CHAPTER 31

INDICATING/ RECORDING SYSTEMS

Learjet

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Insert Latest Revised Pages; Destroy Superseded or Deleted Pages.

* Asterisk indicates pages revised, added or deleted by current revision.
The portion of the text affected by the current revision is indicated by a vertical line in the outer margin of the page.

Record of Temporary Revisions

Rev. No.	Date Inserted	Date Removed	Page Number	Rev. No.	Date Inserted	Date Removed	Page Number
31-1	Mar 24/77	Jun 8/79 Rev 15	31-10-09 Page 202				
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INSTRUMENTS - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. This chapter describes and pictorially presents instruments and panels that mount the instruments, switches, and indicators necessary for operation of the aircraft. These panels are installed in the flight compartment and are referred to as the instrument panel, glareshield, and center pedestal assemblies.

B. The instrument panel, glareshield, and center pedestal assemblies are divided according to function into various subpanels.

C. Independent instruments and systems are included in this chapter. Separate, detailed coverage is provided for these components. (Refer to 31-20-00.)

INSTRUMENTS - MAINTENANCE PRACTICES

1. SAFETY PRECAUTIONS

A. Prior to performing instrument or control panel maintenance, maintenance personnel should familiarize themselves with the following safety precautions.
   (1) Pull and tag applicable system circuit breaker.
   (2) Assure that Battery and Stall Warning Switches are set to OFF prior to lowering any instrument panel.
   (3) Protect instrument face by suitable means.

2. REMOVAL/INSTALLATION

NOTE: The following instructions give typical removal and installation procedures for instruments.

A. Remove Panel Component (See figure 201.)
   (1) Assure that Battery and Stall Warning Switches are OFF.
   (2) Pull and tag applicable system or instrument circuit breaker.
   (3) Remove screws and lower applicable instrument panel.
   (4) Disconnect electrical connector and/or static or pitot line from instrument if applicable.
   (5) Cap all exposed fittings if applicable.
   (6) Remove attaching parts and instrument from instrument panel.

B. Install Panel Component (See figure 201.)
   (1) Install instrument in panel and secure with attaching parts.
   (2) Remove caps from fittings.
   (3) Connect electrical connector and/or static or pitot line to instrument if applicable.
   (4) Raise and secure instrument panel.
   (5) Reset applicable system or instrument circuit breaker.
   (6) Perform operational check of pitot and static system if applicable.

3. CLEANING/PAINTING

A. All instrument glass lenses shall be cleaned at frequent intervals. Whenever instruments with glass lenses are handled, precautionary cleaning should be performed as fingerprint perspiration may permanently etch glass surfaces.

B. Cleaning may be accomplished by using a commercial liquid detergent or a solvent such as isoprophyl alcohol or acetone. If solvent is used, care should be taken to ensure compatibility of the instrument mounting finish with the solvent.

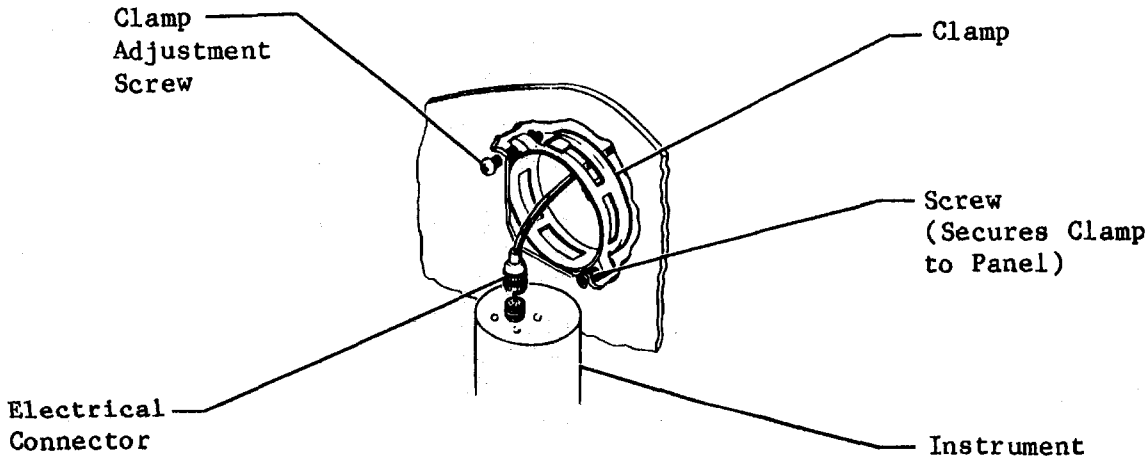
C. Prior to applying cleaning solution to lens surface, all loose dust should be blown off with clean, dry air. A clean, soft cloth must be used for both cleaning and drying.

D. The cleaning process can cause static electricity to build up in the lens. Each glass lens should be touched gently with a metallic object to ensure dissipation of any possible static charge.

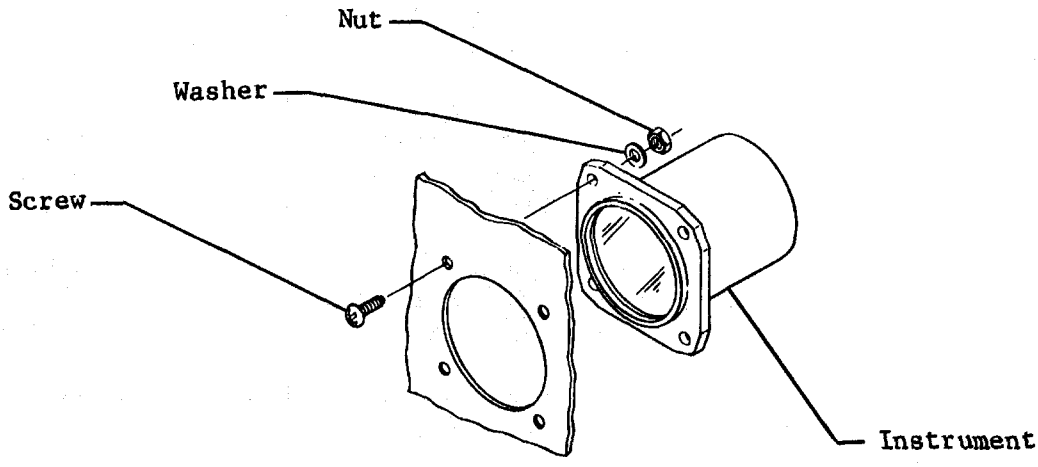
E. Cleaning Lenses

(1) Prepare cleaning solution according to manufacturer's directions.
(2) Apply solution to lens.
(3) Apply clear rinse water.
(4) Wipe lens dry immediately.

CAUTION: FAILURE TO WIPE LENS IMMEDIATELY MAY RESULT IN STAINING WHICH COULD PERMANENTLY DAMAGE LENS SURFACE.



Instrument Installation (Two-Screw Type Clamp Shown, Four-Screw Type Similar)



Instrument Installation (Screw, Washer, and Nut)

Panel Component Installation (Typical)
Figure 201

PANELS - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The instrument panel consists of the pilot's audio control panel, pilot's instrument panel, center instrument panel, copilot's instrument panel, copilot's audio control panel, pilot's switch panel (or anti-ice and avionics switch panel, fuel computer switch panel, and power and ignition switch panel), test switch panel, indicator panel, pressurization module, and lighting and climate control switch panel.

B. The center pedestal consists of the forward pedestal and quadrant section, and the aft double-width or single-width pedestal section.

(1) The forward pedestal and quadrant provides mounting for the throttle, spoiler, flap, parking brake and emergency brake controls.

(2) The aft double-width or single-width pedestal provides for mounting of radio equipment, trim switch panel, trim indicator panel, fuel control panel and yaw damper control head.

C. The glareshield consists of the autopilot controller, warning light panel, and the fire extinguisher controls.

D. Component Description

(1) The audio control panels are secured to the instrument panel structure by screws. A receptacle, mounted to the back of the panel, connects the panel electrically with the aircraft wiring. Each audio panel incorporates electroluminescent lighting. Refer to Chapter 23 for audio control panel markings.

(2) The pilot's instrument panel consists of a structure assembly secured to the main instrument panel structure by screws. The instrument panel is hinged along the lower edge, allowing the panel to be lowered for maintenance of the panel components.

(3) The copilot's instrument panel consists of a structure assembly secured to the main instrument panel structure by screws. The copilot's instrument panel is hinged along the lower edge, allowing the panel to be lowered for maintenance of the panel components.

(4) The center instrument panel consists of the Comm 1 and 2 and Nav 1 and 2 control heads, radar, and an instrument panel assembly.

(a) The Comm and Nav control heads are secured to receptacle strips mounted directly to the main instrument panel structure.

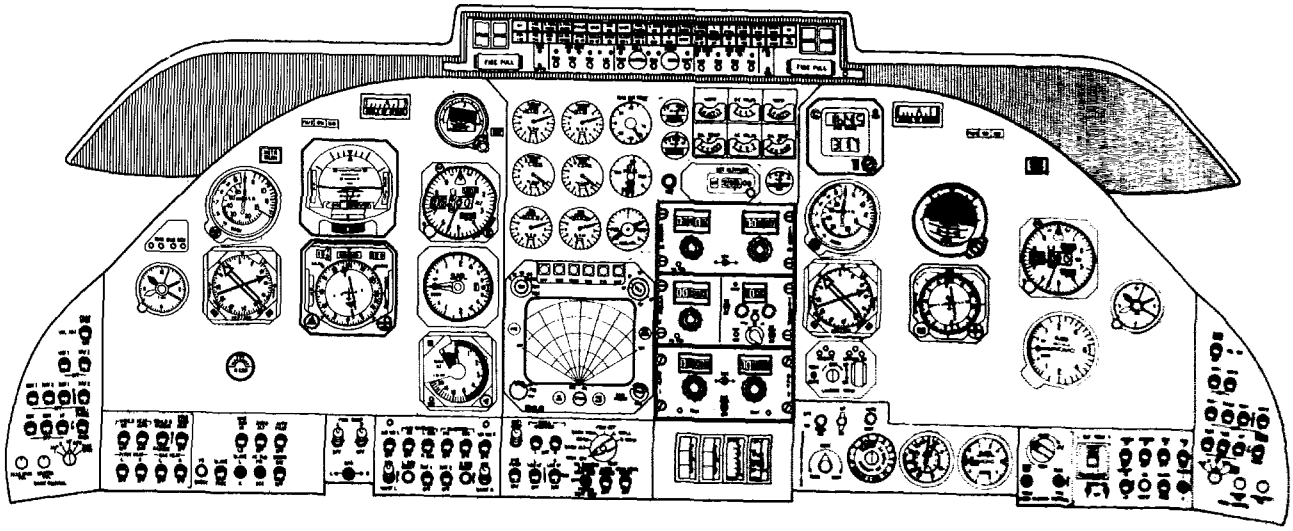
(b) The instrument panel assembly is secured to the main instrument panel structure by screws. The panel inorporates indicator lights beneath an overlay for instrument lighting.

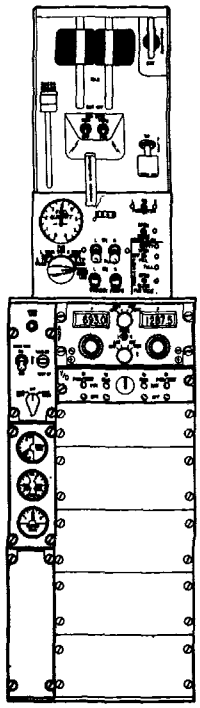
(c) The radar is a rack-mounted instrument secured by a clamp.

(5) The pilot's switch panel consists of a single structure on which the anti-ice and avionics, fuel computer, and power and ignition switch panels are located. The switch panel is secured to the pilot's instrument panel by screws, and is connected to aircraft wiring through two electrical connectors.

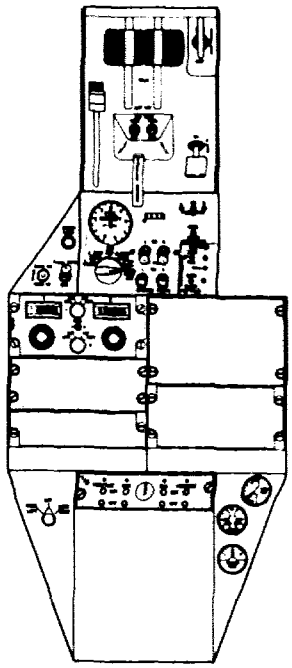
(6) The test switch panel incorporates various electrical system switches. The switch panel is secured by screws and is connected to the aircraft wiring through an electrical connector. The panel incorporates electroluminescent lighting.

(7) The indicator panel provides mounting for the flap position indicator, the stabilizer and wing heat indicators, and the temperature control indicator. The panel is secured by screws.
(8) The pressurization module is described in Chapter 21.
(9) The lighting and climate control switch panel provides mounting for external lighting system controls, battery temperature indicators, and the cabin climate controls. The panel is secured by screws to the copilot's instrument panel structure and is connected to the aircraft wiring by an electrical connector. The panel incorporates electro-luminescent lighting.





Single-Width Pedestal



Double-Width Pedestal

Glareshield, Instrument Panel and Center Pedestal General Arrangement
Figure 1

PILOT'S AND COPILOT'S AUDIO CONTROL PANELS - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

NOTE: ° The following instructions are applicable to either audio panel.

° Refer to Chapter 23 for audio control panel markings.

A. Remove Audio Control Panel

(1) Assure that Battery and Stall Warning Switches are set to OFF.
(2) Pull and tag applicable system circuit breakers.
(3) Remove screws and lower pilot's or copilot's instrument panel.
(4) Disconnect electrical plug from audio panel.
(5) Remove screws and audio panel from instrument panel structure.

B. Install Audio Control Panel

(1) Position audio panel on instrument panel structure and secure with attaching parts.
(2) Connect electrical connector to audio panel.
(3) Raise and secure pilot's or copilot's instrument panel.
(4) Reset applicable circuit breakers.

PILOT'S INSTRUMENT PANEL - MAINTENANCE PRACTICES

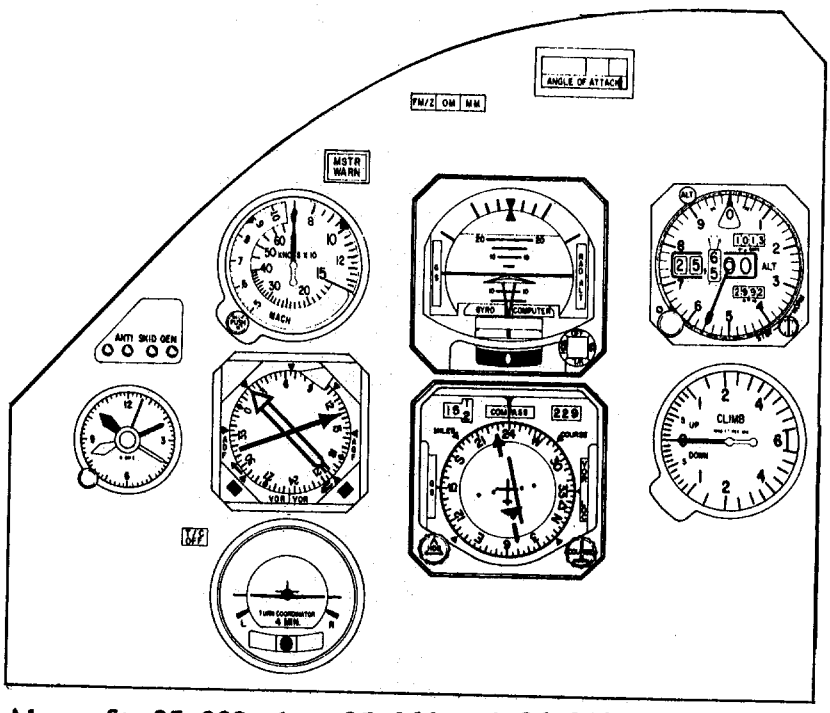
1. REMOVAL/INSTALLATION

A. Remove Pilot's Instrument Panel

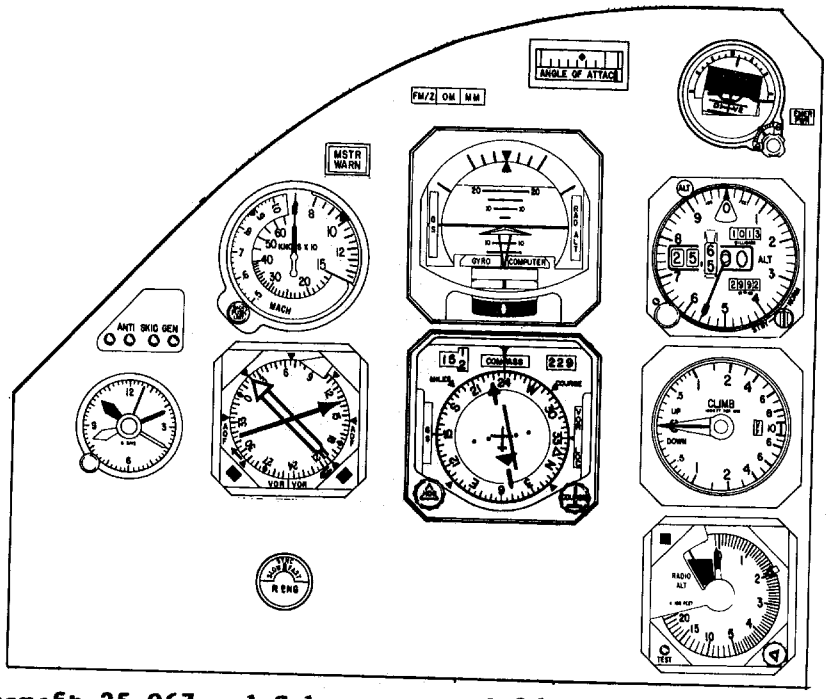
(1) Assure that Battery and Stall Warning Switches are set to OFF.
(2) Pull and and tag applicable circuit breakers.
(3) Remove screws that secure panel to structure.
(4) Lower panel and disconnect electrical connectors and pitot and static lines from instruments.
(5) Cap all exposed pitot and static lines.
(6) Tag all electrical connectors.
(7) Remove attaching parts that secure hinges to instrument panel and remove panel from aircraft.

B. Install Pilot's Instrument Panel

(1) Position instrument panel and secure to hinges with attaching parts.
(2) Remove caps from pitot and static lines and connect to its respective instrument.
(3) Connect electrical connectors to applicable instruments and panels.
(4) Raise and secure panel to main instrument panel structure.
(5) Reset applicable circuit breakers.
(6) Perform pitot and static system leakage check. (Refer to Chapter 34.)



Aircraft 35-002 thru 35-066 and 36-002 thru 36-017



Aircraft 35-067 and Subsequent and 36-018 and Subsequent

Pilot's Instrument Panel
Figure 201

COPILOT'S INSTRUMENT PANEL - MAINTENANCE PRACTICES

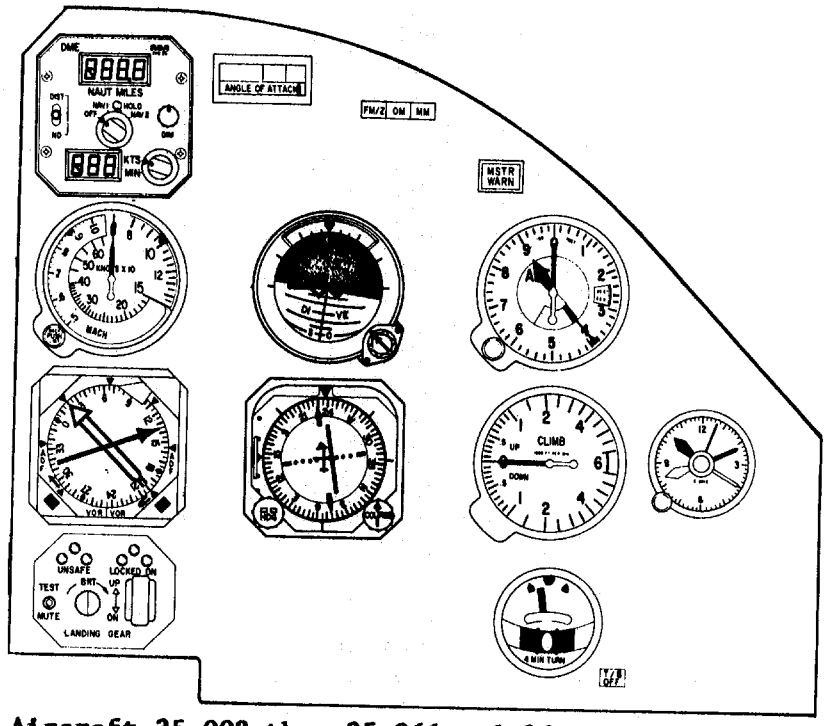
1. REMOVAL/INSTALLATION

A. Remove Copilot's Instrument Panel

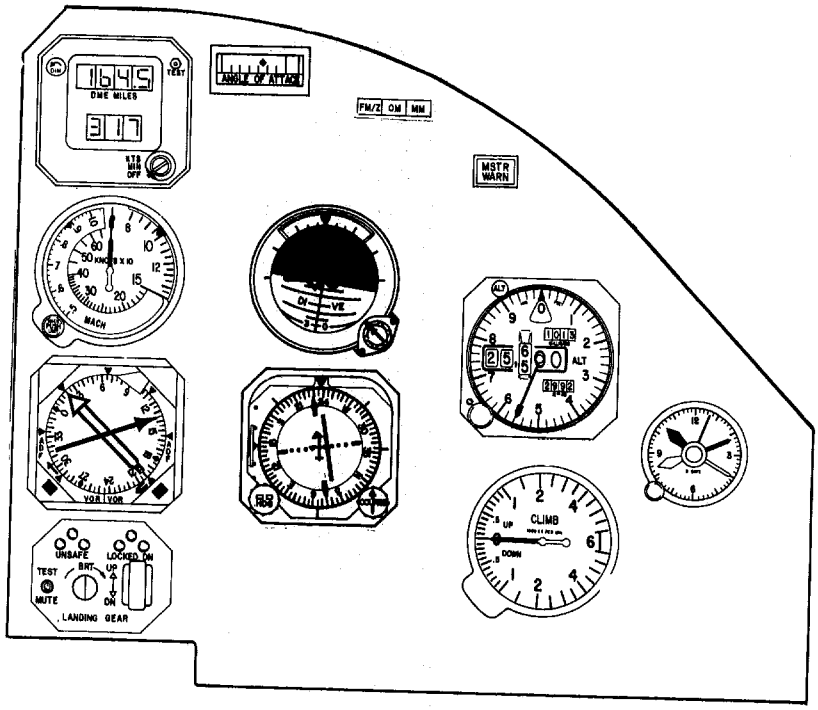
(1) Assure that Battery and Stall Warning Switches are set to OFF.
(2) Pull and and tag applicable circuit breakers.
(3) Remove screws that secure panel to structure.
(4) Lower panel and disconnect electrical connectors and pitot and static lines from instruments.
(5) Cap all exposed pitot and static lines.
(6) Tag all electrical connectors.
(7) Raise panel and temporarily secure with two screws.
(8) Remove screws that secure pressurization module to copilot's panel structure.
(9) Lower module clear of instrument panel.
(10) Support instrument panel and remove two screws.
(11) Remove instrument panel from aircraft.

