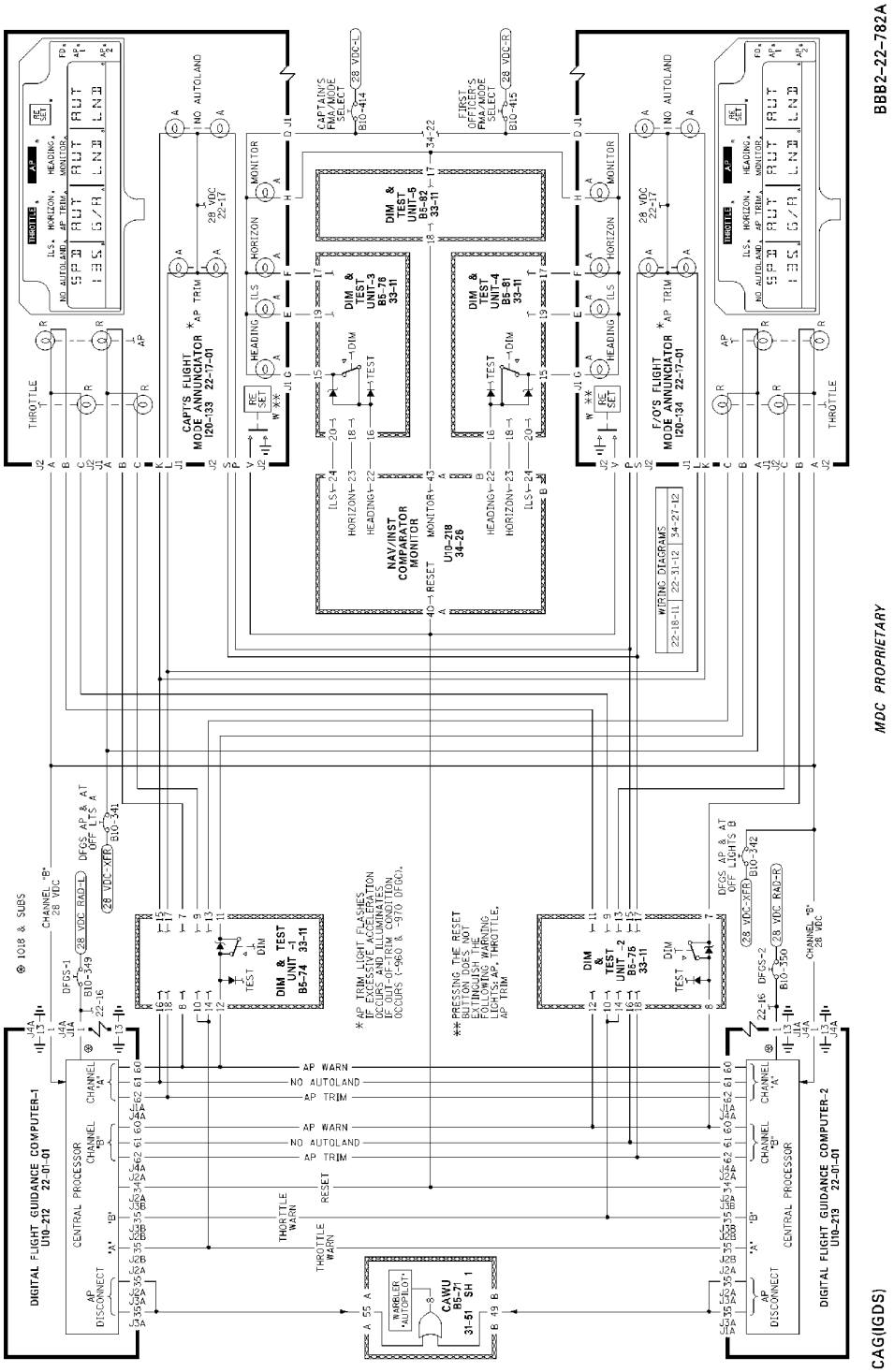
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on Flight Mode Annunciators is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to Flight Mode Annunciators and associated system interface.

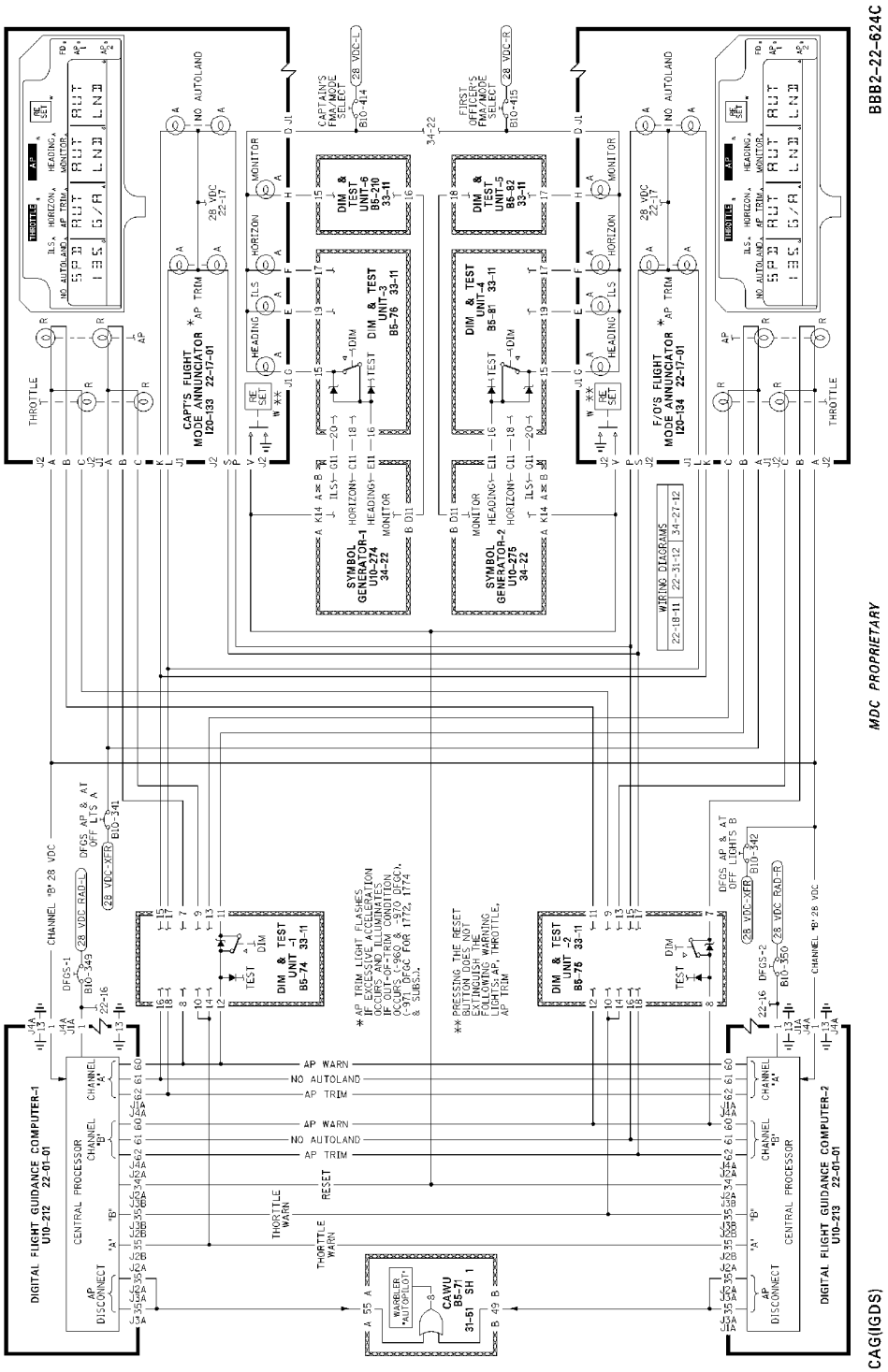
WJE ALL



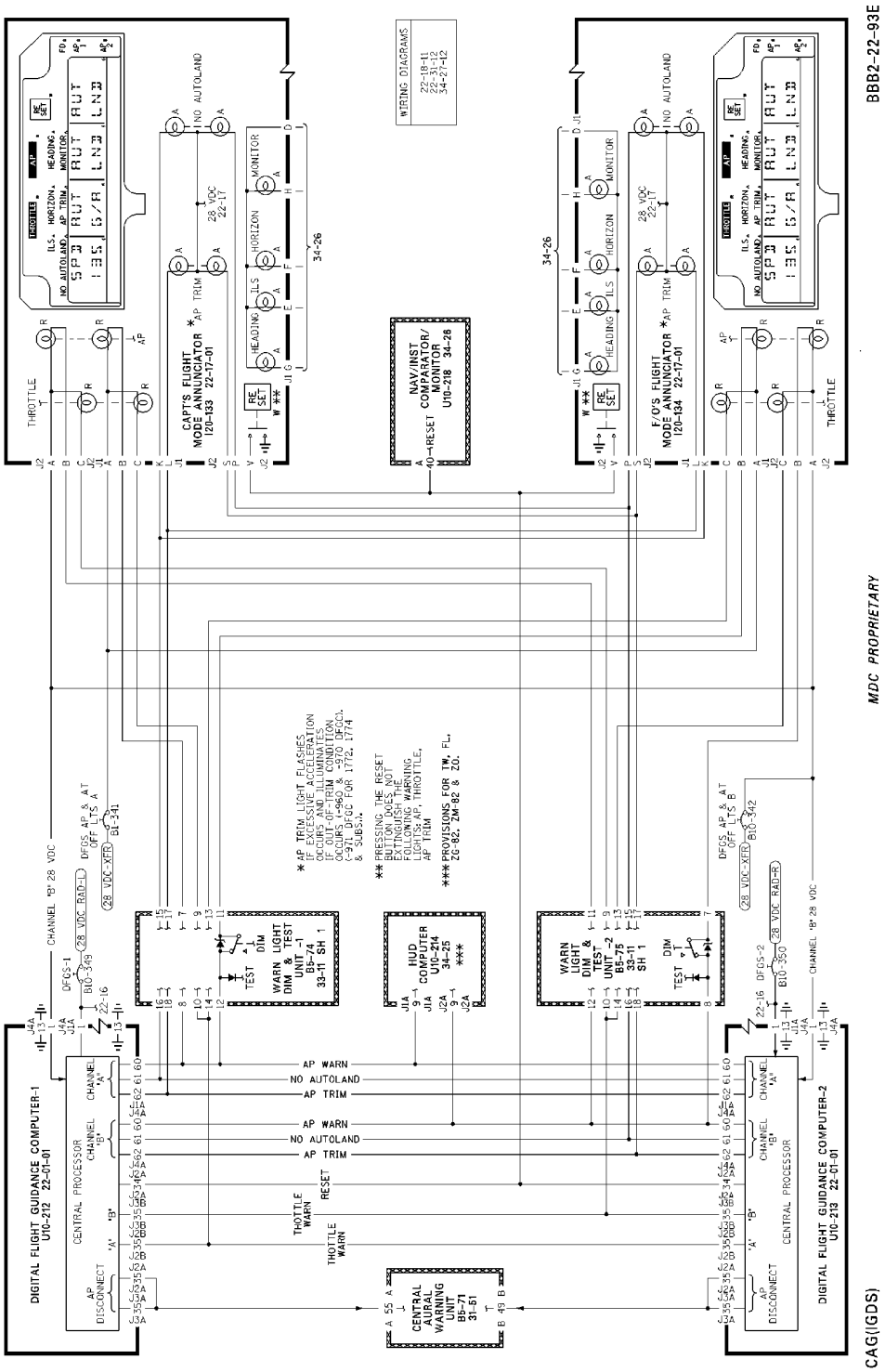
Flight Mode Annunciator
Figure 101/22-17-00-990-803



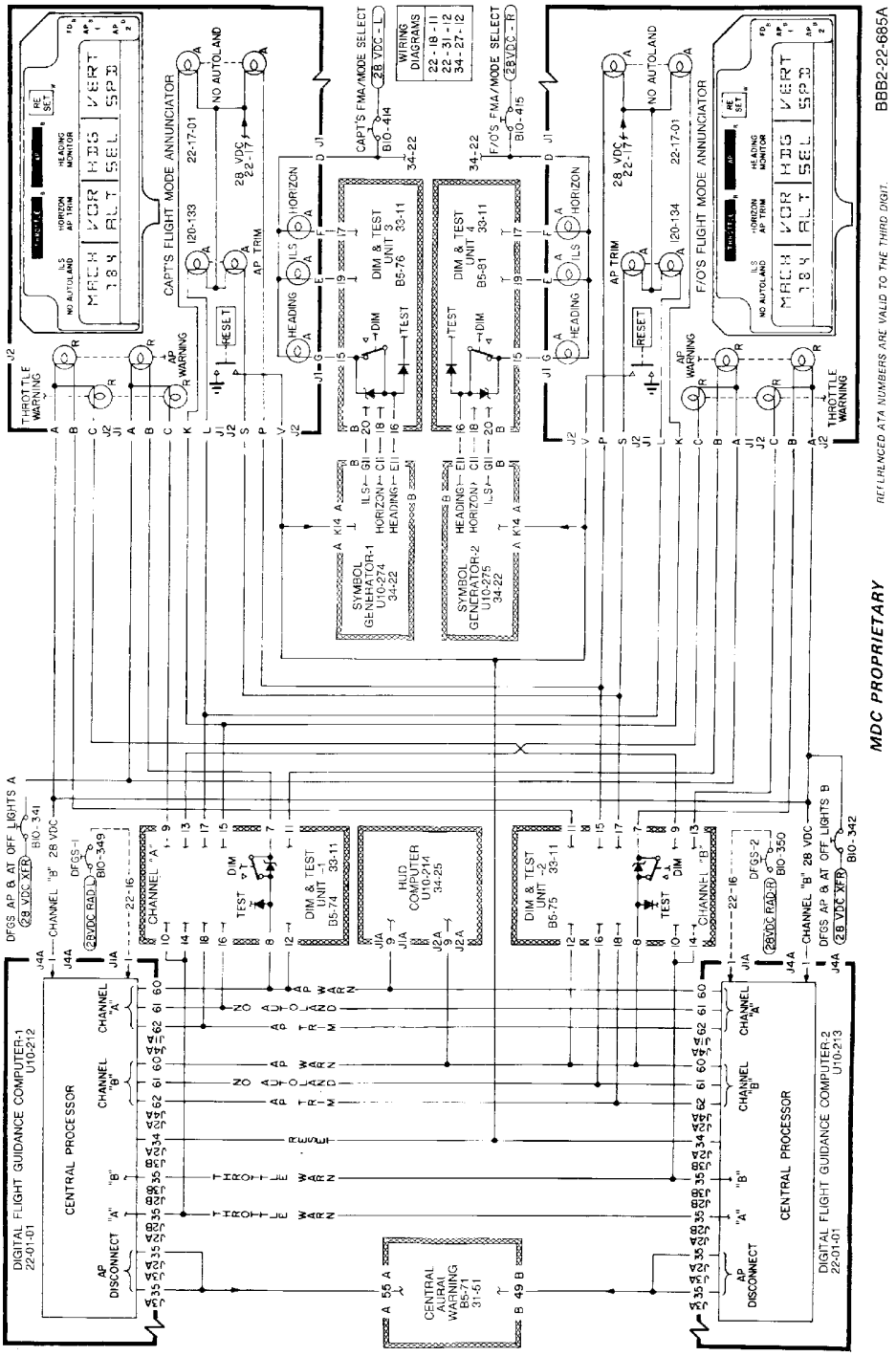
Autopilot & Autothrottle Warning
Figure 102/22-17-00-990-807



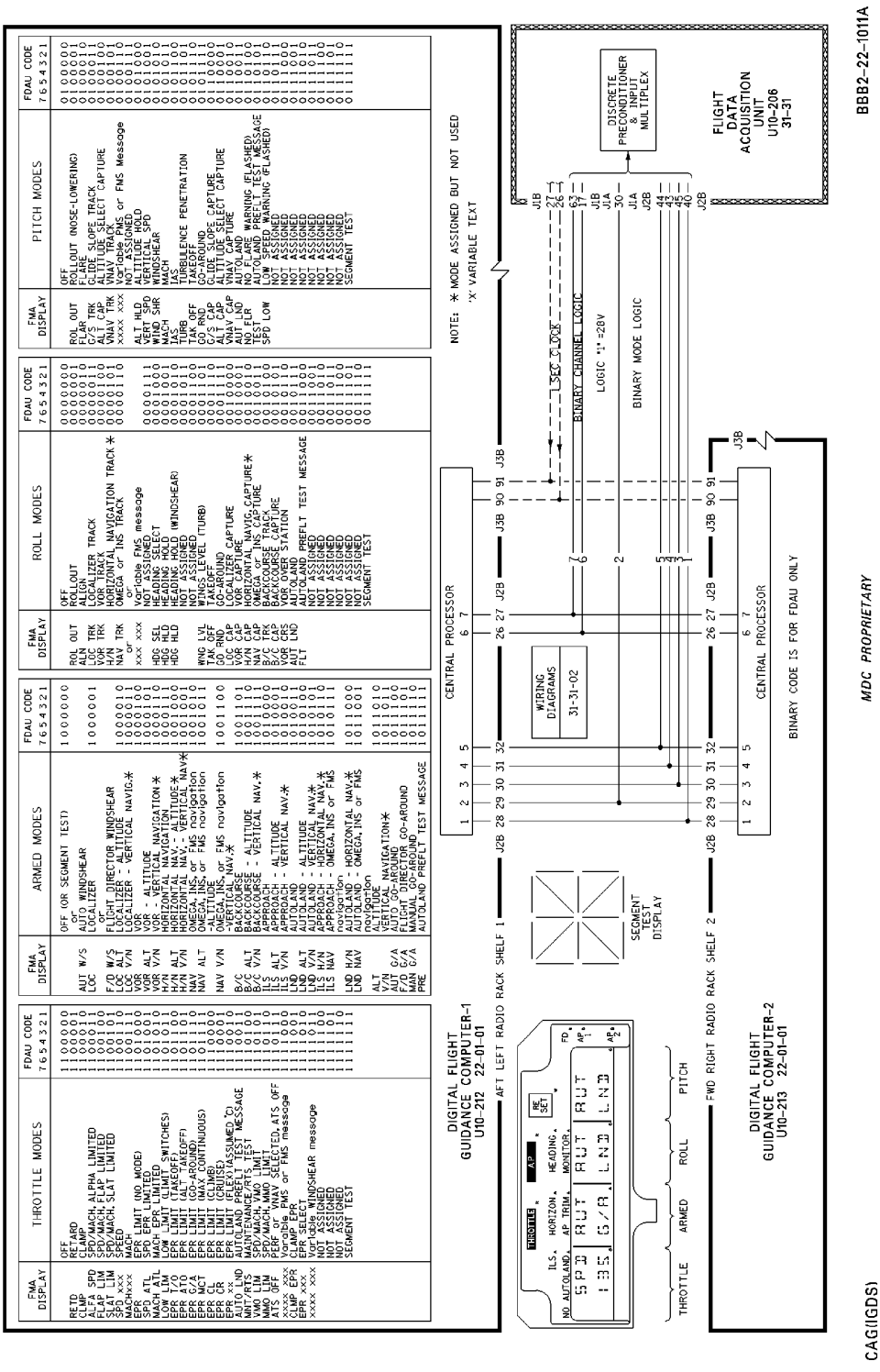
Autopilot & Autothrottle Warning
Figure 103/22-17-00-990-808



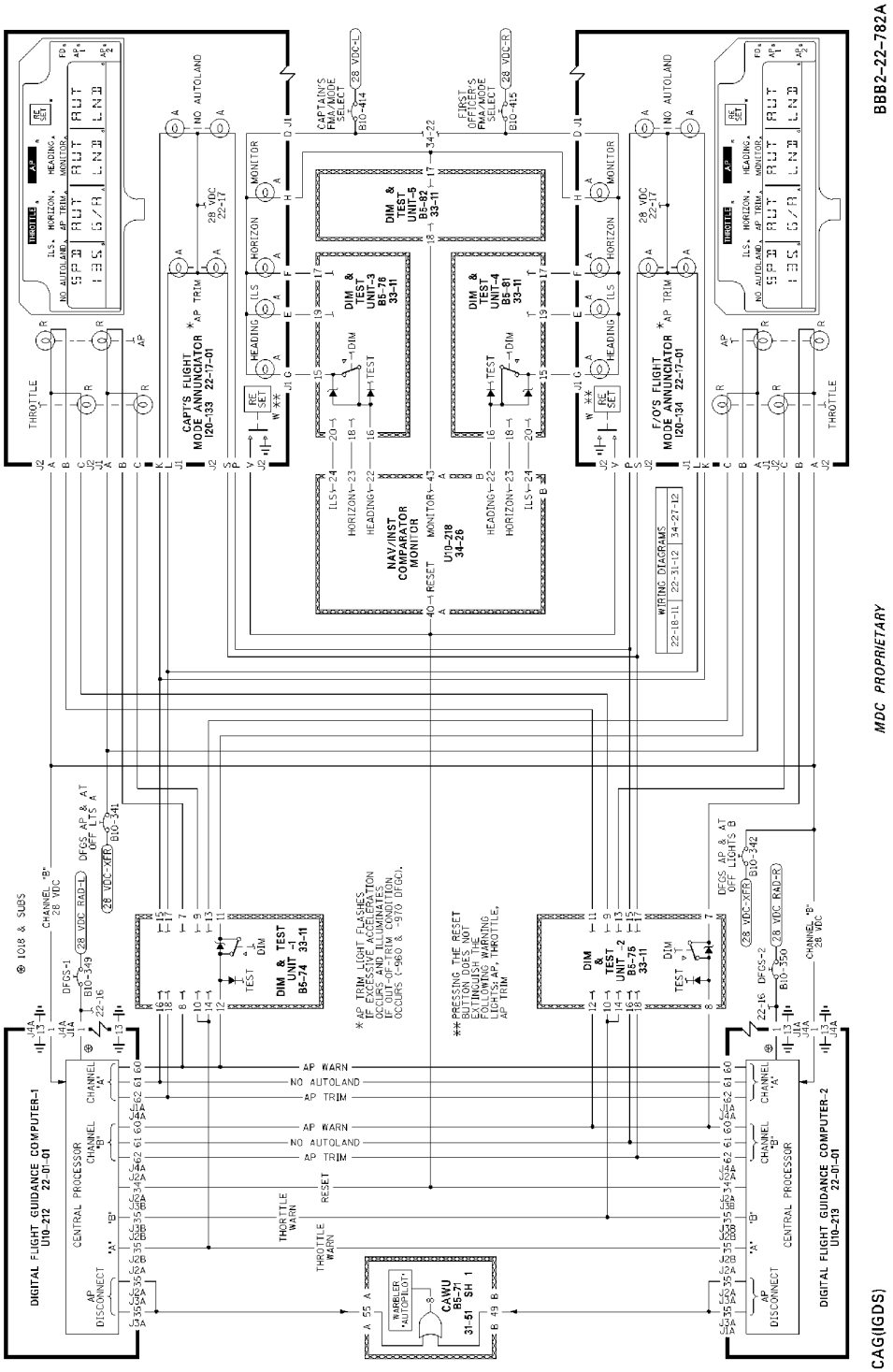
Autopilot & Autothrottle Warning
Figure 104/22-17-00-990-813



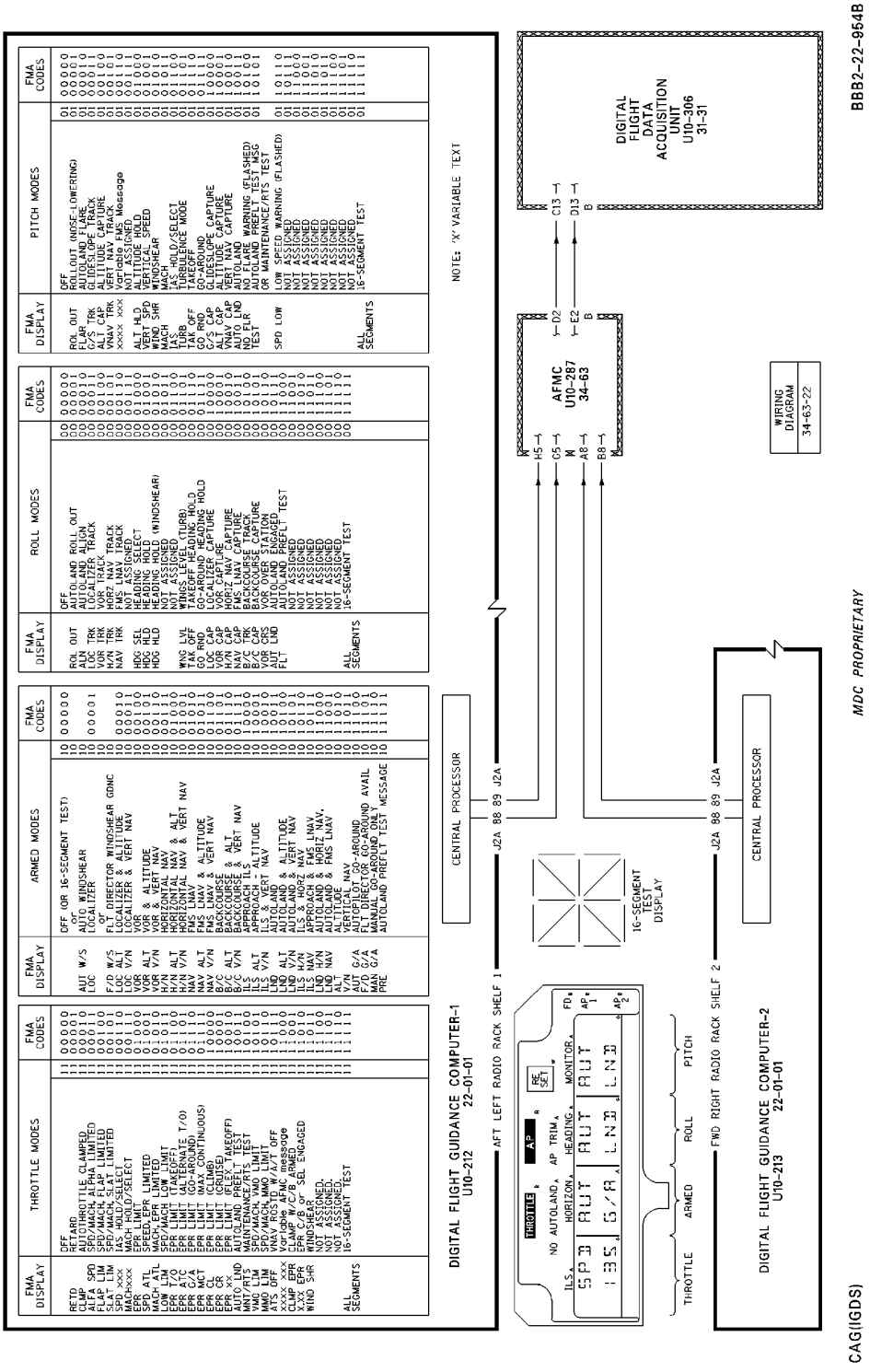
Autopilot & Autothrottle Warning
Figure 105/22-17-00-990-814



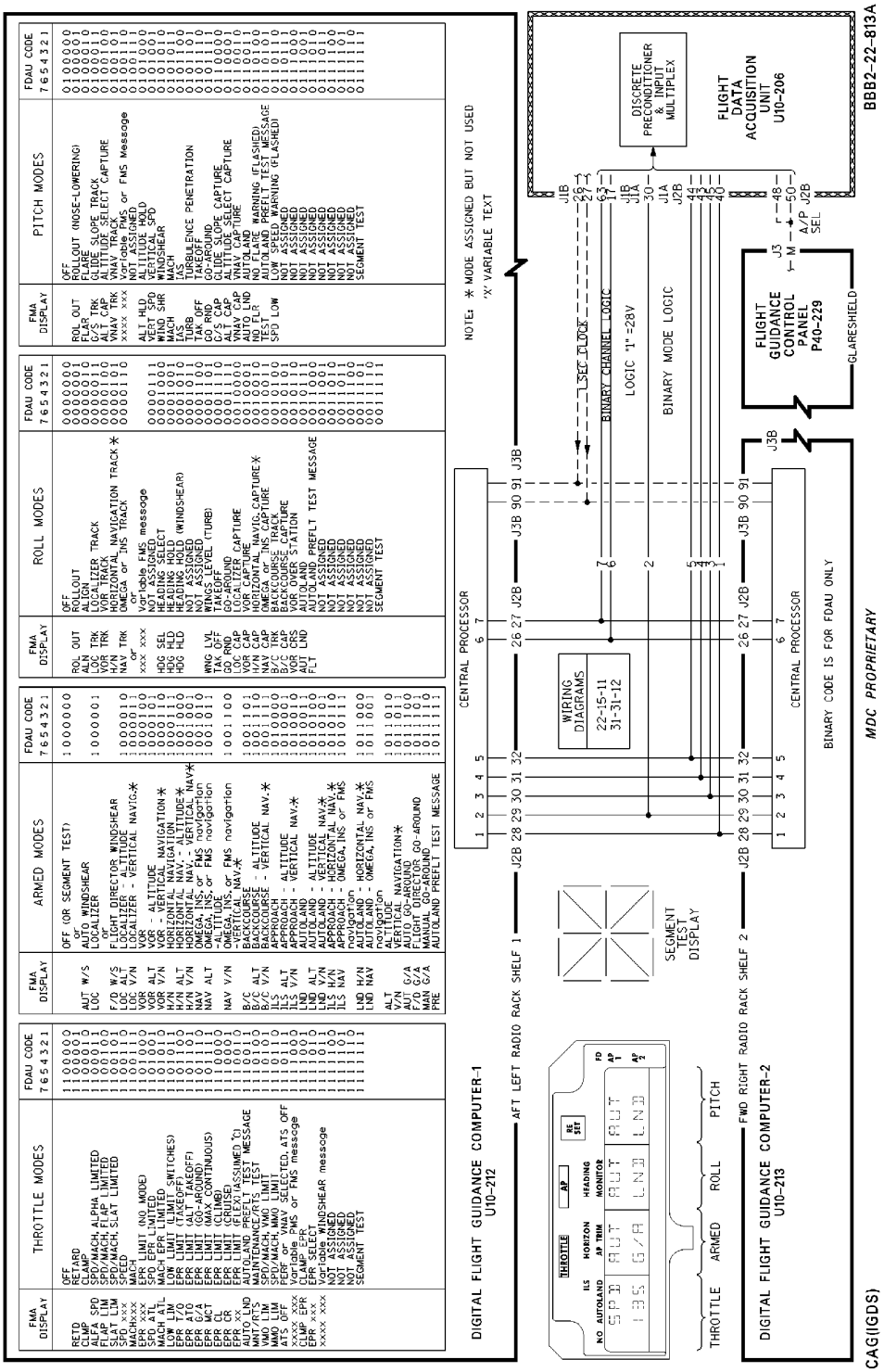
Flight Modes & FDAU Interface
Figure 106/22-17-00-990-816



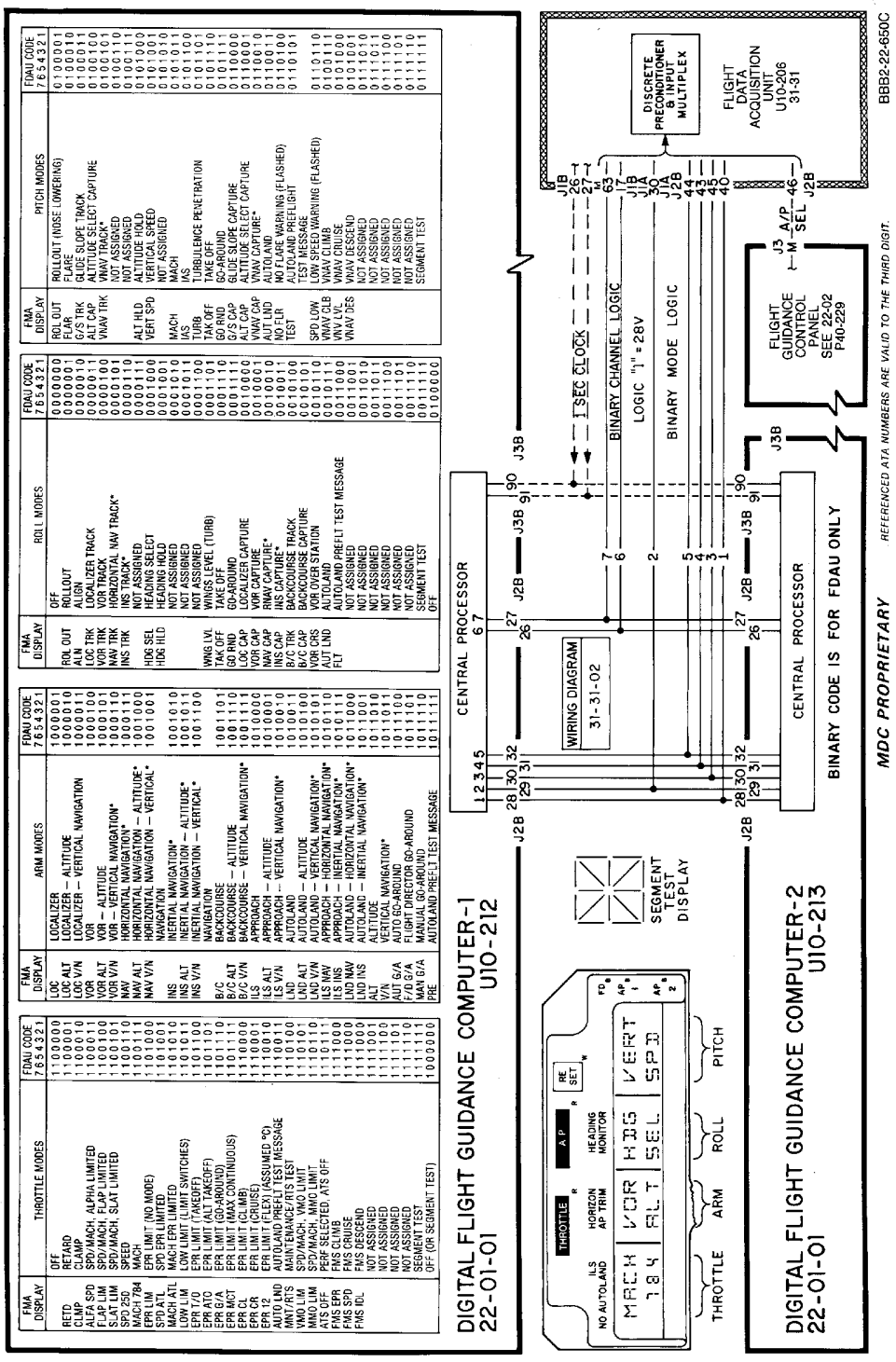
Autopilot & Autothrottle Warning
Figure 107/22-17-00-990-819



Flight Modes & DFDAU Interface
Figure 108/22-17-00-990-824



Flight Modes & FDAU Interface
Figure 109/22-17-00-990-830



FMA DISPLAY	THROTTLE MODES	FDAU CODE 7654321
	OFF	1100000
RETD	RETARD	1100001
CLMB	CLIMB	1100010
ALFA SPD	SPD/MACH, ALPHA LIMITED	1100011
FLAP LIM	SPD/MACH, FLAP LIMITED	1100100
SLAT LIM	SPD/MACH, SLAT LIMITED	1100101
SPD 250	SPEED	1100110
MACH 784	MACH	1100111
EPR LIM	EPR LIMIT (NO MODE)	1101000
SPD ATL	SPD EPR LIMITED	1101001
MACH ATL	MACH EPR LIMITED	1101010
LOW LIM	LOW LIMIT (LIMIT SWITCHES)	1101011
EPR TO	EPR LIMIT (ALT TAKEOFF)	1101100
EPR G/A	EPR LIMIT (GO-AROUND)	1101110
EPR MCT	EPR LIMIT (MAX CONTINUOUS)	1101111
EPR CL	EPR LIMIT (CLIMB)	1110000
EPR CR	EPR LIMIT (CRUISE)	1110001
EPR 12	EPR LIMIT (FLEX) (ASSUMED °C)	1110010
AUTO LND	AUTOLAND PREFLT TEST MESSAGE	1110011
MNT/RTS	MAIN ENANCE/RTS TEST	1110100
VMO LIM	SPD/MACH, VMO LIMIT	1110101
MMO LIM	SPD/MACH, MMO LIMIT	1110110
ATS OFF	PERF SELECTED, ATS OFF	1110111
FMS EPR	FMS CLIMB	1111000
FMS SPD	FMS CRUISE	1111001
FMS IDL	FMS DESCEND	1111000
	NOT ASSIGNED	1111011
	NOT ASSIGNED	1111100
	NOT ASSIGNED	1111101
	SEGMENT TEST	1111110
	OFF (OR SEGMENT TEST)	1111111

FMA DISPLAY	ARM MODES	FDAU CODE 7654321
LOC ALT	LOCALIZER – ALTITUDE	1000001
LOC V/N	LOCALIZER – VERTICAL NAVIGATION	1000010
VOR	VOR	1000011
VOR ALT	VOR – ALTITUDE	1000100
VOR V/N	VOR – VERTICAL NAVIGATION*	1000101
NAV	HORIZONTAL NAVIGATION*	1000111
NAV ALT	HORIZONTAL NAVIGATION – ALTITUDE*	1001000
NAV V/N	HORIZONTAL NAVIGATION – VERTICAL*	1001001
INS	NAVIGATION	1001010
INS ALT	INERTIAL NAVIGATION – ALTITUDE*	1001011
INS V/N	INERTIAL NAVIGATION – VERTICAL*	1001100
B/C	BACKCOURSE	1001101
B/C ALT	BACKCOURSE – ALTITUDE	1001110
B/C V/N	BACKCOURSE – VERTICAL NAVIGATION*	1001111
ILS	APPROACH	1010000
ILS ALT	APPROACH – ALTITUDE	1010001
ILS V/N	APPROACH – VERTICAL NAVIGATION*	1010010
LND	AUTOLAND	1010011
LND ALT	AUTOLAND – ALTITUDE	1010100
LND V/N	AUTOLAND – VERTICAL NAVIGATION*	1010101
LS INS	APPROACH – INERTIAL NAVIGATION*	1010110
LND INS	AUTOLAND – INERTIAL NAVIGATION*	1010111
LND NAV	AUTOLAND – HORIZONTAL NAVIGATION*	1011000
ALT	ALTITUDE	1011001
V/N	VERTICAL NAVIGATION*	1011010
AUT G/A	AUTO GO-AROUND	1011011
F/D G/A	FLIGHT DIRECTOR GO-AROUND	1011100
MAN G/A	MANUAL GO-AROUND	1011101
PRE	AUTOLAND PREFLT TEST MESSAGE	1011110
		1011111

FMA DISPLAY	ROLL MODES	FDAU CODE 7654321
	OFF	0000000
ROL OUT	ROLLOUT	0000001
LOC	LOCALIZER TRACK	0000010
LOC TRK	LOCALIZER TRACK	0000011
VOR TRK	VOR TRACK	0000100
NAV TRK	HORIZONTAL NAV TRACK*	0000101
INS TRK	INS TRACK*	0000110
	NOT ASSIGNED	0000111
HDG SEL	HEADING SELECT	0001000
HDG HLD	HEADING HOLD	0001001
	NOT ASSIGNED	0001010
	NOT ASSIGNED	0001011
WNG LVL	WINGS LEVEL (TURB)	0001100
TAK OFF	TAKE OFF	0001101
GO RND	GO-AROUND	0001110
LOC CAP	LOCALIZER CAPTURE	0001111
VOR CAP	VOR CAPTURE	0010000
NAV CAP	RNAV CAPTURE*	0010001
INS CAP	INS CAPTURE*	0010010
B/C TRK	BACKCOURSE TRACK	0010011
B/C CAP	BACKCOURSE CAPTURE	0010100
VOR CRS	VOR OVER STATION	0010101
AUT LND	AUTOLAND	0010110
FLT	AUTOLAND PREFLT TEST MESSAGE	0010111
	NOT ASSIGNED	0011000
	NOT ASSIGNED	0011001
	NOT ASSIGNED	0011010
	NOT ASSIGNED	0011011
	NOT ASSIGNED	0011100
	NOT ASSIGNED	0011101
	NOT ASSIGNED	0011110
	SEGMENT TEST	0011111
	OFF	0100000

FMA DISPLAY	PITCH MODES	FDAU CODE 7654321
ROL OUT	ROLLOUT (NOSE LOWERING)	0100001
FLAR	FLARE	0100010
G/S TRK	GLIDE SLOPE TRACK	0100011
ALT CAP	ALTITUDE SELECT CAPTURE	0100100
VNAV TRK	VNAV TRACK*	0100101
	NOT ASSIGNED	0100110
	NOT ASSIGNED	0100111
ALT HLD	ALTITUDE HOLD	0101000
VERT SPD	VERTICAL SPEED	0101001
	NOT ASSIGNED	0101010
MACH	MACH	0101011
IAS	IAS	0101100
TURB	TURBULENCE PENETRATION	0101101
TAK OFF	TAKE OFF	0101110
GO RND	GO-AROUND	0101111
G/S CAP	GLIDE SLOPE CAPTURE	0110000
ALT CAP	ALTITUDE SELECT CAPTURE	0110001
VNAV CAP	VNAV CAPTURE*	0110010
AUT LND	AUTOLAND	0110011
NO FLR	NO FLARE WARNING (FLASHED)	0110100
TEST	AUTOLAND PREFLIGHT TEST MESSAGE	0110101
SPD LOW	LOW SPEED WARNING (FLASHED)	0110110
VNAV GLD	VNAV GLIDE	0110111
VNV LVL	VNAV LEVEL	0111000
VNAV DES	VNAV DESCEND	0111001
	NOT ASSIGNED	0111010
	NOT ASSIGNED	0111011
	NOT ASSIGNED	0111100
	NOT ASSIGNED	0111101
	NOT ASSIGNED	0111110
	SEGMENT TEST	0111111

Flight Modes & FDAU Interface
Figure 110/22-17-00-990-835

FLIGHT MODE ANNUNCIATORS - MAINTENANCE PRACTICES

1. General

A. The Flight Mode Annunciators (FMA's) are provided to display AP/FD and auto throttle mode/arm annunciations, comparator/ failure legends and autopilot/auto throttle off warning. There are two FMA's, one located on the captain's instrument panel, and the other located on the first officer's instrument panel.

B. Removal/installation and test procedures are identical for both the captain's and first officer's FMA's.

C. Removal/Installation of displays is in Paragraph 4.

D. The FMA, Part No. 4034234-901, -902, and -903, have four optical filters (three green and one amber), and a new support bracket to replace the original optical filter and support when Service Bulletin 22-129 is incorporated.

NOTE: For FMA's Part No. 4034234-902, a minor change was made to the edgelight panel. The separator bars between the display windows were raised to be flush with the front filter surface. The new edgelight panel, Part No. 4059703-7, requires the four optical filters.

2. Equipment and Materials

NOTE: Equivallent substitutes can be used instead of the following listed items:

Name and Number	Manufacturer
Tool Kit 4037494	Sperry
Display 0-45 (SPN 4035956-4)	Sperry
Plastic Tweezers (4061692–901)	Honeywell

3. Removal/Installation Flight Mode Annunciators (FMA's)

A. Remove FMA

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(1) Open these circuit breakers and install safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
E	19	B10-324	COMPARATOR MONITOR-1

(Continued)

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
WJE ALL			
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
E	07	B10-325	COMPARATOR MONITOR-2
WJE ALL			
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) On front panel of FMA, loosen captive screws (3). (Figure 201)

CAUTION: DO NOT TOUCH THE ELECTRICAL CONNECTOR CONTACT PINS. STATIC ELECTRICAL CHARGES THAT COLLECT ON THE SKIN CAN CAUSE DAMAGE TO THE ELECTROSTATIC SENSITIVE COMPONENTS INSTALLED IN THIS DEVICE.

(3) Carefully pull FMA straight out of instrument panel, and disconnect electrical connectors (2).

(4) If FMA is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install FMA

(1) Make sure that these circuit breakers are open and have safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
E	19	B10-324	COMPARATOR MONITOR-1
WJE ALL			
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
E	07	B10-325	COMPARATOR MONITOR-2
WJE ALL			
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

CAUTION: PRIOR TO INSTALLING ELECTRICAL CONNECTORS, VERIFY CONNECTORS MATE TO PROPER PLUGS ON FMA (J101 AND J102 RESPECTIVELY).

CAUTION: DO NOT TOUCH THE ELECTRICAL CONNECTOR CONTACT PINS. STATIC ELECTRICAL CHARGES THAT COLLECT ON THE SKIN CAN CAUSE DAMAGE TO THE ELECTROSTATIC SENSITIVE COMPONENTS INSTALLED IN THIS DEVICE.

(2) Connect electrical connectors to corresponding mating plugs on FMA.

(3) Carefully slide FMA into instrument panel mounting hole, and secure captive screws (3).

