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3	DEC 22/08	SAS
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R 5	AUG 22/09	SAS.1
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R 10	AUG 22/09	SAS.1
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402	FEB 10/93	12
403	APR 22/07	40
404	APR 22/07	18
23-34-08		
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403	AUG 22/01	08
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403	APR 22/07	01
404	APR 22/07	01
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103	FEB 10/94	01
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R 211	AUG 22/09	02.1
R 212	AUG 22/09	02.101

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PAGE	DATE	CODE

R = REVISED, A = ADDED OR D = DELETED
F = FOLDOUT PAGE
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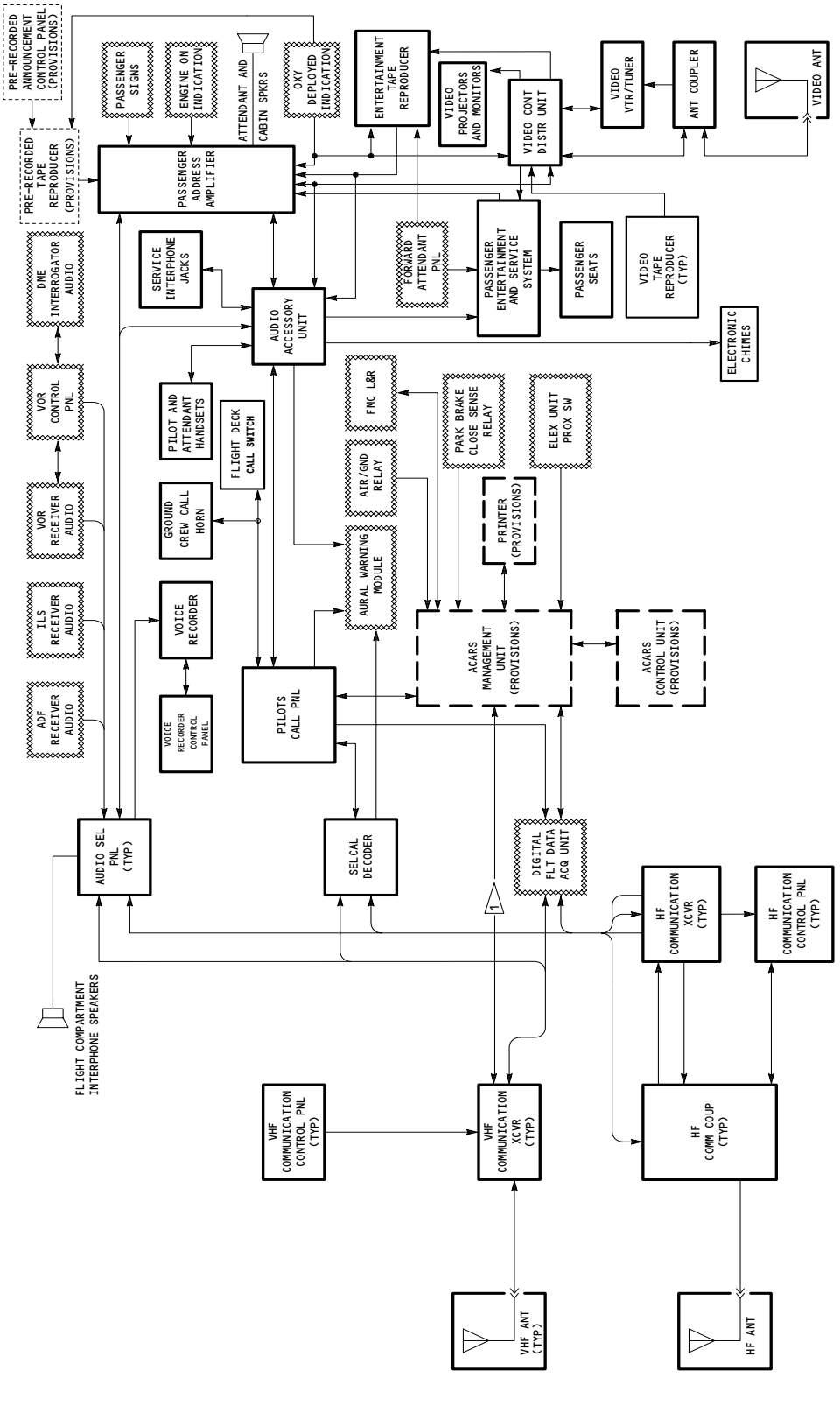
COMMUNICATIONS - GENERAL

1. General
   A. The 767 airplane has facilities for transmitting and receiving voice communications from ground stations or other airplanes. Facilities are also available for communication within the airplane.
2. Communications Systems (Fig. 1)
   A. The HF communication system (23-11) provides long-range voice communication with ground stations or other airplanes. The system can be used to transmit or receive after selection of an operating frequency and mode.
   B. The left, right, and center VHF communications systems (23-12) provide short-range line-of-sight voice communications with ground stations or other airplanes.
   C. The center VHF system interfaces with ACARS.
   D. A five channel SELCAL system (23-21) provides notification to the flight crew when a ground station desires contact on one of the communications transceivers.
   E. The ACARS system interfaces with the center VHF communications system.
   F. The emergency locator transmitter (ELT) (23-24) provides an emergency locator signal to aid in search and rescue operations. The ELT transmits on international distress frequencies 121.5 and 243.0 MHz.
   G. The Satellite Communication (SATCOM) system (23-25) provides data and/or voice links between the airplane and a remote ground earth station. The SATCOM system transmits messages from the airplane to an applicable satellite. The satellite receives signals at a designated input frequency and automatically transmits the received signals at a designated output frequency. The network of ground earth stations can transfer the messages between the airplane and any other user of the network.
   H. The PA (passenger address) system (23-31) provides the pilots and attendants with a way to distribute voice announcements and boarding music to passengers over cabin speakers. Circuits in the system send chime signals over the cabin speakers.
   I. The video portion of the passenger entertainment system (23-32) provides passenger viewing of projected video programs. The programs are received via cassette tapes or through T.V. antennas.
   J. The passenger entertainment/service system (23-34) provides multi-channel audio to individual passenger seats. The system also provides each passenger with attendant call and reading light circuits and controls.
   K. The service interphone system (23-41) provides the ground crew with interior and exterior communication capability. Circuits in the system connect service interphone jacks with the flight deck and cabin attendant stations.
   L. The cabin interphone system (23-42) provides facilities for communication among cabin attendants, and between the flight compartment crewmembers and attendants. The system can be switched to the input of the passenger address system for PA announcements.
   M. The ground crew call system (23-43) provides a signaling capability between the flight compartment and nose landing gear area.



Communication System Block Diagram
Figure 1 (Sheet 1)

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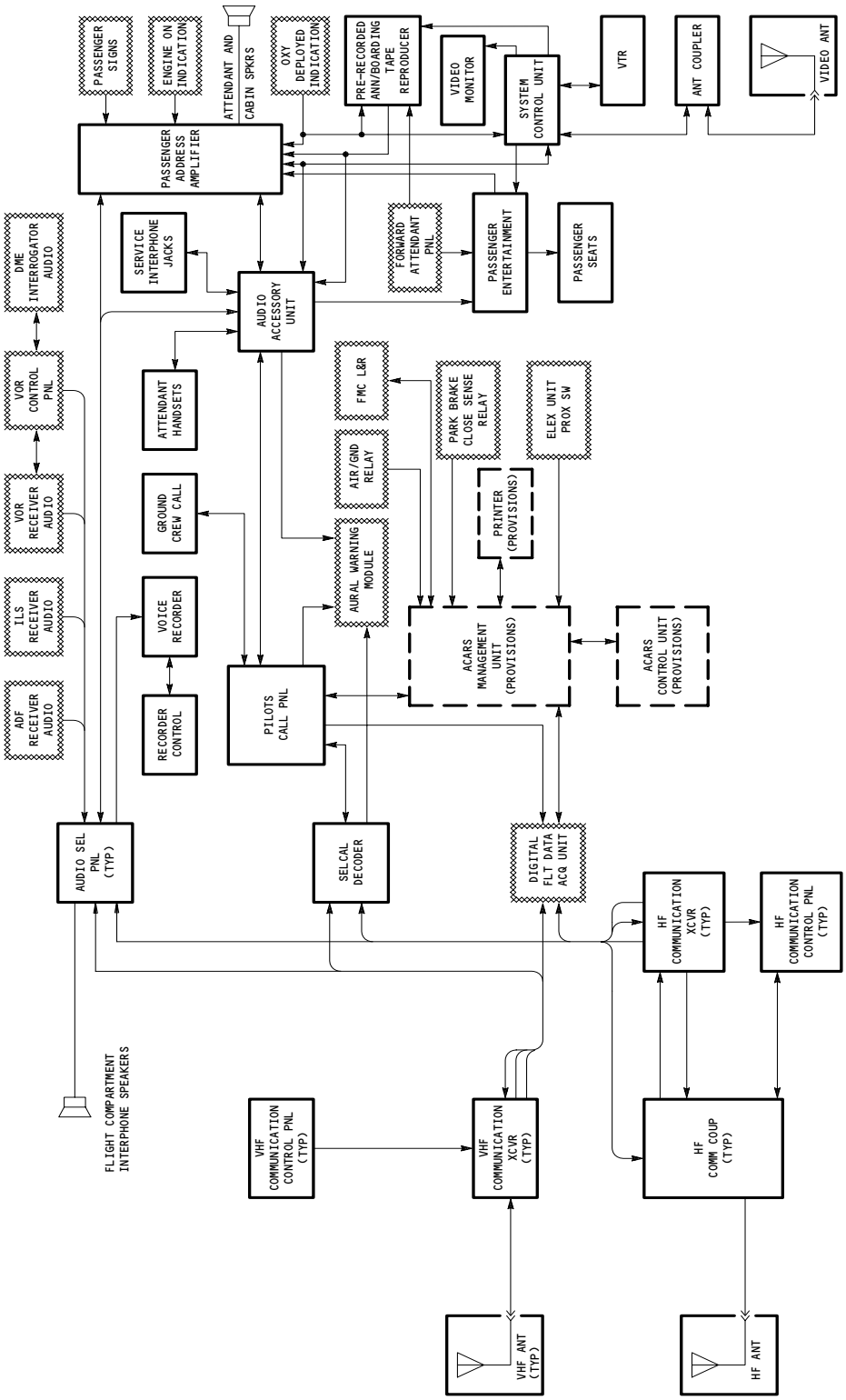
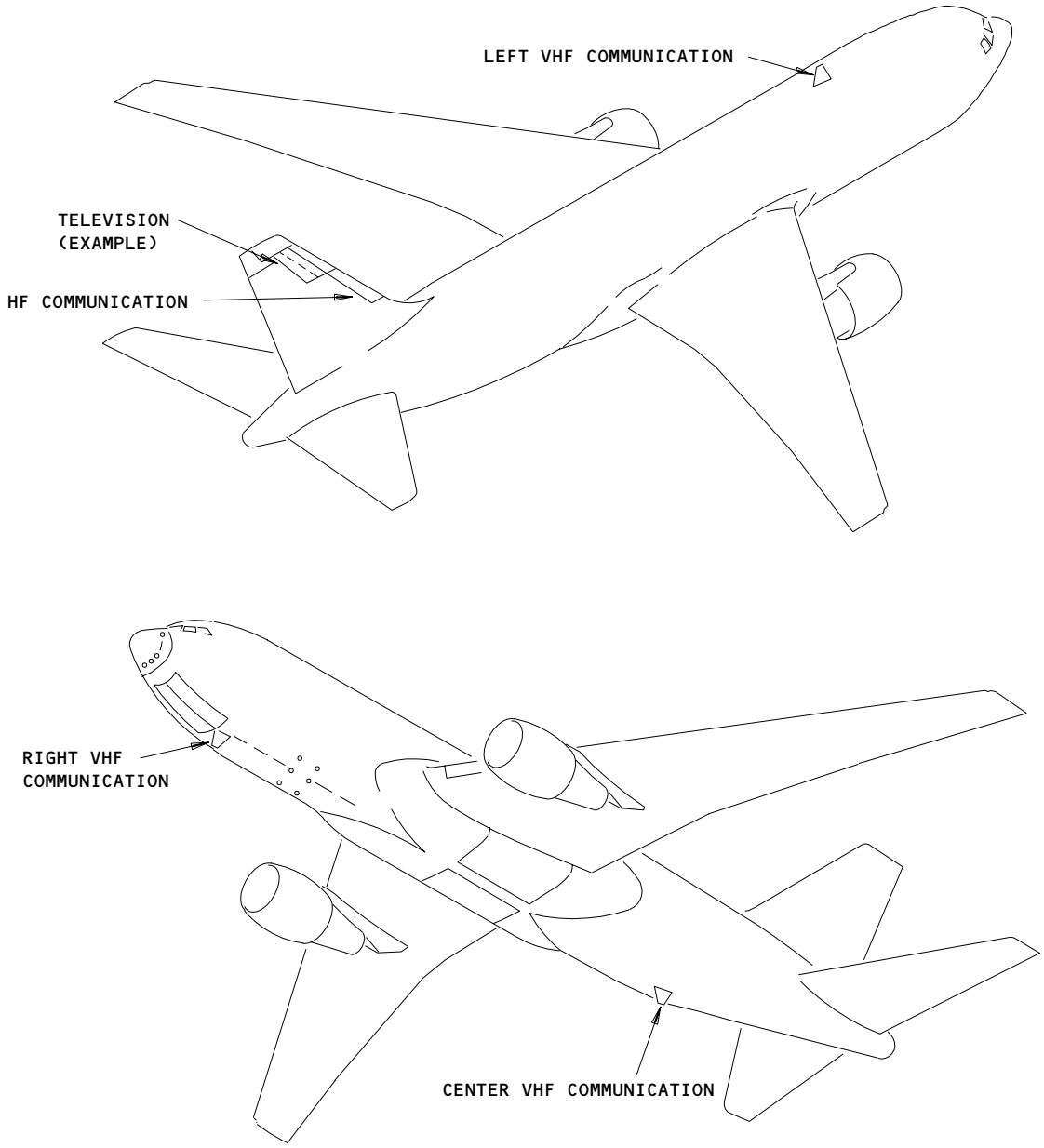


Communication System Block Diagram
Figure 1 (Sheet 2)

N. The flight interphone system (23-51) provides facilities for interphone communication among flight compartment crewmembers, and provides the means for them to key, transmit, and receive on airplane radio systems and receive on airplane navigation receivers.
O. Static dischargers (23-61) discharge static buildup at the trailing edges of the airplane.
P. The voice recorder system (23-71) records flight compartment communications and conversations. The latest 30 minutes or 120 minutes of recorded conversation is available. Erasing is accomplished only when the airplane is on the ground and the parking brake is set.

3. Antenna Locations (Fig. 2)
A. The HF communications antenna is built into the leading edge of the vertical stabilizer.
B. The VHF communications antennas are located on the upper and lower centerline of the fuselage.
C. The left VHF communication antenna is located on the upper forward centerline of the fuselage.
D. The right VHF communication antenna is located on the lower forward centerline of the fuselage.
E. The center VHF communication antenna is located on the lower aft centerline of the fuselage.
F. The video (TV) antenna coupler and two slot antennas are located in the vertical stabilizer. The high-band and low-band slot antennas are in the upper vertical stabilizer, left and right side panels. The video antenna coupler is in the HF coupler bay.



Communication Antenna Locations
Figure 2

COMMUNICATION - DDG MAINTENANCE PROCEDURES

1. General
   A. This procedure has the maintenance tasks that prepare the airplane for flight with certain systems/components inoperative.
   B. It also has the tasks that put the airplane back to its usual condition.
   C. These are the tasks for the components in the communication system:
      (1) DDG 23-51-4 Preparation - Control Wheel Push-To-Talk (PTT) Switches Inoperative.
      (2) DDG 23-51-4 Restoration - Control Wheel PTT Switches Inoperative.

TASK 23-00-00-849-001

2. DDG 23-51-4 Preparation - Control Wheel Push-To-Talk (PTT) Switches Inoperative
   A. General
      (1) This task gives the maintenance steps which prepare the airplane for flight with the PTT switches inoperative.
   B. Equipment
      (1) Insertion and Extraction tool (Duetch No. M15570-20)
   C. References
      (1) AMM 23-51-03/401, CONTROL WHEEL PTT SWITCH
   D. Access
      (1) Location Zones
         (a) 211 Flight Compartment - Left
         (b) 212 Flight Compartment - Right
   E. Deactivate Control Wheel PTT Switch (AMM 23-51-03/401)

      S 869-002
      (1) FOR CAPTAIN'S PTT SWITCH;
      Open these circuit breakers and attach the DO-NOT-CLOSE tag:
      (a) On the overhead circuit breaker panel, P11:
         1) 11C25, INTERPHONE CAPT SEC OBS FLT AMPL DUAL PWR
            or
            INTERPHONE CAPT/OBS
         2) 11G29, INTERPHONE CAPT SEC OBS FLT AMPL DUAL PWR
            or
            INTERPHONE CAPT/OBS

      S 869-003
      (2) FOR FIRST OFFICERS'S PTT SWITCH;
      Open these circuit breakers and attach DO-NOT-CLOSE tags:
      (a) On the overhead circuit breaker panel, P11:
         1) 11C26, INTERPHONE F/O OBS DUAL PWR
            or
            INTERPHONE F/O SEC OBS

2) 11G30, INTERPHONE F/O OBS DUAL PWR
or
INTERPHONE F/O SEC OBS

S 019-004
(3) Remove the medallion and chart holder to get access to the wire bundle.

S 019-005
(4) Remove cap-nut and pull out the wire bundle to get access to the quick disconnect terminals.

S 029-021
(5) Use the extraction tool to disconnect the wires mentioned below from the quick-disconnect terminals.
(a) To remove the R/T control PTT switch, disconnect the WHITE/BLACK/BROWN and WHITE/BLACK/RED wires from the terminals.
(b) To remove the interphone control PTT switch, disconnect the WHITE/BLACK/VIOLET and WHITE/GREY/YELLOW wires from the terminals.

S 419-022
(6) Cap and stow the affected wires.

S 419-023
(7) Install chart holder and medallion removed to access wire bundle.

S 869-024
(8) Put an INOP placard on the PTT switch.

S 869-025
(9) FOR CAPTAIN'S PTT SWITCH;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the overhead circuit breaker panel, P11:
1) 11C25, INTERPHONE CAPT SEC OBS FLT AMPL DUAL PWR
or
INTERPHONE CAPT/OBS
2) 11G29, INTERPHONE CAPT SEC OBS FLT AMPL DUAL PWR
or
INTERPHONE CAPT/OBS

S 869-026
(10) FOR FIRST OFFICERS'S PTT SWITCH;
Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the overhead circuit breaker panel, P11:
1) 11C26, INTERPHONE F/O OBS DUAL PWR
or
INTERPHONE F/O SEC OBS
2) 11G30, INTERPHONE F/O OBS DUAL PWR
or
INTERPHONE F/O SEC OBS

TASK 23-00-00-849-007

3. DDG 23-51-4 Restoration - Control Wheel Push-To-Talk (PTT) Switch Inoperative

A. General
(1) AMM 23-51-03/401, CONTROL WHEEL PTT SWITCH

B. Procedure

S 869-009
(1) Remove the INOP placard from the switch.

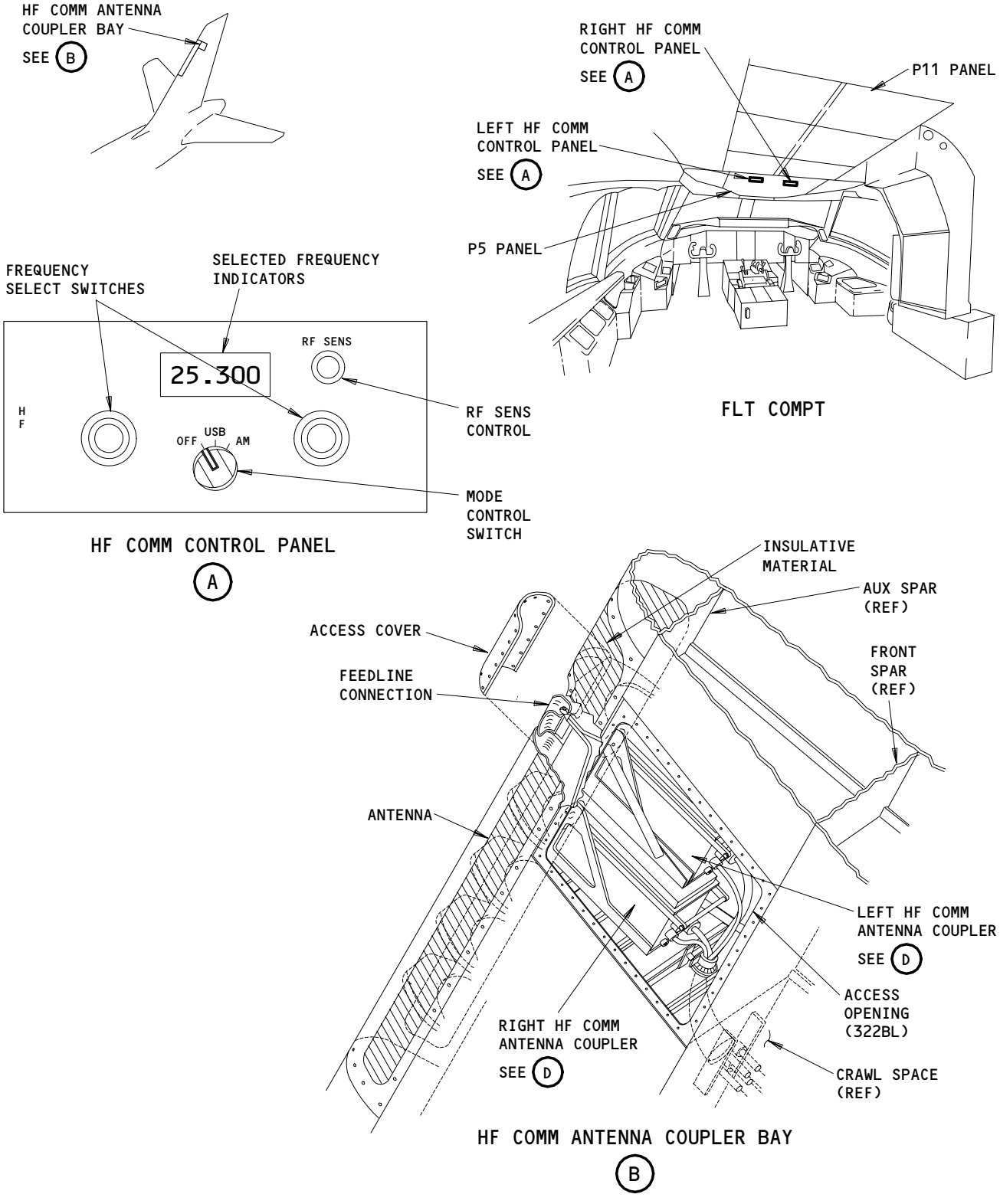
S 029-011
(2) Remove the Control Wheel PTT switch. To remove it, do this task: Control Switch PTT Switch Removal (AMM 23-51-03/401).

S 019-020
(3) Remove the caps from the stowed wires.

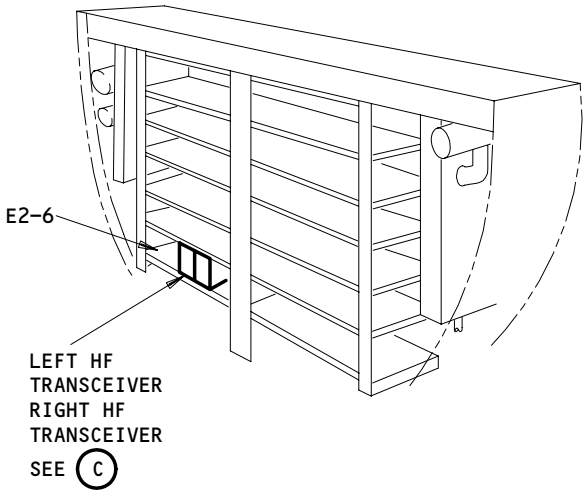
S 429-012
(4) Install the new PTT switch on the control wheel. To install it, do this task: Control Wheel PTT Switch Installation (AMM 23-51-03/401).

HF COMMUNICATION SYSTEM - DESCRIPTION AND OPERATION

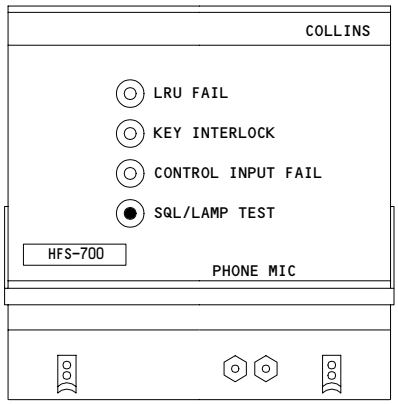
1. General
   A. The HF (high frequency) communication system (referred to as the HF system) provides long-range air-to-ground or air-to-air communications. The HF system operates in the 2.800 to 23.999 MHz frequency range on 21,200 channels in either AM (amplitude modulated) or USB (upper side band) modes.
   B. Two HF (high frequency) communication systems are installed on the airplane.
   C. The left and right HF systems consist of two HF comm transceivers, two HF comm control panels, two HF comm antenna couplers and a single slot-type shunt-fed HF comm antenna. The audio, microphone and PTT functions of each HF system interface with the audio selector panels (ASP's) of the flight interphone system (AMM 23-51-00/001).
   D. The left HF system utilizes 115v ac 400 Hz 3-phase power from the left bus. The right HF system utilizes 115v ac 400 Hz 3-phase power from the right bus. The LEFT HF COMM and RIGHT HF COMM circuit breakers are located on the overhead circuit breaker panel P11.
2. Component Details (Fig. 1)
   A. HF Comm Control Panel
      (1) The left and right HF comm control panels (referred to as the control panels) are located on their respective side of the pilots' overhead panel P5. The control panels weigh approximately 2.2 pounds and are self-contained, including power supply. Each control panel is dedicated to providing mode control, frequency selection, and RF sensitivity adjustment for its respective HF comm transceiver.
      (2) The front panel of the control panel contains a mode selector switch, two concentric frequency control knobs, LCD frequency display, and a RF sensitivity adjustment control. The function selector provides on/off control and the selection of the AM (amplitude modulated) or USB (upper side band) modes. The left frequency control selects the MHz and 100 kHz digits displayed on the frequency counters. The right frequency control selects the 10 kHz and 1.0 kHz digits on the frequency counter. The RF SENS control adjusts the signal sensitivity of the receiver circuits of the HF comm transceiver.
      (3) The control panel contains circuits which convert the mode and frequency selections into digital form. The control panel provides a 32-bit word to the HF comm transceiver in the ARINC-429 format.
   B. HF Comm Transceiver
      (1) The left and right HF comm transceivers (referred to as the transceivers) are located in the main equipment center E2-6. The transceivers are 6 MCU rack-mounted units weighing approximately 26.5 pounds. Each contains an internal blower motor.
      (2) The transceiver contains a transmitter and a receiver. The transmitter output is 125W in the AM mode and 400W pep in the USB mode.



HF Communications System – Component Location
Figure 1 (Sheet 1)

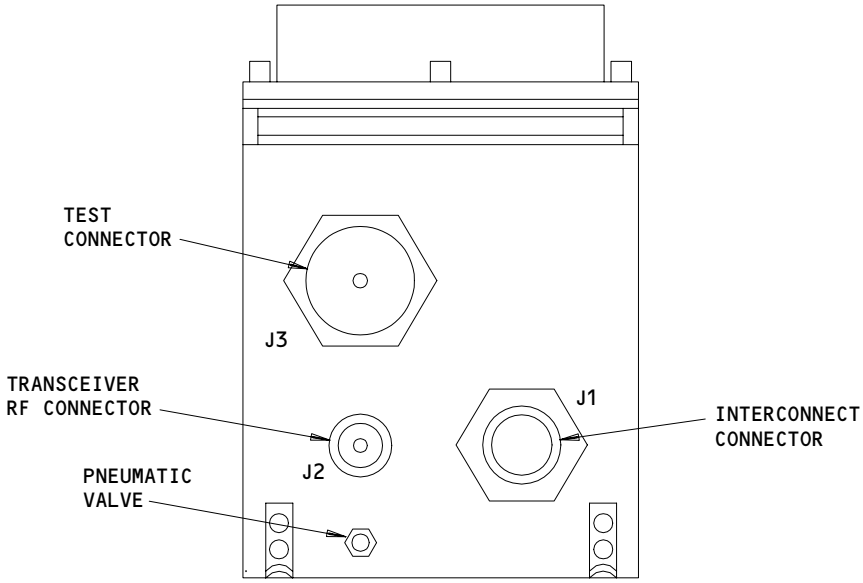


MAIN EQUIP CTR



HF COMM TRANSCEIVER

C



HF COMM ANTENNA COUPLER

D

HF Communication System Component Location
Figure 1 (Sheet 2)

(3) Program pins on the transceiver determine the operating characteristics of the HF system. A program pin is provided to select an operating range from 2.000 MHz to 29.999 MHz or from 2.800 MHz to 23.999 MHz. A program pin is provided to select internal blower motor operation at all times when power is applied to the transceiver or only during transmit.

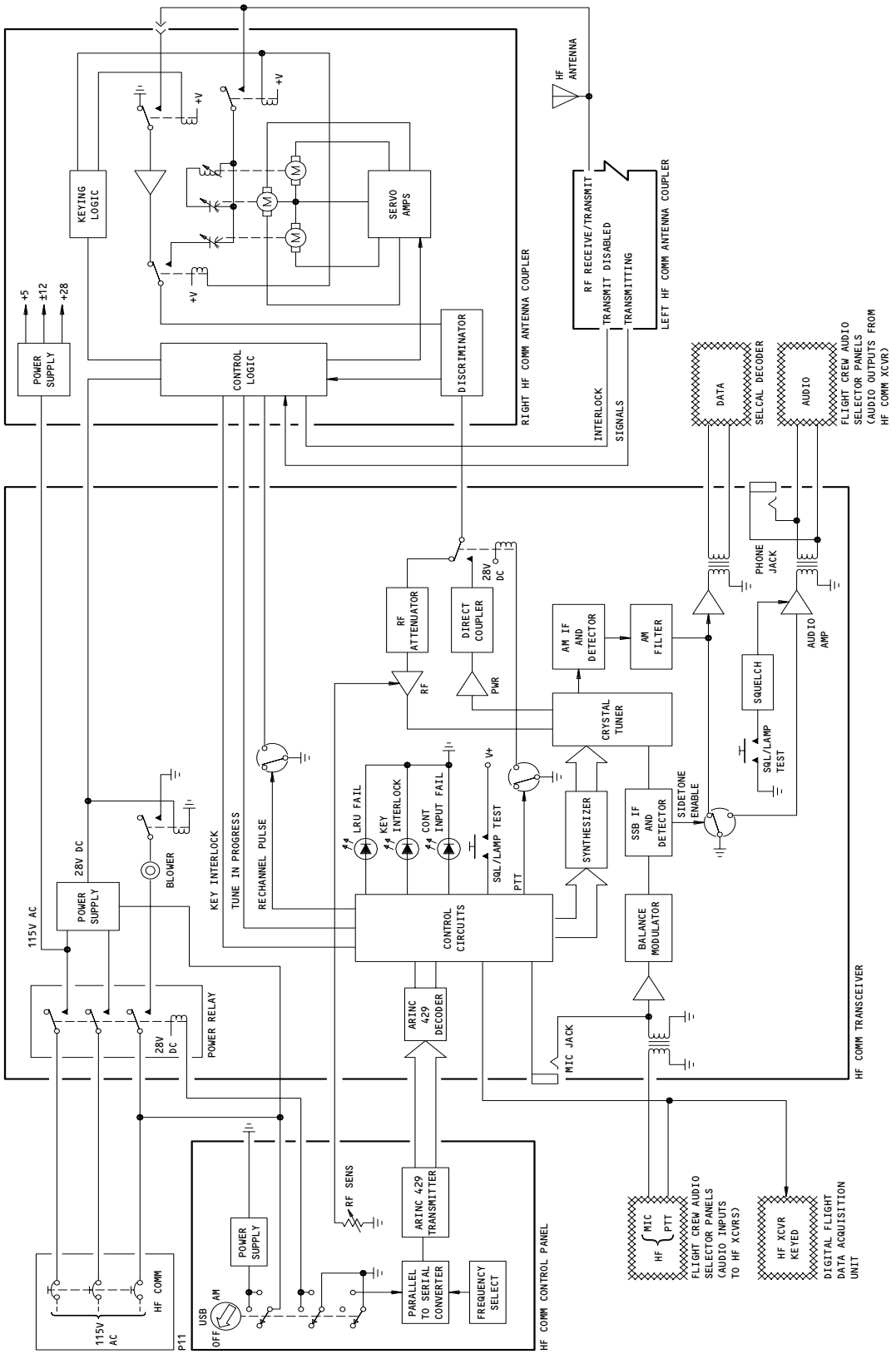
(4) AIRPLANES WITH COLLINS HFS-700 TRANSCEIVER;
The transceiver front panel contains the following:
   (a) LRU FAIL light (LED) which comes on as a result of transceiver faults such as:
      1) Low transmitter output power.
      2) Low power supply voltages.
      3) Frequency control board microcomputer failure.
      4) Frequency synthesizer out-of-lock.
   (b) KEY INTERLOCK light (LED) which comes on as a result of HF comm antenna coupler faults such as:
      1) HF comm antenna coupler internal power failure.
      2) Excessive tuning time.
      3) Extreme tuning reactance.
   (c) The transmitter is disabled when the KEY INTERLOCK light is on.
   (d) CONTROL INPUT FAIL light (LED) which comes on as a result of improper inputs from the control panel such as:
      1) Lack of HF label code for the 32-bit control word input.
      2) Invalid serial data input.
      3) Insufficient repetition rate of HF data.
   (e) SQL/LAMP TEST pushswitch which, when pressed, provides a test condition where the following occurs:
      1) LRU FAIL light comes on.
      2) KEY INTERLOCK light comes on.
      3) CONTROL INPUT FAIL light comes on.
      4) Receiver audio squelch is disabled.
      5) RF sensitivity line is grounded.
   (f) PHONE jack provides a receptacle for utilizing a headphone.
   (g) MIC jack which provides a receptacle for utilizing a hand-held microphone.

(5) Each transceiver uses 115 vac 3-phase power from its respective HF COMM circuit breaker on P11.