B. Install Pilot's Instrument Panel

(1) Position copilot's instrument panel on main panel structure and temporarily secure with two screws.
(2) Secure pressurization module to copilot's instrument panel with attaching parts.
(3) Remove screws temporarily securing copilot's instrument panel to main panel structure.
(4) Remove caps from pitot and static lines and connect lines to applicable instruments.
(5) Connect electrical connectors to applicable instruments.
(6) Raise and secure copilot's panel to main instrument panel structure.
(7) Reset applicable circuit breakers.
(8) Perform pitot and static system leakage check. (Refer to Chapter 34.)



Aircraft 35-002 thru 35-066 and 36-002 thru 36-017



Aircraft 35-067 and Subsequent and 36-018 and Subsequent
Copilot's Instrument Panel
Figure 201

CENTER INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. REMOVAL/UNSTALLATON

A. Remove Center Instrument Panel

NOTE: The following removal and installation instructions are for the entire panel assembly. Remove and installation for individual instruments, radar, and navigation and communication control heads are covered in their respective chapter.

(1) Bleed hydraulic system by pumping brakes until hydraulic pressure indicator reads zero pressure.
(2) Bleed emergency air bottle by loosening valve end nut.
(3) Close oxygen bottle shutoff valve and regulator assembly. Loosen capillary line and bleed pressure from line. Retighten capillary line.

NOTE: On aircraft equipped with optional long range oxygen system, omit step A.(3).

(4) Assure that Battery and Stall Warning Switches are set to OFF.
(5) Pull and tag applicable system circuit breakers.
(6) Lower pilot's and copilot's instrument panels.
(7) Disconnect cap and tag capillary lines from oxygen, emergency air, and hydraulic pressure gages.
(8) Disconnect and tag electrical connector from instruments.
(9) Disconnect electrical wiring from indicator lights.

NOTE: The indicator lights are wired in parallel. Disconnect wiring at solder connection of first light. Tag wiring.

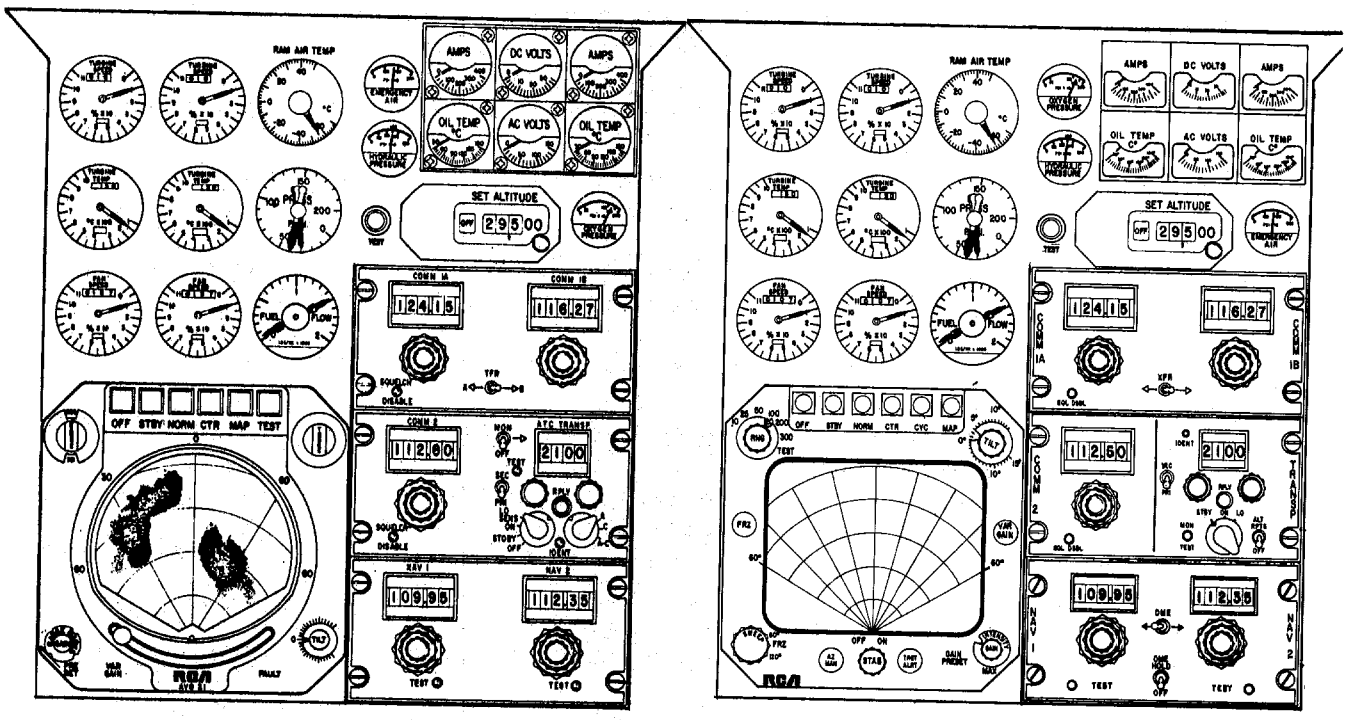
(10) Remove screws and instrument panel assembly from aircraft.

B. Install Center Instrument Panel

(1) Position instrument panel assembly on main instrument panel structure and secure with screws.
(2) Connect electrical wiring to indicator lights.
(3) Remove tags and connect electrical connectors to instruments.
(4) Remove caps and tags from capillary lines and connect to applicable indicator.
(5) Service emergency air bottle. (Refer to 12-10-06.) Check for leaks.
(6) Open oxygen shutoff valve and pressure regulator. Check for leaks.

NOTE: On aircraft equipped with optional long range oxygen system, omit step B.(6).

(7) Pressurize hydraulic system. Check for leaks.
(8) Raise and secure pilot's and copilot's instrument panels.
(9) Reset applicable circuit breakers.



Aircraft 35-002 thru 35-066
and 36-002 thru 36-017

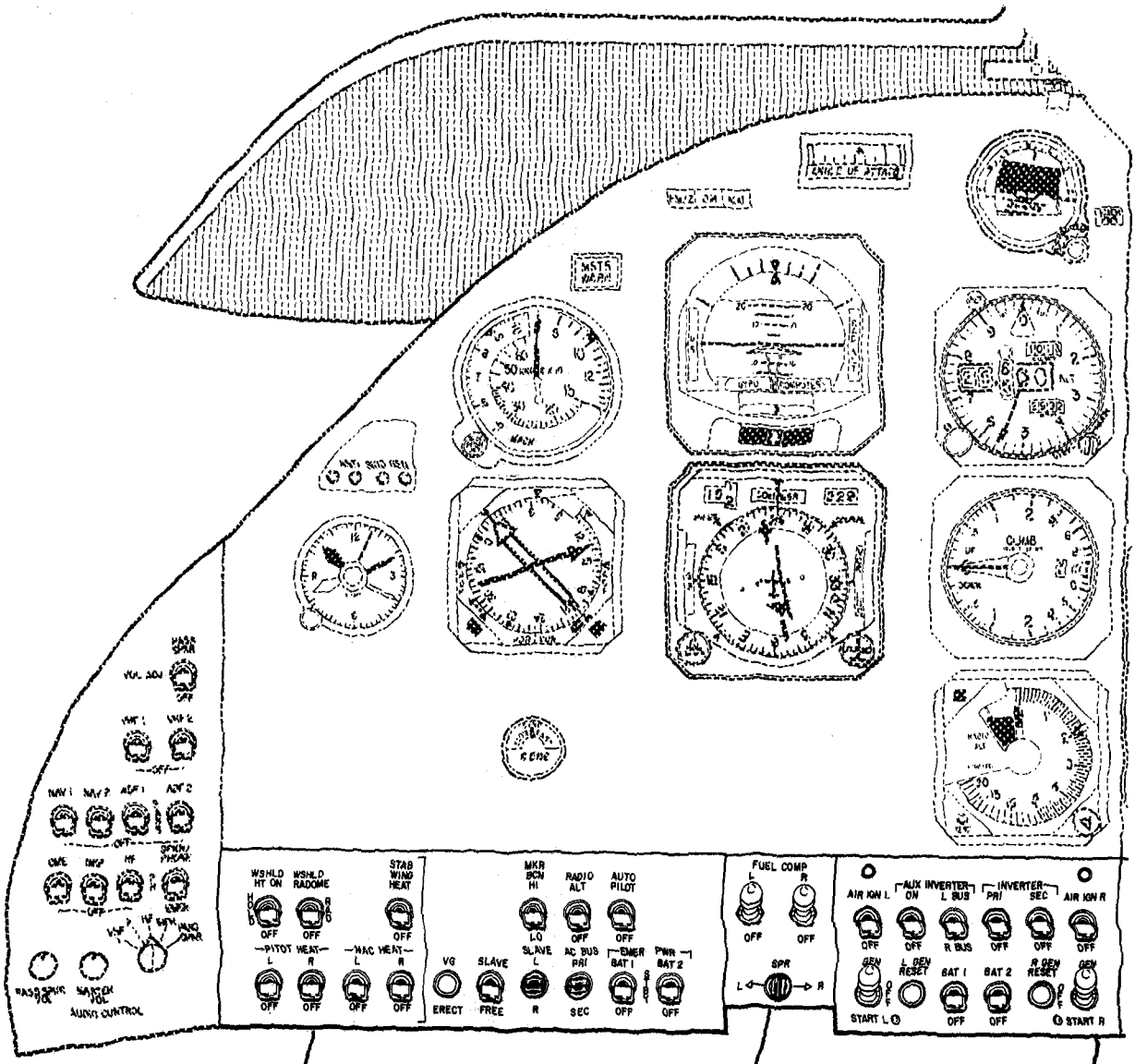
Aircraft 35-067 and Subsequent
and 36-018 and Subsequent

Center Instrument Panel
Figure 201

EFFECTIVITY: ALL
MM-99
Disk 583

PILOT'S SWITCH PANEL - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - A. **Remove Pilot's Switch Panel**
     - (1) Remove electrical power from aircraft.
     - (2) Remove attaching parts and switch guard plates from lower side of switch panel.
     - (3) Disconnect and tag electrical connectors.
     - (4) Remove attaching parts and switch panel assembly from aircraft.
   - B. **Install Pilot's Switch Panel**
     - (1) Install switch panel and secure with attaching parts.
     - (2) Connect electrical connectors.
     - (3) Install switch guard plates and secure with attaching parts.
     - (4) Restore electrical power to aircraft.



Pilot's Switch Panel
Figure 201

TEST SWITCH PANEL - MAINTENANCE PRACTICES

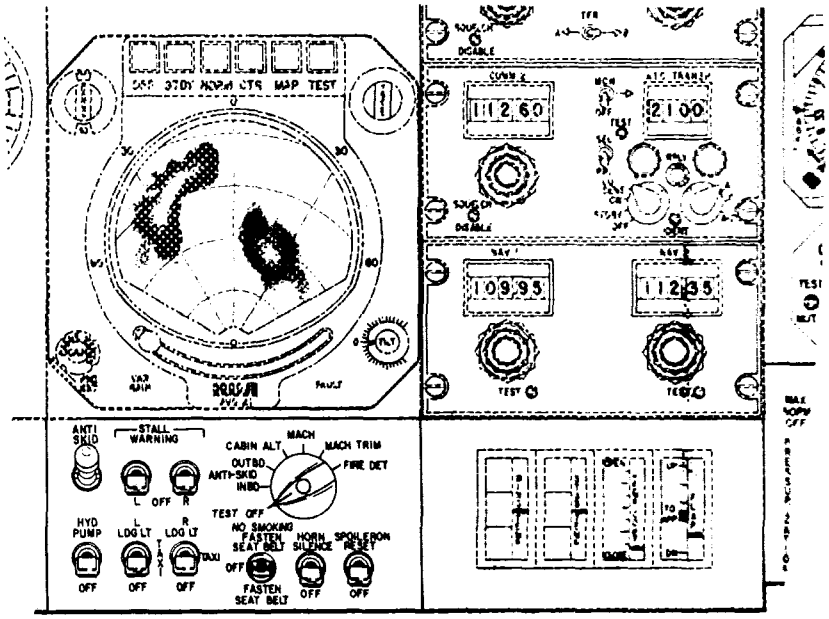
1. REMOVAL/INSTALLATION

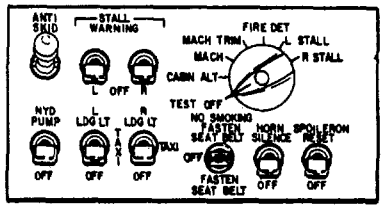
A. Remove Test Switch Panel

(1) Remove electrical power from aircraft.
(2) Disconnect electrical connector from panel.
(3) Remove attaching parts and switch panel from aircraft.

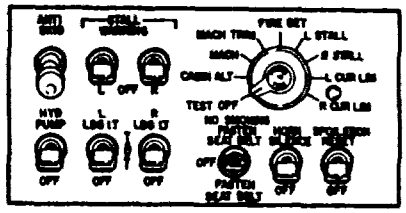
B. Install Test Switch Panel

(1) Install switch panel and secure with attaching parts.
(2) Connect electrical connector.
(3) Restore electrical power to aircraft.





35-067 thru 35-147; 36-032 thru 35-035, prior aircraft equipped with Reduced Approach Speed System, 35-370, 35-390 thru 35-504, 36-048 thru 36-053.

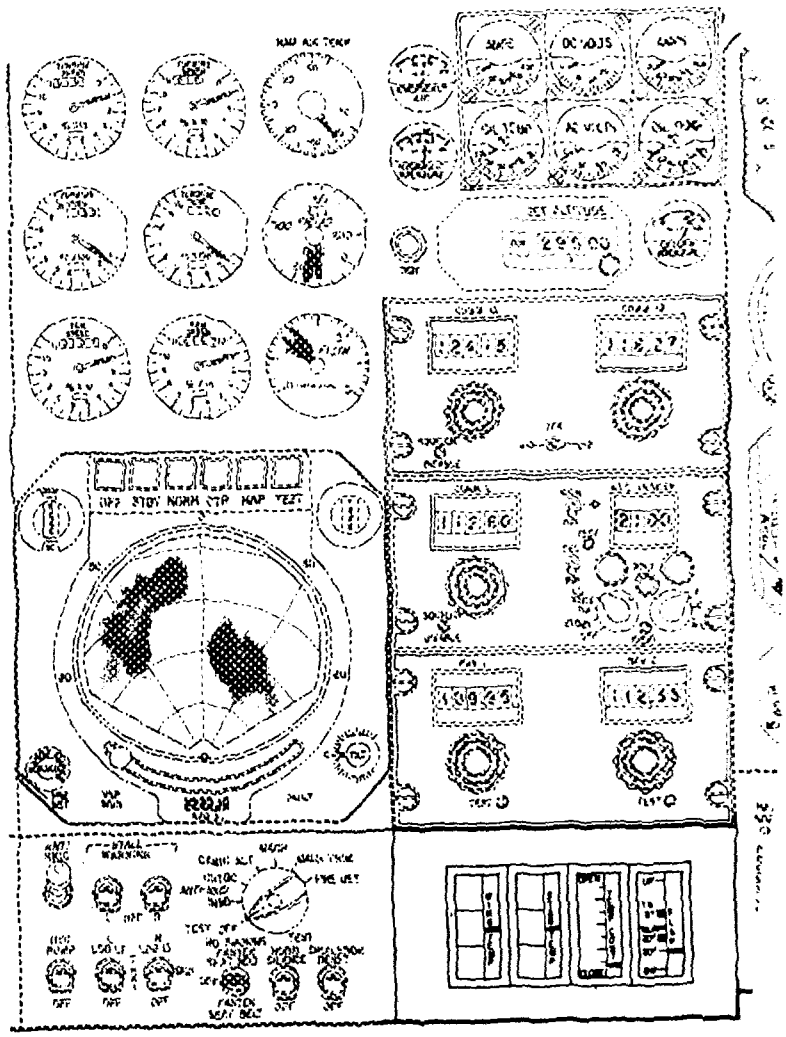


35-148 thru 35-369, 35-371 thru 35-389, 36-036 thru 36-047.

Test Switch Panel
Figure 201

INDICATOR PANEL - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - **A. Remove Indicator Panel**
     - (1) Remove electrical power from aircraft.
     - (2) Disconnect and tag electrical connectors.
     - (3) Remove screws and indicator panel from aircraft.
   - **B. Install Indicator Panel**
     - (1) Install panel and secure with screws.
     - (2) Connect electrical connectors.
     - (3) Restore electrical power to aircraft.



Indicator Panel
Figure 201

PRESSURIZATION MODULE - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   A. Refer to Chapter 21 for maintenance practices.

LIGHTING AND CLIMATE CONTROL SWITCH PANEL - MAINTENANCE PRACTICES

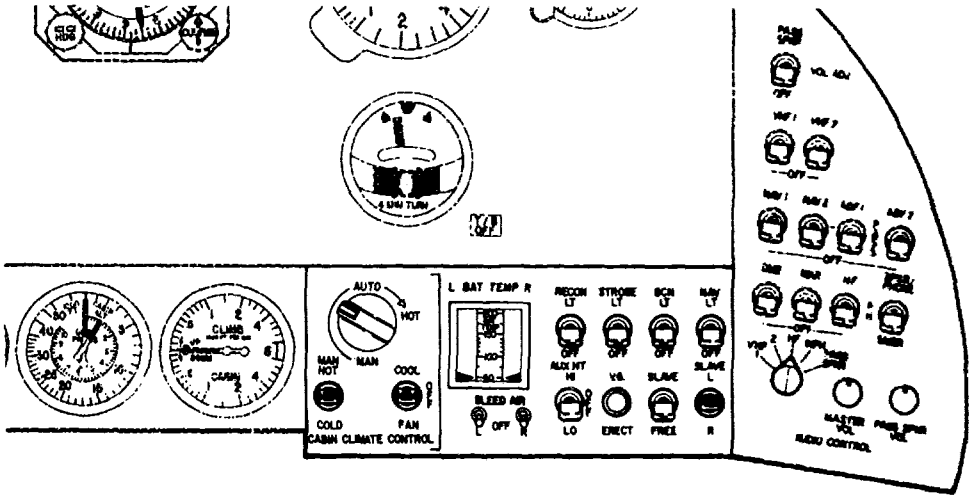
1. REMOVAL/ INSTALLATION

A. Remove Lighting and Climate Control Switch Panel

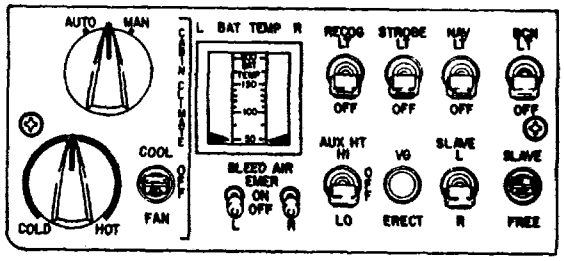
(1) Remove electrical power from aircraft.
(2) Disconnect electrical connector from switch panel.
(3) Remove attaching parts and switch panel from aircraft.

B. Install Lighting and Climate Control Switch Panel

(1) Install panel and secure with attaching parts.
(2) Connect electrical connector.
(3) Restore electrical power to aircraft.



35-107, 35-113 and Subsequent
36-032 and Subsequent



35-002 thru 35-106, 35-108 thru 35-112,
36-002 thru 36-031

Lighting and Climate Control Switch Panel
Figure 201

CENTER PEDESTAL - DESCRIPTION AND OPERATION

1. DESCRIPTION

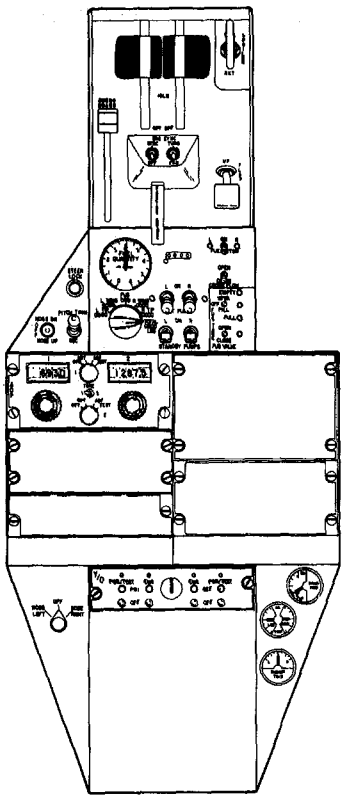
A. The center pedestal consists of the forward pedestal and quadrant section and the aft double-width or single-width pedestal section.

B. The aft double-width or single-width section provides mounting for the radio equipment, yaw damper control head, trim switch panel, trim indicator panel, and fuel control panel. The trim switch panel, trim indicator panel, and fuel control panel are secured to the pedestal structure by screws. The radio equipment and yaw damper control head utilize receptacle strips to secure to pedestal structure.

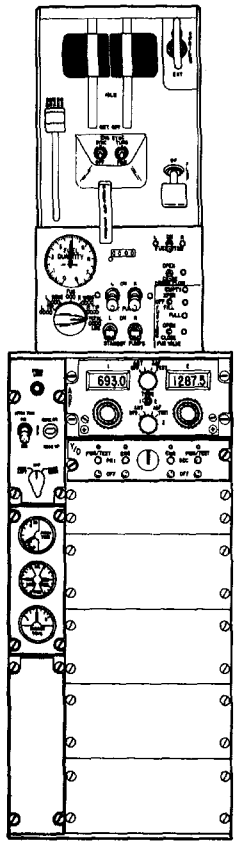
C. The forward pedestal and quadrant assembly provides mounting for the throttle, spoiler, flap, parking brake, and emergency brake controls. Refer to applicable chapter for removal of equipment in forward pedestal and quadrant assembly.

D. Due to many optional center pedestals, only typical single-width and double-width pedestals are shown.

E. Maintenance practices for the quadrant assembly are covered in Chapter 76.



Typical Double-Width Pedestal



Typical Single-Width Pedestal

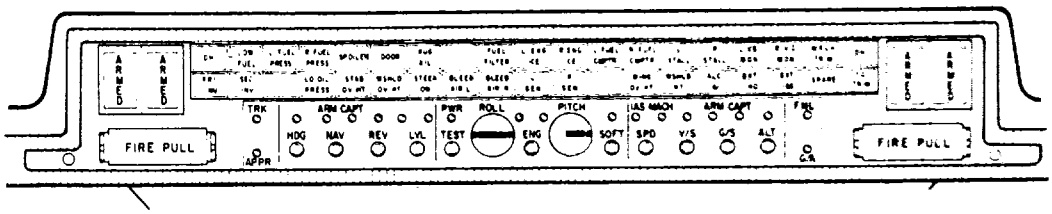
Center Pedestal
Figure 1

CENTER PEDESTAL - MAINTENANCE PRACTICES

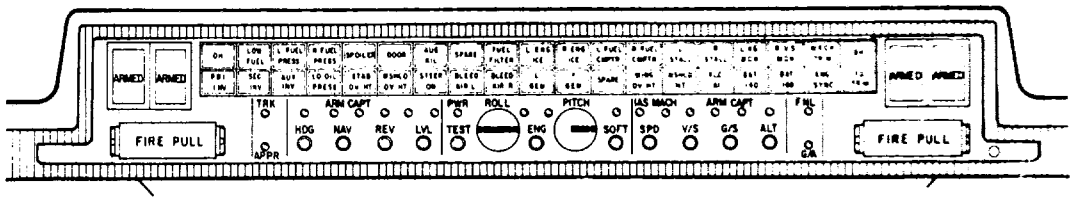
1. **REMOVAL/INSTALLATION**
   A. Equipment installed in the pedestal is secured by either screws or receptacle strips. Removal and installation of this equipment consists mainly of:
      (1) Loosening or removing attaching parts.
      (2) Removing equipment sufficiently to gain access to electrical connector.
      (3) Disconnecting electrical connector and removing equipment from aircraft.