(4) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
W	31	B10-342	DFGS AP & AT OFF LIGHTS B
Z	31	B10-341	DFGS AP & AT OFF LIGHTS A

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
E	19	B10-324	COMPARATOR MONITOR-1
WJE ALL			
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
WJE 405, 409, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
E	07	B10-325	COMPARATOR MONITOR-2
WJE ALL			
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(5) On overhead panel, press and hold ANNUN/DIGITAL LIGHTS TEST button. Verify the following:

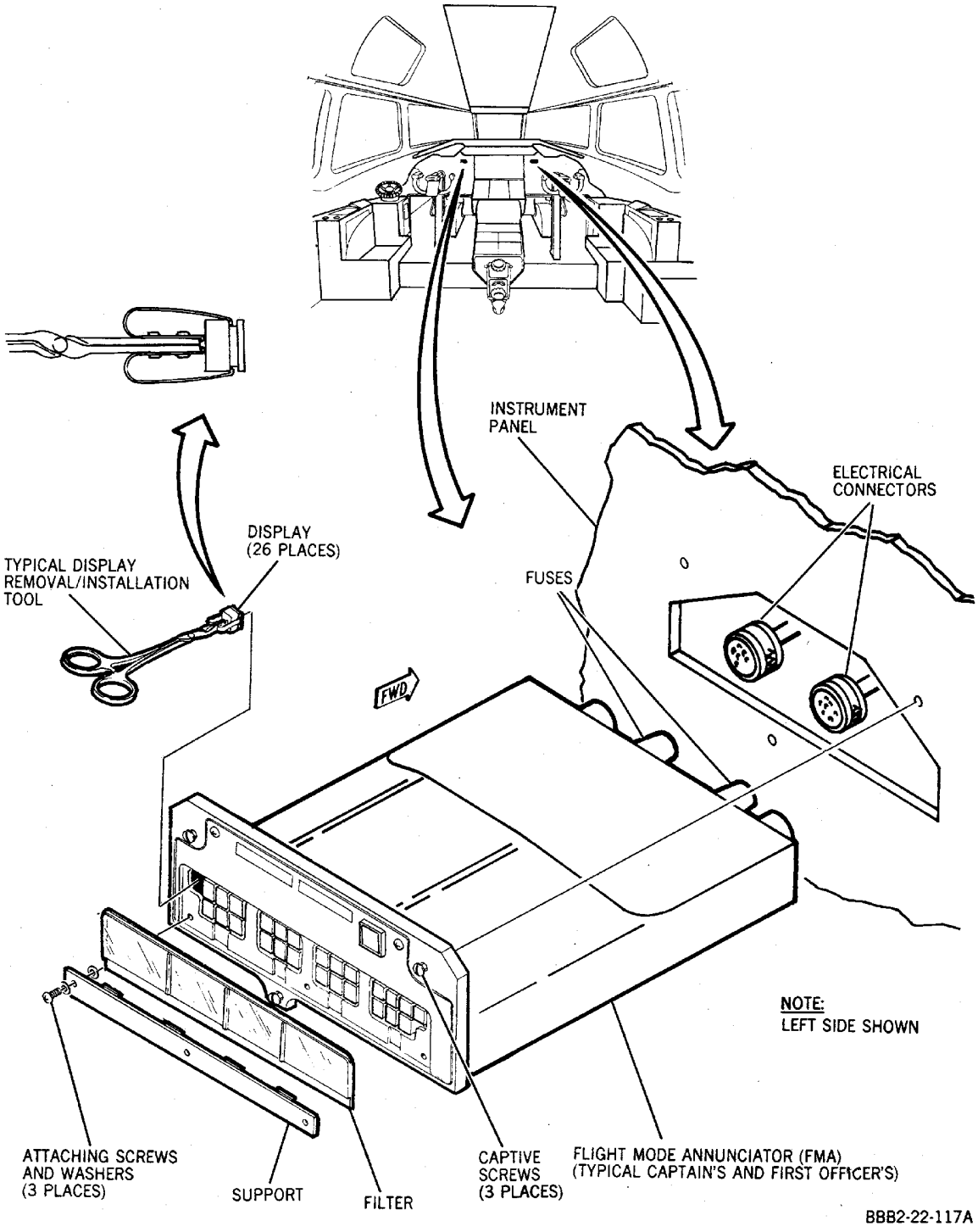
(a) Each of the 26 characters (20 green, 6 amber) will illuminate simultaneously with each of the 16 light segments to form a "STARBURST".

(b) The red THROTTLE and AP warning legends, the blue AP1 and AP2 engage legends and the amber ILS, NO AUTOLAND, HORIZON, AP TRIM, HEADING, and MONITOR legends will illuminate steady.

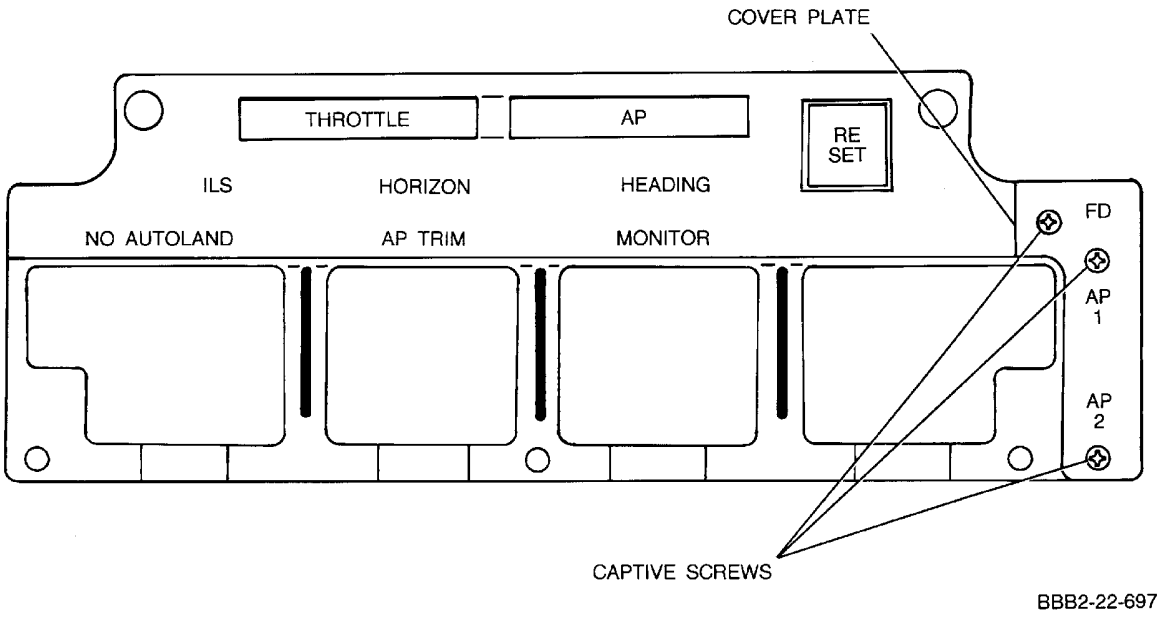
NOTE: If a Comparator/Failure legend was illuminated prior to the test, the Comparator/Failure monitor recall function is enabled, and any Comparator/Failure legend will remain illuminated if the fault still exists. These legends may be reset by use of the FMA RESET switch.

(6) Release ANNUN/DIGITAL LIGHTS TEST button. Light segments and legends will remain illuminated for approximately 5 seconds after release of button, then extinguish.

(7) If no further maintenance is required, return aircraft to required configuration.



Flight Mode Annunciator (FMA) -- Removal/Installation
Figure 201/22-17-00-990-846



-902 Lamp Modules Access Removal/Installation
Figure 202/22-17-00-990-847

4. Removal/Installation Displays

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

A. Remove Displays

Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

CAUTION: THE FMA DISPLAY FILTERS MAY COME APART FROM THE SUPPORT AND FALL DURING THE REMOVAL AND INSTALLATION PROCEDURES. CARE MUST BE TAKEN TO PREVENT DAMAGE TO THE FMA DISPLAY FILTERS.

(1) Remove support and filter from front of annunciator by removing the 3 screws attaching support and filter to annunciator panel. Make certain to retain screws and washers (Figure 201).

NOTE: Displays are replaceable from front of the FMA.

(2) Slide display removal/installation tool over display unit to be removed until tool engages display indents.

(3) Pull tool and display straight out of panel taking care to not damage display connectors.

B. Install Displays

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

CAUTION: EXERCISE CARE WHEN INSTALLING DISPLAYS SO AS NOT TO DAMAGE FACE OF DISPLAY WITH REMOVAL/INSTALLATION TOOL.

(2) Insert display in removal/installation tool taking care to not damage face of display.

(3) Insert tool and display straight into face of annunciator panel and carefully engage display electrical connector pins into panel connector. Withdraw tool.

(4) Install filter and support to face of annunciator panel and install attaching screws and washers.

(5) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(6) On overhead panel, press and hold ANNUN/DIGITAL LIGHTS TEST switch. Displays illuminate to form a starburst.

(7) Release ANNUN/DIGITAL LIGHTS test switch. Displays go off.

(8) If no further maintenance is required, return aircraft to required configuration.

5. Removal/Installation Fixed Displays

A. Remove Displays

NOTE: FD, AP-1, and AP-2 annunciators are replaceable from front of FMA.

NOTE: With AOL 9-1627A performed, the FD blue lamp on the FMA is no longer required for dispatch. A more immediate solution is to paint over the FD legend. The black paint used on the FMA panel is specified in Federal Standard 595, and the correct paint color number is 37038. Honeywell agrees to maintain the FMA in whatever condition the operator establishes to remove the FD legend.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Remove FD, AP-1, and AP-2 annunciators cover plate by loosening three captive screws. (Figure 202)

(3) Using plastic tweezers, unseat the defective lamp module.

B. Install Displays

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Install new lamp module Part No. 4059703-2 containing two type 7009 lamps (28 volt, 20 milliamperes) or Part No. 4059703-5 containing type 6838 lamps. (Figure 202)

(3) Install FD, AP-1, and AP-2 annunciators cover plate by inserting and tightening three captive screws (Figure 202).

(4) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
D	8	B10-352	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	2	B10-362	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	8	B10-350	DIGITAL FLIGHT GUIDANCE SYSTEM-2
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(5) On overhead panel, press and hold ANNUN/DIGITAL LIGHTS TEST button. Verify the following:

(a) The red THROTTLE and AP warning legends, the blue FD, AP1, and AP2 legends, and the amber ILS, NO AUTOLAND, HORIZON, AP TRIM, HEADING, and MONITOR legends will illuminate steady until approximately 5 seconds after release of the ANNUN/DIGITAL LTS TEST button.

(6) Release ANNUN/DIGITAL LIGHTS test switch. Display lights go off.

(7) Return aircraft to required configuration.

LINEAR ACCELERATION - DESCRIPTION AND OPERATION

1. General

A. There are two types of accelerometers, a Dual 3-Axis and a Dual Lateral, located in the airplane that provide acceleration signals to the Digital Flight Guidance System.

B. The Dual 3-Axis accelerometer provides normal, lateral, and longitudinal acceleration signals that provide short term inertial damping for the system. The Dual Lateral accelerometer provides lateral acceleration signals for use in yaw damping.

C. Accelerometer descriptive and maintenance material is provided in the following sections:

Table 1

DUAL 3-AXIS ACCELEROMETER, SUBJECT 22-19-01	Dual 3-Axis Accelerometer
DUAL LATERAL ACCELEROMETER, SUBJECT 22-19-02	Dual Lateral Accelerometer

LINEAR ACCELERATION - TROUBLE SHOOTING

1. General

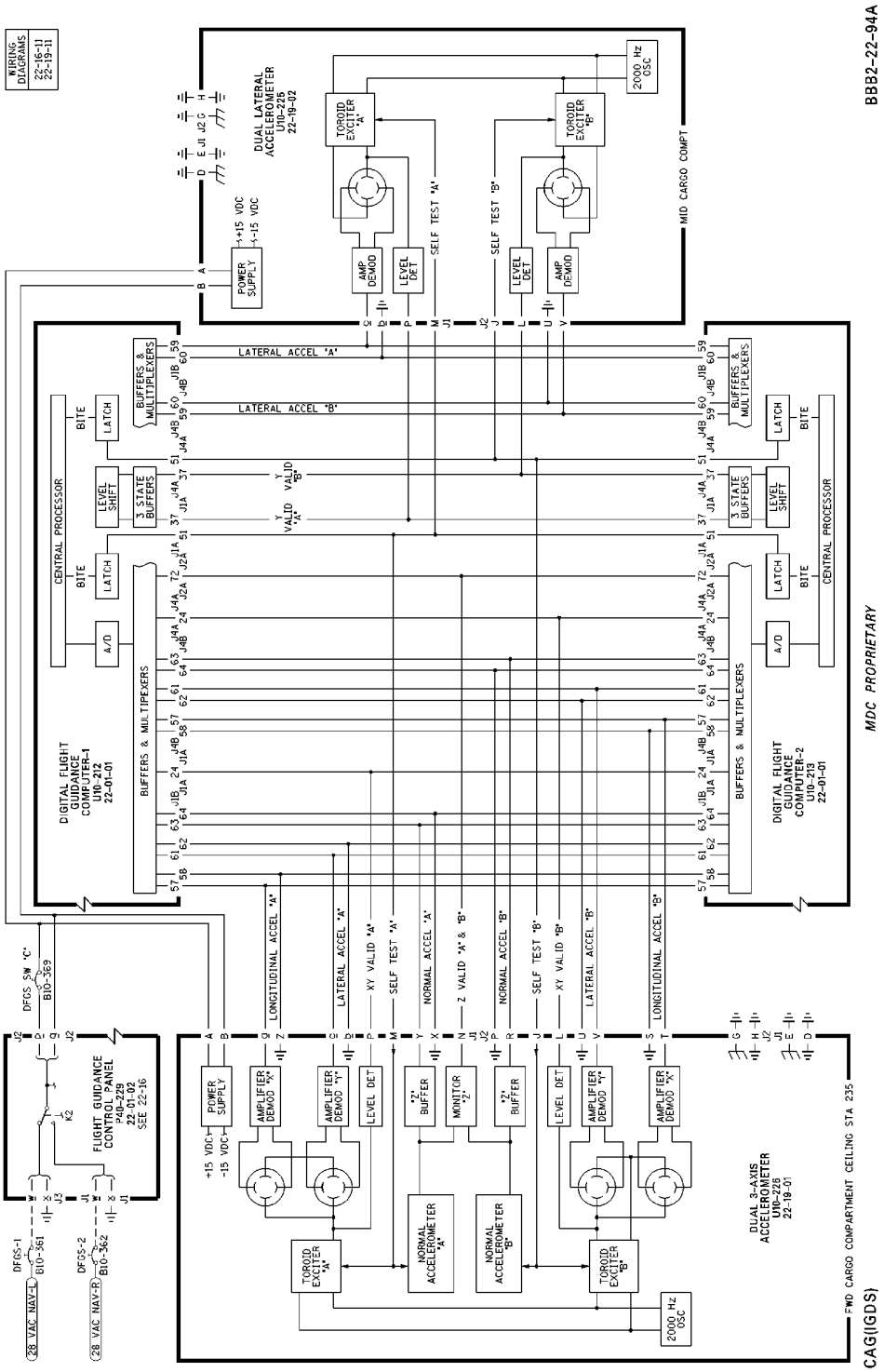
A. Prior to performing accelerometer trouble shooting procedures, check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The accelerometers may be also verified by use of the Maintenance or Return-To-Service tests. (SUBJECT 22-01-05)

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

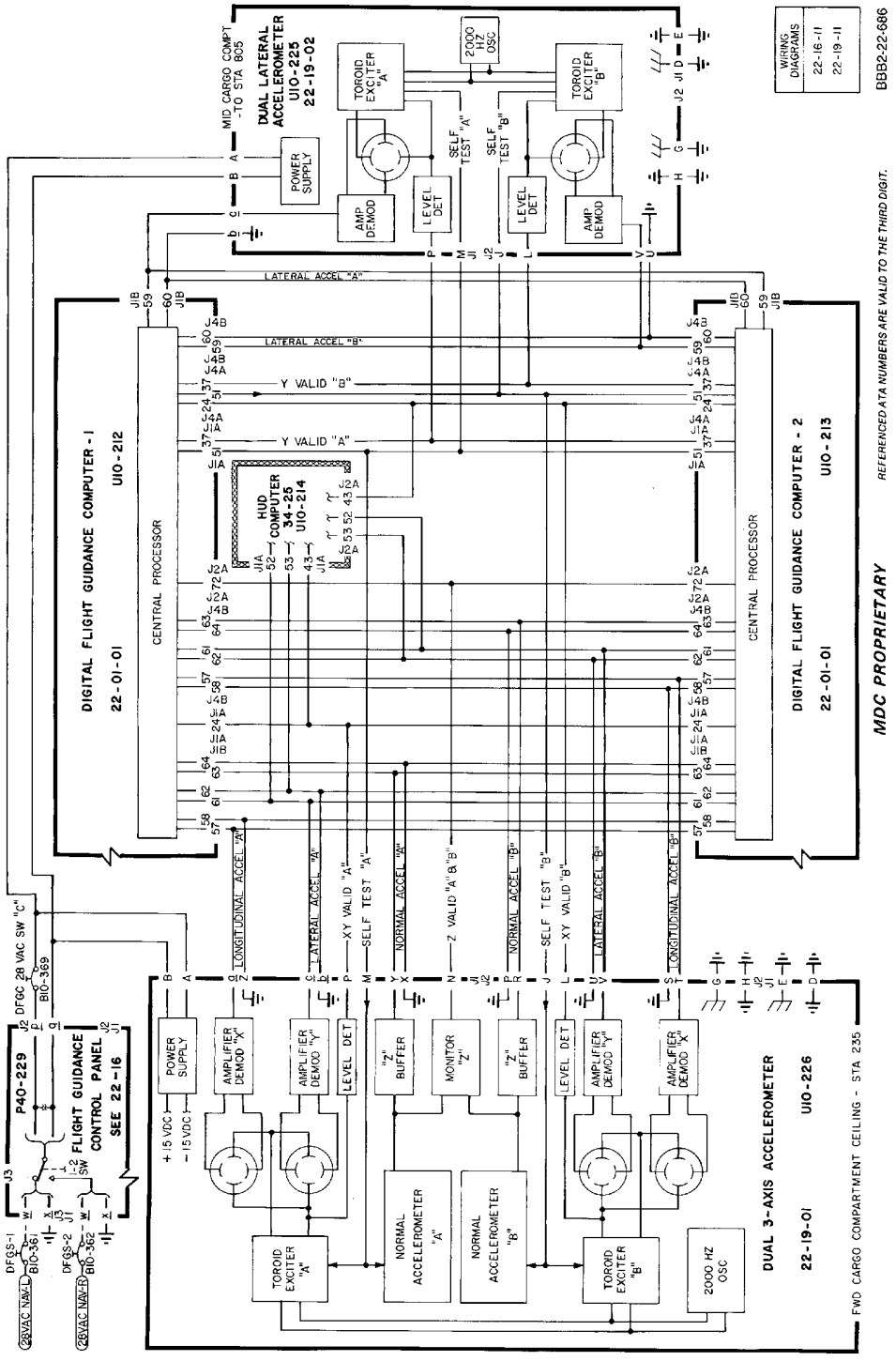
B. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on accelerometers is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to accelerometers and associated system interface.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

C. Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on accelerometers is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to accelerometers and associated system interface.



Accelerometers
Figure 101/22-19-00-990-802



Accelerometers
Figure 102/22-19-00-990-803

DUAL 3-AXIS ACCELEROMETER - DESCRIPTION AND OPERATION

1. General

A. The dual 3-axis accelerometer is designed to provide signals in three mutually perpendicular axes (X, Y, and Z) for short term damping for autopilot and autothrottle.

B. The accelerometer consists of two lateral and longitudinal toroid accelerometers, and two normal pendulous accelerometers, toroidal exitation networks, amplifier demodulator circuits, an oscillator, comparison monitor, and power supply.

C. Lateral acceleration is combined with lateral acceleration from the dual lateral accelerometers within the DFGC for yaw damping computations.

D. The accelerometer is located on the underside of the floor left of the center-line of the airplane in the forward cargo compartment overhead at station 235.

2. Functional Description

A. Lateral and Longitudinal Toroid Accelerometers

(1) Each lateral and longitudinal toroid accelerometer respectively provides lateral and longitudinal acceleration signals. Each toroid accelerometer has a 360 degree fluid cavity that is half filled with an electrolyte fluid.

(2) Conductive, oppositely facing electrode pairs are arranged on the left and right side of the toroidal cavity to form conductive cells. Accelerating the toroidal accelerometer changes the immersed areas of the electrodes and produces an output signal that is linearly proportional to the tilt angle of the fluid.

(3) Each toroid accelerometer has an auxiliary electrode, that is always fully immersed in the fluid. The auxiliary electrode measures the resistance of the electrolyte fluid and automatically compensates the accelerometer scale factor for environmental temperature change.

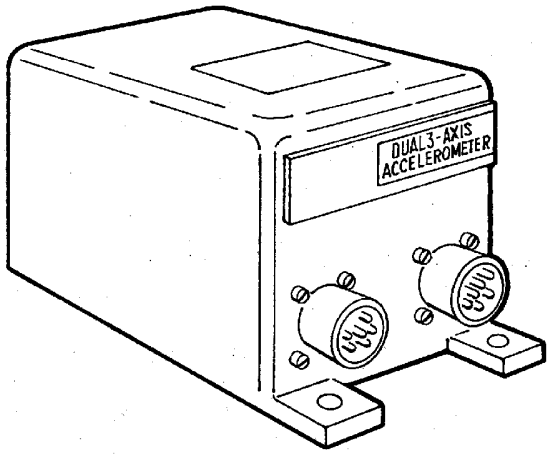
(4) An oscillator provides excitation to the toroid excitation networks, which in turn provides excitation to the toroid accelerometers. This network also provides the self-test of the toroid accelerometers by unbalancing the excitation and measuring the output response. Further toroid monitoring is provided by measuring the excitation drive voltage. The amplifier-demodulator circuit accepts the ac acceleration signal from the toroid and converts the signal to a dc out-put signal.

B. Normal Pendulous Accelerometers

(1) The normal accelerometers are linear, force balanced, close loop, pendulous type units. Acceleration displaces a pendulum that produces an error signal in a position transducer. The error drives a servo amplifier to supply current to a torque coil which opposes the force of the input acceleration to restore the pendulum to the zero position requiring the servo amplifier output to be proportional to input acceleration.

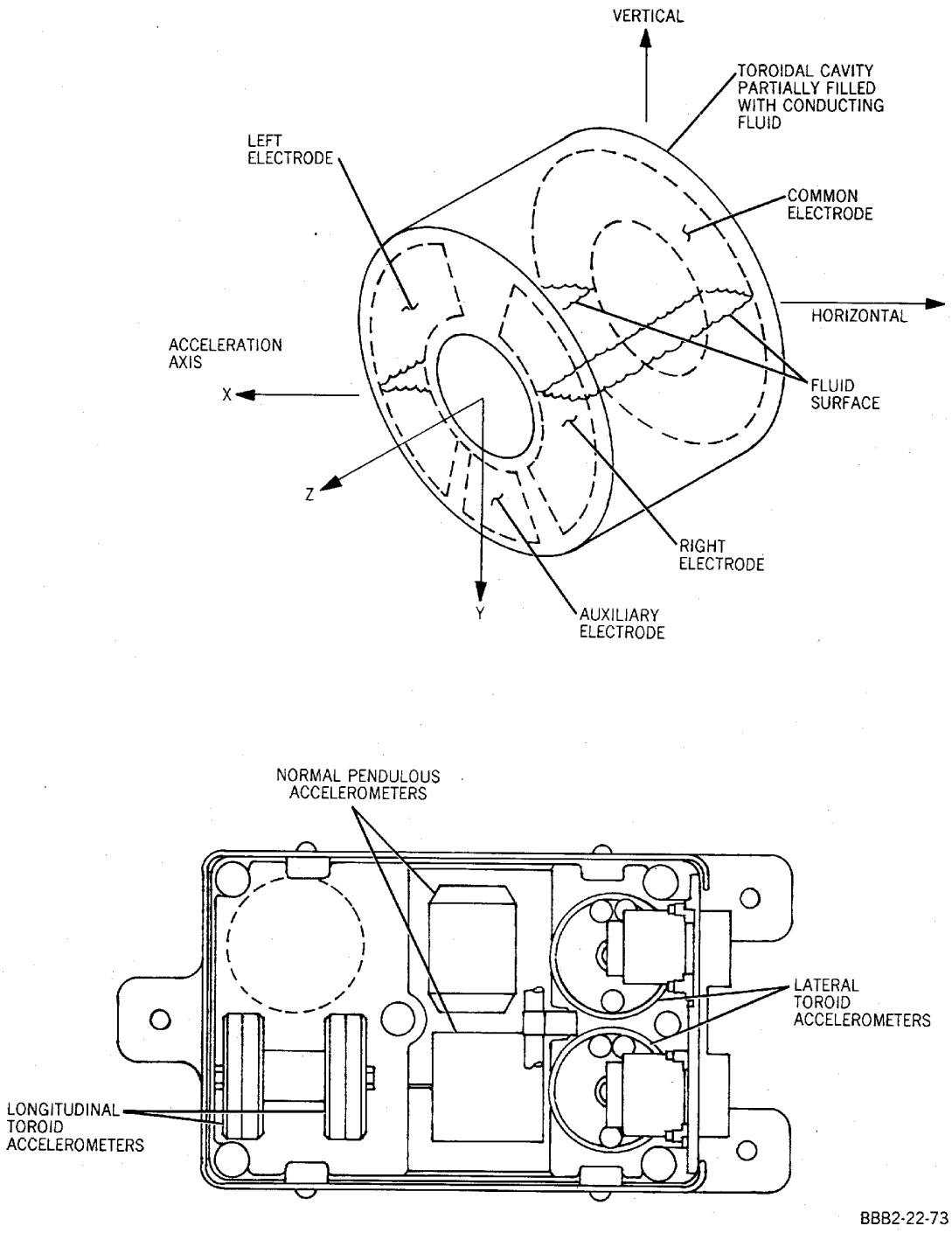
(2) There are two outputs from each accelerometer, one with a one g bias for use by the CADC, and the second without a one g bias for use by the DFGC's. The DFGC also provides continuous monitoring of the normal accelerometer.

(3) Two types of normal accelerometers are provided. The mounting accomodates both types and both accelerometer types are may be used interchangeably.

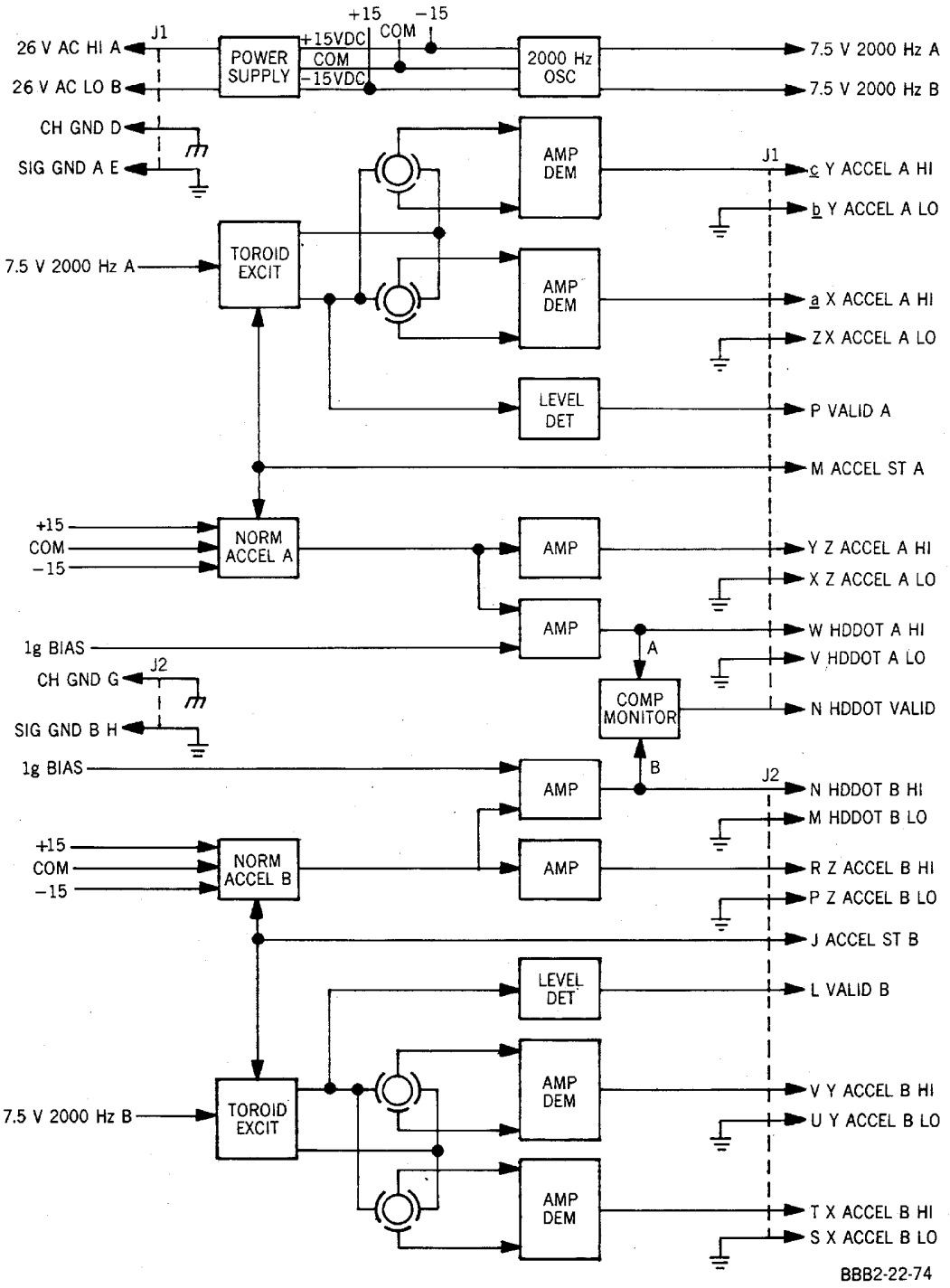


BBB2-22-72

Dual 3-Axis Accelerometer
Figure 1/22-19-01-990-801



Toroid and Pendulous Accelerometers
Figure 2/22-19-01-990-802



Dual 3-Axis Accelerometer - Simplified Schematic
Figure 3/22-19-01-990-803

DUAL 3-AXIS ACCELEROMETER - MAINTENANCE PRACTICES

1. General

A. The dual 3-axis accelerometer is located in the forward cargo compartment ceiling area, left side at station 237. Removal of the forward left hand overhead ceiling panel provides access to the accelerometer. Access opening number is 5149C.

B. After removal/installation of the accelerometer, systems and components associated with accelerometer operation should be in proper operating condition for accelerometer testing.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Accelerometer testing is accomplished by performing a Return-To-Service test from the Status Test Panel (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

D. Accelerometer testing is accomplished by performing a Return-To-Service test from the MCDU (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

2. Removal/Installation Dual 3-Axis Accelerometer

A. Remove Accelerometer

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open this circuit breaker and install safety tag:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

(2) Disconnect electrical connectors from accelerometer.

CAUTION: MANUALLY SUPPORT ACCELEROMETER DURING REMOVAL/INSTALLATION OR DAMAGE TO MOUNTING FLANGES ON ACCELEROMETER MAY RESULT.

(3) Remove the three bolts (3) that attach accelerometer to mount bracket. Do not remove the four safetied bolts that attach the mounting bracket to aircraft structure, or realignment of mount bracket and retorque of the bolts may be required.

(4) If accelerometer is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install Accelerometer

(1) Make sure that this circuit breaker is open and has safety tag:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

CAUTION: MANUALLY SUPPORT ACCELEROMETER DURING REMOVAL/INSTALLATION OR DAMAGE TO MOUNTING FLANGES ON ACCELEROMETER MAY RESULT.

(2) Support accelerometer and install mounting bolts.

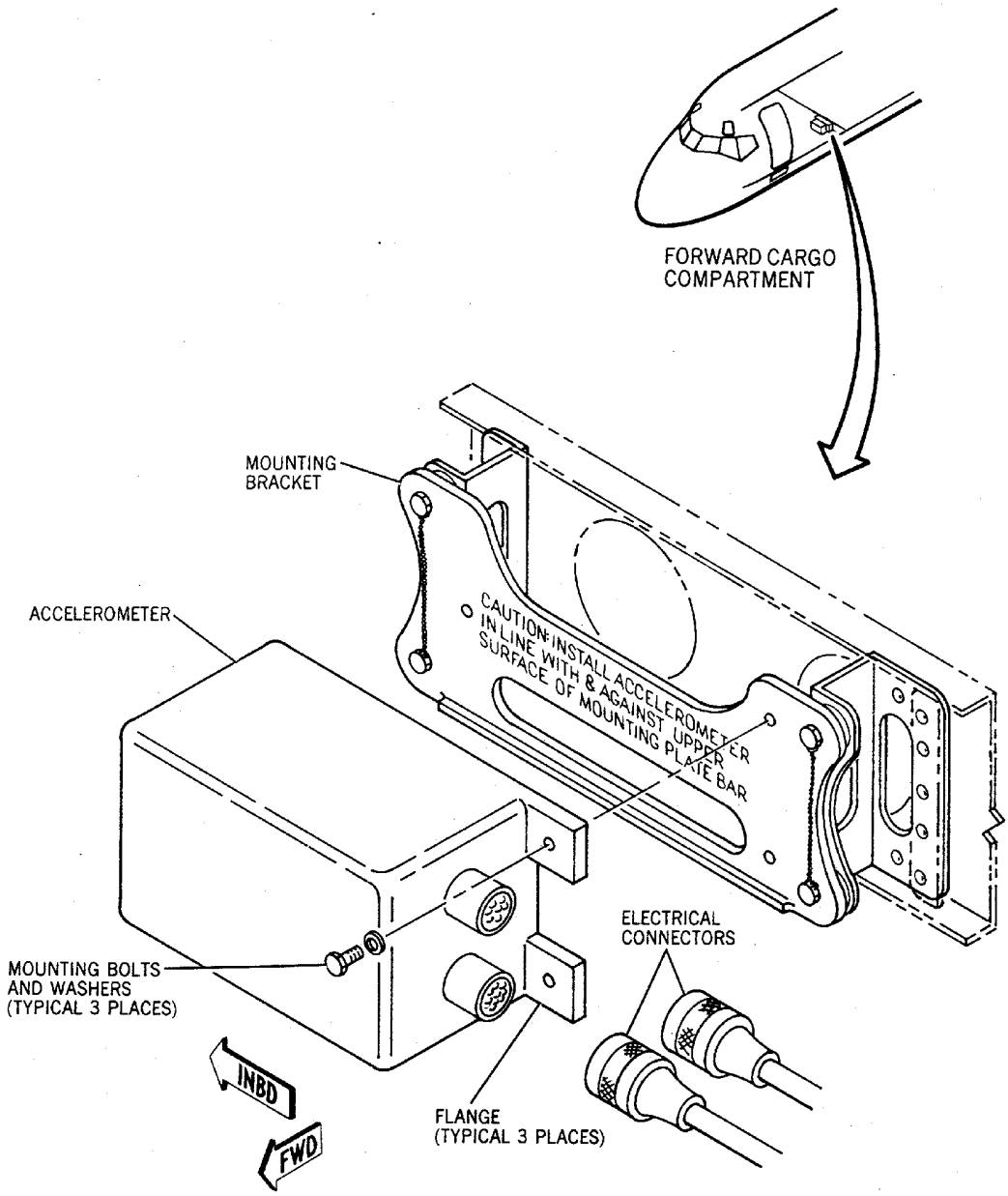
(3) Connect electrical connectors to accelerometer.

(4) Remove the safety tag and close this circuit breaker:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

(5) Perform Return to Service (RTS) test (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).



BBB2-22-135

Dual 3-Axis Accelerometer -- Removal/Installation
Figure 201/22-19-01-990-804

DUAL LATERAL ACCELEROMETER - DESCRIPTION AND OPERATION

1. General

A. The dual lateral accelerometer is designed to provide lateral accelerometer signals to derive lateral rates in connection with the dual 3-axis accelerometer for yaw damping and auto-pilot compensation.

B. The accelerometer consists of two lateral toroid accelerometers, an oscillator, toridal excitation networks, amplifier-demodulator circuit and a power supply.

C. The accelerometer is located on the underside of the floor right of the center-line of the aircraft and forward of station 807.

2. Functional Description

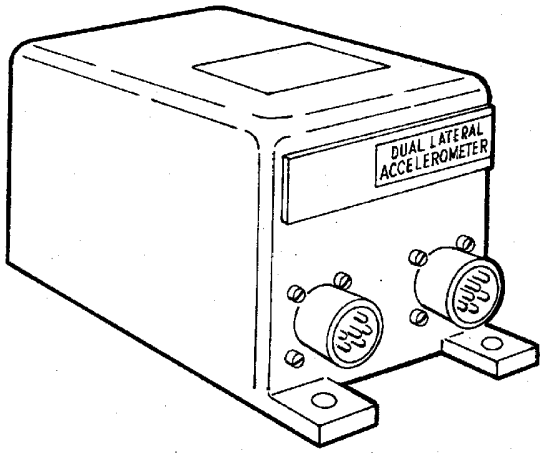
A. Lateral Toroid Accelerometers

(1) Each lateral toroid accelerometer provides dual lateral acceleration signals. Each accelerometer has a 360 degree fluid cavity that is half filled with an electrolyte fluid.

(2) Conductive, oppositely facing electrode pairs are arranged on the left and right side of the toroidal cavity to form conductive cells. Accelerating the toroidal accelerometer changes the immersed areas of the electrodes and produces an output signal that is linearly proportional to the tilt angle of the fluid.

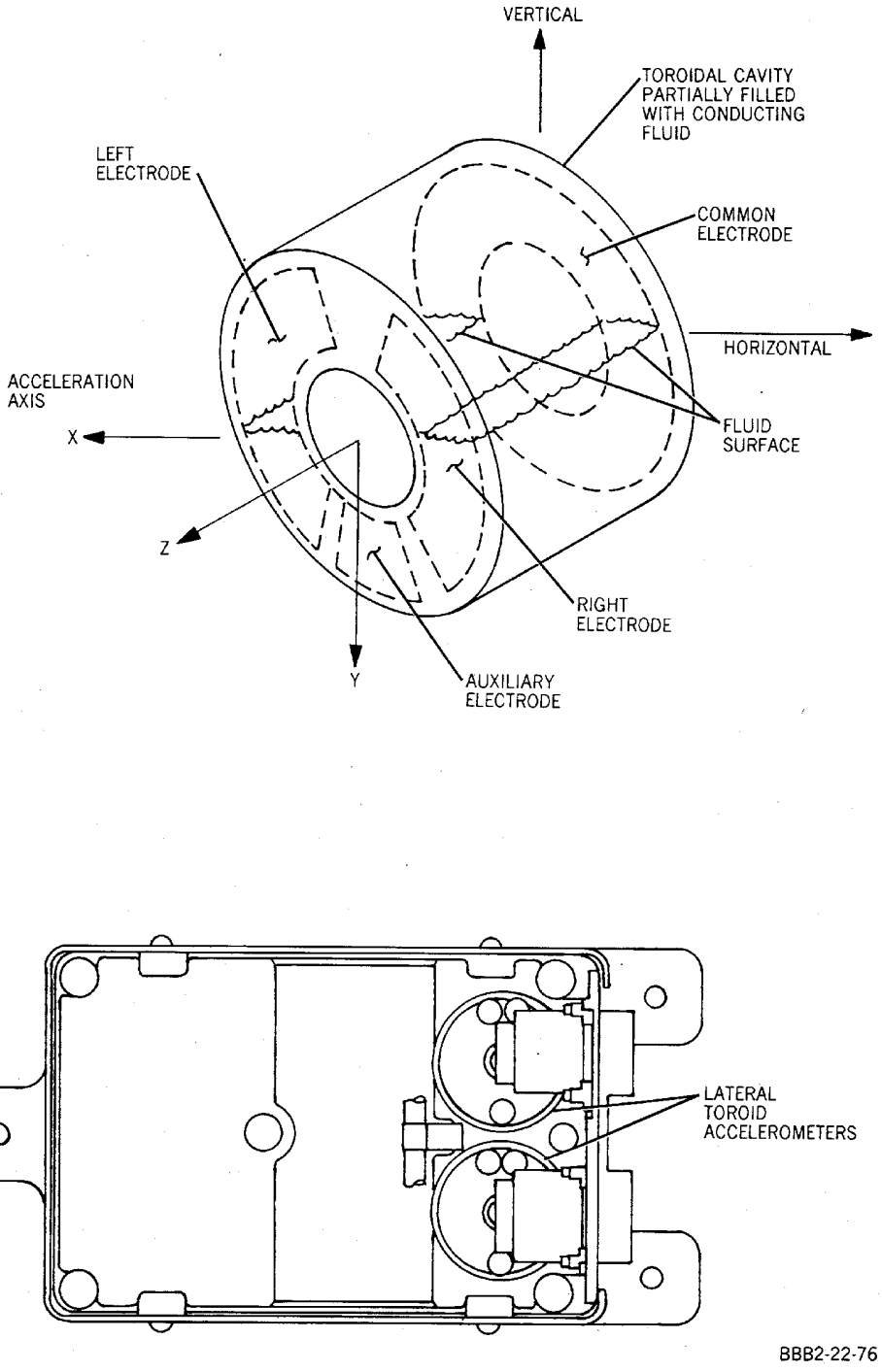
(3) Each toroid accelerometer has an auxiliary electrode, that is always fully immersed in the fluid. The auxiliary electrode measures the resistance of the electrolyte fluid and automatically compensates the accelerometer scale factor for environmental temperature change.

(4) An oscillator provides excitation to the toroid excitation networks, which in turn provides excitation to the toroid accelerometers. This same network also provides the self-test of the toroid accelerometers by unbalancing the excitation and measuring the output response. Further toroid monitoring is provided by measuring the excitation drive voltage. The amplifier-demodulator circuit accepts the Alternating Current (AC) acceleration signal from the toroid and converts the signal to a Direct Current (DC) output signal.

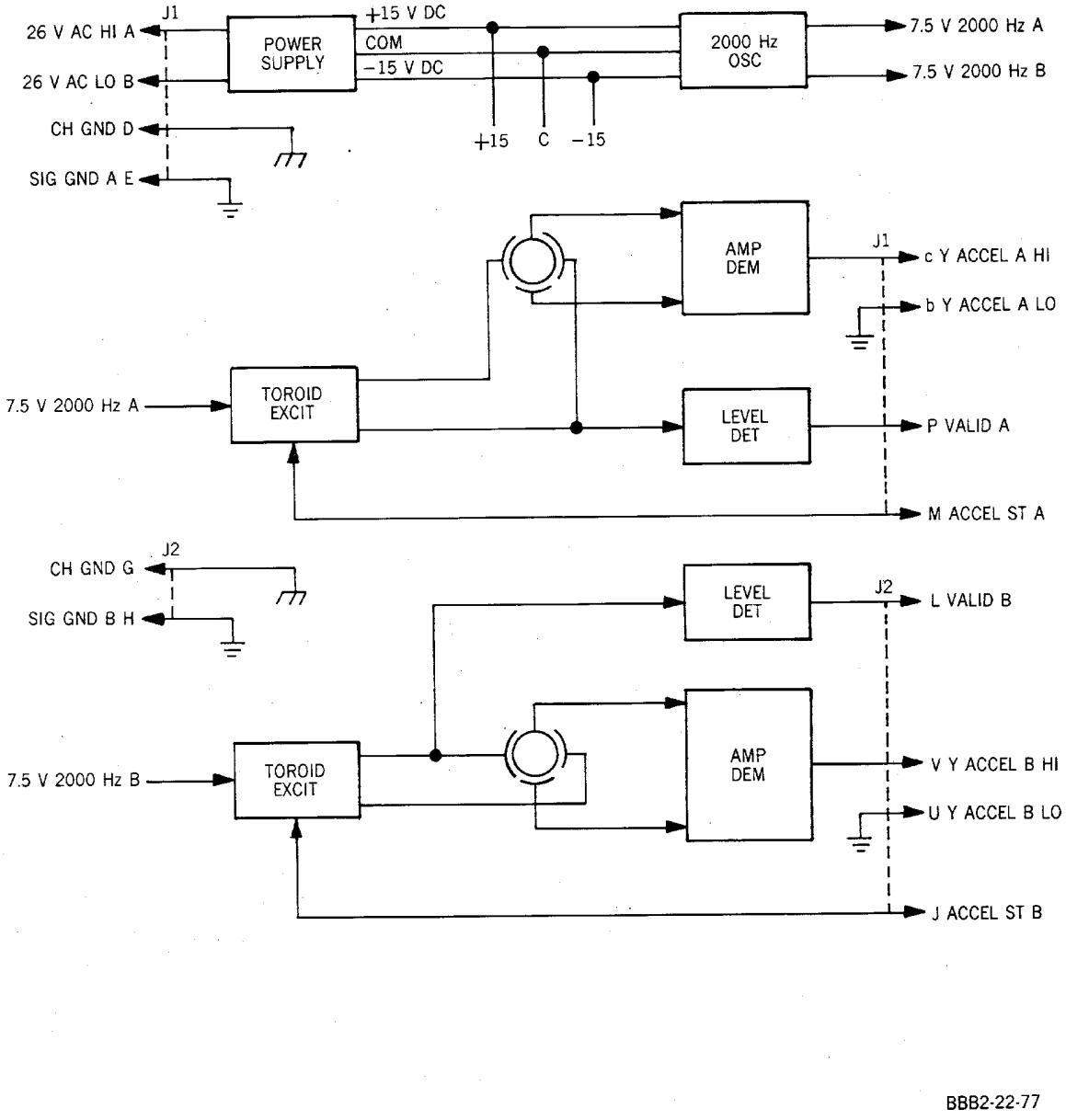


BBB2-22-75

Dual Lateral Accelerometer
Figure 1/22-19-02-990-801



Toroid Accelerometers
Figure 2/22-19-02-990-802



Dual Lateral Accelerometer - Simplified Schematic
Figure 3/22-19-02-990-803

DUAL LATERAL ACCELEROMETER - MAINTENANCE PRACTICES

1. General

A. The dual lateral accelerometer is located aft of the bulkhead of the mid cargo compartment. Access to the accelerometer is through the mid cargo compartment aft bulkhead access door (5107C).

B. After removal/installation of the accelerometer, systems and components associated with accelerometer operation should be in proper operating condition for accelerometer testing.

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

C. Accelerometer testing is accomplished by performing a Return-To-Service test from the Status Test Panel (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

D. Accelerometer testing is accomplished by performing a Return-To-Service test from the MCDU (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

WJE ALL

2. Removal/Installation Dual Lateral Accelerometer

A. Remove Accelerometer

WARNING: TAG AND SAFETY CIRCUIT BREAKER.

(1) Open this circuit breaker and install safety tag:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

(2) Disconnect electrical connectors from accelerometer.

CAUTION: DO NOT ATTEMPT TO REMOVE SAFETIED BOLTS ATTACHING MOUNTING BRACKET TO AIRPLANE STRUCTURE, OR REALIGNMENT OF MOUNTING BRACKET AND BOLT TORQUING MAY BE REQUIRED.

CAUTION: MANUALLY SUPPORT ACCELEROMETER DURING REMOVAL OR DAMAGE TO MOUNTING FLANGES ON ACCELEROMETER MAY RESULT.

(3) Remove bolts (3) attaching accelerometer to mounting bracket.

(4) If accelerometer is being replaced, carefully package defective unit into carton that originally contained new unit.

B. Install Accelerometer

(1) Make sure that this circuit breaker is open and has safety tag:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

(2) Support accelerometer and install mounting bolts.