C. HF Comm Antenna Coupler
   (1) The left and right HF comm antenna couplers (referred to as the antenna couplers) are located in the coupler bay of the vertical stabilizer. The antenna couplers are rack-mounted, pressurized units weighing 17 pounds each. Each antenna coupler is pressurized with dry air at 5-7 psig.
   (2) AIRPLANES WITH ROCKWELL COLLINS ANALOG HF ANTENNA COUPLER;
   The antenna coupler consists of rf tuning elements and control circuits which comprise a closed tuning loop. The antenna coupler is tunable over the frequency range from 2 to 30 MHz. Typical tuning time required is 2 to 7 seconds. The antenna coupler constantly monitors the rf transmissions to automatically adjust the tuning elements.
   (3) AIRPLANES WITH ROCKWELL COLLINS DIGITAL HF ANTENNA COUPLER;
   The antenna coupler provides fast tuning and built in test capability. A microprocessor controller executes sophisticated tuning algorithms to provide fast tuning solutions utilizing relay switched tuning elements. A novel impedance measuring discriminator is used to measure antenna impedance and standing wave ratios as the antenna is automatically tuned.
      (a) The tune time for a frequency not in memory is 2 to 4 seconds typical, 7 seconds maximum.
      (b) The tune time for a frequency saved in memory is:
         1) HFS-700 or HFS-900 transceiver installed: 1 second typical.
         2) HFS-900D transceiver installed: 200 milliseconds typical.
   (4) In dual HF installations, the antenna couplers are electrically interlocked so that only one HF system transmits at any time. Faults within the antenna coupler cause the KEY INTERLOCK light on the transceiver to come on. The following situations are considered faults.
      (a) Tuning element fails to home within 15 seconds.
      (b) Fails to tune within 15 seconds after RF application.
      (c) Internal arcing is detected.
   (5) Access to the antenna couplers is via access panel 322 BL, on the left side of the vertical stabilizer. The panel is between the front spar and auxilliary spar utilizing approximately 75 retaining screws.

D. HF Comm Antenna
   (1) The HF comm antenna (referred to as the antenna) is located in the leading edge of the vertical stabilizer. The antenna is a shunt-fed slot-type approximately eight feet long. The leading edge structure which the antenna is built-into, is 100 inches long. The antenna element is surrounded on three sides by the inverted U-shaped insulative portion of the leading edge structure.
   (2) The single antenna functions as the transmit and receive antennas for both HF systems. The feedline connections from the antenna coupler mounting racks are at the lower edge of the insulative portion across the top of the antenna element.

3. Operation (Fig. 2)



HF Communications System Schematic (Typical)
Figure 2

199153

A. Functional Description
(1) General
(a) The left and right HF systems each function as independent systems with the single antenna as the only common component. The functional signal flow is similar for the left and right systems including the X-Y crossconnections between the antenna couplers (the X-Y crossconnections are to protect each antenna coupler when the other antenna coupler is in transmit mode). The antenna coupler connections to the single antenna assembly are also similar.
(b) Each HF system has a 115v ac three-phase circuit breaker on P11. One phase of the 115v ac provides power directly to the control panel. The OFF/USB/AM switch in the control panel operates the power relay in the transceiver.
(c) The 115v ac is applied to the transceiver power supply, the transceiver blower motor and the antenna coupler which has its own power supply. The transceiver power supply provides +5v dc, +28v dc and the other voltages required by the transmitter and receiver circuitry. The +28v dc is also provided to the antenna coupler.
(d) The blower motor runs all the time the transciever is powered.
(e) Frequency selection is accomplished by turning the frequency selector knobs (one for each frequency digit) until the desired frequency is indicated on the liquid crystal display. Parallel serial shift registers process the frequency and mode data to generate the 32-bit digital word with the HF comm address label in ARINC 429 low-speed format.
(f) The HF comm 32-bit word is received at the port B decoder of the transceiver. The encoder monitors the input word for proper address, parity, sign status matrix, and interval. The control circuits tune the transceiver to the desired mode and frequency via the synthesizer.
(g) The operating frequency band of the transceiver is between 2.800 MHz and 23.999 MHz. Whenever the frequency control knobs are selected below 2.800 MHz or above 23.999 MHz the HF system will not function. If an out-of-band frequency is selected, a 1 kHZ tone will be heard through the headset when transmission is attempted.
(h) Whenever a new frequency is selected at the control panel, the control circuits in the transceiver output a "rechannel" signal to the antenna coupler. The rechannel input causes the antenna coupler tuning elements to go to the "home" position. Tuning of the antenna coupler to the selected frequency is initiated by a PTT input to the antenna coupler. While the antenna coupler elements are tuning, the transceiver transmits a low wattage AM output. The "tune-in-progress" 1 kHz tone is the sidetone output. When the antenna coupler tuning is complete, the transceiver returns to the receive mode.

NOTE: A continuous or pulsed tone indicates that the coupler is tuning to a new frequency. The coupler tune tone will sound no longer than 15 seconds. The average coupler tune time is approximately 1 to 7 seconds.

Some coupler types are able to tune quickly when previously used frequencies are selected, in which case the tune tone may be only a momentary beep or not always audible.

(2) Receive Mode

(a) The RF signal is received at the antenna and routed thru the antenna couplers to the transceivers via coaxial cables. Normally each antenna coupler is tuned to the frequency which is selected on the control panel for the respective transceiver.

(b) The received RF signal enters the antenna coupler via the antenna feedlines and thru a relay to an isolation amplifier. The relay protects the isolation amplifier whenever the other HF system is transmitting. The RF signal is routed thru transmit/receive relays, the discriminator circuits, and on to the transceiver via the coaxial cable.

(c) The received RF signal enters the transceiver thru a transmit/receive relay into the RF amplifier controlled by internal AGC and the RF SENS on the control panel. The tuning circuits perform the frequency conversions and the IF detectors provide the AM or USB audio portions of the signal. The audio is output to the headphone jack and to the flight interphone system (AMM 23-51-00). The AM audio is also output to the SELCAL system (AMM 23-21-00).

(3) Transmit Mode

(a) The microphone and PTT inputs for the HF system are provided by the flight interphone system via the audio selector panels (AMM 23-51-00). After the frequency is selected and the antenna coupler has been tuned, pressing the PTT will cause the transceiver to transmit. The microphone input is modulated as AM or USB onto the RF and the power amplifiers output the signal from the transceiver thru a directional coupler and transmit/receive relay. The audio sidetone is detected and output whenever the power output is greater than 40 watts.

(b) The transmitted signal enters the front of the antenna coupler via the coaxial cable. The PTT input from the transceiver is also provided to the antenna coupler. The RF signal inputs to the discriminator circuits, thru transmit/receive relays, the tuning network and thru another transmit/receive relay. In dual HF systems, an inhibit signal goes to the other system.

(c) The RF signal output is fed to the antenna on the feedline from the HF antenna coupler mounting rack. The transceiver and antenna coupler will be inhibited by the key interlock signal if any antenna coupler faults exist or if the other HF system is transmitting.

B. Test

(1) Listen and check that the transceiver internal blower fan is running.

(2) AIRPLANES WITH COLLINS HFS-700 TRANSCEIVER;
Press the SQL/LAMP TEST switch on the transceiver front panel.

(a) Check that the LRU FAIL, KEY INTERLOCK, and CONTROL INPUT FAIL lights come on and remain on. Check that the receiver squelch is disabled.

(b) Release the SQL/LAMP TEST switch and check that the LRU FAIL, KEY INTERLOCK, and CONTROL INPUT FAIL lights go out.

(c) Any LEDS that stay ON indicate a fault.

C. Control

(1) Turn on procedure.

WARNING: DO NOT OPERATE THE HF SYSTEM WHILE FUEL IS PUT INTO THE AIRPLANE. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY FROM THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

(a) Provide electrical power (AMM 24-22-00/201).

(b) Make sure the LEFT HF COMM and RIGHT HF COMM circuit breakers on the overhead circuit breaker panel, P11, are closed.

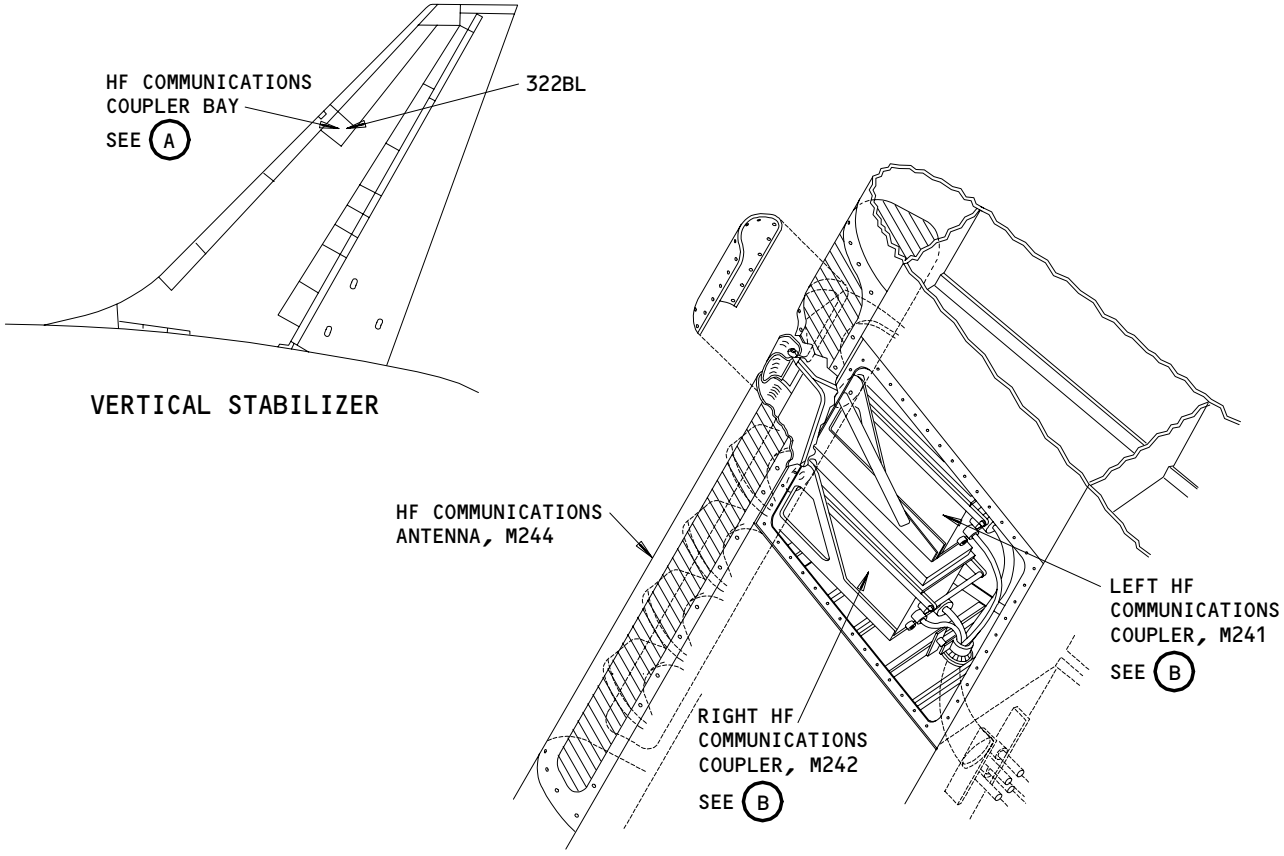
(c) Set the mode selector switch on the HF comm control panel (P5) to either the AM or USB position.

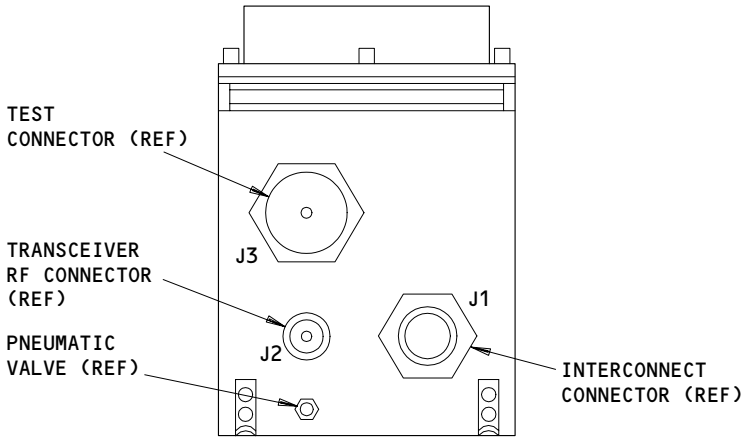
HF COMMUNICATIONS SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
ANTENNA - HF COMM, M244	1	1	322BL, VERTICAL FIN	*
CIRCUIT BREAKER	2		FLT COMPT, P11	
LEFT HF COMM, C340		1	11G8	*
RIGHT HF COMM, C341		1	11G35	*
COUPLER - L, R HF COMM, M241,M242	1	2	322BL, VERTICAL FIN	23-11-01
DECODER - (REF 23-21-00, FIG. 101)				
SELCAL, M180				
PANEL - (REF 23-42-00, FIG. 101)				
PILOTS' CALL, M51				
PANEL - (REF 23-51-00, FIG. 101)				
AUDIO SELECTOR, M70,M71,M98				
PANEL - L, R HF COMM CONTROL, M82,M83	2	2	FLT COMPT, P5	23-11-02
TRANSCEIVER - L, R HF COMM, M152,M153	2	2	119AL, MAIN EQUIP CTR, E2-6	23-11-03
UNIT - (REF 31-31-00, FIG. 101)				
DIGITAL FLIGHT DATA ACQUISITION, M138				

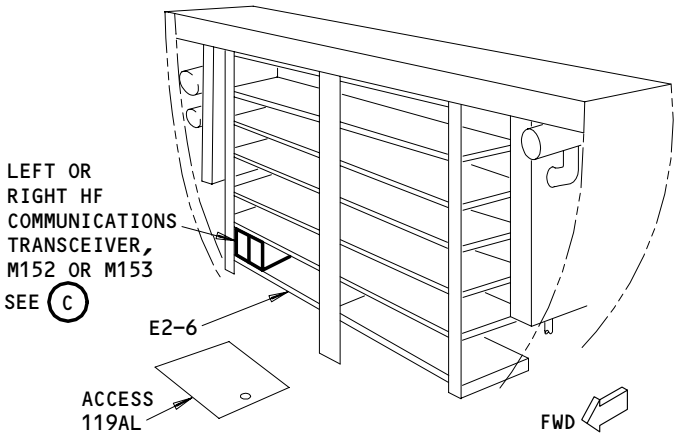
* SEE THE WDM EQUIPMENT LIST

HF Communications System - Component Index
Figure 101

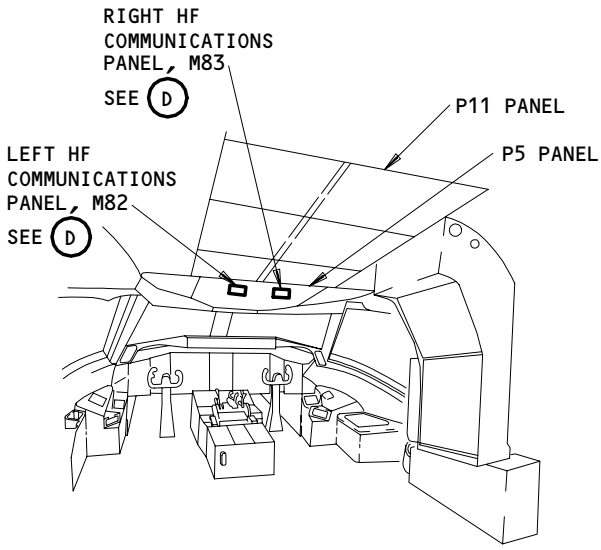




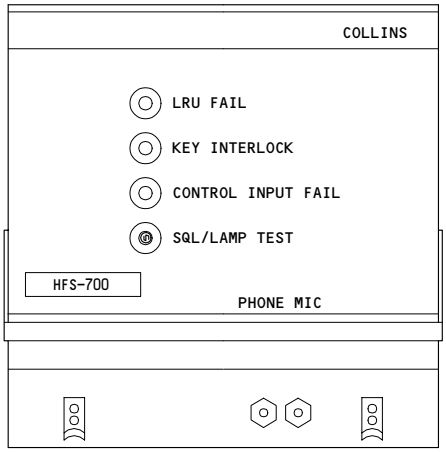
HF Communications System - Component Location
Figure 102 (Sheet 1)



MAIN EQUIPMENT CENTER

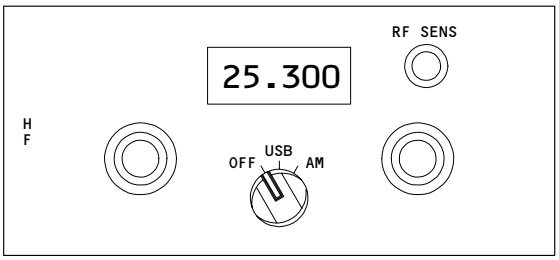


FLIGHT COMPARTMENT



LEFT OR RIGHT HF COMMUNICATIONS
TRANSCEIVER, M152 OR M153

C



LEFT OR RIGHT HF COMMUNICATIONS
CONTROL PANEL, M82 OR M83

D

HF Communications System - Component Location
Figure 102 (Sheet 2)

HF COMMUNICATION SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains two tasks. The first task is an operational test. The second task is a system test.

TASK 23-11-00-715-001

2. Operational Test - HF Comm System
   A. General
      (1) This test does a check of the HF communication systems with the status lights on the transceiver front panels.
   B. References
      (1) AMM 24-22-00/201, Electrical Power - Control
   C. Access
      (1) Location Zones

211	Flight Compartment, Left
212	Flight Compartment, Right
119/120	Main Equipment Center

   D. Prepare for Test

S 865-002

      (1) Supply electrical power (AMM 24-22-00/201).

S 865-003

      (2) Make sure the applicable circuit breaker(s) on the overhead circuit breaker panel, P11, are closed:
         (a) 11G8, LEFT HF COMM
         (b) 11G35, RIGHT HF COMM
   E. HF Operational Test

S 865-195

WARNING: DO NOT OPERATE THE HF COMMUNICATIONS SYSTEM WHILE FUEL IS PUT INTO THE AIRPLANE. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY

THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

      (1) Set the mode selector to USB on the left HF comm control panel, P5.

S 865-007

      (2) Set the frequency selectors to a frequency between 2.800 MHz and 23.999 MHz.

S 865-010

(3) Connect the headphone to the PHONE jack on the left transceiver front panel.

NOTE: If headphone is not available, it is acceptable to use the cockpit headphone or speaker. Ensure someone is monitoring the front panel for proper indications.

S 865-011

(4) Connect the hand microphone to the MIC jack on the left transceiver front panel.

NOTE: If hand microphone is not available, it is acceptable to use the cockpit microphone. Ensure someone is monitoring the front panel for proper indications.

S 865-189

(5) Do these steps at the front panel of the left HF transceiver (E2-6) to do the operational test:

(a) Push and hold the SQL/LAMP TEST switch.

1) Make sure the three front panel status lights come on and stay on:

(b) Release the SQL/LAMP TEST switch.

1) Make sure all the lights go off.

NOTE: When a light stays on after you release the SQL/LAMP TEST switch, the light shows a failure condition.

S 865-204

(6) Push and release the PTT switch on the hand microphone.

(a) Listen for a 1-kilohertz tone (from the headset) for 1 to 7 seconds.

NOTE: A continuous or pulsed tone indicates that the coupler is tuning to a new frequency. The coupler tune tone will sound no longer than 15 seconds. The average coupler tune time is 1 to 7 seconds.

Some coupler types are able to tune quickly when previously used frequencies are selected, in which case the tune tone may be only a momentary beep or may not always be audible.

(b) Make sure none of the lights on the front panel remains illuminated.

NOTE: The Key Interlock light will momentarily blink when the microphone is keyed.

S 865-205

(7) Push and hold the PTT switch on the hand microphone.

NOTE: You will hear a 1-kilohertz sound if the frequency is out of the range for HF frequencies.

(a) Make sure none of the lights on the front panel remains illuminated.

NOTE: The Key Interlock light will momentarily blink when the microphone is keyed.

S 865-206

(8) Release the PTT switch.

F. Right HF Operational Test (if installed).

S 865-191

(1) AIRPLANES WITH RIGHT HF SYSTEM INSTALLED;
Do the HF Communications Test paragraph again for the HF-R.

G. Put the Airplane back to its usual condition.

S 865-038

(1) Remove the headphone and the hand mic from the jacks on the transceiver front panel.

S 865-039

(2) Set the mode selector to OFF on the applicable HF comm control panel(s).

S 865-041
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-11-00-735-042

3. System Test - HF Comm System

A. General

(1) This test does a check of the applicable HF communication system(s). This test includes all adjustment specifications necessary for the best HF system performance.

(2) HF Antenna Coupler Tuning

(a) A tune tone is generated while the HF antenna coupler tunes to a new frequency. The tune tone can be continuous or pulsed (determined by the coupler/transceiver configuration). Some couplers save previously tuned frequencies in memory. If a coupler is set to a frequency in memory, then the tune time can be very short and you may not hear the tune tone. If you hear the tune tone for more than 7 seconds (15 seconds maximum), then it is an indication of a tuning failure.

(b) Rockwell Collins Analog HF Antenna Coupler (Model 490S-1, Part Number 792-6140-001):

1) The tune time is 2-4 seconds typical, 7 seconds maximum.
2) The tune tone is continuous.

(c) Rockwell Collins Digital HF Antenna Coupler (Model CPL-920D, Part Number 822-0987-XXX):

1) The tune time for a frequency not in memory is 2 to 4 seconds typical, 7 seconds maximum.
2) The tune time for a frequency saved in memory is:
   a) HFS-700 or HFS-900 transceiver installed: 1 second typical.
   b) HFS-900D transceiver installed: 200 milliseconds typical.
3) Up to 100 frequencies can be saved in memory.
4) HFS-700 or HFS-900 transceiver installed: The tune tone is pulsed.
5) HFS-900D transceiver installed: The tune tone is continuous.

B. References

(1) AMM 23-51-00/501, Flight Interphone System
(2) AMM 24-22-00/201, Electrical Power - Control

C. Access

(1) Location Zones

211	Flight Compartment, Left
212	Flight Compartment, Right
119/120	Main Equipment Center

D. Prepare for Test

S 865-145

WARNING: DO NOT OPERATE THE HF SYSTEM WHILE THE AIRPLANE IS REFUELED OR DEFUELED. AN EXPLOSION CAN CAUSE INJURY TO PERSONS AND DAMAGE TO THE AIRPLANE.

WARNING: MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY FROM THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

(1) Supply electrical power (AMM 24-22-00/201).

S 725-044
(2) Make sure the captain's audio selector panel (ASP) operates (AMM 23-51-00).

S 865-045
(3) Make sure the applicable circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM

E. Left HF System Test

S 715-203
(1) Do this task for the left HF system: Operational Test - HF Comm System.

S 865-047
(2) Connect the headset/boom microphone to the captain's jack panel, (P15).

S 865-048
(3) Push the L HF MIC SELECTOR switch on the captain's ASP, (P8).
(a) Adjust the L HF listen switch on the captain's ASP.
(b) Set the BOOM/OXY switch to BOOM on the captain's ASP.

S 865-049
(4) Set the mode selector to AM on the left HF comm control panel, (P5).

NOTE: The AM Mode test is optional. Do the AM Mode test ONLY if made necessary by local regulatory authority.

S 735-141
(5) Do these steps to do the AM mode test of the HF system:
(a) Turn the RF SENS (or SQUELCH) control fully clockwise on the left HF comm control panel, (P5).

(b) Set the frequency selectors to an AM frequency between 2.8 MHz and 23.999 MHz.
(c) Push and release the captain's PTT switch and listen for a 1 kHz tone for 1 to 7 seconds.

NOTE: A continuous or pulsed tone indicates that the coupler is tuning to a new frequency. The coupler tune tone will sound no longer than 15 seconds. The average coupler tune time is 1 to 7 seconds.

Some coupler types are able to tune quickly when previously used frequencies are selected, in which case the tune tone may be only a momentary beep or may not always be audible.

1) Make sure none of the status lights on the left transceiver front panel remains illuminated.

NOTE: The Key Interlock light will momentarily blink when the microphone is keyed.

(d) Push and hold the captain's PTT switch.
1) Make sure none of the status lights on the left transceiver front panel remains illuminated.

NOTE: The Key Interlock light will momentarily blink when the microphone is keyed.

(e) Release the PTT switch.
(f) Turn the RF SENS (or SQUELCH) control slowly through its full range of adjustment.
1) Make sure the audio level changes.
(g) Adjust the L HF listen switch through its full range on the captain's ASP, (P8).
1) Make sure the audio level changes smoothly.
(h) Push the PTT switch and speak into the microphone.

NOTE: You will hear a 1 kHz tone if an out of band frequency was set (below 2.8 MHz or above 23.999 MHz).

1) Make sure you hear the sidetone.
(i) Make a communication to a different HF radio (or other applicable radio operator).
1) Make sure the quality of the transmitted and received voice is satisfactory.

S 735-228

(6) Do these steps to do the USB mode test of the HF system:

(a) Set the mode control switch on the left HF comm control panel, (P5) to the USB position.

(b) Set the frequency select knobs to an applicable USB frequency.

(c) Push and hold the captain's PTT switch.

1) Listen for a 1-kilohertz tone for 1 to 7 seconds.

NOTE: A continuous or pulsed tone indicates that the coupler is tuning to a new frequency. The coupler tune tone will sound no longer than 15 seconds. The average coupler tune time is 1 to 7 seconds.

Some coupler types are able to tune quickly when previously used frequencies are selected, in which case the tune tone may be only a momentary beep or may not always be audible.

2) Make sure none of the status lights on the left transceiver front panel remains on.

NOTE: The Key Interlock light will momentarily blink when the microphone is keyed.

(d) Release the PTT switch.

(e) Push and hold the captain's PTT switch.

1) Make sure none of the status lights on the left transceiver front panel come on.

NOTE: The Key Interlock light will momentarily blink when the microphone is keyed.

(f) Release the PTT switch.

(g) Push the PTT switch and speak into the microphone.

NOTE: You will hear a 1 kHz tone if an out of band frequency was set (below 2.8 MHz or above 23.999 MHz).

1) Make sure you hear the sidetone.

(h) Make a communication to a different HF radio (or other applicable radio operator).

1) Make sure there is clear transmission and reception.

F. Right HF System Test

S 865-185

(1) Do the HF Communications Test paragraph again for the HF-R.

S 865-186

(2) Make sure there is clear transmission and reception.

G. Put the airplane back to its usual condition.

S 865-108
(1) Set the mode selector to the OFF position on the left and right HF comm control panels.

S 865-110
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

HF COMMUNICATION ANTENNA COUPLER - REMOVAL/INSTALLATION

1. General
   A. The HF comm antenna couplers, M241 and M242, are in the HF coupler bay of the vertical stabilizer.
   B. The HF coupler is a rack-mounted, pressurized unit weighing 17 pounds. The coupler is pressurized with dry air at 5-7 psig.

TASK 23-11-01-024-001

2. Remove the HF Comm Antenna Coupler
   A. References
      (1) AMM 06-42-00/201, Empennage Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
      (3) AMM 24-22-00/201, Control (Supply Power)
   B. Access
      (1) Location Zone
          322 Vertical Stabilizer - auxiliary spar to front spar
          211/212 Control Cabin - section 41 (left/right)
      (2) Access Panel
          322BL HF Comm Antenna Coupler Bay Access panel
   C. Prepare for the Removal

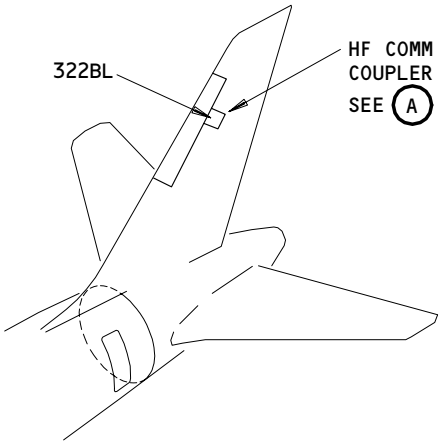
      S 864-026

      (1) Make sure the applicable circuit breaker(s) are closed on the overhead circuit breaker panel P11:
          (a) 11G8, LEFT HF COMM
          (b) 11G35, RIGHT HF COMM

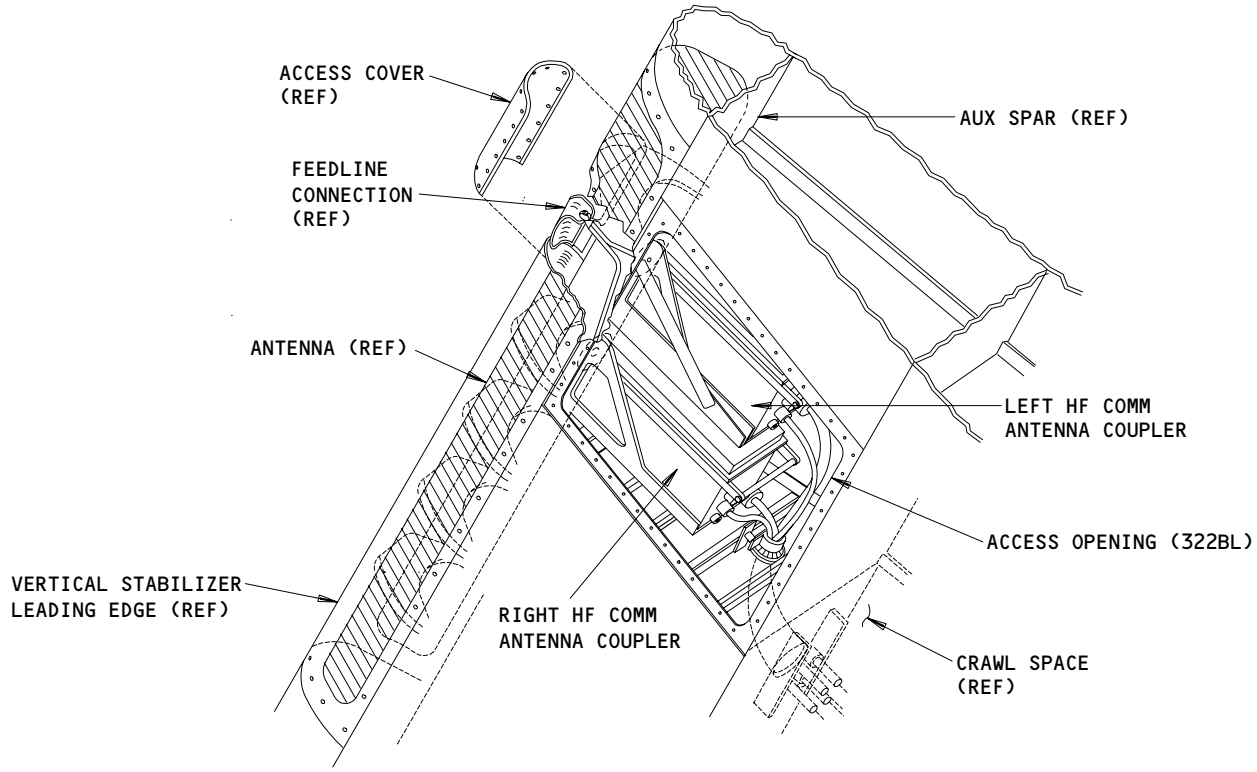
      S 864-035

      CAUTION: YOU MUST PREPARE THE HF COMM ANTENNA COUPLER FOR THE REMOVAL. IF NOT, INTERNAL PARTS ARE EASILY DAMAGED WHEN YOU MOVE THE COMPONENT.

      (2) Supply the electrical power (AMM 24-22-00/201).



VERTICAL STABILIZER



HF COMM ANTENNA COUPLER BAY

A

HF Antenna Coupler Installation
Figure 401

S 864-029

WARNING: DO NOT TRANSMIT WITH THE HF COMMUNICATION SYSTEM. IF YOU TRANSMIT, THE HF COMM ANTENNA COUPLER IS NOT PREPARED FOR THE REMOVAL.

(3) Set the mode selector to AM or USB on the applicable HF comm control panel, (P5).

S 864-053

(4) Set the frequency select switches to a frequency between 2.8 MHZ and 23.999 MHZ.

NOTE: When the HF communication system first tunes to a new frequency, the HF comm antenna coupler is in the HOME position. The HOME position helps prevent internal damage when you move the component.

S 864-030

(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

D. Procedure

S 864-002

(1) Open the applicable circuit breaker(s) on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM

S 014-041

WARNING: MAKE SURE POWER IS REMOVED FROM THE HF SYSTEM BEFORE YOU OPEN THE ANTENNA COUPLER BAY ACCESS PANEL. ACCIDENTAL HF TRANSMISSION CAN CAUSE AN ELECTRICAL SHOCK AND INJURE PERSONS.

(2) Make sure electrical power is removed from the HF system.

S 864-043

(3) Remove access panel 322BL on the left side vertical stabilizer (AMM 06-42-00/201).

NOTE: Approximately 60 screws will need to be removed.

(a) Make sure you know which HF coupler (left, right) is defective.

S 024-031

CAUTION: MOVE THE HF COMM ANTENNA COUPLER CAREFULLY. SET THE COMPONENT ON ITS BOTTOM. DO NOT SET THE COMPONENT ON ITS END (WITH THE HANDLE UP). INTERNAL PARTS ARE EASILY DAMAGED.

(4) Remove the defective HF comm antenna coupler (AMM 20-10-01/401).

TASK 23-11-01-424-008

3. Install HF Comm Antenna Coupler

A. References
(1) AMM 06-42-00/201, Empennage Access Doors and Panels
(2) AMM 20-10-01/401, E/E Rack Mounted Components
(3) AMM 23-51-00/501, Flight Interphone System
(4) AMM 24-22-00/201, Control (Supply Power)

B. Access
(1) Location Zone
322 Vertical Stabilizer - auxiliary spar to front spar
211/212 Control Cabin - section 41 (left/right)
(2) Access Panel
322BL HF Comm Antenna Coupler Access panel

C. Procedure

S 704-048
(1) Before you install the coupler, make sure there is no corrosion and or electrical arcing at the back of the coupler mount, at the rear connection.

S 424-032

CAUTION: MOVE THE HF COMM ANTENNA COUPLER CAREFULLY. SET THE COMPONENT ON ITS BOTTOM. DO NOT SET THE COMPONENT ON ITS END (WITH THE HANDLE UP). INTERNAL PARTS ARE EASILY DAMAGED.

(2) Install the HF comm antenna coupler (AMM 20-10-01/401).