GLARESHIELD - DESCRIPTION AND OPERATION

1. DESCRIPTION (See figure 1.)
   A. The glareshield, located above the instrument panel, provides mounting for the glareshield warning light assembly, the autopilot controller, the fire extinguisher system ARMED and FIRE PULL switches, and the glareshield flood lights. On *Aircraft 35-509 thru 35-588*, screened vents are installed in both sides and the center of the forward glareshield. These vents allow convection cooling of avionics equipment installed in the instrument panel. Ensure that glareshield vents remain open at all times.
      (1) Refer to Chapter 26 for maintenance practices on the fire extinguisher system ARMED switches and FIRE PULL switches.
      (2) Refer to Chapter 33 for maintenance practices on the glareshield flood lights and warning lights.
      (3) Refer to Chapter 22 for maintenance practices on the autopilot controller.

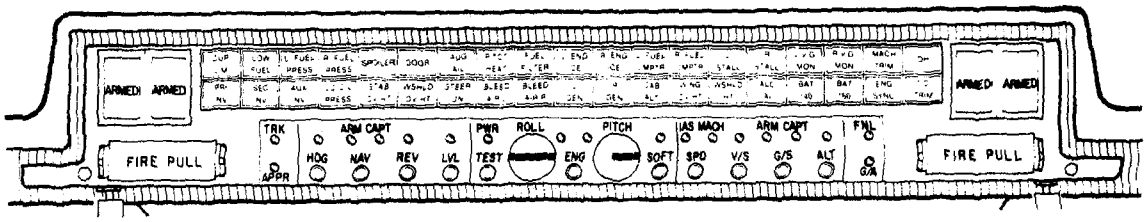


Aircraft 35-002 thru 35-066 and 36-002 thru 36-017
not modified per AAK 83-2, "Installation of FC-530 Autopilot"

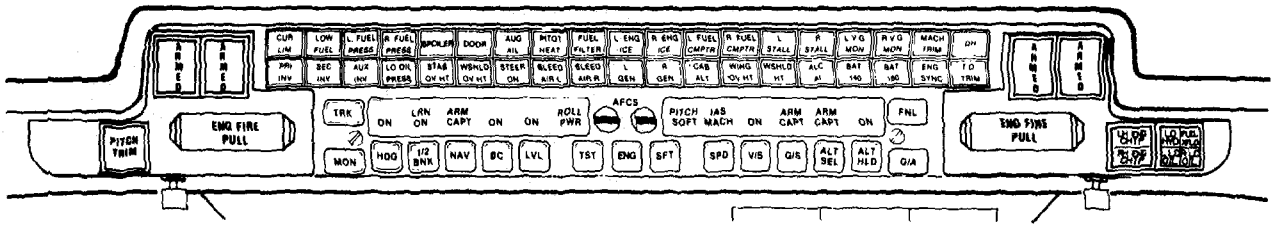


Aircraft 35-067 thru 35-369, 35-371 thru 35-389 and 36-018 thru 36-047
not modified per AAK 83-2, "Installation of FC-530 Autopilot"

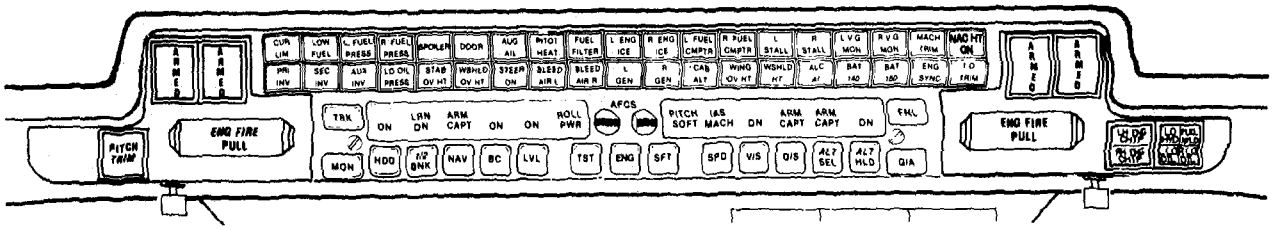
Glareshield
Figure 1 (Sheet 1 of 2)



Aircraft 35-370, 35-390 thru 35-505, 36-048 thru 36-053
not modified per AAK 83-2, "Installation of FC-530 Autopilot"



Aircraft 35-506 and Subsequent, 36-054 and Subsequent and prior
aircraft modified per AAK 83-2, "Installation of FC-530 Autopilot"



Aircraft 35-634 and Subsequent and 36-058 and Subsequent

Glareshield
Figure 1 (Sheet 2 of 2)

INDEPENDENT INSTRUMENTS - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. Independent instruments consist of components or systems which are not related to any major systems of the aircraft.

1. Removal/Installation

NOTE: The compass is a short-period magnetic compass intended to indicate continuously the aircraft heading with reference to the earth's magnetic field. It is equipped with an instrument light and a compensating system. A compass correction card is carried on the mounting bracket.

A. Remove Magnetic Compass
   (1) Remove upholstery as required to gain access to magnetic compass installation.
   (2) Disconnect compass light electrical wiring at splice.
   (3) Remove attaching parts and compass from bracket.

B. Install Magnetic Compass
   (1) Connect compass light electrical wiring.
   (2) Install compass and secure with attaching parts.
   (3) Install previously removed upholstery.

2. Adjustment/Test

A. Magnetic Compass Compensation
   (1) Place the aircraft on a compass rose and level. (Refer to Chapter 8.)
   (2) Loosen and swing compensator coverplate up out of the way.
   (3) Turn the "N-S" and "E-W" compensator adjustment shafts to the null position by aligning the dot on the shafts with the dots on the compensator case. For this, as well as all other adjustments, use a non-magnetic screwdriver.

NOTE: When determining or adjusting the compass readings on all headings, both engines shall be running and all normal operating flight equipment turned on.

   (4) Align the aircraft, setting it on 0°, 30°, 60°, 90°, 120°, 150°, 180°, 210°, 240°, 270°, 300°, and 330° magnetic headings. At each heading, read the magnetic compass and the directisyn (primary and secondary from pilot's side). Record the readings. The reading for the magnetic compass shall not vary more than 5° from the magnetic heading at any check point or the compass shall be recompensated or replaced. Record the corrected compass reading in the "Steer" columns of the compass correction card next to the true heading in the "To Fly" column for 0°, 30°, 60°, 90°, 120°, 150°, 180°, 210°, 240°, 270°, 300°, and 330°.
   (5) The compass should be compensated using coefficients "B" and "C" as explained in the following example:
   (a) Assuming that the compass headings, readings, and deviations are:

Magnetic Heading	Compass Reading	Deviation
180°	178°	2
270°	274°	- 4
0°	6°	- 6
90°	90°	0

(b) Coefficient "C": $C = \frac{(-6°) - (+2°)}{2} = \frac{-8}{2} = -4°$; therefore

with the airplane on a north magnetic heading (actual compass reading 6°), turn the N-S compensator until the compass reads 2°.

NOTE: For all practical purposes, disregard any fraction of a degree when compensating the compass.

(c) Coefficient "B": $B = \frac{(0°) - (-4°)}{2} = \frac{+4}{2} = +2°$; therefore,

with the airplane on east magnetic heading (actual compass heading 90°), turn the E-W compensator until the compass reads 92°.

(6) Position aircraft on primary and secondary magnetic headings and record magnetic headings and corresponding compass readings in their proper columns.

(7) Fill out "Steer" column by making a residual swing through all 24 positions. Then fill in blanks on back of card. Tear off compass card and place it in the cockpit compass card holder. File remainder of card as a permanent record.

(8) Position compensator coverplate over compensator and tighten screws.

CLOCK - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

NOTE: ° The clock is a conventional stem-wound, spring-actuated eight-day unit. A knob is located in the lower left portion of the clock face for winding and resetting. A clock is installed in the pilot's and the copilot's instrument panels.

° The following removal and installation procedures are identical for both clocks.

A. Remove Clock

(1) Assure that Battery and Stall Warning Switches are set OFF.
(2) Lower either instrument panel.
(3) Remove screws and clock from instrument panel.

B. Install Clock

(1) Install clock and secure with attaching parts.
(2) Raise and secure instrument panel.

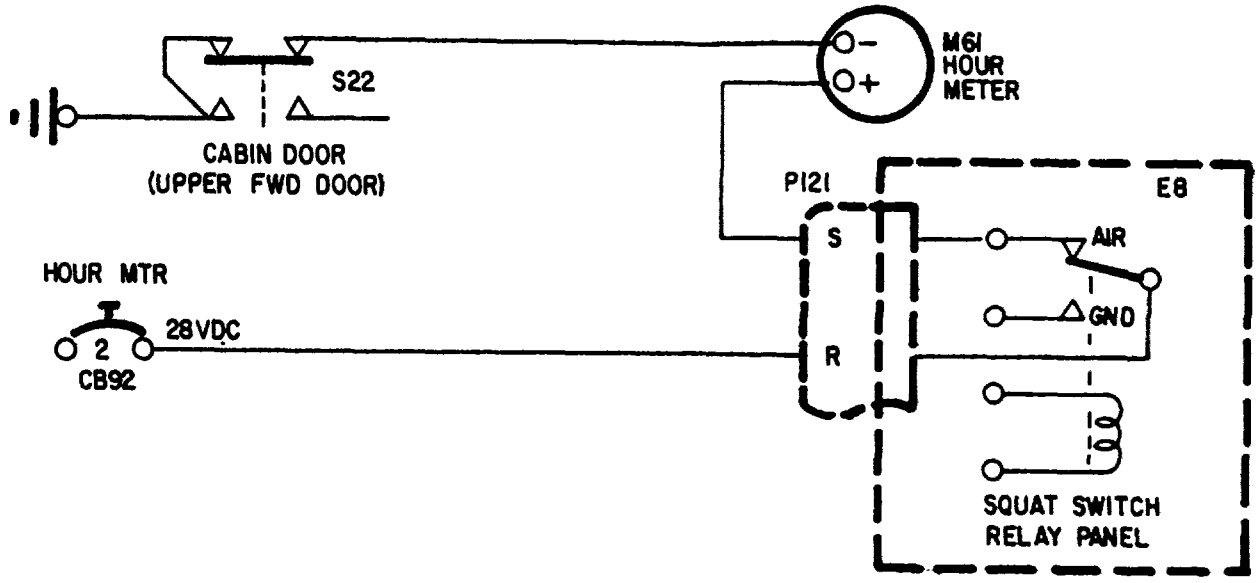
HOUR METER - DESCRIPTION AND OPERTAION

1. DESCRIPTION

A. The hour meter system consists of a 28 vdc circuit breaker installed in the copilot's circuit breaker panel and an hour meter installed in the copilot's instrument panel or in the tailcone.

2. OPERATION (See figure 201.)

A. A ground circuit to the hour meter is completed when the cabin door is closed and latched. A 28 vdc circuit to the hour meter is completed thru a set of contacts in the squat switch relay panel when the aircraft is airborne.



Hour Meter Electrical Schematic
Figure 201

RAM AIR TEMPERATURE SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The ram air temperature system consists of a temperature indicator, a temperature bulb (resistance type) and a system circuit breaker.

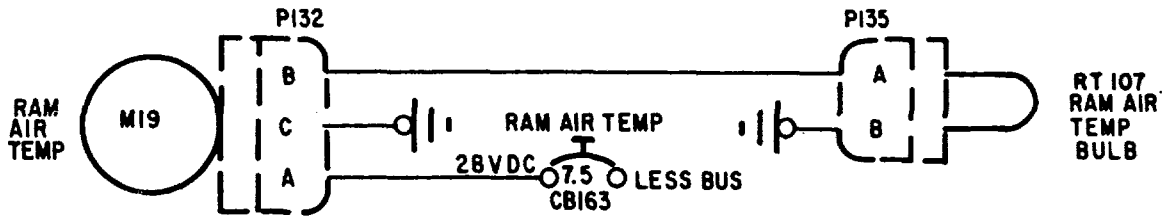
B. Component Description

(1) The temperature indicator is located in the center instrument panel. The indicator is lighted by 5-volt lighting, provided by the pilot's light dimmer assembly.

(2) The temperature bulb (resistance type) is mounted in the aft portion of the dorsal air inlet at approximately FS 525. The sensing element extends into the air inlet to monitor the incoming air temperature. Access to the bulb is gained through the tailcone.

2. OPERATION

A. The incoming air temperature changes the resistance of the bulb. The changes in resistance are monitored by the temperature indicator which provides the crew with a visual indication of the existing outside air temperature. The indicator is calibrated in degrees centigrade.



Ram Air Temperature Electrical Control Schematic
Figure 1

RAM AIR TEMPERATURE INDICATOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - **A. Remove Temperature Indicator**
     - (1) Remove electrical power from aircraft.
     - (2) Remove attaching parts and panel overlay.
     - (3) Loosen instrument clamp screws and remove instrument sufficiently to gain access to the electrical connector.
     - (4) Disconnect electrical connect from indicator.
   - **B. Install Temperature Indicator**
     - (1) Connect electrical connector to indicator.
     - (2) Position indicator in panel and tighten instrument clamp screw.
     - (3) Install panel overlay and secure with attaching parts.
     - (4) Restore electrical power to aircraft.

This data is correct
AEP is in error

RAM AIR TEMPERATURE BULB - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - A. **Remove Temperature Bulb**
     - (1) Remove electrical power from aircraft.
     - (2) Lower tailcone access door.
     - (3) Disconnect electrical connector from temperature bulb.
     - (4) Loosen and remove temperature bulb.
   - B. **Install Temperature Bulb**
     - (1) Install temperature bulb.
     - (2) Connect electrical connector to temperature bulb.
     - (3) Raise and secure tailcone access door.
     - (4) Restore electrical power to aircraft.

LOCKHEED FLIGHT DATA RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The Lockheed 109-D flight data recorder system consists of a flight data recorder, a vertical accelerometer, an automatic event marker, two accumulators and two pneumatic valves installed in the recorder system pitot and static lines, a flight recorder monitor, and four circuit breakers. The flight recorder system automatically records the following aircraft flight data: airspeed, altitude, vertical acceleration, heading, and elapsed time. The recorder readings may be analyzed by maintenance personnel to establish overhaul and maintenance requirements or, in the event of an accident, establish the cause.

B. **Component Description** (See figure 1.)

(1) On Aircraft 35-002 and Subsequent equipped with the Lockheed Flight Data Recorder System:

(a) The flight data recorder is installed on the RH side of the baggage compartment floor between frames 19 and 21.

(b) The vertical accelerometer is installed on the aircraft centerline on the seat floor below the baggage compartment floor overhang.

(c) The automatic event marker is installed on the forward side of frame 21 between stringers 8 and 9.

(d) The accumulators are located forward of frame 17A on the RH side of the aircraft.

(2) On Aircraft 36-002 and Subsequent equipped with the Lockheed Flight Data Recorder System:

(a) The flight data recorder is installed on the baggage compartment floor forward of frame 17A on the aircraft centerline.

(b) The vertical accelerometer is installed adjacent to the recorder on the baggage compartment floor at RBL 18.

(c) The automatic event marker is installed adjacent to the recorder on the baggage compartment floor at RBL 3.

(d) The accumulators are located on the baggage compartment floor aft of the accelerometer.

(3) Connections for pitot and static lines are located on the face of the recorder. A Veeder-Root counter on the face displays the time remaining on the recording foil.

(4) The accumulators incorporate drain valves. Refer to Chapter 34 for drain valve maintenance practices.

(5) Pneumatic valves are installed in the recorder system pitot and static lines between frames 8 and 9 in the copilot's armrest.

(6) The flight data recorder monitor is installed in the pedestal. The monitor includes an audio jack and manual Event Marker Switch. Monitor jack and manual event marker may be housed in a combination panel along with emergency and wing inspection light switches.

(7) Two circuit breakers supply 115 vac and 26 vac to the flight data recorder and another circuit breaker supplies 28 vdc to the automatic event marker.

2. OPERATION

A. When power is applied to the aircraft and the flight recorder circuit breakers are depressed, the flight recorder is operational.

B. The flight recorder consists of four subsystems: drive, altitude and airspeed, heading indicator and accelerometer indicator.

(1) The drive subsystem provides a smooth continuous drive for the foil record assembly. The amount of foil on the take-up spool increases with each revolution of the take-up spool, foil speed varies from 6 inches per hour at start to 12 inches per hour after 200 hours of flight recorder operation. As the foil is transported, styli of the applicable subsystems emboss the foil.

(2) The flight recorder includes a time-remaining counter system. The time-remaining counter is a Veeder-Root counter which is mounted on the front panel assembly. The counter indicates the time remaining in hours and should be reset when the foil is replaced (normally 200 hours).

(3) The flight recorder verification-of-operation signal (beep) is a keyed 400-cps tone. The rate changes proportionally with the elapsed time from the start of the foil spool and varies from approximately 8 per minute at the start of a full spool to 20 per minute after 200 hours of recording time.

(4) The altitude and airspeed subsystem consists of a gas-tight housing which contains two independently functioning bellows assemblies. Fittings on the gas-tight housing provide connections to aircraft pitot and static lines. Each of the bellows assemblies drives a stylus which embosses the foil.

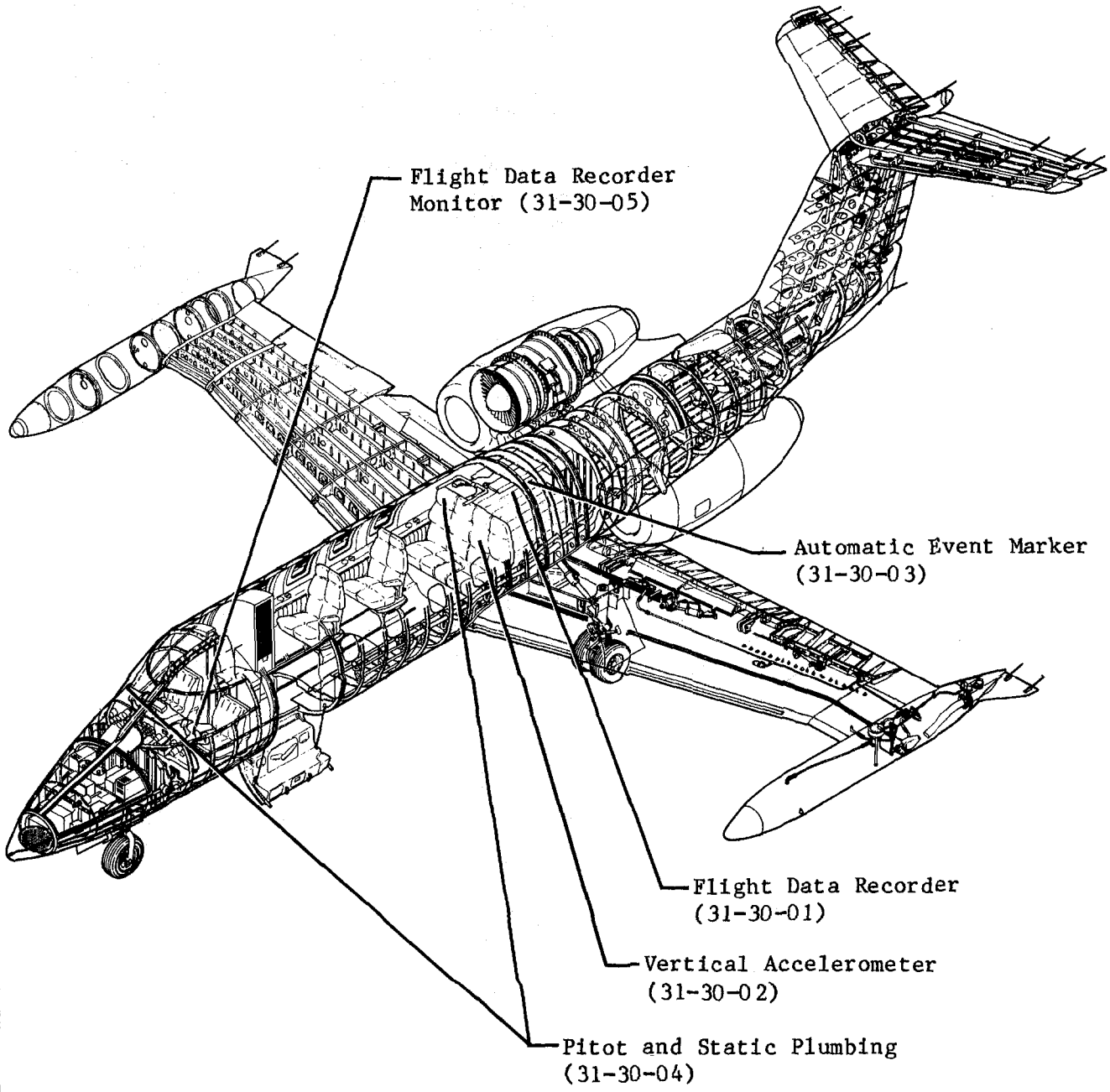
(5) The heading indicator subsystem consists of the heading indicator assembly and the electronics related to heading servo amplification. The input signal to the heading indicator subassembly is obtained from the aircraft directional compass and is connected directly to the heading indicator subassembly heading synchro. If the heading synchro rotor is not electrically aligned with the directional compass synchro, an error signal is developed in the heading synchro. The error signal is applied to the input of the heading servoamplifier circuit where the error signal is amplified to a level sufficient to drive the heading servo motor. The servo motor direction of rotation depends upon the phase of error signal. When the heading servo motor has driven the heading synchro rotor to correspond to the aircraft heading, the error signal is reduced to zero and heading servo motor rotation stops.

(6) The accelerometer indicator subassembly comprises the accelerometer servo assembly and electronics applicable to accelerometer servo amplification. Input for this subsystem is obtained from the Flight Recorder system remote accelerometer. The remote accelerometer is a differential transformer with its output connected in series with the stator windings of the accelerometer servo assembly synchro transmitter. Thus any output from the remote accelerometer generates a signal that is applied to the accelerometer servoamplifier input. The ampli-

fier raises the level of the signal to a value sufficient to drive the accelerometer motor-generator until a null is created between the remote accelerometer output and the linear induction potentiometer output. Thus, the summation signal is returned to zero and accelerometer servo motor-generator rotation is stopped. For further information on the flight recorder system, refer to Overhaul Manual, Model 109-D Flight Recorder, published by the Lockheed Aircraft Service Company, Ontario, California.

