CHAPTER

74

IGNITION

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*74-30-00	1	Deleted
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* Asterisk indicates pages revised, added, or deleted by current revision
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Record of Temporary Revisions

Rev. No.	Date Inserted	Date Removed	Page Number	Rev. No.	Date Inserted	Date Removed	Page Number
74-1	Mar 25/75	Oct 1/75 Rev 4	74-30-02 Page 201				
74-2	Mar 25/75	Oct 1/75 Rev 4	74-00-00 Page 1				
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IGNITION - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. Each engine ignition system consists of an ignition unit, ignition leads, igniter plugs, an air ignition switch, an ignition switch and a 28 vdc circuit breaker.

B. This chapter covers maintenance practices on the air ignition switches, ignition switches and the system circuit breakers. For maintenance practices on the ignition unit, ignition leads and igniter plugs, refer to Engine Maintenance Manual.

C. The igniter unit, mounted on the upper left side of the fan bypass housing, is a radio noise suppressed, high voltage, capacitor discharge, intermittent sparking type unit. The ignition unit utilizes 10 to 30 vdc to provide 18,000 to 24,000 volts output to the igniter plugs. The system is capable of continuous operation if required by flight conditions. The unit provides voltage to produce sparks at the approximate rate of 1 to 5 per second to each igniter lead.

D. The ignition leads are shielded, high-tension flexible leads connecting the ignition unit and igniter plugs.

E. The igniter plugs are mounted at six and seven o'clock positions on the turbine plenum. The plugs are operated by separate ignition leads and fire when pulsed by the ignition unit.

F. The ignition switches, one LH and one RH, are located within the throttle quadrant. The switches are actuated by the thrust levers above cutoff to 70% rpm.

G. The Air Ignition Switches labeled L AIR IGN and R AIR IGN are located on the switch panel. The switches, normally in the OFF position, are used when conditions require continuous ignition operation.

H. The Air Ignition circuit breakers are located in the pilot's and copilot's circuit breaker panels and are labeled L AIR IGN and R AIR IGN respectively.

I. An air ignition light, located above its respective AIR IGN Switch, is installed to indicate ignition system operation. The light will illuminate when the applicable ignition system is operating either continuously (AIR IGN Switch on) or automatically (start cycle).

2. OPERATION

A. 35-002 and Subsequent and 36-002 and Subsequent not equipped with Thrust Reverser System.

(1) During an engine start cycle, 28 vdc from the applicable IGN & START circuit breaker is applied through the Starter-Generator Switch (START position) and the applicable start control relay in the fuel control relay panel to the pedestal ignition switch. When the thrust levers are advanced from cut-off to idle, the ignition switch is actuated and applies 28 vdc power through the applicable AIR IGN Switch (OFF position) to the engine ignition units and the applicable AIR IGN light.

(2) When engine speed reaches approximately 50% N_2 turbine speed (45% on aircraft equipped with 2101142-3 or 2101142-5 fuel computers), the fuel computer applies 28 vdc to a control relay in the fuel control relay panel and de-energizes the applicable start control relay. 28 vdc is removed from the ignition units and the applicable AIR IGN light will extinguish.