S 414-010
(3) Replace access panel 322BL on the left side of the vertical stabilizer (AMM 06-42-00/201).

S 864-011
(4) Remove the DO-NOT-CLOSE tags and close the applicable circuit breakers on the overhead circuit breaker panel, P11:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM

D. HF comm antenna coupler installation Test.

S 804-013

WARNING: DO NOT OPERATE THE HF SYSTEM WHILE FUEL IS PUT INTO THE AIRPLANE. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY FROM THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

(1) Do not operate the HF system while fuel is put into the airplane.

S 864-014

(2) Supply electrical power (AMM 24-22-00/201).

S 864-015

(3) Make sure the captain's audio selector panel operates (AMM 23-51-00/501).

S 864-016

(4) Set the mode selector to AM or USB on the HF comm control panel, (P5).
   (a) Set the frequency select switches to a frequency between 2.8 MHZ and 23.999 MHZ.
   (b) Set the RF SENS control to an applicable volume level.

S 864-018

(5) Connect the headset/boom microphone to the captain's jack panel on P15.

S 864-019

(6) Push the L or R HF MIC SELECTOR switch as applicable on the captain's audio selector panel, (P8).
   (a) Adjust the L HF or R HF listen switch as applicable.

S 864-022

(7) Push and release the captain's PTT switch and listen for a 1 kHz tune-in-progress tone in the headset.

NOTE: A continuous or pulsed tone indicates that the coupler is tuning to a new frequency. The coupler tune tone will sound no longer than 15 seconds. The average coupler tune time is approximately 1 to 7 seconds.

S 704-023

(8) Push the PTT again and speak into the microphone.
   (a) Listen for a sidetone in the headset.

S 864-024

(9) Set the mode selector to OFF on the HF comm control panel.

E. Put the Airplane to Its Usual Condition.

S 864-025

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

HF COMMUNICATIONS CONTROL PANEL - REMOVAL/INSTALLATION

1. General
   A. The HF comm control panels, M82 and M83, are on the left and right sides of pilots' overhead panel, P5.

TASK 23-11-02-024-001

2. Remove the HF Comm Control Panel

   A. Access
      (1) Location Zones
          211 Flight Compartment, Left
          212 Flight Compartment, Right
   B. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11G8, LEFT HF COMM
          (b) 11G35, RIGHT HF COMM

      S 024-038

      CAUTION: CLEARLY IDENTIFY THE CONNECTOR FOR THE PANEL POSITION (LEFT OR RIGHT) DURING REPLACEMENT. THERE IS A CROSS-CONNECTION POSSIBILITY DURING INSTALLATION.

      (2) Remove the HF comm control panel:
          (a) Loosen the quarter-turn fasteners.
          (b) Lift the HF comm control panel to get access to the electrical connector.
          (c) Disconnect the electrical connector.
          (d) Put protective covers on the electrical connector.

TASK 23-11-02-424-005

3. Install the HF Comm Control Panel
   A. References
      (1) AMM 23-51-00/501, Flight Interphone System
      (2) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zone
          211 Flight Compartment, Left
          212 Flight Compartment, Right
   C. Procedure

S 424-039

CAUTION: CLEARLY IDENTIFY THE CONNECTOR FOR THE PANEL POSITION (LEFT OR RIGHT) DURING REPLACEMENT. THERE IS A CROSS-CONNECTION POSSIBILITY DURING INSTALLATION.

(1) Install the HF comm control panel:
   (a) Remove the protective covers from the electrical connector.
   (b) Examine the electrical connector for bent or broken pins, dirt, and damage.
   (c) Connect the electrical connector.
   (d) Put the HF comm control panel in its position on the P8 panel.
   (e) Tighten the quarter-turn fasteners.

S 864-007

(2) Remove the DO-NOT-CLOSE tag and close the circuit breaker on the overhead circuit breaker panel, P11, for the HF comm control panel that you installed:
   (a) 11G8, LEFT HF COMM
   (b) 11G35, RIGHT HF COMM

S 864-040

(3) Make sure that the circuit breaker for the other panel is open.

NOTE: You will close one circuit breaker at a time to do a check for a cross-connection.

D. Installation Test.

S 804-009

WARNING: DO NOT OPERATE THE HF SYSTEM WHILE FUEL IS PUT INTO THE AIRPLANE. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY FROM THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

(1) Do not operate the HF system while fuel is put into the airplane.

S 864-010

(2) Supply electrical power (AMM 24-22-00/201).

S 714-041

(3) Use the new HF communication control panel to set the applicable HF communication system to a test frequency.

S 704-011
(4) Make sure the captain's audio selector panel operates (AMM 23-51-00/501).

S 864-012
(5) Connect the headset/boom microphone to the captain's jack panel, (P15).

S 864-013
(6) Push the L HF or R HF MIC SELECTOR switch, as applicable, on the captain's audio selector panel, (P8).
(a) Adjust the L HF or R HF listen switch as applicable.
(b) Set the BOOM/OXY switch to BOOM.

S 864-016
(7) Set the mode selector to AM or USB on the HF comm control panel, (P5).
(a) Set the frequency select switches to a frequency between 2.8 MHZ and 23.999 MHZ.
(b) Set the RF SENS control to an applicable level.

S 864-018
(8) Momentarily push the captain's PTT switch, listen for 1 kHz tone in the headset.

S 864-019
(9) Push the PTT again and speak into the microphone.
(a) Listen for sidetone in the headset.

S 864-020
(10) Set the mode selector to OFF on the HF comm control panel.

S 864-042
(11) Remove the DO-NOT-CLOSE tag and close the last circuit breaker for the HF communication control panels:
(a) 11G8, LEFT HF COMM

(b) 11G35, RIGHT HF COMM

S 714-043

(12) Use the applicable HF communication control panel to set the HF communication system to a test frequency.

S 714-044

(13) Repeat the communication test for the applicable HF communication control panel, and make sure the HF communication system operates satisfactorily.

E. Put the Airplane to Its Usual Condition

S 864-021

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

HF COMMUNICATION TRANSCEIVER - REMOVAL/INSTALLATION

1. General
   A. The HF comm transceivers, M152 and M153, are in the main equipment center on shelf E2-6.

TASK 23-11-03-024-001

2. Remove the HF Comm Transceiver
   A. Reference
      (1) AMM 20-10-01/401, E/E Rack Mounted Components - Standard Practices
   B. Access
      (1) Location Zones

119/120	Main Equipment Center
211	Flight Compartment, Left
212	Flight Compartment, Right

      (2) Access Panel

119AL	Main Equipment Center Access Door

   C. Procedure

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
         (a) 11G8, LEFT HF COMM
         (b) 11G35, RIGHT HF COMM

      S 024-004
      (2) Remove the HF comm transceiver (AMM 20-10-01/401).

TASK 23-11-03-424-005

3. Install the HF Comm Transceiver
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components - Standard Practices
      (2) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones

119/120	Main Equipment Center
211	Flight Compartment, Left
212	Flight Compartment, Right

      (2) Access Panel

119AL	Main Equipment Center Access Door

   C. Procedure

      S 424-006
      (1) Install the HF comm transceiver (AMM 20-10-01/401).

S 864-007
(2) Remove DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM

D. Installation Test

S 804-009

WARNING: DO NOT OPERATE THE HF SYSTEM WHILE YOU PUT FUEL INTO THE AIRPLANE. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY FROM THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

(1) Do not operate the HF system while fuel is put into the airplane.

S 864-010
(2) Supply electrical power (AMM 24-22-00/201).

S 864-011
(3) Set the mode selector to AM or USB on the HF comm control panel, (P5).

S 714-013
(4) Make sure the internal blower fan on the transceiver operates.

S 744-041
(5) AIRPLANES WITH COLLINS HFS-700 OR HFS-900 TRANSCEIVER;
Do the steps that follow:
(a) Push and hold the SQL/LAMP TEST switch on the transceiver front panel.
1) Make sure the LRU FAIL, KEY INTERLOCK, and CONTROL INPUT FAIL lights come on and stay on.
(b) Release the SQL/LAMP TEST switch.
1) Make sure the LRU FAIL, KEY INTERLOCK, and CONTROL INPUT FAIL lights go off.

S 864-034

(6) Set the mode selector to OFF on the HF comm control panel.

E. Put the Airplane to Its Usual Condition

S 864-017

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

HF COMMUNICATION ANTENNA - REMOVAL/INSTALLATION

1. General
   A. Two tasks are in this procedure:
      (1) Removal of the HF communication antenna.
      (2) Installation of the HF communication antennna.
   B. The HF communication antenna is part of the leading edge of the vertical stabilizer.

TASK 23-11-04-024-001

2. HF Communication Antenna Removal
   A. References
      (1) AMM 55-35-01/401, Vertical Stabilizer Leading Edge
   B. Access
      (1) Location Zones
          211 Flight Compartment, Left
          212 Flight Compartment, Right
          321 Vertical Stabilizer
   C. Procedure

S 864-033

WARNING: REMOVE THE POWER FROM EACH HF COMMUNICATION SYSTEM, BEFORE YOU REMOVE THE HF COMMUNICATION ANTENNA. HF SIGNALS CAN CAUSE ELECTRICAL SHOCKS AND INJURIES TO PERSONS.

(1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM

S 024-005

(2) Remove the part of the leading edge of the vertical stabilizer that contains the HF communication antenna (AMM 55-35-01/401).

TASK 23-11-04-424-006

3. HF Communication Antenna Installation
   A. References
      (1) AMM 23-11-00/501, HF Communication System
      (2) AMM 55-35-01/401, Vertical Stabilizer Leading Edge
   B. Access
      (1) Location Zones
          211 Flight Compartment, Left
          212 Flight Compartment, Right
          321 Vertical Stabilizer
   C. Procedure

S 864-034

WARNING: REMOVE THE POWER FROM EACH HF COMMMUNICATION SYSTEM BEFORE YOU INSTALL THE HF COMMUNICATION ANTENNA. HF SIGNALS CAN CAUSE ELECTRICAL SHOCKS AND INJURIES TO PERSONS.

(1) Make sure these circuit breakers are open on the overhead circuit breaker panel, P11:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM

S 424-008
(2) Install part of the leading edge of the vertical stabilizer that contains the the HF communication antenna (AMM 55-35-01/401).

S 864-009
(3) Remove DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM

D. Installation Test

S 864-031
(1) Do this task: Operational Test- HF Communication System (AMM 23-11-00/501).

HF COMMUNICATION ANTENNA - INSPECTION/CHECK

1. General
   A. This procedure has this task.
      (1) An electrical bond check of the HF communication antenna.
   B. The HF communication antenna is part of the leading edge of the vertical stabilizer.
   C. You must remove the HF antenna coupler(s) to do the electrical bond check. The HF antenna coupler(s) are installed adjacent to the HF communications antenna in the vertical stabilizer.

TASK 23-11-04-766-006

2. HF Communication Antenna - Electrical Bond Check (Fig. 601)
   A. References
      (1) AMM 23-11-01/401, HF Communications Antenna Coupler
      (2) SWPM 20-20-00, Electrical Bonding and Grounding
   B. Equipment
      (1) Bonding Meter (SWPM 20-20-00)
   C. Procedure

S 026-001

WARNING: MAKE SURE THE ELECTRICAL POWER IS REMOVED FROM EACH HF COMMUNICATION SYSTEM. HF SIGNALS CAN CAUSE ELECTRICAL SHOCKS AND INJURY TO PERSONS.

CAUTION: YOU MUST PREPARE EACH HF ANTENNA COUPLER FOR REMOVAL. IF YOU DO NOT PREPARE FOR THE REMOVAL, YOU CAN EASILY CAUSE DAMAGE TO THE INTERNAL PARTS OF THE HF ANTENNA COUPLER.

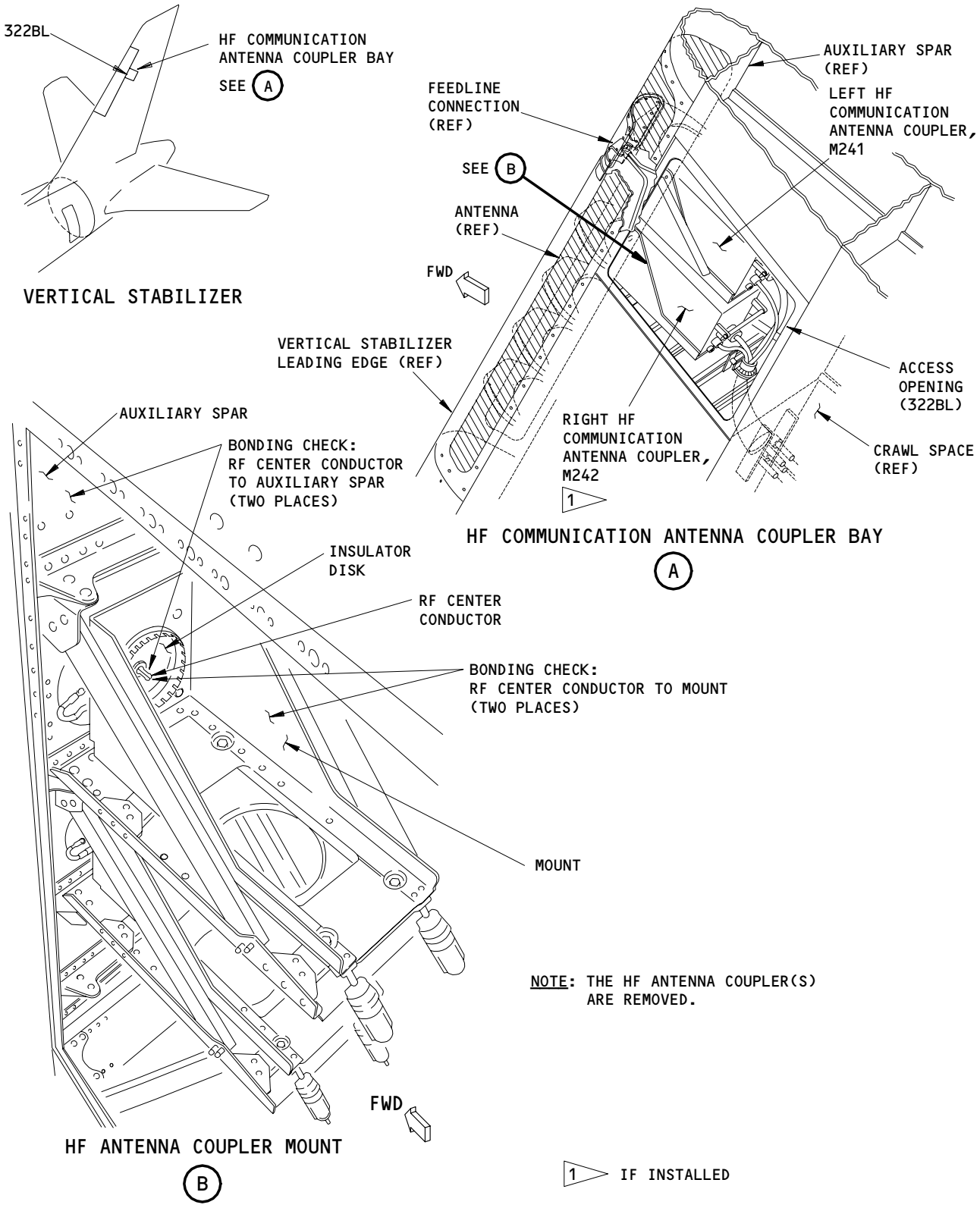
(1) Remove the HF communication antenna coupler(s) (AMM 23-11-01/401).

S 766-003

(2) Measure the resistance at each antenna coupler mount (Fig. 601) as follows (SWPM 20-20-00):
   (a) The RF center conductor of the antenna coupler mount to the antenna coupler mount frame.
      1) Make sure the resistance is 10 milliohms or less.
   (b) The RF center conductor of the antenna coupler mount to the auxiliary spar.
      1) Make sure the resistance is 10 milliohms or less.

S 426-004

(3) Install the HF antenna coupler(s) (AMM 23-11-01/401).



HF Communications Antenna Bonding Check
Figure 601

VHF COMMUNICATION SYSTEM - DESCRIPTION AND OPERATION

1. General
   A. Three VHF (Very High Frequency) communications systems (referred to as the VHF systems) are installed on the airplane.
   B. The VHF systems supply line-of-sight voice communications with ground stations or other airplanes. The VHF systems operate in either 8.33 kHz or 25 KHz increments from a frequency range of 118.00 MHz to 136.975 MHz.
   C. AIRPLANES WITH ACARS INSTALLED;
      the center VHF system can supply an air-to-ground data link for ACARS (ARINC Communications Addressing and Reporting System) (AMM 23-22-00/001).
   D. Each VHF system uses 28-volt dc power. The VHF system circuit breakers are located on the overhead circuit breaker panel, P11.
   E. The left VHF system uses power from the dc standby bus and the right VHF system from the right dc bus.
   F. The center VHF system uses power from the left dc bus.
   G. The VHF system major components are a VHF communication control panel, a VHF communication transceiver, and a VHF communication antenna.
2. Component Details (Fig. 1)
   A. VHF Comm Control Panel

SAS (1) The VHF comm control panel (referred to as the control panel) changes the frequency for the VHF comm transceiver.

SAS (2) Each VHF control panel contains two liquid crystal displays (LCD's) labeled ACTIVE and STANDBY. They show the active and pre-selected frequencies for the given radio. The ACTIVE display indicates the last frequency entered into the radio and the STANBY display acts as a scratch pad for entering frequency data.

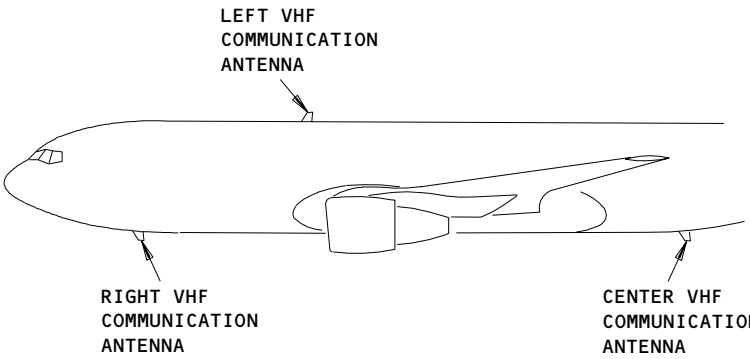
SAS (3) Frequency data is dialed into the STANDBY display by rotating two concentric selector knobs. The outer (large) frequency selector knobadjusts the MHz portion of the frequency; the small (inner) knob adjusts the KHz portion of the frequency.

SAS (4) Once the frequency has been entered into the STANDBY display it can be interchanged, or transferred to the ACTIVE by pressing the TFR push-button. The frequency data is also transmitted to the VHF transceiver, when the TFR button is pressed.

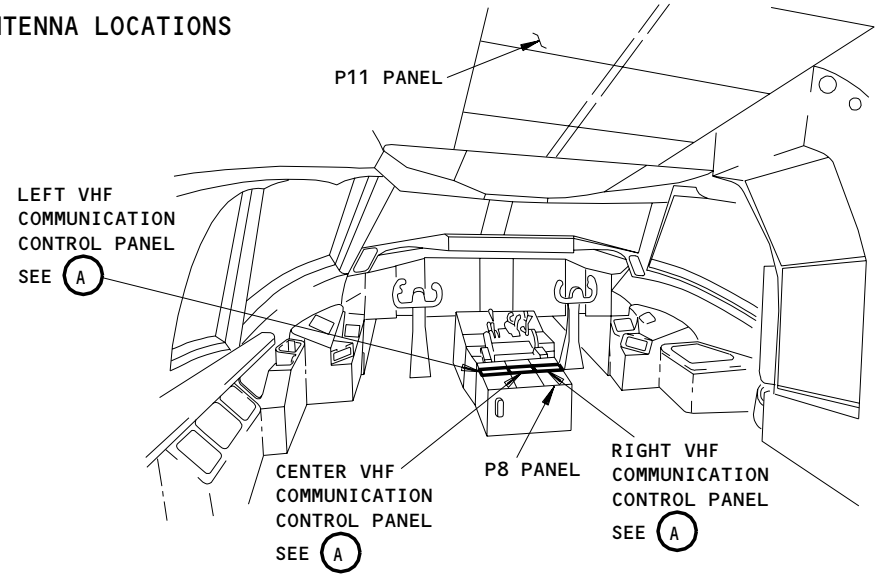
SAS (5) If the COMM TEST push-button is pressed, the control panel encodes the TEST status in the ARINC $@(output. This sets the squelch on the radio to minimum.

SAS (6) The control panel is able to operate in DATA mode (not used). This mode is acheived by turning the selector knod past the minimum or maximum frequency. The word DATA is then displayed in STANDBY. Pressing the TFR trannsfers DATA to the ACTIVE display and data mode is obtained.

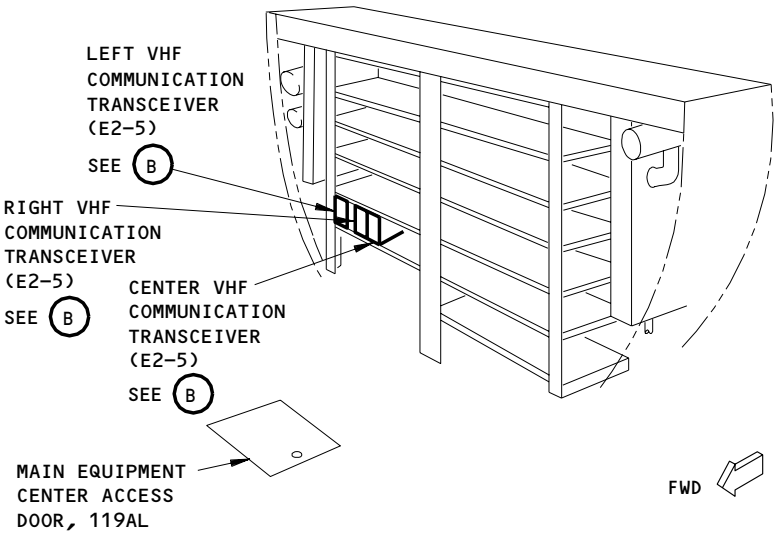
SAS



VHF COMMUNICATION ANTENNA LOCATIONS



FLIGHT COMPARTMENT



MAIN EQUIPMENT CENTER

VHF Communications System - Component Location
Figure 1 (Sheet 1)

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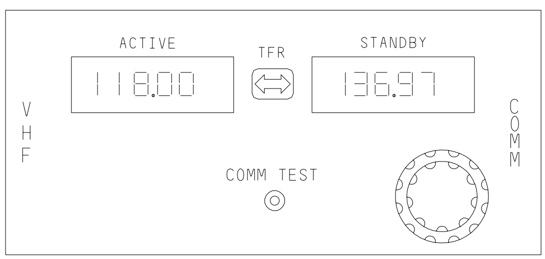
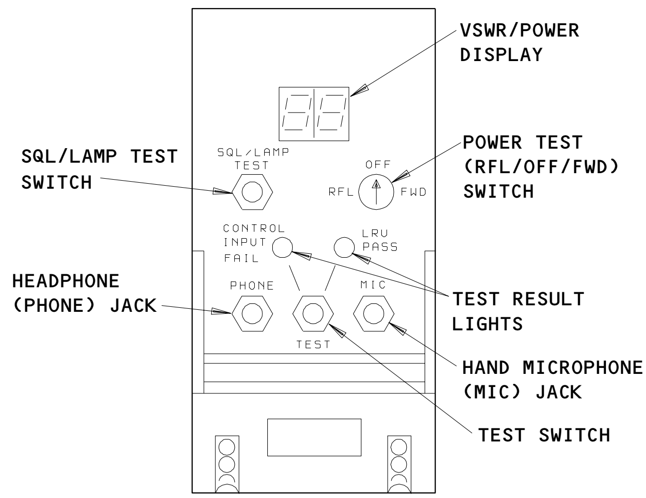


VHF COMMUNICATION CONTROL PANEL

A



VHF COMMUNICATION TRANSCEIVER

B

VHF Communications System - Component Location
Figure 1 (Sheet 2)

B. VHF Communication Transceiver

(1) The VHF comm transceiver (referred to as the transceiver) modulates audio inputs for rf transmission, and demodulates rf signals for audio reception. The front panel of the transceiver contains two jacks, two test switches, a three-position switch, two lights (LEDs), and a digital readout display. The two jacks (MIC and PHONE) allow you to test the transceiver without the interphone circuits. The SQL/LAMP TEST switch disables the squelch circuits, and tests all face panel lights. The TEST switch starts a self-test of critical circuits in the transceiver. The two status lights indicate LRU PASS and frequency CONTROL INPUT FAIL. The three-position, RFL (reflected), FWD (forward), and OFF (normal) switch checks rf power to the antennas, and shows the result in watts on the two-digit display.

(2) All of the transceivers for the VHF system are installed on shelf 5 of main equipment center rack E2 (E2-5).

C. VHF Comm Antenna

(1) The VHF comm antennas (referred to as antennas) are blade types, mounted to the centerline of the airplane fuselage. Each antenna is impedance matched to the transmission line . A coaxial cable connector on the antenna connects to the transmission line from the transceiver.

3. Operation (Fig. 2)

A. Functional Description

SAS (1) The left, right, and center, VHF systems are the same for voice communications.

SAS (2) ACARS uses the center VHF system for data transmission and reception.

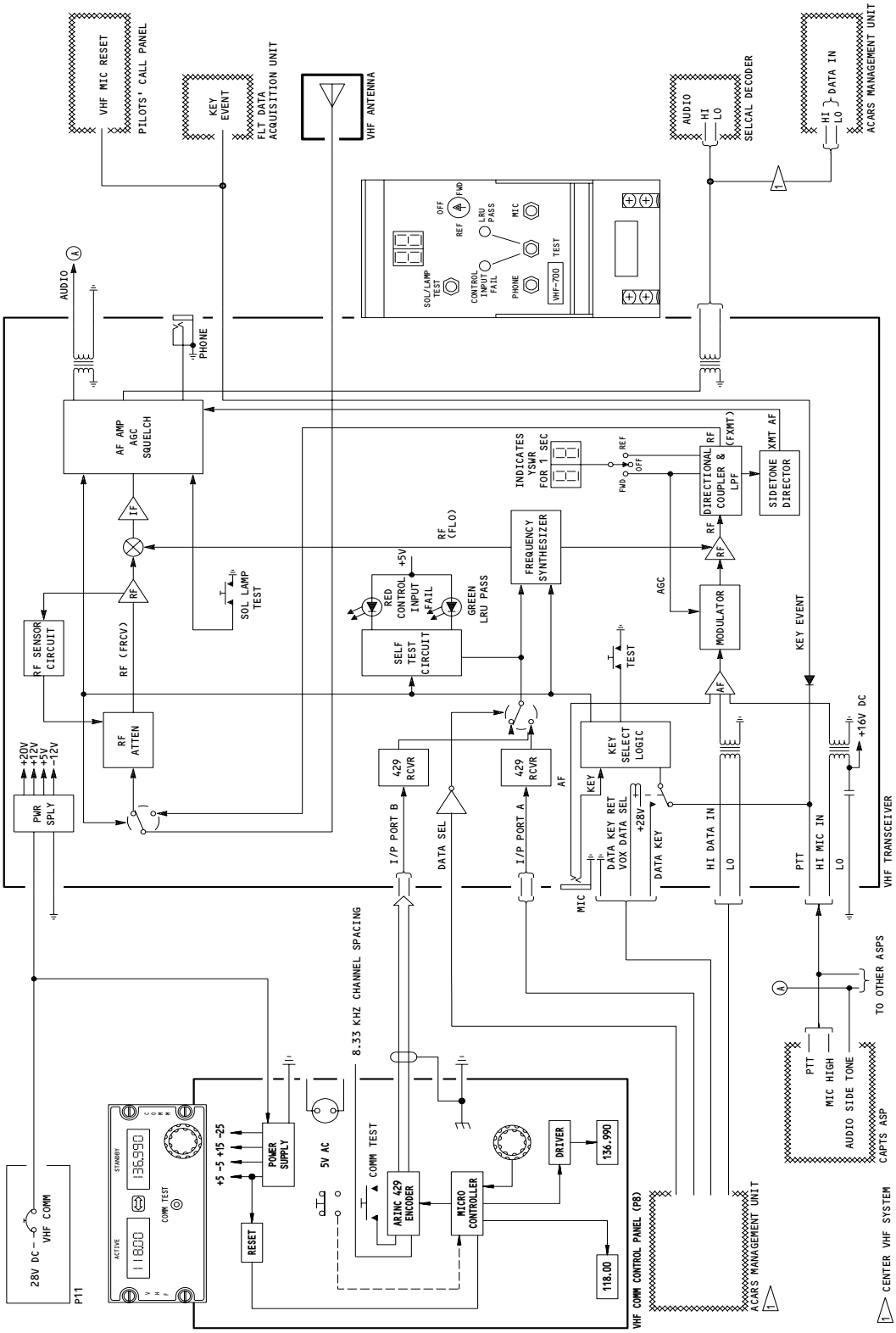
(3) Voice communications:

(a) Audio is received and transmitted on the same frequency. The frequency is set on the control panel. The correct VHF system microphone is set on the crewmember's audio selector panel.

(b) The SELCAL system (AMM 23-21-00/001) tells crewmembers when a ground station calls them. The appropriate VHF switchlight, on the pilots' call panel (P5), comes on and a chime sounds.

(c) To listen to VHF voice, you adjust the volume control, for the VHF system, on the audio selector panel.

(d) The microphone PTT switch, controls transmission in the VHF system. When the switch is pressed, the receiver is disconnected and the transmitter is connected to the antenna. The crewmember may speak into the microphone to transmit. Audio sidetone is sent to the crewmember's headset to indicate operation of the transmitter. When the PTT switch is released, the VHF system returns to receive.



VHF Communication Schematic (Typical)
Figure 2

M60785

(e) The control panel sends the selected frequency data to the transceiver by an ARINC 429 data bus. The data bus provides one way, digital data transmission between components.

(f) The transceivers accept microphone and PTT inputs from the audio selector panels, and from a microphone jack located on the front panel of the transceiver. The antennas transmit and receive rf signals. These signals are distributed by the transceivers. The transceivers provide audio signals to the audio selector panels, and to the headphone jack on the transceiver's front panel. Each time a microphone is keyed (by pressing the PTT switch), an ATC event signal is recorded by the flight data recorder.

(4) Power:

(a) Both the control panel and transceiver are supplied with 28v dc power from a single circuit breaker on overhead panel P11. In the control panel, a power supply generates operating power for the electronics. In the transceiver, the power supply generates dc for electronics use, part of which is supplied to a switching device that controls dc used in transmit mode only.

(5) Frequency Selection:

(a) The frequency selection data originates in the control panel as parallel bcd code, converted to serial bcd, formatted into a ARINC 429 word and transmitted to the transceiver over an ARINC 429 data bus.

(b) In the transceiver, the data is routed to the microprocessor through port B of the port select switch. The microprocessor then issues serial frequency data to the synthesizer.

(6) Transmit:

SAS (a) Transmission is initiated by grounding the PTT line in the voice mode or by grounding the data key line, in the data mode This activates the antenna switch and switches the frequency synthesizer output to the transmitter section.

SAS (b) The frequency synthesizer output is low level amplitude modulated by audio from the interphone system (or data from the ACARS, and amplified for transmission. The forward power output is sampled and fed back to the modulator where it is used to linearize the modulated drive signal, ensuring that the modulated drive signal accurately follows the modulation. Forward power is also sampled to generate sidetone audio to the voice audio output. The rf output is then routed through the antenna switch to the antenna.

(c) The PTT (or data key) signal is also routed out of the transceiver as a key event signal. This is used by the digital flight recorder system to record the times during which the transceiver is keyed. It also is used as the mic reset signal for resetting the SELCAL decoder (if installed).

NOTE: This mic reset signal is routed to the SELCAL decoder through the pilots' call panel (P5).

(7) Receive:

(a) When the transceiver is not keyed, the output from the frequency synthesizer is switched to the receiver mixer and the antenna switch connects the antenna to the receiver input.

(b) With no signal input, the receiver noise output from the detector is filtered and compared to a squelch threshold voltage in the squelch comparator. The comparator output turns off the voice audio output to the interphone systems.

(c) When a signal is received, it is amplified in the rf section and fed to the first mixer. Also in the rf section there is a negative feedback to the variable attenuator to prevent overloading the rf amplifier when there are excessively strong signals. In the first mixer, the frequency synthesizer output is beat with the incoming signal to produce a 20.025 MHz IF. The IF is filtered, amplified and mixed with 9.325 MHz to produce a third IF of 10.7 MHz which is filtered, amplified and detected. Now the detector output is strong and the squelch comparator will gate the audio output through to the voice output amplifier.

B. Self-Test:

(1) AIRPLANES WITH COLLINS VHF-700 TRANSCEIVER;
The VHF comm transceiver has a built-in self-test system that is initiated by push-to-test switches on the front panel of the transceiver. The SQL/LAMP TEST momentary push switch is used to disable transceiver squelch, and to check the front panel lights prior to system self-testing. The red CONTROL INPUT FAIL and green LRU PASS lights come on when the SQL/LAMP TEST switch is pushed.

(2) The TEST push switch is used to initiate the CONTROL INPUT FAIL and LRU PASS tests. The CONTROL INPUT FAIL test checks that the transceiver is receiving valid frequency tuning data from the control panel, or the ACARS management unit (if installed). If the tuning data is not valid, the red CONTROL INPUT FAIL light comes on indicating a control panel failure. The light remains on for about four seconds after the TEST switch is pressed.

(3) The LRU PASS test is initiated at the same time as the CONTROL INPUT FAIL test. The LRU PASS test identifies a failure in the transceiver. After pressing the TEST switch, the green LRU PASS light should come on for about four seconds. At the same time, the digital readout should display a value of less than 3.0. This value is the voltage standing wave ratio (VSWR). If the light fails to come on, a problem may exist in the transceiver.

(4) After the CONTROL INPUT FAIL/LRU PASS tests are completed, turning the power test switch displays power values on the digital readout. The FWD position should display a minimum value of 25, which is the forward power. The RFL position should display 25 percent or less of the forward power value. This is the reflected power.

C. Control

(1) Turn-on procedure:

(a) Provide electrical power (AMM 24-22-00/201).

(b) Make sure the STBY PWR switch, on pilots' overhead panel P5, is in the AUTO position.