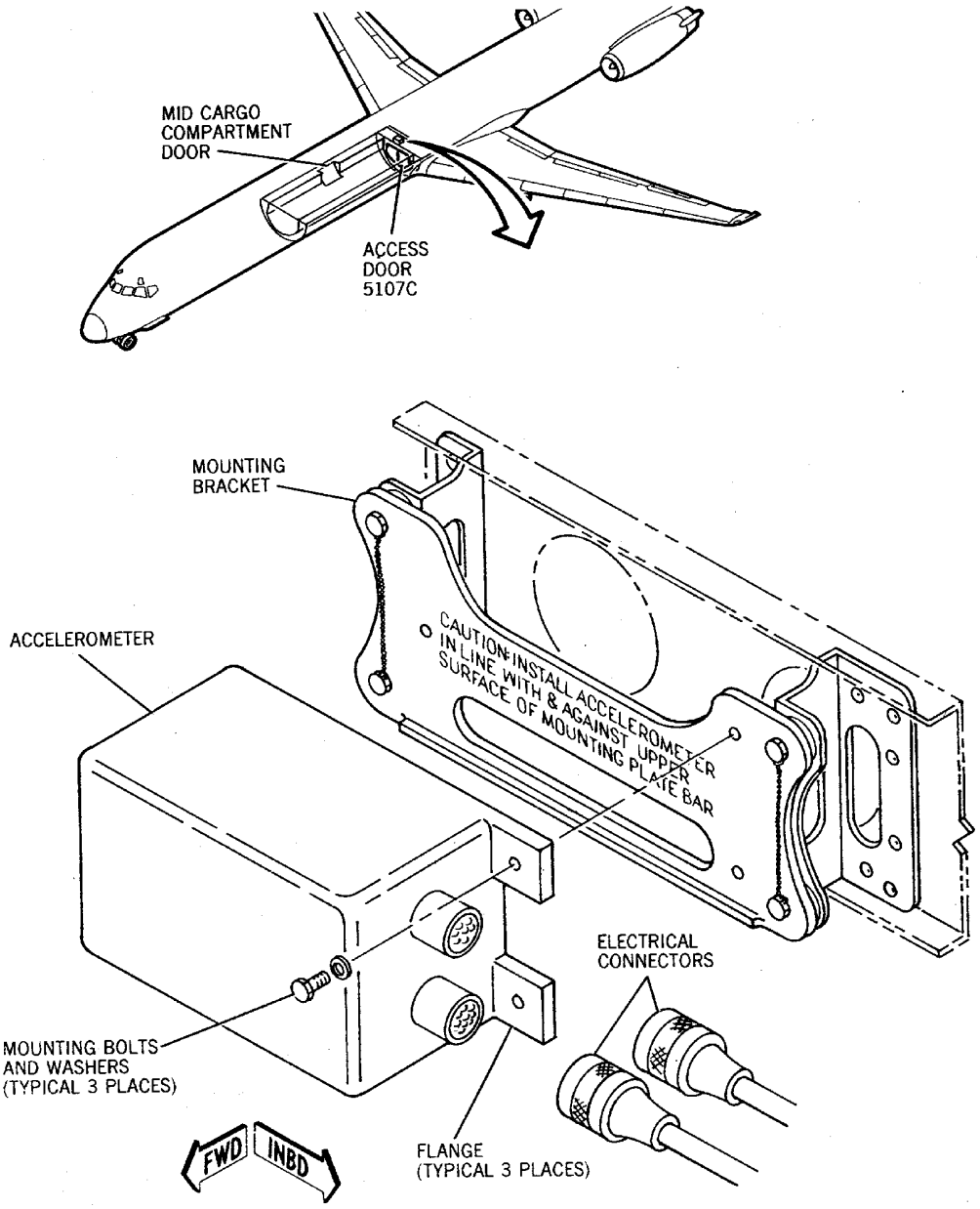
(3) Connect electrical connectors to accelerometer.

(4) Remove the safety tag and close this circuit breaker:

UPPER EPC, 28 VAC

Row	Col	Number	Name
C	19	B10-369	DIGITAL FLIGHT GUIDANCE SYSTEM SWITCH C

(5) Perform Return to Service (RTS) test (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).



BBB2-22-136

Dual Lateral Accelerometer -- Removal/Installation
Figure 201/22-19-02-990-804

SPEED ATTITUDE CORRECTION - DESCRIPTION AND OPERATION

1. General

A. Speed Attitude Correction provides Automatic Pitch Trim and Mach Trim Compensation functions.

B. Automatic Pitch Trim is provided to relieve the autopilot from holding sustained up or down elevator due to actual or apparent change of the center of gravity within the airplane.

C. Mach Trim Compensation automatically adjusts the center position of the control column to compensate for nose-down pitching of the airplane caused by high mach number.

D. Speed Attitude Correction descriptive and maintenance material is provided in the following sections:

- AUTOMATIC PITCH TRIM - DESCRIPTION AND OPERATION, SUBJECT 22-21-00
- MACH TRIM COMPENSATION SYSTEM - DESCRIPTION AND OPERATIO, SUBJECT 22-22-00

AUTOMATIC PITCH TRIM - DESCRIPTION AND OPERATION

1. General

A. Automatic pitch trim is provided to transfer steady-state elevator loads to the stabilizer by moving the horizontal stabilizer up or down. If an out-of-trim condition develops in the pitch axis, the horizontal stabilizer will move up or down as commanded by the automatic pitch trim system to correct the out-of-trim condition.

B. AP TRIM lights, located in the Flight Mode and Instrument Warning annunciators will come on to warn the flight crew if a sustained out-of-trim condition exists. The lights will go off when the out-of-trim condition has been corrected. The AP TRIM lights can not be reset, and can only be turned off when the out-of-trim condition has been corrected, or the autopilot has been disengaged.

2. Operation

A. Automatic pitch trim (up or down) is derived from the DFGC pitch control logic. Whenever a sustained elevator command signal develops, monitors within the DFGC provide a signal to energize an UP TRIM relay or an DOWN TRIM relay located in air-plane wiring. When either of the relays are energized, voltage is applied to a BRAKE RELAY. The BRAKE RELAY provides voltage through an ALTERNATE TRIM BRAKE RELEASE switch to a BRAKE RECTIFIER ASSEMBLY to release a BRAKE COIL within the Alternate Trim motor.

B. When AP & ALTERNATE LONG TRIM circuit breakers are closed, 115 VAC power is applied through the Alternate Trim Motor switch center contact to the UP TRIM and DOWN TRIM relays. When the DFGC calls for UP or DOWN trim, excitation voltage is applied to the Alternate Trim motor. The direction of the motor rotates as a function of the mistrim condition until appropriate horizontal stabilizer movement is provided.

C. UP and DOWN limit switches are provided to limit the mechanical travel of the Alternate Trim motor. If the motor sustains horizontal stabilizer movement for too long a period of time (approximately 8 seconds), the DFGC will provide a signal to turn on the AP TRIM lights. The lights will remain on until the out-of-trim condition is corrected, or the autopilot is disengaged.

MACH TRIM COMPENSATION SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The Mach Trim Compensation system (MTC) automatically provides forces to the control column (elevator) to compensate for nose-down pitching moments of the airplane during high Mach number flight. Control column position is affected by a Mach Trim Actuator installed in the lower part of the first officer's control column.

B. Mach number is computed from pitot (speed) and static (altitude) air pressure input signals from the Central Air Data Computer (CADC). The CADC transmits the information to the Digital Flight Guidance Computer (DFGC) where it is further transmitted to the Mach Trim Actuator. Extension of the Mach Trim Actuator repositions the Mach Trim springs in the mechanical control system. Repositioning the Mach Trim springs results in a repositioning of the elevator load-feel spring.

C. A MACH TRIM COMP switch is located on the overhead switch panel in the flight compartment. The switch provides selection for NORM and OVRD. In addition, a MACH TRIM INOP light is located on the overhead warning annunciator panel to advise the flight crew and maintenance personnel of the operational capability of the system.

D. A Mach Trim Indicator rod is located on the inboard side of the first officer's control column. The indicator rod will extend when the Mach Trim Actuator extends and will retract when the Mach Trim Actuator retracts.

2. System Operation

A. Mach Trim Compensation Mode

(1) When CADC and DFGC power is applied, the MTC mode is in operation and the mode will be active as long as the MACH TRIM COMP switch is in the NORM position. If the MACH TRIM COMP switch is in the OVRD position, the system is disabled and the MACH TRIM INOP light will come on and remain on as long as the switch is in the OVRD position. During flight pitot and static air pressure is applied to the CADC. The pitot and static air pressure is processed through a multiplexer system within the CADC and is converted and distributed as digital Mach information to the DFGC.

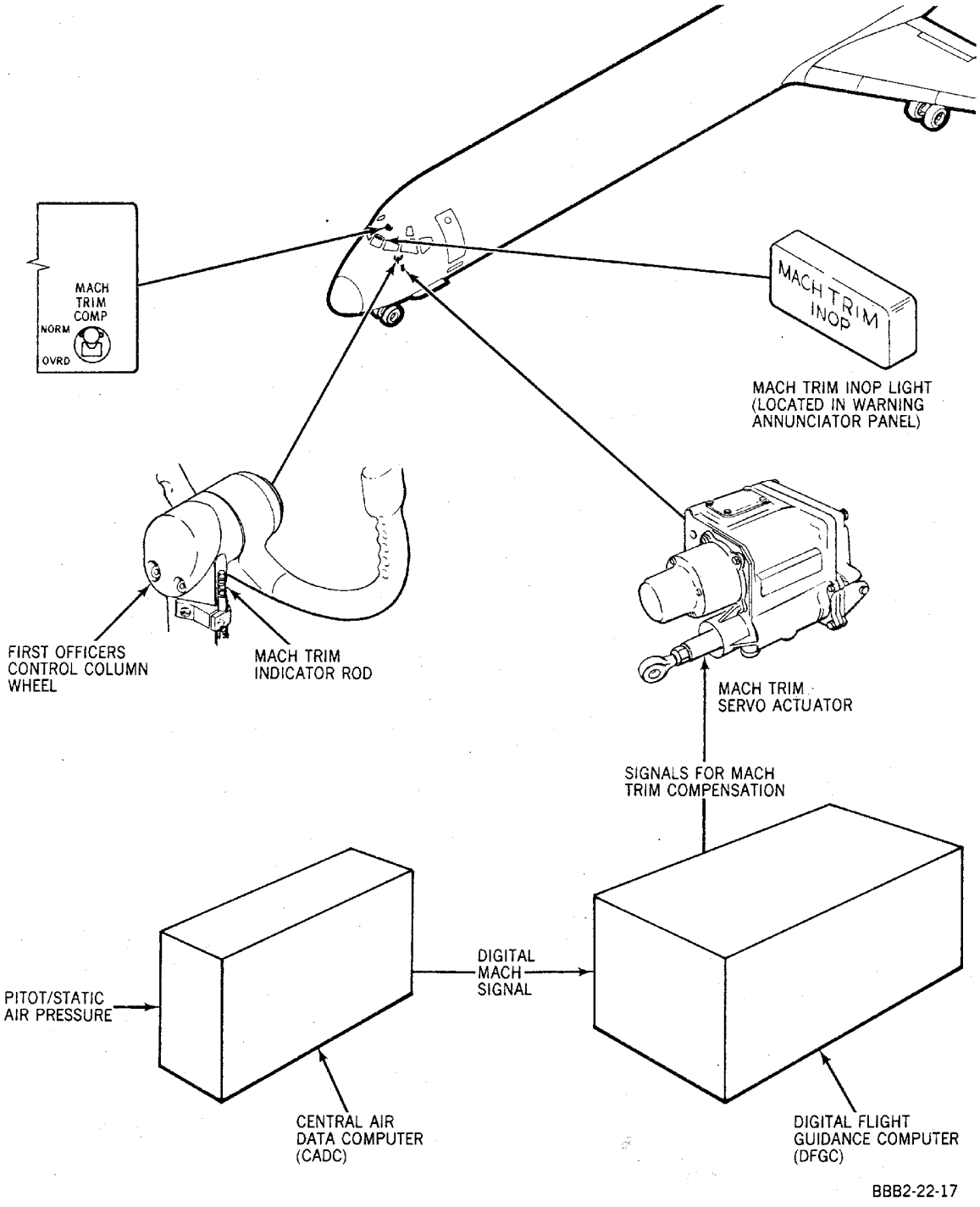
NOTE: The MACH TRIM INOP light will come on when the MACH TRIM COMP switch is placed to the OVRD position.

(2) The DFGC then receives the output from the CADC into a 575 RCVR within the DFGC where the Mach signal is used to generate the required mach trim compensation command. The command is converted to analog form in the digital to analog converter and is then amplified and sent to the Mach Trim Actuator as a Mach compensation command.

(3) The Mach compensation command is used to position a jackscrew in the Mach Trim Actuator. The jackscrew rotates a bellcrank which provides a moment arm for the Mach Trim Compensation spring to act on the control column. The control column is then positioned as a function of Mach number. This repositions the elevator load-feel spring neutral position to maintain normal centering characteristics. The actuator position loop is closed through a position syncro in the actuator. A tach generator also provides position damping.

(4) Limit switches in the Mach Trim Actuator prevent the extendable link in the actuator from driving itself into either the maximum or minimum stops when elevator movement is required.

(5) A monitor within the DFGC is provided to detect MTC failures. The monitor compares output signals to and input signals from the Mach Trim Actuator (servo command versus servo response). If these signals do not cancel each other, a mismatch occurs and power to the monitor is removed. The MACH TRIM INOP light will come on and power is removed from the Mach Trim Actuator.



Mach Trim Compensation System - Functional Layout
Figure 1/22-22-00-990-801

MACH TRIM COMPENSATION SYSTEM - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

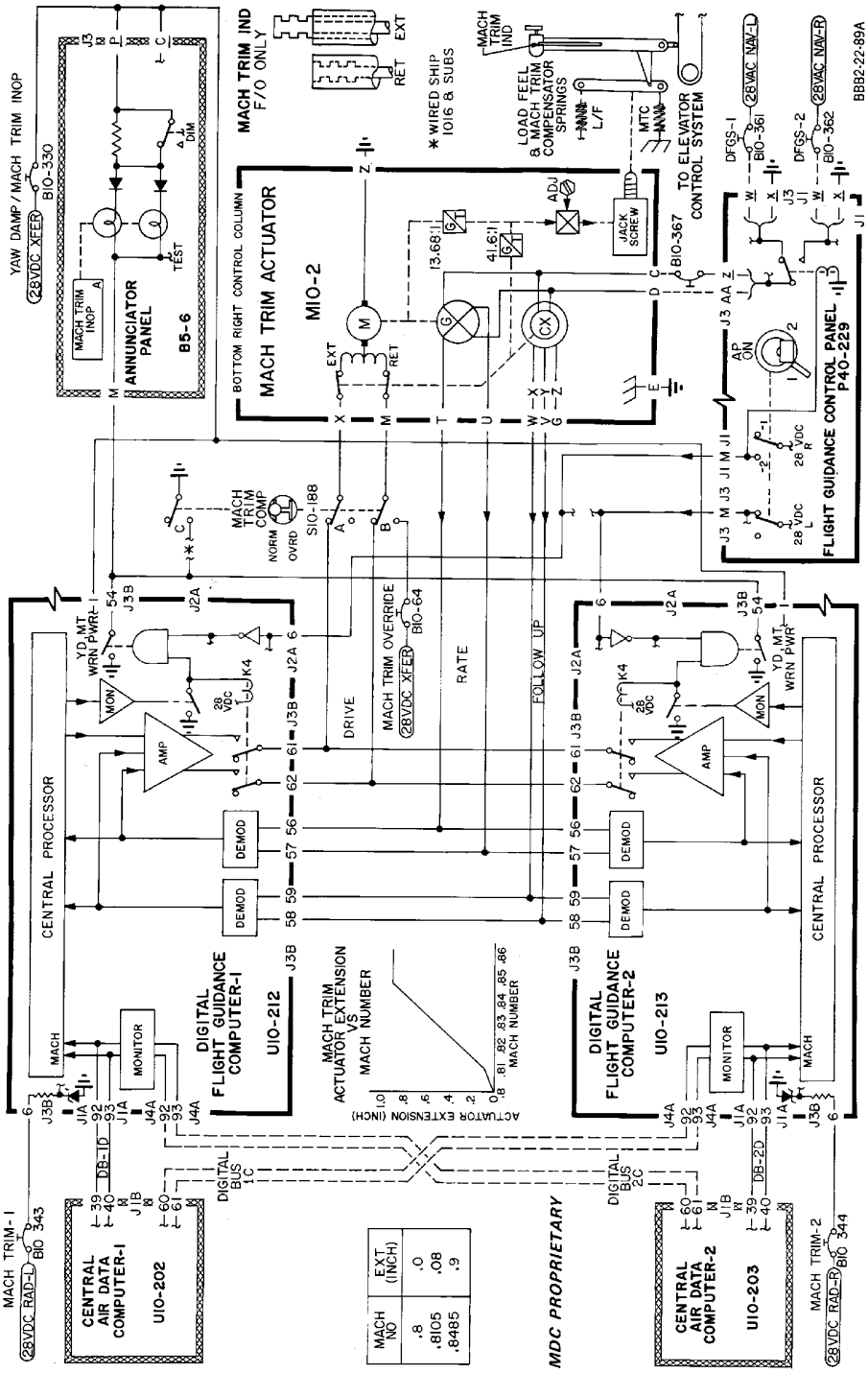
A. Prior to performing Mach Trim trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. Mach Trim may be also verified by use of the Maintenance or Return-To-Service tests. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

B. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on Mach Trim is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to Mach Trim and associated system interface.

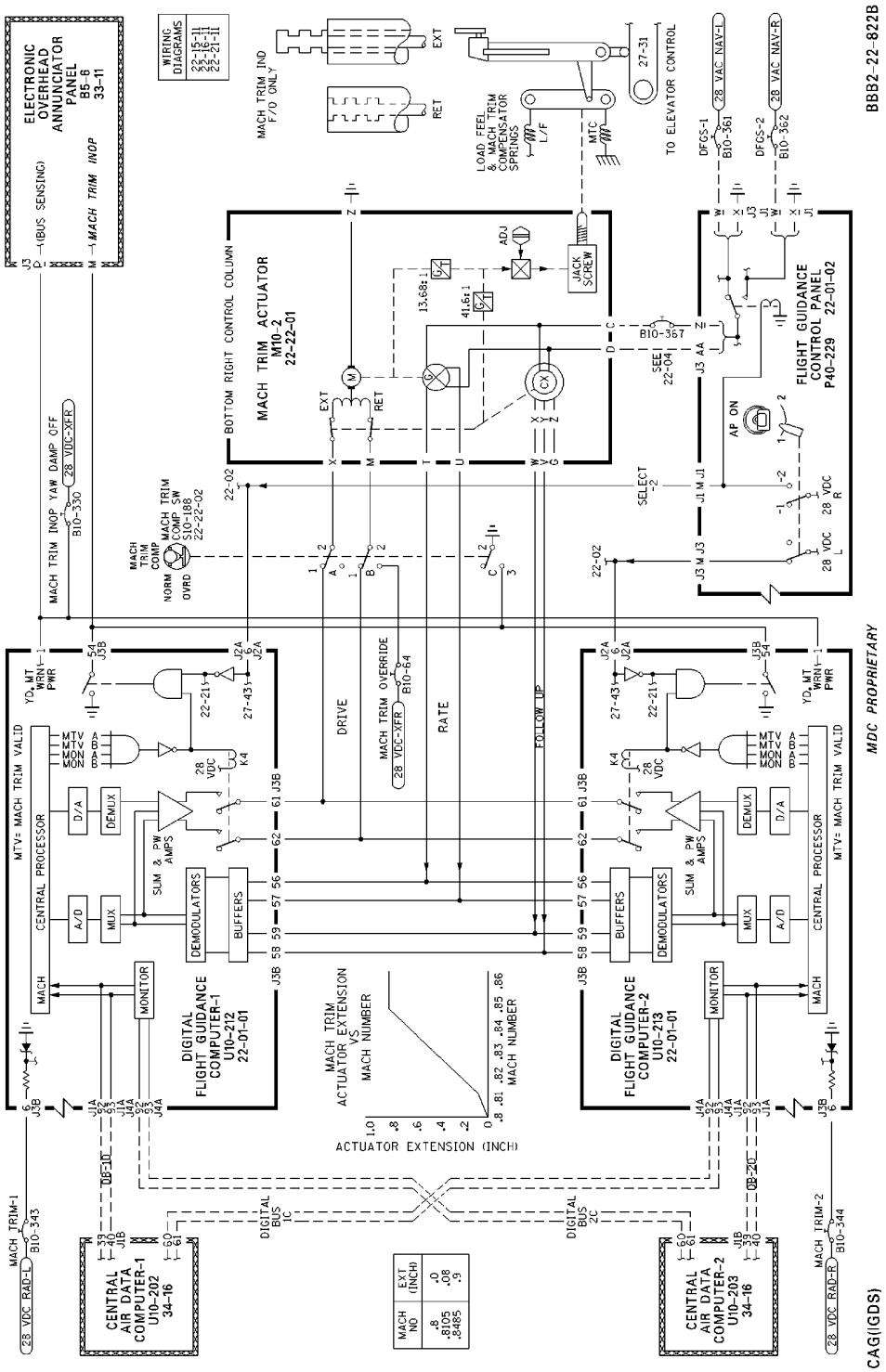
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

C. Prior to performing Mach Trim trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to check if any failures were detected during flight. This trouble shooting may be accomplished by use of Flight Fault Review. Mach Trim may be also verified by use of the Maintenance or Return-To-Service tests. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

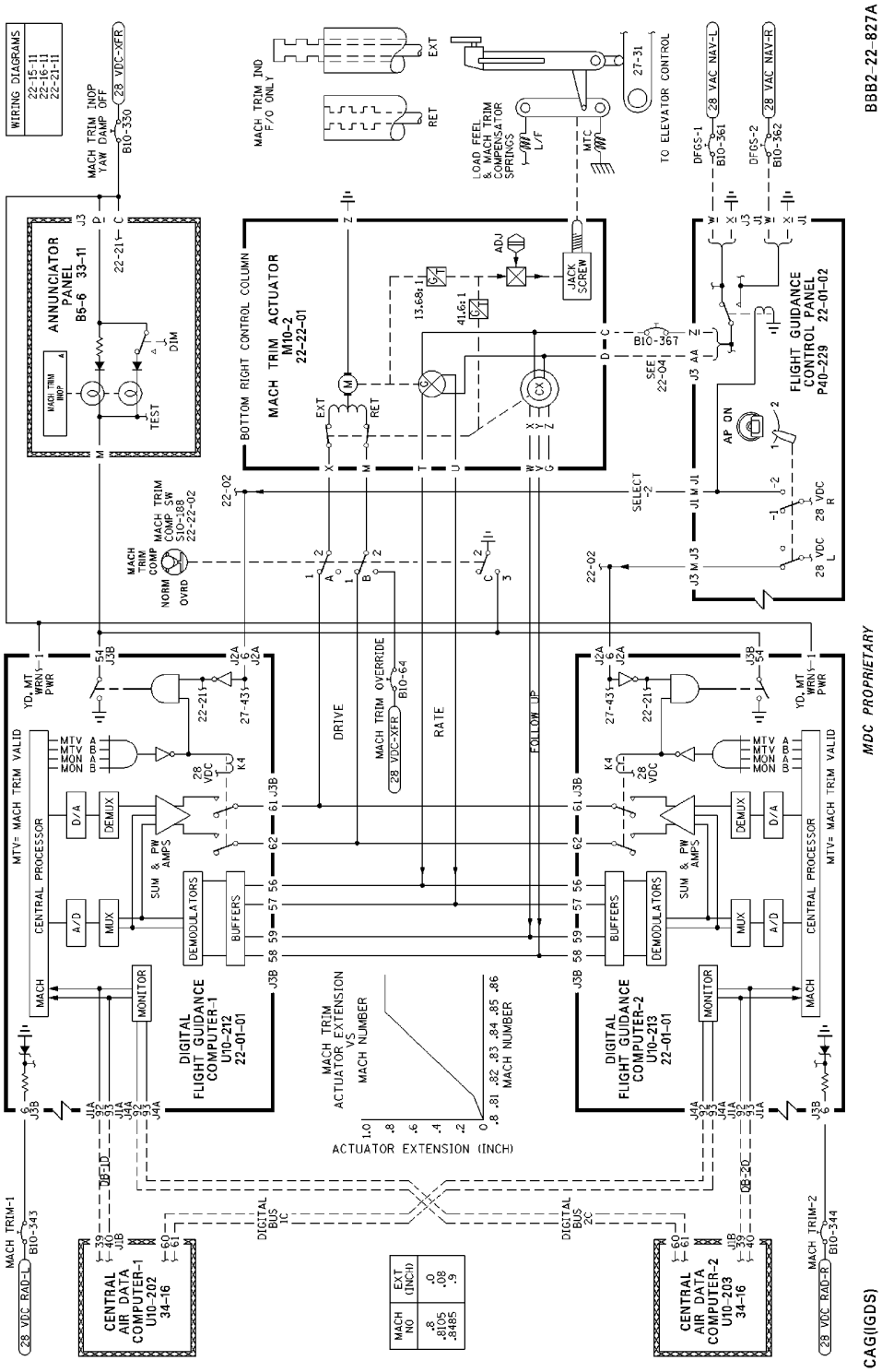
D. Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on Mach Trim is essential for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to Mach Trim and associated system interface.



Mach Trim
Figure 101/22-22-00-990-802



Mach Trim
Figure 102/22-22-00-990-803



Mach Trim
Figure 103/22-22-00-990-805

MACH TRIM ACTUATOR - MAINTENANCE PRACTICES

1. General

A. The Mach Trim Actuator is located on the control column bellcrank assembly below the flight compartment floor. Access to the actuator is through the electrical/electronics compartment access door.

B. Adjustment of the mach trim compensator linkage procedures are given in chapter ELEVATOR AND TAB - ADJUSTMENT/TEST, PAGEBLOCK 27-30-00/501 .

C. A Return to Service test should be performed after installation procedures of the Mach Trim Actuator (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items.

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Turnbuckle fixtures Ref. Figure 201.	
Lockwire, Inconel, NASM20995N32, DPM 684	Not Specified
Lockwire, Corrosion Resistant Steel, NASM20995C32, DPM 5865	Not Specified

3. Removal/Installation Mach Trim Actuator

A. Remove Mach Trim Actuator

(1) Verify AP ON switch is placed OFF.

(2) Remove electrical power from airplane (GENERAL - REMOVAL/INSTALLATION, PAGEBLOCK 24-00-00/401).

(3) On aircraft with three VHF systems, remove VHF-3 transceiver (PAGEBLOCK 23-20-00/201).

WARNING: THE FOLLOWING PROCEDURES REQUIRE THAT STATION 110 JUNCTION BOX BE OPENED AND PARTIALLY REMOVED FOR ACCESS TO THE MACH TRIM ACTUATOR. GREAT CARE SHOULD BE EXERCISED WHILE PERFORMING THESE PROCEDURES TO PREVENT ANY POSSIBLE DAMAGE TO THE JUNCTION BOX.

(4) At station 110 Junction Box release camloc fasteners and remove cover assembly, to gain access to mounting screws.

(5) From upper wire bundle remove nylon straps that secure wire bundles (Figure 201).

(6) Remove screws (7) from channel that secure Junction Box to airplane structure, and carefully remove enough to gain access to upper access panels.

(7) Remove access panels (Figure 201).

(8) Disconnect electrical connector from actuator.

(9) Install turnbuckle fixture (Figure 201).

NOTE: If actuator is in extended position, control column can be rotated forward to extend springs and allow turnbuckle fixture to be installed in a shortened condition. When control column is released, there will be slack in cables.

(10) Remove actuator lower attaching bolt; retain special bolt and washers.

NOTE: If difficulty is encountered in removing bolt because of pressure at attach points, jackscrew access cap on actuator should be removed and jackscrew turned with a screwdriver to release pressure.

(11) Rotate actuator forward and up; remove upper bolt and actuator.

B. Install Mach Trim Actuator

(1) Verify aircraft electrical power is removed.

(2) Install turnbuckle fixture (Figure 201).

(3) Connect electrical connector to actuator.

(4) Position actuator in bellcrank assembly and install upper bolt, nut, and cotter pin.

(5) Install lower special bolt, washers, nut, and safety (Figure 201).

(6) Safety bolt with lockwire. (LOCKWIRE SAFETYING - MAINTENANCE PRACTICES, PAGEBLOCK 20-10-18/201)

(7) Remove turnbuckle fixture.

(8) Install both access panels (Figure 201).

WARNING: PRIOR TO INSTALLING JUNCTION BOX, VERIFY THAT JUNCTION BOX IS FREE FROM ANY INTERNAL DAMAGE, AND THAT ANY LOOSE HARDWARE THAT MAY CAUSE ELECTRICAL DAMAGE IS REMOVED.

(9) Install Junction Box to airplane structure and attach wire bundles using nylon straps.

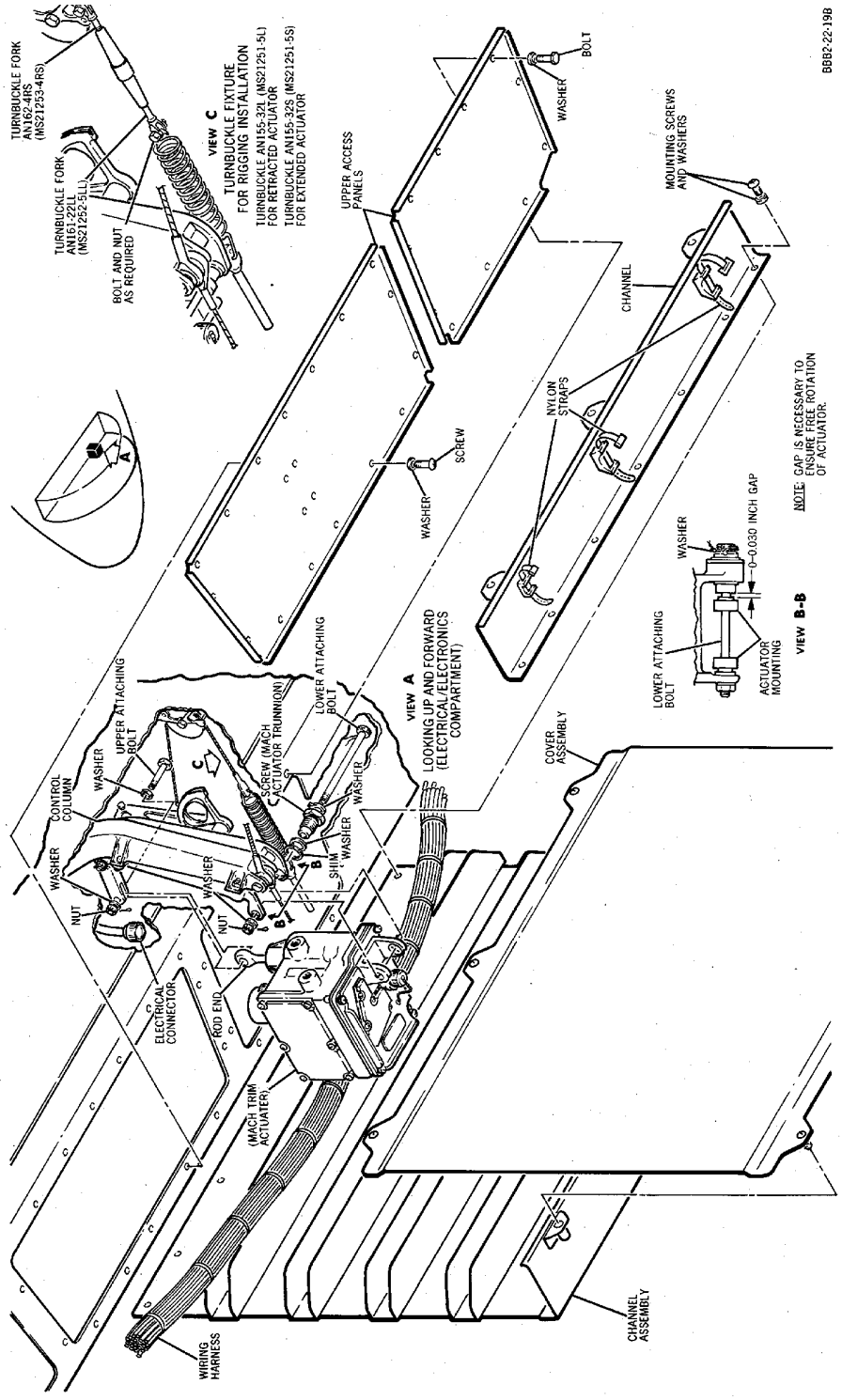
(10) Install cover assembly with camloc fasteners.

(11) On aircraft with three VHF systems, install VHF-3 transceiver (PAGEBLOCK 23-20-00/201).

(12) With actuator in full retract position, check that actuator indicator is flush with end of indicator tube. If necessary, loosen upper tube clamp and adjust tube vertically until flush with indicator. Tighten clamp.

(13) Apply electrical power to airplane (GENERAL - REMOVAL/INSTALLATION, PAGEBLOCK 24-00-00/401).

(14) Test Mach Trim Actuator by performing a Return to Service (RTS) test (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).



Mach Trim Actuator -- Removal/Installation
Figure 201/22-22-01-990-801

AUTO THROTTLE/SPEED CONTROL - DESCRIPTION AND OPERATION

1. General

A. Auto Throttle/Speed Control (AT/SC) provides control of speed, mach and thrust throughout the takeoff, flight and landing modes of operation.

B. Airplane position sensors, air data, flight guidance control inputs, etc. are processed in the Digital Flight Guidance Computers (DFGC's) to generate the speed/thrust signals for AT/SC control during flight and ground mode operations.

C. During autothrottle operation, a throttle servo drives the throttle levers and throttle control system through a gearbox, chain drive, and two separate no-back clutch assemblies. The throttles can be manually overridden with no greater force than normal throttle operation when the autothrottle is engaged.

D. Takeoff/Go-Around (TO/GA) switches are located on the throttle levers. Momentarily pressing either TO/GA switch will automatically change the selected speed control reference to take-off or go-around reference speed during takeoff or go-around modes of operation.

E. Only one DFGC is in command during autothrottle operation. The other DFGC (off-side) is continuously receiving and processing parallel input signals in event selection is required. A switch located below the AP engage switch labeled 1, 2, provides the capability for selection of either DFGC-1 or DFGC-2. However, with flight director switch in NORM position an isolated output signal is provided from each DFGC to the slow-fast pointer (and flight director pitch command bar when in TO/ GA mode) in the captain's and first officer's ADI's.

F. The digital flight guidance computer (DFGC) features an automatic thrust restoration (ATR) function which increases thrust under certain conditions in the event of an engine failure or negative climb rate (-930 and subsequent) during takeoff. Once activated, the ATR function will unclamp and advance the throttles (if the autothrottle is engaged) equally until the left or right engine EPR reaches the G/A EPR limit. Refer to SUBJECT 22-00-00, paragraph entitled Autothrottle/Speed Control, for additional data.

2. AT/SC Functional Description

A. The flight compartment components that control and display AT/SC functions are shown in Figure 2. The autothrottle engage switch, SPD/MACH selector, SPD/MACH readout, and mode select pushbuttons are located on the Flight Guidance Control panel.

B. Auto Throttle Engage Switch

(1) Placing the autothrottle engage switch to AUTO THROT position will automatically engage the throttle servo motor to adjust engine power settings throughout all flight modes from takeoff to automatic retard mode. The switch is solenoid held, and unless all system interlocks are satisfied, the switch will not hold in the AUTO THROT position. Basic autothrottle engage mode is speed or mach whichever is displayed in the SPD/MACH window.

C. SPD/MACH Select Knob

(1) The SPD/MACH select knob provides the means of selecting SPD or MACH reference values to be used for manual or automatic (autothrottle engaged) speed control.

(2) The SPD/MACH select knob is a three position, spring returned to normal position type knob. The knob performs the following type functions:

(a) Normal position selects SPD/MACH at a slow-slew rate.

(b) Knob pushed to mid-detent position, selects SPD/MACH at a fast-slew rate.

(c) Knob pushed to maximum detent position retains the fast-slew rate and alternately switches the SPD/MACH reference signals to the SPD/MACH readout window, and affords a means of changing speed or mach reference for storage within the DFGC's.

(3) On ground, with initial airplane power application on to the DFGC system, the SPD SEL reference value is the primary display on the SPD/MACH readout window. With the autothrottle engage switch in the off position, pushing the SPD/MACH select knob to the maximum detent position alternately sequences the display of the SPD/MACH SEL reference value. Also, this permits preselection of the SPD/MACH SEL value to be stored within the DFGC. If the autothrottle is engaged in the SPD SEL mode, the MACH SEL reference will be displayed on the SPD/MACH readout window for approximately 3 seconds, following the last selected value, and then the readout will revert to and display the existing SPD SEL reference value.

(4) During flight mode, the AT/SC system provides the capability of programming SPD/MACH reference values for storage within the DFGC. These reference values may be programmed during the SPD SEL, MACH SEL, or EPR modes of operation. The descriptive operation of these functions are called out in the applicable modes of operation within this section.

D. SPD/MACH Readout Window

(1) The SPD/MACH readout window is located directly over the SPD/MACH select knob. The window is a three digit numeric readout which displays the selected SPD/MACH reference value. The digits are formed by use of seven light segments. When MACH SEL reference is displayed, a decimal point is in view for the selected mach number. The SPD/MACH reference value is also indicated by the selected IAS bugs located on the Mach Airspeed Indicators, and on the ATS mode annunciators if autothrottles are engaged in the SPD/MACH mode.

E. SPD SEL Pushbutton

(1) During flight mode, if the autothrottle is engaged in MACH SEL, EPR or CLMP mode, pressing the SPD SEL pushbutton will automatically engage the autothrottle in the SPD SEL mode of operation. SPD plus the numeric value of the selected airspeed will be displayed on the ATS mode annunciators.

F. MACH SEL Pushbutton

(1) During flight mode, if the autothrottle is engaged in SPD SEL, EPR, or CLMP mode, pressing the MACH SEL pushbutton will automatically engage the autothrottle in MACH SEL mode of operation. MACH plus the numeric value of the preselected mach number will be displayed on the ATS mode annunciators.

G. EPR LIM Pushbutton

(1) During flight mode, if the autothrottle is engaged in SPD SEL, MACH SEL, RETD, or CLMP mode, pressing the EPR LIM pushbutton or pressing either TO/GA switch will automatically engage the autothrottle in the EPR (engine pressure ratio) mode of operation. The ATS mode annunciator will display EPR T/O, EPR FLX, etc., as applicable for the selected thrust rating EPR LIM on the Thrust Rating Indicator.

H. IAS/MACH Select Bugs

(1) The mach/airspeed indicators contain an IAS/MACH Select bug. The bug is servo driven by the SPD/MACH select knob to agree with the speed reference value as indicated on the SPD/MACH readout window.

I. Thrust Rating Indicator (TRI)

(1) The Thrust Rating Indicator receives computed information from the DFGC to display maximum EPR limit for selected thrust rating. The DFGC computes maximum EPR limit for existing temperature and altitude consistent with operating conditions. If the autothrottle is engaged, and the TO/GA switch is pressed, the throttles will automatically drive to the EPR limit of the selected mode.

(2) During flight mode, if the autothrottle is engaged in SPD SEL, MACH SEL, or CLMP mode, the existing EPR limit is the upper authority limit for autothrottle operation.

J. Minimum Authority

(1) The minimum authority limit for autothrottle travel is established by switches located in the lower throttle quadrant. The minimum authority limit is provided to prevent throttles from being driven to the throttle idle stop during flight.

K. Slow-Fast Display

(1) A slow-fast display is located in each ADI. Except during TO/GA operation, the slow-fast display indicates speed deviation relative to the SPD SEL, MACH SEL, or ALPHA reference speed. When the TO/GA mode is engaged, the slow-fast display indicates existing speed deviation in relation to takeoff or go-around reference speed. When the airplane is in the retard mode of operation, the slow-fast pointers are biased out of view. Each slow-fast pointer is provided command signals from its respective DFGC (i.e., DFGC-1 to captain's slow-fast pointer).

L. Throttle Servo Drive

(1) The throttle servo drive is mounted under the forward end of the pedestal. The throttle servo drives the throttle levers and throttle control system through a gearbox, chain drive, and two separate no-back clutch assemblies.

(2) The speed and direction of rotation of the servo drive are proportional to the command signals provided from the DFGC. Servo drive output speed is reduced through reduction gears and coupled to the gearbox by means of a splined shaft. Drive speed is further reduced in the gearbox, and the out-put torque at the gearbox sprocket drives a chain to position the throttle levers.

(3) A drive clutch couples the throttle servo drive system to the engine throttle levers. The clutch can be manually overpowered with a force no greater than ordinarily required for throttle operation with the autothrottle disengaged. At maximum signal input, the system will drive the throttles at approximately 8 degrees/second.

M. TO/GA Switches

(1) A TO/GA (takeoff/go-around) switch is located on the back side of each throttle lever. The TO/GA switches are provided to initiate takeoff or go-around mode logic.

(2) During takeoff operation, with autothrottle engaged, momentarily pressing either TO/GA switch will establish the auto-throttle/speed control takeoff mode of operation. With either flight director switch on, the pitch and roll mode annunciators will display TAKE OFF, and EPR will be displayed in the ATS mode annunciators. The throttles will drive forward to seek the EPR limit displayed in the Thrust Rating Indicator.

(3) During approach conditions, with flaps extended, pressing either TO/GA switch will establish the go-around mode of operation. If autothrottle is engaged, the throttles will drive to the EPR limit for go-around power setting. The pitch and roll mode annunciators will display GO RND, and the ATS mode annunciator displays EPR G/A. GA will be illuminated on the Thrust Rating Indicator.

N. Autothrottle Disengagement

(1) The throttle levers contain throttle disconnect switches located on the outboard side of each lever. Pressing either of these disconnect switches will automatically cause the autothrottle to disengage. The autothrottle engage switch can also be manually placed to the OFF position.

(2) If the autothrottle is engaged, and monitor logic within the DFGC detects a failure, or if the autothrottle is operating in the EPR mode, and airspeed exceeds the flap/slat placard limit, the autothrottle will automatically disengage. If reverse thrust is applied, or the AP/FD TURB mode is selected the autothrottles will also disengage.

O. Throttle warning Lights

(1) Throttle warning lights are located in each of the Flight Mode and Instrument Warning annunciators. The lights are labeled THROTTLE, and will come on and flash red anytime the autothrottle is disengaged except when reverse thrust is applied.

(2) The lights can be turned off by pressing either throttle disconnect switch, or by placing the autothrottle engage switch to AUTO THROT position.

3. AT/SC Functional Operation

A. The AT/SC Functional Interface illustration, Figure 3, shows the functional interface of the AT/SC system. The AT/SC system receives sensor input and control logic data from air frame and aerodynamic sensors such as angle-of-attack flap and spoiler sensors, air data, vertical gyro, etc. This data is processed within the DFGC to provide the autothrottle/speed control commands to the slow-fast pointers, and a throttle command signal to the autothrottle servo.

B. Mach/speed as selected on the flight guidance control panel, or alpha speed reference is compared with existing mach or indicated airspeed, from the CADC to provide the basic mach/speed error signal. The mach/speed error signal is displayed as slow-fast deviation on the ADI's. Manual throttles or auto-throttles can be used to reduce the mach/speed error signal.

C. Other airframe dynamic signals are also required to provide the proper speed references and dynamic response characteristics. These additional input signals include normal and longitudinal acceleration, pitch and roll attitude, flap position, elevator position movement, and horizontal stabilizer position.

D. A computed angle-of-attack signal is developed within the DFGC by use of forward and vertical acceleration, air data inputs and attitude sensor inputs. Angle-of-attack combined with signals from flaps, slats, spoilers, elevator and horizontal stabilizer sensors is used to compute the coefficient of lift. Computed weight is determined from coefficient of lift, air-speed and wing configuration and is used to establish a minimum safe reference speed. Measured angle-of-attack from the angle-of-attack sensor (AOAS) is used during takeoff and go-around maneuvers in development of a flight director pitch command signal to establish the proper pitch attitude to maintain a takeoff or go-around reference speed.

E. In addition to establishing lift characteristics of the air-plane, the flap and slat position signals are also used to establish the flap/slat design reference speed. The flap/slat design reference speed is used as a limit for autothrottle control of the selected mach/speed consistent with flap/slat configuration. The flap/slat design reference speed is altered as flap/slat configuration is changed.

F. If the autothrottle is engaged in the EPR mode, maximum allow-able thrust control is programmed in accordance with EPR error signals developed from the EPR sensors and thrust rating EPR limit computed within the DFGC. Existing EPR of both engines is compared with computed maximum allowable EPR consistent with environmental conditions to develop a EPR error signal. The error signal provides a control signal to the autothrottle servo to drive the throttles to the selected thrust rating.

G. During retard mode of operation, at approximately 50 feet radio altitude, a signal is provided from either radio altimeter to the DFGC. The signal is used to initiate throttle retard during the flare maneuver as established by the flight guidance system. A logic signal is provided from the DFGC to bypass the lower authority limits and to program the throttles to the retard condition. When the airplane touches down, and wheel spin-up occurs, a signal from the ground spoiler control unit through the autothrottle system will cause the throttles to drive rapidly to a full retard condition. This will place the throttle levers at the idle stop position.

H. Alpha speed is calculated by the DFGC computer as a reference speed based on sensor readings. Alpha speed is not the actual speed of the aircraft. It acts as a reference for stall speed and operational modes that aircraft are in. If any accelerations are applied such as changes in pitch, attitude, bank angle, roll, yaw, etc., the resulting changes in "G" will cause the alpha speed to be adjusted automatically to maintain safe maneuver margins. The adjustments can be particularly significant in bank angles over 30 degrees, when operating in turbulence, when speed brake or spoilers are deployed, and when decelerating rapidly. Tolerances of sensor inputs can result in alpha speed annunciations at plus/minus 15 knots for up/retract configuration and plus/minus 6 knots for slat/extend in stable flight conditions.

NOTE: During some flight maneuvers "alpha speed" may be annunciated for short periods of time even though the correct speed is selected. If the slow/fast command is centered during a flight maneuver and alpha speed ("ALPHA SPD") is annunciated, the aircraft may be flying at a speed higher than selected. If alpha speed registers high in stabilized, unaccelerated flight, it is often a valid indication that the aircraft is heavier than computed. Initial "Alpha Spd" annunciation in the FMA when selecting chart alpha speed on the speed select may indicate high for short periods of time. This is a transient condition.

4. AT/SC Operational Modes

A. The three primary operating modes of the AT/SC system are SPD SEL, MACH SEL, and EPR. Other available AT/SC modes are derived from logic within the DFGC. The modes are CLMP, RETD, ALFA SPD, FLAP LIM, SLAT LIM and ATS LIM. The SPD SEL and MACH SEL modes are useable during any flight condition except when TO/GA mode or RETD mode is engaged. Interlock logic exists between the autopilot IAS and MACH modes and the autothrottle SPD SEL and MACH SEL modes to prevent simultaneous engagement of these operating modes.