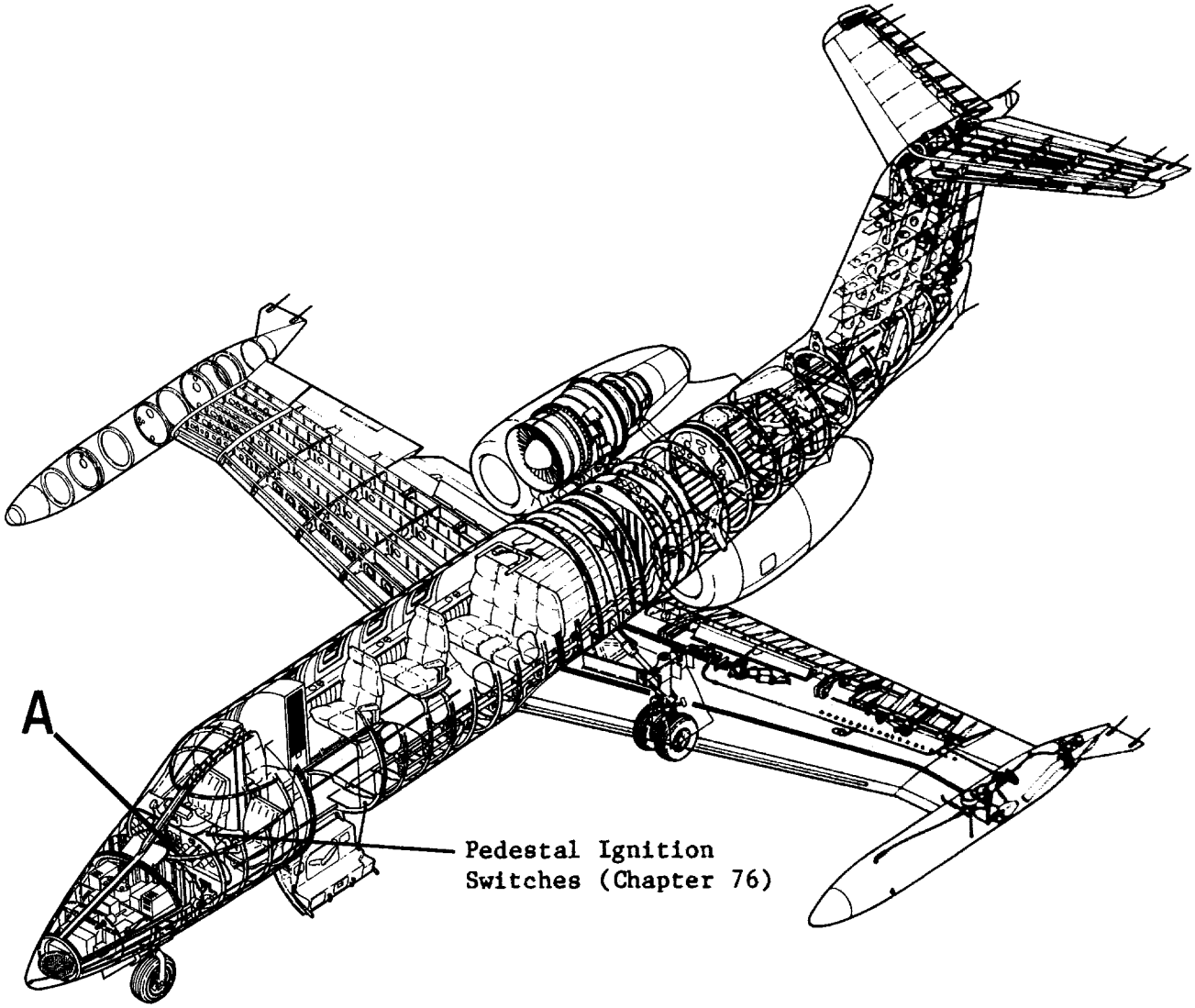
(3) Continuous ignition is provided by setting the applicable Air Ignition Switch to AIR IGN. AIR IGN light will be illuminated as long as the switch is set to AIR IGN.