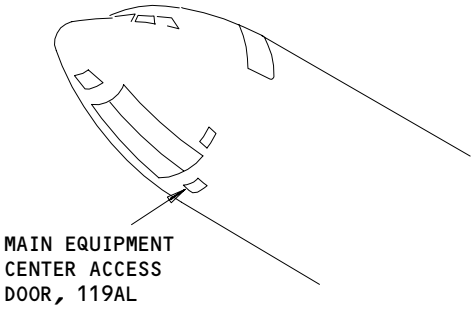
(c) Make sure the VHF COMM LEFT, VHF COMM RIGHT, and VHF COMM CENTER, circuit breakers on the overhead circuit breaker panel, P11, are closed.

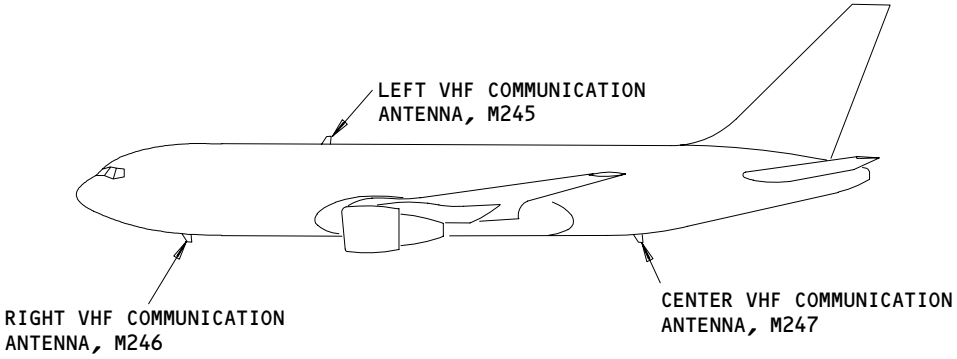
VHF COMMUNICATIONS SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ANTENNA - C VHF COMM, M247	1	1	BOTTOM FUSELAGE, AFT	23-12-03
ANTENNA - L VHF COMM, M245	1	1	TOP FUSELAGE, FWD	23-12-03
ANTENNA - R VHF COMM, M246	1	1	BOTTOM FUSELAGE, FWD	23-12-03
CIRCUIT BREAKER -	2		FLT COMPT, P11	
VHF COMM C, C556		1	11G4	*
VHF COMM L, C544		1	11C3	*
VHF COMM R, C545		1	11G31	*
PANEL - (FIM 23-42-00/101)				
PILOTS' CALL, M51				
PANEL - (FIM 23-51-00/101)				
AUDIO SELECTOR, M70				
AUDIO SELECTOR, M71				
AUDIO SELECTOR, M98				
PANEL - C VHF CONTROL, M80	2	1	FLT COMPT, P8	23-12-02
PANEL - L VHF CONTROL, M78	2	1	FLT COMPT, P8	23-12-02
PANEL - R VHF CONTROL, M79	2	1	FLT COMPT, P8	23-12-02
RELAY - (FIM 32-09-00/101)				
SYS NO. 1 AIR/GROUND, K199				
SYS NO. 2 AIR/GROUND, K203				
TRANSCEIVER - C VHF COMM, M190	2	1	119AL, MAIN EQUIP CTR, E2-5	23-12-01
TRANSCEIVER - L VHF COMM, M188	2	1	119AL, MAIN EQUIP CTR, E2-5	23-12-01
TRANSCEIVER - R VHF COMM, M189	2	1	119AL, MAIN EQUIP CTR, E2-5	23-12-01
UNIT - (FIM 23-21-00/101)				
SELCAL DECODER, M180				
UNIT - (FIM 31-31-00/101)				
FLT DATA ACQUISITION, M138				

* SEE THE WDM EQUIPMENT LIST

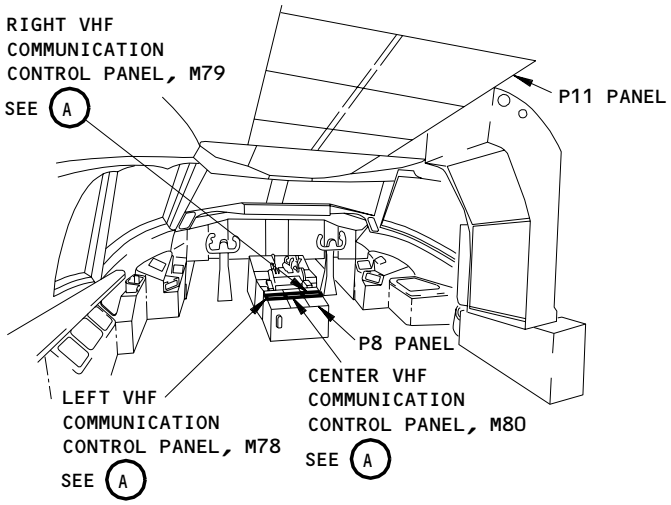
VHF Communications System - Component Index
Figure 101



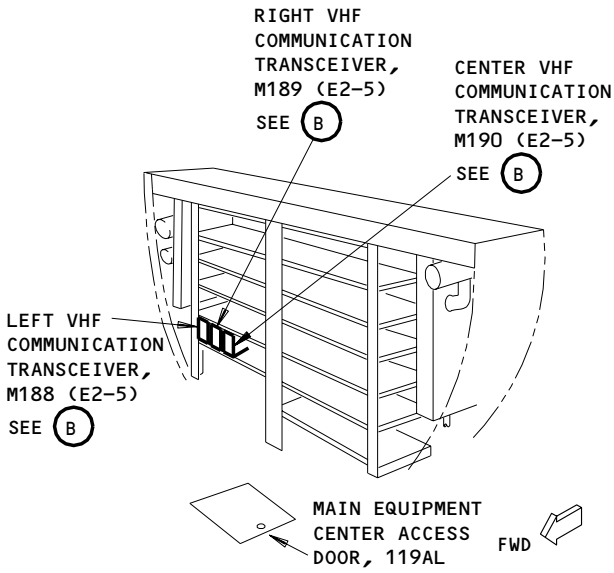


VHF COMMUNICATION ANTENNA LOCATIONS

VHF Communications System - Component Location
Figure 102 (Sheet 1)



FLIGHT COMPARTMENT



MAIN EQUIPMENT CENTER

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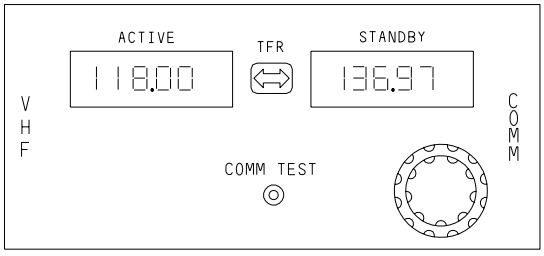
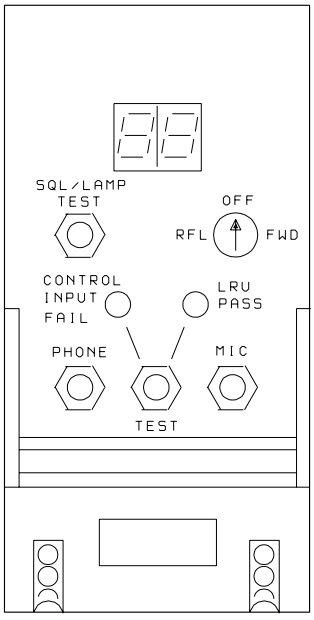


VHF COMMUNICATION CONTROL PANEL

A



VHF COMMUNICATION TRANSCEIVER, M188, M189 OR M190

B

SAS
SAS
SAS

VHF Communications System - Component Location
Figure 102 (Sheet 2)

VHF COMMUNICATION SYSTEM - ADJUSTMENT/TEST

1. General
   A. This subject has this task:
      (1) A system test of the VHF communication system.

   TASK 23-12-00-705-001

2. System Test - VHF Comm System
   A. General
      (1) This test does a check of the VHF communications system to make sure of the best system performance.
   B. References
      (1) AMM 23-51-00/501, Flight Interphone System
      (2) AMM 24-22-00/201, Electrical Power - Control
   C. Access
      (1) Location Zones
          211/212 Flight Compartment
   D. Prepare for the Test

      S 865-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 865-003
      (2) Set the STBY PWR switch, on the pilots' overhead panel P5, to AUTO.

      S 705-004
      (3) Make sure the flight interphone system operates (AMM 23-51-00/501).

      S 865-005
      (4) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
          (a) 11C3, VHF COMM L
          (b) 11G4, VHF COMM CENTER
          (c) 11G31, VHF COMM R
          (d) 11P1, LIGHTING INSTRUMENT & PANEL AISLE STAND
   E. VHF Communications System Test

SAS
SAS   S 745-006
SAS   (1) Self-test (COLLINS VHF-700/700A/700B XCVRs INSTALLED)
SAS   (a) At each VHF comm transceiver (E2-5) do the steps that follow:
                 1) Push and hold the SQL/LAMP TEST switch.
                    a) Make sure the red CONTROL INPUT FAIL and green LRU PASS lights come on.
                 2) Release the SQL/LAMP TEST switch.
                 3) Push and hold the TEST switch.
                    a) Make sure the green LRU PASS light comes on.

b) Make sure the display shows less than 3.0.
c) Make sure the red CONTROL INPUT FAIL light is off.

4) Release the TEST switch.
5) Turn and hold the rotary switch in the FWD position.
a) Make sure a minimum value of at least 25 (Watts) is shown. This is the transmitter output power in watts.
6) Turn and hold the rotary switch in the RFL position.
a) Make sure the value shown is not more than 25 percent of the value displayed with the rotary switch in the FWD position. This is the reflected RF power in watts.
7) Release the rotary switch.

S 705-007

(2) VHF Comm Control Panel Lighting Test

SAS (a) At each VHF comm control panel, (P8), do the steps that follow:

SAS 1) Set the outer PANEL/FLOOD AISLE STAND switch on the left lighting control panel, (P5) to full bright.

SAS 2) Verify that control panel front plastic, both displays and SAS TFR push-button illuminate.

SAS 3) Adjust the outer PANEL/FLOOD AISLE STAND switch and make SAS sure the light intensity of the control panel changes.

S 705-008

(3) VHF Communications Test

(a) Connect the headset/boom mic to the captain's jack panel, on the captain's auxiliary instrument panel, P15.

(b) Make applicable selections on the captain's audio selector panel, (P8):
1) Push the VHF-L MIC SELECTOR switch.
2) Adjust the VHF-L volume control to the middle position.

SAS (c) Do the COMM TEST on the VHF-L comm control panel:
1) Push and hold the COMM TEST switch.

SAS 2) Make sure the squelch is disabled.
3) Release the COMM TEST switch.

SAS (d) Set the VHF-L ACTIVE frequency and STANDBY selectors to two approved test frequencies.

(e) Push the PTT switch on the captain's audio selector panel, or control wheel, and make a communication.

SAS (f) Use the TFR button on the VHF-L control panel, and make sure transmission and reception on the frequencies is clear.

(g) Make sure you hear the sidetone while you transmit.

(h) While you do the voice communication, adjust the VHF-L volume control (on audio selector panel) through the full range.

(i) Make sure the audio level changes smoothly without change in the voice quality.

(j) At the other stations with audio selector panels:
1) Connect the headset/boom mic to applicable jack panel.
2) Push the VHF-L MIC SELECTOR.
3) Adjust the VHF-L volume control approximately to the middle position.
4) Push the PTT switch and speak into the mic.
5) Make sure you hear the sidetone.
6) Adjust the VHF-L volume control through the full range.
7) Make sure the audio level changes smoothly without audible change in the voice quality.

S 705-009

(4) Right VHF Communications Test
(a) Do the VHF Communications Test paragraph again for the VHF-R.

S 705-010

(5) Center VHF Communications Test
(a) Do the VHF Communications Test paragraph again for the VHF-C.

S 865-011

(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VHF COMMUNICATION TRANSCEIVER - REMOVAL/INSTALLATION

1. General

SAS A. The left, right, and center, VHF communication transceivers, M188, M189 and M190, are installed on shelf 5 of the E2 rack in the main equipment center.

B. The removal and installation procedures are the same for each of the VHF communication transceivers.

TASK 23-12-01-024-001

2. Remove the VHF Communication Transceiver

A. References

(1) AMM 20-10-01/401, E/E Rack Mounted Components

(2) AMM 24-22-00/201, Electrical Power - Control

B. Access

(1) Location Zones

119/120 Main Equipment center

C. Procedure

S 864-002

(1) Open these circuit breakers on the overhead circuit breaker panel, P11, as necessary, and attach DO-NOT-CLOSE tags:

(a) 11C3, VHF COMM L

(b) 11G4, VHF COMM CENTER

(c) 11G31, VHF COMM R

S 024-003

(2) Remove the VHF communication transceiver (AMM 20-10-01/401).

TASK 23-12-01-424-004

3. Install the VHF Communication Transceiver

A. References

(1) AMM 20-10-01/401, E/E Rack Mounted Components

(2) AMM 24-22-00/201, Electrical Power - Control

B. Access

(1) Location Zones

119/120 Main Equipment Center

C. Procedure

S 424-005

(1) Install the VHF communication transceiver (AMM 20-10-01/401).

S 864-006

(2) Remove DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11, as appropriate:

(a) 11C3, VHF COMM L

(b) 11G4, VHF COMM CENTER

(c) 11G31, VHF COMM R

D. Installation Test

S 864-007
(1) Supply electrical power (AMM 24-22-00/201).

S 864-008
(2) Set the STBY PWR switch, on the pilots' overhead panel P5, to AUTO.

S 744-073
(3) AIRPLANES WITH COLLINS VHF-700/700A XCVRs INSTALLED;
Do the steps that follow:
(a) Push and hold the SQL/LAMP TEST button on the transceiver.
1) Make sure the red CONTROL INPUT FAIL, and green LRU PASS lights on the transceiver are on.
(b) Release the SQL/LAMP TEST switch.
(c) Push and hold the TEST switch on the VHF transceiver front panel.
(d) Make sure the CONTROL INPUT FAIL light does not come on.
(e) Make sure the green LRU PASS light comes on for approximately four seconds, and the display shows less than 3.0.
(f) Release the TEST switch on the VHF transceiver front panel.

S 864-021
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VHF COMMUNICATION CONTROL PANEL - REMOVAL/INSTALLATION

1. General
   A. The left, right, and center VHF communication control panels, M78, M79, and M80, are installed on the pilots' aft control stand P8.
   B. The removal and installation procedures are the same for all the control panels.

TASK 23-12-02-024-001

2. Remove the VHF Communication Control Panel
   A. Access
      (1) Location Zones
          211/212 Flight compartment
   B. Procedure

      S 864-002
      (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
          (a) On the overhead circuit breaker panel, P11:
              1) 11C3, VHF COMM L
              2) 11G4, VHF COMM CENTER
              3) 11G31, VHF COMM R

      S 024-050

      CAUTION: CLEARLY IDENTIFY THE CONNECTOR FOR THE PANEL POSITION (LEFT, RIGHT OR CENTER) DURING REPLACEMENT. THERE IS A CROSS-CONNECTION POSSIBILITY DURING INSTALLATION.

      (2) Remove the VHF communication control panel.
          (a) Loosen the four quarter-turn fasteners.
          (b) Lift the VHF communication control panel to get access to the electrical connector.
          (c) Disconnect the electrical connector.
          (d) Put protective covers on the electrical connector.

TASK 23-12-02-424-004

3. Install the VHF Communication Control Panel
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          211/212 Flight compartment
   C. Procedure

      S 864-052
      (1) Make sure these circuit breakers are open:
          (a) On the overhead circuit breaker panel, P11:
              1) 11C3, VHF COMM L

2) 11G4, VHF COMM CENTER
3) 11G31, VHF COMM R

S 424-051

CAUTION: CLEARLY IDENTIFY THE CONNECTOR FOR THE PANEL POSITION (LEFT, RIGHT OR CENTER) DURING REPLACEMENT. THERE IS A CROSS-CONNECTION POSSIBILITY DURING INSTALLATION.

(2) Install the VHF communication control panel.
(a) Remove the protective covers from the electrical connector.
(b) Examine the electrical connector for bent or broken pins, dirt, and damage.
(c) Connect the electrical connector.
(d) Set the VHF communication control panel in its position on the P8 panel.
(e) Tighten the quarter-turn fasteners.

S 864-006
(3) Remove THE DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the P11 panel:
1) 11C3, VHF COMM L
2) 11G4, VHF COMM CENTER
3) 11G31, VHF COMM R

D. Installation Test

SAS
SAS S 864-027
SAS (1) Supply electrical power (AMM 24-22-00/201).
SAS
SAS S 864-028
SAS (2) Set the STBY PWR switch, on the pilots' overhead panel P5, to AUTO.
SAS
SAS S 864-029
SAS (3) Rotate the outer knob on the control panel frequency selector and verify the STANDBY display changes in MHz increments.
SAS
SAS S 864-030
SAS (4) Rotate the inner knob on the control panel frequency selector and verify the STANDBY display changes in KHz increments.
SAS
SAS S 864-031
SAS (5) Press the TFR button twice and make sure the contents of the ACTIVE display and the STANDBY display is interchanged twice.
SAS
SAS S 864-032
SAS (6) Set the outer PANEL/FLOOD AISLE STAND switch on the left lighting control panel, (P5) to full bright.

SAS
SAS S 214-033
SAS (7) Verify that control panel front plastic, both displays and the TFR push-button illuminate.
SAS
SAS S 864-034
SAS (8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VHF COMMUNICATION ANTENNA - REMOVAL/INSTALLATION

1. General
   A. The VHF communication antenna is referred to as the VHF antenna.
   B. The left VHF antenna, M245, is on the top of the fuselage at station 654+33.
   C. STANDARD ANTENNA LOCATION;
      The right VHF antenna, M246, is on the bottom of the fuselage at station 513. The center VHF antenna, M247, (if installed) is located on the bottom of the fuselage at station 1197+99.
   D. ALTERNATE ANTENNA LOCATION;
      The right VHF antenna, M246, is on the bottom of the fuselage at station 1197+99. The center VHF antenna, M247, (if installed) is located on the top of the fuselage at station 1320.
   E. The removal and installation procedures are the same for all VHF antennas.

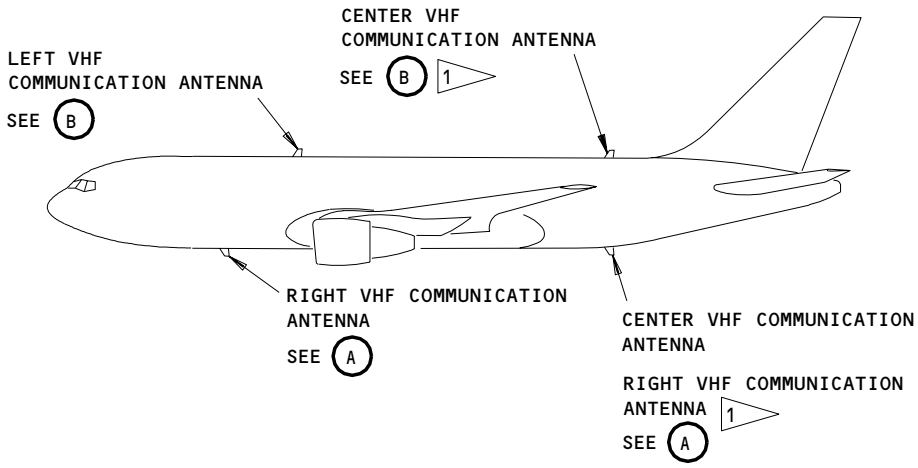
TASK 23-12-03-024-001

2. Remove the VHF Comm Antenna (Fig. 401)
   A. References
      (1) AMM 51-31-01/201, Seals and Sealing
   B. Access
      (1) Location Zones

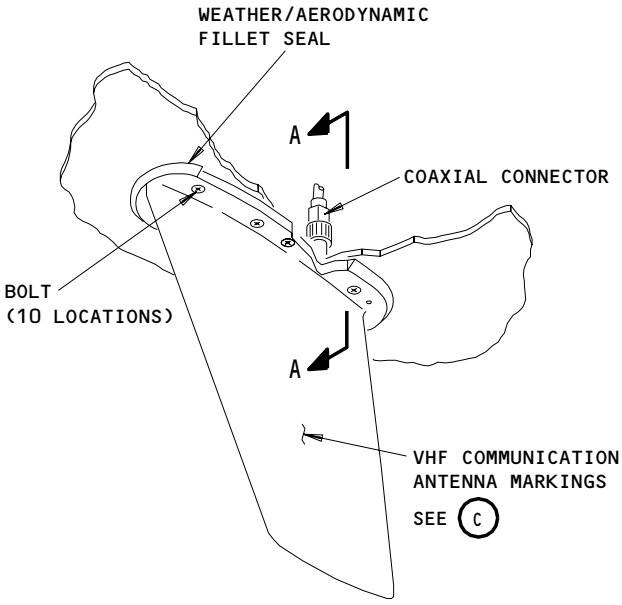
233/234	Area above passenger cabin ceiling - section 43 (exterior)
123/124	Area below forward cargo compartment - (exterior)
155/156	Area below aft cargo compartment - (exterior)

   C. Procedure

      S 864-002
      (1) Open the applicable circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
         (a) 11C3, VHF COMM L
         (b) 11G4, VHF COMM CENTER
         (c) 11G31, VHF COMM R

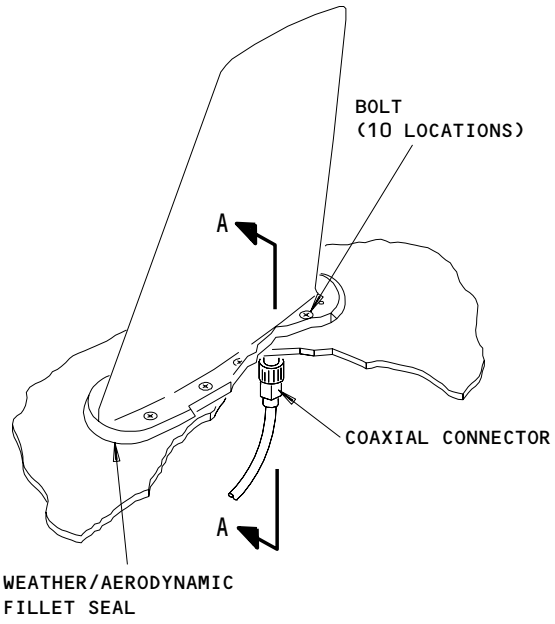


VHF COMMUNICATION ANTENNA LOCATIONS



RIGHT OR CENTER VHF COMMUNICATION ANTENNA

A

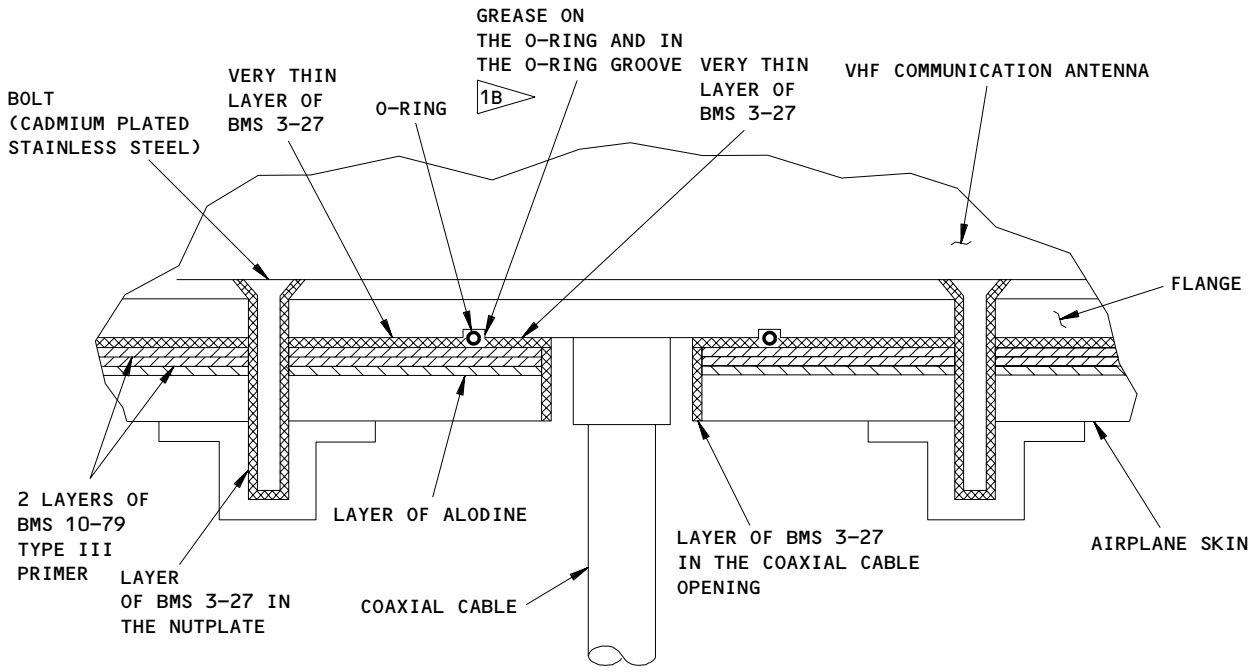


LEFT OR CENTER VHF COMMUNICATION ANTENNA

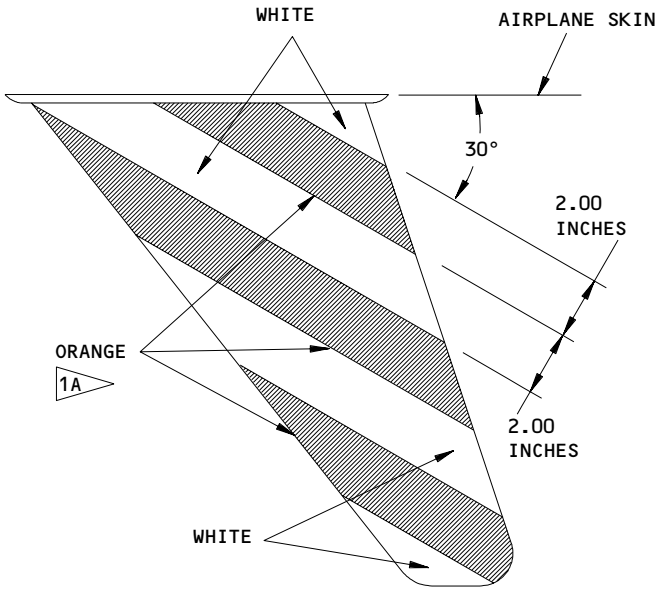
B

1 ALTERNATE ANTENNA LOCATION

VHF Communication Antenna Installation
Figure 401 (Sheet 1)



RECOMMENDED CORROSION PROTECTION
A-A



PAINT STRIPES
BOTTOM VHF COMMUNICATION ANTENNA MARKINGS (OPTIONAL)

1A DO NOT USE METAL BASED PAINT

1B BMS 3-33 (PREFERRED), BMS 3-24 (ALTERNATE).

C

VHF Communication Antenna Installation
Figure 401 (Sheet 2)

S 024-129

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(2) Remove the weather/aerodynamic fillet seal around the base of the VHF antenna (AMM 51-31-01/201).
(a) Do not cause damage to the VHF antenna or airplane skin.

S 034-004
(3) Remove the bolts from the VHF antenna base (hold if necessary).

S 034-005
(4) Move the VHF antenna until you get access to the coaxial cable connector.

S 034-006
(5) Disconnect the cable from the VHF antenna.

TASK 23-12-03-424-007
3. Install the VHF Comm Antenna (Fig. 401)
A. Equipment
(1) Bonding Meter (SWPM 20-20-00)
(2) Spatula
B. Consumable Materials
(1) A00626 Compound - Sealing - BMS 5-95, Class B-1/2
(2) A00707 Sealant (alternative sealant with a shorter cure time) - PR 1826, class B 1/2 and B 1/4 (with primer) dark gray, PR 1828, class B 1/2 and B 1/4, white
(3) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261
(4) C00064 Coating - surface treatment - MIL-C-5541, Type II, Grade C class 1 for Aluminum or Aluminum Alloys - Alodine 1000 Clear
(5) D00633 Grease - BMS 3-33 (preferred)
(6) D00015 Grease - BMS 3-24, Corrosion Preventive (alternate)
(7) C00175 Primer - BMS 10-79, Type III
(8) G00034 Cheesecloth - New, Clean, Dry, Lint Free
(9) G01395 Compound - Corrosion Inhibiting Mastinox 6856K, BMS 3-27 (Preferred)

(10) C50056 Compound - Non-drying Corrosion Inhibiting Resin Mix, BMS 3-38 (Alternate)
(11) G50136 Paste - Corrosion Inhibiting, Non-drying, BMS 3-38 (Alternate)
(12) G50237 Compound - Non-drying Corrosion Inhibiting Cor-Ban 27L, BMS 3-38 (Alternate)
(13) C00033 BMS 10-60 Type II, Coating, Exterior Protective Enamel

C. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 51-21-04/701, Alodine Coating
(3) AMM 51-21-10/701, Decorative Exterior Finishes
(4) AMM 51-31-01/201, Seals and Sealing
(5) SWPM 20-20-00, Electrical Bonding and Grounding

D. Access
(1) Location Zones
233/234 Area above passenger cabin ceiling - section 43 (exterior)
123/124 Area below forward cargo compartment - (exterior)
155/156 Area below aft cargo compartment - (exterior)

E. Procedure

S 114-106

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

(1) Clean the airplane mating surface with solvent, Series 88 (AMM 20-30-88/201).
(a) Make a clean cheesecloth moist (not soaked) with solvent, Series 88 (AMM 20-30-88/201).
(b) Rub the airplane mating surface with the cheesecloth until the surface is clean.

S 374-045
(2) SAS 050, 051, 150-157, 162-167, 275-280 WITHOUT SL 51-23;
Do these steps to prepare the airplane surface:
(a) Do this task to apply a layer of alodine 1000 to the airplane mating surface: Apply the Alodine Coating (AMM 51-21-04/701).

NOTE: This task removes corrosion, cleans the surface, and applies the alodine.

(b) Apply two layers of BMS 10-79 type III primer to the airplane mating surface.
1) Let each layer dry for the correct cure time.

S 374-087
(3) SAS 050, 051, 150-157, 162-167, 275-280 WITH SL 51-23, AND SAS 052-149, 158-161, 168-274, 281-999;
If the airplane surface has corrosion or other damage, do these steps to prepare the airplane surface:
(a) Do this task to apply a layer of alodine 1000 to the airplane mating surface: Apply the Alodine Coating (AMM 51-21-04/701).

NOTE: This task removes corrosion, cleans the surface, and applies the alodine.

(b) Apply two layers of BMS 10-79 type III primer to the airplane mating surface.
1) Let each layer dry for the correct cure time.

S 214-001
(4) Make sure the O-ring is not damaged.

S 394-003
(5) Apply a layer of BMS 3-33 (preferred) or BMS 3-24 (alternate) grease in the O-ring groove.

S 394-002
(6) Apply a layer of BMS 3-33 (preferred) or BMS 3-24 (alternate) grease on the O-ring.

S 434-000
(7) Install the O-ring in the O-ring groove.

S 624-023
(8) Apply a layer of BMS 3-27 (preferred) or BMS 3-38 (alternate), corrosion inhibiting compound, to the surfaces that follow (Fig. 401):
(a) The opening for the coaxial cable
(b) The nutplate
(c) The threads of the bolts.

S 624-024
(9) Apply a very thin layer of BMS 3-27 (preferred) or BMS 3-38 (alternate) on the mating surface of the VHF antenna (Fig. 401).
(a) Do not get BMS 3-27 (preferred) or BMS 3-38 (alternate) in the O-ring groove.

S 434-014
(10) Connect the coaxial cable to the VHF antenna.

S 824-015
(11) Put the VHF antenna in position.
(a) Install the 10 bolts (use cadmium plated stainless steel bolts).

S 764-028

(12) Measure the bond resistance between the VHF antenna and the airplane skin (SWPM 20-20-00).
   (a) Make sure the resistance is less than 25 milliohms.

S 114-029

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

(13) If BMS 3-27 (preferred) or BMS 3-38 (alternate) is around the edge of the VHF antenna or is on the bolts, clean the surfaces with solvent, Series 95 (AMM 20-30-95/201) until all the BMS 3-27 (preferred) or BMS 3-38 (alternate) is removed.

NOTE: Sealing compound will not bond to BMS 3-27.

S 394-130

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(14) Apply a weather/aerodynamic fillet seal around the base of the VHF antenna with the sealing compound (AMM 51-31-01/201).
   (a) Use the spatula to make the surface smooth and remove unwanted material.

S 394-005

(15) Apply a layer of sealing compound on the surface of the bolts.

F. VHF Communication Antenna - Painting/Marking (Optional)

NOTE: Fig. 401 shows an example of a caution marking for the bottom VHF antenna. Follow airline requirements for VHF antenna marking. Color and pattern can be different.

S 114-030

(1) Clean the surface of the VHF communication antenna with solvent and a clean, dry cloth.

S 434-031

CAUTION: WHEN YOU REPAINT THE VHF COMMUNICATION ANTENNA MAKE SURE YOU DO NOT USE METAL BASED PAINT. A HIGH VSWR WILL OCCUR AND CAN CAUSE DAMAGE TO THE VHF COMMUNICATION TRANSCEIVER.

(2) Use BMS 10-60, Type II, Enamel to apply paint stripes on the bottom of the VHF communication antenna (Fig. 401).

NOTE: You can repaint the VHF antenna, if there are no indications of delamination, wear, or cracking in the antenna or antenna base. Paint erosion due to wind and rain is considered normal. If you find any indications of cracking or delamination, replace the VHF antenna.

G. Procedure

S 864-018

(1) Remove the DO-NOT-CLOSE tag and close the applicable circuit breaker on the overhead circuit breaker panel, P11:
(a) 11C3, VHF COMM L
(b) 11G4, VHF COMM CENTER
(c) 11G31, VHF COMM R

H. Installation Test

S 864-019

(1) Supply electrical power (AMM 24-22-00/201).

S 714-032

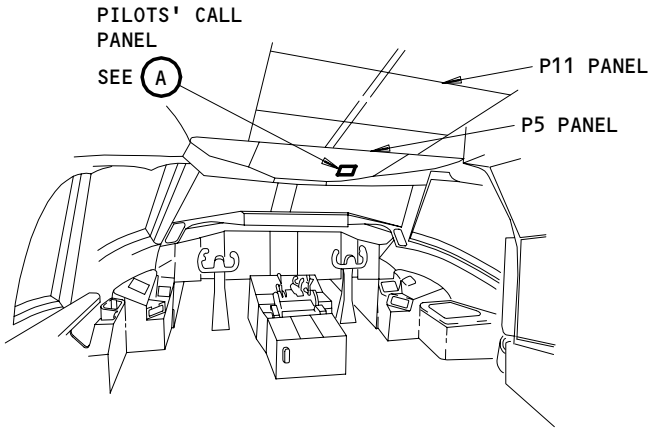
(2) Tune in a VHF station and make sure the reception is satisfactory.