C. The accelerometer provides signal proportional to vertical acceleration forces occurring to the aircraft. The accelerometer is calibrated to respond to acceleration forces from -3g to +6g along its vertical axis.

D. The automatic event marker receives an electrical signal each time the PTT button on the pilot's or copilot's microphone is depressed. The marker relays this signal to the flight data recorder to be recorded on the foil as an event.



Lockheed Flight Data Recorder System Component Locator
Figure 1

LOCKHEED FLIGHT DATA RECORDER SYSTEM - ADJUSTMENT/TEST

1. ADJUSTMENT/TEST

NOTE: The pitot-static system must be functionally checked prior to checking the flight recorder system. (Refer to Chapter 34.)

A. Tools and Equipment

NOTE: Equivalent substitutes can be used in lieu of the following:

NAME	NUMBER	MANUFACTURER	USE
Pitot and Static System Tester	1811F or Equivalent	Barfield Instrument Co. Atlanta, GA	Pitot static check
Turn Table Assembly	TN26409	Gates Learjet Corp. Wichita, KS	For directional gyro check.
Extension Cable		Fabricate Locally	
External Power Source	---	Commercially Available	
Linear Scale	4024511-1	Lockheed Aircraft Service Co.	
Spool & Foil	4020538-1	Lockheed Aircraft Service Co.	

B. Functional Test of Lockheed 109-D Flight Recorder System

(1) Perform operational check of pitot-static system. (Refer to Chapter 34.)

CAUTION: ° DO NOT APPLY PRESSURE FASTER THAN 20 KNOTS PER SECOND.

° ASSURE THAT THE FLIGHT RECORDER PNEUMATIC PITOT SELECTOR IS SET TO OPEN.

(2) Connect pitot-static tester to copilot's pitot and static system and apply pitot pressure to give an indication of 300 knots airspeed. Block off other static ports.

(3) Turn off pressure and seal the system. System pressure drop shall not exceed 5 knots in 5 minutes.

CAUTION: ° DO NOT RELEASE PRESSURE FASTER THAN 20 KNOTS PER SECOND.

° ASSURE THAT THE PITOT-STATIC TESTER CROSS-BLEED IS OPEN TO PREVENT DAMAGE TO AIRCRAFT INSTRUMENTS AND TESTER AIRSPEED INDICATOR.

NOTE: Assure that the flight recorder pneumatic static selector is in the open position.

(4) Open the test cross-bleed.
(5) Apply vacuum to the copilot's static system until the tester altimeter indicates 28,000 feet.
(6) Shut off vacuum and seal the system. The altimeter should not indicate less than 27,440 feet in one minute.
(7) Release the vacuum on the system slowly, at a rate within the range of the aircraft rate-of-climb indicator.

CAUTION: TO PREVENT DISENGAGEMENT OF ALTITUDE STYLUS ARM BALL AND SOCKET JOINT (INSIDE HOUSING), USE CARE WHEN INSTALLING OR REMOVING FOIL RECORD ASSEMBLY.

(8) The foil record assembly must be held at an angle of approximately 30 degrees from vertical as the slotted legs are engaged with the alignment rod in the recorder mounting plate. It may then be pivoted until vertical and secured by tightening the knob nearest the centerline of the recorder. Likewise, on removal, the foil record assembly is released by loosening the knob nearest the recorder centerline, carefully tilting the foil record assembly at least 30 degrees from vertical, then lifting it off.
(9) The foil record assembly is serially matched in calibration to the particular recorder with which it is to be used. Check that the serial number on the foil recorder assembly matches the serial number of the flight recorder.
(10) Remove magazine from flight recorder and replace existing spool with a spool of test foil. Lightly scribe a start line on the test foil before inserting magazine into flight recorder.
(11) Remove secondary directional gyro from aircraft. Refer to Chapter 34.)
(12) Install secondary directional gyro on turntable and connect to aircraft wiring with patch cable.
(13) Connect external power to the aircraft.
(14) Set Battery Switches on.
(15) Set Inverter Switches on.
(16) Assure that FLT RCDR 115 and 26 vac circuit breakers are depressed.
(17) Assure that EVENT MKR 28 vdc circuit breaker is depressed.
(18) Insert headset phone plug in monitor jack.
(19) Verify 400 cycle beep tone is audible in headset. The beep signal is the flight recorder's verification-of-operation.

NOTE: The rate of tone interruptions changes proportionately with the elapsed time from the start of the foil spool, and varies from approximately 8 per minute at the start of a full spool to 20 per minute after 200 hours of recording time.

(20) Remove headset.

NOTE: ° Energize the selected event marker at the beginning and end of each segment or check point of the test being performed.

° The manual event marker is initiated by depressing the EVENT button on the recorder monitor.

° The automatic event marker is initiated by depressing the pilot's or copilot's microphone press-to-talk button.

(21) Use the manual event marker for this test.
(22) Remove mounting screws from accelerometer.
(23) Place accelerometer in the positions as shown in table 1. Allow accelerometer to rest in each position for not less than one minute.

Accelerometer Physical Position	Acceleration Position in Degrees	Acceleration in g's	Tolerance
Connector facing up	0	1.0	±0.2 g
Connector facing outboard	90	0.0	±0.2 g
Connector facing down	180	-1.0	±0.2 g

TABLE 1

(24) Install accelerometer on mounting bracket and tighten screws securely.
(25) Use the pilot's automatic event marker for this test.
(26) Assure that secondary directional gyro circuit breaker is depressed and wait three minutes for system to synchronize. Set the SLAVE-FREE Switches to the FREE mode of operation.
(27) Position the turntable with secondary directional gyro to four cardinal headings = N, E, S, W (±1) degree. (Refer to table 2.)
(28) Allow gyro to remain at each heading for not less than three minutes.
(29) Pull the secondary directional gyro circuit breaker. Permit the gyro to coast down in speed before removing the directional gyro. Remove secondary directional gyro from turntable and install in aircraft, maintaining the gyro level during movement.
(30) Use the copilot's automatic event marker for designated test points.

Heading	Degrees	Tolerance
N	360	±3°
E	90	±3°
S	180	±3°
W	270	±3°

TABLE 2

(31) Connect the pitot-static tester to the pilot's and copilot's pitot tube and static system. Block off other static ports.

(32) Adjust the pitot-static tester to obtain the readings listed in table 3. Seal off tester and allow pressure to remain at each test point value for not less than one minute.

Pitot

Airspeed Knots	Tolerance ± Knots
100	10
200	10
250	10
300	10

TABLE 3

Static

Airspeed Knots	Tolerance ± Knots
2,000	100
10,000	150
20,000	300
40,000	600

TABLE 4

(33) Adjust the pitot-static tester to obtain the readings listed in table 4. Seal off tester and allow vacuum to remain at each test point valve for not less than one minute.

(34) Disconnect pitot-static tester from copilot's pitot-static system and remove tape from static ports.

(35) Pull the FLT RCDR and AUTO-EVENT MKR circuit breakers. Set the Battery Switches to OFF and disconnect external power source from aircraft.

(36) Remove magazine from flight recorder and replace test foil with new foil. Manually reset the time-remaining counter to indicate the minimum time remaining for recorder operation (normally 200 hours) whenever the foil is replaced. The time-remaining counter is a Veeder-Root counter which is mounted on the front panel of the flight recorder.

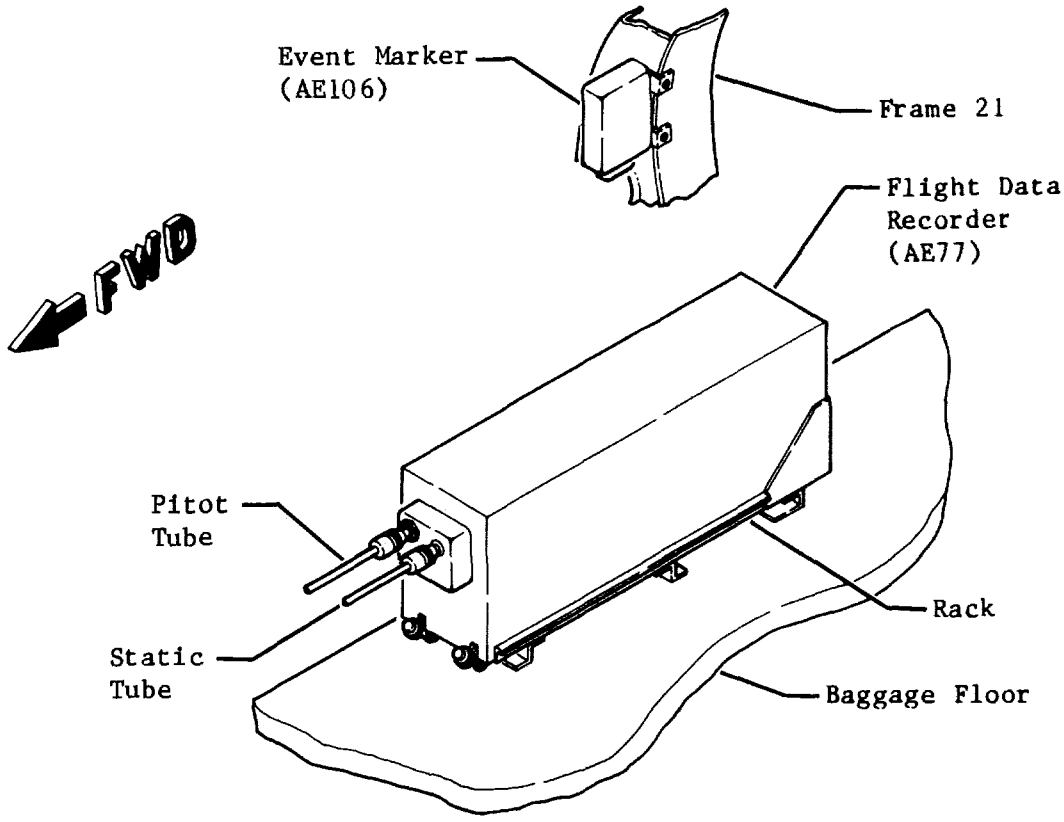
(37) Use scale overlay on test foil and evaluate recorded tracings for sequential directions and values against input data. Refer to tables 1, 2, 3, and 4 for trace tolerances. Refer to Calibration Chart furnished with each flight recorder. Ensure that all foil tracings are legible.

(38) Check test foil for all event marker tracings, time marks (minutes, quarter hour, and hour marks), auxiliary trace, and reference line.

1. Removal/Installation

A. Remove Flight Data Recorder. (See figure 201.)
   (1) Remove electrical power from aircraft.
   (2) Close pneumatic pitot and static valves. (Refer to 31-31-04.)
   (3) Remove attaching parts and cover from recorder installation.
   (4) Disconnect pitot and static lines from recorder. Cap lines.
   (5) Loosen holddown nuts and remove recorder from aircraft.

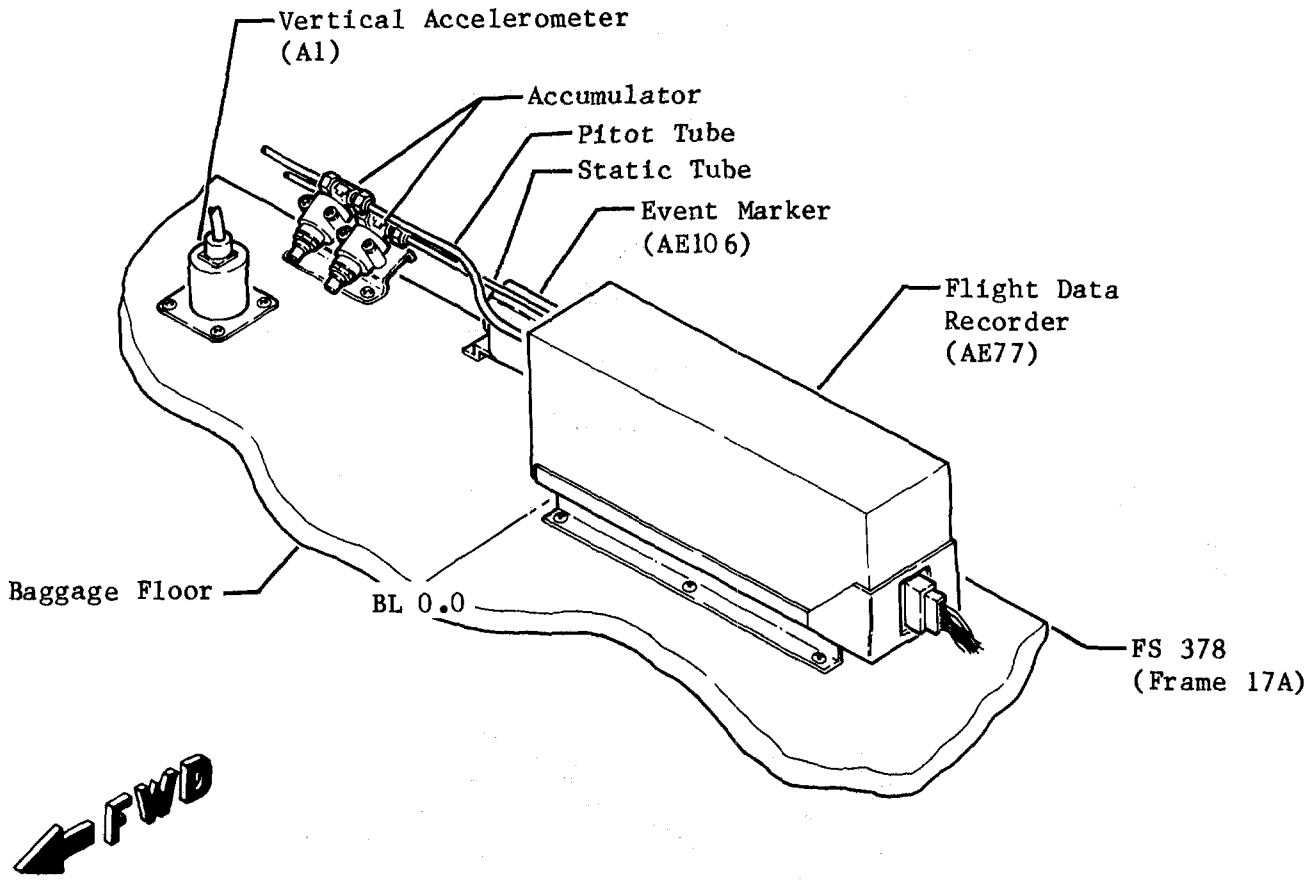
B. Install Flight Data Recorder. (See figure 201.)
   (1) Install flight data recorder in mounting rack and tighten holddown nuts.
   (2) Remove caps and connect pitot and static lines to recorder.
   (3) Position cover over recorder installation and secure with attaching parts.
   (4) Open pneumatic pitot and static valves. (Refer to 31-31-04.)
   (5) Restore electrical power to aircraft.
   (6) Perform leak check of pitot/static system. (Refer to Chapter 34.)
   (7) Perform operational check of flight data recorder. (Refer to 31-30-00.)



MODEL 35/35A
SHOWN WITH COVER REMOVED

10-70B-3

Lockheed Flight Data Recorder Installation
Figure 201 (Sheet 1 of 2)



MODEL 36/36A
SHOWN WITH COVER REMOVED

10-70B-2

Lockheed Flight Data Recorder Installation
Figure 201 (Sheet 2 of 2)

EFFECTIVITY: OPTIONAL

MM-99

FLIGHT RECORDER ACCELEROMETER - MAINTENANCE PRACTICES

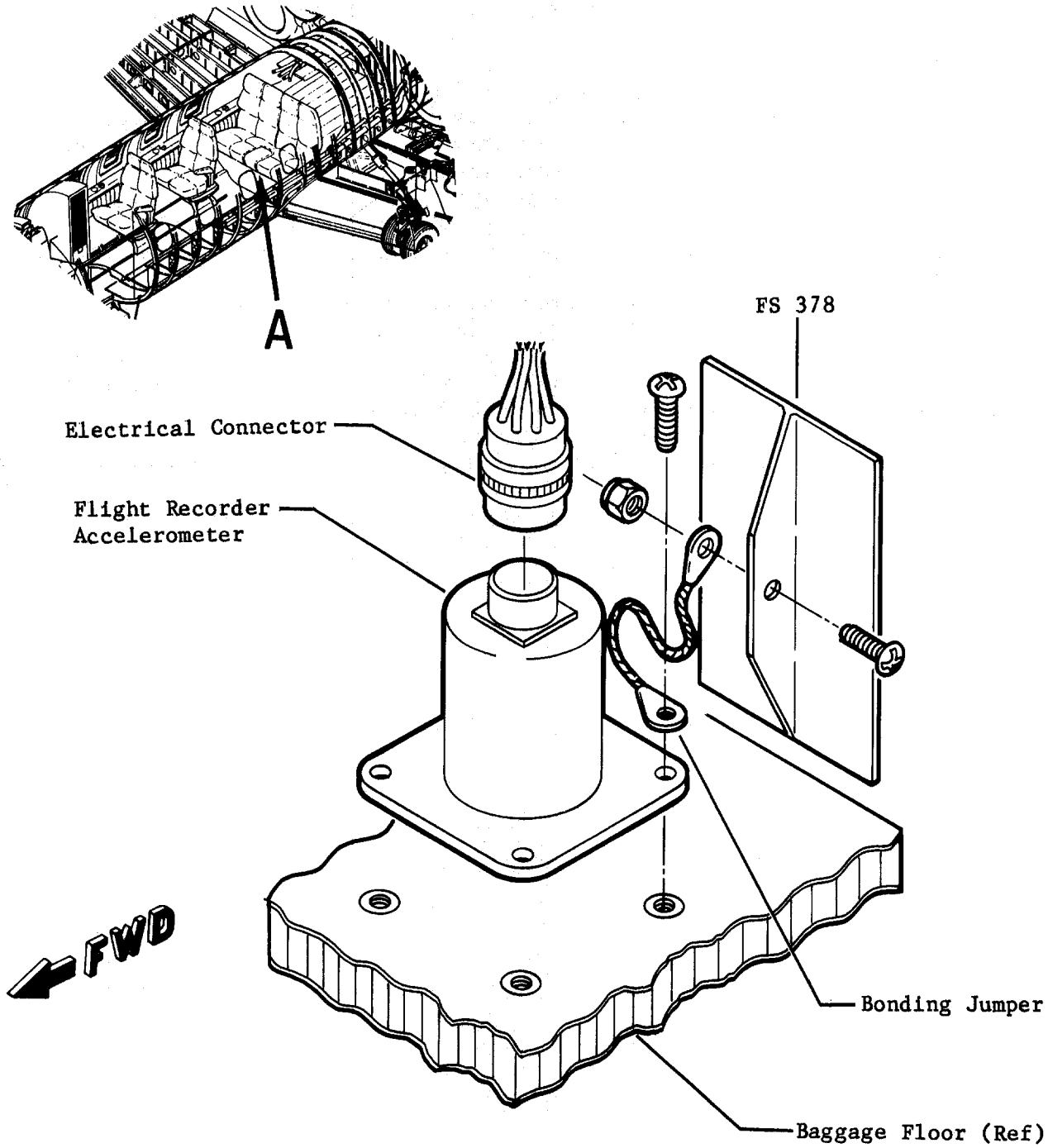
1. **REMOVAL/INSTALLATION**

   A. Remove Flight Recorder Accelerometer (See figure 201.)

   (1) Gain access to accelerometer by removing divan (if installed). The flight recorder accelerometer is located just forward of FS 378 under the divan at the aircraft centerline.
   (2) Remove electrical power from aircraft.
   (3) Disconnect electrical connector from accelerometer.
   (4) Remove attaching parts which secure bonding jumper in place and remove bonding jumper from installation.
   (5) Remove attaching parts and remove accelerometer from aircraft.

   B. Install Flight Recorder Accelerometer (See figure 201.)

   (1) Place flight recorder accelerometer in position. Place bonding jumper in position. Secure accelerometer installation with attaching parts.
   (2) Connect electrical connector to accelerometer.
   (3) Restore electrical power to aircraft.
   (4) Perform flight recorder functional test. (Refer to 31-30-00, Adjustment/Test.)
   (5) Install divan and any other equipment removed to facilitate removal of flight recorder accelerometer.