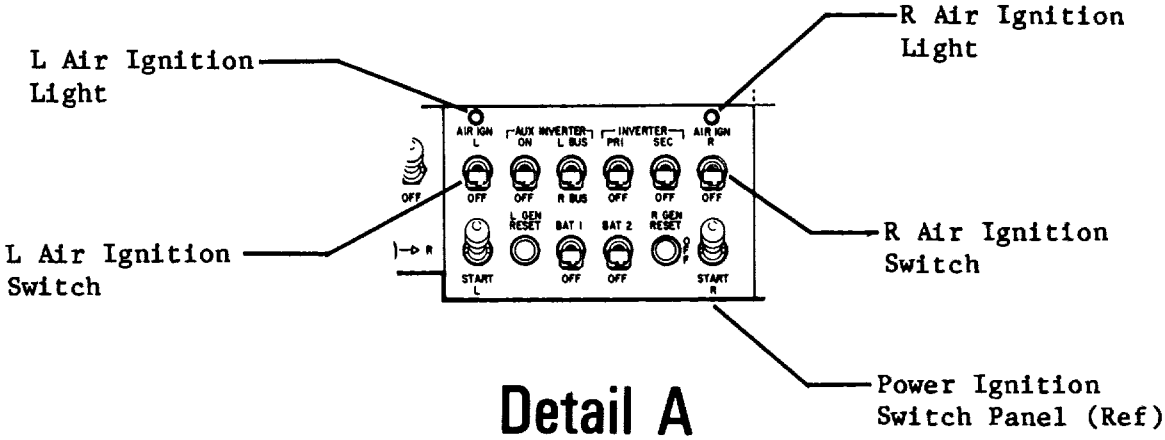
B. 35-002 thru 35-500, 35-506 and 36-002 thru 36-053 equipped with Thrust Reverser System.

(1) During an engine start cycle, 28 vdc from the applicable IGN & START circuit breaker is applied through the Starter-Generator Switch (START position) and the applicable start control relay in the fuel control relay panel to a set of contacts of the de-energized ignition and emergency stow control relay in the emergency stow cutout relay box. When the thrust levers are advanced from cut-off to idle, the pedestal ignition switch completes a ground circuit and energizes the ignition and emergency stow control relay. Once energized, 28 vdc is applied through