S 864-020

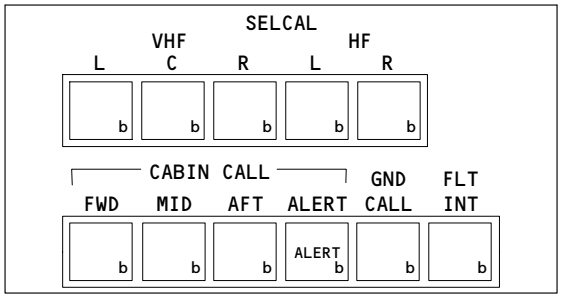
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

SELCAL SYSTEM - DESCRIPTION AND OPERATION

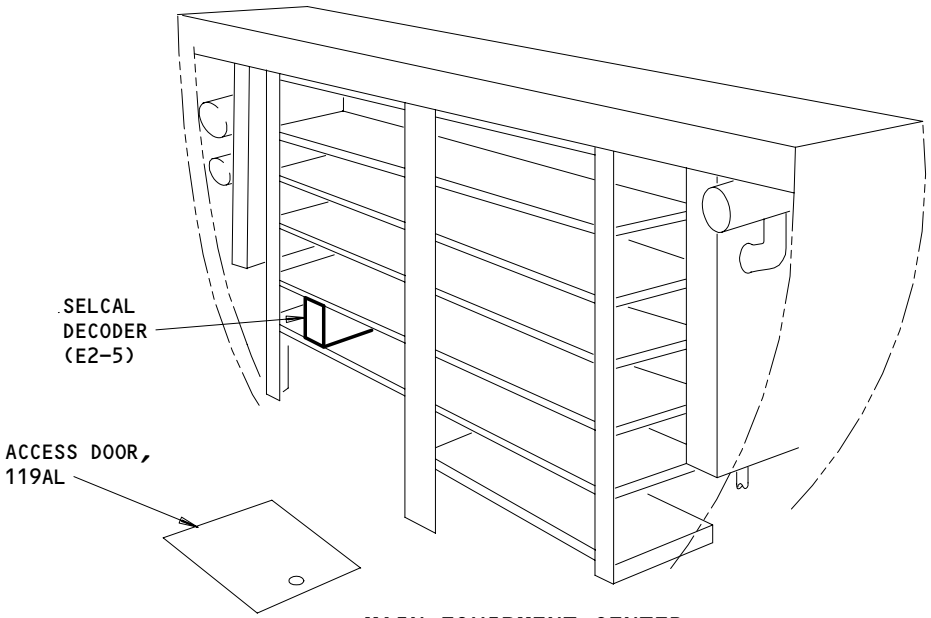
1. General
   A. The SELCAL system provides notification to the flight crew when a ground station desires contact on one of the communication transceivers. SELCAL reduces pilot diversions and workload by eliminating the need for continuous monitoring of communications frequencies.
   B. A ground station calls a particular airplane by transmitting a set of four audio tones over a communications transceiver. The SELCAL decoder receives the audio from the particular transceiver and compares the tones to an assigned code. When the tones and the code are the same, a chime sounds and a call light on the pilots' call panel comes on, corresponding to the communications transceiver which received the signal. The decoder and call switch are manually reset after each call.
   C. The SELCAL system consists of a SELCAL decoder, a coding receptacle, HF, and VHF call switches on the pilots' call panel. System electrical power comes from the left DC bus, through a circuit breaker on overhead panel P11.
2. Component Details (Fig. 1)
   A. SELCAL Decoder
      (1) The decoder monitors audio from the VHF and HF communication transceivers, recognizes receipt of the tone set assigned to the airplane, and provides flight compartment call alert signals.
      (2) The decoder has no front panel features, and is located on shelf 5 of main equipment center rack E2.
   B. Coding Receptacle
      (1) The SELCAL coding receptacle provides a 4-bit binary code to the decoder for each of the four tones.
      (2) The coding receptacle is located on the E2-5 rack disconnect bracket assembly near the rear of the SELCAL decoder.
   C. SELCAL Call Switches
      (1) There is one blue call switch on the pilots' call panel for each transceiver connected to the SELCAL decoder. Each call switch alerts the flight crew of a ground-to-air call received by that transceiver. Pushing the call switch, or pushing the PTT button on the associated transceiver, resets the light and decoder.
      (2) The SELCAL call switches are located on the pilots' call panel, on pilots' overhead panel P5.
3. Operation (Fig. 2)
   A. Functional Description
      (1) Power and audio inputs are wired directly to the decoder. Thus, the only operational control is for the reset function. The system is reset by pushing the associated call switch or by pushing the PTT button for the associated transceiver.
      (2) The decoder monitors audio from the VHF and HF transceivers. When the received code matches the code programmed by the coding receptacle, the decoder recognizes it as a call to that airplane. The decoder then turns on the call switch associated with the transceiver which received the call, and also sounds a chime in the flight compartment. The call switch and SELCAL decoder are then manually reset to await the next call.



FLIGHT COMPARTMENT

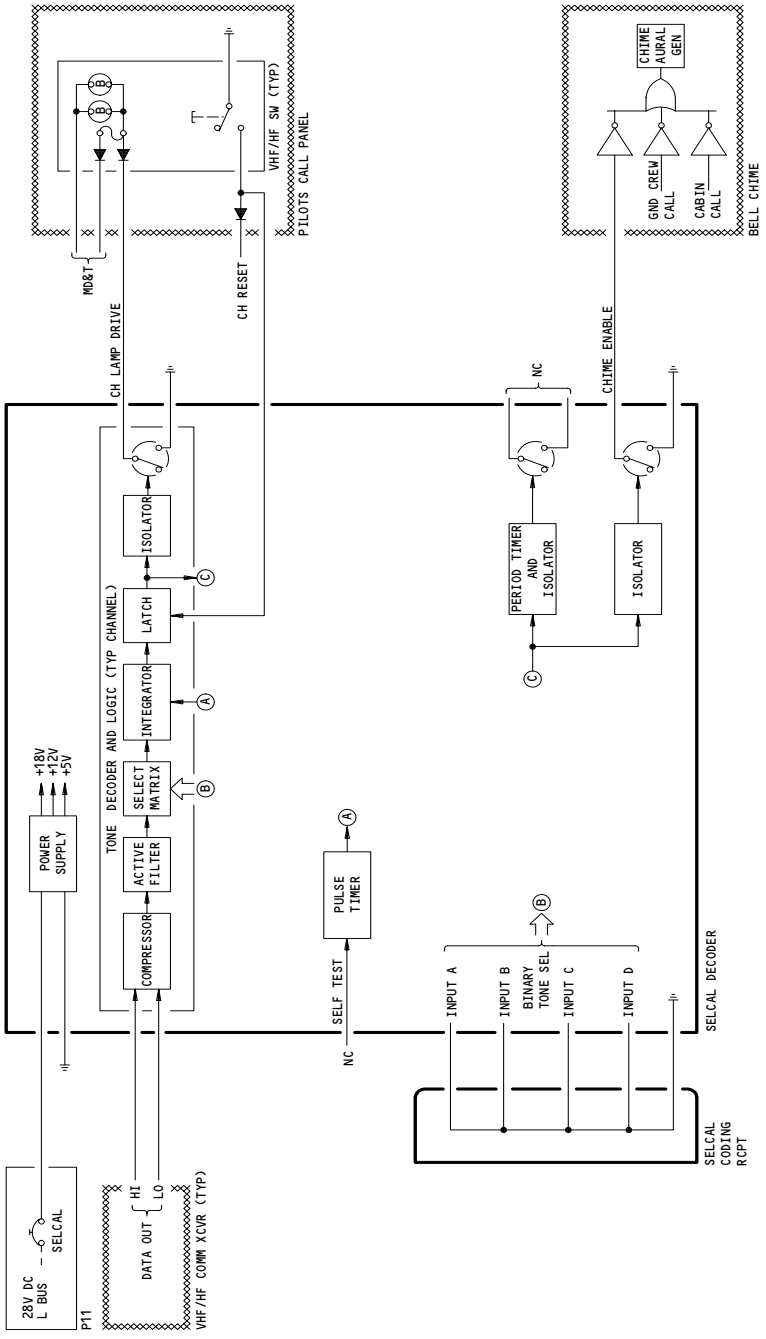


PILOTS' CALL PANEL
A



MAIN EQUIPMENT CENTER

SELCAL System Component Location
Figure 1



SELCAL System Schematic
Figure 2

B. Control

(1) To place the system in operation, perform the following:

(a) Supply electrical power (AMM 24-22-00/201).

(b) Check that SELCAL circuit breaker on overhead panel P11 is closed.

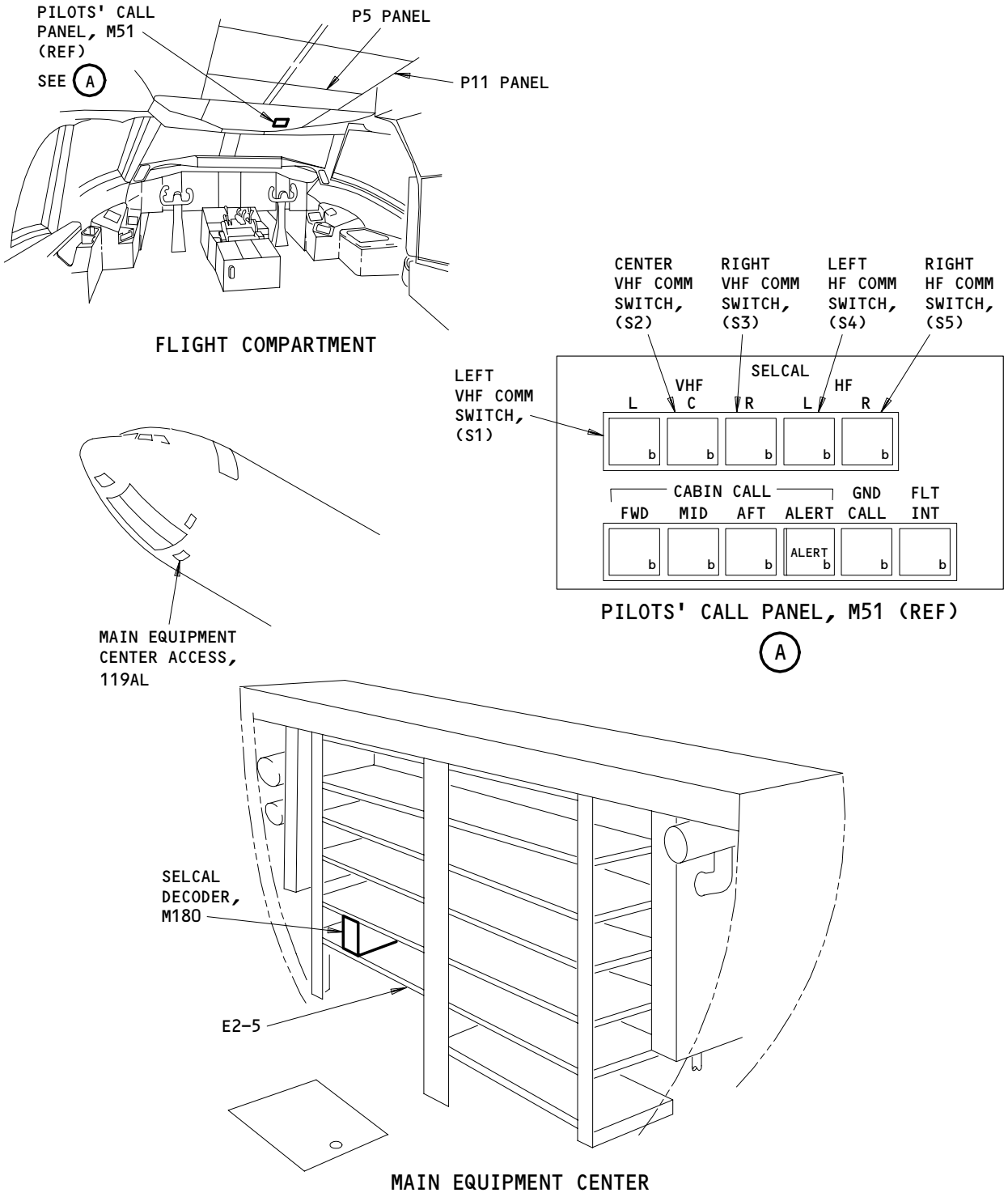
(c) Check that VHF and HF communications systems are operational.

SELCAL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
CIRCUIT BREAKER	--		FLT COMPT, P11	
SELCAL, C539		1	11G3	*
DECODER - SELCAL, M180	--	1	119AL, MAIN EQUIP CTR, E2-5	23-21-01
MODULE - (REF 31-51-00, FIG. 101)				
BELL CHIME AURAL WARNING, M1000				
PANEL - (REF 23-42-00, FIG. 101)				
PILOTS' CALL, M51				
RECEPTACLE - SELCAL CODING, M974	--	1	119AL, MAIN EQUIP CTR, E2-5	*
SWITCH - (REF 23-42-00, FIG. 101)				
L VHF COMM, (S1)	--	1		
R VHF COMM, (S3)	--	1		
C VHF COMM, (S2)	--	1		
L HF COMM, (S4)	--	1		
R HF COMM, (S5)	--	1		
TRANSCEIVER - (REF 23-12-00, FIG. 101)				
C VHF COMM, M190				
L VHF COMM, M188				
R VHF COMM, M189				
TRANSCEIVER - (REF 23-11-00, FIG. 101)				
L HF COMM, M152				
R HF COMM, M153				

* SEE THE WDM EQUIPMENT LIST

Selcal System - Component Index
Figure 101



SELCAL System - Component Location
Figure 102

SELCAL SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains one task. This task is the system test of the SELCAL System.

TASK 23-21-00-735-001

2. System Test - SELCAL System
   A. General
      (1) This test is a check of the SELCAL system to make sure of the best system performance.
      (2) Use only approved test frequencies for this test.
   B. Equipment
      (1) Encoder
         (a) CTS-700 Ramp Test Set (PN: 10000005-01 or 10000005-02)
             Avtech Corporation
             3400 Wallingford Ave N
             Seattle, WA 98013
         (b) N1304A Encoder - SELCAL Ground Equipment
             Motorola Inc
             1000 Mittel Drive
             Wood Dale, IL 60191

             NOTE: This encoder is used with HF and VHF transmitters as part of a SELCAL ground station.

   C. References
      (1) AMM 23-11-00/501, HF Communications System
      (2) AMM 23-12-00/501, VHF Communications System
      (3) AMM 23-42-00/501, Cabin Interphone System
      (4) AMM 23-51-00/501, Flight Interphone System
      (5) AMM 24-22-00/201, Electrical Power - Control
      (6) AMM 31-51-00/501, Warning System
   D. Access
      (1) Location Zones
          211/212 Flight Compartment
   E. Prepare for System Test

      S 865-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 945-003
      (2) Make sure the systems that follow operate:
         (a) HF communications system (AMM 23-11-00/501).
         (b) VHF communications system (AMM 23-12-00/501).
         (c) Pilots' call panel (AMM 23-42-00/501).
         (d) Captain's audio selector panel (AMM 23-51-00/501).

(e) Aural warning system (AMM 31-51-00/501).

S 865-004

(3) Make sure this circuit breaker on the overhead circuit breaker panel, P11, is closed:
(a) 11G3, SELCAL

S 865-005

(4) Connect the headset/boom mic to the captain's auxiliary instrument panel P15.

F. SELCAL System test

S 765-056

(1) Open these circuit breakers on the overhead circuit breaker panel, P11:
(a) 11G4, VHF COMM CENTER
(b) 11G8, LEFT HF COMM
(c) 11G31, VHF COMM R
(d) 11G35, RIGHT HF COMM

S 865-011

(2) Make applicable selections and adjustments on the captain's audio selector panel, (P8):
(a) Push the VHF-L MIC SELECTOR.
(b) Adjust the VHF-L volume control knob to around the 12 o'clock position.
(c) Set the BOOM/OXY toggle switch to the BOOM position.

S 865-012

(3) Set an approved test frequency. With the VHF-L system, have the airplane SELCAL code transmitted from the ground station through the VHF-L communications.

NOTE: If the transmitting station is not available, make a SELCAL coded transmission with the SELCAL encoder. Make sure the transmissions are approved.

S 205-013

(4) Make sure the results that follow occur:
(a) The VHF-L switchlight on the pilots' call panel (P5) comes on.
(b) A chime sounds through the aural warning speakers.

S 215-021
(5) Switchlight check
(a) Push the VHF-L switchlight.
(b) Make sure the VHF-L switchlight goes off.
(c) With the VHF-L system, have the airplane SELCAL code transmitted from the ground station through the same approved test frequency.

NOTE: If the transmitting station is not available, make a SELCAL coded transmission with the SELCAL encoder. Make sure the transmissions are approved.

(d) Make sure the VHF-L switchlight on the pilots' call panel (P5) comes on.
(e) Make sure the VHF-L MIC SELECTOR switch on the captain's audio selector panel is in, then push the captain's PTT switch.
(f) Make sure the VHF-L switchlight goes off.

S 865-022
(6) Close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G31, VHF COMM R

S 865-020
(7) Set a different approved test frequency on the VHF-R. With the VHF-L system, have the airplane SELCAL code transmitted from the ground station through the VHF-R communications.

S 705-023
(8) Do the switchlight check again for VHF-R. Use the test frequency set in the step above.

S 865-024
(9) Open this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G31, VHF COMM R

S 865-029
(10) Close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G4, VHF COMM CENTER

S 865-030
(11) Set a different approved test frequency on the VHF-C.
(a) With the VHF-L system, have the airplane SELCAL code transmitted from the ground station through the VHF-C communications.

S 705-033
(12) Do the switchlight check again for the VHF-C. Use the test frequency set in the step above.

S 865-034
(13) Close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G8, LEFT HF COMM

S 865-036
(14) Set a different approved test frequency on the HF-L.
(a) With the VHF-L system, have the airplane SELCAL code transmitted from the ground station through the HF-L communication.

S 705-037
(15) Do the switchlight check again for the HF-L. Use the test frequency set in the step above.

S 865-038
(16) Open this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G8, LEFT HF COMM

S 865-040
(17) Close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G35, RIGHT HF COMM

S 865-042
(18) Set a different approved test frequency on the HF-R.
(a) With the VHF-L system, have the airplane SELCAL code transmitted from the ground station through the HF-R communications.

S 705-043
(19) Do the switchlight check again for HF-R. Use the test frequency set in the step above.

S 865-044

(20) Close these circuit breakers on the overhead circuit breaker panel, P11:
(a) 11G8, LEFT HF COMM
(b) 11G31, VHF COMM R

S 865-080

(21) Remove electrical power if it is not necessary (AMM 24-22-00/201).

SELCAL DECODER - REMOVAL/INSTALLATION

1. General
   A. The SELCAL decoder M180 is found on shelf 5 of the main equipment center rack E2 (E2-5).

TASK 23-21-01-004-001

2. Remove SELCAL Decoder
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
   C. Procedure

      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tag:
          (a) 11G3, SELCAL

      S 024-003
      (2) Remove the SELCAL decoder (AMM 20-10-01/401).

TASK 23-21-01-404-004

3. Install SELCAL Decoder
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 24-22-00/201, Electrical Power - Control
   B. Equipment
      (1) Encoder
          (a) CTS-700 Ramp Test Set (PN: 10000005-01 or 10000005-02)
              Avtech Corporation
              3400 Wallingford Ave N
              Seattle, WA 98013
          (b) N1304A Encoder - SELCAL Ground Equipment
              Mototola Inc
              1000 Mittel Drive
              Wood Dale, IL 60191

              NOTE: This encoder is used with HF and VHF transmitters as part of a SELCAL ground station.

C. Access
(1) Location Zones
119/120 Main Equipment Center
D. Procedure

S 424-005
(1) Install the SELCAL decoder (AMM 20-10-01/401).

S 864-012
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G3, SELCAL
E. The SELCAL decoder installation test

S 864-006
(1) Supply electrical power (AMM 24-22-00/201).

S 804-007
(2) Have an approved SELCAL coded transmission sent from the ground station through approved communications.

NOTE: If a ground station is not available, send a SELCAL coded transmission with the SELCAL encoder. Make sure the transmissions are approved.

S 204-008
(3) Make sure the applicable SELCAL switchlight comes on and that you hear one Hi chime in the flight compartment.

S 864-009
(4) Push the applicable SELCAL switchlight.

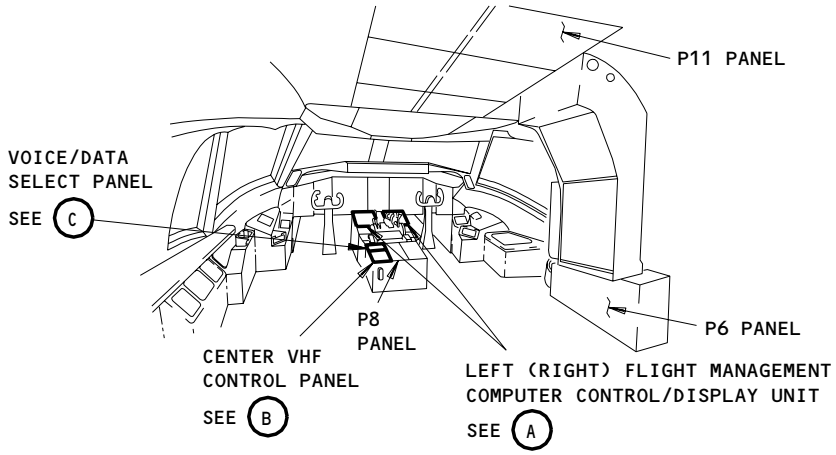
S 864-010
(5) Make sure the SELCAL switchlight goes off.

S 864-011
(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

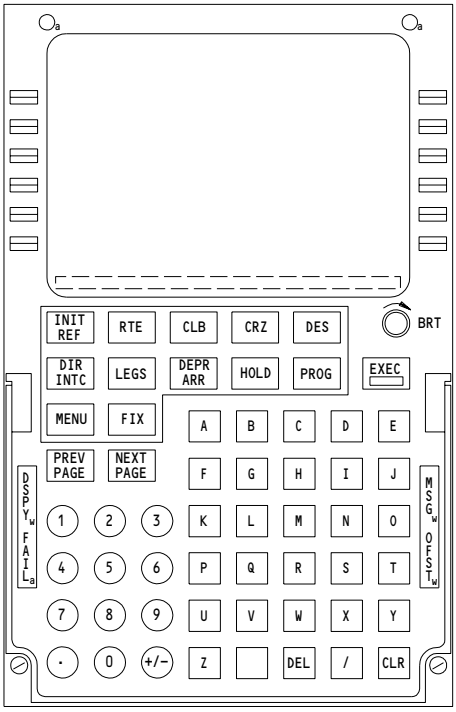
ACARS - DESCRIPTION AND OPERATION

1. General
   A. ACARS (Aircraft Communication Addressing and Reporting System) is a digital data-link system that is used for communication between the airplane and the ground station.
   B. ACARS is used in air/ground communications to decrease the work load in the flight compartment and stop much of the air/ground voice communications. ACARS uses these systems for the data link between the airplane and the ground facilities: a VHF transceiver, the ARINC data link stations, the landlines, the central ARINC control station, and the airplane terminal. The data link sends and receives regular information that is necessary for airline operation. ACARS uses these systems for voice communications between the airplane and the ground telephone circuit: the VHF transceiver, and ARINC voice station, the landlines, the central control station, and the ground telephone system.
   C. Voice communications on ACARS start from the airplane or the ground. ACARS tells the pilot if the ground circuit is open or full. When the circuit is open, the pilot uses an unassigned frequency and follows the procedure for air/ground communication.
   D. ACARS receives power from the left 115v ac bus and the 28v dc hot battery bus. The circuit breakers for the system are on the overhead circuit breaker panel, P11, and the main power distribution panel, P6.
   E. The primary ACARS component is the Management Unit (referred to as the MU).
2. Component Details
   A. The FMC Control Display Unit
      (1) The flight management computer control/display units (referred to as the FMC C/DU) (AMM 34-61-00) are used to access ACARS and show transmitted data.
      (2) The left and right FMC C/DUs (referred to as L and R FMC C/DU) are installed on the forward electronics panel, P9.
      (3) Various automatic prompts and menus are shown on the FMC C/DUs by the MU. These prompts are used to operate ACARS.
   B. The ACARS Management Unit
      (1) The Management Unit (referred to as the MU) is the central clock, the memory, and the data processor for ACARS. The MU receives data from the event sensors. The MU also receives and transmits data to the Data Management Unit (referred to as the DMU), the multi-input printer, and the Flight Management Computer (referred to as the FMC). The MU receives the data from these sources and does a test for errors, processes and stores the data. Data is received and sent by the MU to the ground stations with the center VHF transceiver. Crew interface with the MU is via the FMC CDU. The MU also receives program information from the wiring of various program pins. The MU has build in test equipment (referred to as BITE) and fault indicators.

SAS

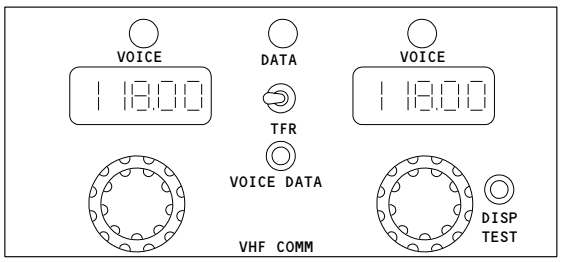


FLIGHT COMPARTMENT



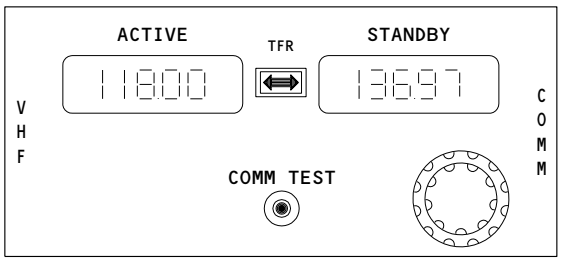
LEFT (RIGHT) FLIGHT MANAGEMENT
COMPUTER CONTROL/DISPLAY UNIT

A



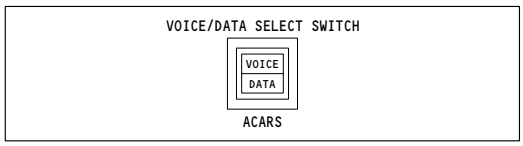
CENTER VHF CONTROL PANEL

B 1



CENTER VHF CONTROL PANEL

B 2



VOICE/DATA SELECT PANEL

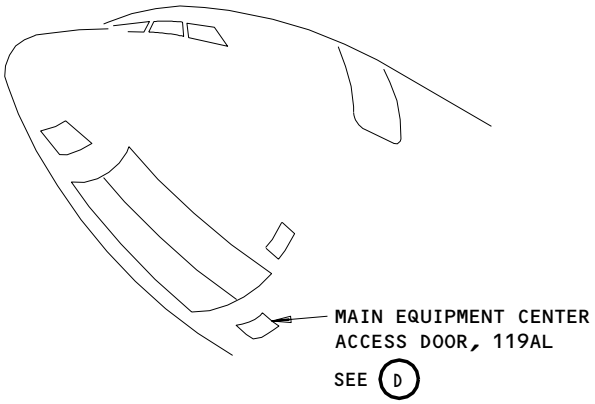
C

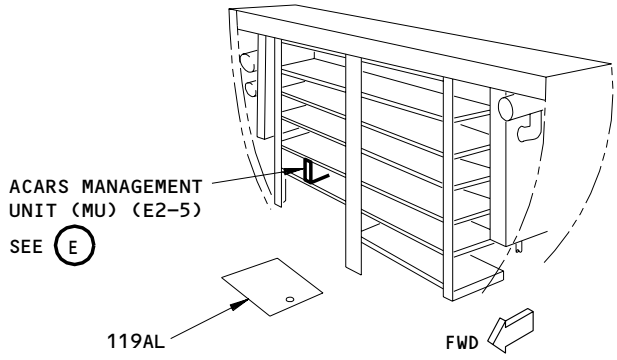
1 SAS 150,152-157, 162-167

2 MTH 275-278,280,281

ACARS - Component Location
Figure 1 (Sheet 1)

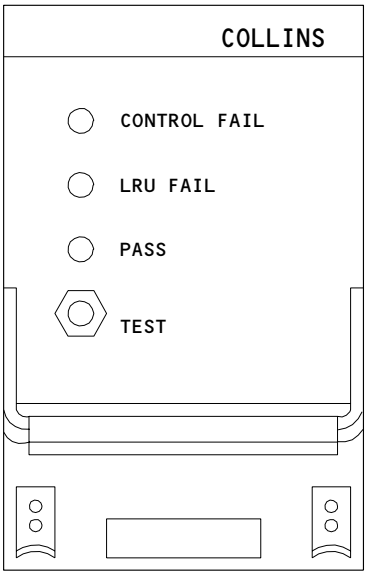
SAS





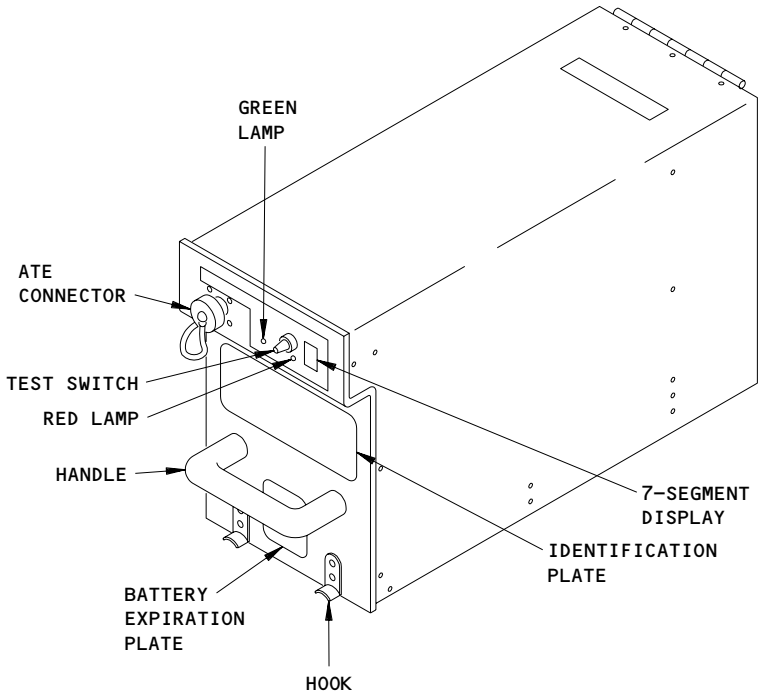
MAIN EQUIPMENT CENTER

D



ACARS MANAGEMENT UNIT (MU)

E 1



ACARS MANAGEMENT UNIT (MU)

E 2

ACARS - Component Location
Figure 1 (Sheet 2)

(2) The MU has these properties in the design:
(a) Microprocessor based hardware
(b) Software installed in EPROM's (Electrically Programmable Read Only Memory) which can be changed
(c) Digital interface hardware; discretes, data buses, and program pins
(d) Internal timing control with the UTC clock
(e) Built in system test for hardware and software.

(3) SAS 150, 152-157, 162-167;
The MU front panel has three lights. The CONTROL FAIL light shows an error with the FMC CDU interface. The LRU light shows an error with the MU. The PASS light shows the ACARS system passed the test.

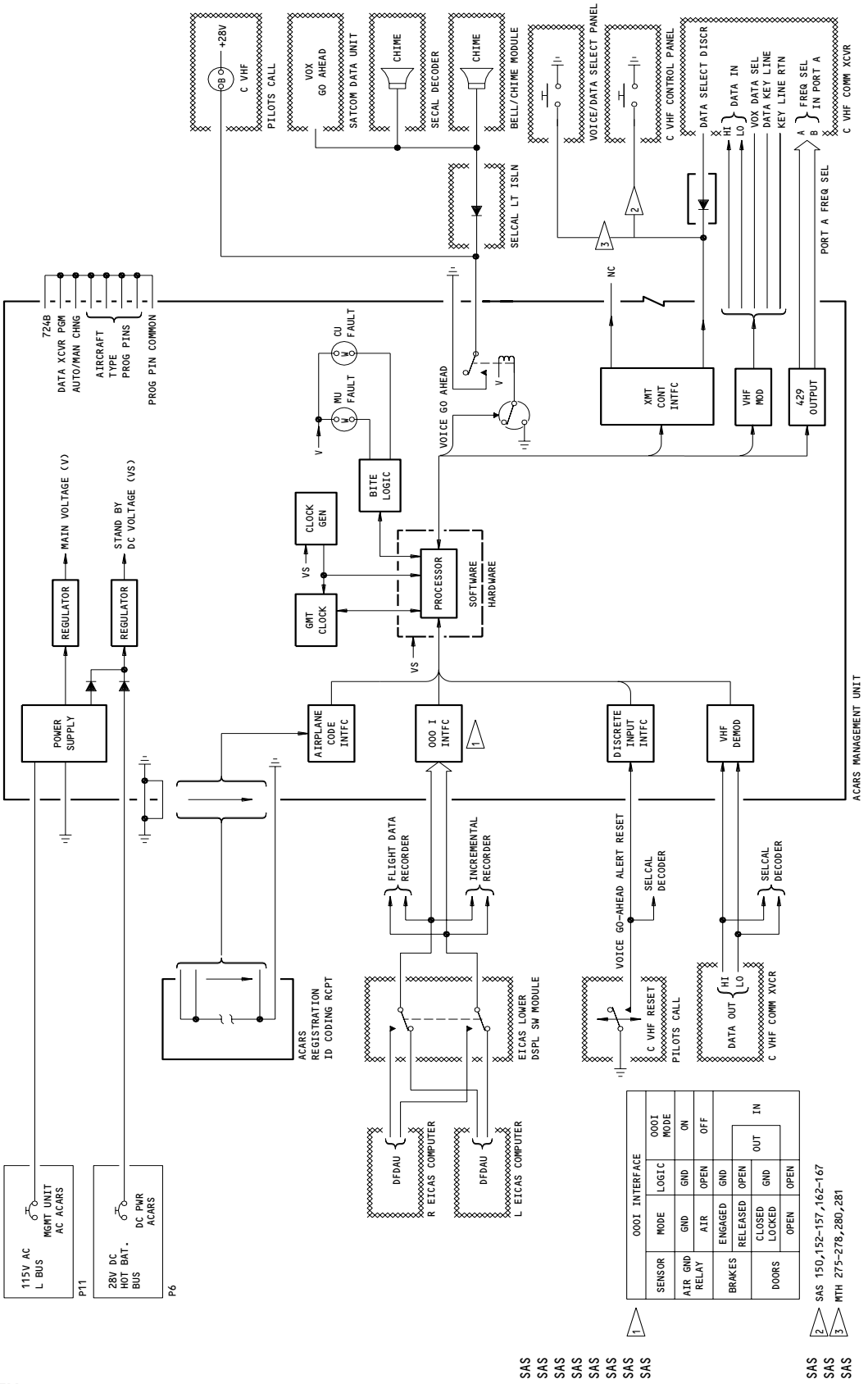
MTH (4) MTH 275-278, 280-281;
MTH The MU front panel has two lights. The RED FAULT light shows that a
MTH bit failure of some type exists. The GREEN PASS light indicates
MTH that the MU is functioning correctly.