B. Take Off Mode (Figure 4)

(1) With "on ground" logic established for more than 20 seconds, placing the autothrottle engage switch to AUTO THROT position, will automatically arm the autothrottle system for takeoff mode of operation. The throttle servo motor will be clamped (power removed from motor windings), and the ATS mode annunciators will display CLMP.

(2) Placing either or both flight director switches on, selecting T.O. (T.O. FLX) pushbutton on the Thrust Rating Indicator, and momentarily pressing the TO/GA switch will automatically establish the takeoff EPR mode of operation. TAKE OFF will be displayed in the pitch and roll mode annunciator(s).

(3) Takeoff EPR mode logic reapplies power to the servo motor. The ATS mode annunciators display EPR TO (EPR FLX), and throttles drive forward to seek maximum allowable takeoff EPR limit.

(4) During the takeoff roll, the pitch command bars will display nose-up (the pitch command bar and slow-fast pointers should be ignored until after rotation). The roll command bars should be centered to existing magnetic heading. The EPR display in the thrust rating indicator remains locked until another thrust rating mode is selected. The throttles adjust power settings to establish the displayed EPR limit speed, until the indicated airspeed reaches approximately 60 knots. At that point the DFGC locks on to the established EPR limit.

(5) At 60 knots indicated airspeed, power is again removed from the servo motor, and autothrottles are prevented from movement during rotation and lift off. CLMP will again be displayed in both ATS mode annunciators. After rotation, the airplane attitude can be maneuvered to keep the pitch command bars centered. Both the pitch command bars and slow-fast pointers should be centered when the actual airspeed equals the takeoff climbout reference speed, consistent with existing weight and wing configuration.

(6) During airplane climb to cruise altitude, the speed control system will adjust the reference speed for existing airplane configuration (i.e. flaps retracted, etc.). The pitch and roll mode annunciators will continue to display TAKE OFF until another pitch mode is selected. The autothrottle system clamp mode is terminated when another ATS mode is selected (i.e. EPR, SPD, or MACH) or another thrust rating other than T.O. or T.O. FLX is selected.

NOTE: A selected heading may be established for roll control if desired.

C. SPD SEL Mode (Figure 5)

(1) SPD SEL is the basic mode for AT/SC operation during low altitude conditions for both manual and autothrottle control. Selected airspeed is the primary reference for SPD SEL mode. An airspeed error is determined by comparing the existing airspeed signal from the CADC with the selected speed displayed on the SPD/MACH readout window. The selected speed is also displayed by the servo driven indicated airspeed bug on the Mach/Airspeed indicators. The speed error signal drives the slow-fast pointers on the ADI's, and the throttle servo motor, if autothrottle is engaged.

(2) If SPD SEL reference speed is displayed on the SPD/MACH readout window, placing the autothrottle engage switch to the AUTO THROT position will automatically place the system in the SPD SEL mode. The ATS mode annunciators will display SPD plus the numeric reference value displayed on the SPD/ MACH readout window. The throttles will adjust to seek and maintain the selected speed reference value. If the auto-throttle is not engaged, the ATS mode annunciators will be blank, and the slow-fast pointers provide the speed deviation with respect to the selected speed control.

(3) With autothrottle engaged in the SPD SEL mode, if the alpha reference speed is a higher value than the selected speed, ALFA SPD will be displayed on the ATS mode annunciators and the speed will be controlled to the alpha reference speed.

(4) Pushing the SPD/MACH select knob to the maximum detent position, with autothrottle engaged in the SPD SEL mode, will cause a temporary switching from the SPD SEL to the MACH SEL reference in the SPD/MACH readout window. This will permit changes to the selected mach reference to be stored within the DFGC. The SPD SEL mode remains engaged, and the ATS mode annunciators continue to display SPD SEL and numeric selected speed value. The MACH SEL reference value will be displayed for approximately 3 seconds on the SPD/MACH read-out window, or as long as MACH SEL numbers are being adjusted. Then the readout will revert back to the SPD SEL reference value.

(5) If the autothrottle is operating in the SPD SEL mode, and the autopilot IAS or MACH mode is selected, the autothrottle will automatically engage into the clamp mode. CLMP will be annunciated on the ATS mode annunciators and flash for approximately 3 seconds, alerting the flight crew to the change to the AT/SC operating mode. The throttles will remain stationary at the setting when IAS or MACH mode was selected.

(6) With the autopilot operating in either the IAS or MACH mode of operation, and the autothrottle is engaged in CLMP mode, pressing the SPD SEL pushbutton on the Flight Guidance Control panel or selecting a flight guidance pitch mode, will automatically reestablish the autothrottle SPD SEL mode. The ATS mode annunciator will display SPD plus the numeric value in the SPD/MACH readout. The autopilot pitch mode annunciator will display VERT SPD or ALT HLD depending on the pitch attitude of the airplane and flash for approximately 3 seconds, alerting the flight crew to the autopilot operating mode. The throttles will adjust to seek and maintain the speed reference value.

D. VMO LIM Mode

(1) When the autothrottle is operating in selected speed mode, and the indicated airspeed approaches the maximum overspeed limit (Vmo), the VMO LIM mode will be engaged. Both ATS mode annunciators will display VMO LIM. The throttles will automatically be controlled to maintain IAS below Vmo limit until the indicated airspeed is again within the proper operating selected speed threshold. The ATS mode annunciators will then automatically revert back to selected speed (SPD SEL).

E. MACH SEL Mode (Figure 6)

(1) MACH SEL reference value on the SPD/MACH readout window is the primary reference for MACH SEL mode. A mach/airspeed error is determined by comparing the mach signal from the CADC with the MACH SEL displayed on the SPD/MACH readout window. The servoed (IAS) bug on the MACH/AIRSPEED indicator displays airspeed corresponding to the MACH SEL value for the existing pressure altitude. The mach/airspeed error signal drives the slow-fast pointers on the ADI's, and the throttle servo motor, if autothrottle is engaged.

(2) Pressing the MACH SEL pushbutton on the Flight Guidance Control panel, and placing the autothrottle engage switch to the AUTO THROT position will automatically place the system in the MACH SEL mode. (If the SPD/MACH readout window was previously displaying mach, the autothrottle will automatically engage into MACH SEL mode.) The ATS mode annunciators will display MACH plus the numeric mach reference value displayed on the SPD/MACH readout window. The throttles will adjust to seek and maintain the selected mach reference value. If the autothrottle is not engaged, the ATS mode annunciators will be blank, and the slow-fast pointers provide the speed deviation signal for selected mach control.

(3) With autothrottle engaged in the MACH SEL mode, if a alpha speed reference is a higher value than the selected mach, ALFA SPD will be displayed on the ATS mode annunciators and autothrottles will maintain the alpha speed reference value.

(4) Pushing the SPD/MACH select knob to the maximum detent position, with autothrottle engaged in the MACH SEL mode, will cause temporary switching from the selected mach to speed reference in the SPD/MACH readout window. This will permit changes to the selected speed reference to be stored within the DFGC. The selected mach mode remains engaged, and the ATS mode annunciators continue to display the selected mach and numeric value. The selected SPD reference value will be displayed for approximately 3 seconds on the SPD/MACH read-out window, or as long as speed numbers are being adjusted. Then the readout will revert back to the selected mach reference value.

(5) If the autothrottle is operating in the selected mach mode, and the autopilot IAS or MACH mode is selected, the auto-throttle will automatically engage into the clamp mode. CLMP will be annunciated on the ATS mode annunciators and flash for approximately 3 seconds, alerting the flight crew to the change to the autothrottle operating mode. The throttles will remain stationary at the point when IAS HOLD or MACH HOLD mode was selected.

(6) With the autopilot operating in either the IAS or MACH mode of operation, and the autothrottle is engaged in CLMP mode, pressing the MACH SEL pushbutton or selecting another pitch mode on the Flight Guidance Control panel will automatically reestablish the autothrottle MACH SEL mode. The ATS mode annunciators will display MACH plus the numeric value in the SPD/MACH readout. The pitch mode annunciator will display VERT SPD or ALT HLD depending on the pitch attitude of the airplane and flash for approximately 3 seconds, alerting the flight crew to the autopilot operating mode. The throttles will adjust to seek and maintain the mach reference value.

F. MMO LIM Mode

(1) When the autothrottle is operating in selected mach mode, and the selected mach number has approached the maximum overspeed limit (Mmo), the MMO LIM mode will be engaged. Both ATS mode annunciators will display MMO LIM. The throttles will automatically be controlled to maintain mach airspeed below the Mmo limit until the mach airspeed is again within the proper operating selected mach airspeed threshold. The ATS mode annunciators will then automatically revert back to the selected mach airspeed (MACH SEL).

G. EPR LIM Mode (Figure 7)

(1) EPR can be selected by use of the EPR LIM pushbutton on the Flight Guidance Control panel, or automatically when the TO/GA switch is pressed.

(2) Placing the autothrottle engage switch to AUTO THROT position, and selecting EPR LIM, the throttles will adjust to seek and maintain the EPR LIM displayed on the Thrust Rating Indicator. EPR and the thrust rating (i.e. EPR CR), will be displayed on the ATS mode annunciators. During EPR mode the SPD/MACH readout will display the preselected speed/mach reference value.

(3) While operating in the EPR LIM mode, if the ENG SYNC switch is in the OFF position, the DFGC will monitor the Engine Synchronizer actuator that provides adjustment of the left engine EPR to match the EPR of the right engine. This is accomplished by a Relay Driver unit that transfers control of the Sychronizer actuator from the Engine Synchronizer Control Unit to the selected DFGC when the N_1/N_2 ENG SYNC switch is in the OFF position.

(4) Pushing the SPD/MACH select knob to the maximum detent position, while operating in the autothrottle EPR mode, will alternately switch the reference displayed in the SPD/MACH readout window to either SPD or MACH reference. This permits changes to the selected speed/mach reference values to be stored within the DFGC. The autothrottle will remain engaged in the EPR mode, and EPR plus the thrust rating mode will be displayed on the ATS mode annunciators.

H. ALFA SPD Mode

(1) The alpha speed mode is automatically engaged when the SPD/ MACH readout window is set to a value less than the alpha speed reference, and the SPD SEL or MACH SEL autothrottle mode is engaged. Slow-fast will respond to alpha speed limiting with autothrottle engaged or disengaged.

(2) ALFA SPD will be annunciated in the ATS mode annunciators, and the throttles will adjust to seek and maintain the airspeed at the alpha speed reference. The ATS mode annunciators will continue to display ALFA SPD until a higher SPD SEL/MACH SEL reference speed is established, or the alpha speed value has decreased, because of changes in airplane configuration.

I. ATS LIM Mode

(1) During autothrottle operation, the EPR limit selected on the thrust rating indicator is used as the maximum authority limit for autothrottle control of the throttles. With auto-throttles engaged, and operating in the SPD SEL, MACH SEL, or ALFA SPD mode, and an autothrottle commands a thrust setting greater than the selected thrust rating EPR LIM, or lower than the throttle low-limit threshold (minimum authority switches), the autothrottle will be automatically con-trolled from exceeding these thresholds. The ATS mode annunciators will display SPD ATL or MACH ATL when throttles are limited to EPR setting, or LOW LIM when throttles reach aft of the low limit switch (Retard).

(2) When the autothrottle commands a thrust setting within normal autothrottle operating thrust range, the autothrottle will resume adjustment of the throttles to the applicable speed reference. The ATS mode annunciators will revert from ATS LIM and display the engaged autothrottle mode.

J. FLAP LIM Mode

(1) With autothrottle engaged and operating in the SPD SEL, or MACH SEL mode, and the selected speed/mach is greater than the flap placard reference speed, the autothrottle will automatically adjust to seek and maintain the throttles at the flap design limit airspeed. The ATS mode annunciators will display FLAP LIM and flash for approximately 3 seconds, alerting the flight crew to the autothrottle operating mode. The slow-fast pointers on the ADI's should be centered when the autothrottle adjusts to the flap design limit speed.

(2) If the selected speed/mach reference is reduced below the flap placard reference speed, or flap configuration is changed, the autothrottle will automatically revert to the engaged speed/mach mode. Airspeed will be adjusted, and the ATS mode annunciators will display the operating autothrottle mode.

(3) If the autothrottle is engaged in the FLAP LIM mode, and EPR is selected, the autothrottle will automatically disengage.

K. SLAT LIM Mode

(1) With autothrottle engaged and operating in the SPD SEL or MACH SEL mode, and the selected speed/mach is greater than the slat design limit, the autothrottle will automatically adjust to seek and maintain the throttles at the slat design limit airspeed. The ATS mode annunciators will display SLAT LIM and flash for approximately 3 seconds, alerting the flight crew to the autothrottle operating mode. The slow-fast pointers on the ADI's should be centered when the auto-throttle adjusts to the slat design limit reference speed.

(2) If the selected speed/mach or alpha speed reference is reduced below the slat design limit, or slat configuration is changed, the autothrottles will automatically revert to the engaged speed/mach or alpha speed mode. Airspeed will be adjusted, and the ATS mode annunciators will display the operating autothrottle mode.

(3) If the autothrottle is engaged in the SLAT LIM mode, and EPR is selected, the autothrottle will automatically disengage.

L. RETD Mode

(1) Autothrottle retard mode is independent of the AP or FD operating mode. With approach slat/flap logic applied to the autothrottle system, and radio altitude at approximately 50 feet, the retard mode of operation is automatically established. A logic signal is provided to bypass the lower authority limits and to program the throttles for the retard condition.

(2) At the retard altitude threshold, the ATS mode annunciators will display RETD. The slow-fast pointers on the ADI's will bias out of view, and the autothrottle will reduce throttle setting.

(3) At main gear touchdown, a wheel spin-up signal from the ground spoiler control unit triggers a maximum throttle retard command to the autothrottle servo motor. The throttles will drive rapidly to a full idle stop position.

(4) During ground rollout prior to reverse thrust (autothrottle still engaged), pressing the TO/GA switch will automatically place the speed control system in takeoff/go-around speed control and autothrottle EPR modes. The pitch and roll mode annunciators will display TAKE OFF or GO ARND (depending on time interval of nose wheel compression), and the throttles will drive to the maximum EPR LIM for go-around operation. The ATS mode annunciator will display EPR thrust rating.

M. GO-ARND Mode (Figure 8)

(1) The go-around mode can be selected when the flaps are extended and either the flight director or autopilot are engaged. Autothrottle can either be engaged or disengaged when performing go-around operations. If the autothrottle is engaged, momentarily pressing the TO/GA switch will automatically drive the throttles to the maximum go-around EPR LIM. The go-around legend will appear in the pitch and roll mode annunciators, and GA will appear on the Thrust Rating Indicator. The ATS mode annunciator will display EPR G/A. Speed reference becomes go-around speed with autothrottle control at maximum thrust limited by EPR LIM.

(2) During the go-around maneuver, the DFGC establishes the proper pitch angle consistent with maintaining the go-around speed. The command signal is displayed by the command bar and slow-fast pointer in both ADI's. If the autopilot is engaged, a comparable signal is also sent to the elevator control system.

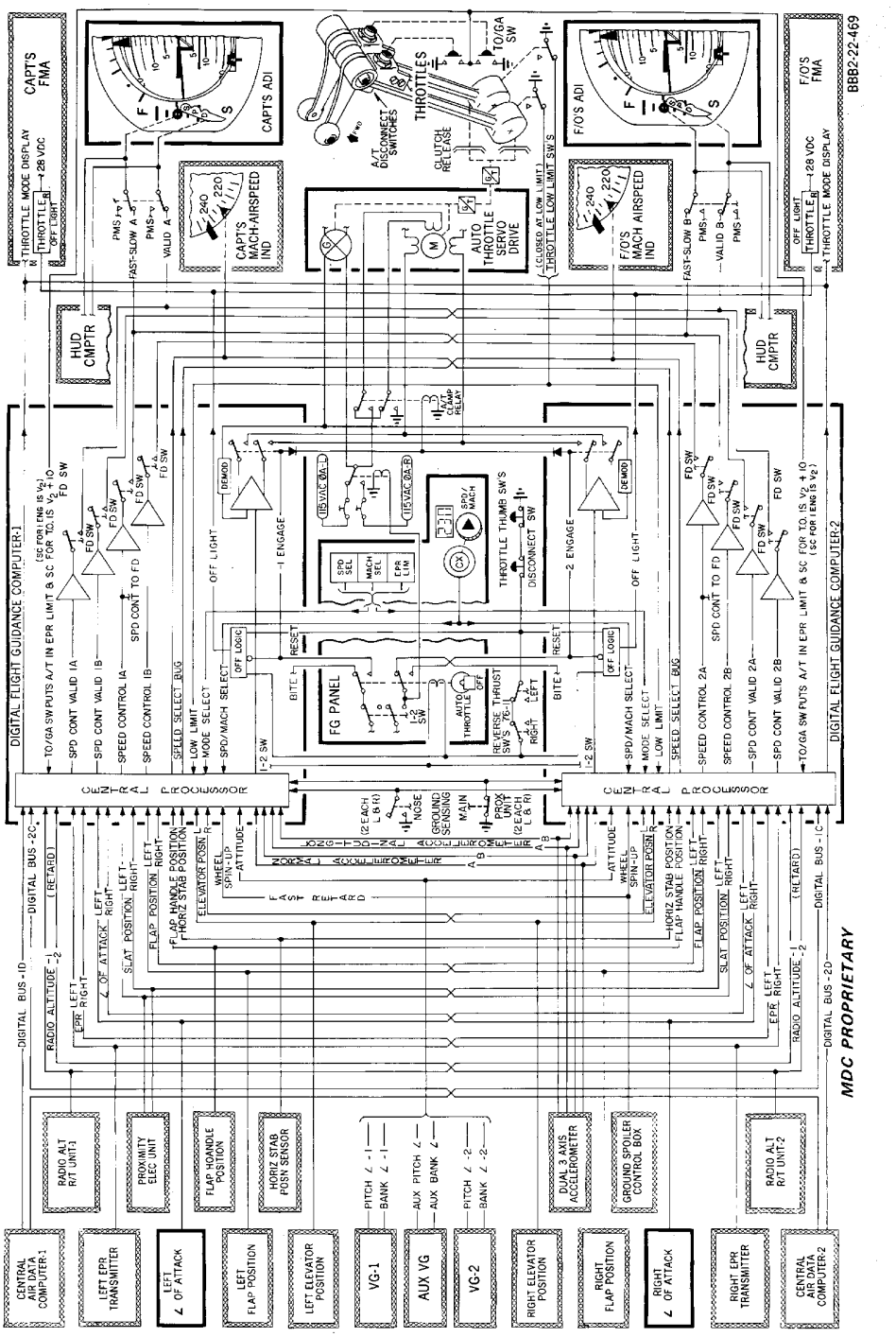
(3) Keeping the command bars and slow-fast pointers centered will result in minimum altitude loss during the transition from approach reference speed to go-around speed reference. The autothrottle go-around mode can be disengaged by selection of another autothrottle control mode.

N. Performance Management Control Mode

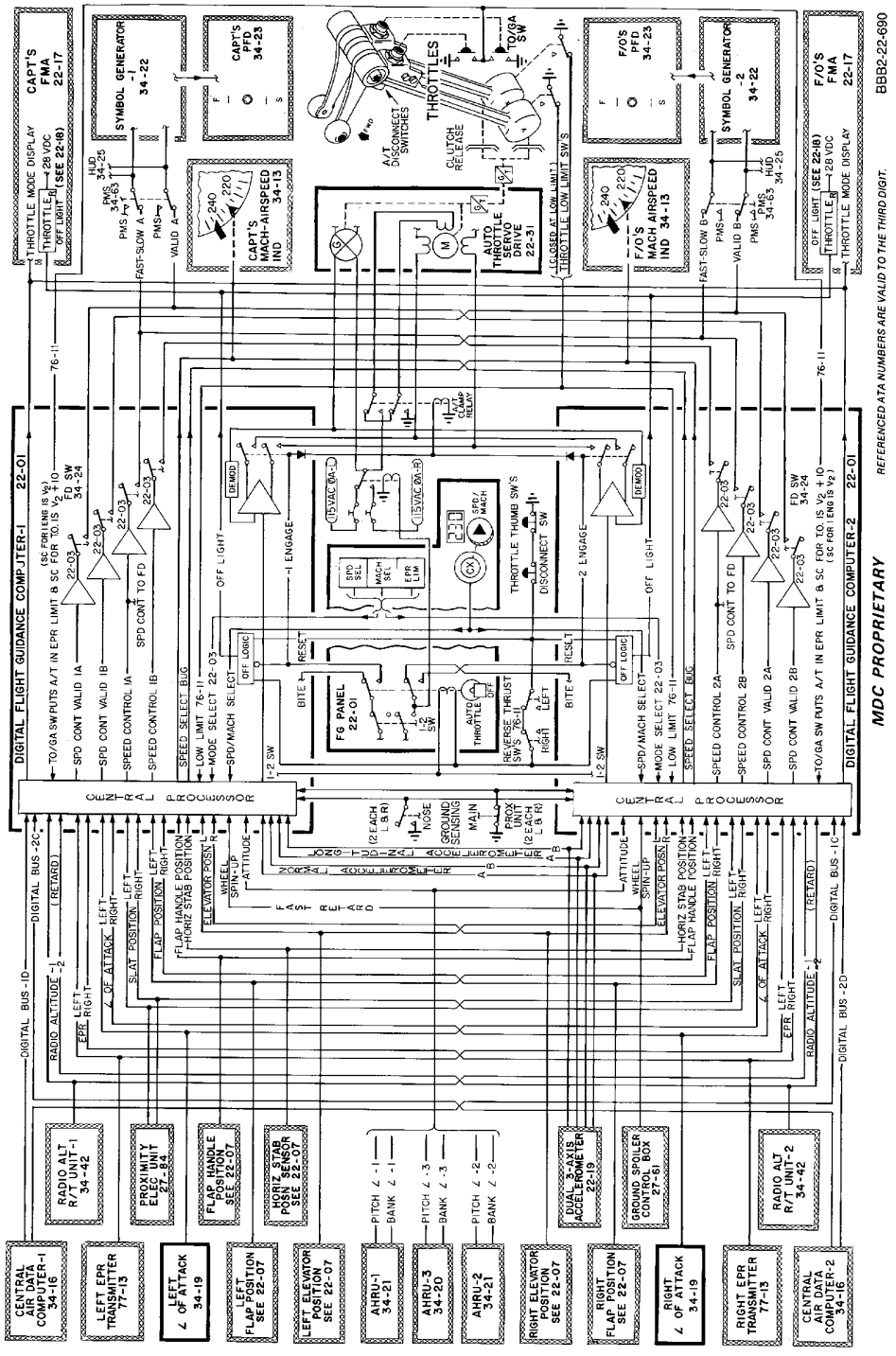
(1) The Performance Management Control (PERF) Mode provides autothrottle thrust control to the PMS commanded EPR (as seen on the PMS CDU), through climb, cruise or descent. Pressing the PERF pushbutton on the Flight Guidance Control Panel, with autothrottle and autopilot engaged, automatically establishes the mode.

(2) The ATS mode annunciators will display PERF and the existing control mode, CLB, CRZ or DES. If the autothrottle is not engaged, the ATS mode annunciator will display ATS OFF flashing to remind the flight crew to engage autothrottle.

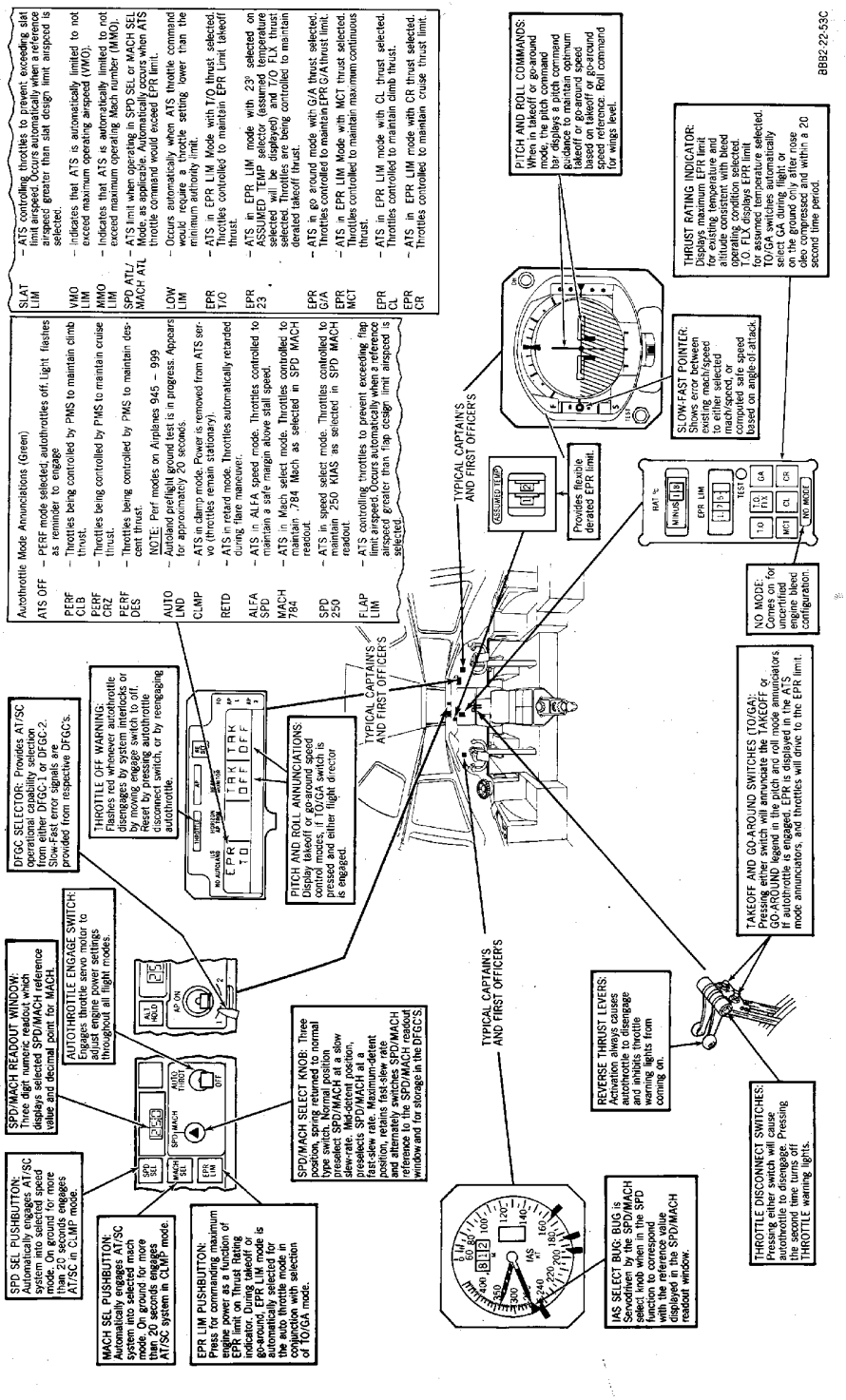
(3) Performance Management Control Mode will become disabled by selecting another autothrottle or autopilot pitch control mode or when the glideslope beam is intercepted.



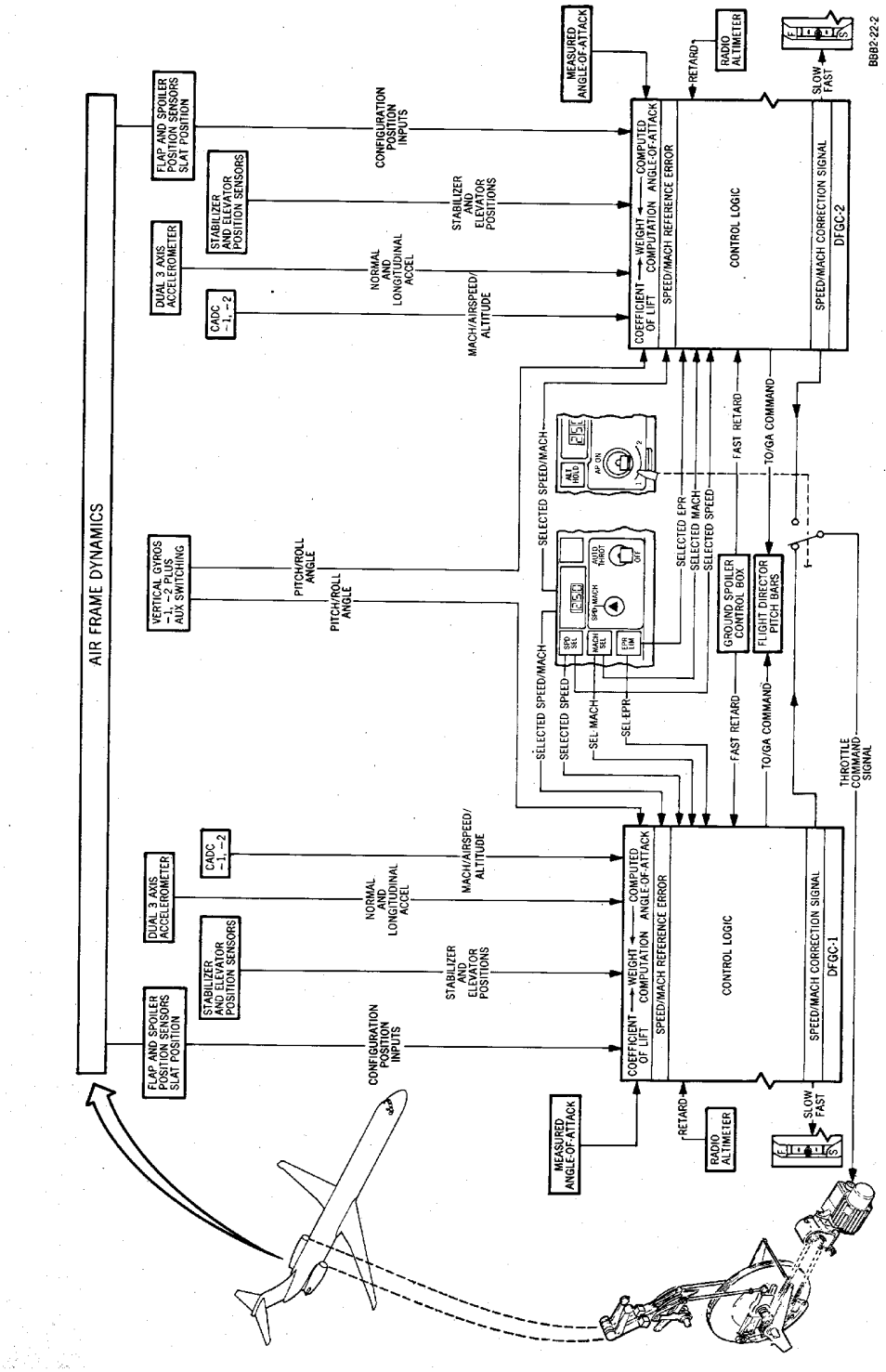
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-951 (Sheet 1 of 2)



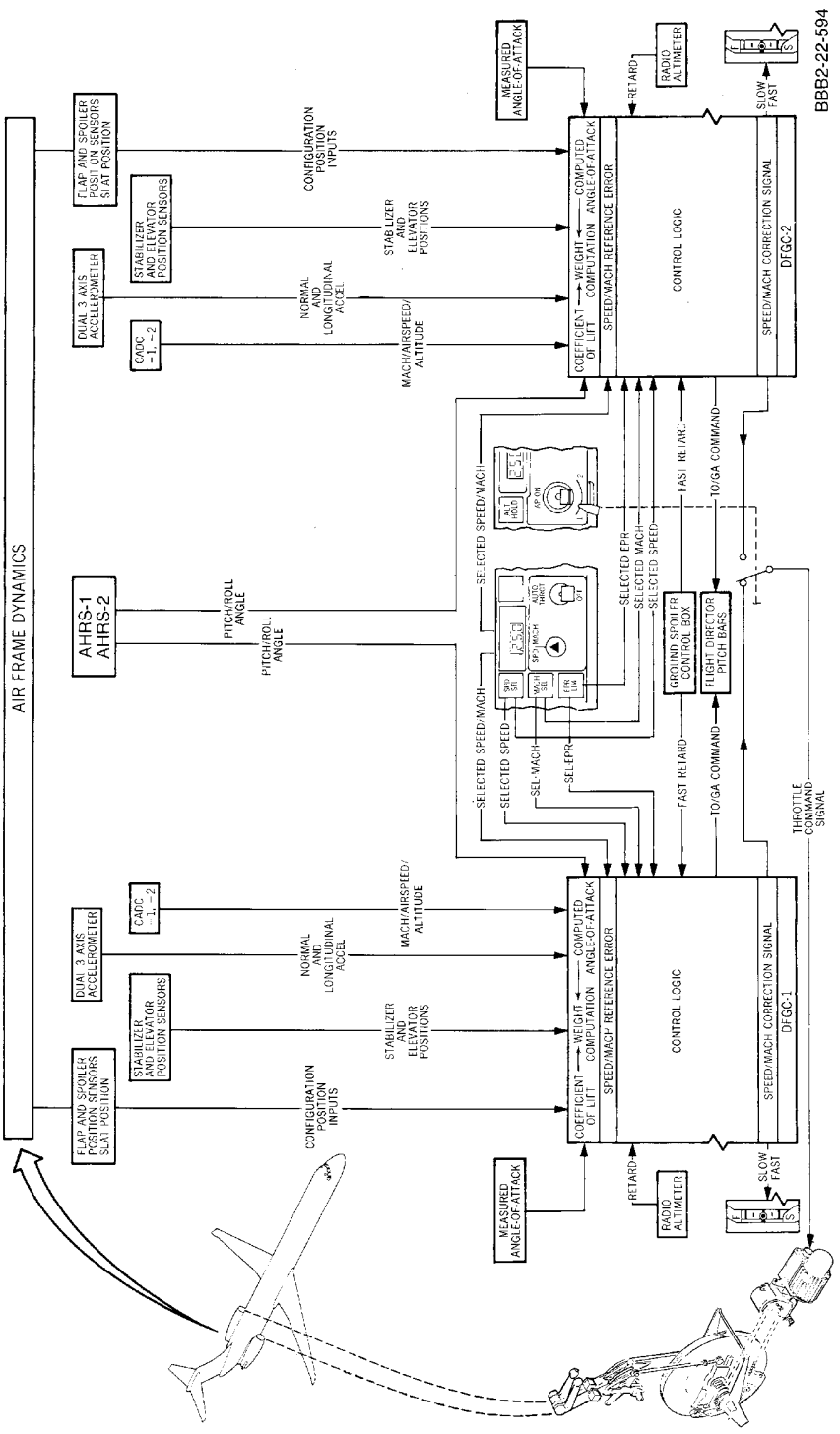
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-951 (Sheet 2 of 2)



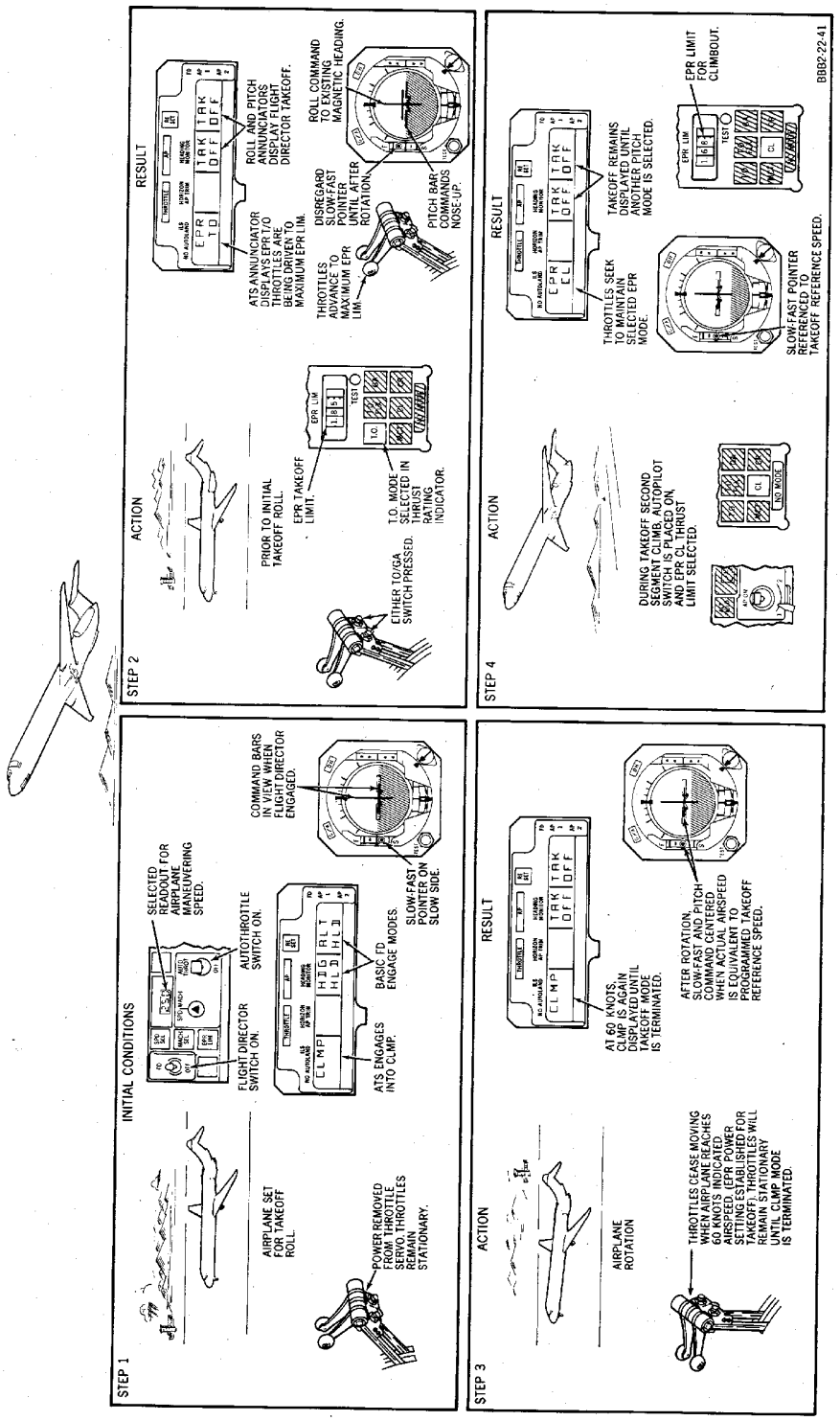
AT/SC System Functional Layout
Figure 2/22-31-00-990-952



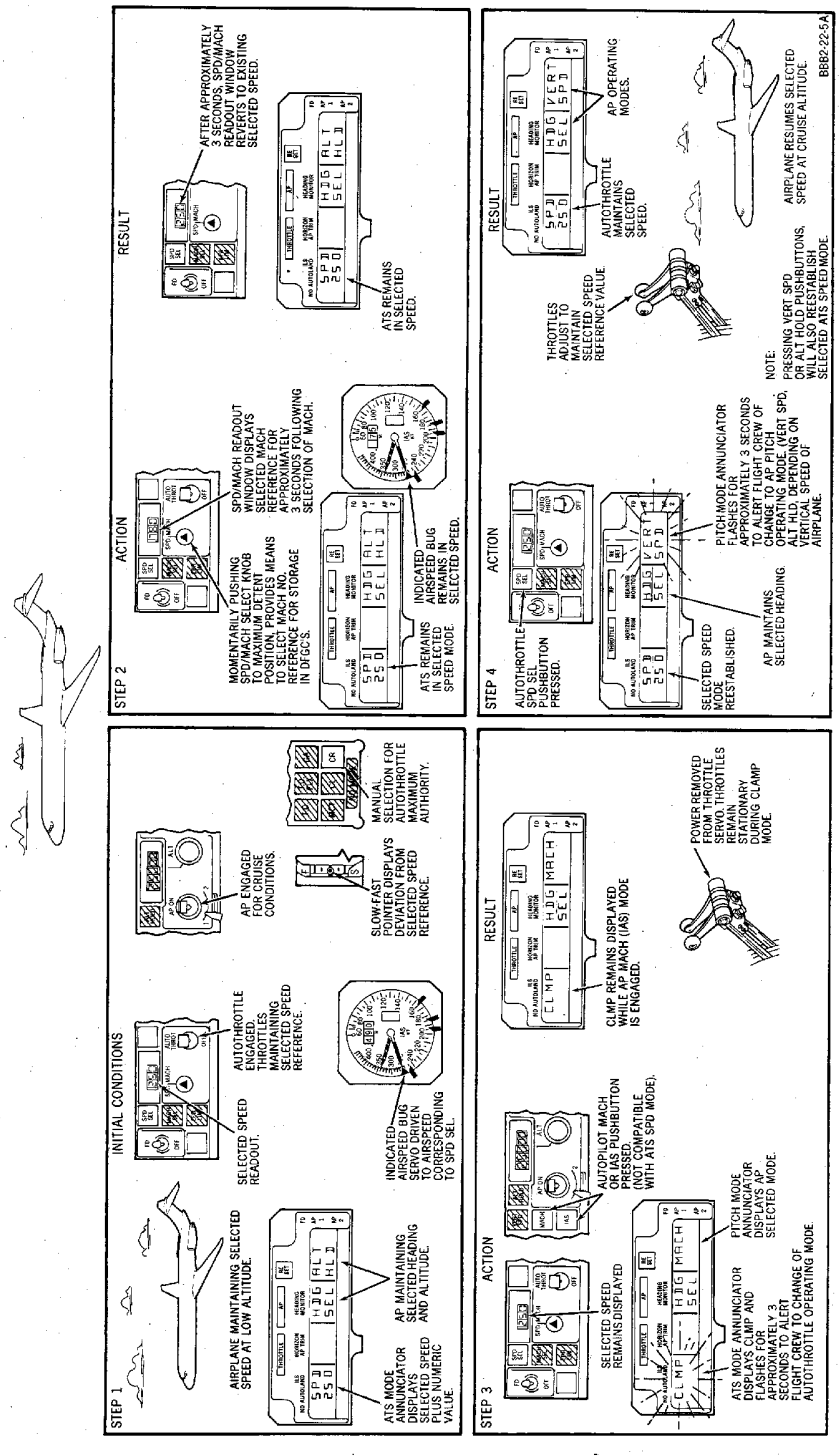
AT/SC Functional Interface
Figure 3/22-31-00-990-954 (Sheet 1 of 2)



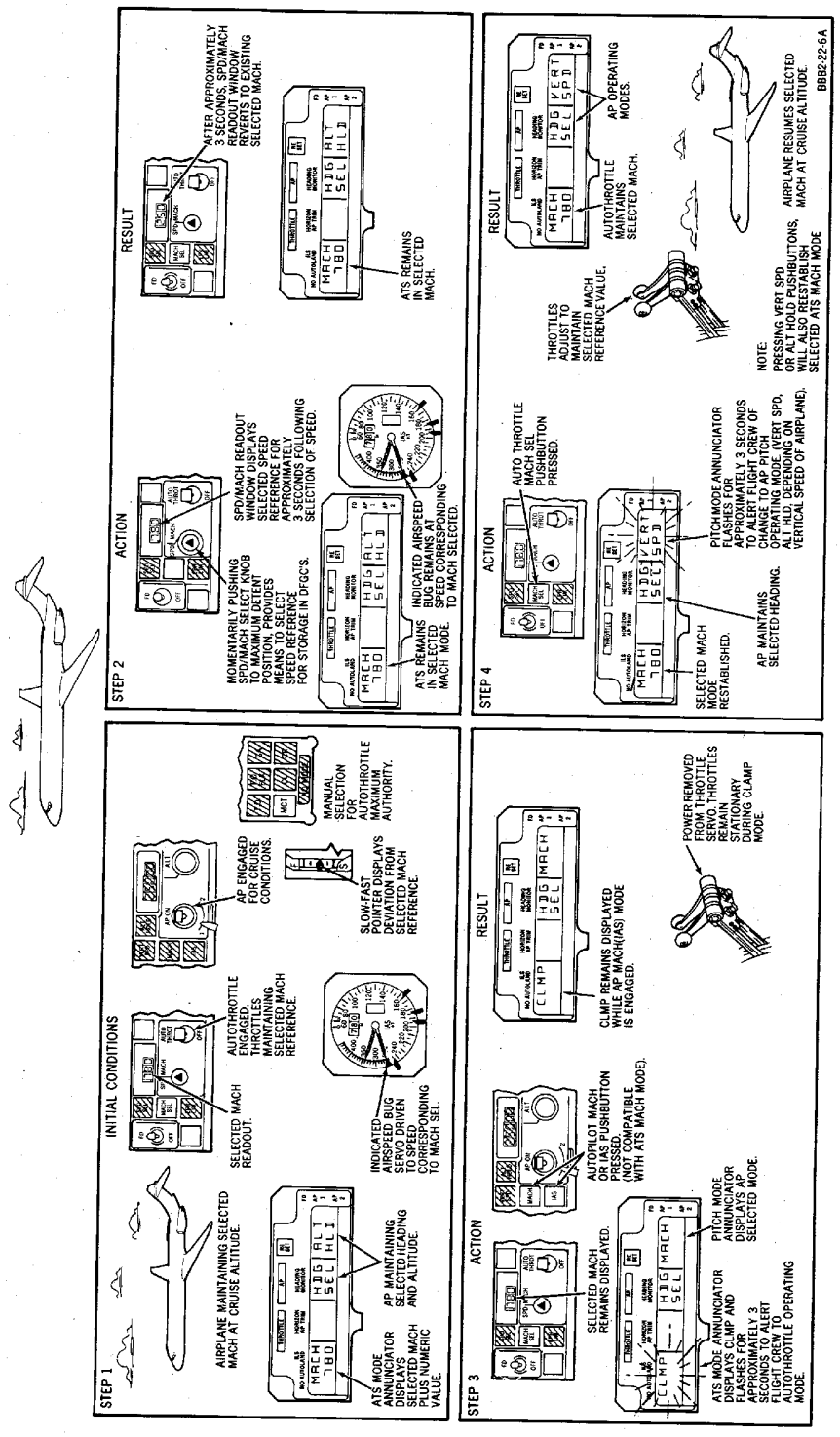
AT/SC Functional Interface
Figure 3/22-31-00-990-954 (Sheet 2 of 2)