the applicable AIR IGN Switch (OFF position) to the engine ignition unit and the applicable AIR IGN light.

(2) When engine speed reaches approximately 50% N_2 turbine speed, (45% on aircraft equipped with 2101142-3 or 2101142-5 fuel computers), the fuel computer applies 28 vdc to a control relay in the fuel control relay panel and de-energizes the applicable start control relay. 28 vdc is removed from the ignition units and the applicable AIR IGN light will extinguish.

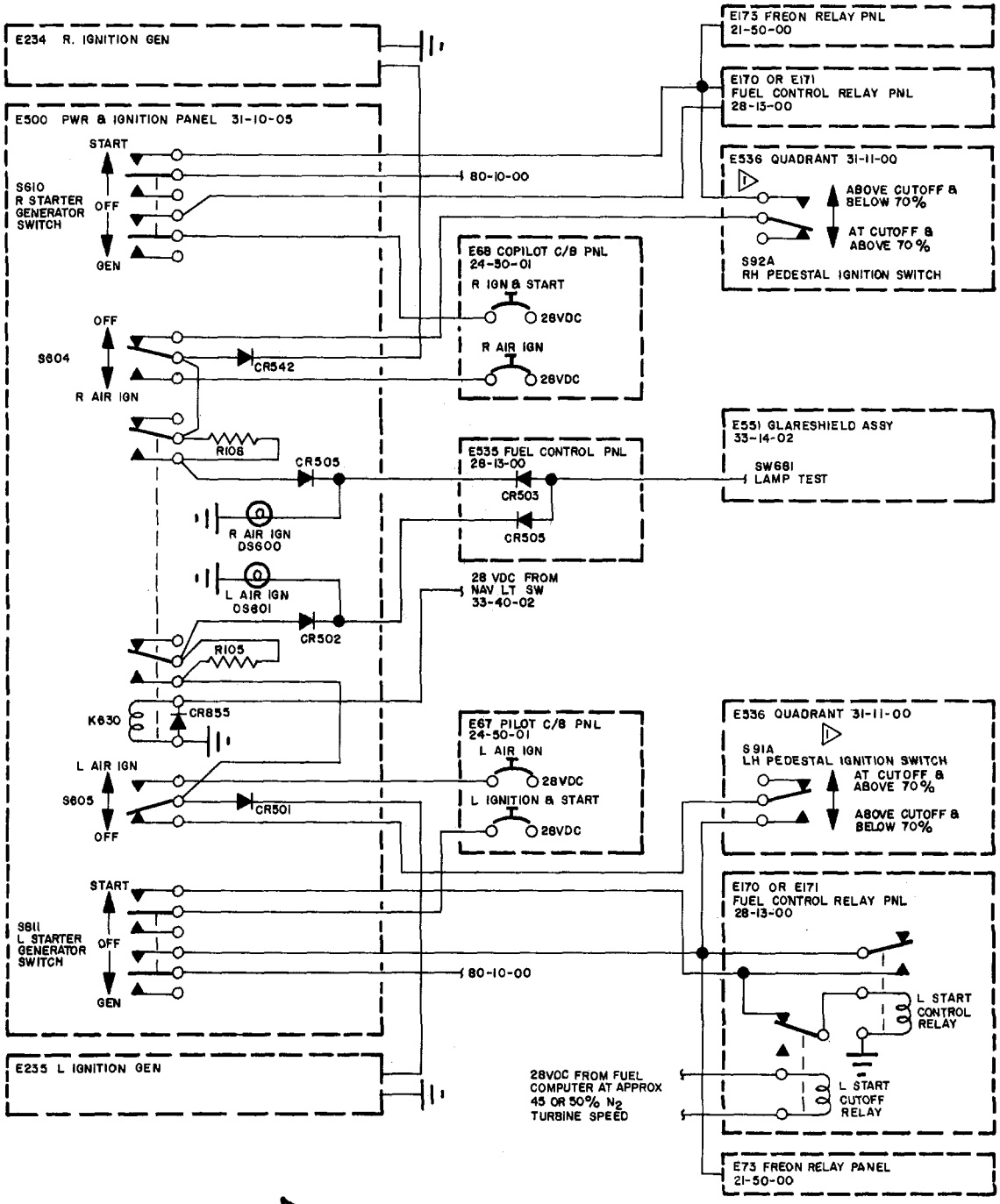
(3) Continuous ignition is provided by setting the applicable Air Ignition Switch to AIR IGN. AIR IGN light will be illuminated as long as the switch is set to AIR IGN.