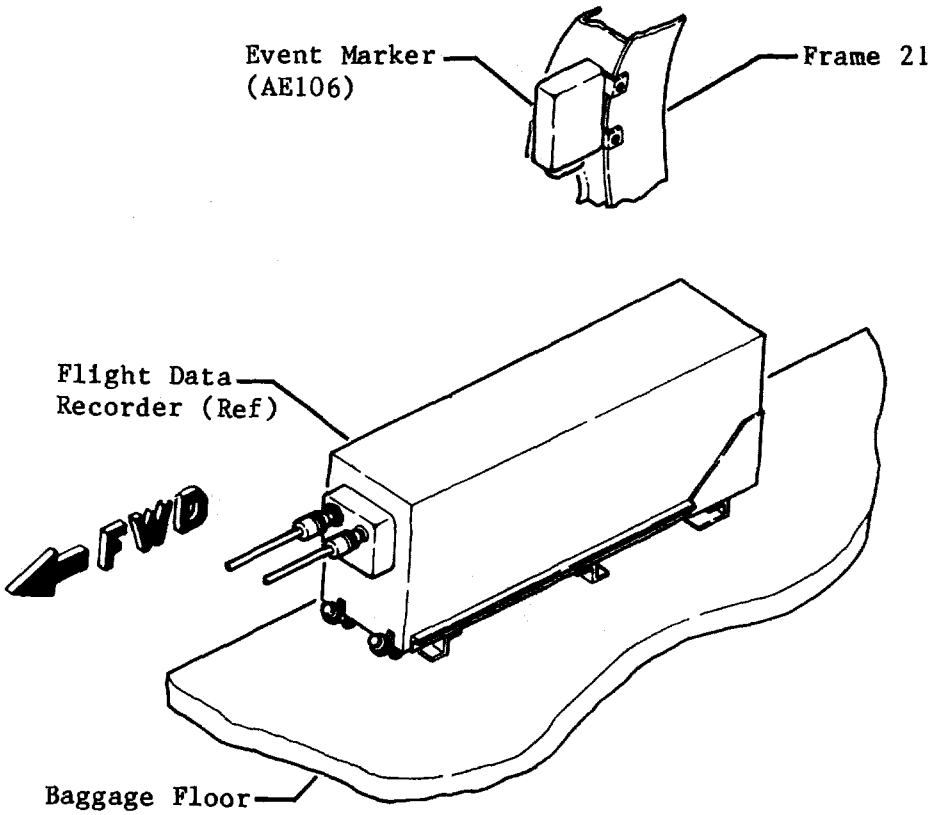


Detail A

Flight Recorder Accelerometer Installation
Figure 201

AUTOMATIC EVENT MARKER - MAINTENANCE PRACTICES

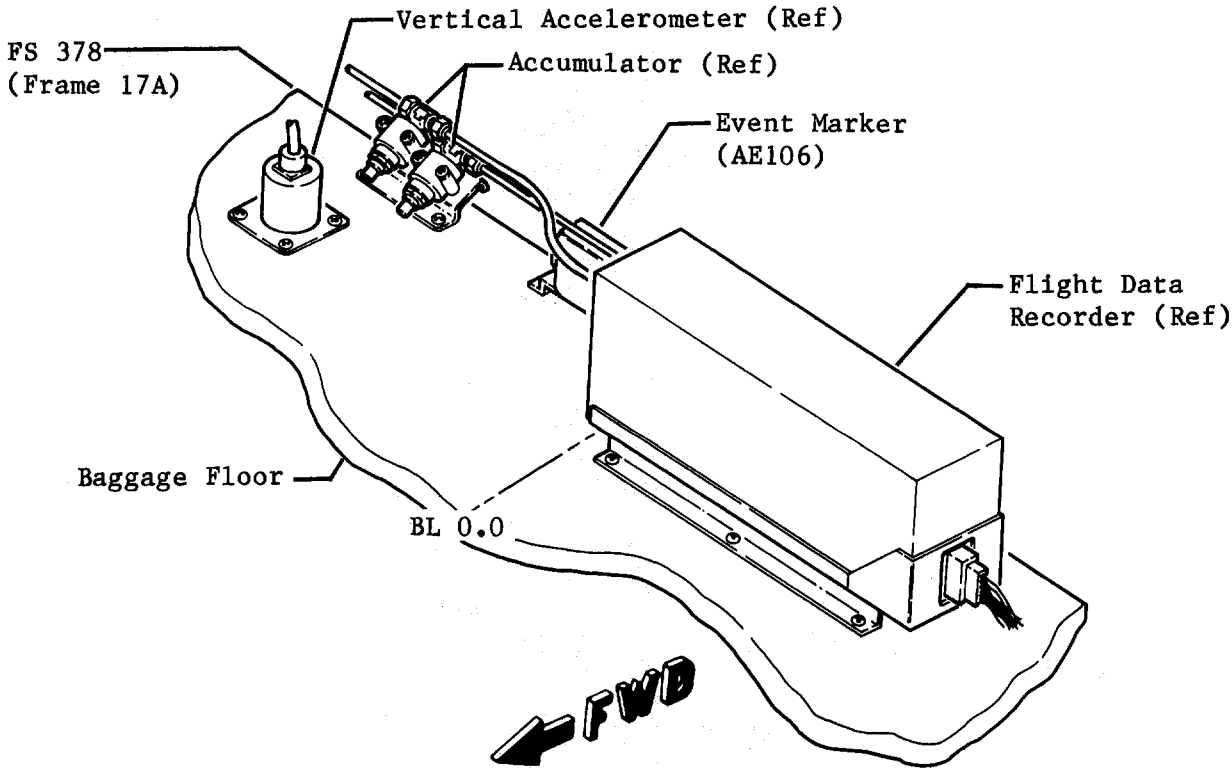
1. **REMOVAL/INSTALLATION**
   - **A. Remove Automatic Event Marker** (See figure 201.)
     - (1) Pull FLT RCDR circuit breakers and EVENT MKR circuit breaker.
     - (2) Disconnect electrical connector from automatic event marker.
     - (3) Remove attaching parts and automatic event marker from aircraft.
   - **B. Install Automatic Event Marker** (See figure 201.)
     - (1) Install automatic event marker and secure with attaching parts.
     - (2) Connect electrical connector to automatic event marker.
     - (3) Reset EVENT MKR circuit breaker and FLT RCDR circuit breakers.



MODEL 35/35A
SHOWN WITH COVER REMOVED

Detail A

Automatic Event Marker Installation
Figure 201 (Sheet 1 of 2)

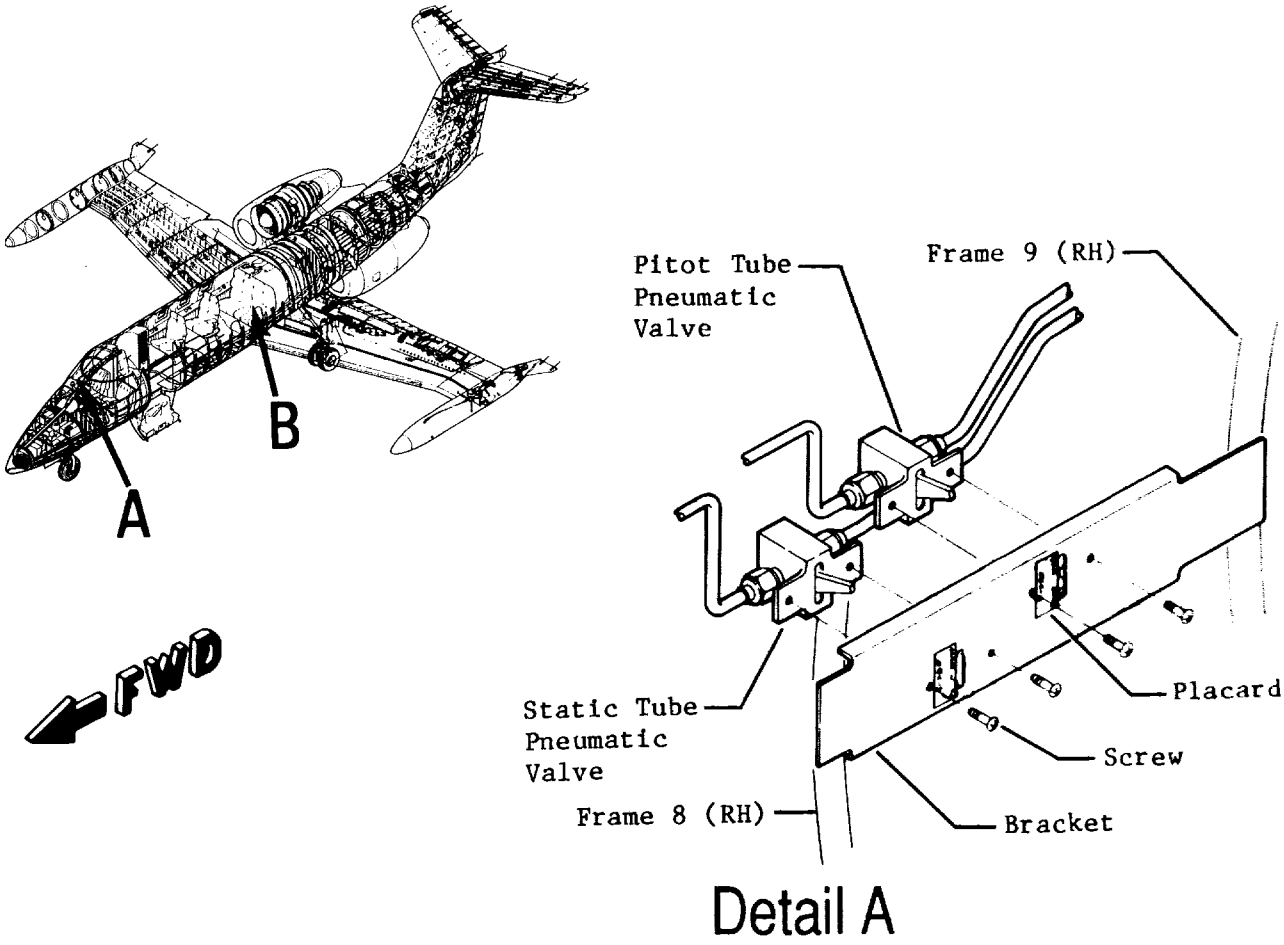


MODEL 36/36A
SHOWN WITH COVER REMOVED

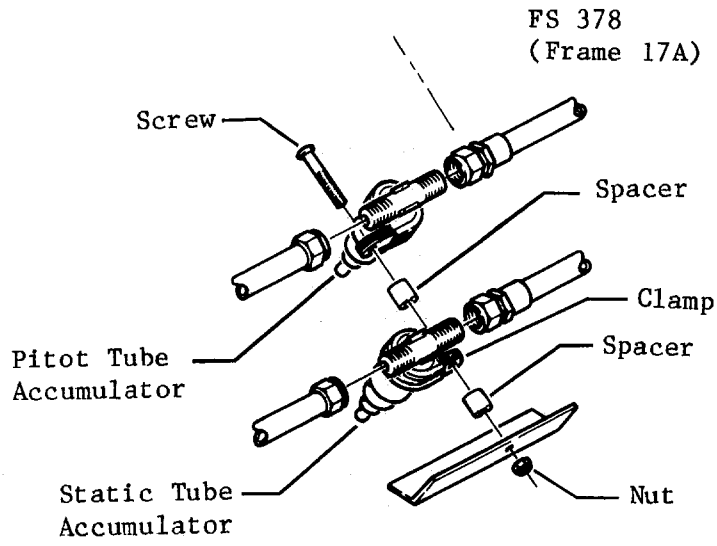
Detail A

Automatic Event Marker Installation
Figure 201 (Sheet 2 of 2)

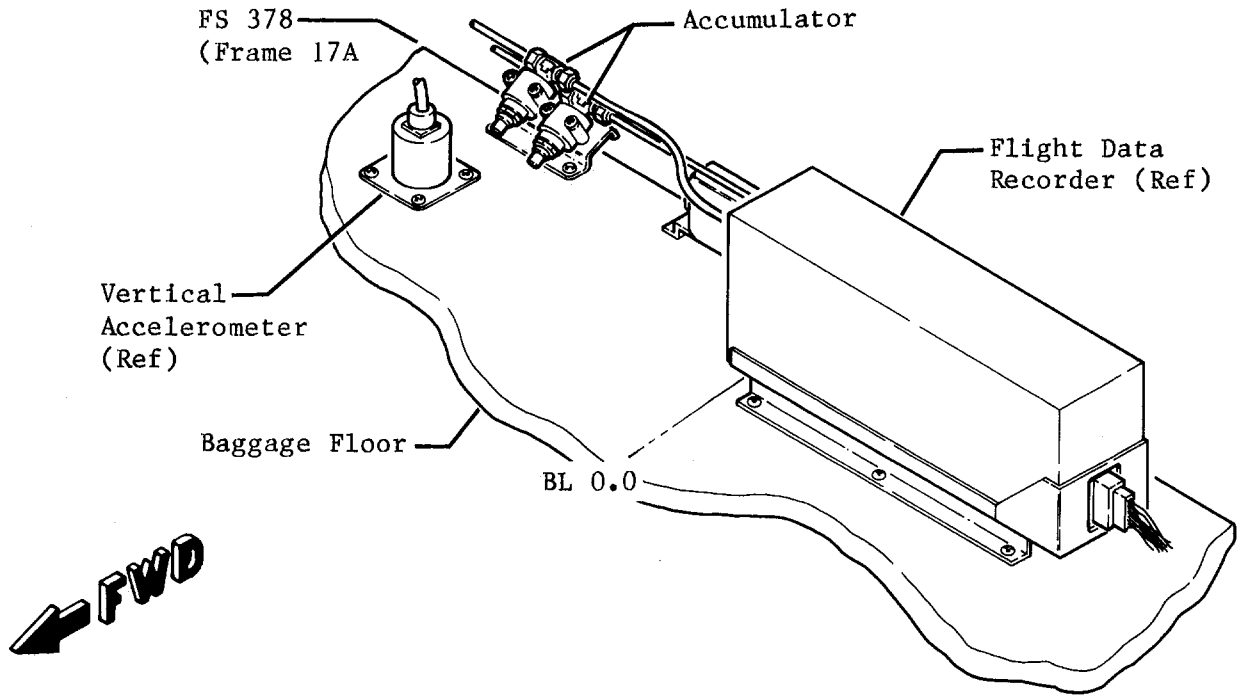
1. **Removal/Installation**
   A. Remove Pneumatic Valves. (See figure 201.)
      (1) Gain access to pneumatic valves.
      (2) Disconnect pitot and static lines from pneumatic valves.
      (3) Remove attaching parts and pneumatic valves from aircraft.
      (4) Cap pitot and static lines.
   B. Install Pneumatic Valves. (See figure 201.)
      (1) Install pneumatic valves on bracket and secure with attaching parts.
      (2) Remove caps and connect pitot and static lines to pneumatic valves.
      (3) Perform pitot/static leak check. (Refer to Chapter 34.)
   C. Remove Accumulators (See figure 201.)
      (1) Disconnect pitot and static lines from accumulators.
      (2) Cap lines. Remove attaching parts and accumulators from aircraft.
   D. Install Accumulators (See figure 201.)
      (1) Install accumulators and secure with attaching parts. Remove caps from pitot and static lines.
      (2) Connect pitot and static lines to accumulators.
      (3) Perform pitot/static leak check. (Refer to Chapter 34.)



Flight Data Recorder Pitot and Static Plumbing Installation
Figure 201 (Sheet 1 of 2)



Model 35/35A Accumulator Installation



Model 36/36A Accumulator Installation

Detail B

14-205A
10-70B-2

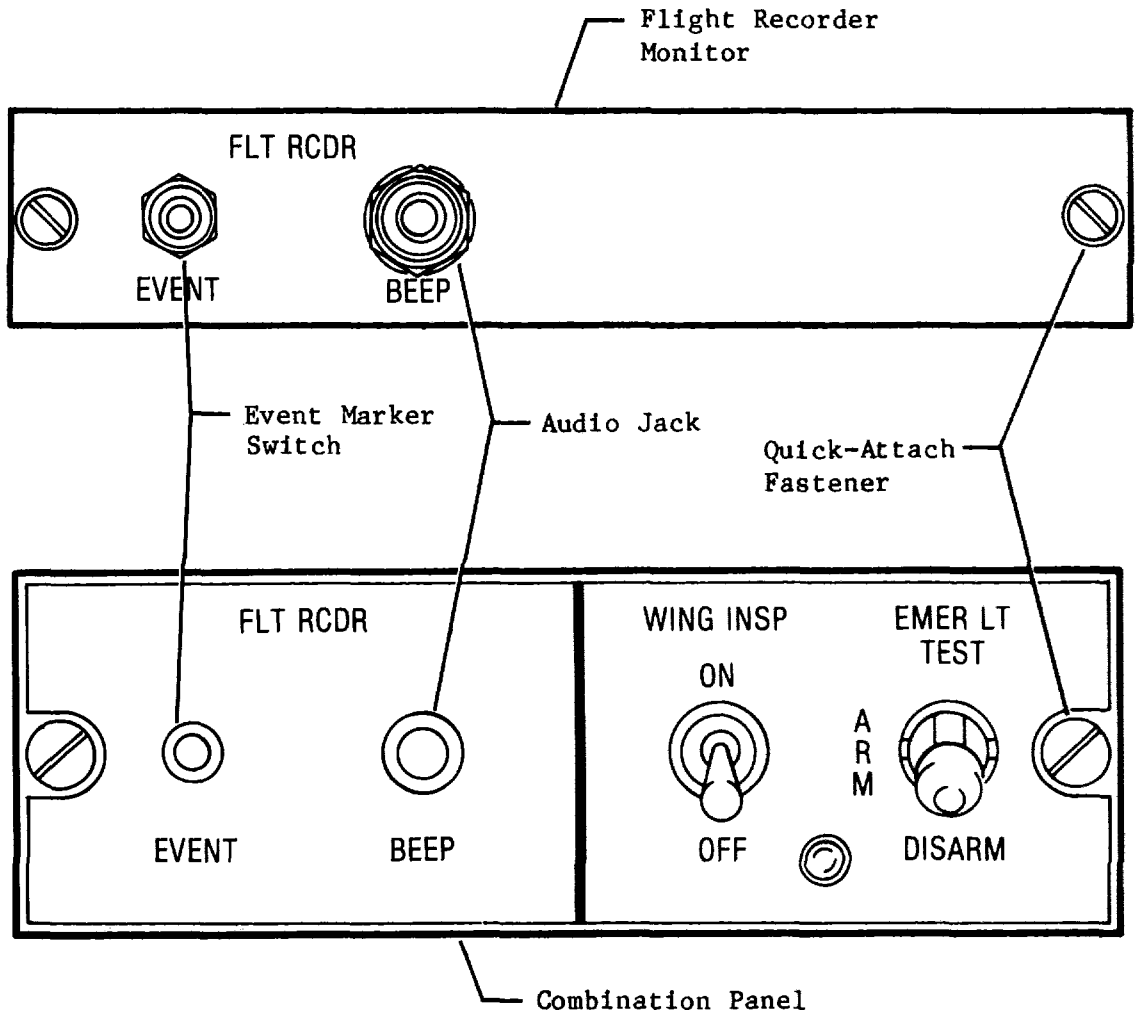
Flight Data Recorder Pitot and Static Plumbing Installation
Figure 201 (Sheet 2 of 2)

C. **Remove Accumulators** (See figure 201.)
   (1) Disconnect pitot and static lines from accumulators.
   (2) Cap lines. Remove attaching parts and accumulators from aircraft.

D. **Install Accumulators** (See figure 201.)
   (1) Install accumulators and secure with attaching parts. Remove caps from pitot and static lines.
   (2) Connect pitot and static lines to accumulators.
   (3) Perform pitot/static leak check. (Refer to 34-11-00.)

FLIGHT RECORDER MONITOR - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**
   - A. ***Remove Flight Recorder Monitor*** *(See figure 201.)*
     - (1) Remove electrical power from aircraft.
     - (2) Remove attaching parts from monitor.
     - (3) Disconnect electrical wiring from monitor.
     - (4) Remove monitor from aircraft.
   - B. **Install Flight Recorder Monitor** (See figure 201.)
     - (1) Connect electrical wiring to monitor.
     - (2) Install monitor and secure with attaching parts.
     - (3) Restore electrical power to aircraft.



Flight Recorder Monitor Installation
Figure 201

SUNDSTRAND FLIGHT DATA RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. The Sundstrand FA542 flight data recorder system consists of a flight data recorder, a vertical accelerometer, an automatic event marker, two accumulators, two pneumatic valves installed in the recorder system pitot and static lines, a control panel or a trip and date encoder and FDR FAIL annunciator, and four circuit breakers. The flight data recorder system automatically records the following aircraft flight data: airspeed, altitude, vertical acceleration, heading, and elapsed time. The recorder readings may be analyzed by maintenance personnel to establish overhaul and maintenance requirements or, in the event of an accident, establish the cause.

B. **Component Description** (See figure 1.)

(1) The flight data recorder is installed in the RH side of the tailcone between frames 26A and 28. The recorder contains a magazine assembly that stores recorded flight data. Connections for pitot and static tubes are located on the face of the recorder.

(2) The vertical accelerometer is installed on the aircraft centerline on the divan seat floor below the baggage compartment floor overhang.

(3) An automatic event marker is installed between the recorder and the RH side of the aircraft.

(4) The accumulators are installed on stringer 13A forward of frame 27. The accumulators incorporate drain valves. Refer to Chapter 34 for drain valve maintenance practices.

(5) Pneumatic valves are installed in the recorder system pitot and static lines between frames 8 and 9 in the copilot's armrest.

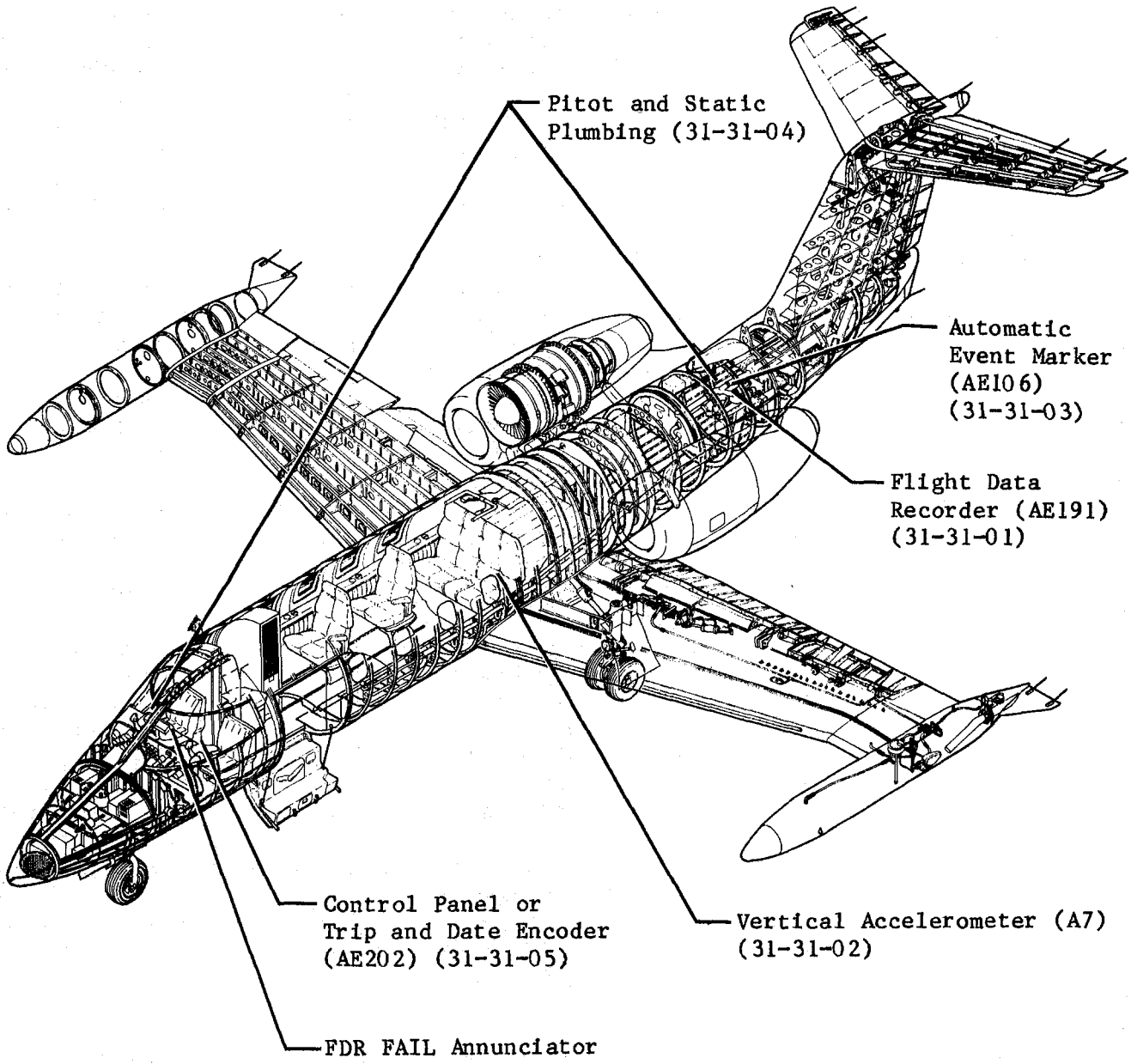
(6) The control panel or trip and date encoder is installed in the pedestal. The control panel incorporates a manual Event Marker Switch and an FDR FAIL annunciator which indicates system failure when illuminated. The control panel is part of the wing inspection, emergency light, and flight data recorder panel. The trip and date encoder permits recording of trip number and date and includes a manual Event Marker Switch, Repeat Switch, indicator light, and hours remaining indicator.

(7) The FDR FAIL annunciator, located on the glareshield warning light panel, indicates system failure when illumiated.