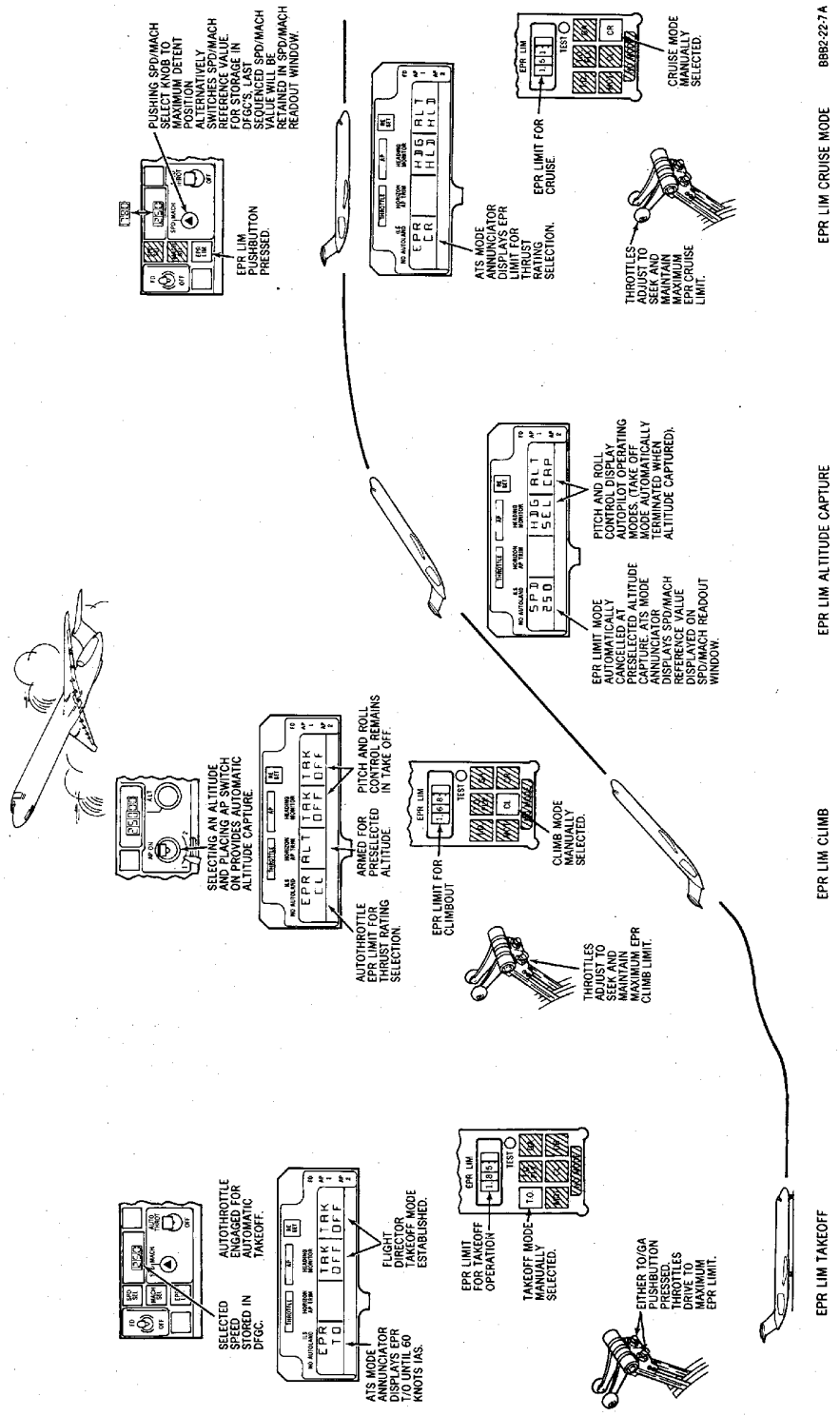
Take Off Mode Of Operation
Figure 4/22-31-00-990-953



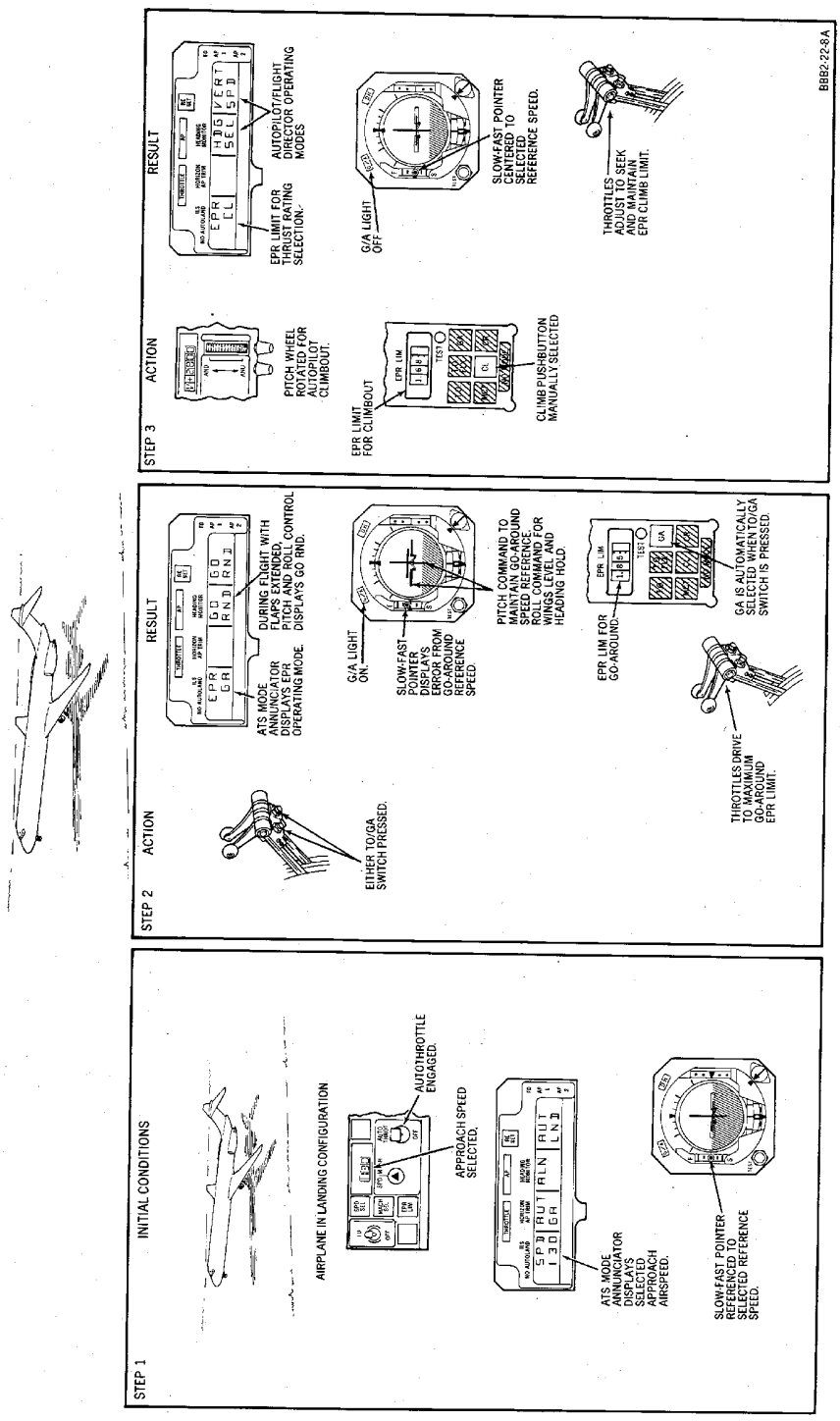
SPD SEL Mode Of Operation
Figure 5/22-31-00-990-955



MACH SEL Mode Of Operation
Figure 6/22-31-00-990-956



EPR LIM Mode Of Operation
Figure 7/22-31-00-990-957



GO-ARND Mode Of Operation
Figure 8/22-31-00-990-958

AUTO THROTTLE/SPEED CONTROL - DESCRIPTION AND OPERATION

1. General

A. Auto Throttle/Speed Control (AT/SC) provides control of speed, mach and thrust throughout the takeoff, flight and landing modes of operation.

B. Airplane position sensors, air data, flight guidance control inputs, etc. are processed in the Digital Flight Guidance Computers (DFGC's) to generate the speed/thrust signals for AT/SC control during flight and ground mode operations.

C. During autothrottle operation, a throttle servo drives the throttle levers and throttle control system through a gearbox, chain drive, and two separate no-back clutch assemblies. The throttles can be manually overridden with no greater force than normal throttle operation when the autothrottle is engaged.

D. Takeoff/Go-Around (TO/GA) switches are located on the throttle levers. Momentarily pressing either TO/GA switch will automatically change the selected speed control reference to take-off or go-around reference speed during takeoff or go-around modes of operation.

E. Only one DFGC is in command during autothrottle operation. The other DFGC (off-side) is continuously receiving and processing parallel input signals in event selection is required. A switch located below the AP engage switch labeled 1, 2, provides the capability for selection of either DFGC-1 or DFGC-2. However, with flight director switch in NORM position an isolated output signal is provided from each DFGC to the slow-fast pointer (and flight director pitch command bar when in TO/ GA mode) in the captain's and first officer's ADI's.

F. The digital flight guidance computer (DFGC) features an automatic thrust restoration (ATR) function which increases thrust under certain conditions in the event of an engine failure or negative climb rate (-930 and subsequent) during takeoff. Once activated, the ATR function will unclamp and advance the throttles (if the autothrottle is engaged) equally until the left or right engine EPR reaches the G/A EPR limit. Refer to SUBJECT 22-00-00, paragraph entitled Autothrottle/Speed Control, for additional data.

2. AT/SC Functional Description

A. The flight compartment components that control and display AT/SC functions are shown in Figure 2. The autothrottle engage switch, SPD/MACH selector, SPD/MACH readout, and mode select pushbuttons are located on the Flight Guidance Control panel.

B. Auto Throttle Engage Switch

(1) Placing the autothrottle engage switch to AUTO THROT position will automatically engage the throttle servo motor to adjust engine power settings throughout all flight modes from takeoff to automatic retard mode. The switch is solenoid held, and unless all system interlocks are satisfied, the switch will not hold in the AUTO THROT position. Basic autothrottle engage mode is speed or mach whichever is displayed in the SPD/MACH window.

C. SPD/MACH Select Knob

(1) The SPD/MACH select knob provides the means of selecting SPD or MACH reference values to be used for manual or automatic (autothrottle engaged) speed control.

(2) The SPD/MACH select knob is a three position, spring returned to normal position type knob. The knob performs the following type functions:

(a) Normal position selects SPD/MACH at a slow-slew rate.

(b) Knob pushed to mid-detent position, selects SPD/MACH at a fast-slew rate.

(c) Knob pushed to maximum detent position retains the fast-slew rate and alternately switches the SPD/MACH reference signals to the SPD/MACH readout window, and affords a means of changing speed or mach reference for storage within the DFGC's.

(3) On ground, with initial airplane power application on to the DFGC system, the SPD SEL reference value is the primary display on the SPD/MACH readout window. With the autothrottle engage switch in the off position, pushing the SPD/MACH select knob to the maximum detent position alternately sequences the display of the SPD/MACH SEL reference value. Also, this permits preselection of the SPD/MACH SEL value to be stored within the DFGC. If the autothrottle is engaged in the SPD SEL mode, the MACH SEL reference will be displayed on the SPD/MACH readout window for approximately 3 seconds, following the last selected value, and then the readout will revert to and display the existing SPD SEL reference value.

(4) During flight mode, the AT/SC system provides the capability of programming SPD/MACH reference values for storage within the DFGC. These reference values may be programmed during the SPD SEL, MACH SEL, or EPR modes of operation. The descriptive operation of these functions are called out in the applicable modes of operation within this section.

D. SPD/MACH Readout Window

(1) The SPD/MACH readout window is located directly over the SPD/MACH select knob. The window is a three digit numeric readout which displays the selected SPD/MACH reference value. The digits are formed by use of seven light segments. When MACH SEL reference is displayed, a decimal point is in view for the selected mach number. The SPD/MACH reference value is also indicated by the selected IAS bugs located on the Mach Airspeed Indicators, and on the ATS mode annunciators if autothrottles are engaged in the SPD/MACH mode.

(2) The tolerances between the Flight Guidance Control Panel (FGCP) SPD/MACH select knob and the airspeed command bugs are as follows:

(a) The tolerances are max 4 knots split between the captain, first officer, stand-by, and FGCP in the speed range of 80 to 149 KIAS.

(b) The tolerances are max 6 knots split between the captain, first officer, stand-by, and FGCP in the speed range of 150 to 249 KIAS.

(c) The tolerances are max 10 knots split between the captain, first officer, stand-by, and FGCP in the speed range of 250 to 350 KIAS.

(d) The maximum for a match selected speed is .02 mach to .8 mach.

(e) When using the autopilot, the autopilot shall control to ± 5 knots of FGCP selected speed.

E. SPD SEL Pushbutton

(1) During flight mode, if the autothrottle is engaged in MACH SEL, EPR or CLMP mode, pressing the SPD SEL pushbutton will automatically engage the autothrottle in the SPD SEL mode of operation. SPD plus the numeric value of the selected airspeed will be displayed on the ATS mode annunciators.

F. MACH SEL Pushbutton

(1) During flight mode, if the autothrottle is engaged in SPD SEL, EPR, or CLMP mode, pressing the MACH SEL pushbutton will automatically engage the autothrottle in MACH SEL mode of operation. MACH plus the numeric value of the preselected mach number will be displayed on the ATS mode annunciators.

G. EPR LIM Pushbutton

(1) During flight mode, if the autothrottle is engaged in SPD SEL, MACH SEL, RETD, or CLMP mode, pressing the EPR LIM pushbutton or pressing either TO/GA switch will automatically engage the autothrottle in the EPR (engine pressure ratio) mode of operation. The ATS mode annunciator will display EPR T/O, EPR FLX, etc., as applicable for the selected thrust rating EPR LIM on the Thrust Rating Indicator.

H. IAS/MACH Select Bugs

(1) The mach/airspeed indicators contain an IAS/MACH Select bug. The bug is servo driven by the SPD/MACH select knob to agree with the speed reference value as indicated on the SPD/MACH readout window.

I. Thrust Rating Indicator (TRI)

(1) The Thrust Rating Indicator receives computed information from the DFGC to display maximum EPR limit for selected thrust rating. The DFGC computes maximum EPR limit for existing temperature and altitude consistent with operating conditions. If the autothrottle is engaged, and the TO/GA switch is pressed, the throttles will automatically drive to the EPR limit of the selected mode.

(2) During flight mode, if the autothrottle is engaged in SPD SEL, MACH SEL, or CLMP mode, the existing EPR limit is the upper authority limit for autothrottle operation.

J. Minimum Authority

(1) The minimum authority limit for autothrottle travel is established by switches located in the lower throttle quadrant. The minimum authority limit is provided to prevent throttles from being driven to the throttle idle stop during flight.

K. Slow-Fast Display

(1) A slow-fast display is located in each ADI. Except during TO/GA operation, the slow-fast display indicates speed deviation relative to the SPD SEL, MACH SEL, or ALPHA reference speed. When the TO/GA mode is engaged, the slow-fast display indicates existing speed deviation in relation to takeoff or go-around reference speed. When the airplane is in the retard mode of operation, the slow-fast pointers are biased out of view. Each slow-fast pointer is provided command signals from its respective DFGC (i.e., DFGC-1 to captain's slow-fast pointer).

L. Throttle Servo Drive

(1) The throttle servo drive is mounted under the forward end of the pedestal. The throttle servo drives the throttle levers and throttle control system through a gearbox, chain drive, and two separate no-back clutch assemblies.

(2) The speed and direction of rotation of the servo drive are proportional to the command signals provided from the DFGC. Servo drive output speed is reduced through reduction gears and coupled to the gearbox by means of a splined shaft. Drive speed is further reduced in the gearbox, and the out-put torque at the gearbox sprocket drives a chain to position the throttle levers.

(3) A drive clutch couples the throttle servo drive system to the engine throttle levers. The clutch can be manually overpowered with a force no greater than ordinarily required for throttle operation with the autothrottle disengaged. At maximum signal input, the system will drive the throttles at approximately 8 degrees/second.

M. TO/GA Switches

(1) A TO/GA (takeoff/go-around) switch is located on the back side of each throttle lever. The TO/GA switches are provided to initiate takeoff or go-around mode logic.

(2) During takeoff operation, with autothrottle engaged, momentarily pressing either TO/GA switch will establish the auto-throttle/speed control takeoff mode of operation. With either flight director switch on, the pitch and roll mode annunciators will display TAKE OFF, and EPR will be displayed in the ATS mode annunciators. The throttles will drive forward to seek the EPR limit displayed in the Thrust Rating Indicator.

(3) During approach conditions, with flaps extended, pressing either TO/GA switch will establish the go-around mode of operation. If autothrottle is engaged, the throttles will drive to the EPR limit for go-around power setting. The pitch and roll mode annunciators will display GO RND, and the ATS mode annunciator displays EPR G/A. GA will be illuminated on the Thrust Rating Indicator.

N. Autothrottle Disengagement

(1) The throttle levers contain throttle disconnect switches located on the outboard side of each lever. Pressing either of these disconnect switches will automatically cause the autothrottle to disengage. The autothrottle engage switch can also be manually placed to the OFF position.

(2) If the autothrottle is engaged, and monitor logic within the DFGC detects a failure, or if the autothrottle is operating in the EPR mode, and airspeed exceeds the flap/slat placard limit, the autothrottle will automatically disengage. If reverse thrust is applied, or the AP/FD TURB mode is selected the autothrottles will also disengage.

O. Throttle warning Lights

(1) Throttle warning lights are located in each of the Flight Mode and Instrument Warning annunciators. The lights are labeled THROTTLE, and will come on and flash red anytime the autothrottle is disengaged except when reverse thrust is applied.

(2) The lights can be turned off by pressing either throttle disconnect switch, or by placing the autothrottle engage switch to AUTO THROT position.

3. AT/SC Functional Operation

A. The AT/SC Functional Interface illustration, Figure 3, shows the functional interface of the AT/SC system. The AT/SC system receives sensor input and control logic data from air frame and aerodynamic sensors such as angle-of-attack flap and spoiler sensors, air data, vertical gyro, etc. This data is processed within the DFGC to provide the autothrottle/speed control commands to the slow-fast pointers, and a throttle command signal to the autothrottle servo.

B. Mach/speed as selected on the flight guidance control panel, or alpha speed reference is compared with existing mach or indicated airspeed, from the CADC to provide the basic mach/speed error signal. The mach/speed error signal is displayed as slow-fast deviation on the ADI's. Manual throttles or auto-throttles can be used to reduce the mach/speed error signal.

C. Other airframe dynamic signals are also required to provide the proper speed references and dynamic response characteristics. These additional input signals include normal and longitudinal acceleration, pitch and roll attitude, flap position, elevator position movement, and horizontal stabilizer position.

D. A computed angle-of-attack signal is developed within the DFGC by use of forward and vertical acceleration, air data inputs and attitude sensor inputs. Angle-of-attack combined with signals from flaps, slats, spoilers, elevator and horizontal stabilizer sensors is used to compute the coefficient of lift. Computed weight is determined from coefficient of lift, air-speed and wing configuration and is used to establish a minimum safe reference speed. Measured angle-of-attack from the angle-of-attack sensor (AOAS) is used during takeoff and go-around maneuvers in development of a flight director pitch command signal to establish the proper pitch attitude to maintain a takeoff or go-around reference speed.

E. In addition to establishing lift characteristics of the airplane, the flap and slat position signals are also used to establish the flap/slat design reference speed. The flap/slat design reference speed is used as a limit for autothrottle control of the selected mach/speed consistent with flap/slat configuration. The flap/slat design reference speed is altered as flap/slat configuration is changed.

F. If the autothrottle is engaged in the EPR mode, maximum allow-able thrust control is programmed in accordance with EPR error signals developed from the EPR sensors and thrust rating EPR limit computed within the DFGC. Existing EPR of both engines is compared with computed maximum allowable EPR consistent with environmental conditions to develop a EPR error signal. The error signal provides a control signal to the autothrottle servo to drive the throttles to the selected thrust rating.

G. During retard mode of operation, at approximately 50 feet radio altitude, a signal is provided from either radio altimeter to the DFGC. The signal is used to initiate throttle retard during the flare maneuver as established by the flight guidance system. A logic signal is provided from the DFGC to bypass the lower authority limits and to program the throttles to the retard condition. When the airplane touches down, and wheel spin-up occurs, a signal from the ground spoiler control unit through the autothrottle system will cause the throttles to drive rapidly to a full retard condition. This will place the throttle levers at the idle stop position.

H. Alpha speed is calculated by the DFGC computer as a reference speed based on sensor readings. Alpha speed is not the actual speed of the aircraft. It acts as a reference for stall speed and operational modes that aircraft are in. If any accelerations are applied such as changes in pitch, attitude, bank angle, roll, yaw, etc., the resulting changes in "G" will cause the alpha speed to be adjusted automatically to maintain safe maneuver margins. The adjustments can be particularly significant in bank angles over 30 degrees, when operating in turbulence, when speed brake or spoilers are deployed, and when decelerating rapidly. Tolerances of sensor inputs can result in alpha speed annunciations at plus/minus 15 knots for up/retract configuration and plus/minus 6 knots for slat/extend in stable flight conditions.

NOTE: During some flight maneuvers "alpha speed" may be annunciated for short periods of time even though the correct speed is selected. If the slow/fast command is centered during a flight maneuver and alpha speed ("ALPHA SPD") is annunciated, the aircraft may be flying at a speed higher than selected. If alpha speed registers high in stabilized, unaccelerated flight, it is often a valid indication that the aircraft is heavier than computed. Initial "Alpha Spd" annunciation in the FMA when selecting chart alpha speed on the speed select may indicate high for short periods of time. This is a transient condition.

4. AT/SC Operational Modes

A. The three primary operating modes of the AT/SC system are SPD SEL, MACH SEL, and EPR. Other available AT/SC modes are derived from logic within the DFGC. The modes are CLMP, RETD, ALFA SPD, FLAP LIM, SLAT LIM and ATS LIM. The SPD SEL and MACH SEL modes are useable during any flight condition except when TO/GA mode or RETD mode is engaged. Interlock logic exists between the autopilot IAS and MACH modes and the autothrottle SPD SEL and MACH SEL modes to prevent simultaneous engagement of these operating modes.

B. Take Off Mode (Figure 4)

(1) With "on ground" logic established for more than 20 seconds, placing the autothrottle engage switch to AUTO THROT position, will automatically arm the autothrottle system for takeoff mode of operation. The throttle servo motor will be clamped (power removed from motor windings), and the ATS mode annunciators will display CLMP.

(2) Placing either or both flight director switches on, selecting T.O. (T.O. FLX) pushbutton on the Thrust Rating Indicator, and momentarily pressing the TO/GA switch will automatically establish the takeoff EPR mode of operation. TAKE OFF will be displayed in the pitch and roll mode annunciator(s).

(3) Takeoff EPR mode logic reapplies power to the servo motor. The ATS mode annunciators display EPR TO (EPR FLX), and throttles drive forward to seek maximum allowable takeoff EPR limit.

(4) During the takeoff roll, the pitch command will display nose-up and be centered to existing magnetic heading (the command bar and slow-fast pointers should be ignored until after rotation). The EPR displayin the thrust rating indicator remains locked until another thrust rating mode is selected. The throttles adjust power settings to establish the displayed EPR limit speed, until the indicated airspeed reaches approximately 60 knots. At that point the DFGC locks on to the established EPR limit.

(5) At 60 knots indicated airspeed, power is again removed from the servo motor, and autothrottles are prevented from movement during rotation and lift off. CLMP will again be displayed in both ATS mode annunciators. After rotation, the airplane attitude can be maneuvered to keep the command bars centered. Both the command bars and slow-fast pointers should be centered when the actual airspeed equals the takeoff climbout reference speed, consistent with existing weight and wing configuration.

(6) During airplane climb to cruise altitude, the speed control system will adjust the reference speed for existing airplane configuration (i.e. flaps retracted, etc.). The pitch and roll mode annunciators will continue to display TAKE OFF until another pitch mode is selected. The autothrottle system clamp mode is terminated when another ATS mode is selected (i.e. EPR, SPD, or MACH) or another thrust rating other than T.O. or T.O. FLX is selected.

NOTE: A selected heading may be established for roll control if desired.

C. SPD SEL Mode (Figure 5)

(1) SPD SEL is the basic mode for AT/SC operation during low altitude conditions for both manual and autothrottle control. Selected airspeed is the primary reference for SPD SEL mode. An airspeed error is determined by comparing the existing airspeed signal from the CADC with the selected speed displayed on the SPD/MACH readout window. The selected speed is also displayed by the servo driven indicated airspeed bug on the Mach/Airspeed indicators. The speed error signal drives the slow-fast pointers on the ADI's, and the throttle servo motor, if autothrottle is engaged.

(2) If SPD SEL reference speed is displayed on the SPD/MACH readout window, placing the autothrottle engage switch to the AUTO THROT position will automatically place the system in the SPD SEL mode. The ATS mode annunciators will display SPD plus the numeric reference value displayed on the SPD/ MACH readout window. The throttles will adjust to seek and maintain the selected speed reference value. If the auto-throttle is not engaged, the ATS mode annunciators will be blank, and the slow-fast pointers provide the speed deviation with respect to the selected speed control.

(3) With autothrottle engaged in the SPD SEL mode, if the alpha reference speed is a higher value than the selected speed, ALFA SPD will be displayed on the ATS mode annunciators and the speed will be controlled to the alpha reference speed.

(4) Pushing the SPD/MACH select knob to the maximum detent position, with autothrottle engaged in the SPD SEL mode, will cause a temporary switching from the SPD SEL to the MACH SEL reference in the SPD/MACH readout window. This will permit changes to the selected mach reference to be stored within the DFGC. The SPD SEL mode remains engaged, and the ATS mode annunciators continue to display SPD SEL and numeric selected speed value. The MACH SEL reference value will be displayed for approximately 3 seconds on the SPD/MACH read-out window, or as long as MACH SEL numbers are being adjusted. Then the readout will revert back to the SPD SEL reference value.

(5) If the autothrottle is operating in the SPD SEL mode, and the autopilot IAS or MACH mode is selected, the autothrottle will automatically engage into the clamp mode. CLMP will be annunciated on the ATS mode annunciators and flash for approximately 3 seconds, alerting the flight crew to the change to the AT/SC operating mode. The throttles will remain stationary at the setting when IAS or MACH mode was selected.

(6) With the autopilot operating in either the IAS or MACH mode of operation, and the autothrottle is engaged in CLMP mode, pressing the SPD SEL pushbutton on the Flight Guidance Control panel or selecting a flight guidance pitch mode, will automatically reestablish the autothrottle SPD SEL mode. The ATS mode annunciator will display SPD plus the numeric value in the SPD/MACH readout. The autopilot pitch mode annunciator will display VERT SPD or ALT HLD depending on the pitch attitude of the airplane and flash for approximately 3 seconds, alerting the flight crew to the autopilot operating mode. The throttles will adjust to seek and maintain the speed reference value.

D. VMO LIM Mode

(1) When the autothrottle is operating in selected speed mode, and the indicated airspeed approaches the maximum overspeed limit (Vmo), the VMO LIM mode will be engaged. Both ATS mode annunciators will display VMO LIM. The throttles will automatically be controlled to maintain IAS below Vmo limit until the indicated airspeed is again within the proper operating selected speed threshold. The ATS mode annunciators will then automatically revert back to selected speed (SPD SEL).

E. MACH SEL Mode (Figure 6)

(1) MACH SEL reference value on the SPD/MACH readout window is the primary reference for MACH SEL mode. A mach/airspeed error is determined by comparing the mach signal from the CADC with the MACH SEL displayed on the SPD/MACH readout window. The servoed (IAS) bug on the MACH/AIRSPEED indicator displays airspeed corresponding to the MACH SEL value for the existing pressure altitude. The mach/airspeed error signal drives the slow-fast pointers on the ADI's, and the throttle servo motor, if autothrottle is engaged.

(2) Pressing the MACH SEL pushbutton on the Flight Guidance Control panel, and placing the autothrottle engage switch to the AUTO THROT position will automatically place the system in the MACH SEL mode. (If the SPD/MACH readout window was previously displaying mach, the autothrottle will automatically engage into MACH SEL mode.) The ATS mode annunciators will display MACH plus the numeric mach reference value displayed on the SPD/MACH readout window. The throttles will adjust to seek and maintain the selected mach reference value. If the autothrottle is not engaged, the ATS mode annunciators will be blank, and the slow-fast pointers provide the speed deviation signal for selected mach control.

(3) With autothrottle engaged in the MACH SEL mode, if a alpha speed reference is a higher value than the selected mach, ALFA SPD will be displayed on the ATS mode annunciators and autothrottles will maintain the alpha speed reference value.

(4) Pushing the SPD/MACH select knob to the maximum detent position, with autothrottle engaged in the MACH SEL mode, will cause temporary switching from the selected mach to speed reference in the SPD/MACH readout window. This will permit changes to the selected speed reference to be stored within the DFGC. The selected mach mode remains engaged, and the ATS mode annunciators continue to display the selected mach and numeric value. The selected SPD reference value will be displayed for approximately 3 seconds on the SPD/MACH read-out window, or as long as speed numbers are being adjusted. Then the readout will revert back to the selected mach reference value.

(5) If the autothrottle is operating in the selected mach mode, and the autopilot IAS or MACH mode is selected, the auto-throttle will automatically engage into the clamp mode. CLMP will be annunciated on the ATS mode annunciators and flash for approximately 3 seconds, alerting the flight crew to the change to the autothrottle operating mode. The throttles will remain stationary at the point when IAS HOLD or MACH HOLD mode was selected.

(6) With the autopilot operating in either the IAS or MACH mode of operation, and the autothrottle is engaged in CLMP mode, pressing the MACH SEL pushbutton or selecting another pitch mode on the Flight Guidance Control panel will automatically reestablish the autothrottle MACH SEL mode. The ATS mode annunciators will display MACH plus the numeric value in the SPD/MACH readout. The pitch mode annunciator will display VERT SPD or ALT HLD depending on the pitch attitude of the airplane and flash for approximately 3 seconds, alerting the flight crew to the autopilot operating mode. The throttles will adjust to seek and maintain the mach reference value.

F. MMO LIM Mode

(1) When the autothrottle is operating in selected mach mode, and the selected mach number has approached the maximum overspeed limit (Mmo), the MMO LIM mode will be engaged. Both ATS mode annunciators will display MMO LIM. The throttles will automatically be controlled to maintain mach airspeed below the Mmo limit until the mach airspeed is again within the proper operating selected mach airspeed threshold. The ATS mode annunciators will then automatically revert back to the selected mach airspeed (MACH SEL).

G. EPR LIM Mode (Figure 7)

(1) EPR can be selected by use of the EPR LIM pushbutton on the Flight Guidance Control panel, or automatically when the TO/GA switch is pressed.

(2) Placing the autothrottle engage switch to AUTO THROT position, and selecting EPR LIM, the throttles will adjust to seek and maintain the EPR LIM displayed on the Thrust Rating Indicator. EPR and the thrust rating (i.e. EPR CR), will be displayed on the ATS mode annunciators. During EPR mode the SPD/MACH readout will display the preselected speed/mach reference value.

(3) While operating in the EPR LIM mode, if the ENG SYNC switch is in the OFF position, the DFGC will monitor the Engine Synchronizer actuator that provides adjustment of the left engine EPR to match the EPR of the right engine. This is accomplished by a Relay Driver unit that transfers control of the Sychronizer actuator from the Engine Synchronizer Control Unit to the selected DFGC when the N_1/N_2 ENG SYNC switch is in the OFF position.

(4) Pushing the SPD/MACH select knob to the maximum detent position, while operating in the autothrottle EPR mode, will alternately switch the reference displayed in the SPD/MACH readout window to either SPD or MACH reference. This permits changes to the selected speed/mach reference values to be stored within the DFGC. The autothrottle will remain engaged in the EPR mode, and EPR plus the thrust rating mode will be displayed on the ATS mode annunciators.

H. ALFA SPD Mode

(1) The alpha speed mode is automatically engaged when the SPD/ MACH readout window is set to a value less than the alpha speed reference, and the SPD SEL or MACH SEL autothrottle mode is engaged. Slow-fast will respond to alpha speed limiting with autothrottle engaged or disengaged.

(2) ALFA SPD will be annunciated in the ATS mode annunciators, and the throttles will adjust to seek and maintain the airspeed at the alpha speed reference. The ATS mode annunciators will continue to display ALFA SPD until a higher SPD SEL/MACH SEL reference speed is established, or the alpha speed value has decreased, because of changes in airplane configuration.

I. ATS LIM Mode

(1) During autothrottle operation, the EPR limit selected on the thrust rating indicator is used as the maximum authority limit for autothrottle control of the throttles. With auto-throttles engaged, and operating in the SPD SEL, MACH SEL, or ALFA SPD mode, and an autothrottle commands a thrust setting greater than the selected thrust rating EPR LIM, or lower than the throttle low-limit threshold (minimum authority switches), the autothrottle will be automatically con-trolled from exceeding these thresholds. The ATS mode annunciators will display SPD ATL or MACH ATL when throttles are limited to EPR setting, or LOW LIM when throttles reach aft of the low limit switch (Retard).

(2) When the autothrottle commands a thrust setting within normal autothrottle operating thrust range, the autothrottle will resume adjustment of the throttles to the applicable speed reference. The ATS mode annunciators will revert from ATS LIM and display the engaged autothrottle mode.

J. FLAP LIM Mode

(1) With autothrottle engaged and operating in the SPD SEL, or MACH SEL mode, and the selected speed/mach is greater than the flap placard reference speed, the autothrottle will automatically adjust to seek and maintain the throttles at the flap design limit airspeed. The ATS mode annunciators will display FLAP LIM and flash for approximately 3 seconds, alerting the flight crew to the autothrottle operating mode. The slow-fast pointers on the ADI's should be centered when the autothrottle adjusts to the flap design limit speed.

(2) If the selected speed/mach reference is reduced below the flap placard reference speed, or flap configuration is changed, the autothrottle will automatically revert to the engaged speed/mach mode. Airspeed will be adjusted, and the ATS mode annunciators will display the operating autothrottle mode.

(3) If the autothrottle is engaged in the FLAP LIM mode, and EPR is selected, the autothrottle will automatically disengage.

K. SLAT LIM Mode

(1) With autothrottle engaged and operating in the SPD SEL or MACH SEL mode, and the selected speed/mach is greater than the slat design limit, the autothrottle will automatically adjust to seek and maintain the throttles at the slat design limit airspeed. The ATS mode annunciators will display SLAT LIM and flash for approximately 3 seconds, alerting the flight crew to the autothrottle operating mode. The slow-fast pointers on the ADI's should be centered when the auto-throttle adjusts to the slat design limit reference speed.

(2) If the selected speed/mach or alpha speed reference is reduced below the slat design limit, or slat configuration is changed, the autothrottles will automatically revert to the engaged speed/mach or alpha speed mode. Airspeed will be adjusted, and the ATS mode annunciators will display the operating autothrottle mode.

(3) If the autothrottle is engaged in the SLAT LIM mode, and EPR is selected, the autothrottle will automatically disengage.

L. RETD Mode

(1) Autothrottle retard mode is independent of the AP or FD operating mode. With approach slat/flap logic applied to the autothrottle system, and radio altitude at approximately 50 feet, the retard mode of operation is automatically established. A logic signal is provided to bypass the lower authority limits and to program the throttles for the retard condition.

(2) At the retard altitude threshold, the ATS mode annunciators will display RETD. The slow-fast pointers on the ADI's will bias out of view, and the autothrottle will reduce throttle setting.

(3) At main gear touchdown, a wheel spin-up signal from the ground spoiler control unit triggers a maximum throttle retard command to the autothrottle servo motor. The throttles will drive rapidly to a full idle stop position.

(4) During ground rollout prior to reverse thrust (autothrottle still engaged), pressing the TO/GA switch will automatically place the speed control system in takeoff/go-around speed control and autothrottle EPR modes. The pitch and roll mode annunciators will display TAKE OFF or GO ARND (depending on time interval of nose wheel compression), and the throttles will drive to the maximum EPR LIM for go-around operation. The ATS mode annunciator will display EPR thrust rating.

M. GO-ARND Mode (Figure 8)

(1) The go-around mode can be selected when the flaps are extended and either the flight director or autopilot are engaged. Autothrottle can either be engaged or disengaged when performing go-around operations. If the autothrottle is engaged, momentarily pressing the TO/GA switch will automatically drive the throttles to the maximum go-around EPR LIM. The go-around legend will appear in the pitch and roll mode annunciators, and GA will appear on the Thrust Rating Indicator. The ATS mode annunciator will display EPR G/A. Speed reference becomes go-around speed with autothrottle control at maximum thrust limited by EPR LIM.

(2) During the go-around maneuver, the DFGC establishes the proper pitch angle consistent with maintaining the go-around speed. The command signal is displayed by the command bar and slow-fast pointer in both ADI's. If the autopilot is engaged, a comparable signal is also sent to the elevator control system.

(3) Keeping the command bars and slow-fast pointers centered will result in minimum altitude loss during the transition from approach reference speed to go-around speed reference. The autothrottle go-around mode can be disengaged by selection of another autothrottle control mode.

WJE 405, 409, 410, 873, 874, 881, 883, 884, 886, 887, 892, 893

N. Performance Management Control Mode

(1) The Performance Management Control (PERF) Mode provides autothrottle thrust control to the PMS commanded EPR (as seen on the PMS CDU), through climb, cruise or descent. Pressing the PERF pushbutton on the Flight Guidance Control Panel, with autothrottle and autopilot engaged, automatically establishes the mode.

(2) The ATS mode annunciators will display PERF and the existing control mode, CLB, CRZ or DES. If the autothrottle is not engaged, the ATS mode annunciator will display ATS OFF flashing to remind the flight crew to engage autothrottle.

(3) Performance Management Control Mode will become disabled by selecting another autothrottle or autopilot pitch control mode or when the glideslope beam is intercepted.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

O. Performance Management Control Mode (aircraft with PMS)

(1) The Performance Management Control (PERF) Mode provides autothrottle thrust control to the PMS commanded EPR (as seen on the PMS CDU), through climb, cruise or descent. Pressing the PERF pushbutton on the Flight Guidance Control Panel, with autothrottle and autopilot engaged, automatically establishes the mode.

(2) The ATS mode annunciators will display PERF and the existing control mode, CLB, CRZ or DES. If the autothrottle is not engaged, the ATS mode annunciator will display ATS OFF flashing to remind the flight crew to engage autothrottle.

(3) Performance Management Control Mode will become disabled by selecting another autothrottle or autopilot pitch control mode or when the glideslope beam is intercepted.

WJE 401-404, 412, 414, 875-879

P. Flight Management System

WJE 401-404, 412, 414, 875-879 (Continued)

(1) The Flight Management System (FMS) mode of the Digital Flight Guidance System (DFGS) provides autothrottle thrust control commands to the DFGC for commanded FMS EPR through climb, cruise or descent. Selecting autopilot or flight director and autothrottles on the DFGCP, then pressing VNAV and NAV will engage FMS. If autothrottles are not engaged, they must be selected within 5 seconds of selecting VNAV to retain VNAV engagement. In addition, during roll maneuvers (LNAV) in all phases of flight, the throttles are adjusted to maintain aircraft speed.

(2) The ATS mode annunciators will display FMS and the existing control mode, EPR, SPD or IDL. If the autothrottle is not engaged, the ATS mode annunciator will display ATS OFF flashing to remind the flight crew to engage autothrottle and thereby enabling VNAV portion of the FMS.

(3) The NAV portion of the FMS will become automatically disengaged by the DFGC upon localizer capture. While flying the descent path, VNAV provides pitch commands to the DFGC to hold the path. The pilot may be requested to use speed brakes or the FMS may advance the throttles to maintain speed if a significant acceleration or deceleration should occur. The throttles are automatically advanced if speed approaches minimum speed. VNAV will become disengaged at autothrottle disengagement.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

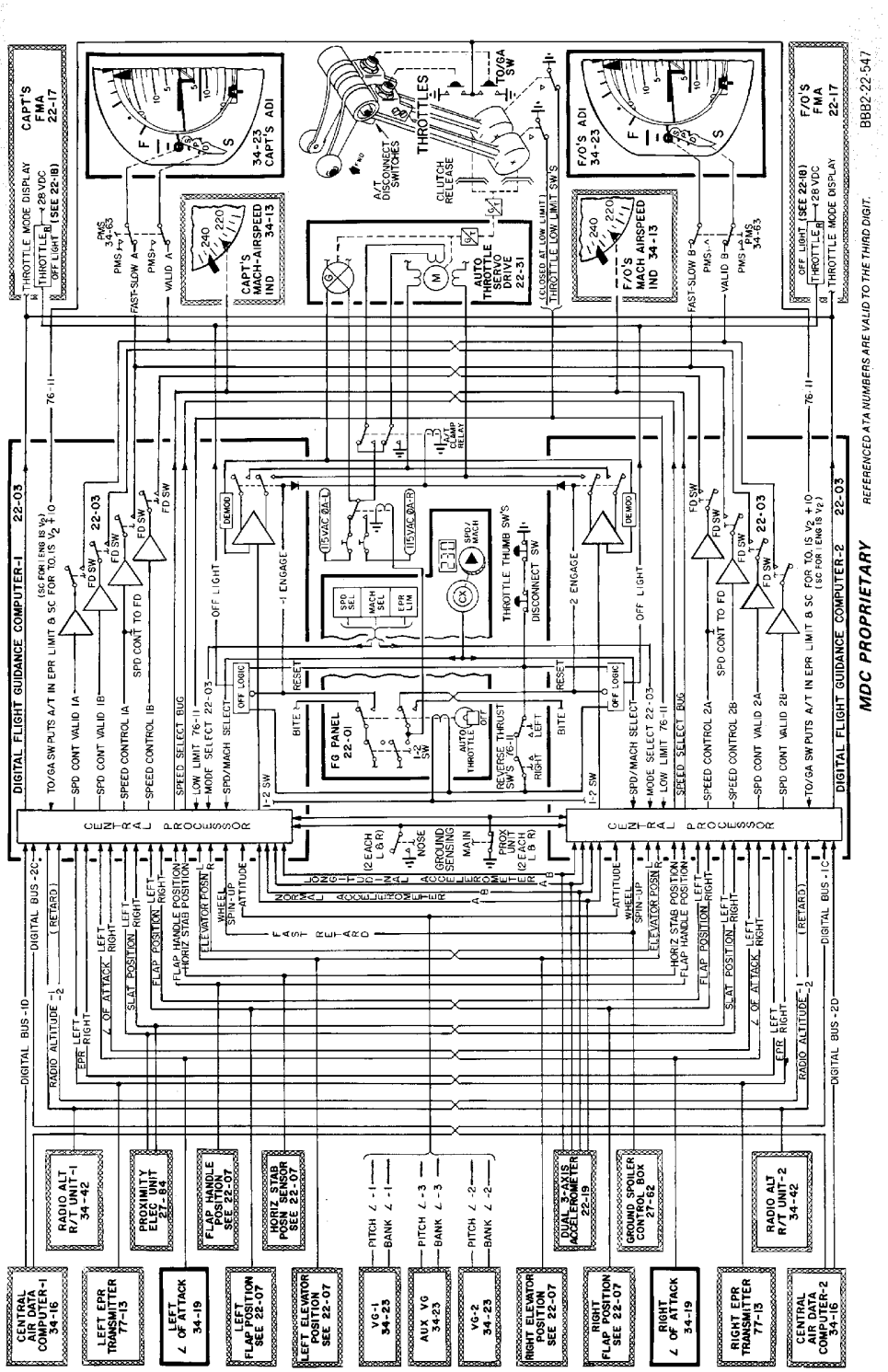
Q. Flight Management System (aircraft with FMS)

(1) The Flight Management System (FMS) mode of the Digital Flight Guidance System (DFGS) provides autothrottle thrust control commands to the DFGC for commanded FMS EPR through climb, cruise or descent. Selecting autopilot or flight director and autothrottles on the DFGCP, then pressing VNAV and NAV will engage FMS. If autothrottles are not engaged, they must be selected within 5 seconds of selecting VNAV to retain VNAV engagement. In addition, during roll maneuvers (LNAV) in all phases of flight, the throttles are adjusted to maintain aircraft speed.

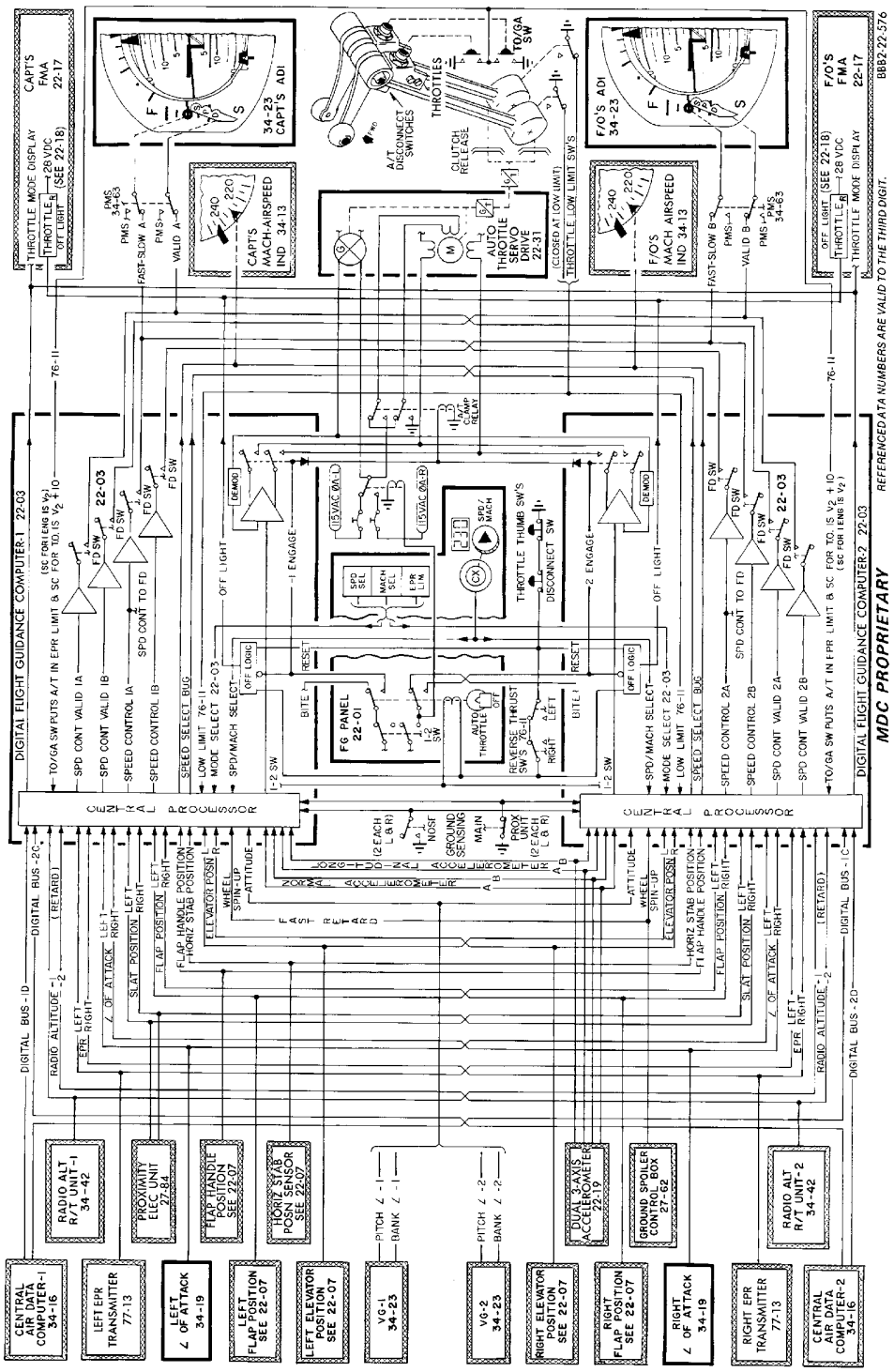
(2) The ATS mode annunciators will display FMS and the existing control mode, EPR, SPD or IDL. If the autothrottle is not engaged, the ATS mode annunciator will display ATS OFF flashing to remind the flight crew to engage autothrottle and thereby enabling VNAV portion of the FMS.