Detail A

Ignition System Locator
Figure 1

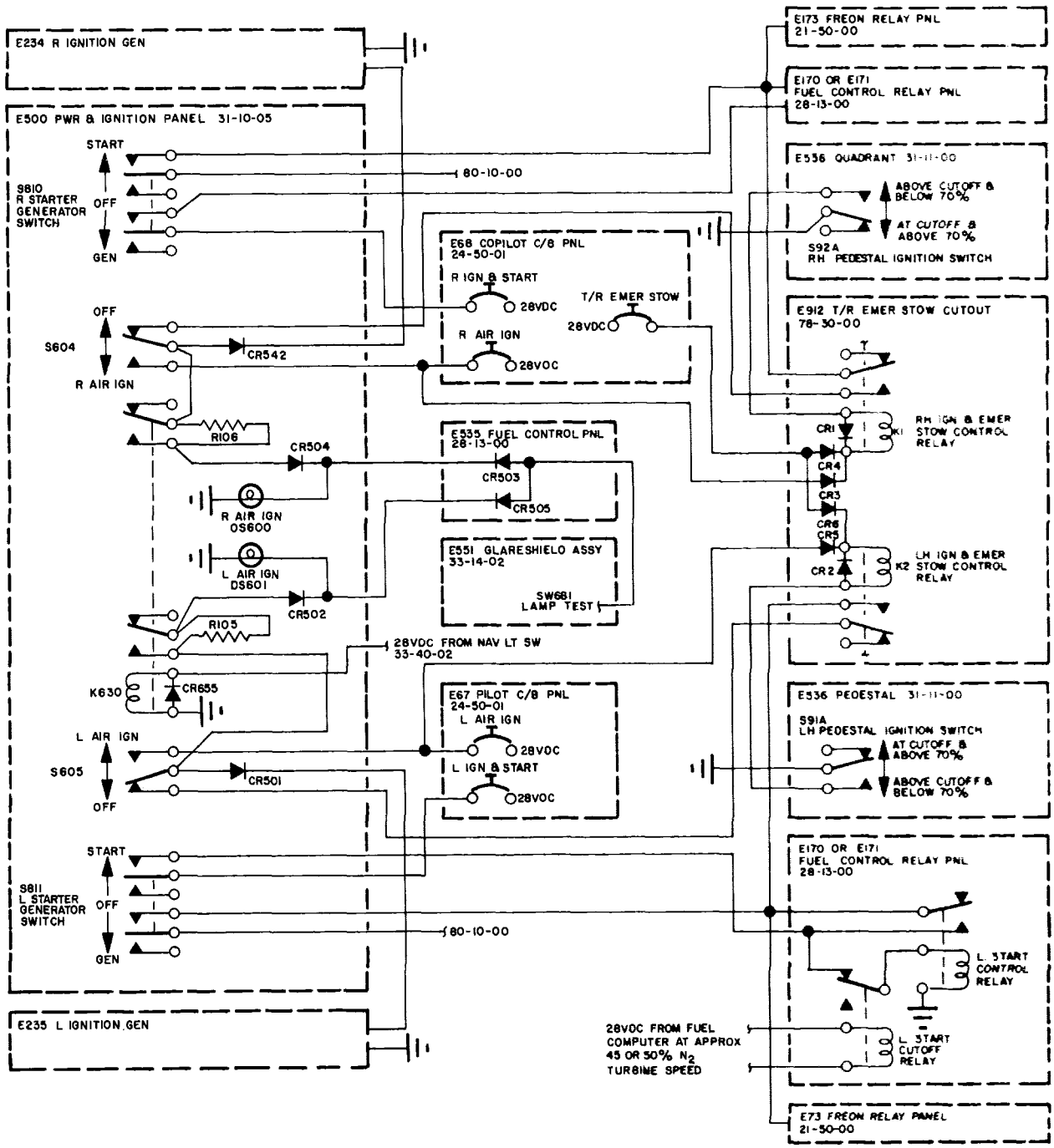


1 Effective on 35-002 thru -071, -073 thru -079 and 36-002 thru -020, change E536 to E503, S91A to SW 689, and S92A to SW 688.

Ignition System Electrical Control Schematic
Figure 2 (Sheet 1 of 2)

357400C

EFFECTIVITY: **AIRCRAFT NOT EQUIPPED WITH THRUST REVERSER SYSTEM**
MM-99
Disk 523



Ignition System Electrical Control Schematic
Figure 2 (Sheet 2 of 2)

357400C-1

EFFECTIVITY: **AIRCRAFT EQUIPPED WITH**
MM-99 **THRUST REVERSER SYSTEM**
Disk 523

IGNITION SWITCHES - MAINTENANCE PRACTICES

1. **REMOVAL/INSTALLATION**

   A. **Remove Ignition Switch** (Aircraft 35-002 thru 35-071, 35-073 thru 35-079 and 36-002 thru 36-020 not equipped with Thrust Reverser System) (See figure 201.)

   (1) Remove pilot's and copilot's crew seats.
   (2) Remove screws securing plate on foward side of quadrant.
   (3) Remove emergency brake handle and parking brake handle.

   NOTE: If aircraft is equipped with engine synchronizer system, loosen and remove nuts securing synchronizer switches to bracket. Let the switches hang loose after quadrant cover is removed.

   (4) Remove attaching parts and carefully remove quadrant cover.
   (5) Remove cotter pin, washer, and pin securing throttle cable to clutch adapter.
   (6) Disconnect electrical plug.
   (7) Remove attaching parts (both sides of pedestal) and lift quadrant assembly from pedestal.
   (8) Place quadrant assembly in test stand (T/N 69036) or equivalent.
   (9) Remove attaching parts securing switches to quadrant and remove sufficiently to allow wiring to be disconnected.
   (10) Disconnect wiring from applicable switch.

   B. **Install Ignition Switch** (Aircraft 35-002 thru 35-071, 35-073 thru 35-079 and 36-002 thru 36-020) (See figure 201.)