(8) Two circuit breakers supply 115 vac and 26 vac to the flight data recorder and two circuit breakers supply 28 vdc to the automatic event marker and the pneumatic valves.

2. OPERATION

A. When the Battery Switches are set to BAT 1 and BAT 2 and the Inverter Switches are set to PRI and SEC, the flight data recorder system begins recording. The system automatically records the following aircraft flight data: airspeed, altitude, vertical acceleration, heading, and elapsed time. For further information on the flight data recorder system, refer to manufacturer's publication listed under Supplemental Publications in the Introduction to this manual.



Sundstrand Flight Data Recorder System Component Locator
Figure 1

EFFECTIVITY: OPTIONAL
MM-99
Disk 957

SUNDSTRAND FLIGHT DATA RECORDER SYSTEM - ADJUSTMENT/TEST

1. ADJUSTMENT/TEST

A. Tools and Equipment

NAME	PART NUMBER	MANUFACTURER
Pitot/Static Tester	1811F or MB-1	Barfield Instrument Co. Atlanta, Ga. Aircraft Products Co. Bridgeport, Pa.
Turntable Assembly	TN 26409	Gates Learjet
Extension Cable	-	Fabricate Locally
Transparent Scale	600-2060-001	Sundstrand Data Control, Inc.
Test Foil	-	Sundstrand Data Control, Inc.

B. Functional Test of Sundstrand FA-542 Flight Data Recorder System (See figure 201.)

CAUTION: ° DO NOT APPLY OR RELEASE PRESSURE FASTER THAN 20 KNOTS PER SECOND.

° ASSURE THAT FLIGHT RECORDER PITOT AND STATIC PNEUMATIC VALVES ARE SET TO "OPEN."

NOTE: The integrity of the pitot/static system must be verified prior to performing flight recorder functional test. (Refer to Chapter 34.)

(1) Connect pitot/static tester to copilot's pitot and static system and slowly apply pitot pressure until airspeed indicator indicates 300 knots.
(2) Turn off pressure and seal system. Pressure drop shall not exceed 5 knots in 5 minutes. Slowly release pressure from copilot's pitot system.
(3) Open tester cross-bleed valve.
(4) Apply vacuum to copilot's static system until tester altimeter indicates 28,000 feet.
(5) Turn off vacuum and seal system. After one minute, altimeter shall not indicate less than 27,440 feet. Slowly release vacuum from copilot's static system.
(6) Remove magazine from flight recorder and replace existing spool with a spool of test foil.

(7) Lightly scribe a start line on test foil before inserting magazine into recorder.
(8) Remove nose compartment access doors.
(9) Disconnect electrical connector from secondary directional gyro. Remove attachingg parts and gyro from aircraft.
(10) Install gyro on turntable. Connect gyro to aircraft wiring using extension cable.
(11) Connect external power source to aircraft.
(12) Set Battery Switches to BAT 1 and BAT 2 and Inverter Switches to PRI and SEC. Assure that FLT RCDR 26 vac and 115 vac circuit breakers are depressed.
(13) Verify that FDR FAIL annunciator is not illuminated.

NOTE: Two minutes may be required for annunciator to extinguish.

(14) Pull FLT RCDR 115 vac circuit breaker and verify that FDR FAIL annunciator light illuminates (approximately two minutes). After annunciator is illuminated, depress circuit breaker.
(15) Use manual Event Marker Switch for designated test points in the following steps.
(16) Remove attaching parts from accelerometer.
(17) Place accelerometer in positions shown in table 201. Allow accelerometer to test in each position for not less than one minute.

ACCELEROMETER PHYSICAL POSITION	ACCELERATION POSITION IN DEGREES	ACCELERATION IN g'S	TOLERANCE
Connector facing up	0	1.0	±0.2 g
Connector facing outboard	90	0.0	±0.2 g
Connector facing down	180	-1.0	±0.2 g

Table 201

(18) Install accelerometer and secure with attaching parts.
(19) Assure that SEC DIR GYRO circuit breaker is depressed and wait three minutes for system to synchronize. Set SLAVE-FREE Switch to FREE.
(20) Position turntable with secondary directional gyro to four cardinal headings = N, E, S, W (±1) degree. (Refer to table 202.)
(21) Allow gyro to remain at each heading for not less than three minutes.
(22) Pull SEC DIR GYRO circuit breaker. Permit gyro to coast down in speed before removing it. Remove gyro from turntable and install in aircraft, maintaining gyro level during movement.

HEADING	DEGREES	TOLERANCE
N	360	±3°
E	90	±3°
S	180	±3°
W	270	±3°

Table 202

(23) Use automatic event marker for designated test points in the following steps. Initiate automatic event marker marking by depressing pilot's or copilot's microphone Press-To-Talk Switch.
(24) Adust pitot/static tester to obtain readings listed in tables 203 and 204. Seal off tester and allow vacuum to remain at each test point value for not less than one minute.
(25) Disconnect pitot/static tester from copilot's pitot and static system and remove tape from static ports.
(26) Pull FLT RCDR and EVENT MKR circuit breakers. Set Battery Switches to OFF and disconnect external power source from aircraft.
(27) Remove magazine from flight recorder and replace test foil with new foil. Manually reset time-remaining counter to indicate minimum time remaining for recorder operation (normally 400 hours) whenever foil is replaced. Time-remaining counter is a Veeder-Root counter which is mounted on flight recorder front cover assembly panel.
(28) Use scale overlay on test foil and evaluate recorded tracings for sequential directions and values against input data. Refer to tables 201, 202, 203, and 204 for trace tolerances. Refer to Calibration Chart furnished with each flight recorder. Ensure that all foil tracings are legible.
(29) Check test foil for all event marker tracings, time marks (minutes, quarter hour, and hour marks), aux. trace, and reference line.

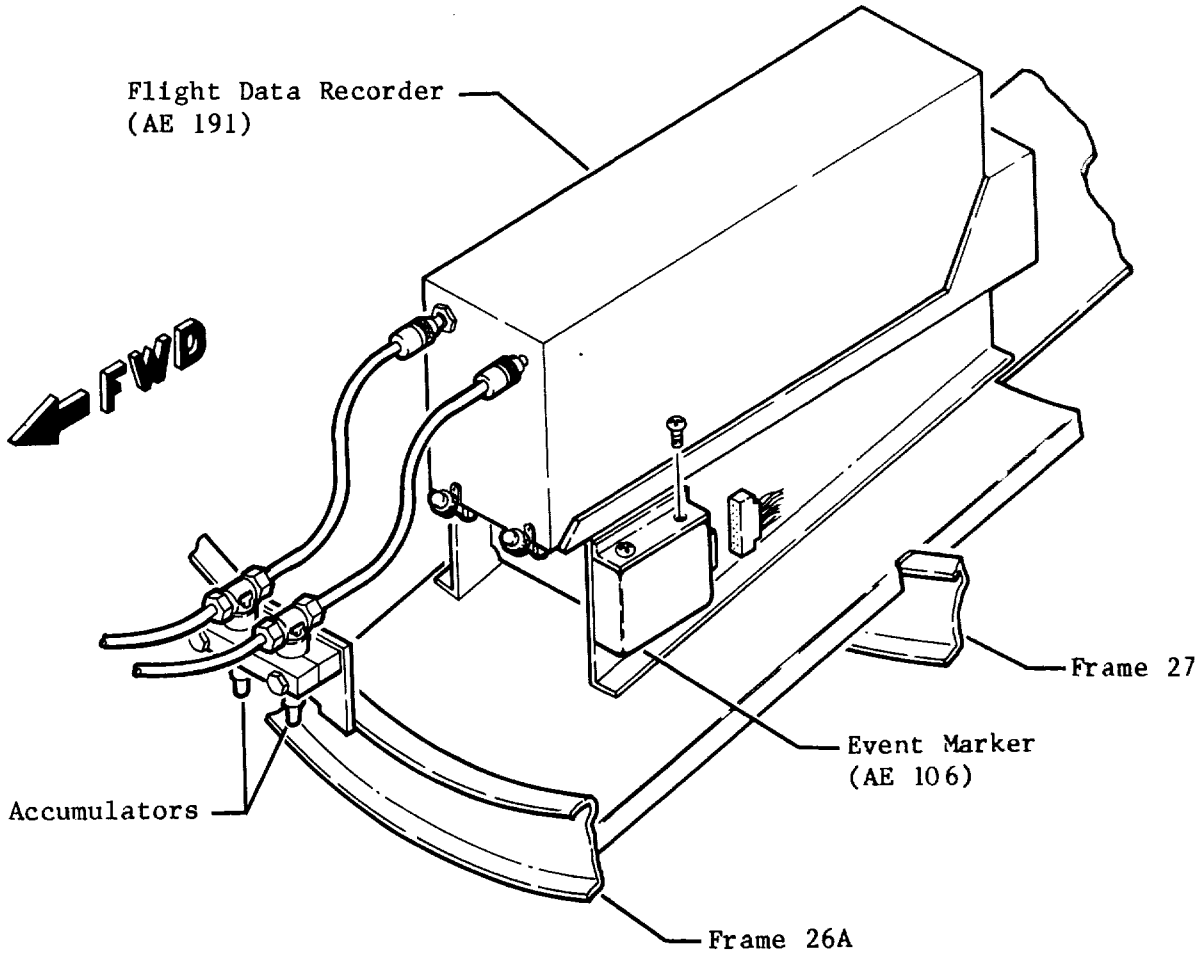
PITOT	
AIRSPEED KNOTS	TOLERANCE ± KNOTS
100	10
200	10
250	10
300	10

Table 203

STATIC	
ALTITUDE FEET	**TOLERANCE ± FEET**
2,000	100
10,000	150
20,000	300
40,000	600

Table 204

1. **Removal/Installation**
   A. Remove Flight Data Recorder. (See figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Close pneumatic pitot and static valves. (Refer to 31-31-04.)
      (3) Open tailcone access door.
      (4) Disconnect pitot and static lines from recorder. Cap lines.
      (5) Loosen hold-down nuts and remove recorder from aircraft.
   B. Install Flight Data Recorder. (See figure 201.)
      (1) Install flight data recorder on mounting rack and secure with hold-down nuts.
      (2) Remove caps and connect pitot and static lines to recorder.
      (3) Open pneumatic pitot and static valves. (Refer to 31-31-04.)
      (4) Restore electrical power to aircraft.
      (5) Close tailcone access door.
      (6) Perform leak check of pitot/static system. (Refer to Chapter 34.)
      (7) Perform operational check of flight data recorder. (Refer to 31-31-00.)

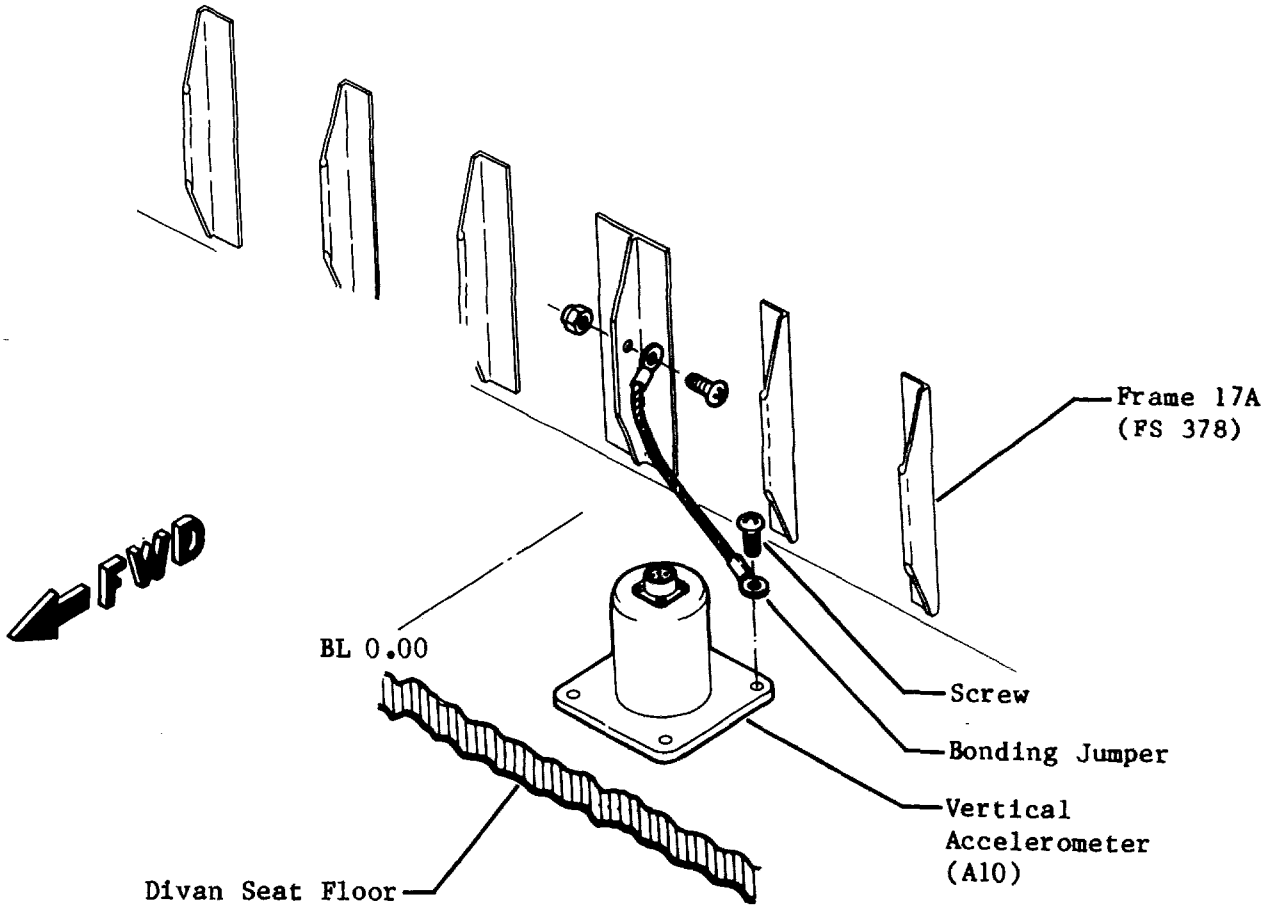


10-70A

Sundstrand Flight Data Recorder Installation
Figure 201

FLIGHT RECORDER ACCELEROMETER - MAINTENANCE PRACTICES

1. **REMOVAL/ INSTALLATION**
   - **A. Remove Flight Recorder Accelerometer** (See figure 201.)
     - (1) Remove electrical power from aircraft.
     - (2) Disconnect electrical connector from accelerometer.
     - (3) Remove attaching parts and accelerometer from baggage seat floor.
   - **B. Install Flight Recorder Accelerometer** (See figure 201.)
     - (1) Position accelerometer on divan seat floor.
     - (2) Secure accelerometer with attaching parts. Attach an electrical bonding jumper to accelerometer with one of the mounting screws.
     - (3) Connect electrical connector to accelerometer.
     - (4) Restore electrical power to aircraft.

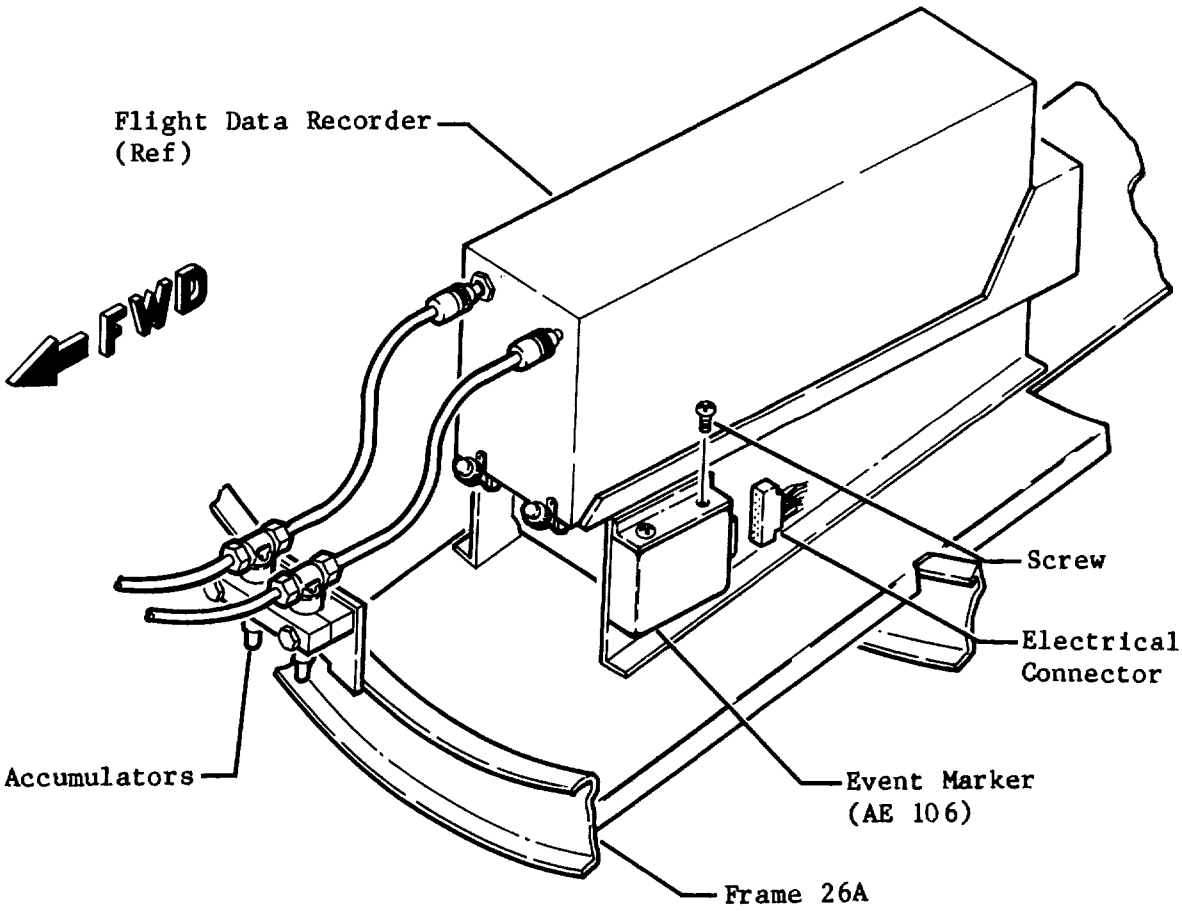


Flight Recorder Accelerometer Installation
Figure 201

10-117C

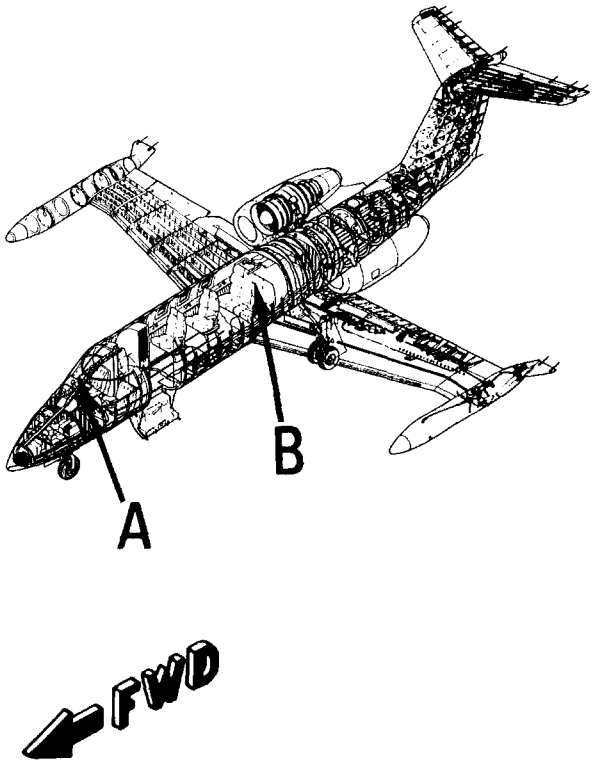
SUNDSTRAND AUTO-EVENT MARKER - MAINTENANCE PRACTICES

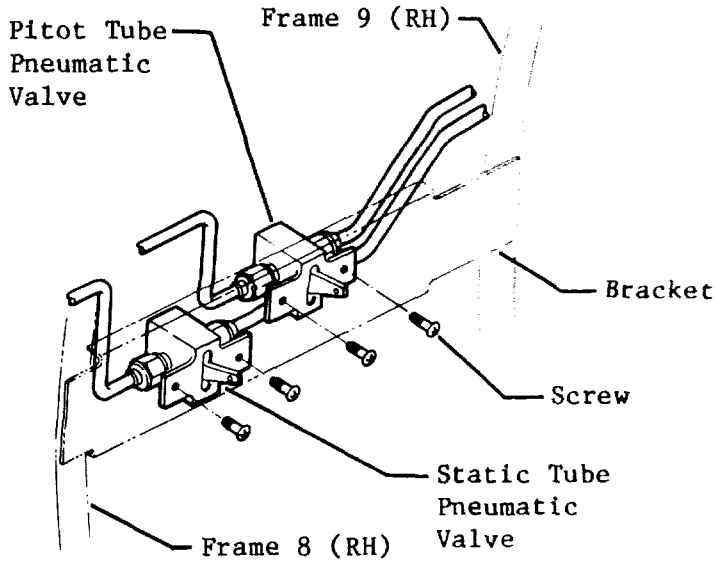
1. **REMOVAL/ INSTALLATION**
   - **A. Remove Auto-Event Marker** (See figure 201.)
     - (1) Open tailcone access door.
     - (2) Remove electrical power from aircraft.
     - (3) Disconnect electrical connector from auto-event marker.
     - (4) Remove attaching parts and auto-event marker from aircraft.
   - **B. Install Auto-Event Marker** (See figure 201.)
     - (1) Install auto-event marker and secure with attaching parts.
     - (2) Connect electrical connector to auto-event marker.
     - (3) Restore electrical power to aircraft.
     - (4) Close tailcone access door.



Sundstrand Event Marker Installation
Figure 201

1. **Removal/Installation**
   A. Remove Pneumatic Valves (See figure 201.)
      (1) Gain access to pneumatic valves.
      (2) Disconnect pitot and static lines from pneumatic valves.
      (3) Remove attaching parts and pneumatic valves from aircraft.
      (4) Cap pitot and static lines.
   B. Install Pneumatic Valves (See figure 201.)
      (1) Install pneumatic valves on bracket and secure with attaching parts.
      (2) Remove caps. Connect pitot and static lines to pneumatic valves.
      (3) Perform pitot/static system leak check. (Refer to Chapter 34.)