(5) The MU is on shelf five of rack E2 in the main equipment center.

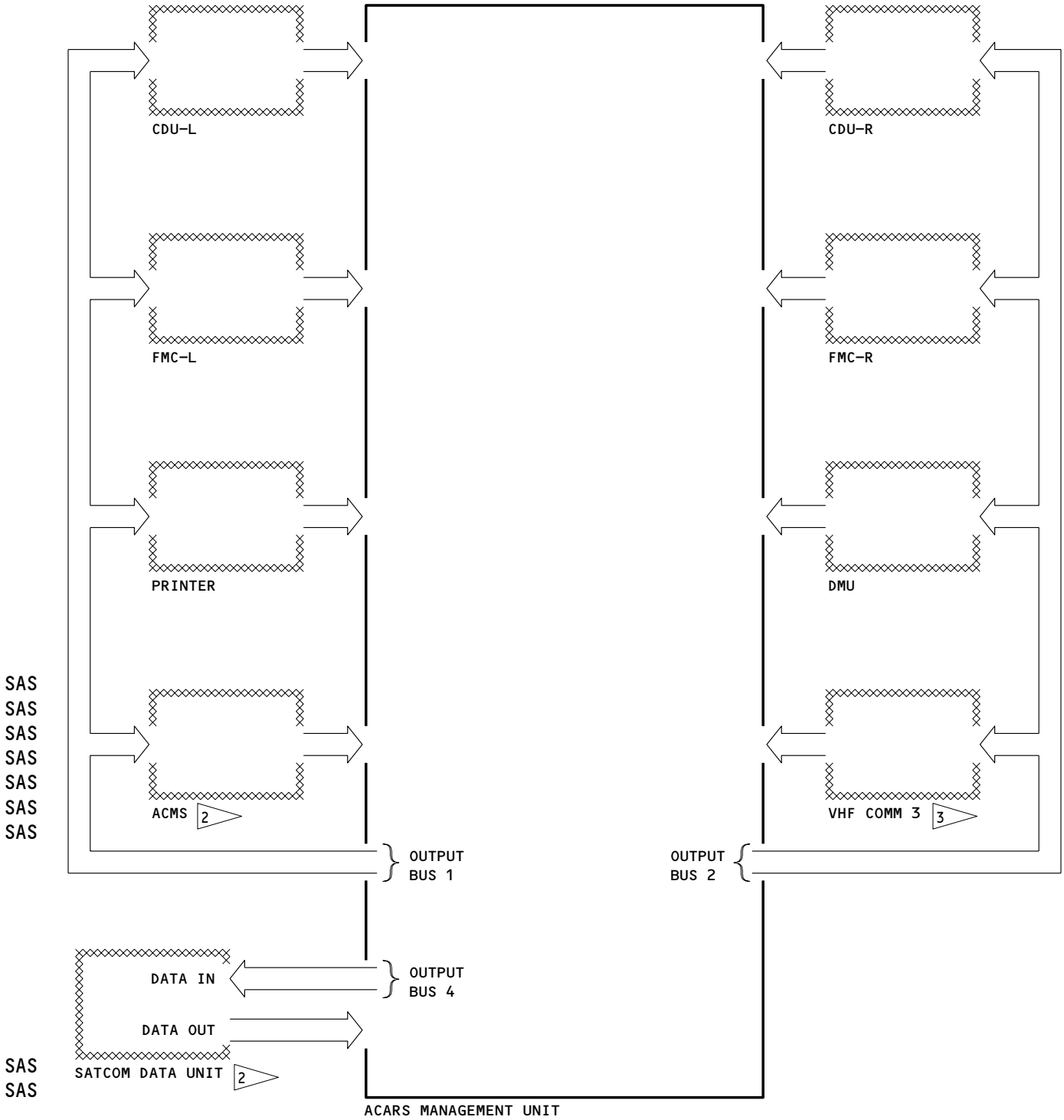
SAS C. Voice/Data Switch Panel
SAS (1) The Voice/Data Switch Panel (referred to as the Switch Panel) is
SAS used by the aircrew to select voice or data mode of the No. 3 VHF
SAS transmitter.
SAS (2) The Switch Panel is located on the aft pedestal, P8.
SAS (3) A single pushbutton annunciator is used to select the mode. The
SAS annunciator is illuminated to show the current selected mode, either
SAS VOICE or DATA.

3. Operation (Fig. 2)
A. Functional Description
(1) The Off Mode
(a) ACARS is off when the 115v ac left bus is removed form the MU.
(b) The UTC clock is on as long as power is supplied from the 28v dc hot battery bus. Data such as OOOI times from before are stored in the non-volatile memory.
(c) During power-up, the off mode is shown to the data demand mode. At this time, the ACARS-MAIN MENU page is shown on the FMC CDU.

(2) The Data Demand Mode
(a) In the data demand mode, ACARS will get data when one or more of these conditions occur:
1) When messages are sent,
2) When the pilot starts to send data,
3) When certain conditions occur such as an OOOI event.
(b) The MU will go into data demand mode when the transmission channel has no other transmissions. The data demand mode is used when there are not many data communications.
(c) The MU is put in the data demand mode when one of these conditions occur:
1) When the ac power is supplied to the MU in the off mode,
2) SAS 150, 152-157, 162-167;
When the pilot pushes the DATA MODE switch on the center VHF control panel.



ACARS Schematic
Figure 2 (Sheet 1)



ACARS Schematic
Figure 2 (Sheet 2)

MTH 3) MTH 275-278, 280-281;
MTH When the pilot pushes the MODE Select switch on the
MTH Voice/Data Switch Panel.
4) From the data polled mode, there is an ON event,
5) From the data polled mode, there is no poll for more than 1.5 minutes,
6) From the data polled mode, the ground station tells the MU to go to the data demand mode.

(d) The MU is removed from the data demand mode with one of these conditions:
1) When the ac power is removed, the MU will go to the off mode,
2) When the pilot pushes the DATA MODE switch,
3) When a ground station tells the MU to go to data polled mode,

(3) The Data Polled Mode

(a) In the data polled mode, ACARS sends data only when told to (referred to as polled) by the ground station. The ground station regularly (about every two seconds) polls ACARS for messages. If ACARS has data for the ground station, an applicable message is sent automatically. If there is not data, ACARS automatically sends a general poll message. The data polled mode makes sure the system is available when there are many data communications.

(b) The MU is put in data polled mode from these conditions:
1) The ground station tells the MU to go from data demand mode to the data polled mode,
2) The pilot goes from voice mode to data mode and the MU was in the data polled mode before the voice mode.

(c) The MU is removed from data polled mode with these conditions:
1) The pilots puts the MU in the voice mode,
2) The ground station tells the MU to go to data demand mode,
3) There is no poll from a ground station for 1.5 minutes,
4) There is an ON event.

(4) The Voice Mode

(a) The voice mode is used for ACARS voice communication. In the voice mode, the MU continues to compile data but the MU does not transmit data. The center VHF transceiver is used for voice communications.

(b) The VOICE mode is entered from either data mode upon pilot or ground command.

(c) When a ground station wants voice communications with the airplane, the uplink will make the light in the SELCAL VHF-C switch comes on and a chime will be heard. The transceiver is automatically tuned and the pilot puts the MU in the voice mode.

(d) When the voice mode is stopped, the MU will go to the data mode that was used before.

(5) The Failed Mode

(a) The failed mode is entered from any "on" mode when a failure is found. The failure is shown on the MU by the red FAIL LEDs.

(6) The ACARS Message Format
  (a) Twenty-two characters are used to prepare the system for a message: 16 characters for pre-key, 2 for bit sync, 2 for character sync, 1 for the start of the heading, and 1 for the mode. Seven address characters are used to identify the airplane to the ground station. Uplink messages contain the airplane registration or airline identification number, the downlinks contain the airplane registration. One character is used for technical acknowledgement: an ACK message (acknowledgement) clears the last message from storage, or a NAK message (no acknowledgement) transmits (up to six times) the stored message. Two characters are used for a message label. One character is for the end of preamble. Message text, if there is any, is carried by 220 characters. One character is for the end of text suffix. Sixteen block-check sequence (BCS) characters do a test of all of the bits after the start of the heading thru the end of the text. The BCS characters also control the transmission for the ACK (for an error-free message) of NAK message. One character is for a BCS suffix.

(7) The ACARS Message Labels
  (a) ACARS message labels are used to identify the message type and the function, and to give the correct response. Some labels are for basic ACARS functions, and the others are for services done by ACARS.

(8) The ACARS Air-Ground Data Code
  (a) The ACARS message characters have a usual seven-bit character code (USA Standard Code for Information Interchange) and one odd parity bit.

(9) The MU Power
  (a) The MU is supplied with 115v ac and 28v dc power. Usually, the 115v ac is for all the power used by ACARS. When the 115v ac power is not on, the 28v dc source supplies power for the clock, the non-volatile memory, and the MU front panel failure indicators.

(10) The MU Microprocessor
  (a) The MU microprocessor supplies central operational control and computations. The MU microprocessor supplies the initialization, BITE, the usual computations and the operational routines (arithmetic logic, control logic, I/O). External interrupts are available.
  (b) The MU microprocessor is a 16-bit microprocessor with these functions:
    1) EPROMs that are for the software program,
    2) RAM (Random Access Memory) that is for data storage,
    3) Non-volatile memory that is for data such as the OOOI times and the departure and destination data.

(11) The Clock Generator
  (a) The MU clock generator supplies timing for all of the system. The clock generator has a 3 MHz oscillator with dividers to supply 600 kHz and 300 kHz to the modulator.

(12) The MU-FMC CDU Interface
  (a) The data is moved to and from the CDU on duplex digital ports in a serial 429 form with 32-bit words. Data from the MU to the CDU is transmitted at the high-speed data rate, 100kHz. From the CDU to the MU data transfer is at the low-speed rate, 11kHz.
(13) The Airline and Airplane Identification Pins
  (a) Program pins supply airline identification and airplane registration numbers.
  (b) The airplane registration number has seven characters, and airline identification has two numbers
(14) The Out, Off, On, In (OOOI) Sensor
  (a) The OOOI event program pins put the OOOI sensor inputs into a code for the MU. The sensor inputs are given to the MU microprocessor where the codes for the OOOI events are included in the software. The microprocessor identifies when an event has occurred and stores the event UTC in the memory.
  (b) When any OOOI event occurs, the event time is automatically downlinked.
(15) The Pilots' Call Panel
  (a) A data uplink or a voice signal from the MU microprocessor operates a relay contact connected to the SELCAL VHF-C switch on the pilot's call panel on the pilots overhead panel, P5. The blue light comes on. The MU internal relay and the switch are reset when you push the SELCAL VHF-C switch, or by keying the center VHF transceiver.
(16) The Bell Chime Module
  (a) The data uplink or the voice go-ahead signal from the MU microprocessor also operates a chime once. No chime reset is necessary.
(17) The MU-VHF Transceiver Interface
  (a) The transceiver tuning control is set by a port select isolated from the MU. The transceiver is tuned on an ARINC 429 bus to the frequency select port A on the transceiver. When a data key line is grounded the transceiver goes into the data mode.
  (b) The data is supplied to the transceiver from the encoder/modulator in 1200/2400 Hz tones. The data is supplied directly to the transceiver modulator for transmission.
  (c) The data to the MU from the transceiver is in the same form as data to the transceiver. The data is demodulated and sent to the MU microprocessor.
(18) The Flight Management Computer Interface
  (a) The MU can be connected to the Left and Right Flight Management Computers, each by two dedicated ARINC 429 buses, to provide a data link between the ground and the FMCs. This can be used for the FMCs to request and receive data such as the latest weather information, etc.

(19) The Data Mangement Unit (DMU) Interface
(a) Data is sent from the DMU to the MU for one of these conditions:
1) SAS 150, 152-157, 162-167;
The pilot requests to see data on the IDU,
MTH 2) MTH 275-278, 280-281;
MTH The pilot requests to see data on the CDU.
3) The ground station requests an ACMS report.
4) When there is a stable cruise condition after a take-off.
(20) The Multi-Input Printer Interface
(a) Usual printer operation is controlled by the MU. The printer receives data for printout from the MU and sends the status of the printer to the MU.
(21) SAS 150, 152-157, 162-167;
The SATCOM Data Unit (SDU) Interface
(a) When a SATCOM communication system is installed, an interface between the SDU and MU provides general message transfer between the two systems. The MU has no control over the SATCOM system, but only transmits data to the SDU for satellite downlink and receives data from the SDU from satellite uplinks.

B. Control
(1) The ACARS on Procedure
(a) Supply electrical power (AMM 24-22-00).
(b) Make sure this circuit breaker on the overhead circuit breaker panel, P11, is closed:
1) 11G6, ACARS MGMT UNIT AC
(c) Make sure this circuit breaker on the main power distribution panel, P6, is closed:
1) 6G5, ACARS DC PWR

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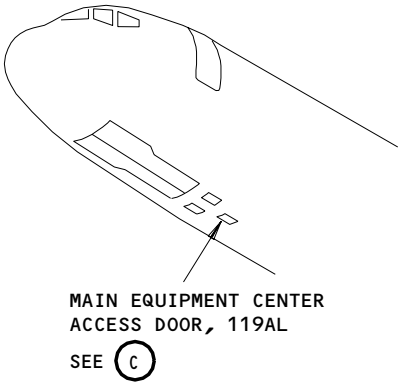

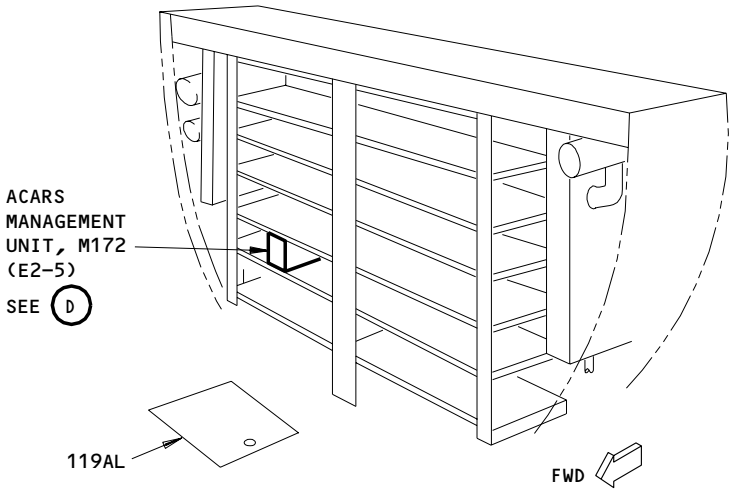

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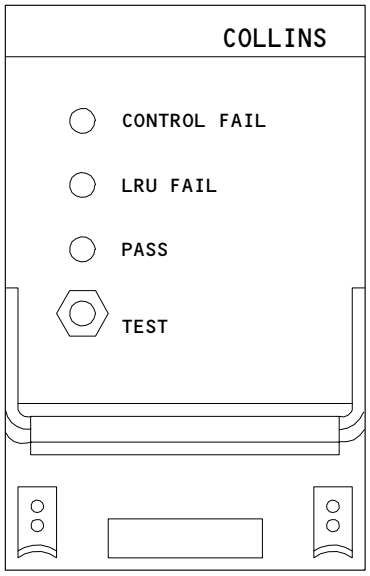
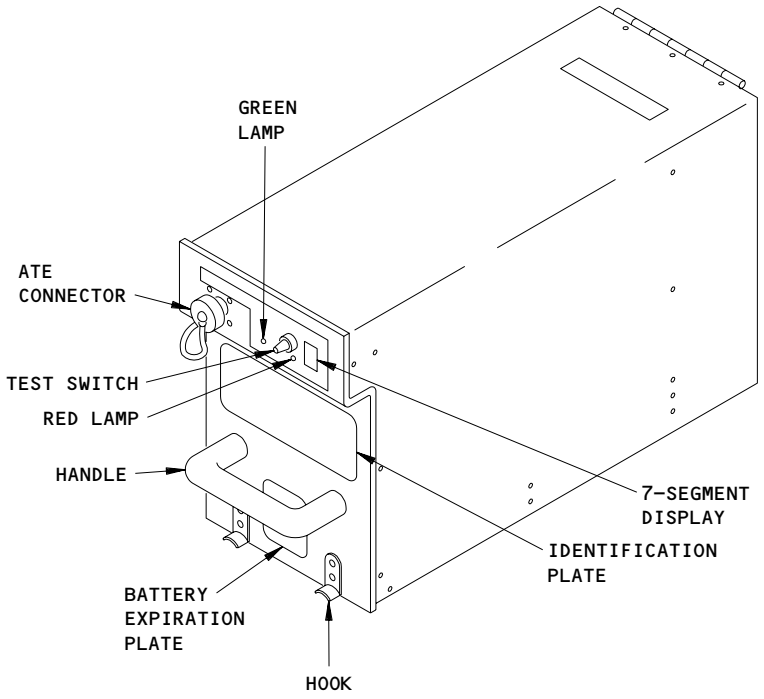


ACARS MANAGEMENT UNIT (MU), M172
D 1



ACARS MANAGEMENT UNIT (MU), M172
D 2

ACARS - Component Location
Figure 102 (Sheet 2)

ACARS - ADJUSTMENT/TEST

1. General
   A. This procedure contains one task. The task is a system test of ACARS (ARINC Communications Addressing and Reporting System).
   B. The system test makes sure the ACARS operates correctly.

   TASK 23-22-00-735-015

2. The ACARS System Test
   A. References
      (1) AMM 23-12-00/501, VHF Communications System
      (2) AMM 23-51-00/501, Flight Interphone System
      (3) AMM 24-22-00/201, Electrical Power - Control
      (4) AMM 31-41-00/501, EICAS
      (5) AMM 32-44-00/501, Parking Brake System
      (6) AMM 34-61-00/501, Flight Management Computer
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

   C. Prepare for the System Test of the ACARS

      S 865-016
      (1) Supply electrical power (AMM 24-22-00/201).

      S 865-017
      (2) Make sure these systems are serviceable:
          (a) The Center VHF communications system (AMM 23-12-00/501).
          (b) The captain's audio selector panel (AMM 23-51-00/501).
          (c) The EICAS system (AMM 31-41-00/501)
          (d) The parking brake system (AMM 32-44-00/501).
          (e) The FMC CDU (AMM 34-61-00/501).

      S 865-018
      (3) Make sure this circuit breaker on the main power distribution panel, P6, is closed:
          (a) 6G5, ACARS DC PWR

      S 705-250
      (4) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
          (a) 11E8, FMCS CDU LEFT
          (b) 11E9, FMCS CMPTR LEFT
          (c) 11E29, FMCS CDU RIGHT
          (d) 11E30, FMCS CMPTR RIGHT
          (e) 11G6, ACARS MGMT UNIT AC

      S 865-021
      (5) Make sure the parking brake is set.

D. The ACARS System Test

S 705-251

(1) Do the CDU and Center VHF Interface Test.

(a) At the main equipment center, push the reset button on the lower right corner of the faceplate of the ACARS MU.

NOTE: The switch is accessed by a small hole that requires a tool to push. There may not be any label by the switch to identify it.

(b) On the FMC CDU, use the line select key (LSK) and the switches as follows:

1) Push the MENU switch on left and right CDUs.
2) Make sure the ACARS are shown on the left and right CDU display, adjacent to 2L switch.
3) LSK 2L for <ACARS.
4) Make sure the ACARS MAIN MENU comes up in the CDU.
5) LSK 5L for <MAINT MENU.
6) LSK 5L for <MAINT ENTRY.
7) Enter 0060 in the scratchpad of the CDU.

NOTE: The code is the software version times 10.

8) LSK 1L for <CODE.
9) LSK 3R for SYS PARMS>
10) LSK 4L for *RESET SYSTEM DEFAULTS
11) LSK 4L for *PRESS TO CONFIRM.
12) SAS 150, 152-157, 162-167;
LSK 2L for <SATCOM.
MTH 13) MTH 275-278, 280-281;
MTH LSK 6L for <RETURN
14) SAS 150, 152-157, 162-167;
LSK 1L till ENABLED is shown.
15) SAS 150, 152-157, 162-167;
LSK 6L for <RETURN.
16) LSK 2R for ADVISORIES>.
17) LSK 1L till MOMENTARY is shown.
18) LSK 3L till MOMENTARY is shown.
19) Select the NEXT PAGE on the CDU until page 3/5 is shown.
20) LSK 1L till MOMENTARY is shown.
21) LSK 3L till CONTINUOUS is shown.
22) LSK 6L for <RETURN to get to the SYS PARMS page.
23) LSK 6L for <RETURN to get to the MAINT ENTRY page.
24) LSK 6L for <RETURN to get to the MAINT MENU page.
25) LSK 3L for <COMM CNTRL to get to the COMM CNTRL page.
26) LSK 4R for VHF CNTRL> to get to the VHF CNTRL page.
27) LSK 4L for <LINK TEST.
28) Make sure the <LINK TEST promt adjacent to 4L LSK disappear and then reappear.

S 735-247

(2) Printer Interface, Registration Coding and Airplane ID Test.

(a) On the CDU, do the step that follows:

1) LSK 6L for <RETURN.

2) LSK 1L for <SYS STATUS.

3) Make sure the airplane type adjacent to the LSK 1L is 767-300.

4) SAS 150, 152-157, 162-167;
Make sure the airplane ID center first line is SK.

MTH 5) MTH 275-278, 280-281;
MTH Make sure the airplane ID center first line is MP.

6) Make sure the airplane registration number, adjacent to the LSK 1R, matches the REG/SELCAL placard located on the center instrument panel.

7) LSK 5L for *PRINT.

(b) Make sure the SYSTEM STATUS PAGE is printed on the printer.

S 735-248

(3) SAS 150, 152-157, 162-167;
Voice/DATA Select Switch Test

(a) On the center VHF control panel, do the steps that follow:

1) Set the TFR switch to the left position.

SAS (b) On the Voice/Data switch panel, do the steps that follow:

SAS 1) Make sure the VOICE indicator is illuminated.

SAS 2) Make sure the DATA indicator is NOT illuminated.

SAS

SAS NOTE: If DATA is illuminated, press the annunciator once.

SAS

SAS (c) On the center VHF control panel, do the step that follows:

SAS 1) Make sure the left VOICE indicator is illuminated.

SAS (d) On the Left and Right MCDU, with the ACARS page selected, do
SAS the step that follows:

SAS 1) Make sure the VOICE indicator is illuminated.

SAS (e) On the Voice/Data switch panel, do the steps that follow:

SAS 1) Push the VOICE/DATA switch.

SAS 2) Make sure the DATA indicator is illuminated.

SAS (f) On the center VHF control panel, do the step that follows:

SAS 1) Make sure the left and right VOICE indicators are NOT
SAS illuminated.

SAS (g) On the left and Right MDCU, with the ACARS page selected, do
SAS the step that follows:
SAS 1) Make sure the VOICE indicator is NOT illuminated.
MTH
MTH S 735-329
MTH (4) MTH 275-278, 280-281;
MTH Voice/Data Select Switch Test.
MTH (a) On the center VHF control panel, do the step that follows:
MTH 1) Set the TFR switch to the left position.
MTH (b) On the Voice/Data switch panel, do the steps that follow:
MTH 1) Make sure the VOICE indicator is illuminated.
MTH 2) Make sure the DATA indicator is NOT illuminated.

MTH NOTE: If DATA is illuminated, press the annunciator once.

MTH (c) On the Left and Right CDU, with the ACARS page selected:
MTH 1) Make sure the VOICE indicator is illuminated.
MTH (d) On the Voice/Data switch panel, do the steps that follow:
MTH 1) Push the VOICE/DATA switch.
MTH 2) Make sure the DATA indicator is illuninated.
MTH (e) On the Left and Right CDU, with the ACARS page selected:
MTH 1) Make sure the VOICE indicator is NOT illuminated.

S 735-283
(5) Do the EICAS interface test.
(a) On the EICAS display select panel, select the left EICAS computer.
(b) On the left FMC CDU, use the line select key (LSK) and the switches as follows:
1) LSK 6L for RETURN.
2) LSK 2R for SENSOR>.
(c) Release the parking brake when safe to do so.
1) On the left CDU, make sure REL shows next to the BRAKE.
2) Set the parking brake.
3) On the left CDU, make sure SET shows next to the BRAKE.
(d) On the EICAS select panel, set the switch to the right EICAS position.
1) On the left CDU, make sure SET shows next to the BRAKE.
2) Release the parking brake.
3) On the right CDU, make sure REL shows adjacent to the LSK 2L next to BRAKE.
4) Set the parking brake.

E. Restore the airplane to normal

S 865-314
(1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

ACARS MANAGEMENT UNIT - REMOVAL/INSTALLATION

1. General
   A. The ACARS management unit, M172, (referred to as the MU) is on shelf 5 of the main equipment center rack E2.

TASK 23-22-01-004-001

2. Remove the ACARS Management Unit
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

      (2) Access Panel
          119AL Main Equipment Center Access

   C. Prepare for Removal

      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11G6, ACARS MGMT UNIT AC

      S 864-004
      (2) Open this circuit breaker on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag:
          (a) 6G5, ACARS DC PWR
   D. Remove the ACARS Management Unit

      S 914-005

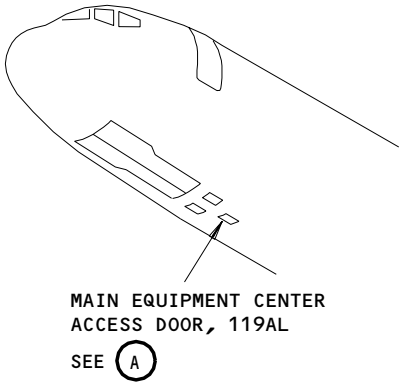
      CAUTION: DO NOT TOUCH THE MU BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE MU.

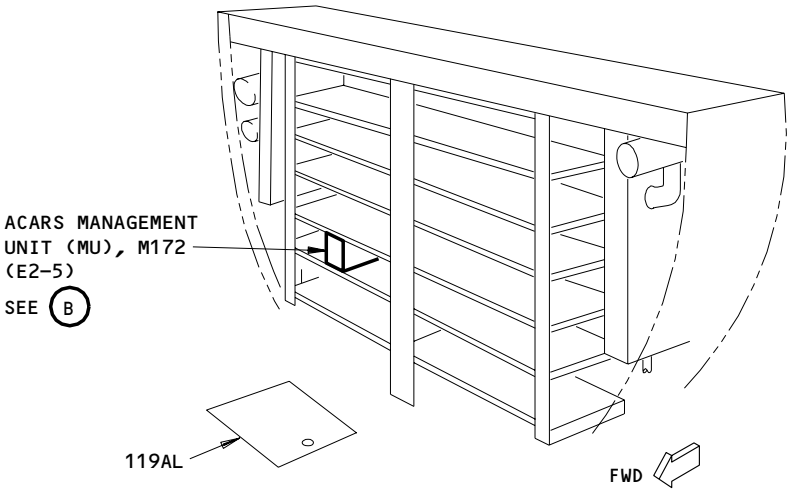
      (1) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

      S 024-007
      (2) Remove the ACARS management unit (AMM 20-10-01/401).

TASK 23-22-01-404-008

3. Install the ACARS Management Unit
   A. References
      (1) AMM 20-10-01/401, Rack-Mounted Components





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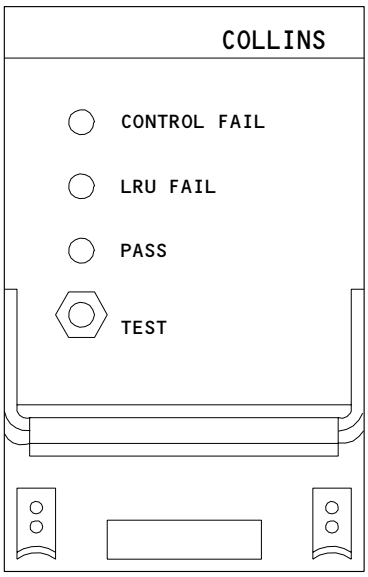

ACARS MANAGEMENT UNIT (MU), M172
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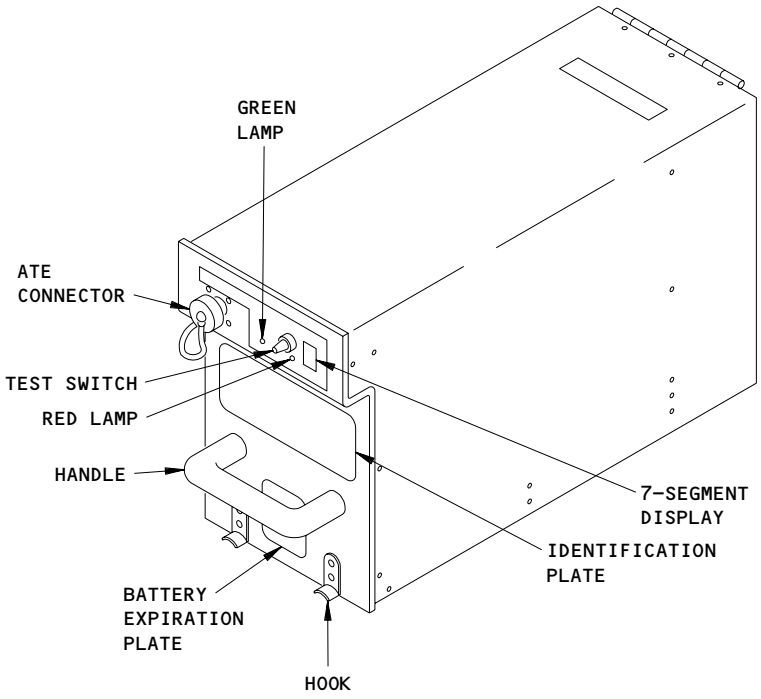


ACARS MANAGEMENT UNIT (MU), M172
(B) 2

1 SAS 150,152-157,162-167
2 MTH 275-278,280,281

ACARS Management Unit Installation
Figure 401

(2) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
(3) AMM 24-22-00/201, Electrical Power - Control

B. Access

(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment

(2) Access Panels

119AL	Main Equipment Center Access

C. Install the ACARS Management Unit

S 914-006

CAUTION: DO NOT TOUCH THE MU BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE MU.

(1) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 424-009
(2) Install the ACARS management unit (AMM 20-10-01/401).

S 864-010
(3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11G6, ACARS MGMT UNIT AC

S 864-012
(4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the main power distribution panel, P6:
(a) 6G5, ACARS DC PWR

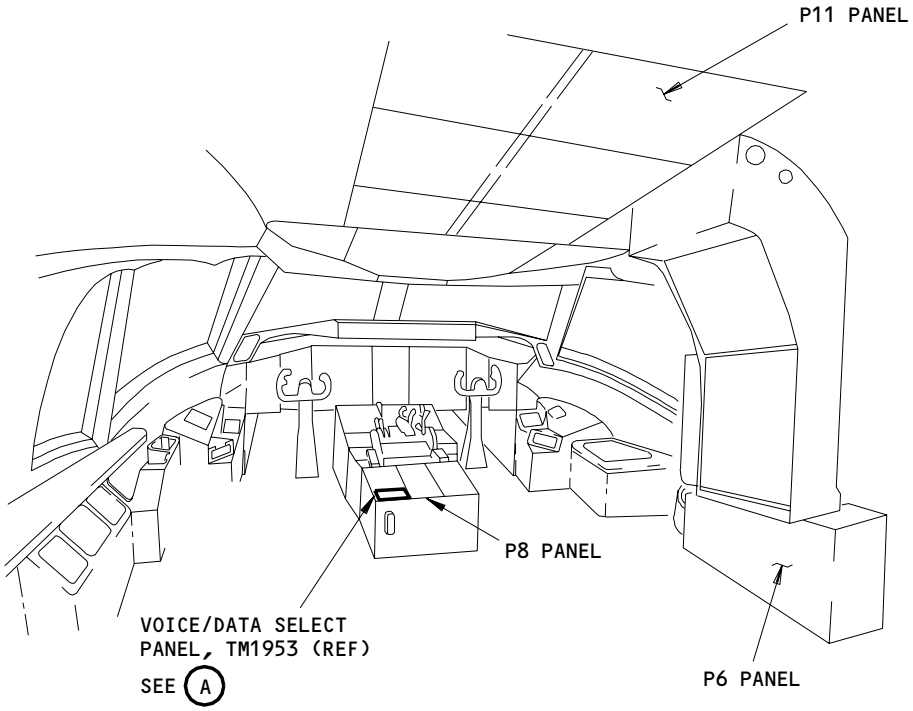
D. Do a test of the MU installation.

S 714-017
(1) Do the "Operational Test - ACARS" task (AMM 23-22-00/501).