   (1) Connect wiring to ignition switch. (Refer to applicable wiring diagram in wiring manual.)
   (2) Install switches and secure with attaching parts.
   (3) Install quadrant assembly in pedestal and secure with attaching parts.
   (4) Connect electrical plug.
   (5) Connect throttle cables to clutch adapters and secure with attaching parts.
   (6) Adjust ignition switches. (Refer to Chapter 76.)
   (7) Install and secure pedestal cover.
   (8) Install and secure engine synchronizer switches (if installed).
   (9) Install emergency brake handle and parking brake handle.
   (10) Install plate and attaching parts.
   (11) Install pilot's and copilot's crew seats.

C. **Remove Ignition Switch** (Aircraft 35-072, 35-080 and Subsequent and 36-021 and Subsequent and prior aircraft equipped with Thrust Reverser System) (See figure 201.)

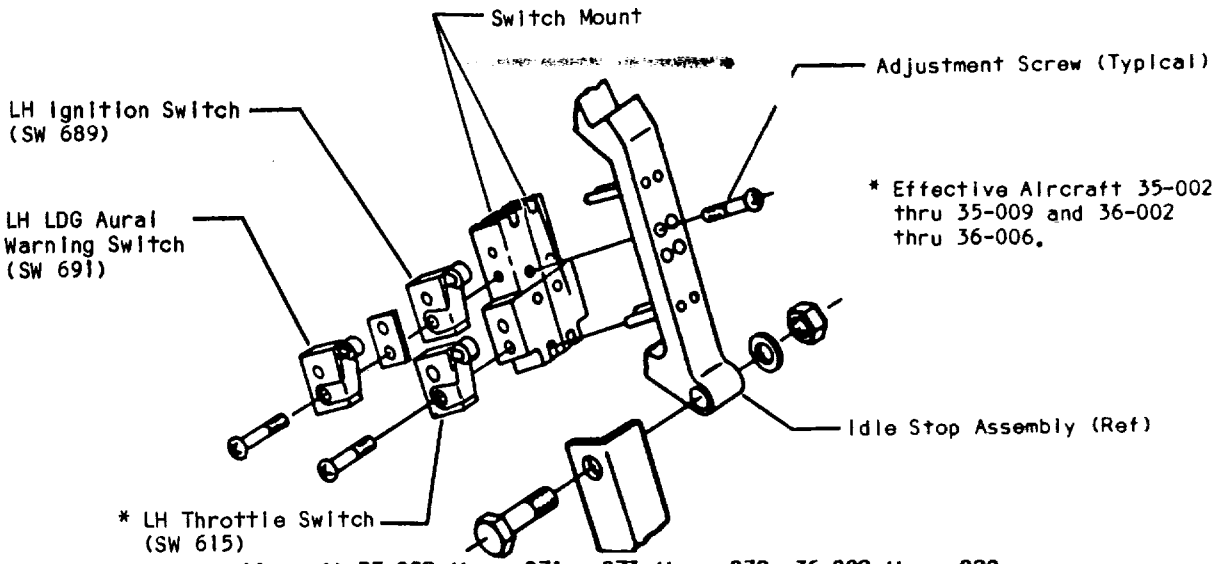
(1) Remove pilot's and copilot's crew seats.
(2) Remove screws securing plate on forward side of quadrant.
(3) Remove emergency brake handle and parking brake handle.
(4) Loosen and remove nuts securing engine synchronizer switches to bracket. Let the switches hang loose after quadrant cover is removed.
(5) Remove attaching parts and carefully remove quadrant cover from pedestal.
(6) Loosen set screw and slide lever from cam switch assembly.

CAUTION: NOTE POSITION OF CAM SWITCH AS IT IS INSTALLED BEFORE REMOVING CAM SWITCH.

(7) Loosen attaching parts and remove cam switch assembly sufficiently to allow wiring to be disconnected.
(8) Disconnect electrical wiring.