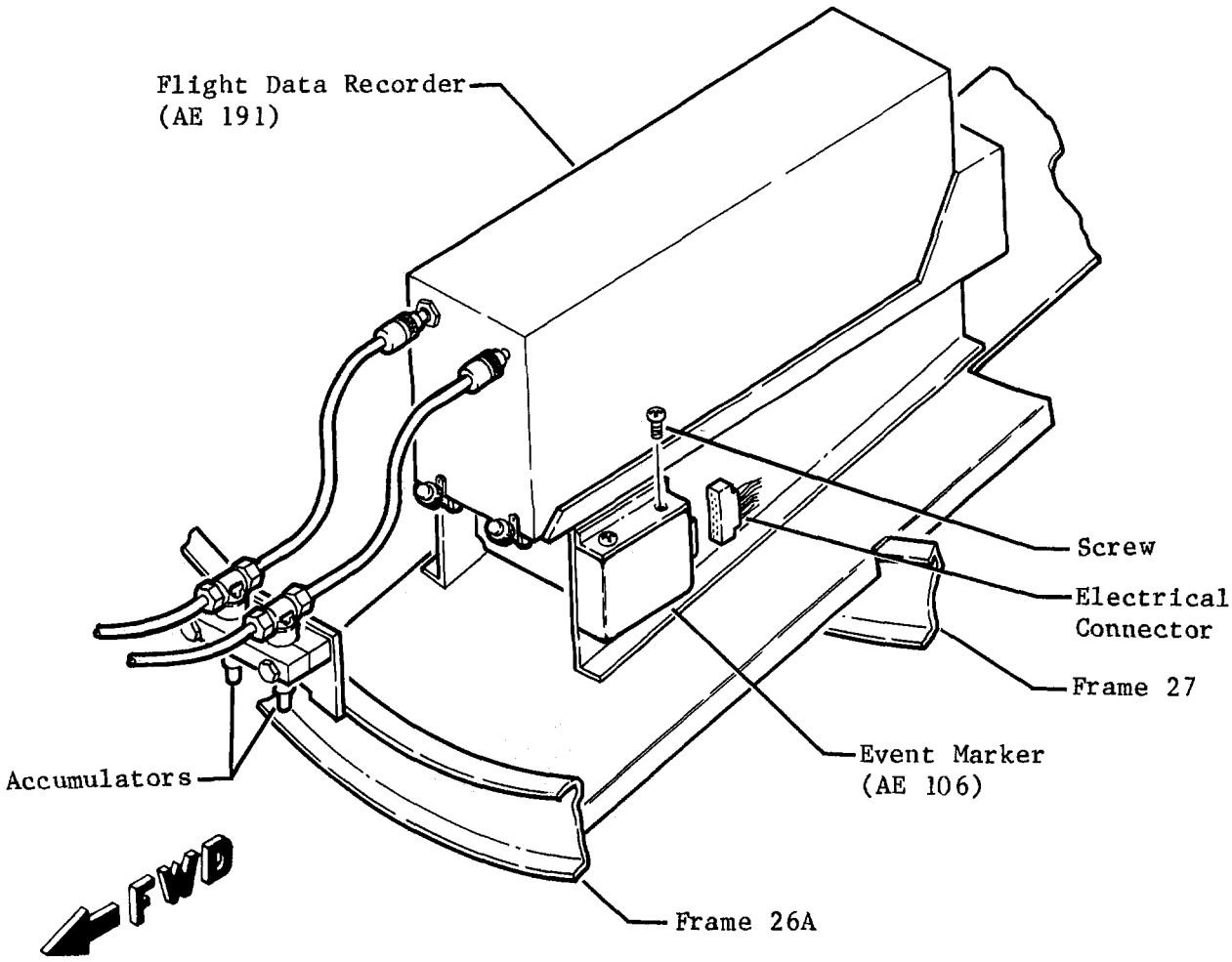


Detail A

Flight Data Recorder Pitot and Static Plumbing Installation
Figure 201 (Sheet 1 of 2)

C. Remove Accumulators (See figure 201.)
   (1) Open tailcone access door.
   (2) Disconnect pitot and static lines from accumulators.
   (3) Cap lines. Remove attaching parts and accumualtors from aircraft.

D. Install Accumulators (See figure 201.)
   (1) Install accumulators and secure with attaching parts. Remove caps.
   (2) Connect pitot and static lines to accumulators.
   (3) Perform pitot/static system leak check. (Refer to Chapter 34.)



Detail B

10-70A

Flight Data Recorder Pitot and Static Plumbing Installation
Figure 201 (Sheet 2 of 2)

TRIP AND DATE ENCODER - MAINTENANCE PRACTICES

1. REMOVAL/ INSTALLATION

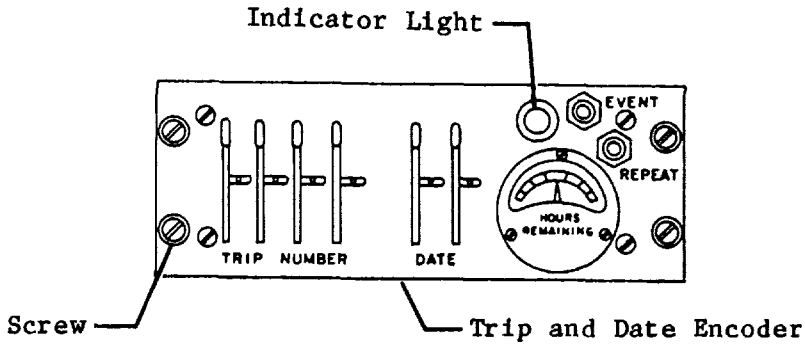
NOTE: The trip and date encoder may be installed on the center instrument panel or on the pedestal.

A. Remove Trip and Date Encoder (See figure 201.)

(1) Remove attaching parts securing encoder.
(2) Remove encoder sufficiently to expose electrical connector.
(3) Disconnect electrical connector from encoder and remove encoder from aircraft.

B. Install Trip and Date Encoder (See figure 201.)

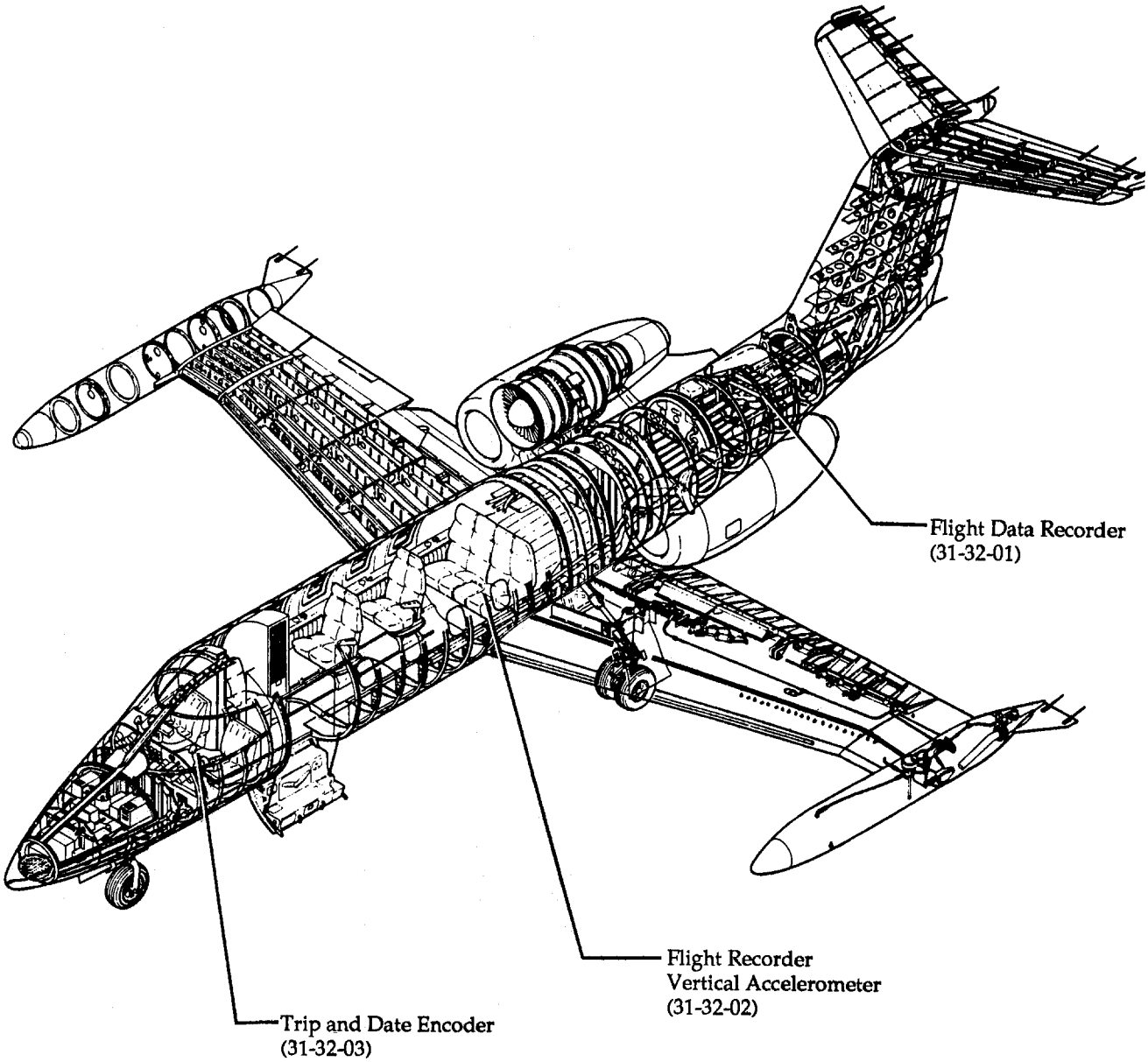
(1) Connect electrical connector to encoder.
(2) Install encoder and secure with attaching parts.



Trip and Date Encoder Installation
Figure 201

FAIRCHILD FLIGHT DATA RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. Description
   A. The Fairchild Model F800 Flight Data Recorder System is used to record pertinent flight profile data on a crash-survivable magnetic tape. The system components include a flight data recorder, a trip and date encoder unit, a vertical accelerometer, and the voice recorder cut-out box.
   B. The trip and date encoder furnishes the recorder tape with a flight number and date encoding so that the recorded data is correlated with the correct flight number and date. An encoder control panel is located on the pedestal which incorporates thumb-wheels to set the flight and date number, momentary pushbuttons for initiating the encoding cycle and special event marking, and an encoding cycle indicator light.
   C. The flight data recorder and storage unit is a crash-protected airborne data recording unit which continuously records selected input data on a six-track metal magnetic tape. The tape is a continuous loop tape-over type with a storage capacity to record the last 25 hours of flight history. After approximately 25 hours of operation the recorder will automatically start taping over previously recorded material. Input data is received for altitude, indicated airspeed, heading, and peak accelerations. An automatic self-test function is incorporated to continually monitor system functions and warn the crew if a malfunction occurs. For all data readouts, a Read Data Unit is required.
   D. The flight data recorder system utilizes the cockpit voice recorder cut-out box for system enable power control. System activation power is enabled and disabled by the engine oil pressure switches. Power will be disconnected 4 to 10 minutes after loss or shutdown of both engines. Power will be restored when either engine is restarted.
   E. System activation power is 115 vac supplied through the 1-amp FLT RCDR circuit breaker on the pilot's circuit breaker panel. Flight data recorder unit operating power is supplied through the 26 vac 1-amp FLT RCDR circuit breaker on the pilot's circuit breaker panel.
   F. Component Description
      (1) The flight data recorder is located in the tailcone between frame 29 and frame 30. The recorder case is international orange. A front mounted ATE connector is provided and serves a dual purpose:
         (a) As a connector for use with automatic or bench test equipment for final recorder checkout and for checkout of the recorder on the aircraft during calibration checks.
         (b) As a connector for use in dumping data into a copy reader while installed in the aircraft or on the bench.
      (2) A vertical accelerometer is located on the divan seat floor between frame 17 and frame 17A. The installation of the accelerometer is such that the mounting flange is horizontal and at the bottom. This is the one "g" position.
      (3) Trip and Date Encoder Control Panel - All crew activated controls for the flight data recording system are located on the trip and date encoder panel on the pedestal. The trip and date encoder provides coded pulses to the recorder as determined by six code switches.
         (a) Trip and Date Selectors - Four TRIP and two DATE number selector thumb-wheels are incorporated on the encoder control panel to mechanically set the flight number and date to be encoded on the flight data tape. Rotate the associated thumb-wheel until the desired number appears.
         (b) Recording Hours Remaining Meter - The RECORDING HOURS REMAINING meter has no function in this installation due to the continuous recording feature of the magnetic tape. The indicator needle will always show full scale deflection when the system is activated.
         (c) Encoding Cycle Indicator Light - The trip and date encoding cycle light on the control panel is illuminated when the 15-minute cycle is in progress. The light will extinguish when the cycle ends or power is disrupted.



Flight Data Recorder Component Locator
Figure 1

EFFECTIVITY: OPTIONAL

(d) Event Button - The EVENT pushbutton on the control panel is installed to provide the operator with a means of marking the recording tape in order to facilitate locating a particular event when the tape is interpreted. Marking an event is accomplished by depressing the EVENT pushbutton for approximately two seconds.

NOTE: Do not depress the EVENT button while the encoding cycle is in progress (indicator light illuminated). This may cause incorrect interpretation of trip and date numbers when the tape is read.

(e) Repeat Button - The momentary REPEAT pushbutton on the control panel is used to activate the automatic 15-minute trip and date encoding cycle. Depressing and releasing the button initiates the encoding cycle and illuminates the cycle indicator light. (See Operation.)

(4) FDR FAIL Light - The amber FDR FAIL annunciator light installed on the glareshield will alert the crew of a flight data recording system malfunction. The annunciator will illuminate under one or more of the following conditions:
(a) Loss of primary AC power. (Aircraft)
(b) Loss of low DC voltage. (Internal)
(c) Loss of either read or write data.
(d) Track change fault.
(e) Central Processing Unit (CPU) faults.
(f) Engine not started within 4 to 10 minutes of power application.

2. Operation

A. The Fairchild Model F800 Flight Data Recorder is functional when electrical power is applied to the aircraft. The internal self-test circuitry is automatically actuated and the recorder fault light (FDR FAIL) installed in the glareshield will illuminate. The fault light will extinguish in approximately five seconds. If the Recorder Fault light illuminates after seven seconds, the flight data recorder may not be functioning properly or the input data to the recorder is incorrect. Should any parameter expected by the recorder be missing, the Recorder Fault Light will illuminate. If no input parameter to the flight data recorder is missing and the self-test circuitry does not find a defect within the flight data recorder, the recorder will operate automatically until power is removed. There are no controls or switches associated with the flight data recorder and its operation is completely automatic.

B. The current trip number and date code should be set on the control panel prior to applying power to the aircraft.

C. The flight data recording system will activate when power is applied to the aircraft. If an engine is not started within 4 to 10 minutes of system activation, the system will shutdown and the FDR fail light will illuminate. Should system activation be desired without engine operation, DC and AC power must be cycled or the system circuit breakers must be pulled and reset at each 4 to 10 minute interval until an engine is started.

NOTE: If the previous flight trip and date code is activated when the system is powered-up, set new code on control panel prior to actuating the REPEAT button.

FLIGHT DATA RECORDER SYSTEM - TROUBLE SHOOTING

1. **Troubleshooting**
   A. Tools and Equipment

NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Multimeter	Simpson 260	Simpson	Check voltages and continuity

B. Flight Data Recorder System Trouble Shooting. (See Figure 101.) (Refer to Avionics and Optional Electrical Customization Wiring Manual for Flight Data Recorder System wiring diagrams.)

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
1. Flight Data Recorder Inoperative, FDR FAIL Annunciator Illuminated.		
a. Loss of 115 vac power.	Check for open FLT RCDR 115 vac circuit breaker.	Depress FLT RCDR 115 vac circuit breaker.
b. Loss of 26 vac power.	Check for open FLT RCDR 26 vac circuit breaker.	Depress FLT RCDR 26 vac circuit breaker.
c. Open circuit to Flight Data Recorder.	Check for continuity in all power supply wires and all ground wires.	Repair or replace defective wiring or components as necessary.
d. Faulty Flight Data Recorder.	Check for continuity in the Flight Data Recorder System interconnect wiring. Substitute with known operational Flight Data Recorder.	Replace Flight Data Recorder (refer to 31-32-01).
2. Flight Data Recorder Trip and Date Encoder Inoperative.		
a. Open circuit to Trip and Date Encoder.	Check for continuity in all power supply wires and all ground wires.	Repair or replace defective wiring or components as necessary.
b. Faulty Trip and Date encoder.	Check for continuity in Trip and Date Encoder interconnect wiring. Substitute with known operational Trip and Date Encoder.	Replace Trip and Date Encoder (refer to 31-32-03).

Flight Data Recorder System Trouble Shooting
Figure 101

1. General
   A. Maintenance personnel should be familiar with the flight data recorder system and the input parameters.
      (1) Electrical power (115 vac) is routed through the voice recorder cutout to the Flight Data Recorder. The interlock system of the voice recorder cutout shall be satisfied or electrical power will be removed from the Flight Data Recorder.
      (2) Input Parameters
         (a) Heading information is supplied by primary directional gyro.
         (b) Airspeed information is supplied by air data unit.
         (c) Altitude information is supplied by pilot's encoding altimeter.
         (d) Trip and date information is supplied by a trip and date encoder. The vertical 'g' information is supplied by an accelerometer. Both trip and date encoder and accelerometer are flight data recorder system components.

2. Tools and Equipment

   NOTE: Equivalent substitutes may be used in lieu of the following:

NAME	PART NUMBER	MANUFACTURER	USE
Pitot-Static Test Set	MB-1	Aircraft Products Co. Bridgeport, PA.	Simulate altitude and airspeed.
	or		
	1811F	Barfield Instrument Co. Atlanta, GA.	Simulate altitude and airspeed.
Portable Data Display (Print) Unit	17-TE165	Fairchild Weston Systems Inc. Sarasota, FL.	
	or		
Copy Recorder	17-TE160	Fairchild Weston Systems Inc. Sarasota, FL.	
	or		
Portable Data Transfer	17-TE163	Fairchild Weston Systems Inc. Sarasota, FL.	

3. Adjustment/Test
   A. Functional Test of Flight Data Recorder System.
      (1) Pull FLT RCDR circuit breakers.
      (2) Pull R PITOT HT and L PITOT HT circuit breakers.
      (3) Connect pitot-static tester to pilot's pitot-static system. Observe cautions and procedures defined in Chapter 34.
      (4) Locate the cockpit voice recorder cutout box. (Refer to Chapter 23.)
         (a) Disconnect electrical connector from cutout box.
         (b) Place a jumper wire between pins J and K.

CAUTION: 115 VAC WILL BE APPLIED THROUGH THE JUMPER WIRE WHEN THE FLT RCDR 115 VAC CIRCUIT BREAKER IS ENGAGED.

(5) Apply external power to the aircraft. Set Battery Switches on.
(6) Verify that parameter input systems are operating.
(7) Allow three minutes elapsed time for gyro and radios to stabilize.
(8) Set FREE/SLAVE Switch to FREE position.
(9) Set Trip number to 2161 and date to current date on Trip and Date Encoder.
(10) Verify that FDR FAIL annunciator on glareshield is illuminated.
(11) Engage FLT RCDR circuit breakers. FDR FAIL annunciator shall extinguish in approximately five seconds.
(12) Before proceeding, allow trip and date to encode as follows:
  (a) A light on the trip and date encoder will illuminate and remain illuminated until coding cycle in progress is complete.
(13) Set pitot-static tester to the following values and slew pilot's DG to correct heading. Perform step (14) at each setting.

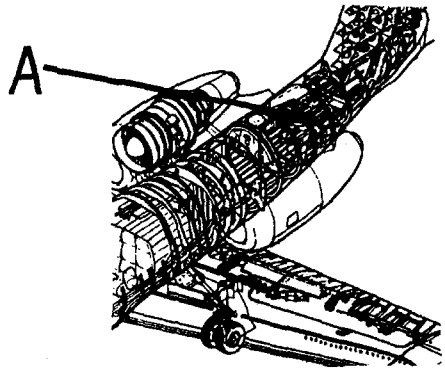
Airspeed	Altitude	Heading	Key Comm Transmitter
200	45,000	000	
200	30,000	030	VHF COMM 1 Twice
300	20,000	060	VHF COMM 2 Three Times
250	15,000	120	VHF COMM 1 Twice
200	10,000	180	VHF COMM 2 Three Times
150	5,000	210	
0	Fld Elev	300	

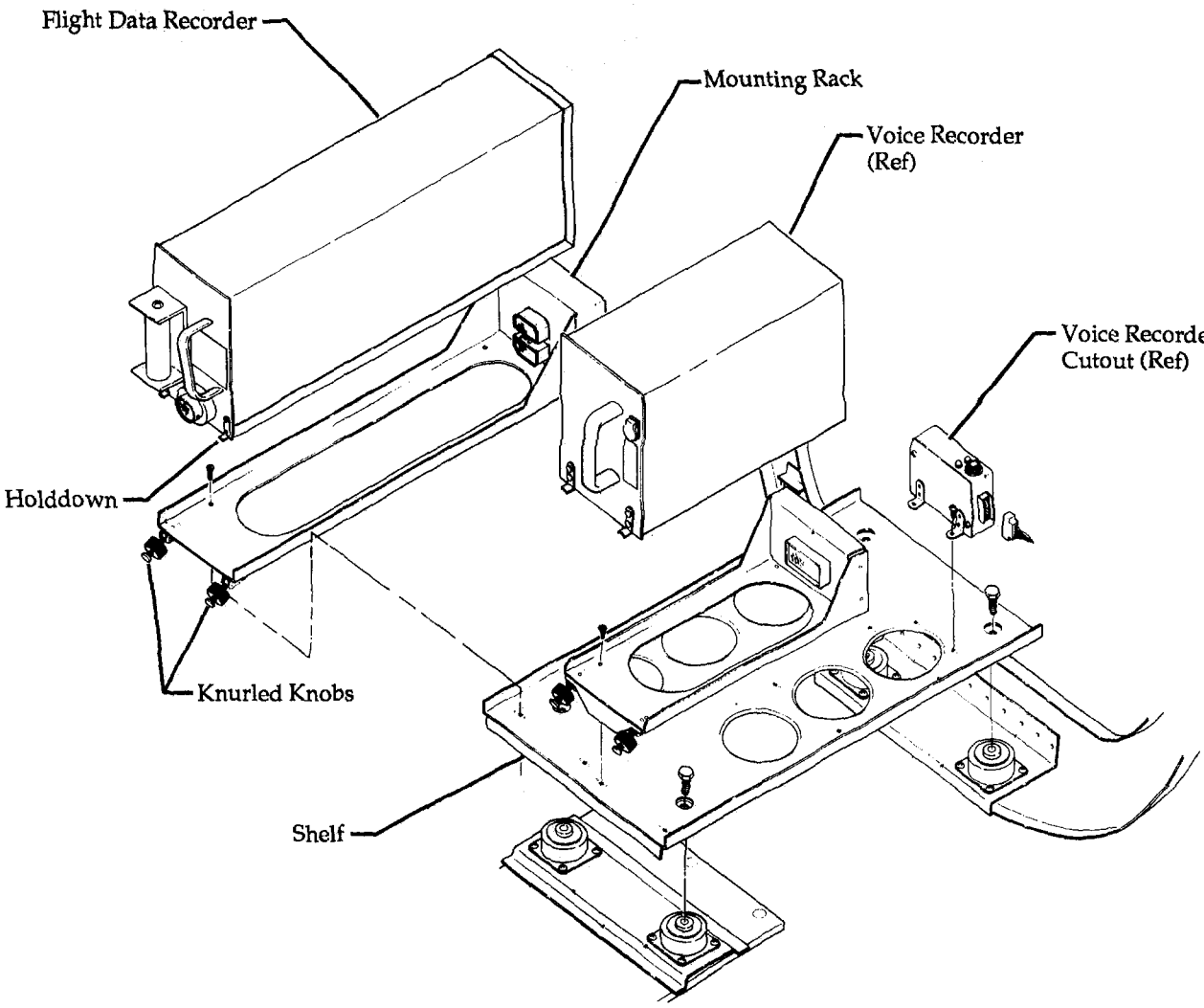
(14) At each setting press EVENT button for five seconds. Key microphone as indicated in step (13).
(15) Accelerometer Test
  (a) Remove accelerometer mounting screws, allowing accelerometer to be manipulated manually. (Refer to 31-32-02.)
  (b) Press EVENT button for five seconds.
  (c) Hold accelerometer in normal mounted position for 30 seconds.
  (d) Rotate 90 degrees (base vertical) and hold for 30 seconds.
  (e) Rotate further 90 degrees (base on top) and hold for 30 seconds.
  (f) Rotate back to normal position and shake gently for 30 seconds.
(16) Disconnect pitot-static tester and restore aircraft to normal configuration.
(17) Connect a portable transfer or recorder unit to the connector on the face panel of flight data recorder. Transfer information from flight data recorder to portable unit, in accordance with manufacturers instructions supplied with unit.