(3) The NAV portion of the FMS will become automatically disengaged by the DFGC upon localizer capture. While flying the descent path, VNAV provides pitch commands to the DFGC to hold the path. The pilot may be requested to use speed brakes or the FMS may advance the throttles to maintain speed if a significant acceleration or deceleration should occur. The throttles are automatically advanced if speed approaches minimum speed. VNAV will become disengaged at autothrottle disengagement.

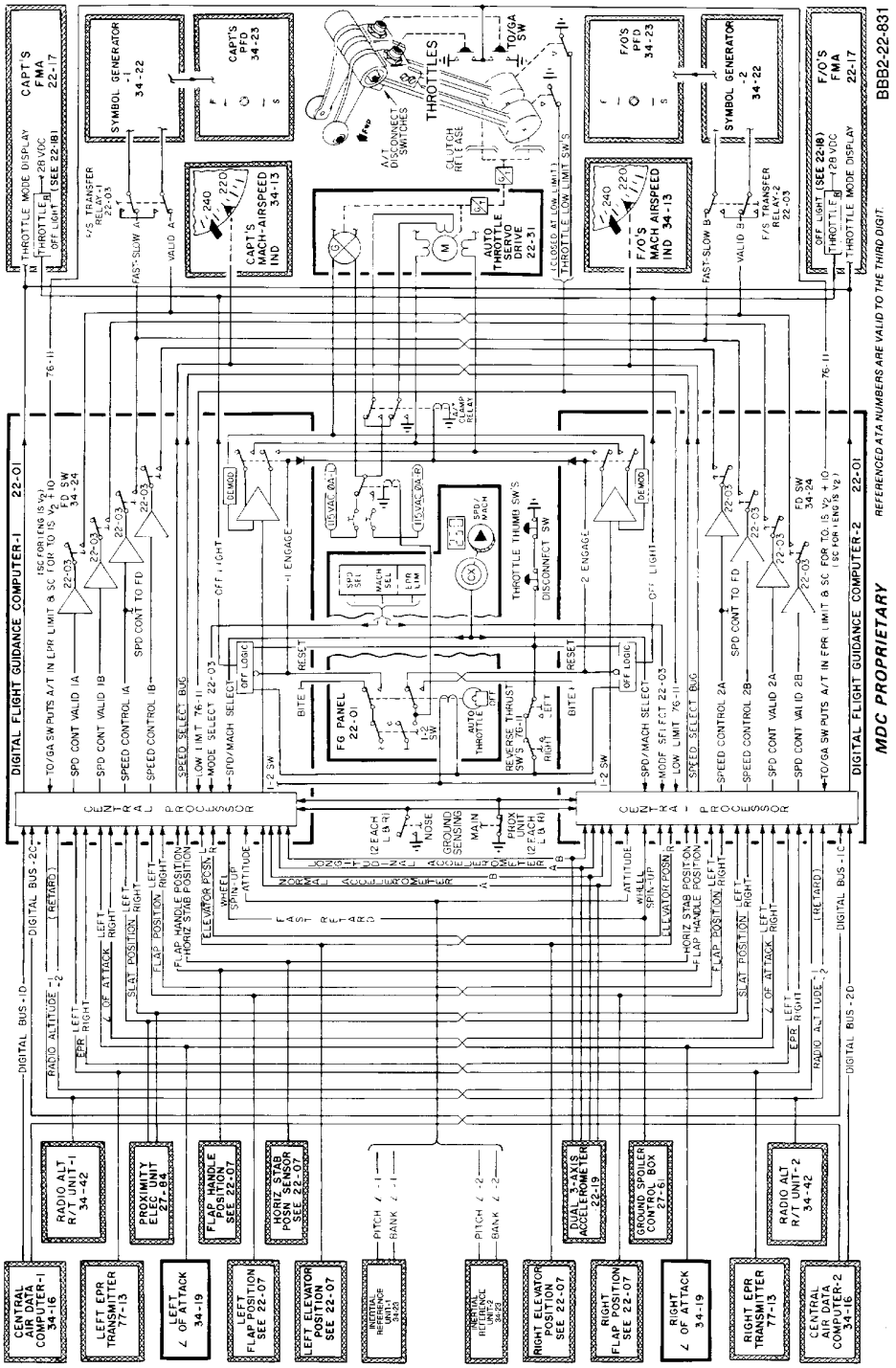
WJE 401-405, 409, 410, 412, 414-427, 429, 861-866, 868, 869, 871-879, 881, 883, 884, 886, 887, 891-893



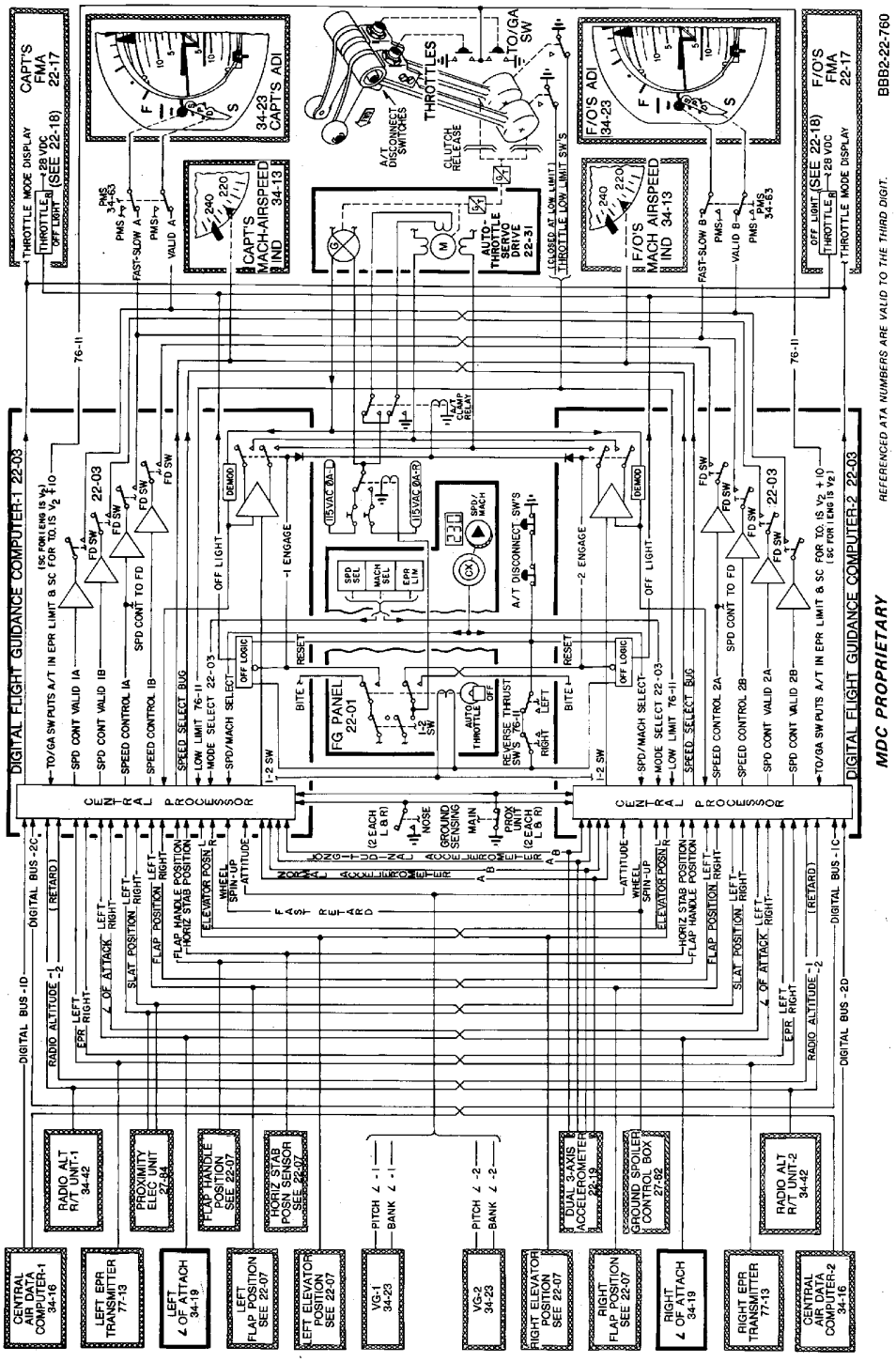
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-959 (Sheet 1 of 7)



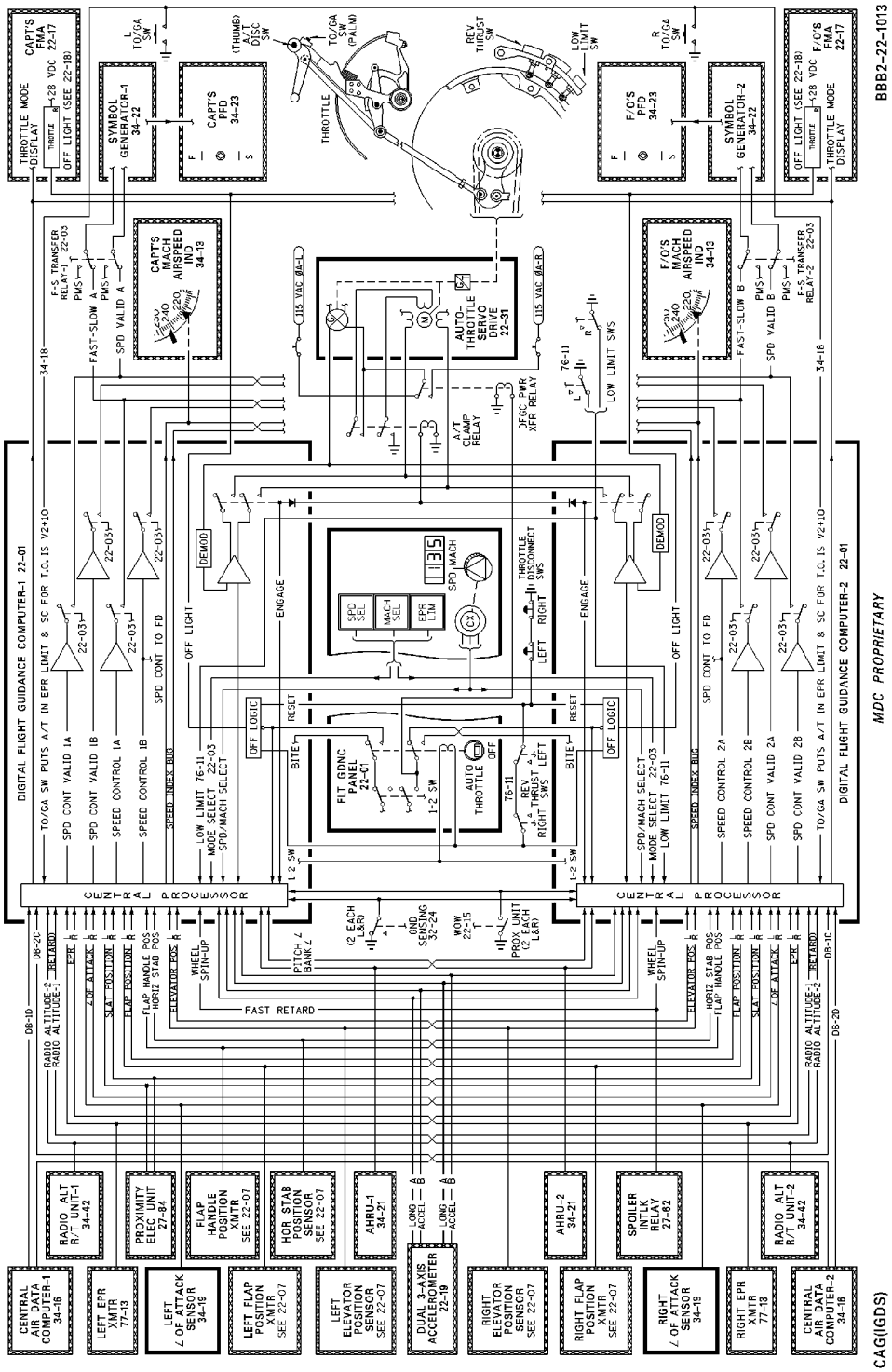
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-959 (Sheet 2 of 7)



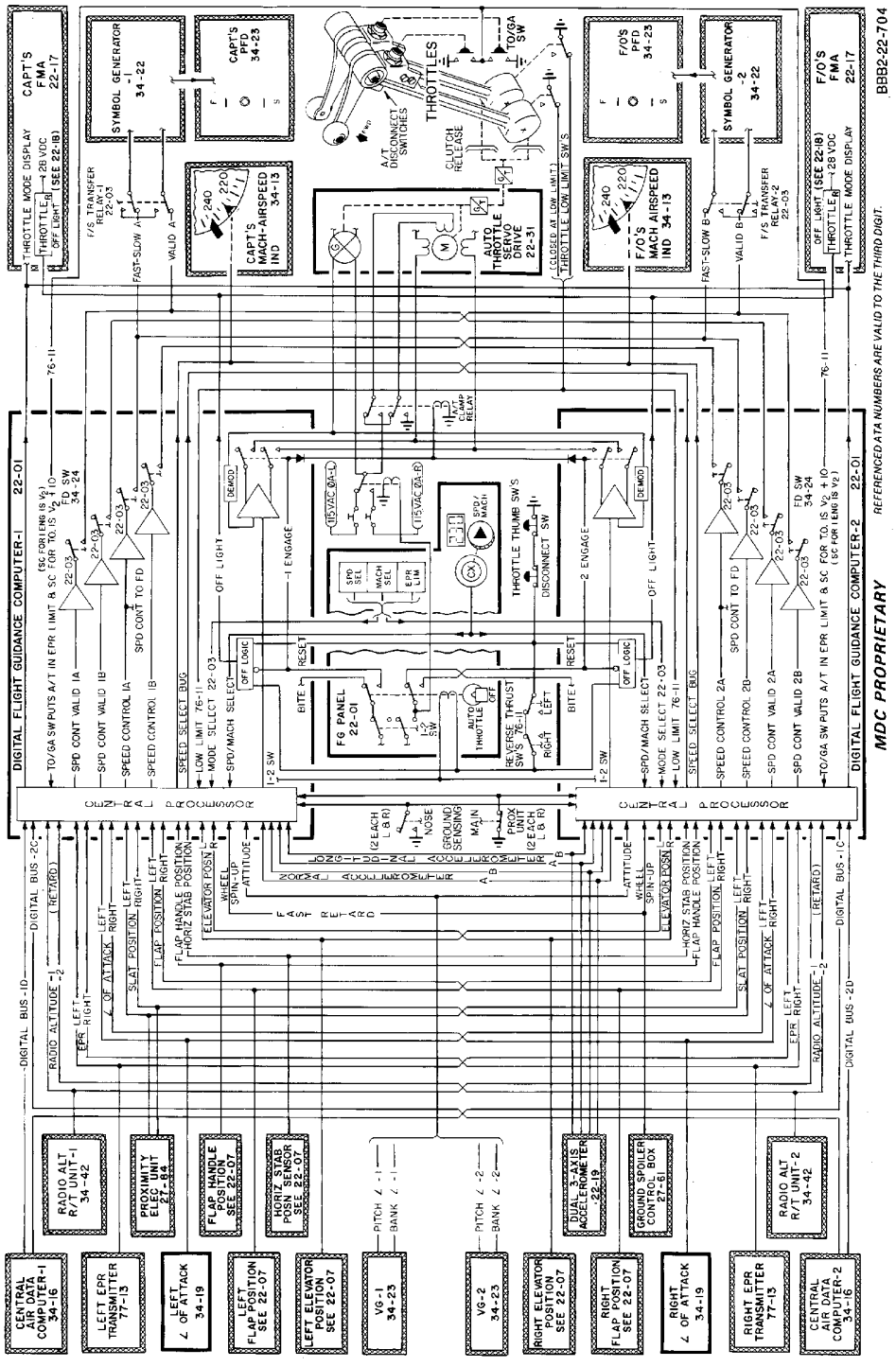
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-959 (Sheet 3 of 7)



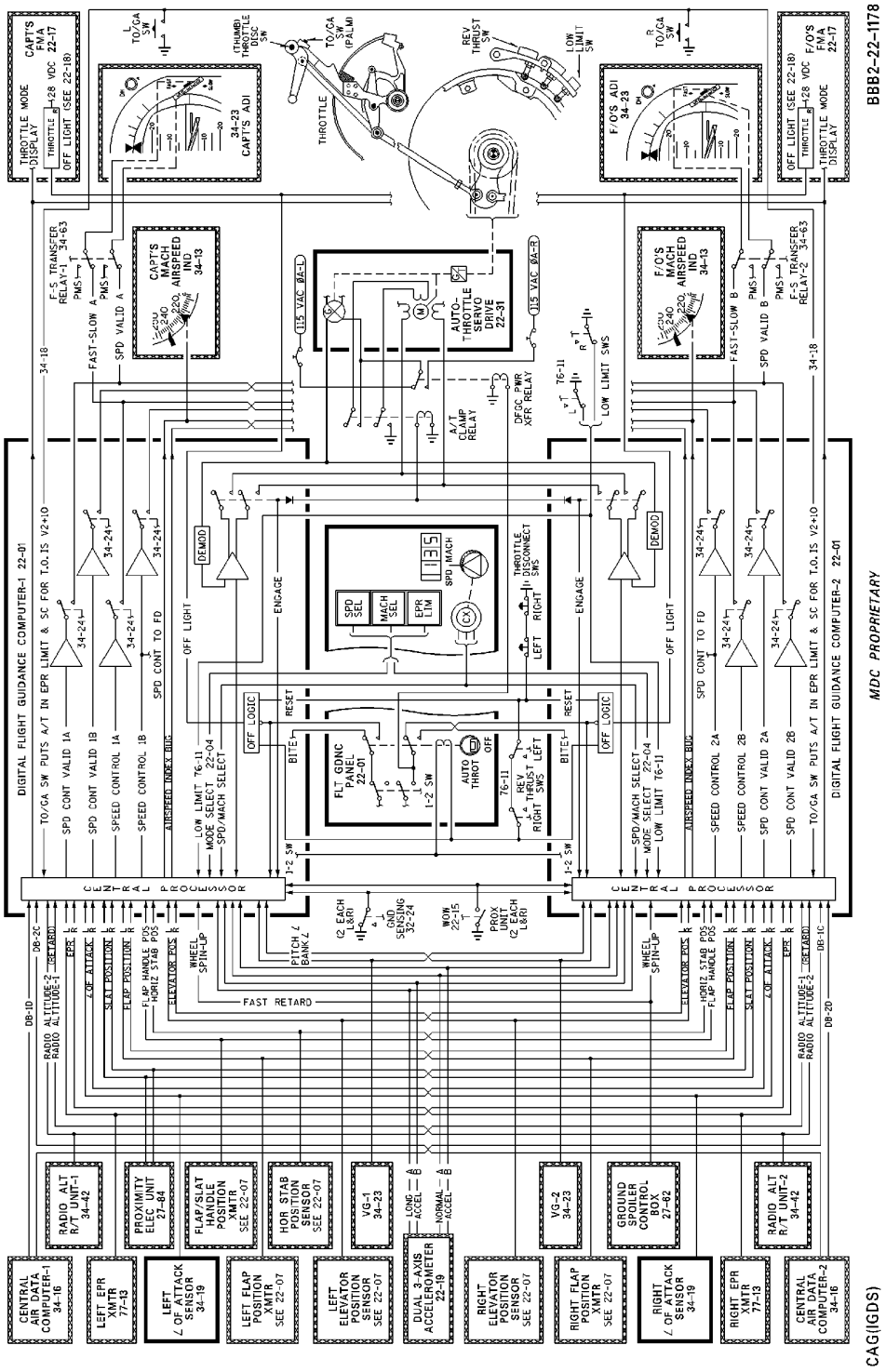
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-959 (Sheet 4 of 7)



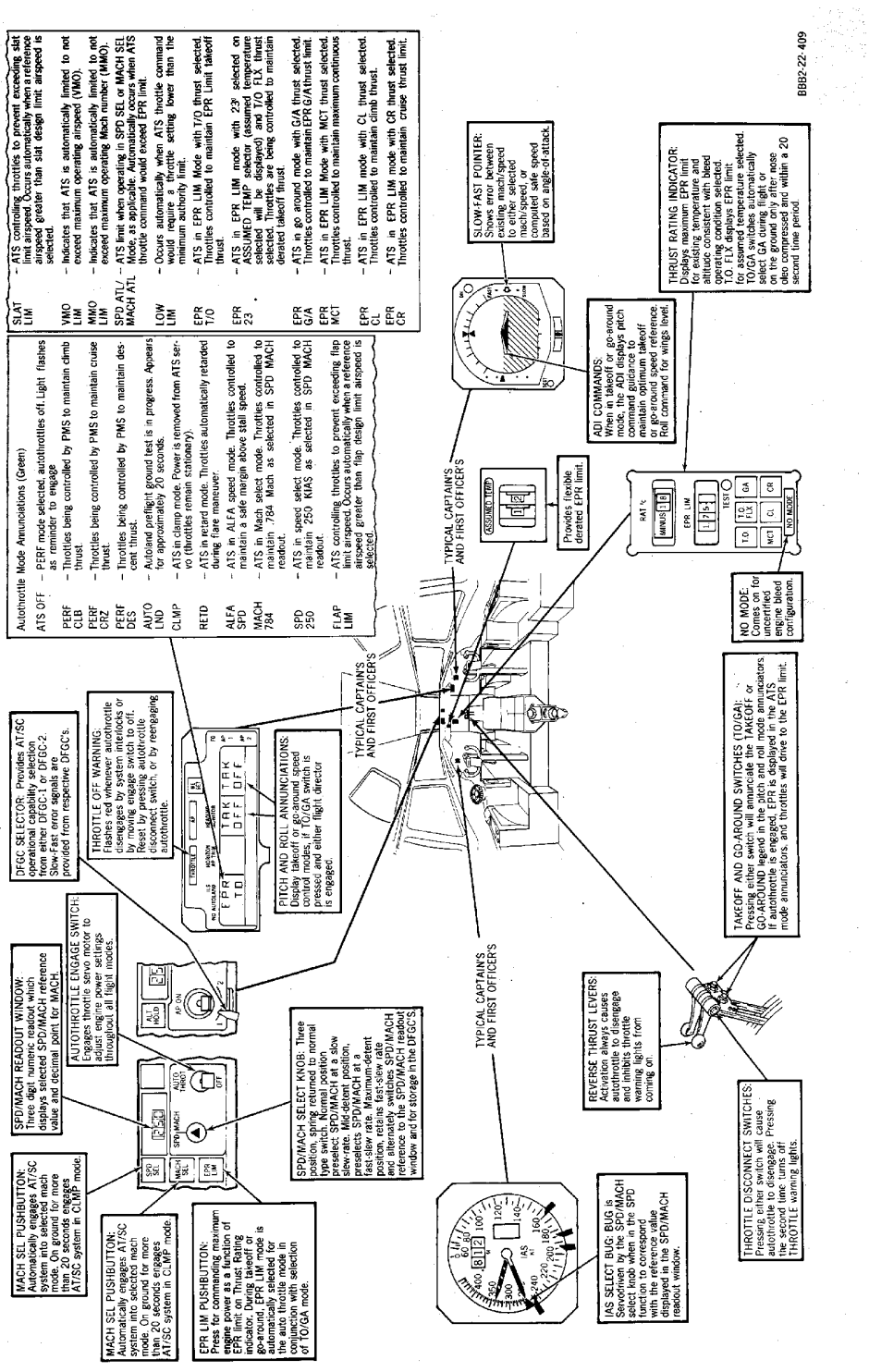
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-959 (Sheet 5 of 7)



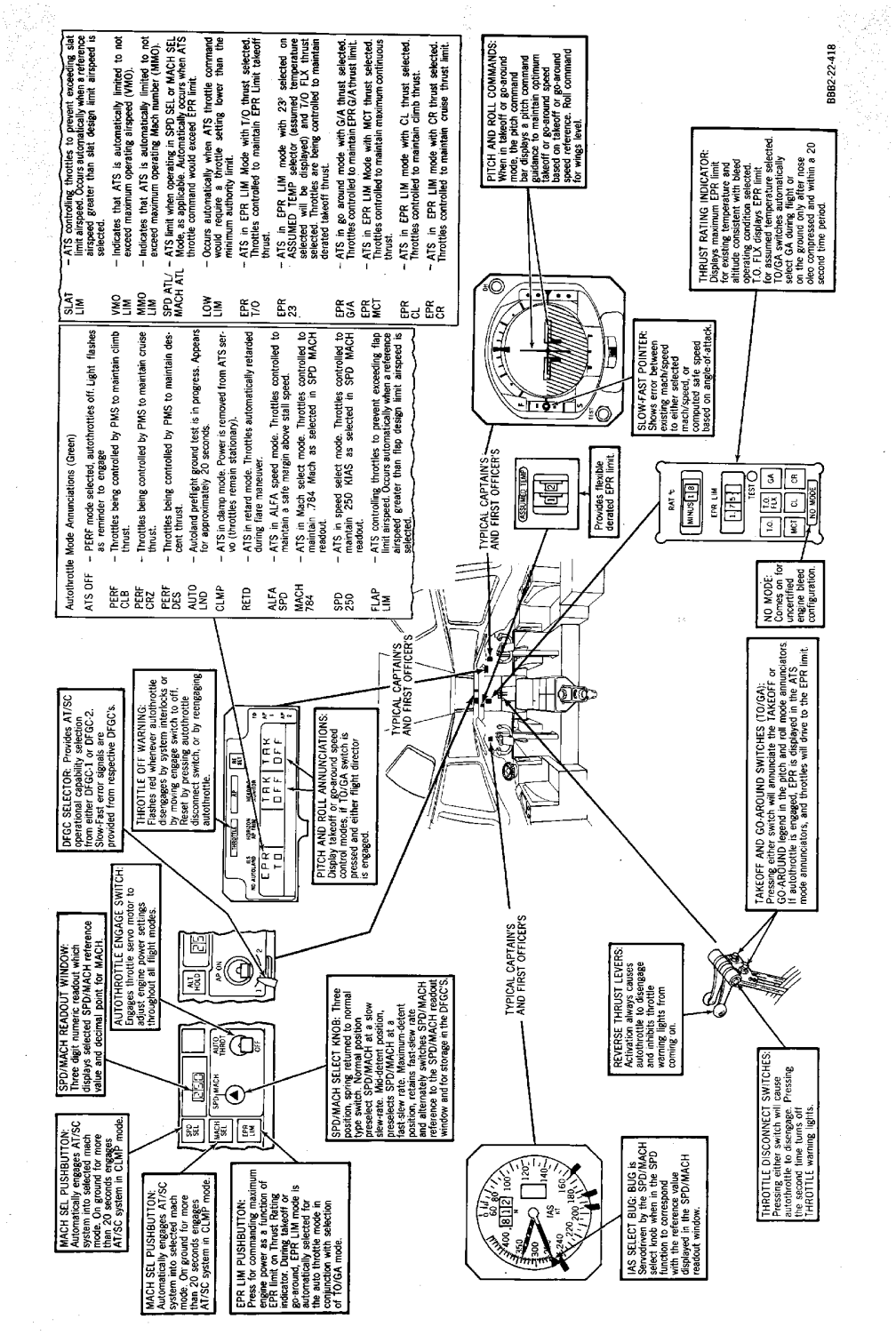
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-959 (Sheet 6 of 7)



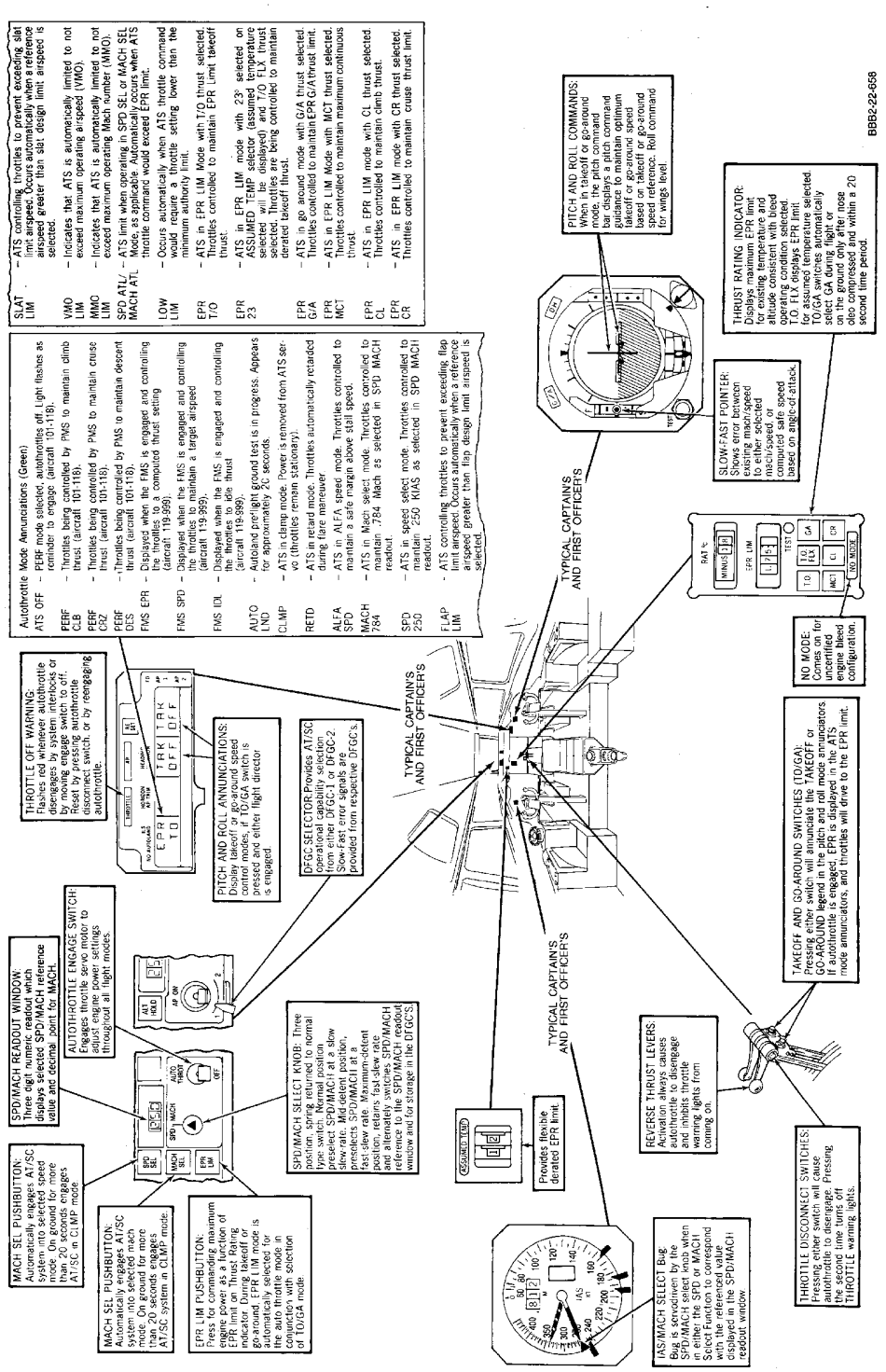
AT/SC -- Simplified Block Diagram
Figure 1/22-31-00-990-959 (Sheet 7 of 7)



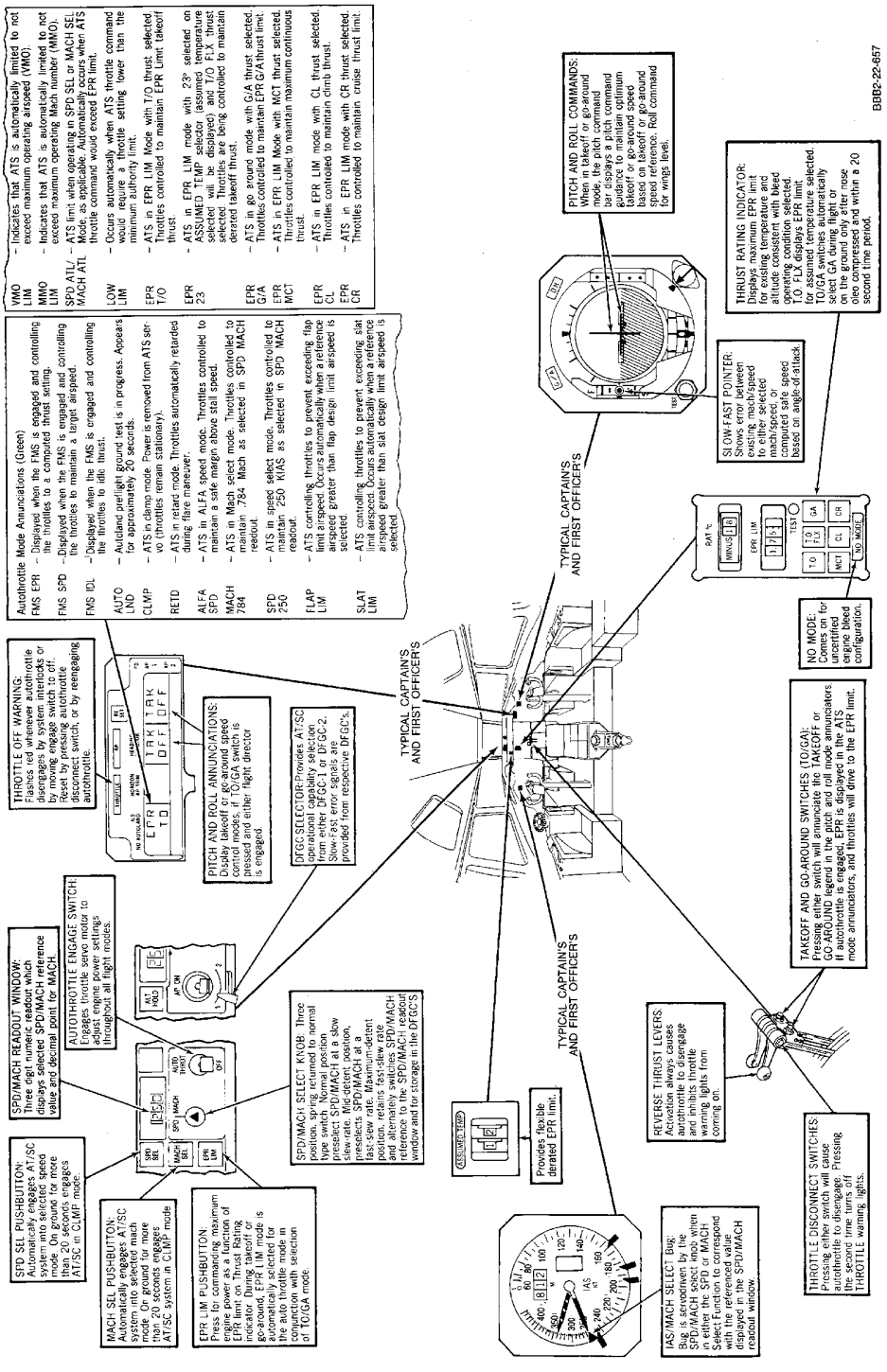
AT/SC System Functional Layout
Figure 2/22-31-00-990-960 (Sheet 1 of 4)



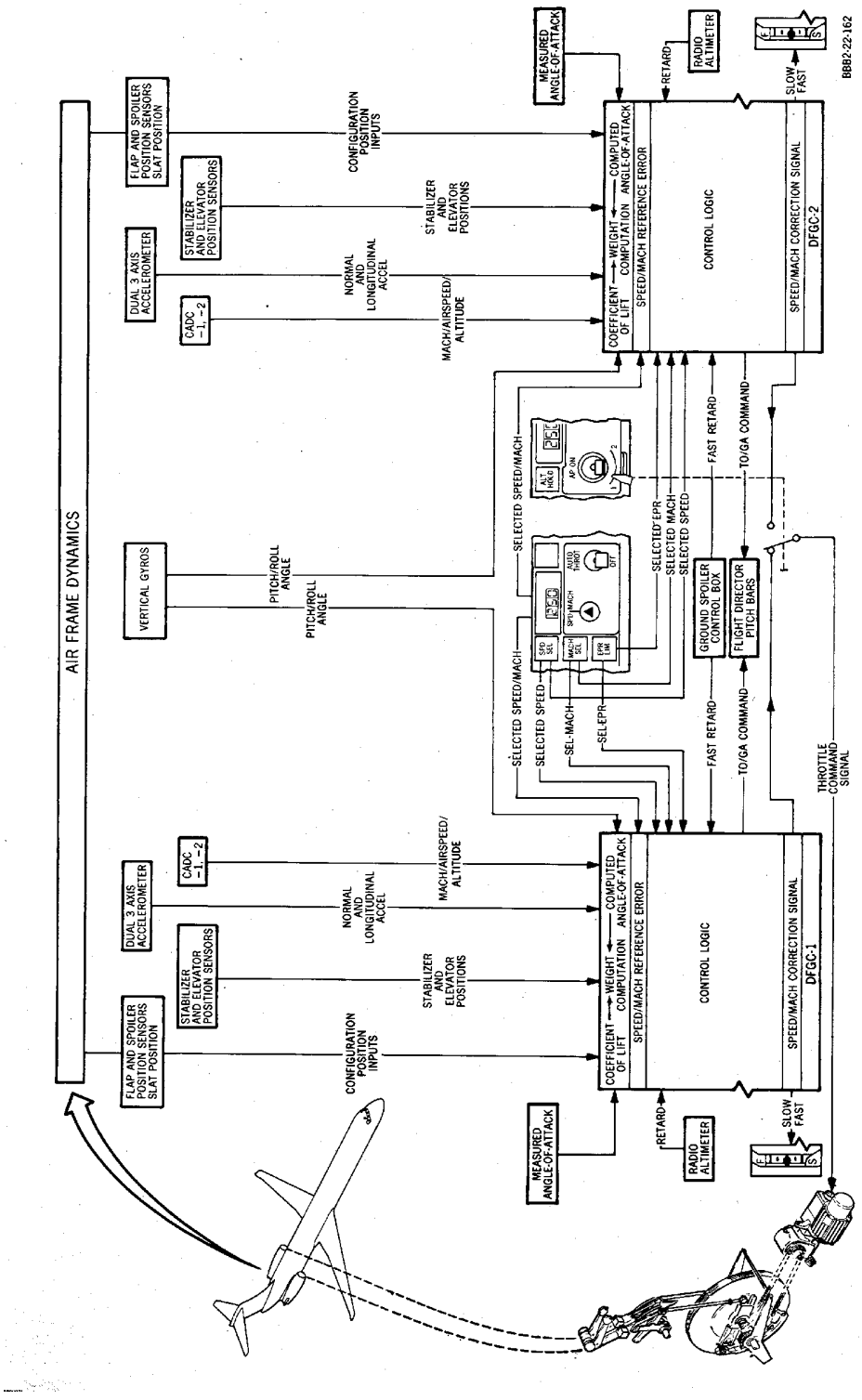
AT/SC System Functional Layout
Figure 2/22-31-00-990-960 (Sheet 2 of 4)



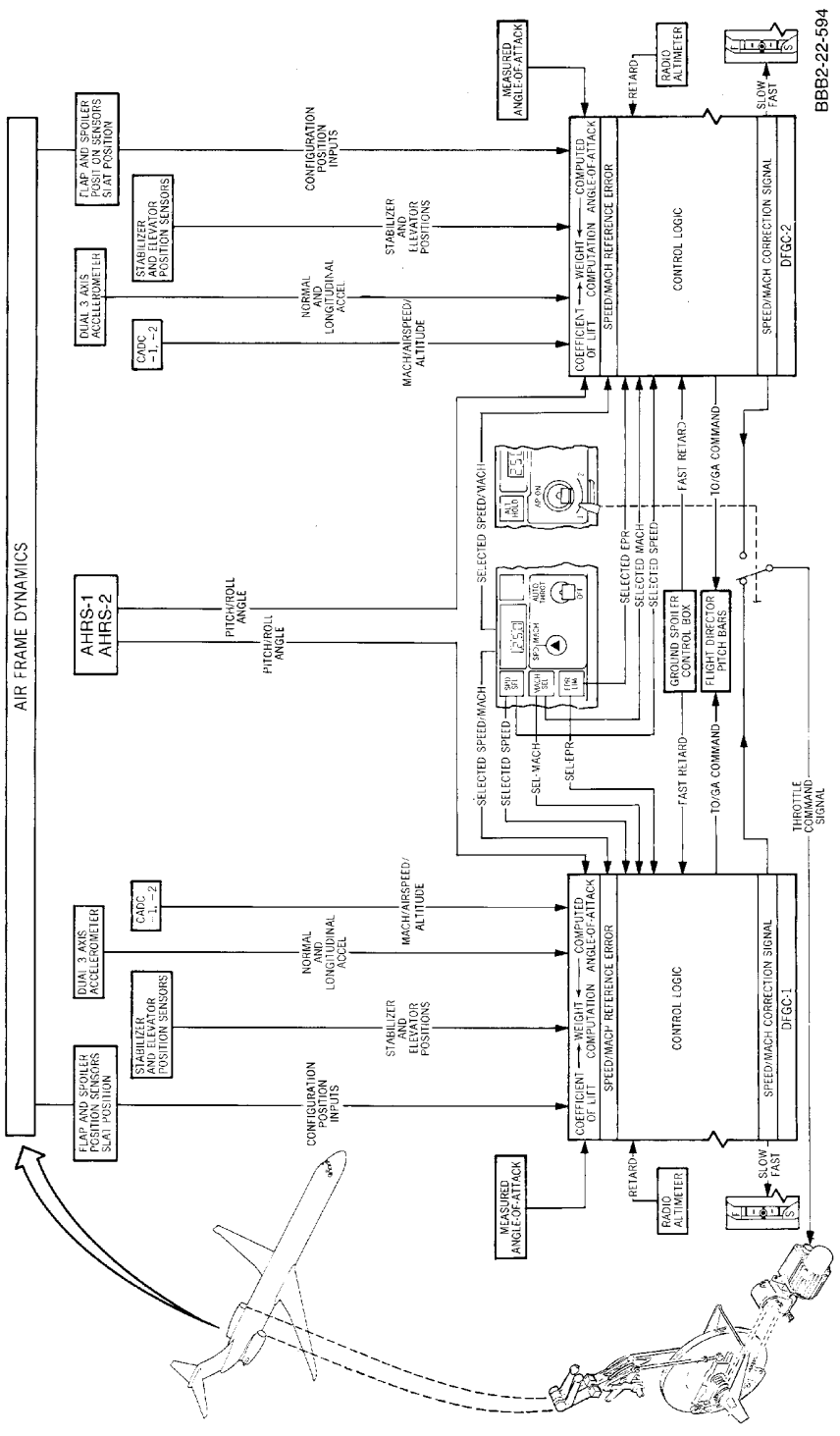
AT/SC System Functional Layout
Figure 2/22-31-00-990-960 (Sheet 3 of 4)



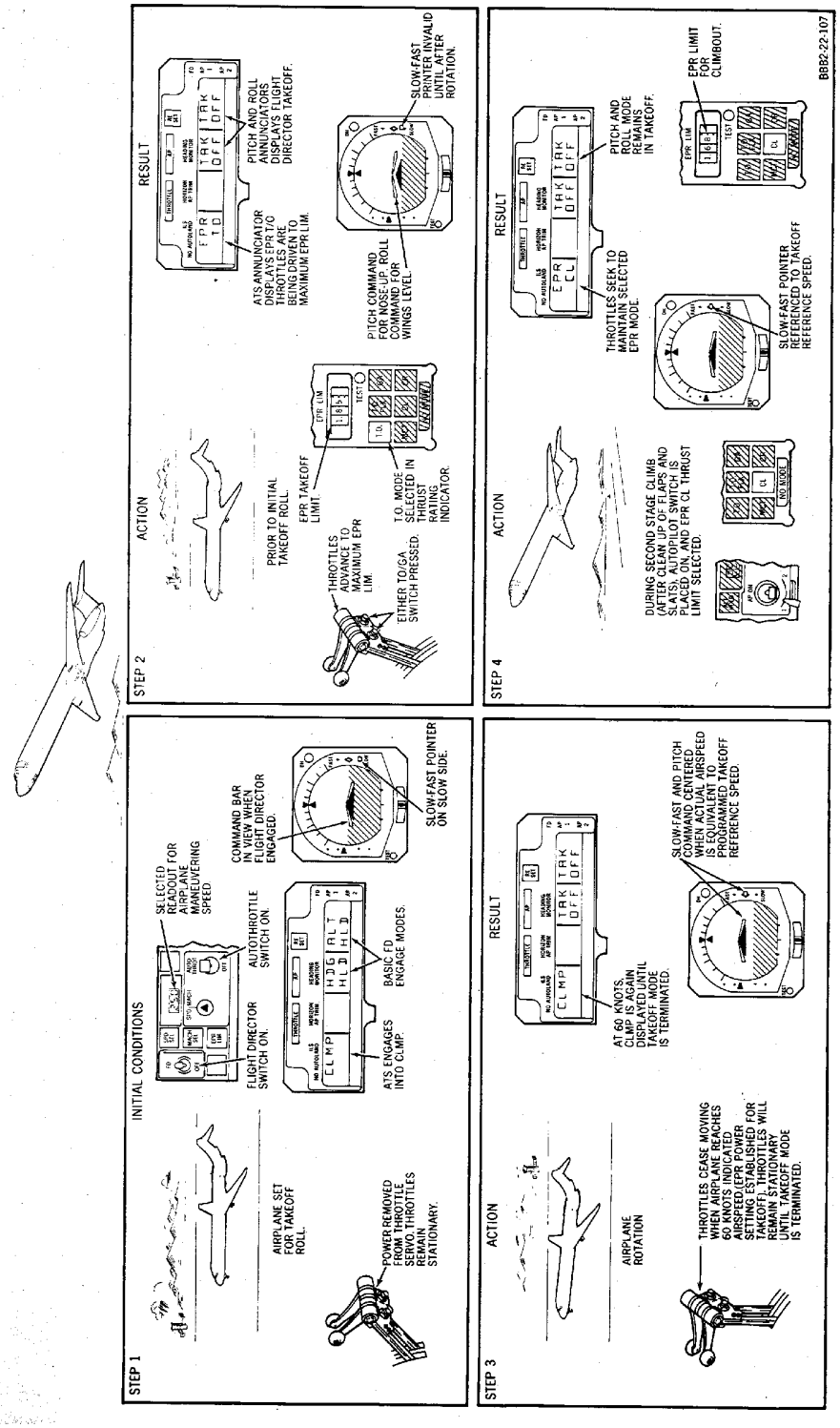
AT/SC System Functional Layout
Figure 2/22-31-00-990-960 (Sheet 4 of 4)