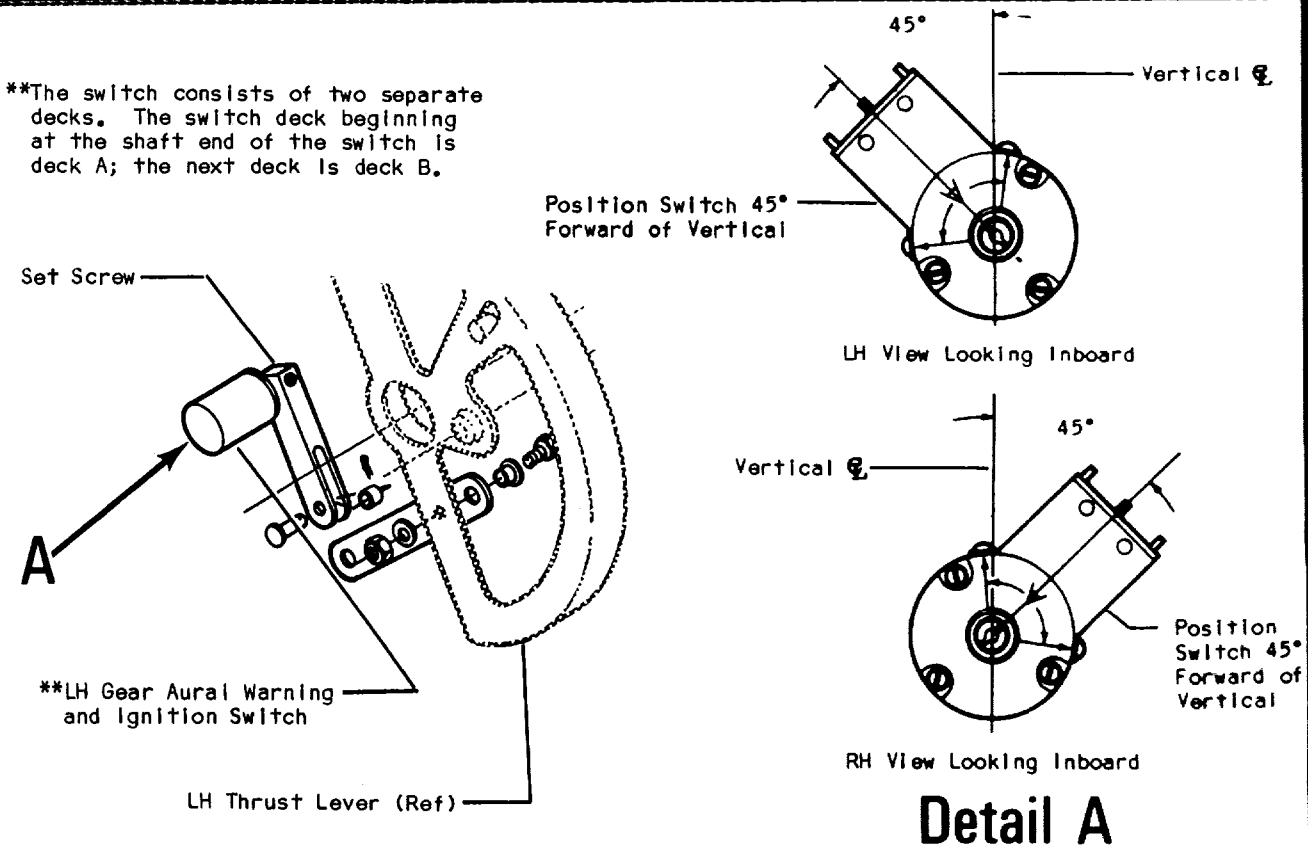
D. **Install Ignition Switch** (Aircraft 35-072, 35-080 and Subsequent and 36-021 and Subsequent and prior aircraft equipped with Thrust Reverser System) (See figure 201.)

(1) Connect electrical wiring to cam switch assembly. (Refer to wiring diagram in wire manual.)
(2) Install cam switch assembly and temporarily secure with attaching parts.
(3) Rotate cam switch assembly until microswitches and mounts are approximately 45° forward of vertical (see detail A).
(4) Tighten attaching parts securing cam switch assembly.
(5) Install lever on switch assembly shaft. Do not tighten set screw cam at this time.
(6) Adjust cam switch assembly. (Refer to 76-10-00.)
(7) Carefully install quadrant cover on pedestal and secure with attaching parts.
(8) Secure engine synchronizer switches with attaching parts.
(9) Install emergency brake handle and parking brake handle.
(10) Install plate and secure with attaching parts.
(11) Install pilot's and copilot's crew seats.