NOTE: If a portable transfer or recorder unit is not available, perform step (18) and remove flight data recorder from the aircraft and forward it to a location capable of interpreting the recorded information.

(18) Remove electrical power from aircraft.
(19) Install accelerometer. (Refer to 31-32-02.)
(20) Remove jumper wire from cockpit voice recorder cutout and connect aircraft wire bundle connector.
(21) Depress R PITOT HT and L PITOT HT circuit breakers.
(22) Restore aircraft to normal.

1. **Removal/Installation**
   A. Remove Flight Data Recorder. (See Figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Lower tailcone access door.
      (3) Loosen knurled knobs to release holddowns securing recorder in mounting rack.
      (4) Use handle to pull flight data recorder from mount and remove recorder from aircraft.
   B. Install Flight Data Recorder. (See Figure 201.)
      (1) Position recorder in mounting rack and slide aft engaging electrical connector.
      (2) Lift knurled knobs to engage holddowns and tighten knurled knobs.
      (3) Restore electrical power to aircraft.
      (4) Perform Self Test function when recorder is installed without maintenance to recorder. (FDR FAIL annunciator will extinguish approximately five seconds after power is applied to system.) If recorder is replaced or had maintenance performed on it, perform Functional Test of Flight Data Recorder System. (Refer to 31-32-00, Adjustment/Test.)
      (5) Close tailcone access door.
      (6) Restore aircraft to normal.





Detail A

10-54B-4

Flight Data Recorder
Figure 201

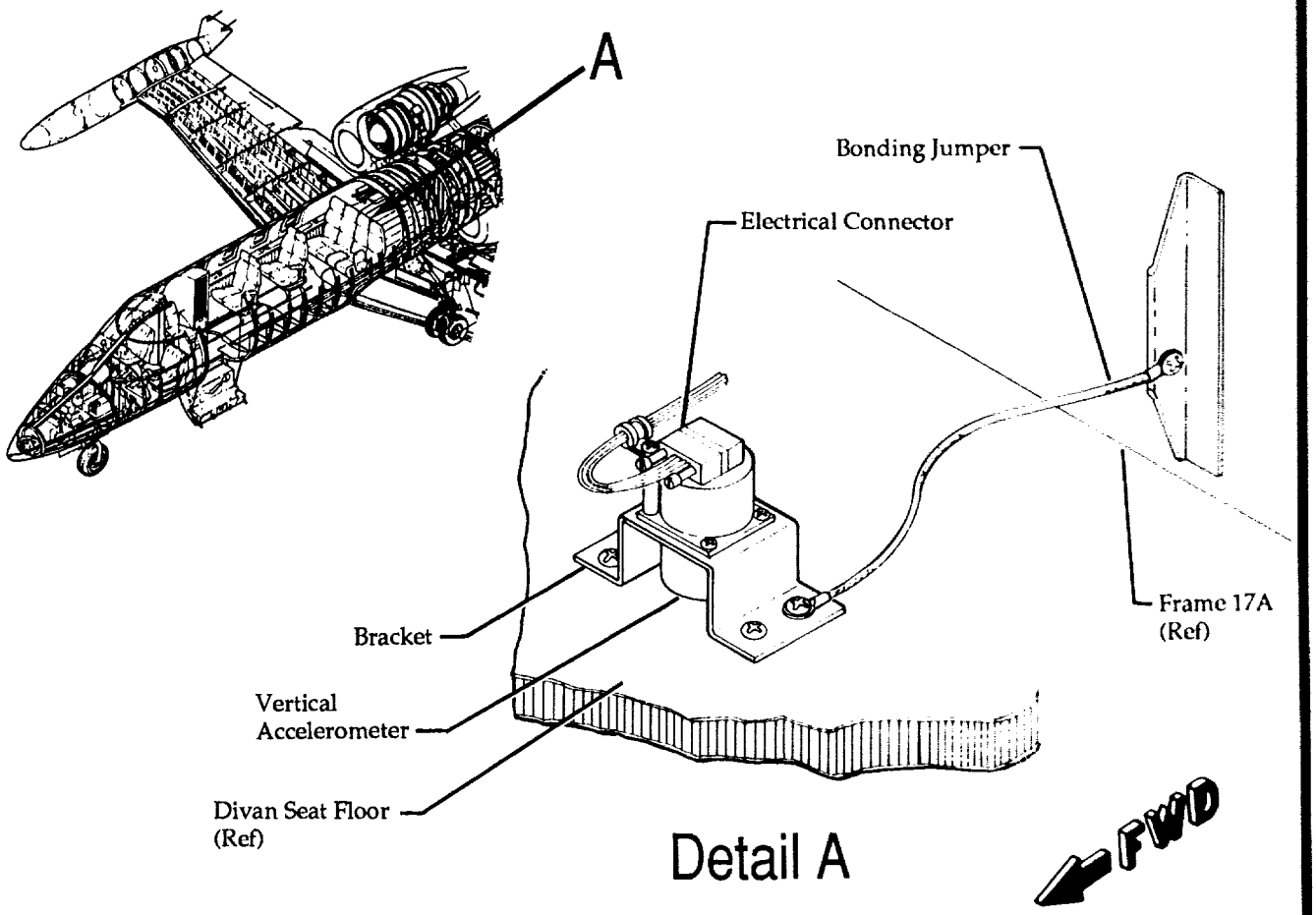
EFFECTIVITY: OPTIONAL

FLIGHT RECORDER VERTICAL ACCELEROMETER - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Flight Recorder Vertical Accelerometer. (See figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Disconnect electrical connector from vertical accelerometer.
      (3) Remove attaching parts and accelerometer from divan seat floor.
   B. Install Flight Recorder Vertical Accelerometer. (See figure 201.)
      (1) Position vertical accelerometer on divan seat floor.
      (2) Connect electrical connector to accelerometer.
      (3) Secure accelerometer with attaching parts. Attach an electrical bonding jumper to accelerometer with one of the mounting screws.

      NOTE: Check electrical resistance between vertical accelerometer and aircraft structure. Resistance shall NOT be greater than the value specified in Chapter 20 of the wiring manual.

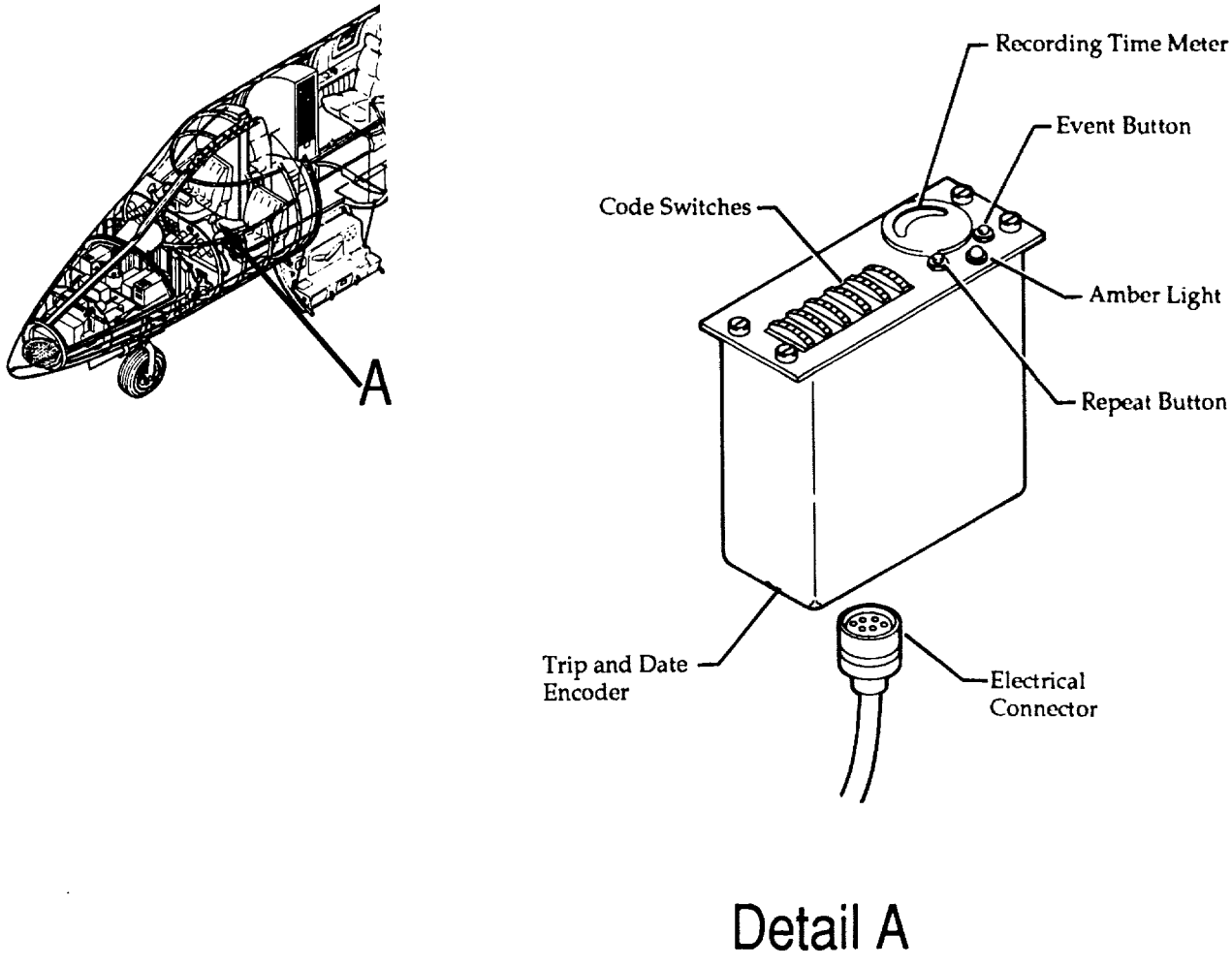
      (4) Restore electrical power to aircraft.
      (5) Perform Functional Test of Flight Data Recorder System. (Refer to 31-32-00, Adjustment/Test).
      (6) Restore aircraft to normal.



10-117A

Flight Recorder Vertical Accelerometer Installation
Figure 201

1. Removal/Installation
   A. Remove Trip and Date Encoder. (See figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Release quick-attach fasteners securing trip and date encoder to pedestal.
      (3) Lift trip and date encoder from pedestal, disconnect electrical connector, and remove trip and date encoder.
   B. Install Trip and Date Encoder. (See figure 201.)
      (1) Connect electrical connector to trip and date encoder.
      (2) Slide trip and date encoder into pedestal and secure to pedestal by locking quick-attach fasteners.
      (3) Restore electrical power to aircraft.
      (4) Perform Functional Test of Flight Data Recorder System. (Refer to 31-32-00, Adjustment/Test.)
      (5) Restore aircraft to normal.



10-116A

Trip and Date Encoder Installation
Figure 201

AURAL WARNING UNIT - DESCRIPTION AND OPERATION

1. Description

A. On *Aircraft 35-002 thru 35-065, except 35-050, and 36-002 thru 36-017*, the aural warning unit is located aft of frame 14 under the RH seat floorboard. On *Aircraft 35-050*, the aural warning unit is located aft of frame 13E between stringers 18R and 19R. On *Aircraft 35-066 and Subsequent, 36-018 and Subsequent*, the aural warning unit is located aft of frame 13B between stringers 18L and 19L. On *Aircraft 35-657 and Subsequent and 36-060, 36-061, 36-064 and Subsequent*, a relay (K36) is located adjacent to the aural warning unit.

B. The aural warning unit supplies four different tones to the aircraft audio system. These are Mach overspeed warning, cabin pressure altitude warning, autopilot disengage aural warning and landing gear aural warning.

2. Operation

A. Cabin altitude aural warning is obtained when a ground signal is applied to pin B of P71. (Refer to 31-51-00 in the Wiring Manual.) The tone is applied to the audio system via pins C (Headphone output) and E (Speaker output) of P71. The tone varies approximately 700 Hz within a frequency range of 1680 to 3360 Hz every 0.3 (±0.06) seconds. When 28 vdc is applied to pin K, P71 (reset), the tone will cease for approximately 60 seconds before starting again.

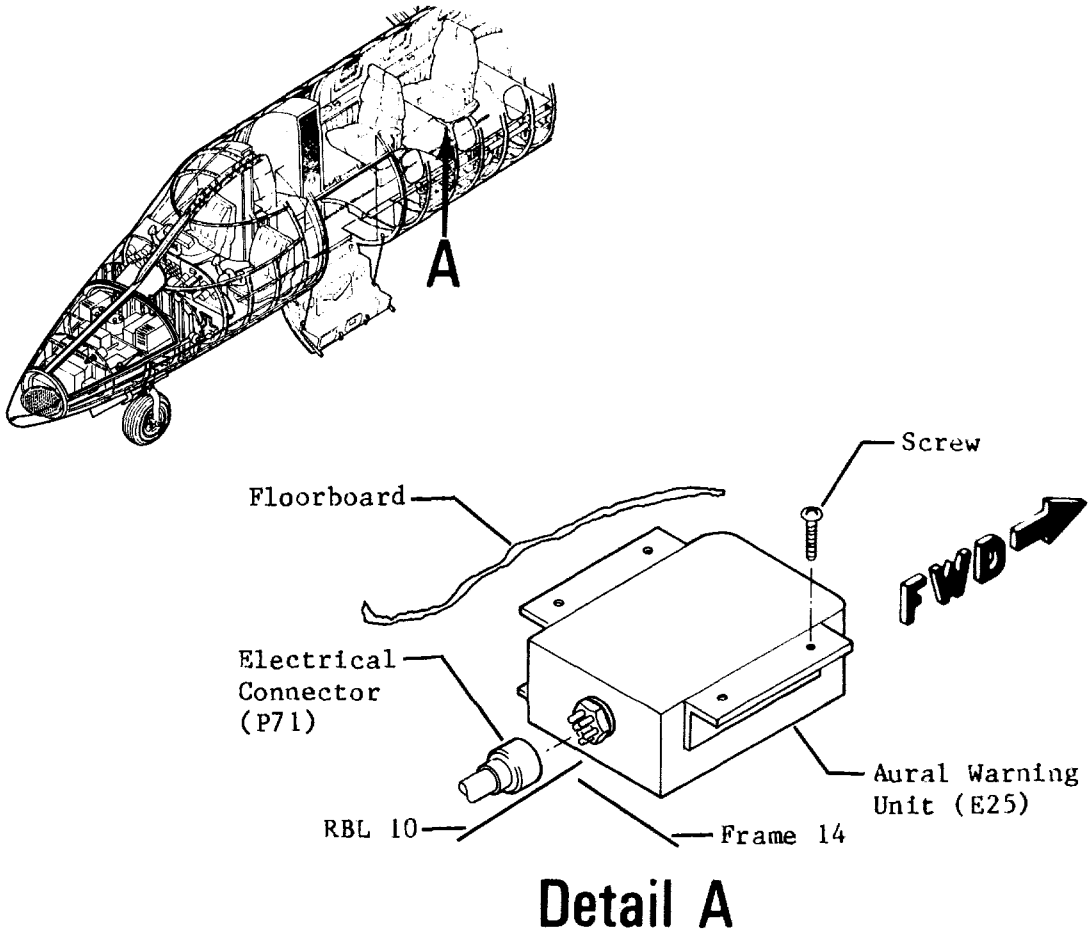
B. Mach overspeed aural warning is obtained when a ground is applied to pin H of P71. The tone increases approximately 900 Hz within a frequency range of 1900 to 3000 Hz every 1.5 seconds. The tone is applied to the audio system via pins C (Headphone output) and E (Speaker output) of P71. The mach aural warning will continue until corrective action has been taken.

C. The autopilot disengage aural warning is obtained when 28 vdc is removed from pin F of P71. The tone is 500 Hz and lasts approximately one second. The tone is applied to the audio system via pins C (Headphone output) and E (Speaker output) of P71.

D. The gear aural warning is obtained when a ground is applied to pin D of P71. The tone is a continuous 220 Hz tone and is applied to the audio system via pins C (Headphone output) and E (Speaker output) of P71. The tone may be muted by holding the TEST-MUTE Switch on the gear control panel to MUTE. *Aircraft 35-657 and Subsequent and 36-060, 36-061, 36-064 and Subsequent*, the relay (K36) eliminates distortion in the gear horn audio alarm.

AURAL WARNING UNIT - MAINTENANCE PRACTICES

1. **Removal/Installation**
   A. Remove Aural Warning Unit (See figure 201.)
      (1) Remove electrical power from aircraft.
      (2) Remove seats and upholstery as required to gain access to RH seat floorboard between frames 14 and 15.
      (3) Remove attaching parts and floorboard.
      (4) Disconnect electrical connector from unit.
      (5) Remove attaching parts and aural warning unit from floorboard.
   B. Install Aural Warning Unit (See figure 201.)
      (1) Position unit on underside of floorboard and secure with attaching parts.
      (2) Connect electrical connector to aural warning unit.
      (3) Position floorboard on structure and secure with attaching parts.
      (4) Install previously removed upholstery and seats.
      (5) Restore electrical power to aircraft.



A9-211A

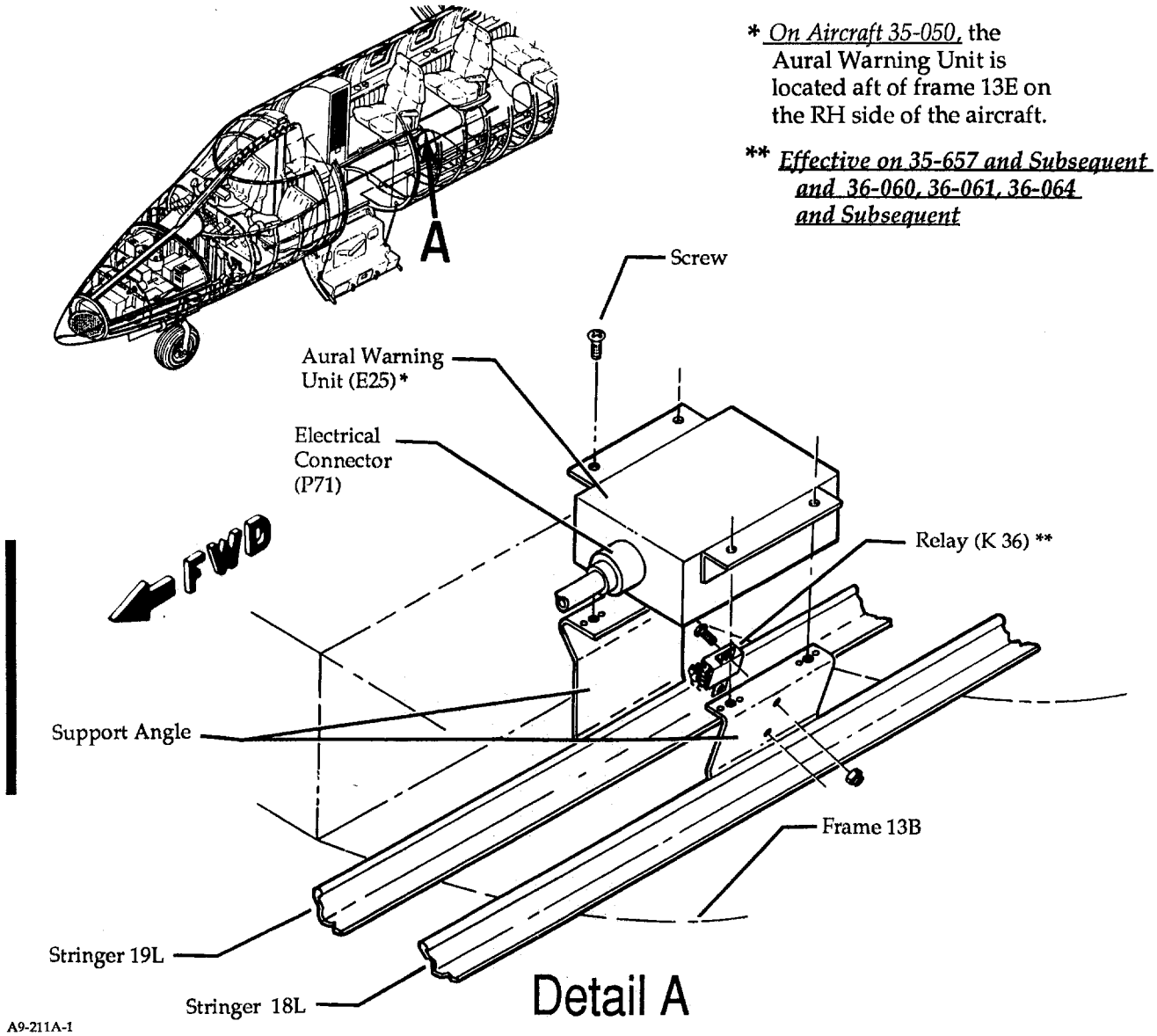
Aural Warning Unit Installation
Figure 201

C. Remove Aural Warning Unit (See figure 202.)
   (1) Remove electrical power from aircraft.
   (2) Remove equipment and upholstery as required to gain access to aural warning unit.
   (3) Disconnect electrical connector frame aural warning unit.
   (4) Remove attaching parts and aural warning unit from aircraft.

D. Install Aural Warning Unit (See figure 202.)
   (1) Position unit on support angles and secure with attaching parts.
   (2) Connect electrical connector to aural warning unit.
   (3) Install previously removed upholstery and equipment.
   (4) Restore electrical power to aircraft.

2. **Adjustment/Test**

A. Adjustment of the aural warning unit is made per the Operational Check of the Audio Control System in Chapter 23.



Aural Warning Unit Installation
Figure 202