AT/SC Functional Interface
Figure 3/22-31-00-990-961 (Sheet 1 of 2)

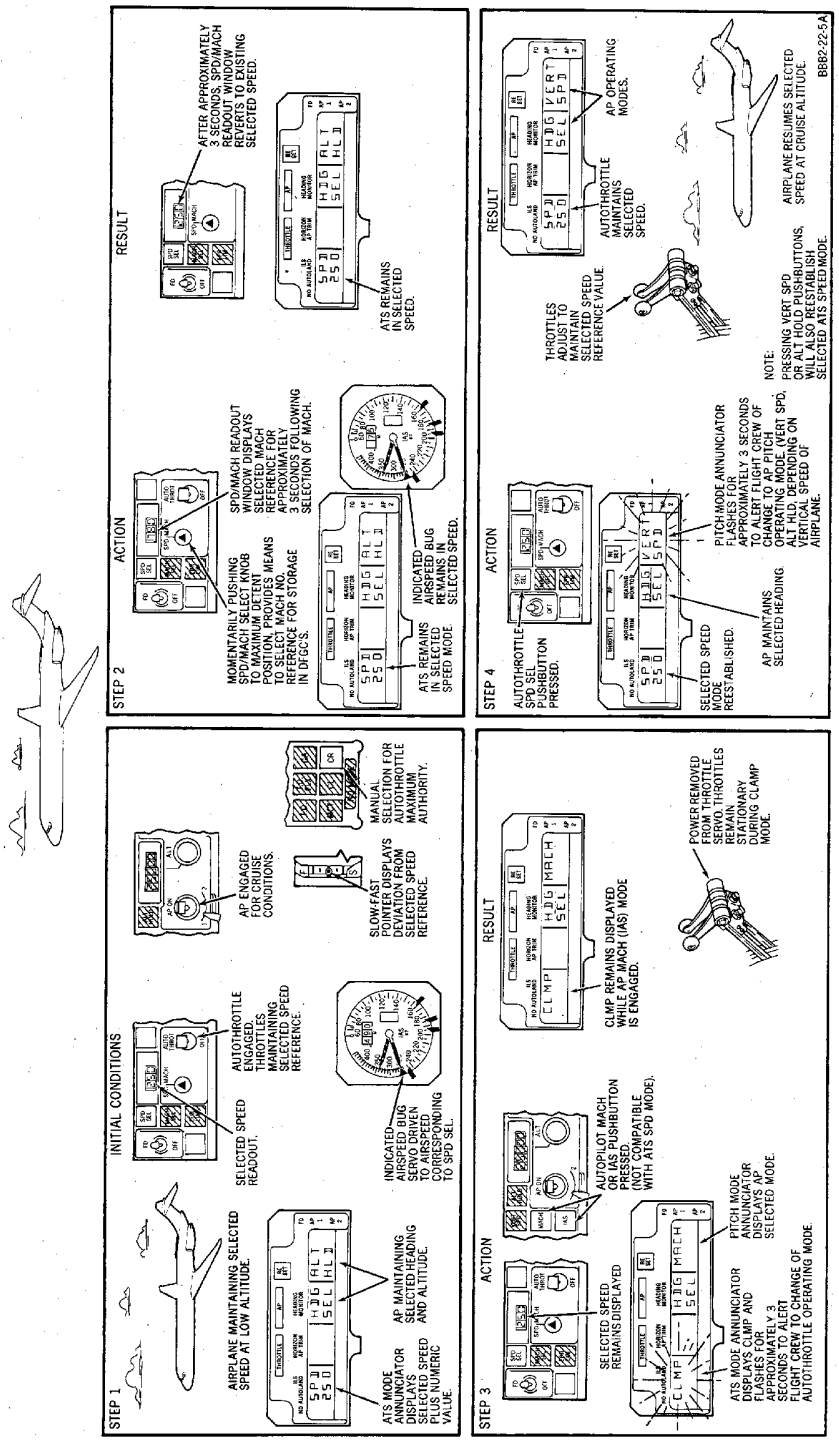


AT/SC Functional Interface
Figure 3/22-31-00-990-961 (Sheet 2 of 2)

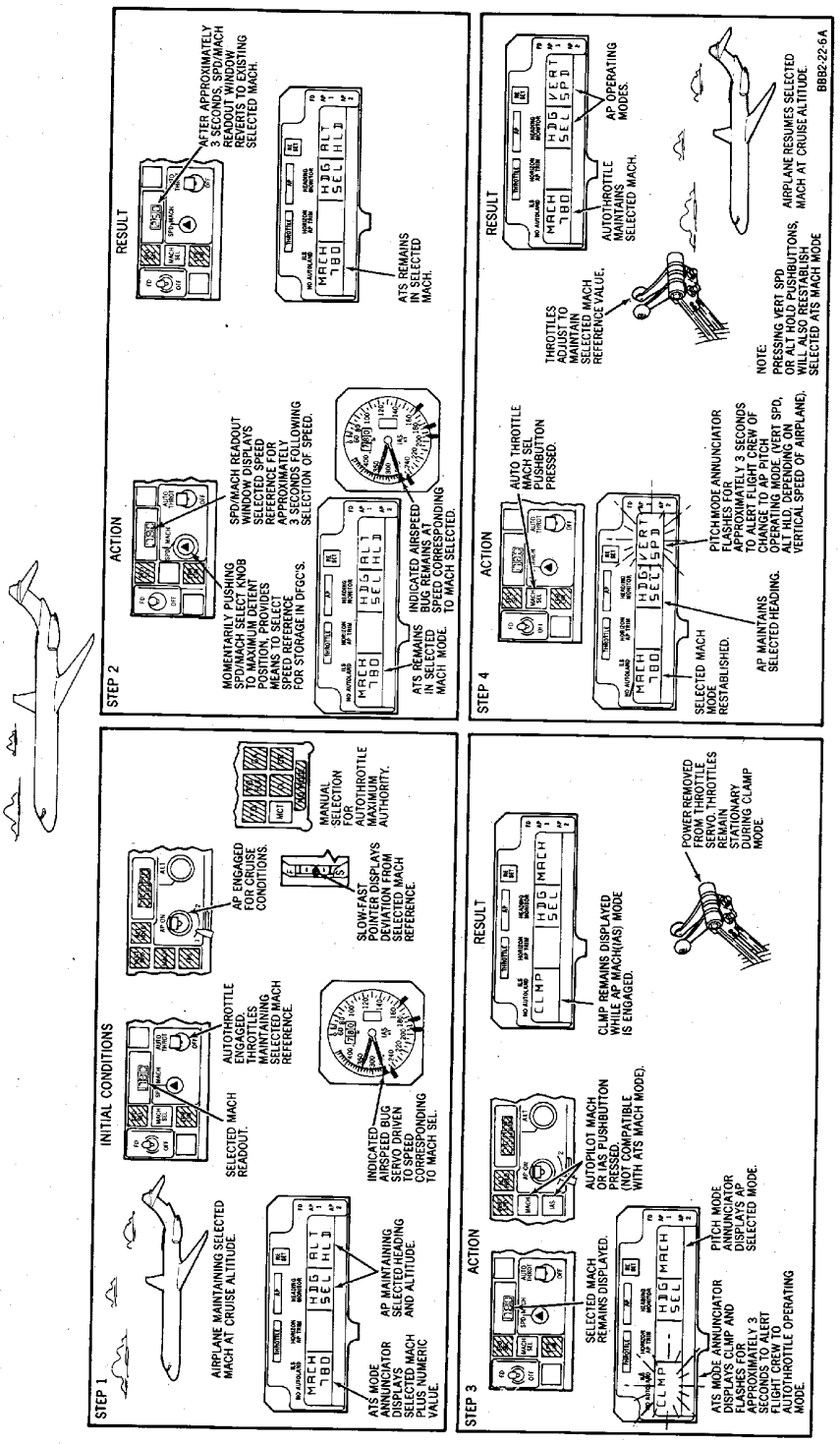


Take Off Mode Of Operation
Figure 4/22-31-00-990-962

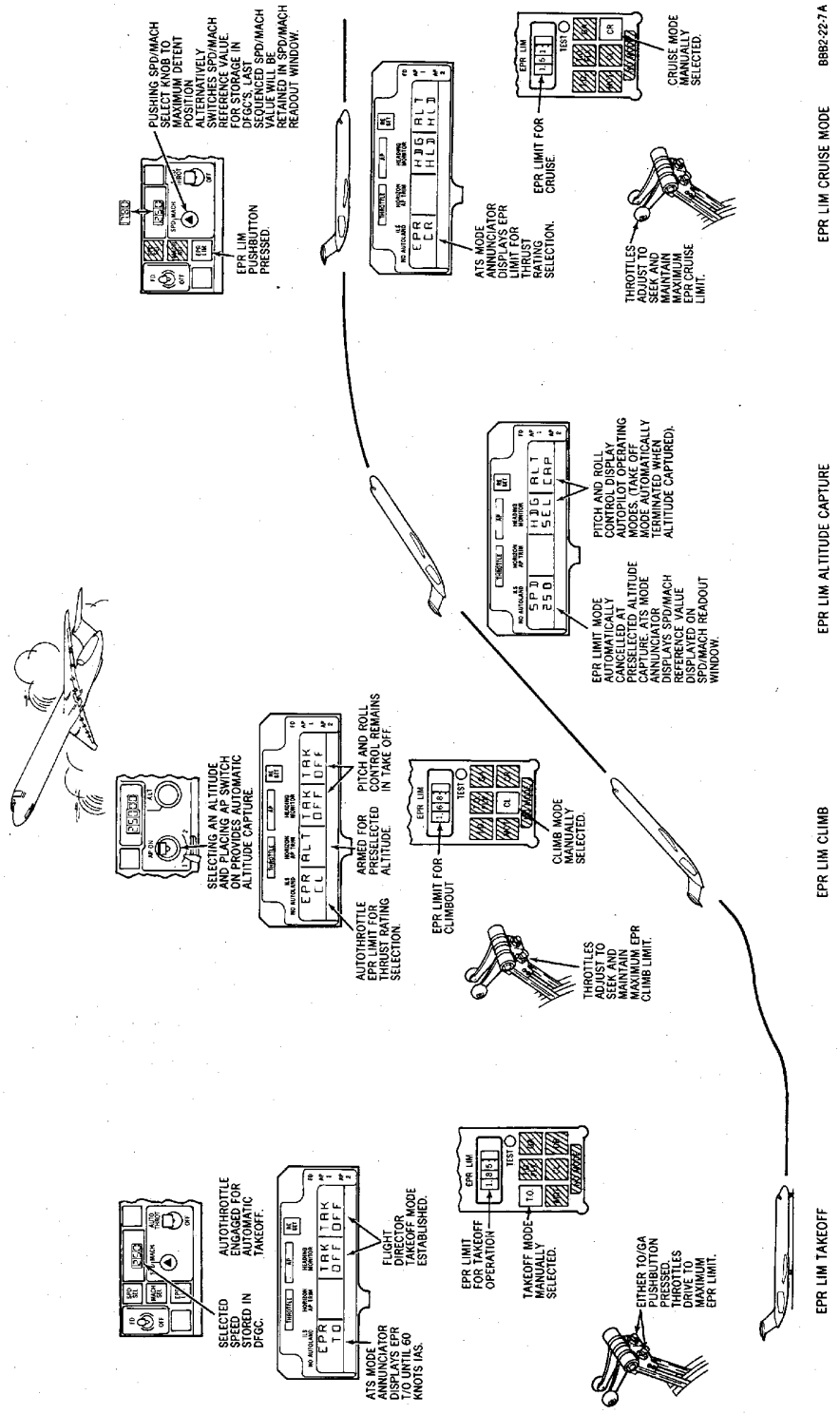
EFFECTIVITY
WJE 401-405, 409, 410, 412, 414-427, 429, 861-866, 868, 869, 871-879, 881, 883, 884, 886, 887, 891-893



SPD SEL Mode Of Operation
Figure 5/22-31-00-990-963

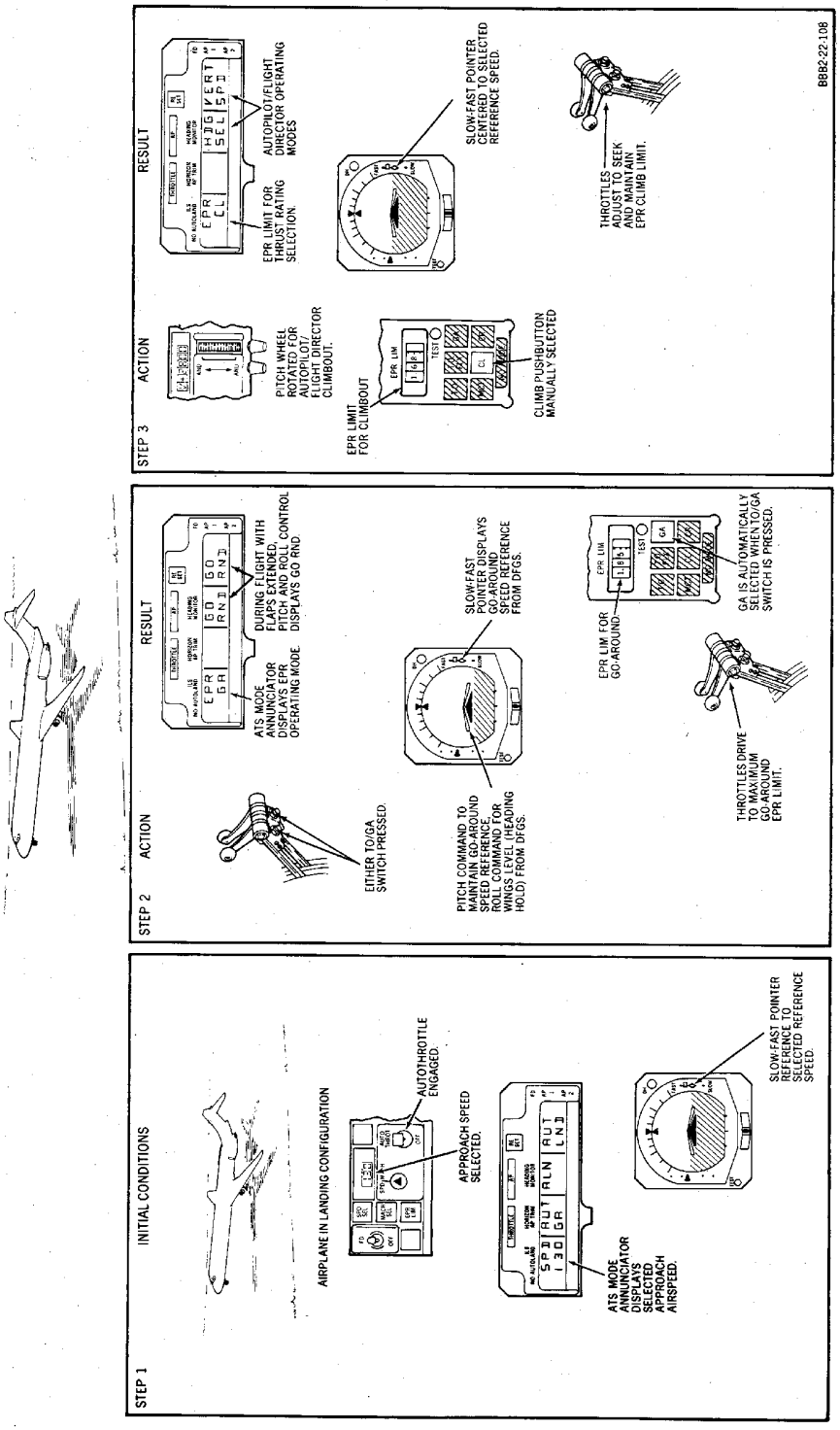


MACH SEL Mode Of Operation
Figure 6/22-31-00-990-964



EPR LIM Mode Of Operation
Figure 7/22-31-00-990-965

EFFECTIVITY
WJE 401-405, 409, 410, 412, 414-427, 429, 861-866, 868, 869, 871-879, 881, 883, 884, 886, 887, 891-893



GO-ARND Mode Of Operation
Figure 8/22-31-00-990-966

AUTO THROTTLE/SPEED CONTROL (AT/SC) - TROUBLE SHOOTING

1. General

WJE 401-412, 414, 873-881, 883, 884, 886, 887, 892, 893

A. Prior to performing AT/SC trouble shooting procedures, the Status Test Panel (STP) located below the captain's briefcase compartment should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The AT/SC may be also verified by use of the Maintenance or Return-To-Service tests. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

B. Trouble shooting procedures consist primarily using the STP prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on AT/SC is helpful for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to AT/SC and associated system interface. (AUTO THROTTLE/SPEED CONTROL, SUBJECT 22-31-00, Page 1)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

C. Prior to performing AT/SC trouble shooting procedures, the Multipurpose Control Display Unit (MCDU) located on forward pedestal should be utilized to check if any failures were detected during flight. This may be accomplished by use of Flight Fault Review. The AT/SC may be also verified by use of the Maintenance or Return-To-Service tests. (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201)

D. Trouble shooting procedures consist primarily using the MCDU prior to faulty component replacement. A thorough knowledge of the interrelationship of components that have a direct bearing on AT/SC is helpful for meaningful trouble shooting. For this reason the following schematics are grouped into this section for quick reference to AT/SC and associated system interface. (AUTO THROTTLE/SPEED CONTROL, SUBJECT 22-31-00, Page 1)

WJE ALL

E. The following Trouble Shooting Guide Notes are to be used in conjunction with the Trouble Shooting Guide. (Paragraph 3.)

2. Trouble Shooting Guide Notes

A. This trouble shooting guide addresses only the auto throttle system (ATS). Therefore, operators with either a Performance Management System (PMS) or Flight Management System (FMS) installed, must verify that these systems are not the cause of the related problem prior to auto throttle trouble shooting. If this cannot be verified by ground checks, flying the next flight leg without PMS/FMS coupled may be required.

B. Auto Throttle Disconnects - If auto throttle disconnects occur in conjunction with erratic VHF Nav panel course displays, check the AC Emergency Power Transfer Relay (AEPTR) R2-47, for correct wiring and operation. To test for proper operation of the AEPTR, the following conditions must be set. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 24-00-00/001)

(1) Both left and right 115 VAC buses powered. This can be accomplished using external power, Auxiliary Power Unit (APU) generator or main engine generators.

(2) If an operator chooses to use an engine generator(s) to perform this test, the AC BUS X TIE switch must be in the OPEN position.

(3) Place the appropriate left 115 VAC BUS switch or generator switch to the OFF position. Verify that the AC EMER BUS OFF annunciation does not illuminate.

C. EPR Mode Failures - If auto throttle is engaged in an EPR mode, maximum allowable thrust control is programmed in accordance with EPR error signals developed from the EPR sensors and thrust rating EPR limit computed within the DFGC. Existing EPR of both engines is compared with computed maximum allowable EPR consistent with environmental conditions to develop an EPR error signal. The error signal provides a control signal to the Auto Throttle Servo to drive the throttles to the selected thrust rating.

(1) Therefore, flight fault review diagnostic numbers associated with EPR problems (i.e. 52-53, 148, 228-229, 494-495, and 266-268) should be investigated first.

D. EPR Transmitter Failure - Prior to EPR transmitter replacement, make sure that the PT2 Compressor Inlet and the PT7 Turbine Discharge Probes are clear and do not leak. (ENGINE GENERAL - TROUBLESHOOTING-05, PAGEBLOCK 72-00-05/101)

E. Power Phasing - Correct power phasing is critical for proper auto throttle operation. Therefore, the DFGS Power Transfer Relay (R20-100), must be functioning correctly. Prior to checking R20-100, maintain a split AC Bus power configuration on the aircraft (Left AC Buses NOT powered by a single source or generator).

F. Engine Synchronization - The engine synchronization system is interconnected to the throttle system on the left engine only. To isolate the ATS, the engine synchronization should be function checked separately. If the engine synchronization system is suspected of causing the auto throttle problem, the circuit breaker for this system should be opened while trouble shooting the ATS. (THROTTLE SYSTEMS, SUBJECT 76-11-00, Page 501)

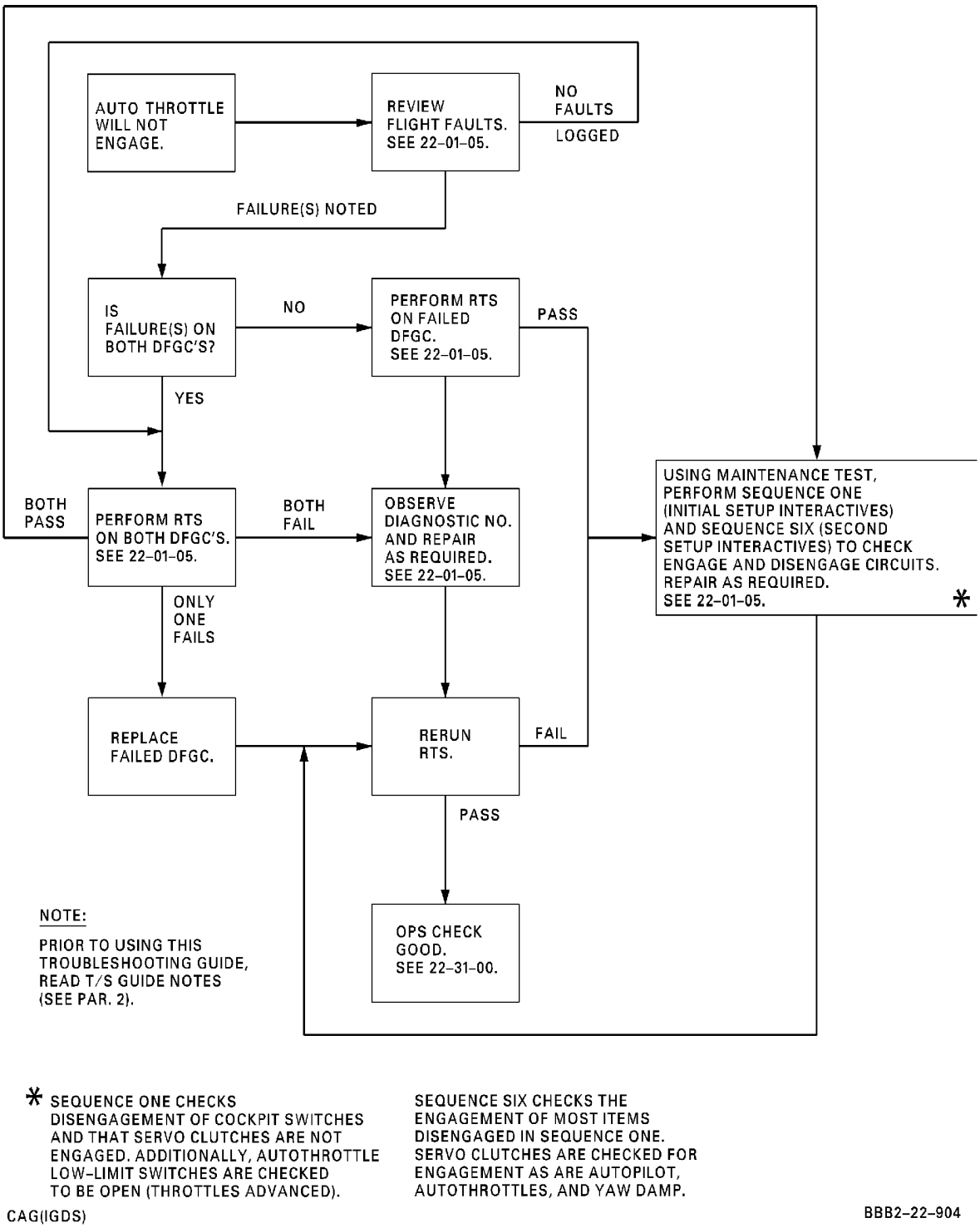
G. Engine Overspeed - Auto throttle problems associated with engine overspeed may be the result of operational procedure(s) by the flight crew. Under normal auto throttle system operation, the throttles will not automatically drive below the low limit position.

(1) If throttles are manually positioned below low limit position, the ATS may automatically advance from below the low limit position to a high EPR limit (i.e. TO, GA, etc.). In this case, an engine overspeed may occur.

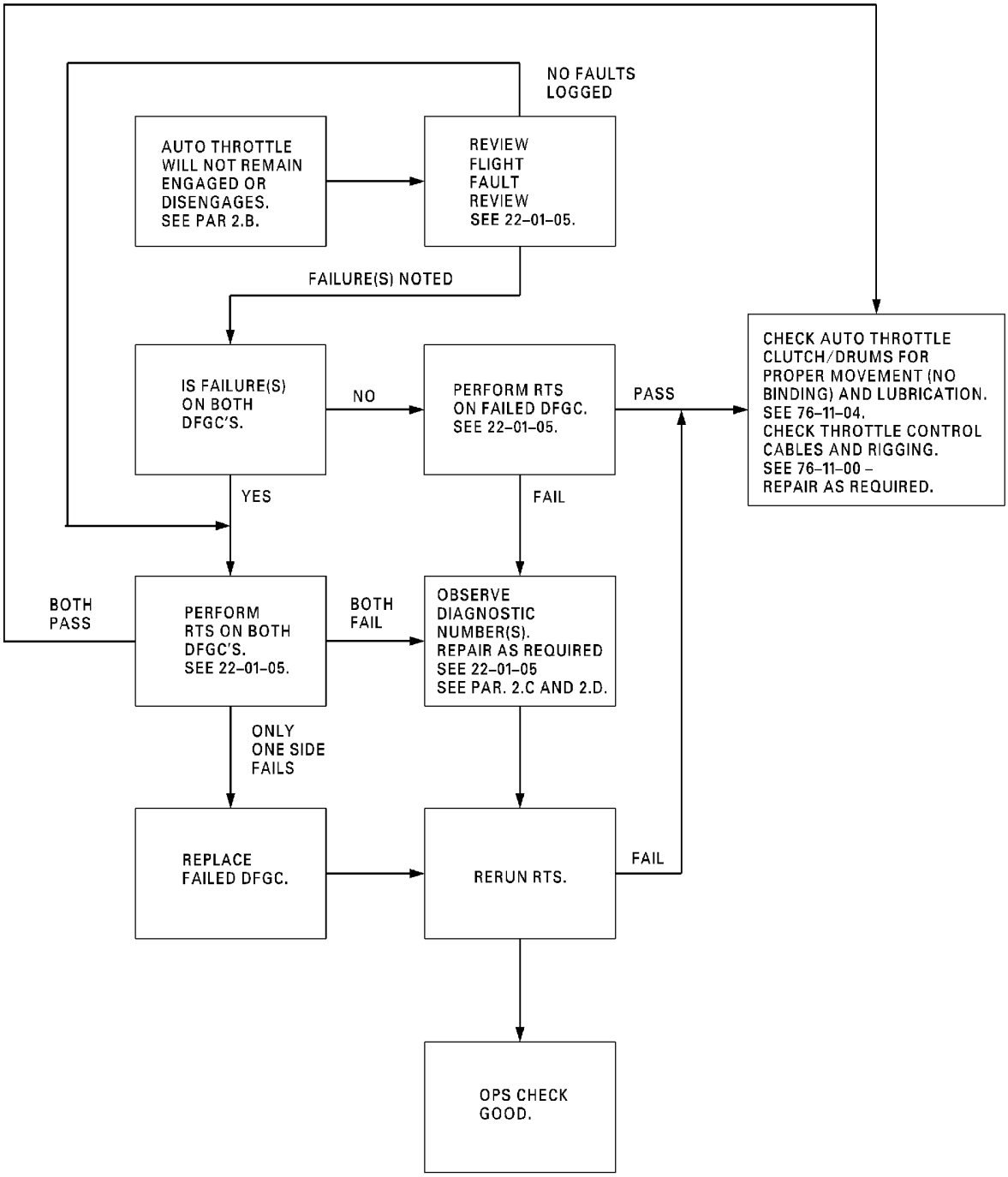
H. Throttles Staggered - Since a single Auto Throttle Servo drives both throttles, a stagger in throttle position during auto throttle operation is not considered an auto throttle problem. This defect may be the result of improper operation of the auto throttle clutch, throttle lever rigging, etc.

3. Trouble Shooting Guide

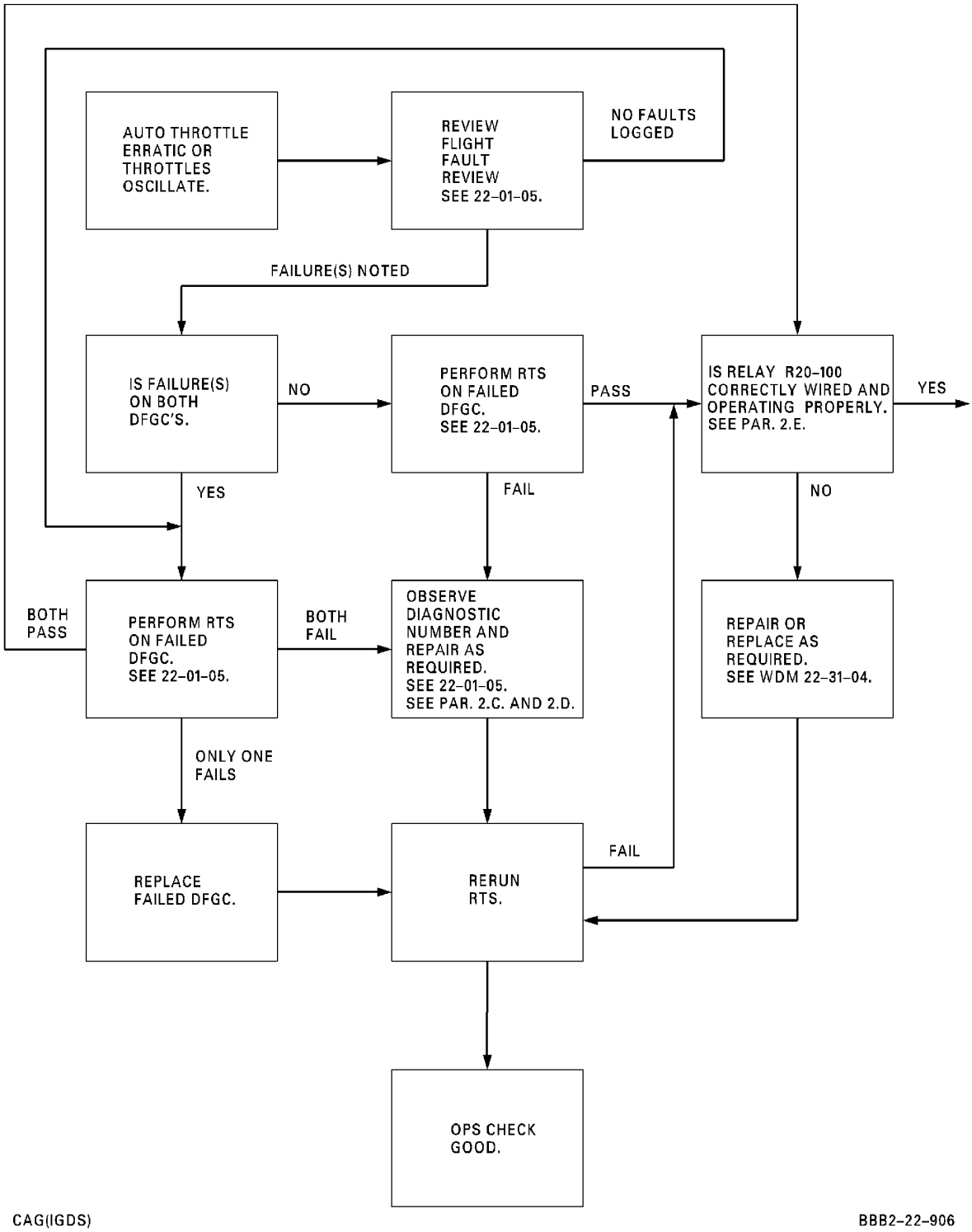
A. The following Trouble Shooting Guide is intended for quick reference to be used in conjunction with the Flight Fault Review and Return-To-Service tests. For notes called out in this guide, refer to the Trouble Shooting Guide Notes in Paragraph 2..



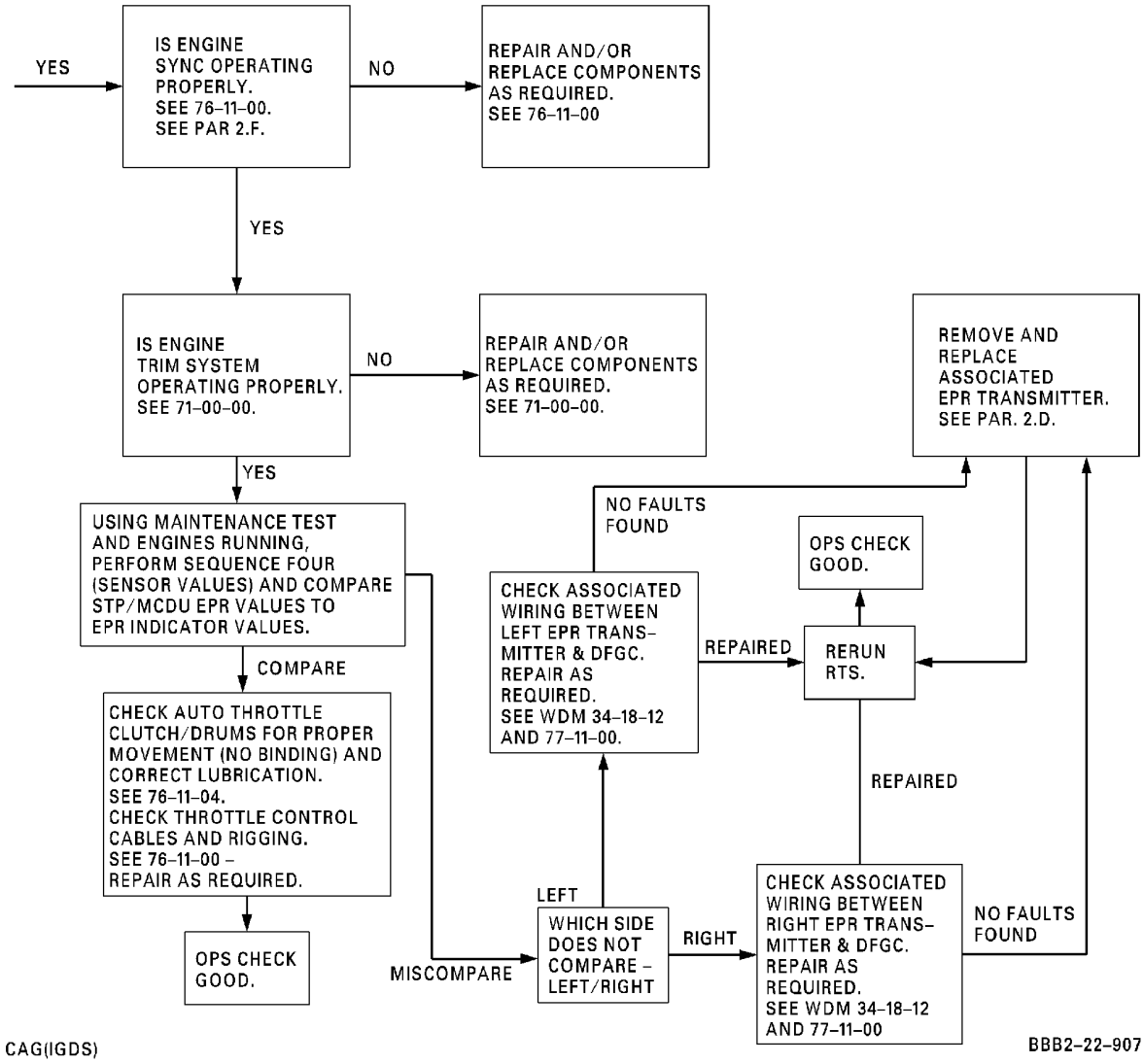
Auto Throttle Trouble Shooting Guide
Figure 101/22-31-00-990-898 (Sheet 1 of 4)



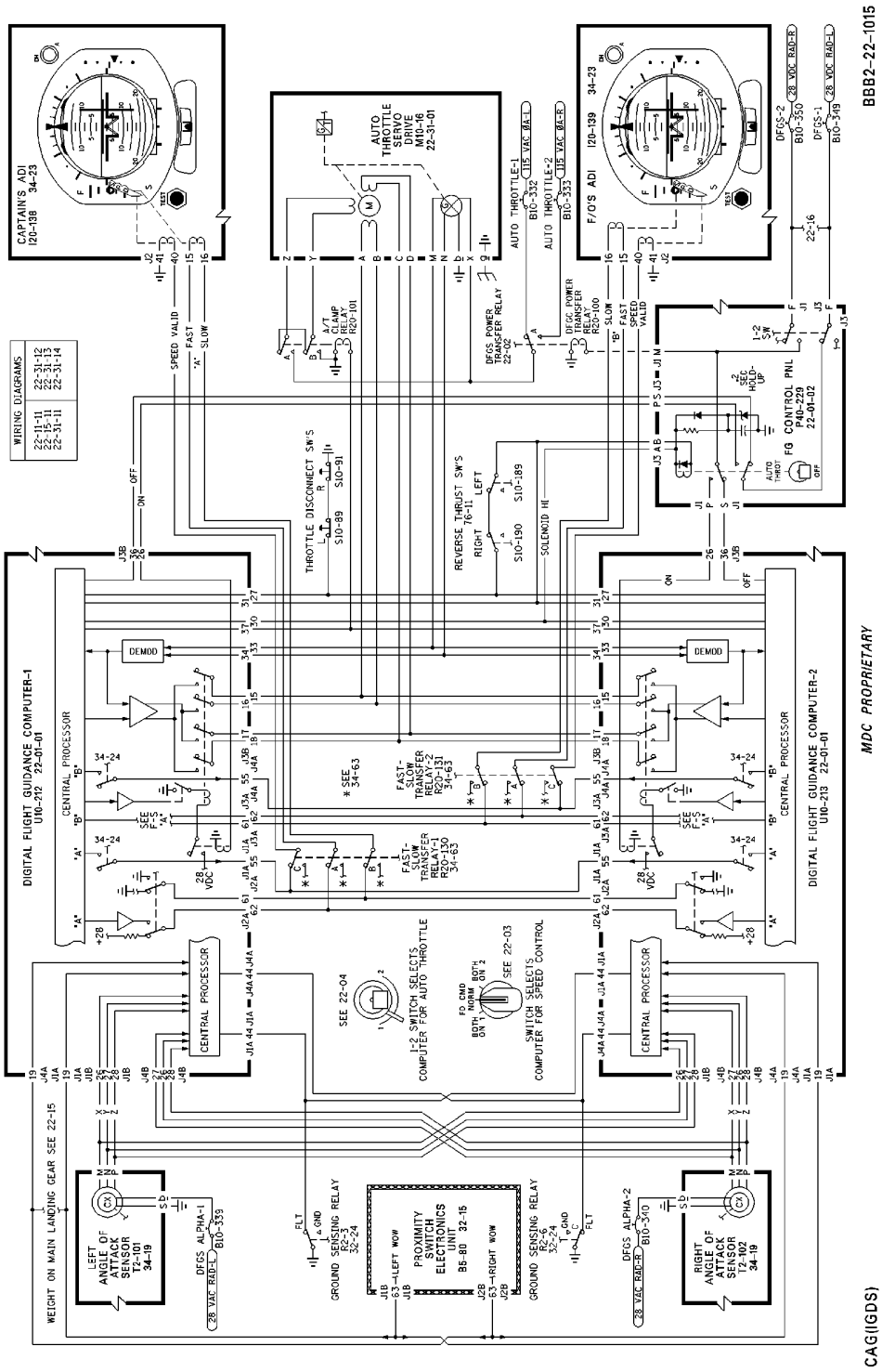
Auto Throttle Trouble Shooting Guide
Figure 101/22-31-00-990-898 (Sheet 2 of 4)



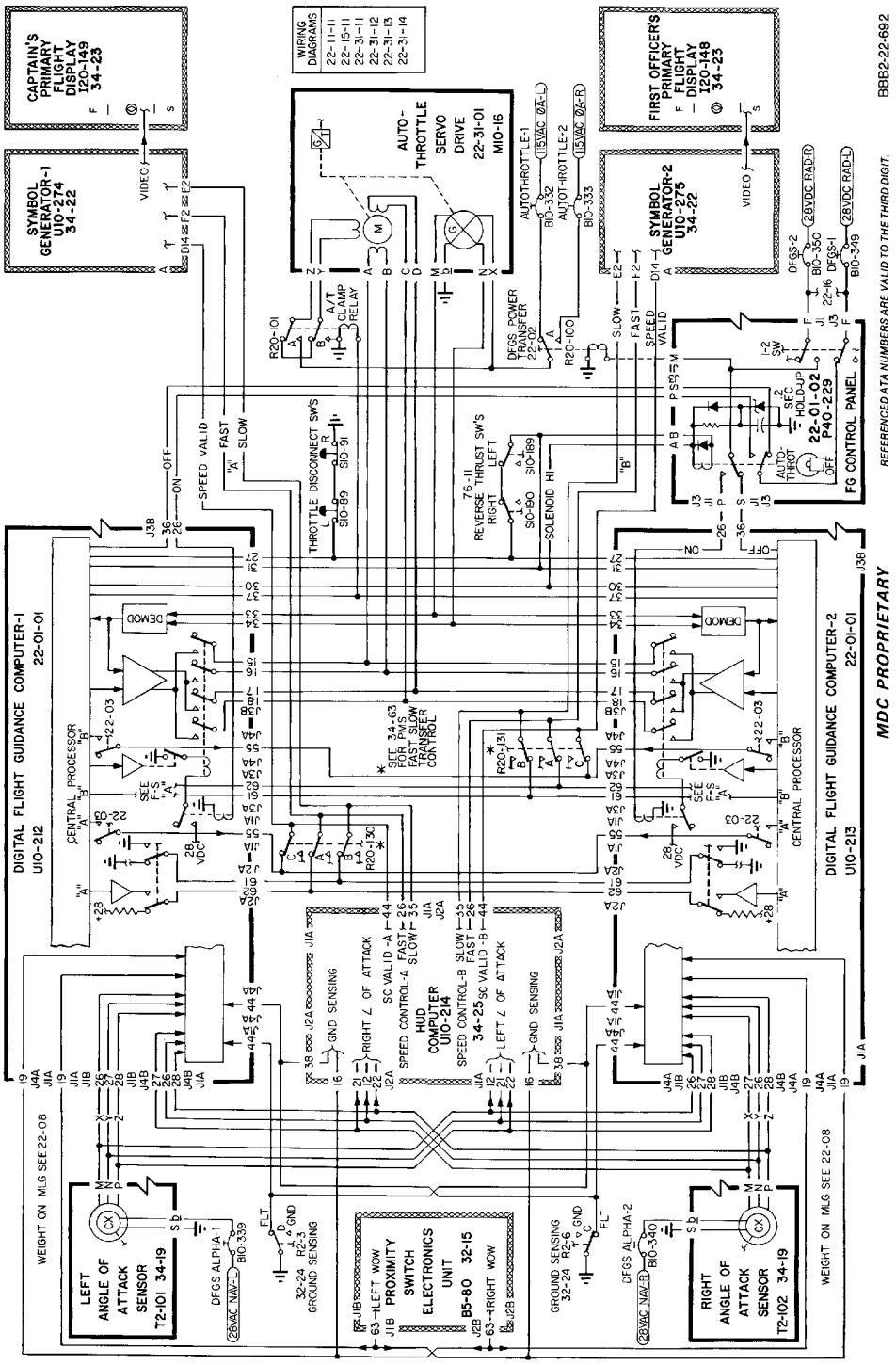
Auto Throttle Trouble Shooting Guide
Figure 101/22-31-00-990-898 (Sheet 3 of 4)