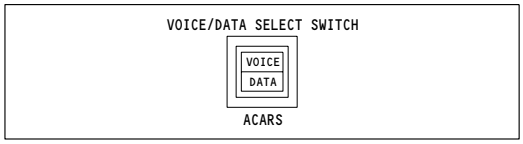
SAS ACARS VOICE/DATA SWITCH PANEL - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. The ACARS Voice/Data Switch Panel, TM1953, is located on the pilot's aft
SAS control stand P8, above the center VHF control panel.
SAS B. This procedure contains two tasks. The first task removes the Voice/Data
SAS Switch Panel. The second task installs the Voice/Data Switch Panel and
SAS does a test of the installation.
SAS
SAS TASK 23-22-07-004-001
SAS 2. Remove the ACARS Voice/Data Switch Panel
SAS A. Access
SAS (1) Location Zones
SAS 211/212 Flight Compartment

SAS B. Prepare for Removal
SAS
SAS S 864-002
SAS (1) Open this circuit breaker on the overhead circuit breaker panel,
SAS P11, and attach a DO-NOT-CLOSE tag:
SAS (a) 11G6, ACARS MGMT AC
SAS
SAS S 864-014
SAS (2) Open this circuit breaker on the main power distribution panel, P6,
SAS and attach a DO-NOT-CLOSE tag:
SAS (a) 6G5, ACARS DC PWR
SAS C. Procedure
SAS
SAS S 024-016
SAS (1) Remove the Voice/Data Switch Panel.
SAS (a) Loosen the quarter-turn fasteners.
SAS (b) Lift the Voice/Data Switch Panel to get access to the
SAS electrical connector.
SAS (c) Disconnect the electrical connector.
SAS (d) Put protective covers on the electrical connectors.
SAS
SAS TASK 23-22-07-404-004
SAS 3. Install the ACARS Voice/Data Switch Panel
SAS A. References
SAS (1) 24-22-00/201, Electrical Power - Control
SAS B. Access
SAS (1) Location Zones
SAS 211/212 Flight Compartment

SAS



FLIGHT COMPARTMENT



VOICE/DATA SELECT PANEL, TM1953 (REF)

(A)

Interactive Display Unit Installation
Figure 401

SAS C. Procedure
SAS
SAS S 424-005
SAS (1) Install the ACARS Voice/Data Switch Panel
SAS (a) Remove the protective covers from the electrical connectors.
SAS (b) Examine the electrical connector for bent or broken pins, dirt and damage.
SAS (c) Connect the electrical connector.
SAS (d) Put the Voice/Data Switch Panel in its position on the P8 panel.
SAS (e) Tighten the quarter-turn fasteners.
SAS
SAS S 864-006
SAS (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
SAS (a) 11G6, ACARS MGMT AC
SAS
SAS S 864-017
SAS (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the main power distribution panel, P6:
SAS (a) 6G5, ACARS DC PWR
SAS D. Installation Test
SAS
SAS S 864-007
SAS (1) Supply electrical power (Ref 24-22-00/201).
SAS
SAS S 864-008
SAS (2) Set the STBY PWR switch on the pilot's overhead P5 panel to AUTO.

S 864-018
(3) SAS 150, 152-157, 162-167;
SAS Set the TFR switch on the VHF comm control panel to the left position.
SAS
SAS S 864-019
SAS (4) On the Voice/Data switch panel, do the steps that follow:
SAS (a) Make sure the VOICE indicator is illuminated.
SAS (b) Make sure the DATA indicator is NOT illuminated.
SAS
SAS NOTE: If DATA is illuminated, press the annunciator once.

SAS
SAS S 864-020
SAS (5) On the Left and Right MDCU, with the ACARS page selected, do the step that follows:
SAS (a) Make sure the VOICE indicator is illuminated.

S 864-021

(6) SAS 150, 152-157, 162-167;

SAS On the center VHF control panel do the step that follows:

SAS (a) Make sure the left VOICE indicator is illuminated.

SAS

SAS S 864-022

SAS (7) On the Voice/Data Switch Panel, do the steps that follow:

SAS (a) Push the VOICE/DATA switch.

SAS (b) Make sure the DATA indicator is illuminated.

SAS

SAS S 864-023

SAS (8) On the Left and Right MDCU, with the ACARS page selected, do the

SAS step that follows:

SAS (a) Make sure the VOICE indicator is not illuminated.

S 864-024

(9) SAS 150, 152-157, 162-167;

SAS On the center VHF control panel, do the step that follows:

SAS (a) Make sure the left and right VOICE indicators are NOT

SAS illuminated.

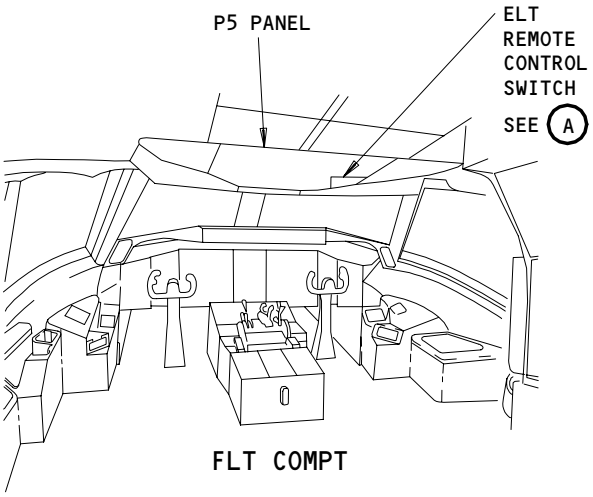
SAS

SAS S 864-013

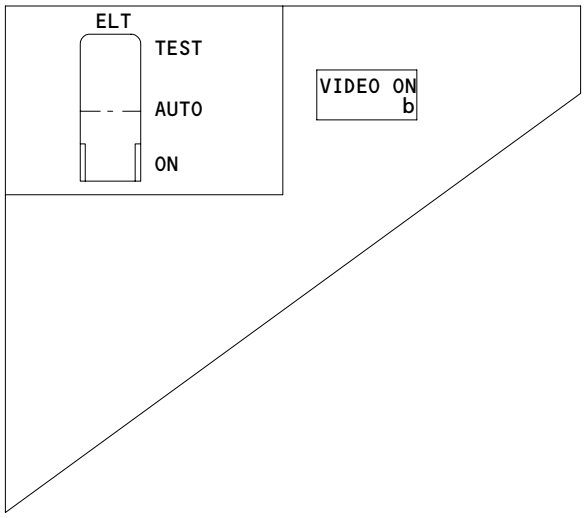
SAS (10) Remove electrical power if it is not necessary (Ref 24-22-00/201).

EMERGENCY LOCATOR TRANSMITTER - DESCRIPTION AND OPERATION

1. General
   A. The emergency locator transmitter (ELT) is located in the aft section of the airplane above voice and flight recorder rack E7. The ELT provides an emergency locator signal to aid in search and rescue operations. The ELT transmits on international distress frequencies 121.5 MHz and 243.0 MHz.
   B. The ELT uses a self-contained, non-rechargeable battery back as its power supply. Operation of the ELT can be controlled from a switch on the units front panel or from a remote switch located on pilots' overhead panel P5.
   C. The ELT consists of a control head assembly attached to a battery pack. The ELT is connected to an external antenna by a special coaxial cable. A remote control switch located on the P5 panel allows for operation of the ELT from the flight compartment in emergency or test situations.
2. Component Details (Fig. 1)
   A. Emergency Locator Transmitter (ELT)
      (1) The ELT consists of a control head assembly and a battery pack. The front panel of the control head assembly contains the following:
         (a) A RESET switch to reset the ELT after automatic activation.
         (b) A set of terminals for the leads from a remote control switch.
         (c) An ON-OFF-ARM switch. This is the master control switch for the ELT. With the switch set to ON, the ELT will be on, regardless of the setting of the remote control switch on P5. With the switch set to OFF, the ELT will be off. The switch must be set to ARM to allow for automatic activation of the ELT and to allow the ELT to be controlled by the switch on P5.
         (d) A coaxial connector for the lead from an external antenna.
      (2) The control head assembly also contains a G switch which controls the automatic activation of the ELT. When the ELT is exposed to a shock force of sufficient size and duration, the G switch will activate the ELT, provided the ON-OFF-ARM switch is set to ARM.
      (3) The battery pack is an alkaline battery power supply. The battery pack will power the ELT for approximately 52 hours.
   B. Remote Control Switch
      (1) The ELT remote control switch is a guarded, three position toggle switch located on pilots' overhead panel P5. The switch allows for testing or manual activation of the ELT from the flight compartment, provided the ON-OFF-ARM switch on the ELT is set to ARM.
      (2) The ELT will be on when the switch is set to ON. When the switch is held to the momentary TEST position, the ELT will come on, allowing the signal to be monitored on one of the VHF communication systems. The switch is spring loaded from TEST back to AUTO. With the switch set to AUTO, the ELT is set to be automatically activated. With the guard closed, the switch will be in the AUTO position.

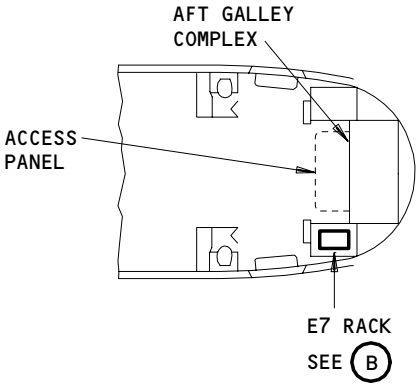


FLT COMPT

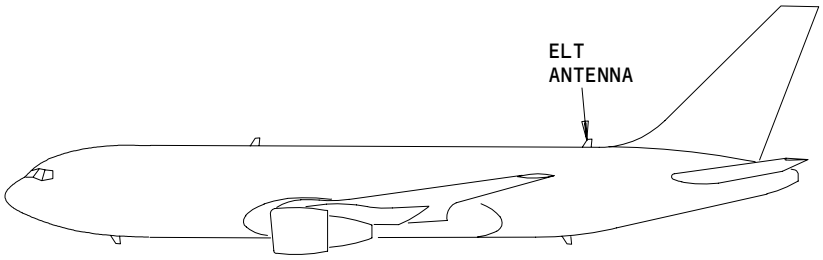


ELT REMOTE CONTROL SWITCH

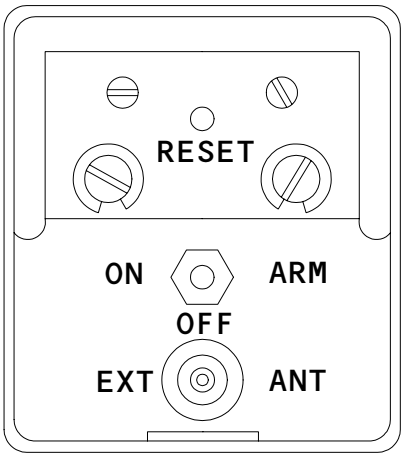
A



Emergency Location Transmitter Component Location
Figure 1 (Sheet 1)

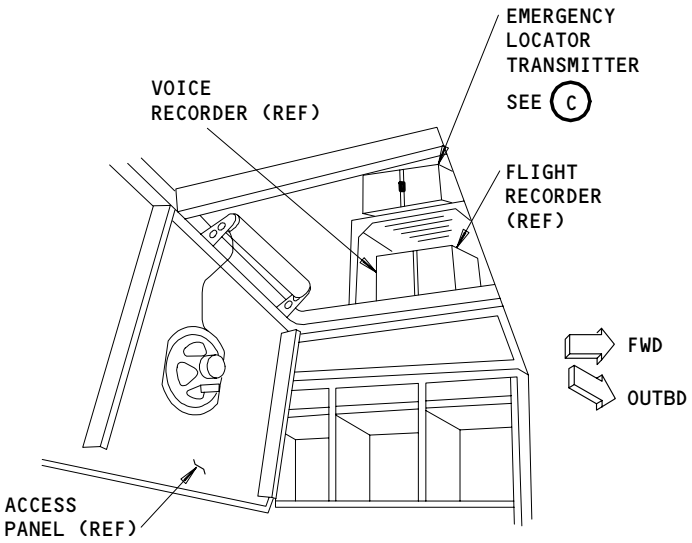


ELT ANTENNA LOCATION



EMERGENCY LOCATOR
TRANSMITTER

C



E7 RACK

B

Emergency Location Transmitter Component Location
Figure 1 (Sheet 2)

C. External Antenna

(1) The external antenna is a blade type antenna mounted 18 inches off the centerline in the area above the aft left service/entry door. The antenna is connected to the ELT by a coaxial cable, the length of which is critical. The antenna is impedance matched to the coaxial cable.

3. Operation

A. Functional Description

(1) The ELT has a nonrechargeable battery pack as it's power supply. The battery pack has a life of approximately 52 hours under load.

(2) The ON-OFF-ARM switch on the ELT front panel is the master control switch for the transmitter. With the switch set to ON (OFF) the ELT will be on (off) regardless of the setting of the remote control switch on the P5 panel. With the switch set to ARM the ELT is set to be automatically activated. With the switch set to ARM, the ELT can also be controlled from the remote switch on the P5 panel. The ON-OFF-ARM switch should always be set to ARM unless the transmitter is being tested or replaced.

(3) Once the ELT has been automatically activated, the RESET switch on the ELT front panel must be pressed to turn the transmitter off.

B. Control

(1) Check that ON-OFF-ARM switch on the ELT front panel is set to ARM.

(2) To turn the ELT on, set the remote control switch on the P5 panel to ON.

(3) To test the ELT, hold the remote control switch on the P5 panel to TEST. ELT transmissions can be monitored on a VHF transceiver tuned to 121.5 MHz.

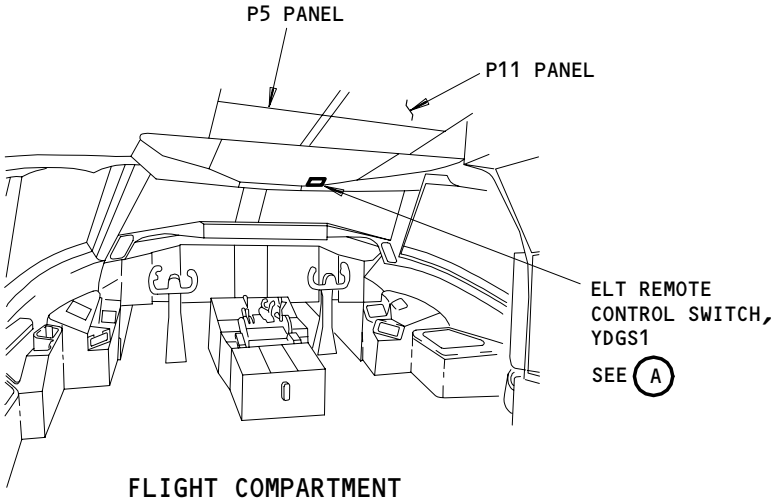
EMERGENCY LOCATOR TRANSMITTER (ELT)

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ANTENNA - EMERGENCY LOCATOR TRANSMITTER, M1596	2	1	FUSELAGE	23-24-02
SWITCH - EMERGENCY LOCATOR TRANSMITTER REMOTE CONTROL, YDGS1	1	1	FLIGHT COMPARTMENT, P5 PANEL	*
TRANSMITTER - EMERGENCY LOCATOR, M1597	2	1	AFT PASSENGER CABIN CEILING, ABOVE E7 RACK	23-24-01

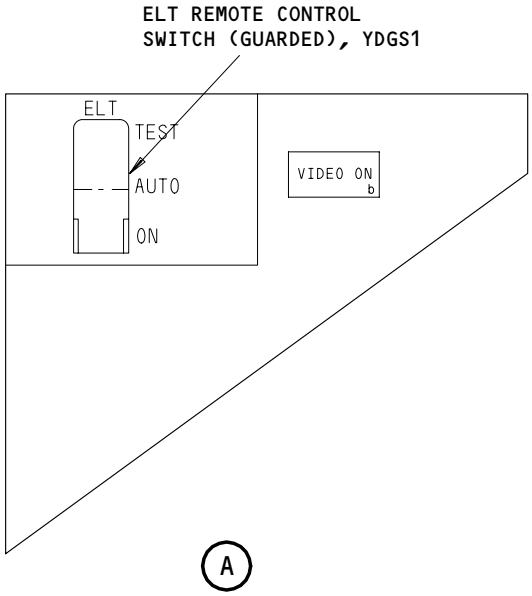
* SEE THE WDM EQUIPMENT LIST

Emergency Locator Transmitter (ELT) - Component Index
Figure 101

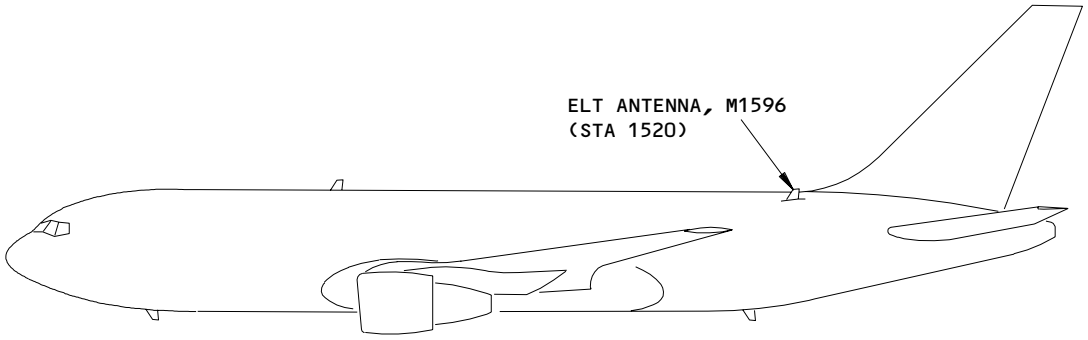
E24097



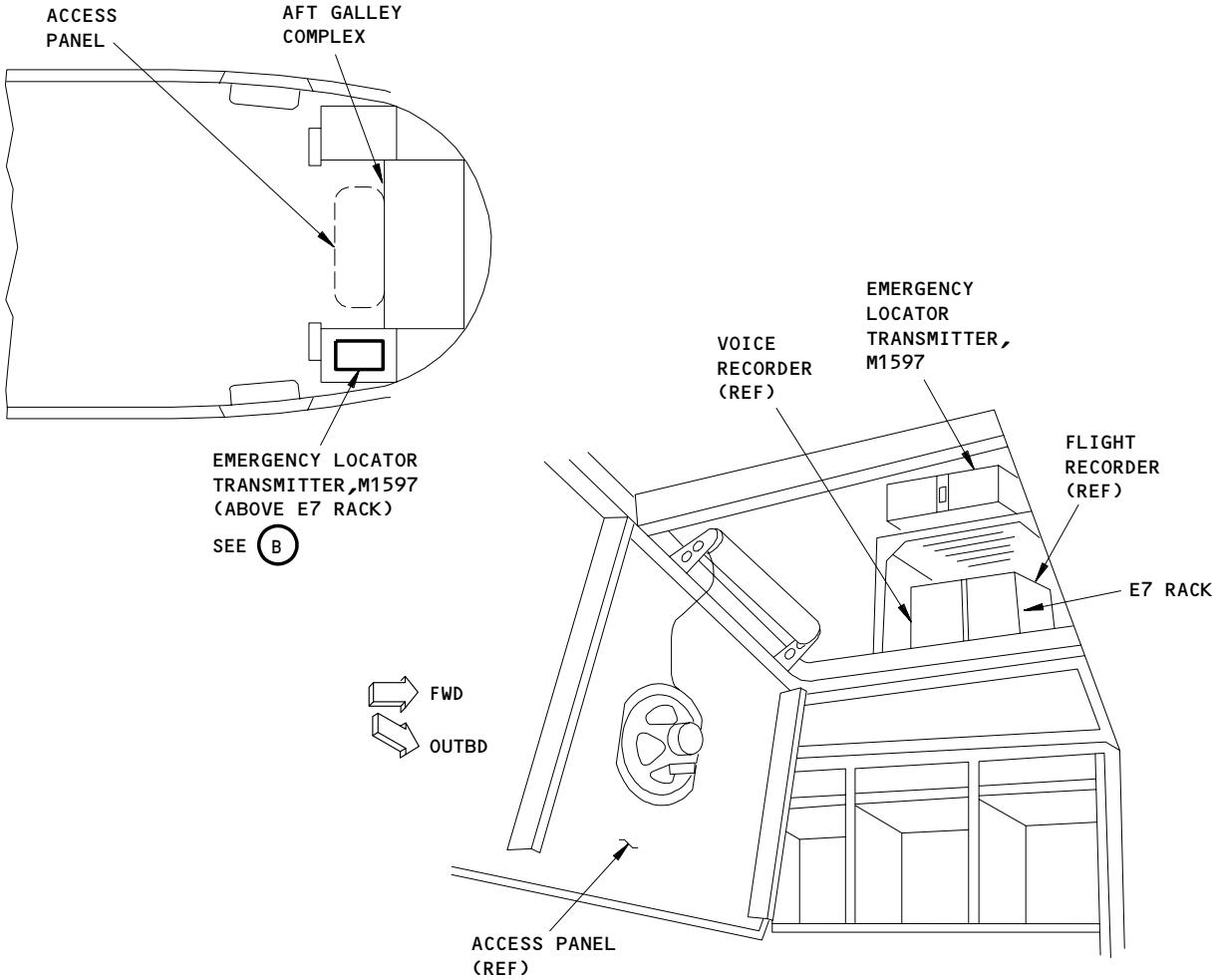
FLIGHT COMPARTMENT



Emergency Locator Transmitter (ELT) - Component Location
Figure 102 (Sheet 1)



ELT ANTENNA LOCATION



EMERGENCY LOCATOR TRANSMITTER, M1597
B

Emergency Locator Transmitter (ELT) - Component Location
Figure 102 (Sheet 2)

EMERGENCY LOCATOR TRANSMITTER - ADJUSTMENT/TEST

1. General
   A. This procedure contains one task. This task is the operational test of the emergency locator transmitter (ELT). This task takes a minimum quantity of time and uses only equipment found on the airplane.

   TASK 23-24-00-715-001

2. Emergency Locator Transmitter - Operational Test
   A. References
      (1) AMM 23-12-00/501, VHF Communication System
      (2) AMM 23-51-00/501, Flight Interphone System
      (3) AMM 24-22-00/201, Electrical Power - Control
      (4) AMM 31-41-00/501, Engine Indication and Crew Alerting System (EICAS)
   B. Access
      (1) Location Zones
          211/212 Flight Compartment
   C. Procedure

      S 865-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 865-003
      (2) Make sure these systems operate:
          (a) The VHF communication system (AMM 23-12-00/501).
          (b) The flight interphone system (AMM 23-51-00/501).
          (c) The engine indication and crew alerting system (EICAS) (AMM 31-41-00/501).

      S 865-004
      (3) Set the VHF-R communication system to listen for the 121.5 MHz test frequency (AMM 23-12-00/501).

          NOTE: Any VHF system with a bottom mounted antenna can be used for this test. If the VHF antenna is on the top, it is possible to hear the ELT signal even though the ELT antenna has failed.

S 865-005

CAUTION: MAKE SURE YOU FOLLOW THE LOCAL ELT OPERATION REGULATIONS. TELL THE AUTHORITIES IF AN ACCIDENTAL TRANSMISSION IS MADE. THIS WILL PREVENT EMERGENCY SEARCH OPERATIONS THAT ARE NOT NECESSARY.

(4) Open the guard on the ELT switch on the pilots' overhead panel, P5.

S 715-006

(5) Push and hold the ELT switch in the TEST position.
  (a) Make sure the ELT signal can be heard on the VHF system.

S 715-007

(6) Release the ELT switch.
  (a) Make sure the switch returns to the AUTO position.
  (b) Make sure the ELT signal can not be heard on the VHF system.

S 865-008

(7) Close the guard over the ELT switch.

S 865-009

(8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EMERGENCY LOCATOR TRANSMITTER - MAINTENANCE PRACTICES

1. General
   A. The emergency locator transmitter (ELT) is found above the voice and flight data recorders. Access to the ELT is through a panel in the aft galley ceiling.
   B. Maintenance practices for the ELT contain the procedures that follow:
      - Removal
      - Installation
      - Battery Replacement

TASK 23-24-01-002-001

2. Remove Emergency Locator Transmitter (Fig. 201)
   A. Access
      (1) Location Zone
          253/254 Area above passenger cabin ceiling - section 46
   B. Procedure

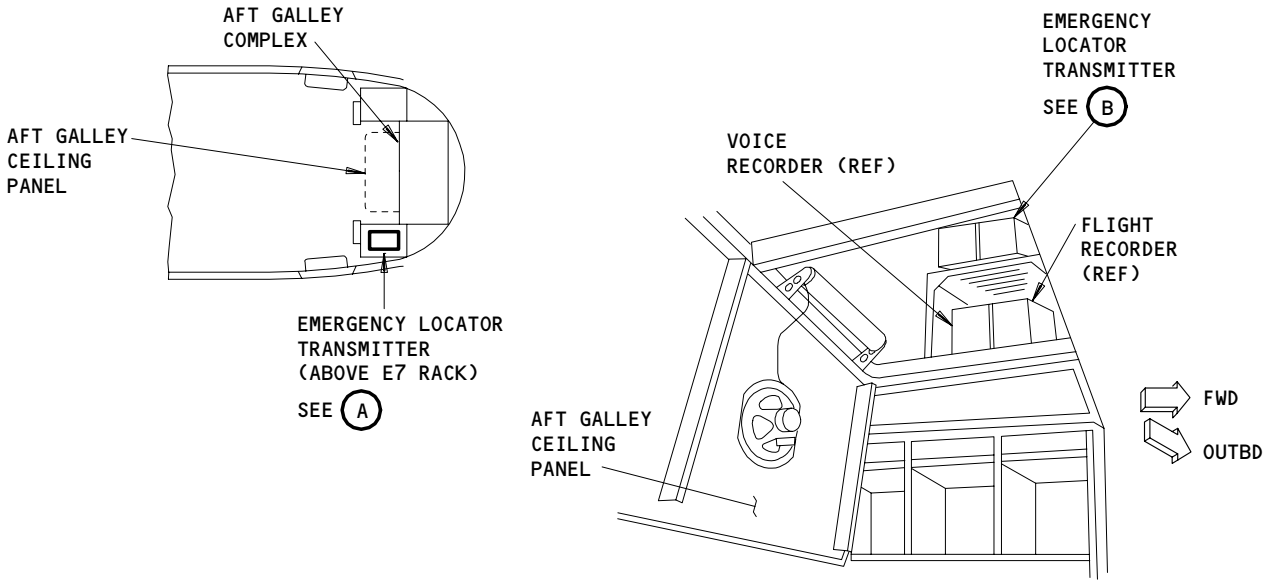
      S 842-002
      (1) Release the latches along the front edge of the panel on the aft galley ceiling.

      S 842-003
      (2) Release the ceiling panel from the lanyard and let the panel open fully.

      S 862-004
      (3) Set the control switch to OFF at the ELT front panel.

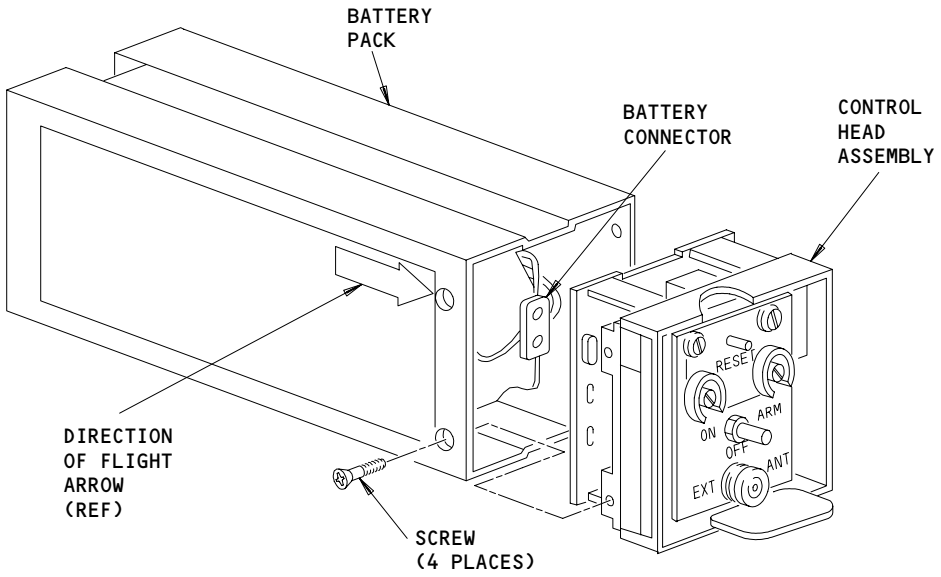
      S 032-005
      (4) Remove the coaxial connector from the ELT front panel.

      S 862-007
      (5) Make a note of the location and color of the wires on the ELT front panel.



EMERGENCY LOCATOR
TRANSMITTER

A



EMERGENCY LOCATION TRANSMITTER

B

Emergency Locator Transmitter
Figure 201

S 032-006
(6) Remove the wires.

S 032-008
(7) Hold the ELT and release the LATCH lever on the ELT mounting bracket.

S 022-009
(8) Remove the ELT.

NOTE: If the ELT is programmed with Aircraft registry (tail ID) or airplane 24 BIT address ID, remove the activation/identification module from the ELT and keep to install on the new ELT. If you don't know the airplane activation/identification module programmed configuration, ask your engineering department.

TASK 23-24-01-402-010

3. Install Emergency Locator Transmitter (Fig. 201)
   A. Reference
      (1) AMM 24-22-00/201, Electrical Power Control
   B. Access
      (1) Location Zone
          253/254 Area above passenger cabin ceiling - section 46
   C. Procedure

S 422-011
(1) Put the ELT in the mounting bracket.
(a) Make sure the DIRECTION OF FLIGHT arrow is forward.

S 432-012
(2) Close the LATCH lever on the ELT mounting bracket.

S 432-013
(3) Connect the wires to the ELT front panel.
(a) Make sure the location of the wires is the same as before.

S 432-014
(4) Install the coaxial connector on the ELT front panel.

S 862-015
(5) Set the control switch to ARM on the ELT front panel.

S 862-016
(6) Lift the galley ceiling panel and attach the lanyard.

S 432-017
(7) Close the galley ceiling panel and tighten the latches.
(a) Make sure the ceiling panel is tight.

D. ELT Installation Test

S 862-018
(1) Supply electrical power (AMM 24-22-00/201).

S 862-042
(2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11C3, VHF COMM L
(b) 11C26, INTERPHONE DUAL PWR F/O
(c) 11G30, INTERPHONE DUAL PWR F/O

S 432-019
(3) Connect the headphone to the HEADPHONE jack at the first officer's jack panel (P16).

S 822-020
(4) Adjust the first officer's audio selector panel to the condition that follows:
(a) L-VHF MIC SELECTOR switch on (switchlight on).
(b) The L-VHF should be on with the volume at the middle position (all other volume controls should be off).

S 822-021
(5) Adjust the left VHF comm control panel to the condition that follows:
(a) TFR switch set to right.
(b) Right frequency controls set to 121.5 MHz

S 862-040

CAUTION: FOLLOW THE LOCAL ELT REGULATIONS. THIS WILL PREVENT EMERGENCY SEARCH OPERATIONS THAT ARE NOT NECESSARY.

(6) Open the guard on the ELT switch on the pilots' overhead panel P5.

S 862-023
(7) Push and hold the ELT switch in the TEST position. Make sure the ELT signal can be heard through the headphones connected to the first officer's jack panel.

S 862-041
(8) Release the ELT switch.
(a) Make sure the ELT signal can not be heard in the headphones.

S 862-024
(9) Close the guard over the ELT switch.

S 862-025
(10) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-24-01-902-026
4. Replace ELT Battery (Fig. 201)
A. Access
(1) Location Zone
253/254 Area above passenger cabin ceiling - section 46
B. Procedure

S 012-027
(1) Remove the ELT from the mounting bracket (refer to the Remove Emergency Locator Transmitter paragraph).

S 012-028
(2) Remove the four screws that hold the control head assembly to the battery pack (Fig. 201).

S 012-029
(3) Remove the control head assembly from the battery pack to get access to the battery connector.

S 012-030
(4) Remove the battery connector from the control head assembly.

S 012-031
(5) Remove the protective tape for the new battery pack connector.

S 012-032
(6) Install the connector on the back of the control head assembly.

S 802-033
(7) Look at the manufacturers instructions on the container of the sealant supplied with the new battery pack.

S 802-034
(8) Apply a thin continuous bead of sealant to the control head assembly.
(a) Do it in an area where the assembly touches the battery pack.

S 422-035
(9) Make sure the screw holes are in position and install the control head on the battery pack.

S 802-036
(10) Apply a small quantity of the sealant to the countersink of each screw hole.

S 432-037
(11) Install four screws and hand tighten. Do not overtighten the screws.

S 102-038
(12) Make the surfaces clean.

S 412-039
(13) Install the ELT in the mounting bracket do a test of the installation (refer to the Install Emergency Locator Transmitter paragraph).

EMERGENCY LOCATOR TRANSMITTER (ELT) ANTENNA - REMOVAL/INSTALLATION

1. General
   A. This procedure has these tasks:
      (1) A removal of the emergency locator transmitter (ELT) antenna.
      (2) An installation of the ELT antenna.
   B. The ELT antenna, M1596, is found on the upper left section of the fuselage at station 1520.

TASK 23-24-02-004-001

2. ELT Antenna Removal (Fig. 401)
   A. Equipment
      (1) Sealant removal tool - hardwood or plastic
   B. Access
      (1) Location Zones
          253 Area above passenger cabin ceiling - section 46 (Left)
          254 Area above passenger cabin ceiling - section 46 (Right)
   C. Removal Procedure

      S 024-005
      (1) Remove the bolts that attach the ELT antenna to the airplane.

      S 024-029

      CAUTION: BE CAREFUL WHEN YOU REMOVE THE AERODYNAMIC FILLET SEAL WITH THE SEALANT REMOVAL TOOL. DAMAGE TO THE AIRPLANE SKIN OR THE COAXIAL CABLE CAN OCCUR.

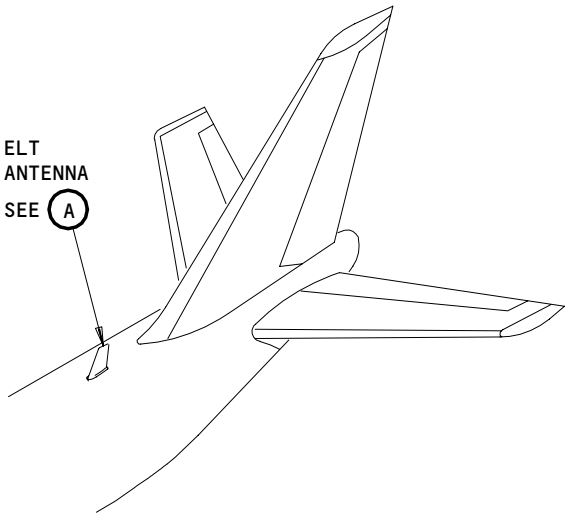
      (2) Use the sealant removal tool to remove the weather aerodynamic fillet seal from the base of the antenna.

      S 014-004
      (3) Lift the ELT antenna until you have access to the coaxial connector.