Aircraft 35-002 thru -071, -073 thru -079; 36-002 thru -020 not Equipped with Thrust Reverser System

**The switch consists of two separate decks. The switch deck beginning at the shaft end of the switch is deck A; the next deck is deck B.



Detail A

Aircraft 35-072, -080 and Subsequent; 36-021 and Subsequent and Prior Aircraft Equipped with Thrust Reverser System

Ignition Switch Installation
Figure 201

AIR IGNITION SWITCH - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

A. Remove Air Ignition Switch (See figure 201.)

(1) Remove attaching parts and remove pilot's switch panel sufficiently to gain access to air ignition switches.

CAUTION: THE PANEL OVERLAY IS ELECTROLUMINESCENT (EL) LIGHTED AND MUST BE REMOVED TO GAIN ACCESS TO AIR IGNITION SWITCH ATTACHING PARTS. USE CARE NOT TO BREAK ELECTRICAL WIRING WHEN REMOVING EL OVERLAY FROM PILOT'S SWITCH PANEL.

(2) Remove attaching parts securing EL overlay to pilot's switch panel. Remove EL overlay sufficiently to gain access to air ignition switches. Use extreme care not to break wiring to EL overlay.

(3) Disconnect electrical wiring from applicable air ignition switch.

(4) Remove attaching parts and switch from switch panel.

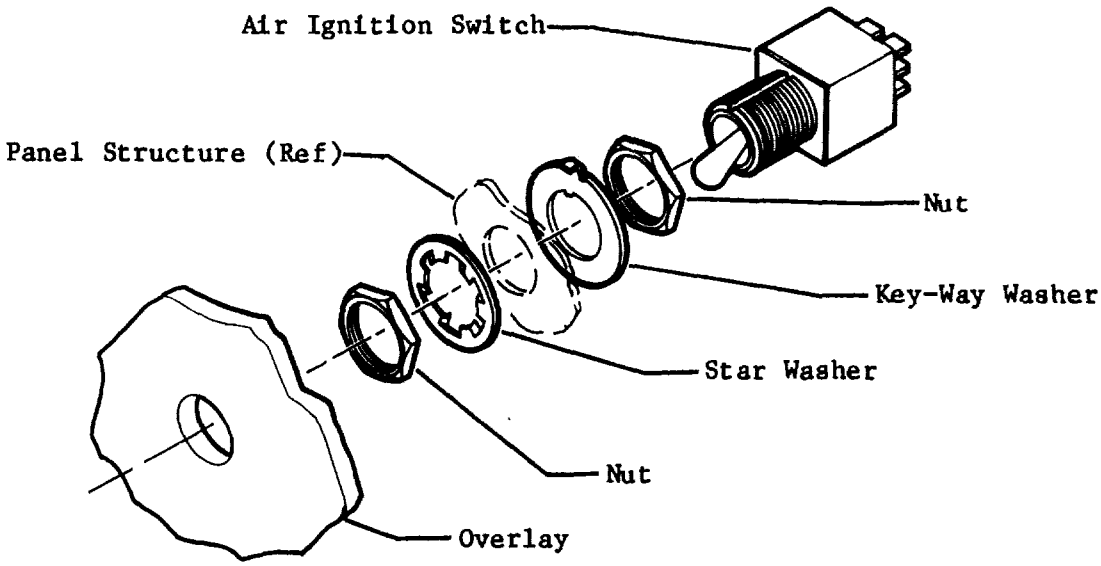
B. Install Air Ignition Switch (See figure 201.)

(1) Install switch and secure with attaching parts.

(2) Position EL overlay on pilot's switch panel and secure with attaching parts.

(3) Connect electrical wiring to applicable air ignition switch.

(4) Install switch panel and secure with attaching parts.



Air Ignition Switch Installation
Figure 201