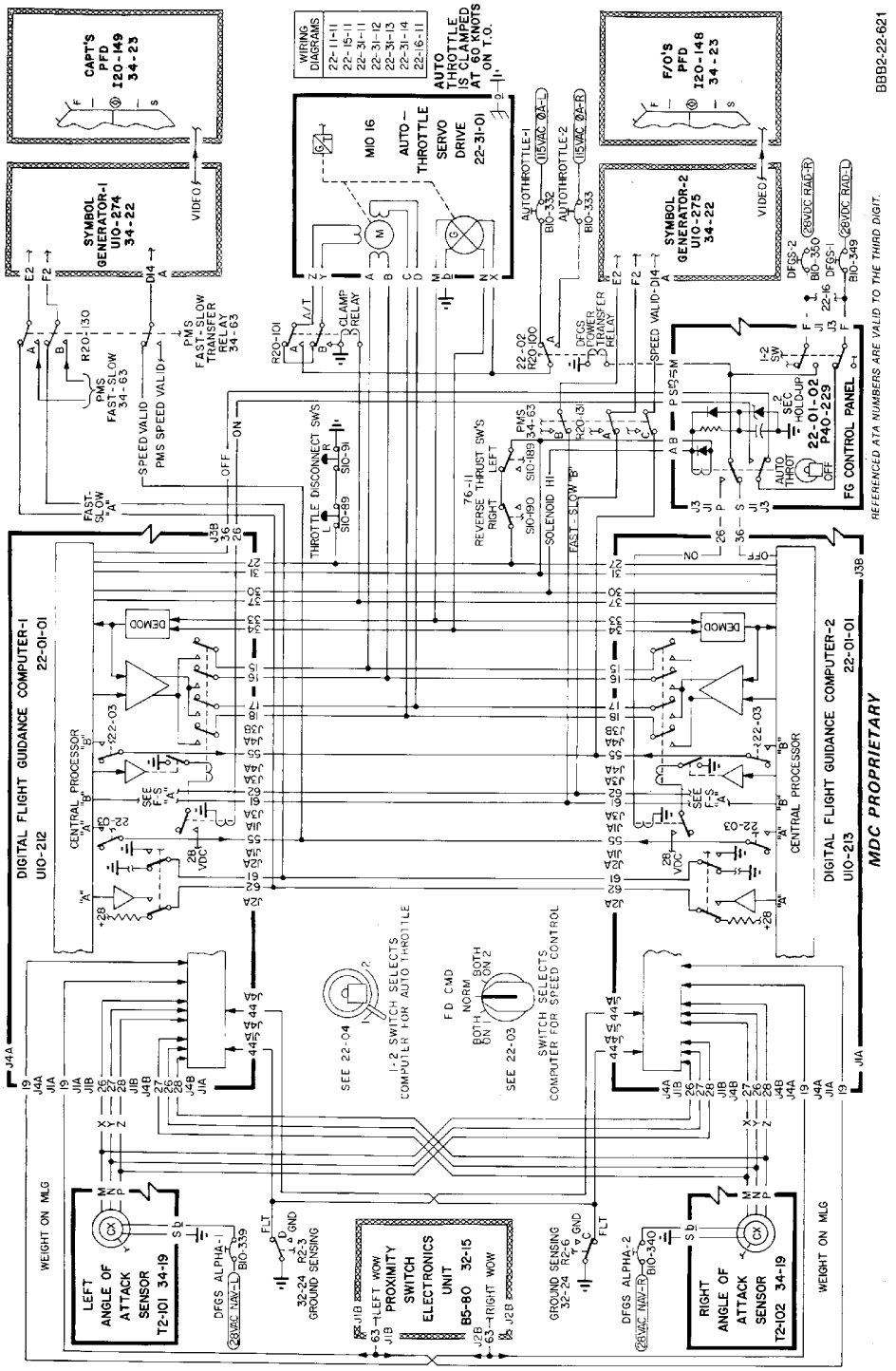
Auto Throttle Trouble Shooting Guide
Figure 101/22-31-00-990-898 (Sheet 4 of 4)



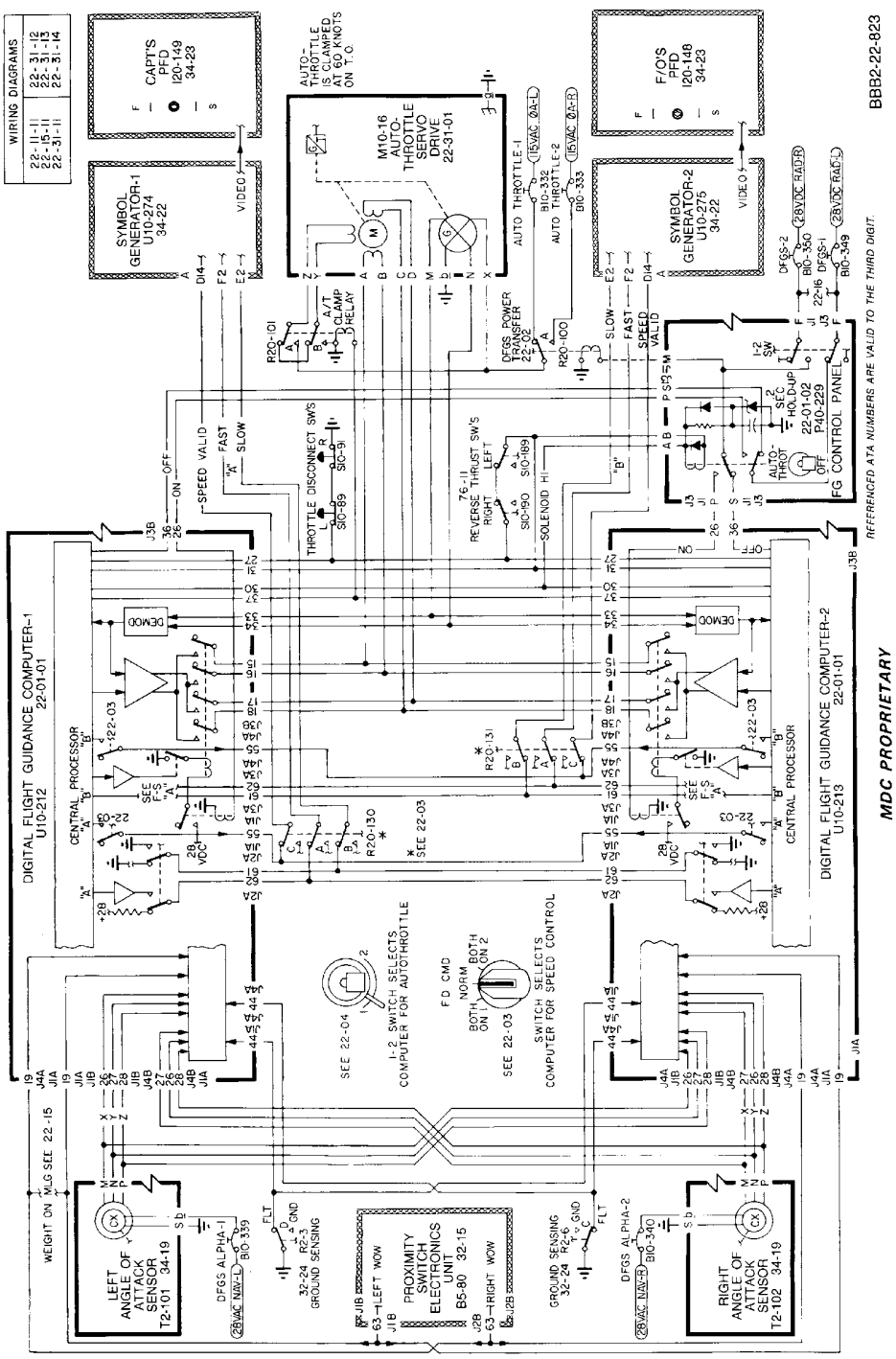
Auto Throttle and Speed Control
Figure 102/22-31-00-990-899



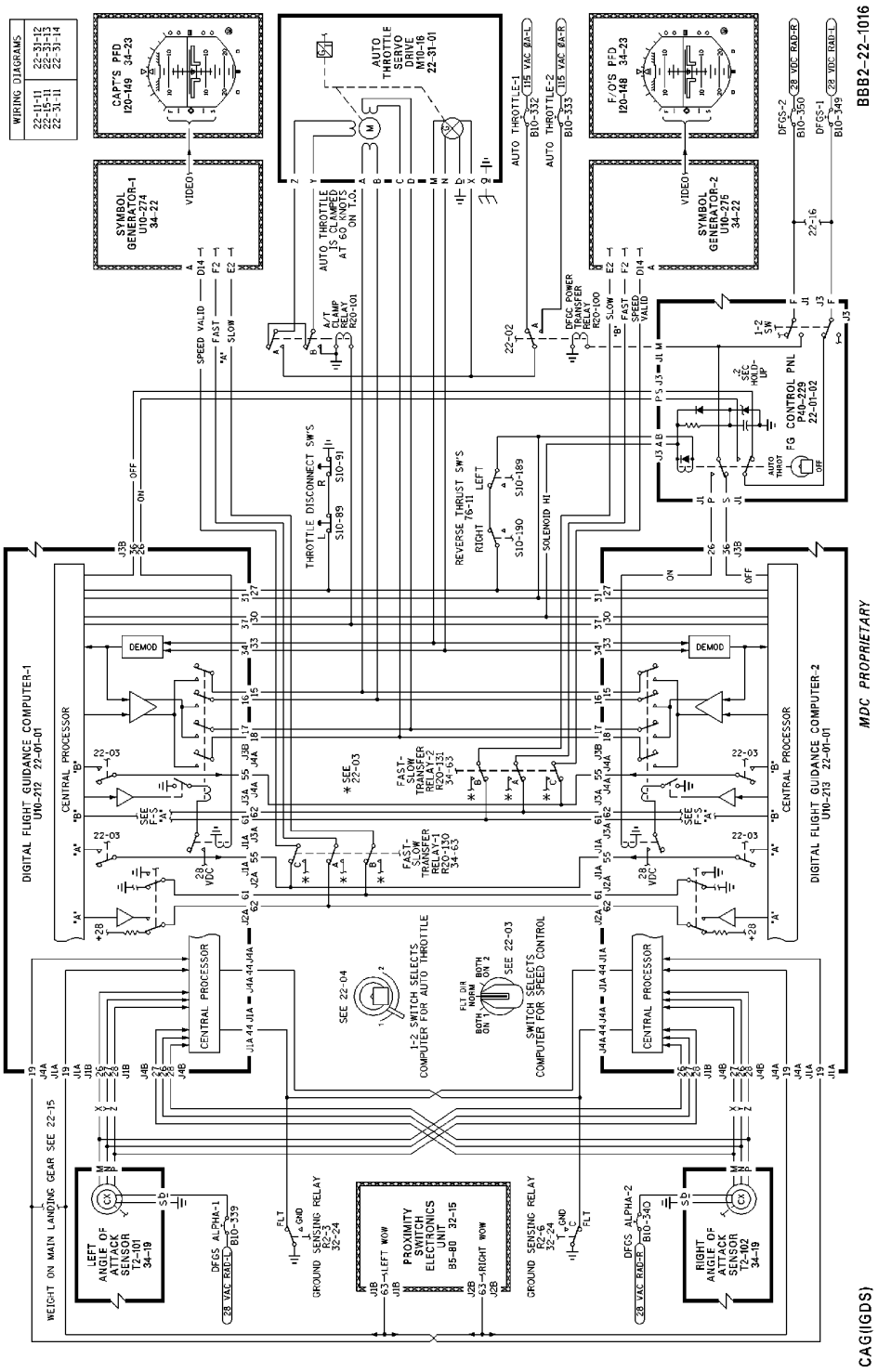
Auto Throttle and Speed Control
Figure 103/22-31-00-990-900



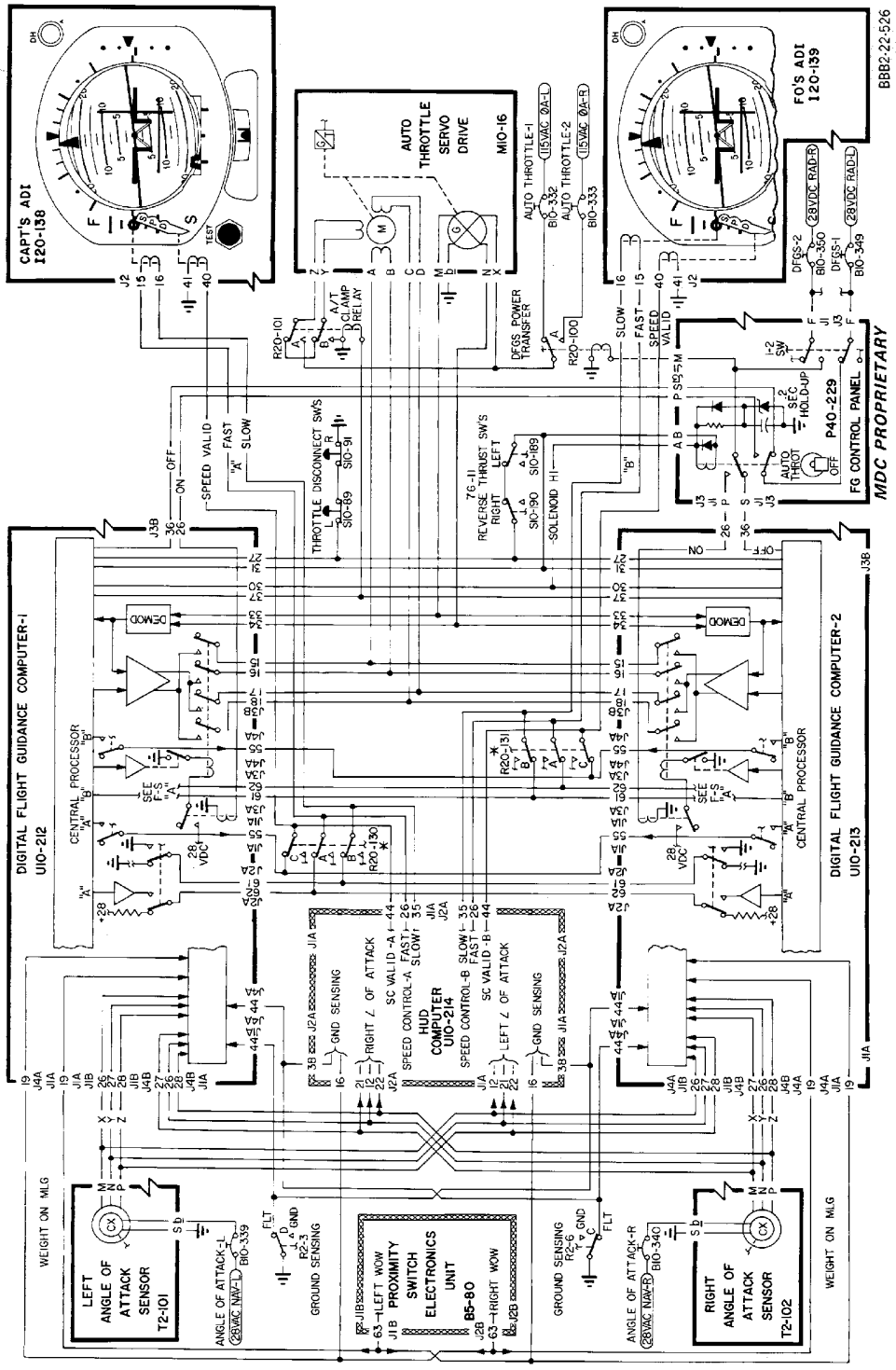
Auto Throttle and Speed Control
Figure 104/22-31-00-990-904



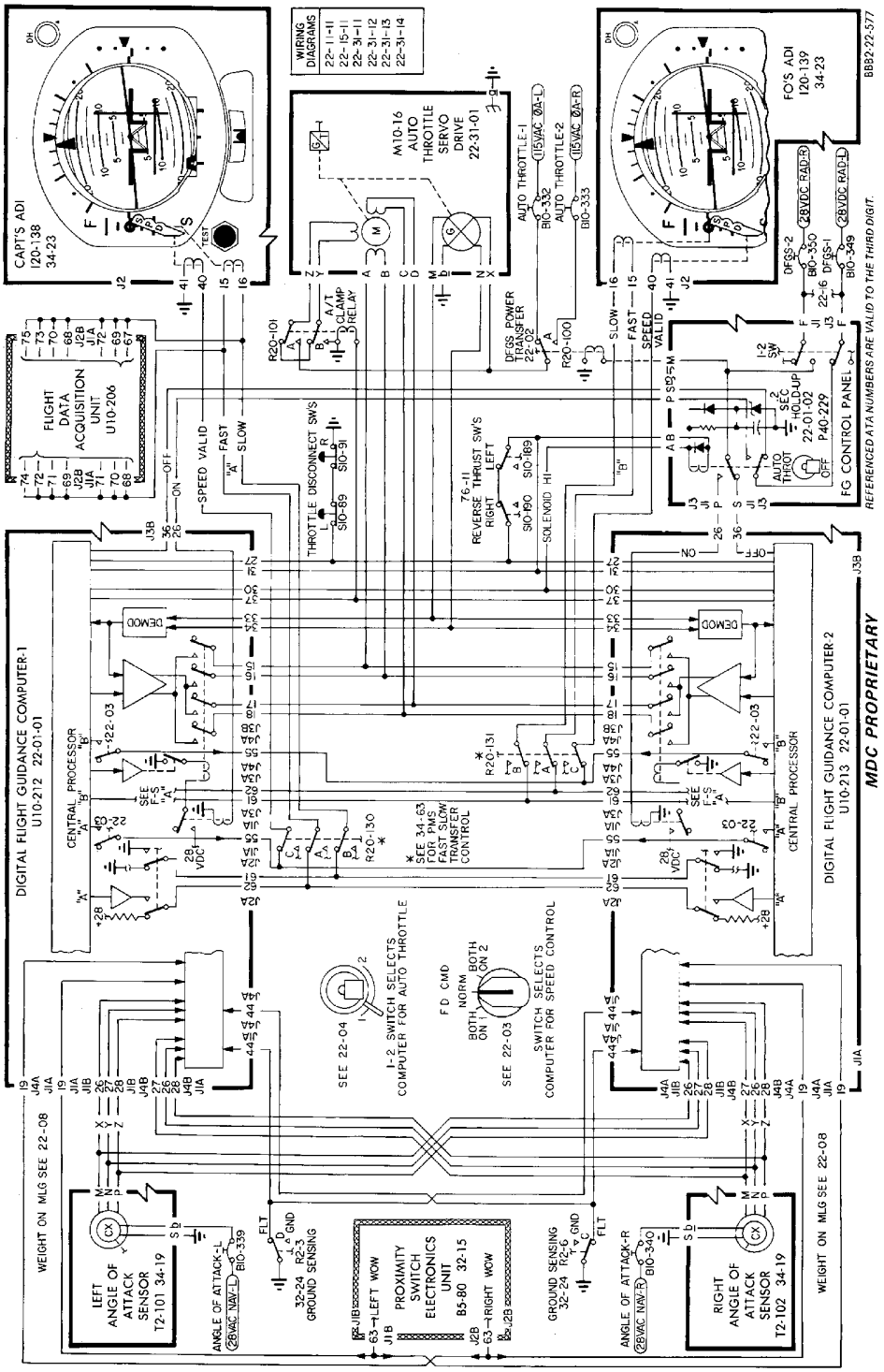
Auto Throttle and Speed Control
Figure 105/22-31-00-990-906



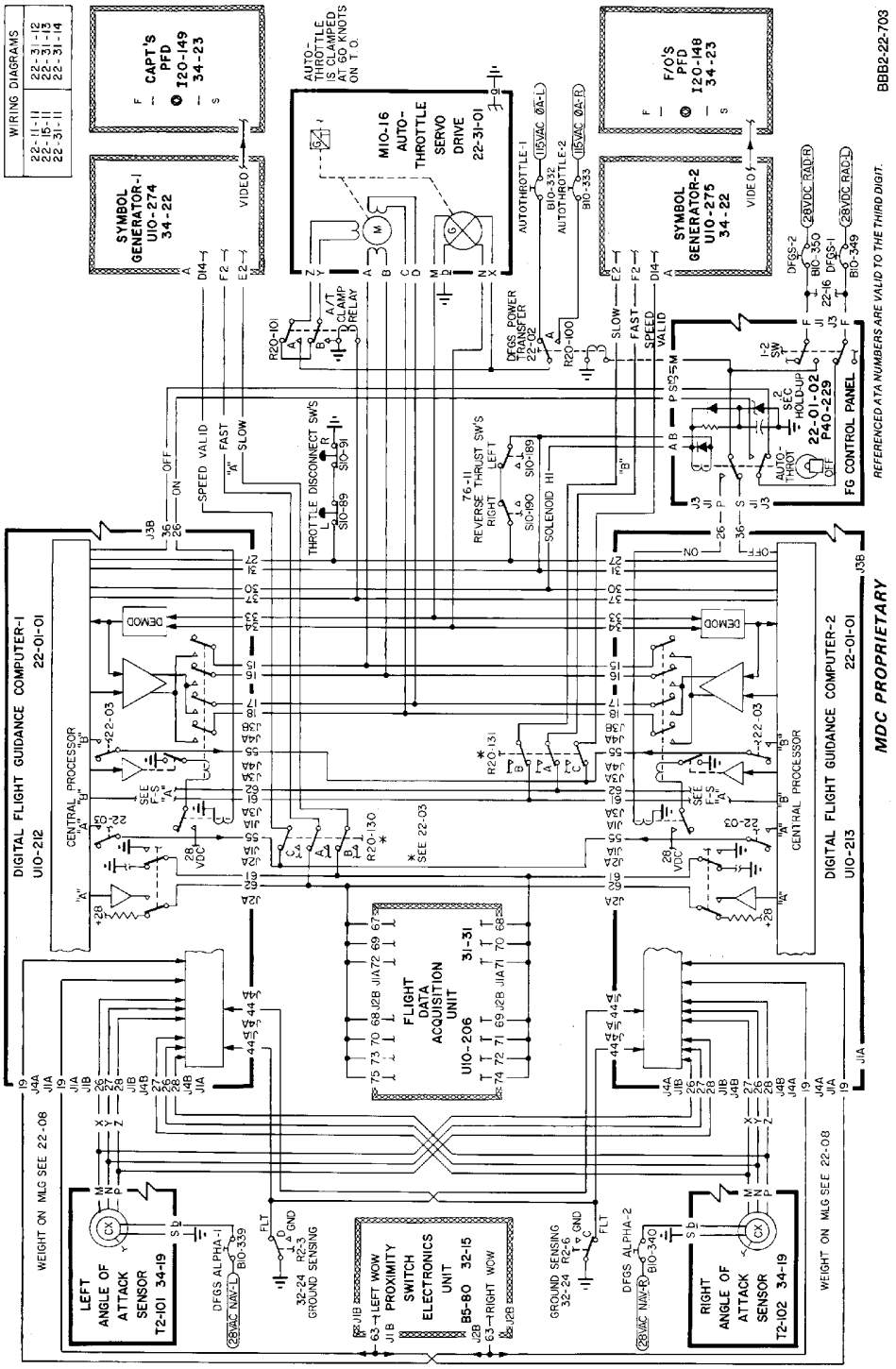
Auto Throttle and Speed Control
Figure 106/22-31-00-990-909



Auto Throttle and Speed Control
Figure 107/22-31-00-990-924



Auto Throttle and Speed Control
Figure 108/22-31-00-990-938



Auto Throttle and Speed Control
Figure 109/22-31-00-990-939

AUTO THROTTLE/SPEED CONTROL (AT/SC) - MAINTENANCE PRACTICES

1. General

A. The Return to Service test at the status test panel, tests the engage and disengaged state of the circuits plus both the open and closed state of the minimum authority (low limit) switch.

2. Operational Test

A. Test Autothrottle Engage and Disengage

Table 201 Autothrottle Engage and Disengage Test

Step	Action	Desired Result
1	On flight guidance control panel, place flight director switch to FD position.	Test set up
2	On flight guidance control panel, place 1-2 switch to 1 position.	Test set up
3	On thrust rating indicator press and release T.O. pushbutton.	NO MODE annunciation goes off
4	On flight guidance control panel, place autothrottle switch to AUTO THROT position.	CLAMP annunciated in both captain's and first officer's flight mode annunciators (FMA); throttle levers do not move.
5	(5) On number 1 throttle lever, press and release TO/GA switch.	Both FMA's display EPR T/O in throttle windows; TAKE OFF in roll and pitch windows; throttles drive to forward mechanical stop.
NOTE: If throttle levers oscillate when they reach the forward mechanical stops, check rigging of stops. (THROTTLE SYSTEMS - ADJUSTMENT/TEST, PAGEBLOCK 76-11-00/501 Config 1, Page 501.) Although rigging is properly adjusted, small amounts of oscillation and autothrottle disconnect may be normal. Avoid lengthy time with throttles driving against the stops.		
6	On throttle lever No. 1, press and release A/T disconnect switch.	Autothrottles disengage; THROTTLE warning light comes on flashing; throttle window on both FMA's blank.
7	On flight guidance control panel, place flight director switch to OFF, then back to FD position.	Test set up
8	Repeat steps (3) through (7) using throttle lever No. 2, TO/GA and A/T disconnect switch.	Same as for steps (3) through (7).
9	Repeat steps (2) through (8) with 1-2 switch in 2 position.	Same as for steps (2) through (8).
10	Return aircraft to required configuration.	

AUTOTHROTTLE SERVO DRIVE - MAINTENANCE PRACTICES

1. General

A. The autothrottle servo drive is mounted under the forward end of the pedestal. The servo drives the throttle levers and throttle control system through a gearbox chain drive, and two separate no-back clutch assemblies. Access to the servo is through the electrical/electronics compartment access door.

B. Removal/installation procedures are for the complete unit which consists of a servo drive motor and a gearbox. The motor can be removed from the installed unit by removing the electrical connector and the bolts (3) attaching the motor to the gearbox (Figure 201). Removal/installation of the motor will not disturb the chain adjustment.

2. Removal/Installation Servo Drive Unit

A. Remove Servo Drive Unit

(1) On Flight Guidance Control Panel, place AP switch to 1 position.

(2) Verify AUTO THROT switch is placed OFF.

WARNING: TAG AND SAFETY THE FOLLOWING CIRCUIT BREAKERS.

(3) Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	12	B10-339	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	3	B10-340	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(4) Disconnect electrical connector from servo drive motor.

(5) Remove spring lock connecting link from servo drive chain, and remove chain from servo drive sprocket.

(6) Support servo drive unit and remove mounting bolts.

B. Install Servo Drive Unit

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	12	B10-339	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	3	B10-340	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(2) Install servo drive unit.

(3) Install servo drive chain, and connect chain ends with spring lock connecting link.

(4) Adjust turnbuckle of servo drive to provide 1/4-inch midspan movement in chain with 3 to 5 pound force.

(5) Install turnbuckle clip.

(6) Connect electrical connector to servo drive motor.

(7) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	12	B10-339	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-1

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1

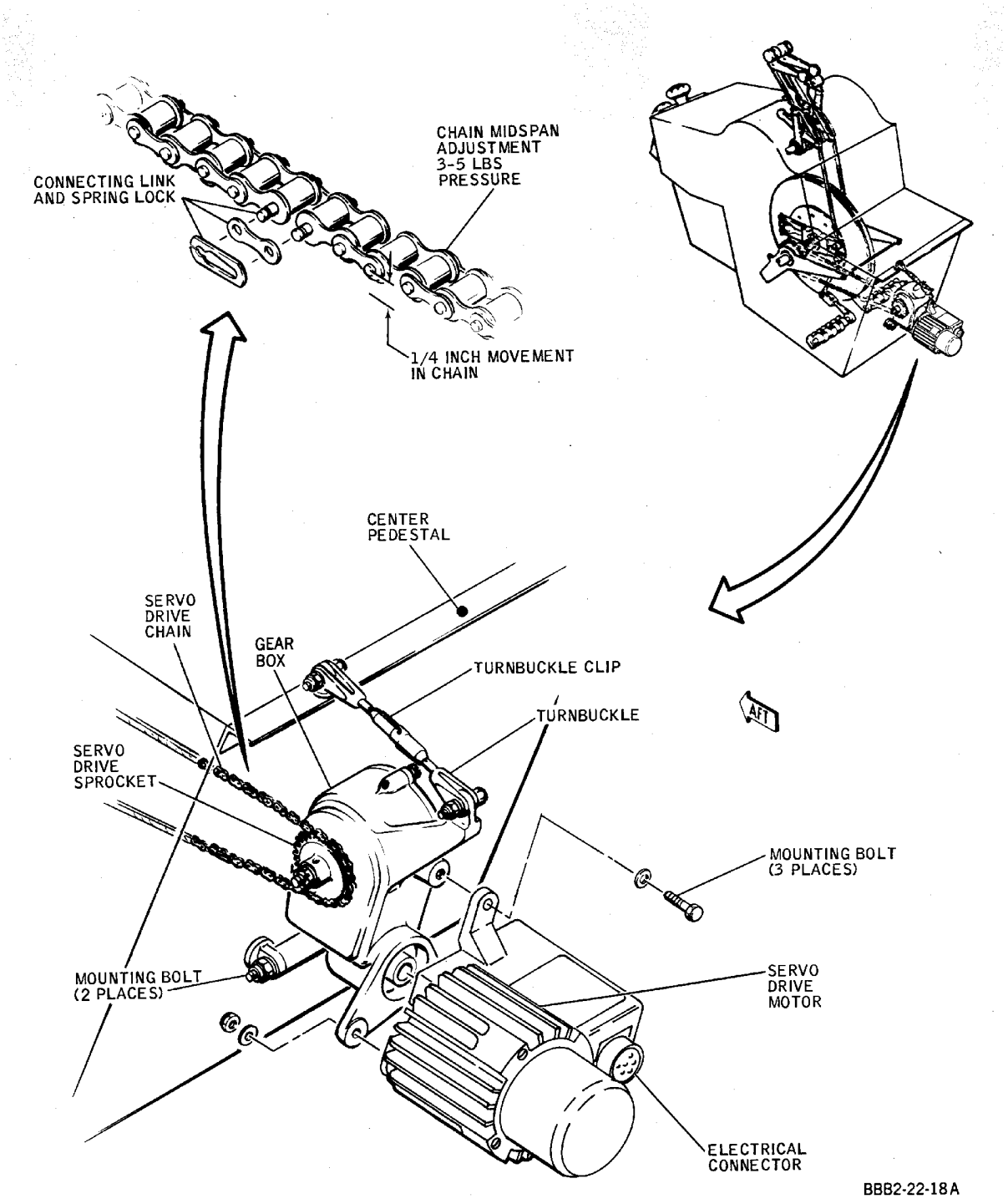
UPPER EPC, RIGHT RADIO BUS

Row	Col	Number	Name
C	1	B10-360	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	3	B10-340	DIGITAL FLIGHT GUIDANCE SYSTEM ALPHA-2

UPPER EPC, RIGHT RADIO DC BUS

Row	Col	Number	Name
E	9	B10-347	DIGITAL FLIGHT GUIDANCE SYSTEM-1

(8) Perform Return to Service (RTS) test (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).



Servo Drive Unit - Removal/Installation
Figure 201/22-31-01-990-801

AUTOTHROTTLE/RETARD MODE - MAINTENANCE PRACTICES

1. General

A. The tests in this section test the operational capability of the Autothrottle/Retard Mode.

B. Prior to performing any autothrottle operational tests, it is assumed that all autothrottle components (i.e. throttle servo drive), interfacing LRU's (i.e. N1, EPR) and instrumentation are in proper operating condition. Also, all circuit breakers as called out in AUTO FLIGHT, SUBJECT 22-00-00, Page 201 are closed.

C. Correct adjustments of the reverse thrust switch and low limit switch must be made to ensure proper separation between the reverse thrust switch actuation point and the point at which the thrust reversers are deployed. (THROTTLE SYSTEMS - ADJUSTMENT/TEST, PAGEBLOCK 76-11-00/501 Config 1)

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

Table 201

Name and Number	Manufacturer
Proximity switch dummy targets (2) P/N 4952969-1	McDonnell Douglas

3. Operational Tests

A. Test Autothrottle/Retard Mode

WARNING: THIS TEST REQUIRES THE USE OF HYDRAULIC POWER. BEFORE PRESSURIZING HYDRAULIC SYSTEMS, VERIFY THAT LANDING GEAR LOCKPINS ARE INSTALLED AND CLEAR CONTROL SURFACE AREAS OF ALL PERSONNEL AND EQUIPMENT. MAKE CERTAIN FLIGHT COMPARTMENT THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION.

WARNING: ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO THE AIRCRAFT.

(1) Pressurize aircraft hydraulic system (PAGEBLOCK 29-00-00/201).

(2) Remove safety pin from thrust reverser control valve.

(3) Place throttle and thrust reverser levers in idle position (throttle against pedestal aft mechanical stop and reverser lever fully down).

WARNING: NORMAL ELECTRICAL POWER TO VARIOUS SYSTEMS MAY BE INTERRUPTED WHEN GROUND CONTROL RELAY CIRCUIT BREAKERS ARE OPENED. IF GROUND CONTROL RELAY CIRCUIT BREAKERS ARE TO BE OPENED WHILE PERFORMING PROCEDURES, MAKE CERTAIN SWITCHES AND CONTROLS OF AFFECTED SYSTEMS ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF EQUIPMENT.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Open these circuit breakers and install safety tags:

UPPER EPC, L AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
K	30	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	33	B1-23	LEFT GROUND CONTROL RELAY

UPPER EPC, R AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
L	30	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	33	B1-24	RIGHT GROUND CONTROL RELAY

WJE ALL

(5) Remove the safety tags and close these circuit breakers:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY

(6) Install dummy targets over main gear Weight-On-Wheels (WOW) proximity switch. This simulates flight mode.

(7) Wait 5 minutes before continuing test.

NOTE: Timer prevents retard mode from occurring for 5 minutes after a takeoff.

(8) Momentarily press CR button on thrust rating indicator (TRI) and verify that A/C supply switch is in AUTO position.

(9) On Flight Guidance Control Panel (FGCP), place DFGS selector switch to position 1 or 2 as applicable to test.

(10) Adjust SPD/MACH display on FGCP to indicate 250 knots.

(11) Verify both Flight Director (FD) switches are in ON position.

(12) Hold throttle levers at aft mechanical stop and move auto throttle engage switch on FGCP to AUTO THROT position. FMA throttle window displays "LOW LIMIT" and THROTTLE warning lights are extinguished.

(13) Release both throttle levers and verify both throttles move forward.

NOTE: If throttle levers oscillate when they reach the forward mechanical stops, check rigging of stops. (THROTTLE SYSTEMS - ADJUSTMENT/TEST, PAGEBLOCK 76-11-00/501 Config 1) Although rigging is properly adjusted, small amounts of oscillation and auto throttle disconnect might be normal. Avoid lengthy time with throttles driving against the stops.

(14) FMA throttle window displays "SPD 250" or "ALFA SPD".

(15) Verify radio altimeter indicates less than 50 feet.

CAUTION: MAKE CERTAIN THAT AREA NEAR FLAPS/SLATS IS CLEAR BEFORE MOVING FLAP/SLAT HANDLE.

(16) While holding throttle levers at mid forward thrust region, place flap/slat handle to 40°/LND position. Verify auto throttle engage switch is at AUTO THROT position. FMA indicates RETD.

NOTE: FMA will not display retard (RETD) in Paragraph 3.A.(11) until aircraft has been in flight configuration for 5 minutes and have flaps greater than 20 degrees.

(17) Release both throttle levers and verify throttle levers retard to aft mechanical stops. Thrust reverser levers should be down in forward idle position.

CAUTION: CLEAR ENGINE AREA BEFORE PLACING REVERSE THRUST LEVER INTO REVERSE THRUST REGION.

(18) Slowly pull left thrust reverser lever into reverse thrust region until AUTO THROT engage switch drops to OFF position. Observe that THROTTLE warning light on both FMA's remain off and L ENG REVERSE UNLOCK light is off.

(19) Measure perpendicular distance from throttle quadrant lightplate to center of left thrust reverser knob; left thrust reverser knob should be 4.4 ±0.5 in. (111.8 ±12.7 mm) above lightplate. (THROTTLE SYSTEMS - ADJUSTMENT/TEST, PAGEBLOCK 76-11-00/501 Config 1)

CAUTION: MAKE CERTAIN THRUST REVERSER AREA IS CLEAR.

(20) Slowly pull left thrust reverser lever upward until the L ENG REVERSE UNLOCK light comes on.

(21) L ENG REVERSE UNLOCK and L ENG REVERSE THRUST lights come on. Left thrust reverser deploys.

(22) Measure perpendicular distance from throttle quadrant lightplate to center of left thrust reverser knob; left thrust reverser knob should be equal to or greater than 5.5 in. (139.7 mm) above lightplate. (THROTTLE SYSTEMS - ADJUSTMENT/TEST, PAGEBLOCK 76-11-00/501 Config 1)

(23) Push left thrust reverser lever down to forward idle thrust position. Both thrust reverser levers should be in forward idle thrust position.

(24) L ENG REVERSE UNLOCK and L ENG REVERSE THRUST lights extinguish. Left thrust reverser is stowed.

(25) Manually advance both throttle levers to just near mid forward thrust region.

(26) Move autothrottle engage switch to AUTO THROT position; FMA indicates RETD. Throttle levers move to aft mechanical stops.

(27) Manually move both throttle levers to mid forward thrust range and release; both levers should retard to aft mechanical stop and thrust reverser levers should remain down in forward idle position.

(28) Slowly pull right thrust reverser lever into reverse thrust region until AUTO THROT engage switch drops to OFF position; THROTTLE warning light on both FMA's remain off and R ENG REVERSE UNLOCK light on main instrument panel remains off.

(29) Measure perpendicular distance from throttle quadrant lightplate to center of right thrust reverser knob; right thrust reverser knob should be 4.4 ±0.5 in. (111.8 ±12.7 mm) above lightplate.

CAUTION: MAKE SURE THRUST REVERSER AREA IS CLEAR.

(30) Slowly pull right thrust reverser lever upward until R ENG REVERSE UNLOCK light comes on.

(31) R ENG REVERSE UNLOCK and R ENG REVERSE THRUST lights come on. Right thrust reverse deploys.

(32) Measure perpendicular distance from throttle quadrant lightplate to center of right thrust reverser knob; knob should be equal to or greater than 5.5 (139.7 mm) inches above lightplate.

(33) Push right thrust reverser lever down to forward idle thrust position; both left and right reverse thrust levers are in forward idle position. R ENG REVERSE THRUST light goes off. R ENG REVERSE UNLOCK light goes off. Right thrust reverse is stowed.

(34) Move throttle lever from full forward to aft 1.025 ±0.015 in. (26.035 ±0.381 mm) from aft stop as measured on lightplate. Throttle lower limit switch should actuate. If unsatisfactory, adjust cam assembly as necessary. (THROTTLE SYSTEMS - ADJUSTMENT/TEST, PAGEBLOCK 76-11-00/501 Config 1)

(35) Place DFGC switch to "2" position.

(36) Manually advance both throttle levers to mid forward thrust region.

NOTE: FMA will not display retard (RETD) in Paragraph 3.A.(27) until aircraft has been in flight configuration for 5 minutes and have flaps greater than 20 degrees.

(37) Move autothrottle engage switch to AUTO THROT.

(a) Throttle FMA displays RETD.

(b) Throttle levers move to aft mechanical stops.

(38) Check reverse thrust levers do not move into reverse thrust region. Reverse thrust levers should remain down in forward idle position.

(39) Manually pull right reverse thrust lever through its full travel into reverse thrust region.

(a) Autothrottle engage switch drops to OFF.

(b) Throttle FMA goes blank.

(c) Throttle warning light remains off.

(d) R ENG REVERSE UNLOCK and R REVERSE THRUST lights of main instrument panel come on.

(e) Right thrust reverser deploys.

(40) Manually push right reverse thrust lever through its full travel to forward idle position.

(a) R ENG REVERSE UNLOCK and R REVERSE THRUST lights go out.

(b) Right thrust reverser is stowed.

(41) Manually advance both throttle levers to just mid forward thrust region.

(42) Place autothrottle engage switch to AUTO THROT position.

(a) Throttle FMA displays RETD.

(b) Throttle levers move to aft mechanical stops.

(43) Check reverse thrust levers do not move into reverse thrust region. Reverse thrust levers should remain down in forward idle position.

(44) Manually pull left reverse thrust lever through its full travel into reverse thrust region.

(a) Autothrottle engage switch drops to OFF position.

(b) Throttle FMA display goes blank.

(c) Throttle warning light remains off (extinguished).

(d) L ENG REVERSE UNLOCK and L REVERSE THRUST lights come on.

(e) Left thrust reverser is deployed.

(45) Manually push left reverse thrust lever through its full travel into forward thrust region.

(a) L ENG REVERSE UNLOCK and L ENG REVERSE THRUST light go off.

(b) Left thrust reverser is stowed.

(46) Reinsert safety pin into thrust reverser control valve.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(47) Open these circuit breakers and install safety tags:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY

(48) Remove dummy targets over main gear WOW proximity switch.

(49) Remove the safety tags and close these circuit breakers:

UPPER EPC, L AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
K	30	B1-23	LEFT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	33	B1-23	LEFT GROUND CONTROL RELAY

WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893 (Continued)

UPPER EPC, R AC BUS

Row	Col	Number	Name
WJE 417, 419, 421, 423, 865, 869, 871, 872			
L	30	B1-24	RIGHT GROUND CONTROL RELAY
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	33	B1-24	RIGHT GROUND CONTROL RELAY

WJE ALL

(50) Depressurize aircraft hydraulic system.

(51) Return aircraft to required configuration.

AUTOTHROTTLE DISCONNECT SWITCHES - MAINTENANCE PRACTICES

1. General

A. These maintenance practices provides removal and installation procedures for the autothrottle disconnect switches. The disconnect switches are located on the outboard side of each throttle handle.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

Table 201 Tool and Equipment List

Name and Number	Manufacturer
Adapter, torque MPN 3961919-1	The Boeing Co.

3. Removal/Installation Autothrottle Disconnect Switches

A. Remove Autothrottle Disconnect Switches

(1) On Flight Guidance Control Panel, place AP switch to 1 position.

(2) Verify AUTO THROT switch is placed OFF.

WARNING: TAG AND SAFETY THE FOLLOWING CIRCUIT BREAKERS.

(3) Open these circuit breakers and install safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

(4) At outboard side of throttle handle, remove slotted lock ring using torque adapter tool.

CAUTION: USE EXTREME CARE IN REMOVING SWITCH. DAMAGE TO WIRING CAN OCCUR.

(5) Grasp and pull switch out and away from throttle handle.

(6) Carefully remove two screws, nuts and washers securing wiring to switch. Avoid dropping hardware into pedestal.

B. Install Autothrottle Disconnect Switches

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1

(Continued)

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

(2) Connect wiring to switch. Avoid dropping hardware into pedestal.

(3) Carefully insert switch into throttle handle.

(4) Place slotted lock ring into throttle handle and tighten.

(5) Remove the safety tags and close these circuit breakers:

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	18	B10-332	AUTO THROTTLE-1
D	20	B10-351	DIGITAL FLIGHT GUIDANCE SYSTEM-1

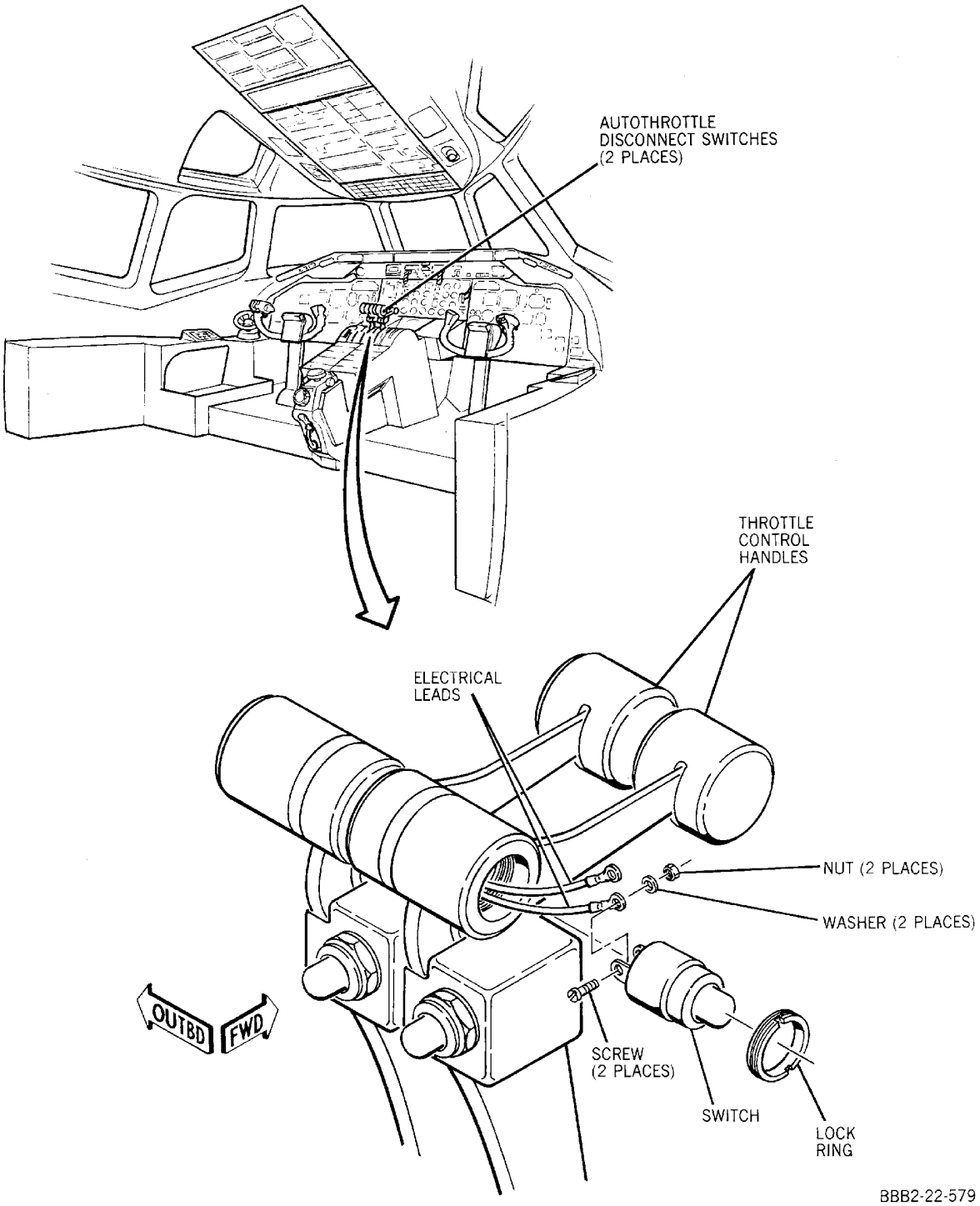
UPPER EPC, LEFT RADIO BUS

Row	Col	Number	Name
C	10	B10-361	DIGITAL FLIGHT GUIDANCE SYSTEM-1
C	11	B10-363	DIGITAL FLIGHT GUIDANCE SYSTEM-2

UPPER EPC, LEFT RADIO DC BUS

Row	Col	Number	Name
E	18	B10-365	AUTO THROTTLE-1
E	20	B10-349	DIGITAL FLIGHT GUIDANCE SYSTEM-1
E	21	B10-348	DIGITAL FLIGHT GUIDANCE SYSTEM-2

(6) Perform Return to Service (RTS) test (DFGS STATUS/TEST, SUBJECT 22-01-05, Page 201).



Autothrottle Disconnect Switches - Removal/Installation
Figure 201/22-31-03-990-801