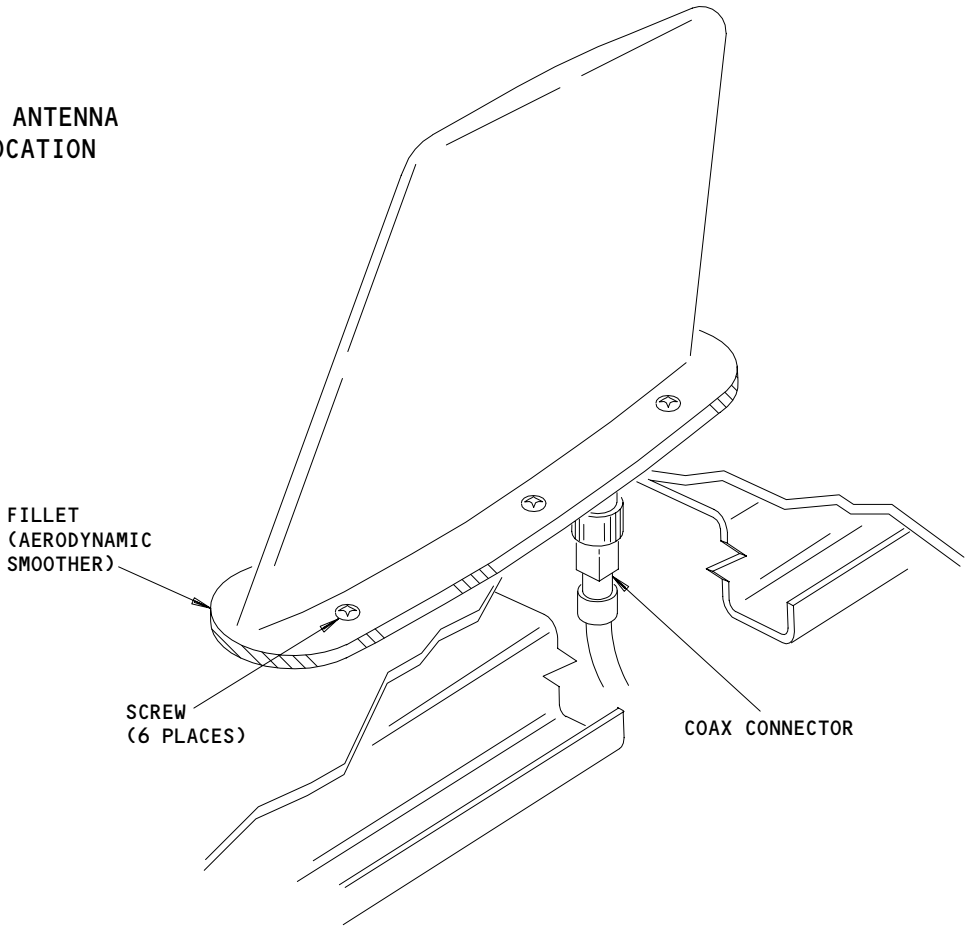
      S 024-030
      (4) Disconnect the coaxial cable from the antenna at the coaxial connector.

TASK 23-24-02-404-006

3. ELT Antenna Installation (Fig. 401)
   A. Equipment
      (1) Bonding Meter (SWPM 20-20-00)



ELT ANTENNA
LOCATION



ELT ANTENNA

A

ELT Antenna Installation
Figure 401

613193

(2) Gloves, neoprene or rubber; Commercially available
(3) Respirator; Commercially available
(4) Spatula - commercially available

B. Consumable Materials
(1) A00247 Sealant - Chromate, Type BMS 5-95, Class B
(2) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261
(3) C00064 Coating - Surface Treatment - MIL-C-5541, Type II, Grade C class 1 for Aluminum or Aluminum Alloys - Alodine 1000 Clear
(4) C00175 Primer - BMS 10-79, Type III
(5) D00015 Grease - BMS 3-24, Corrosion Preventive
(6) G00034 Cheesecloth - New, Clean, Dry, Lint Free
(7) G01395 Compound - Corrosion Inhibiting Matinox 6856K, BMS 3-27 (Preferred)
(8) C50056 Compound - Non-drying Corrosion Inhibiting Resin Mix, BMS 3-38 (Alternate)
(9) G50136 Paste - Corrosion Inhibiting Non-drying, BMS 3-38 (Alternate)
(10) G50237 Compound - Corrosion Inhibiting Non-drying Cor-Ban 27L, BMS 3-38 (Alternate)

C. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 51-21-04/701, Alodine Coating
(3) AMM 51-31-01/201, Seals and Sealing
(4) SWPM 20-20-00, Electrical Bonding and Grounding

D. Access
(1) Location Zones
253 Area above passenger cabin ceiling - section 46 (Left)
254 Area above passenger cabin ceiling - section 46 (Right)

E. Installation Procedure

S 114-006

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

(1) Clean the airplane mating surface with solvent, Series 88 (AMM 20-30-88/201).
(a) Make a clean cheesecloth moist (not soaked) with solvent, Series 88 (AMM 20-30-88/201) .
(b) Rub the airplane mating surface with the cheesecloth until the surface is clean.

S 374-008
(2) SAS 050, 051, 150-157, 162-167 WITHOUT SL 51-23;
Do these steps to prepare the airplane surface:

(a) Do this task to apply a layer of alodine 1000 to the airplane mating surface: Apply the Alodine Coating (AMM 51-21-04/701).

NOTE: This task removes corrosion, cleans the surface, and applies the alodine.

(b) Apply two layers of BMS 10-79 type III primer to the airplane mating surface.
1) Let each layer dry for the correct cure time.

S 374-007

(3) SAS 050, 051, 150-157, 162-167 POST SL 51-23;
SAS 052-149, 158-161, 168-274;
If the airplane surface has corrosion or other damage, do these steps to prepare the airplane surface:
(a) Do this task to apply a layer of alodine 1000 to the airplane mating surface: Apply the Alodine Coating (AMM 51-21-04/701).

NOTE: This task removes corrosion, cleans the surface, and applies the alodine.

(b) Apply two layers of BMS 10-79 type III primer to the airplane mating surface.
1) Let each layer dry for the correct cure time.

S 624-009

(4) Apply a layer of BMS 3-27 (preferred) or BMS 3-38 (alternate), corrosion inhibiting compound, to the surfaces that follow:
(a) The opening for the coaxial cable
(b) The nutplate
(c) The threads of the bolts

S 624-018

(5) Apply a thin layer of BMS 3-27 (preferred) or BMS 3-38 (alternate) on the mating surface of the ELT antenna.

S 424-015

(6) Attach the coaxial connector to the ELT antenna.

S 414-021
(7) Align the holes on the ELT antenna with the holes on the airplane.

S 424-010
(8) Install 5 of the 6 bolts which attach the ELT antenna to the airplane.

S 764-011
(9) Measure the bond resistance between the ELT antenna and the airplane skin (SWPM 20-20-00).
(a) Make sure the resistance is less than 25 milliohms.

S 424-019
(10) Install the last bolt.

S 114-016

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

(11) Use solvent, Series 95 (AMM 20-30-95/201) to clean the BMS 3-27 or BMS 3-38 from around the flange of the ELT antenna and the bolts.

NOTE: Sealant will not bond to BMS 3-27 or BMS 3-38.

S 394-013
(12) Use a spatula to apply sealant BMS 5-95 around the flange of the ELT antenna to make an aerodynamic fillet seal (AMM 51-31-01/201).

S 394-017
(13) Apply a layer of sealant BMS 5-95 on the top surface of the bolts.

F. Installation Test

S 864-018
(1) Supply electrical power (AMM 24-22-00/201).

S 864-019
(2) Make sure these circuit breakers are closed:
(a) On the overhead circuit breaker panel, P11:
1) 11C3, VHF COMM L

2) 11C26, INTERPHONE DUAL PWR F/O
3) 11G30, INTERPHONE DUAL PWR F/O

S 864-020

(3) Connect the headphones to the HEADPHONE jack at the first officer's jack panel (P16).

S 864-021

(4) Adjust the first officer's audio selector panel to the condition that follows:
(a) L-VHF MIC SELECTOR switch on (switchlight on).
(b) The L-VHF must be set to the middle position. All other volume controls must be off.

S 864-022

(5) Adjust the left VHF comm control panel to the condition that follows:
(a) TFR switch set to right
(b) Right frequency controls set to 121.5 MHz

S 804-023

CAUTION: FOLLOW THE LOCAL ELT OPERATION REGULATIONS. THIS WILL PREVENT EMERGENCY SEARCH OPERATIONS.

(6) Follow the local ELT operation regulations.

S 864-024

(7) Open the guard on the ELT switch on the pilots' overhead panel P5.

S 864-025

(8) Push and hold the ELT switch in the TEST position.
(a) Make sure the ELT signal can be heard through the headphones connected to the first officer's jack panel.

S 864-026

(9) Release the ELT switch.
(a) Make sure the ELT signal can no longer be heard in the headphones.

S 864-027

(10) Close the guard over the ELT switch.

S 864-031

(11) Remove electrical power if it is not necessary (AMM 24-22-00/201).

SAS SATELLITE COMMUNICATION (SATCOM) SYSTEM - DESCRIPTION AND OPERATION
SAS
SAS 1. General
SAS A. The satellite communications (SATCOM) system provides communication links between the airplane and ground earth stations (GES) via satellites in geostationary orbit. The ground earth stations interface with the terrestrial telephone network to complete the two-way communication link between the airplane and a distant communication station. Figure 1 shows the communication link between an aircraft earth station, the space segment, and the ground earth station. The SATCOM network provides services for voice transmission, low speed data transmission, high speed data transmission, and other uses.
SAS (1) The total multichannel aviation satellite communications system (MCS-6000 SATCOM) consists of the following:
SAS (a) Airplane earth station (airborne avionics subsystems and antenna subsystem)
SAS (b) Space segment (satellite network)
SAS (c) Ground earth stations
SAS (d) Public, as well as private voice and data terrestrial telecommunications networks
SAS (2) The Airplane Earth Station
SAS (a) The airplane earth station (AES) comprised of the airplane avionics provides the communication link between a GES, the space segment and the AES.
SAS (b) The AES is fully compliant with the requirements of ARINC Characteristic 741.
SAS (c) Standard interfaces between the MCS SATCOM avionics and other airplane avionics enable the AES to accept data and voice messages from various sources, encode and modulate this information onto appropriate RF carrier frequencies, and transmit these carriers to the space segment for relay to the GES.
SAS (d) The AES receives RF signals from a GES via the satellite, demodulates these signals, performs the necessary decoding of the encoded messages and outputs the voice or data to the flight crew or passengers.

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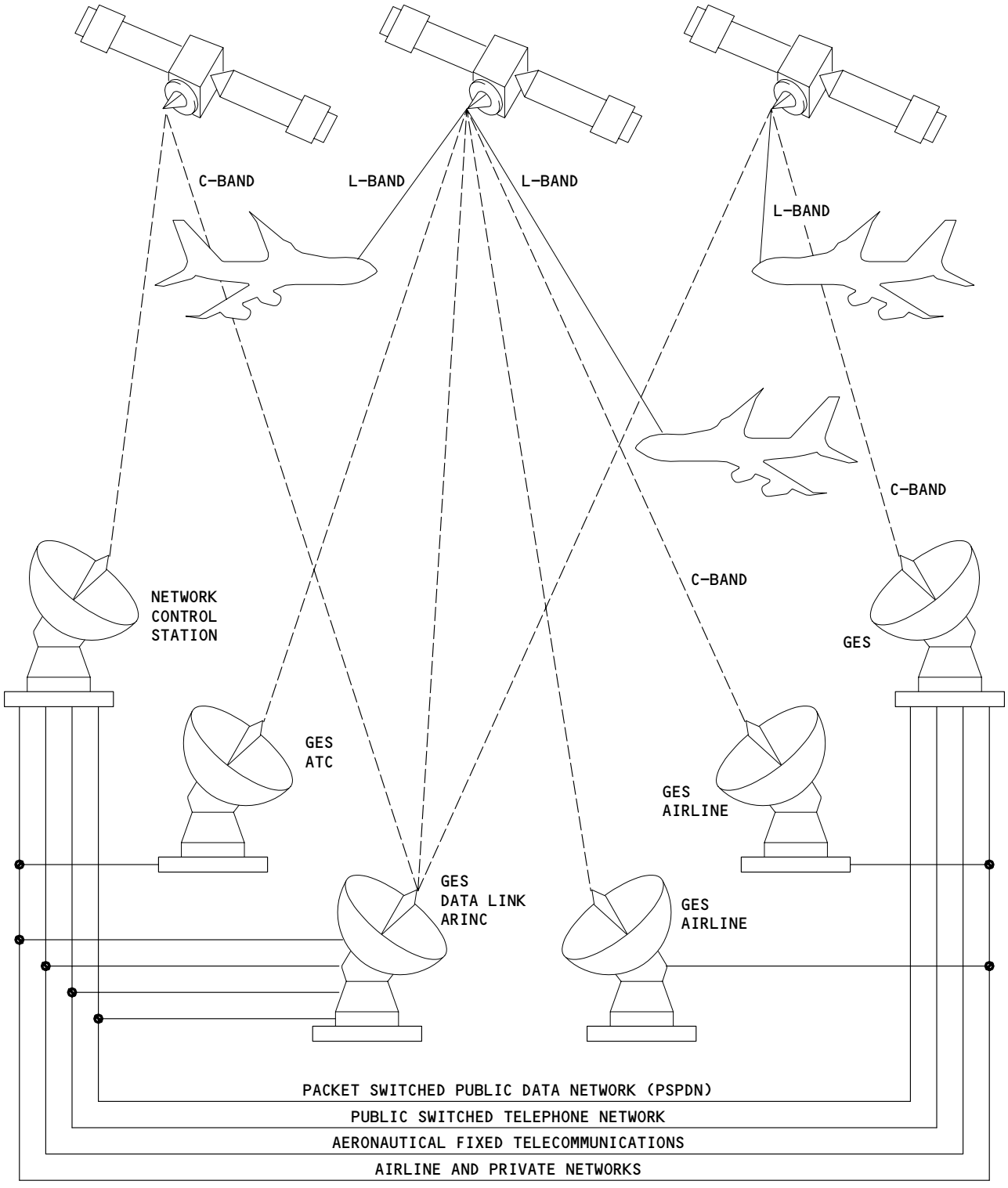


SATCOM Network Configuration
Figure 1

SAS (e) The AES (Honeywell MCS-6000 SATCOM/Ball AIRLINK Systems) provides six communication channels. The airline determines the allocation of channels and programs the options in to the owner requirements table (ORT). A maximum of two channels are available for cockpit use. The remaining four channels are allocated as follows:

SAS 1) One channel is reserved for system maintenance and control. This channel is also available for ACARS (packet) data use.

SAS 2) The remaining 3 channels are assigned to the cabin and passenger use as defined by the ORT.

SAS 3) As a result of specific equipment failure conditions, the system will automatically reconfigure to eliminate cabin channels before cockpit channels are lost.

SAS (f) Each AES is classified according to the configuration and capabilities of its airplane avionics. An AES may be fitted with any combination of the following classes of installations:

SAS 1) Class 1: AES installation utilizing a low-gain antenna and provides low rate packet-mode data services only.

SAS 2) Class 2: AES installation utilizing a high-gain antenna only and provides telephony, and optional circuit-mode services.

SAS 3) Class 3: AES installation utilizing a high-gain antenna and provides telephony service, packet-mode data services, and optional circuit-mode data services.

SAS 4) Class 4: AES installation utilizing a high-gain antenna and provides packet-mode data services only.

SAS (g) The AES service levels are defined as follows:

SAS 1) Level 1: AES capable of operating and supporting the protocols to receive P-channel transmission and transmit a T-channel and an R-channel transmission at rates of 600, 1200, and 2400 bps.

SAS 2) Level 2: AES capable of a level 1 AES and is also capable of receiving one P-channel transmission at rates of 4800 and 10500 bps. Transmitting a T-channel and an R-channel at rates of 10500 bps.

SAS 3) Level 3: AES capable of level 2 AES and is also capable of operating and supporting the protocols to receive and transmit data on one channel at rates of 10500 and 21000 bps.

SAS 4) Level 4: AES capable of a level 3 AES and is also capable of simultaneous operation of one or more C-channels and an R-channel. Simultaneous operation of one or more C-channels with the T-channel.

SAS (3) The space segment
SAS (a) The space segment consists of satellites placed in geostationary orbits to provide air-ground packet-switched data services and voice communications. Both of which use worldwide standardized conventions. The satellites function as communication transponders to support L-band links to and from the airplane, and provide links to the GES.
SAS (b) The AES is compatible with a wide range of satellite types including:
SAS 1) A global beam satellite with the satellite broadcasting the Psmc-channel from several GESs
SAS 2) A spot beam satellite where the spot beams cover only part of the earth's surface. The GESs operate a dedicated Pd-channel in each of the satellites spot beams.
SAS (c) International Maritime Satellite Organization (INMARSAT) whose system is in place today provides worldwide coverage with the following satellites:

1) Atlantic Ocean Region-West	(AOR West)	54.0° West longitude
2) Atlantic Ocean Region-East	(AOR East)	15.5° West longitude
3) Pacific Ocean Region	(POR)	178° East longitude
4) Indian Ocean Region	(IOR)	64.5° East longitude

SAS (d) The Communication Satellite Corporation (COMSAT) and the International Maritime Satellite Organization (INMARSAT) define the GES networks and the satellite networks for the SATCOM system.
SAS (e) Some problems with coverage may be encountered when the airplane flies in polar regions with a latitude greater than 75°.
SAS (4) The ground earth station
SAS (a) Each ground earth station (GES) has the necessary equipment to communicate with terrestrial networks and communicate via satellites with the airplane.
SAS (b) The ground earth stations are located strategically around the globe to provide redundancy and diversity in the terrestrial extension of communications. An airplane will be connected to a GES via an "in-view" satellite depending on the service preference table settings encoded in the airplane avionics.
SAS (c) Listed below are the satellites, associated ground earth stations and service providers for that GES (Table 1):
SAS

SAS

Table 1				
Satellite	SAT ID	GES	GES ID	Service Provider
AOR-West	00	Goonhilly	001	British Telecom
		Southbury	002	COMSAT
		Weir	003	Teleglobe Canada
AOR-East	01	Goonhilly	101	British Telecom
		Aussaguel	103	France Telecom
POR	02	Senstosa	201	Singapore Telecom
		Santa Paula	202	COMSAT
		Yamaguchi	203	KDD
		Perth	205	OTC Australia
		Niles Canyon	206	IDB-A
IOR	03	Eik	301	Norwegian Telecom
		Aussaguel	303	France Telecom
		Perth	305	OTC Australia
		Yamaguchi	306	KDD

SAS

SAS (d) Network coordination stations (NCS) are located at designated ground earth stations to interface with the GESs for the purpose of allocating satellite channels.

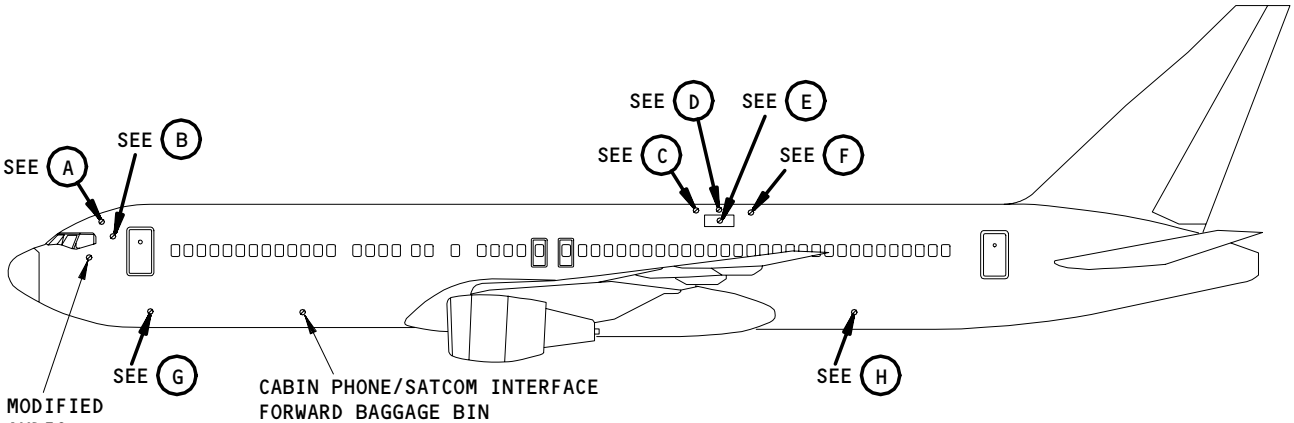
SAS B. The airplane earth stations (AES) transmit to and receive from the satellites at L-band frequencies (1530-1660.5 MHz). The ground earth stations (GES) transmit and receive from the satellites at C-band frequencies (4-6 GHz). The uplink frequency differs from the downlink frequency. The difference gives enough clearance to prevent interference between the uplink and the downlink. Each satellite can use one or more transponders to rebroadcast each signal it receives.

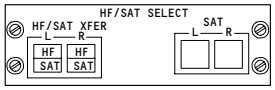
SAS C. The SATCOM system contains these components (Fig. 2):

SAS (1) One satellite data unit (SDU)

SAS (2) One radio frequency unit (RFU)
SAS (3) One high power amplifier (HPA)
SAS (4) One radio frequency combiner
SAS (5) Two beam steering units (BSU)
SAS (6) Two low noise amplifier/diplexers (LNA diplexer)
SAS (7) Two high-gain antennas (HGA)
SAS (8) One ICAO airplane address plug
SAS (9) One HF/SAT select panel
SAS (10) Two HF/SAT relays
SAS (11) One high power relay (HPR)
SAS (12) One attenuator

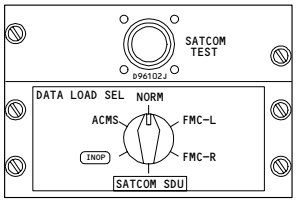
SAS





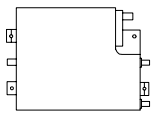
HF/SATCOM SELECT CONTROL PANEL
(PANEL P5)

A



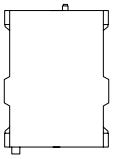
ADL/SAT CONTROL PANEL
SATCOM TEST PANEL
(PANEL P61)

B



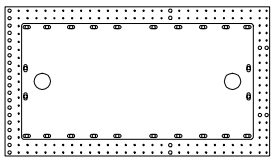
LOW NOISE AMP/DIPLEXER
(STA 1100, TWO INSTALLED)

C



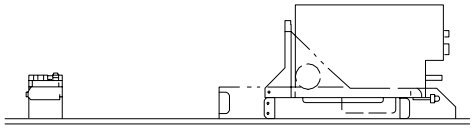
BEAM STEERING UNIT
(STA 1090, TWO INSTALLED)

D



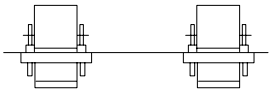
HIGH GAIN ANTENNA
(STA 1100, TWO INSTALLED)

E



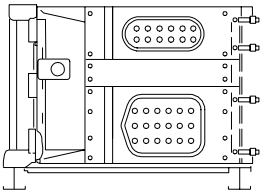
HIGH POWER AMPLIFIER
HIGH POWER RELAY/COMBINER
(SHELF E10, STA 1069)

F



HF/SAT RELAYS
(SHELF E2-6)

G



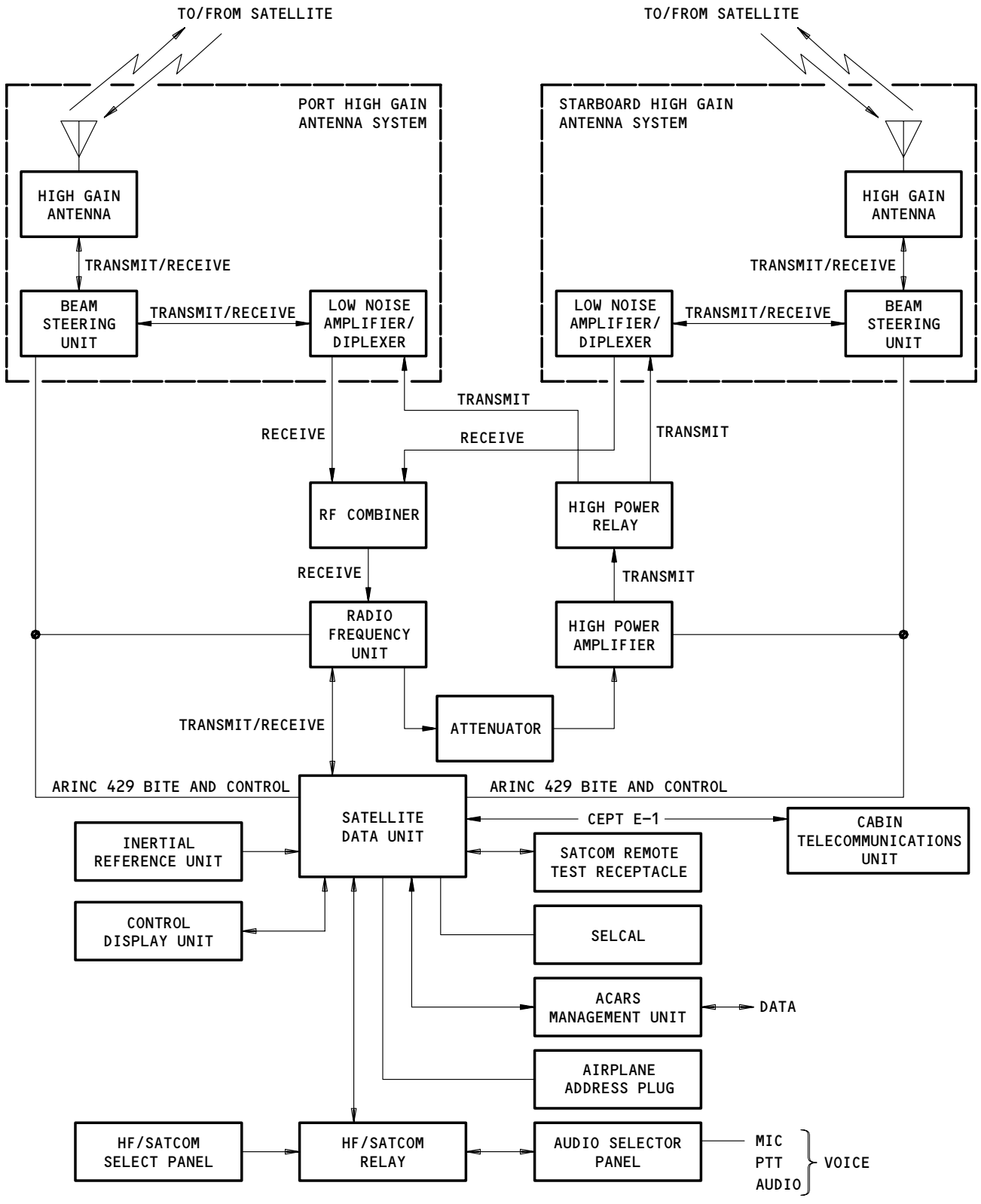
LRU, SATELLITE DATA UNIT
LRU, RADIO FREQUENCY UNIT
AIRPLANE ADDRESS PLUG
(SHELF E9, STA 1210)

H

SATCOM System - Component Location
Figure 2

SAS

SAS



SATCOM System Block Diagram
Figure 3

SAS 2. Component Details

SAS A. The satellite data unit (SDU)

SAS (1) The satellite data unit is installed on shelf 1 of the aft equipment center, E9 (E9-1). E9 is forward of the aft cargo door on the right side of the aft cargo compartment.

SAS (2) The SDU is the core element of the MCS SATCOM avionics and provides the operational interface between the AES, the GES, and the communication satellites in orbit.

SAS (3) The SDU contains three channels capable of providing simultaneous full duplex operation. These channels support voice and data communications from the cabin and cockpit.

SAS (4) The SDU houses the voice codecs and modems required for voice and data service. The format for voice/data codes follows the INMARST system definitions for voice and data transmission and reception. The SDU digitizes the voice or data signal and adds special codes to make the airplane-to-ground station connection possible. The voice codecs translate baseband analog voice signals to and from the 9600 bps digital coding standard. The modems, one for each communication channel, perform all the physical layer signal processing functions. Including multiplexing/demultiplexing, interleaving/deinterleaving, modulation/demodulation and Doppler effect correction.

SAS (5) The SDU provides the interface to these components:

SAS (a) The radio frequency unit

SAS (b) The high power amplifier

SAS (c) The beam steering units

SAS (d) The control display units

SAS (e) The inertial reference unit

SAS (f) Passenger phone system

SAS (g) Flight crew audio system

SAS (h) The ACARS management unit

SAS (6) The SDU is packaged as an ARINC 600 6 MCU.

SAS (7) The front panel assembly contains a 20 character alphanumeric display for displaying BITE information and software confirmation numbers. The display remains inactive when its temperature is less than -10°C (+14°F) or greater than +50°C (+122°F). The panel also contains two momentary action push-button switches on the front panel labeled TEST and CM/SCROLL. The TEST switch initiates BITE in the SDU. The CM/SCROLL switch enables the alphanumeric display to scroll through the BITE information and the software confirmation numbers. Two red light emitting diodes (LEDs) on the front panel are labeled SDU FAILURE and SYSTEM LRU. The LEDs indicate the BITE status of both the SDU and other LRUs in the system. The front panel also contains and ARINC 615 data loader connector.

SAS (8) The rear connector is a size No. 2 shell assembly (per ARINC 600) that engages a mating connector in the mounting rack when the SDU is installed in the rack. The top and middle inserts are type 02 arrangements and the bottom insert is a type 04 arrangement. Index pin code 04 is used on both the SDU and the airplane rack connector.

SAS (9) The SDU is partitioned into functional Shop Replaceable Units (SRUs) that are electrically interconnected via the motherboard. The major SRUs are:

SAS (a) Power supply unit

SAS (b) Radio frequency module

SAS (c) Channel filter circuit card assembly

SAS (d) Modem circuit card assembly (3)

SAS (e) Voice codec circuit card assembly (2)

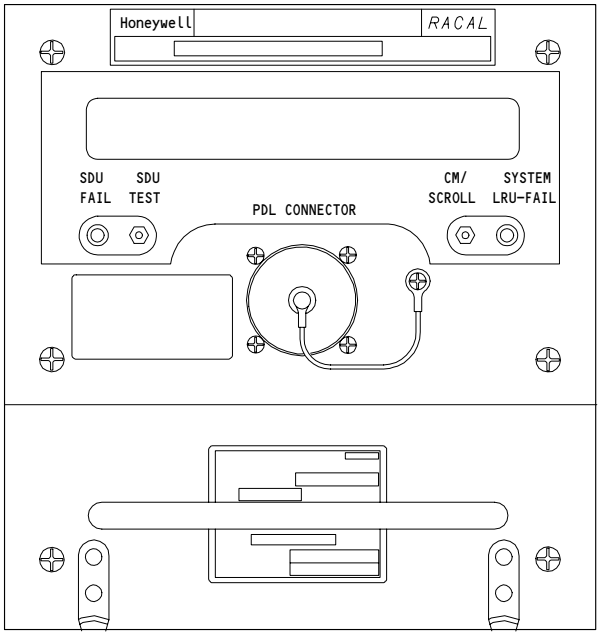
SAS (f) Main processor module

SAS (g) Input/Output module

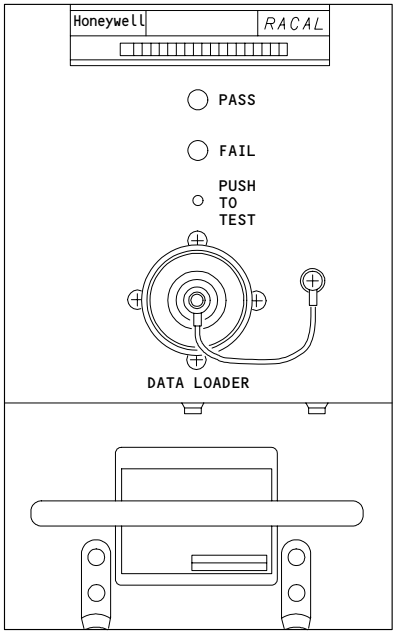
SAS (h) Reference oscillator module

SAS (10) The front panel assembly is removable to permit access to the SRUs, with exception of the power supply unit, radio frequency module, channel filter module, and reference oscillator module. The power supply unit and radio frequency module form the side panels of the SDU, which are removable to permit access to these modules. The channel filter module is installed on the radio frequency module. The reference oscillator is attached to four shock mounts located near the rear connector.

SAS



SATELLITE DATA UNIT



RADIO FREQUENCY UNIT

MCS SATCOM Equipment
Figure 4

SAS B. The radio frequency unit (RFU)
SAS (1) The radio frequency unit is installed on shelf 1 of the aft equipment center, E9 (E9-1). E9 is forward of the aft cargo door on the right side of the aft cargo compartment.
SAS (2) The RFU performs these functions:
SAS (a) Converts the broadband IF (141.74 to 175.74 MHz) received from the SDU to the transmit frequency (1626.5 to 1660.5 MHz) and sends that transmit frequency to the high power amplifier.
SAS (b) Accepts the amplified 1530.0 to 1559.0 MHz from the low noise amplifier/diplexer that is in operation.
SAS (c) Down-converts the 1530.0 to 1559.0 MHz signal to the very high frequency (VHF) IF (243.24 to 272.24 MHz) used by the SDU.
SAS (3) The RFU provides an additional three simultaneous full-duplex channels. The channels provided by the RFU are not (in contrast to the SDU) capable of supporting analog voice transactions. These channels accommodate digitized voice and data signals relayed to and from the cabin telecommunications unit (CTU). The RFU supports public correspondence calls only via the CTU. All air traffic control and airline operations calls are routed through the SDU first.
SAS (4) The RFU modulates the coded voice/data signals with the proper radio frequency for transmission to the satellite. The RFU adjusts the frequency in 1 Hertz increments to compensate for the Doppler shift caused by the speed of the airplane.
SAS (5) The RFU contains transcoders to support optional facsimile and personal computer data functions.
SAS (6) The RFU is packaged as an ARINC 600 4 MCU.
SAS (7) The front panel assembly contains a push-to-test (PTT) switch to initiate BITE and a red (FAIL) and green (PASS) LED to indicate BITE status. The front panel also contains an ARINC 615 data loader connector.
SAS (8) The RFU is partitioned into functional Shop Repairable Units (SRUs) that are electrically interconnected via the motherboard. The major SRUs are:
SAS (a) Power supply unit
SAS (b) Radio frequency module
SAS (c) Channel filter circuit card assembly
SAS (d) Transcoder circuit assembly (3)
SAS (e) Main processor module
SAS (f) Input/Output module
SAS (g) Reference recovery module

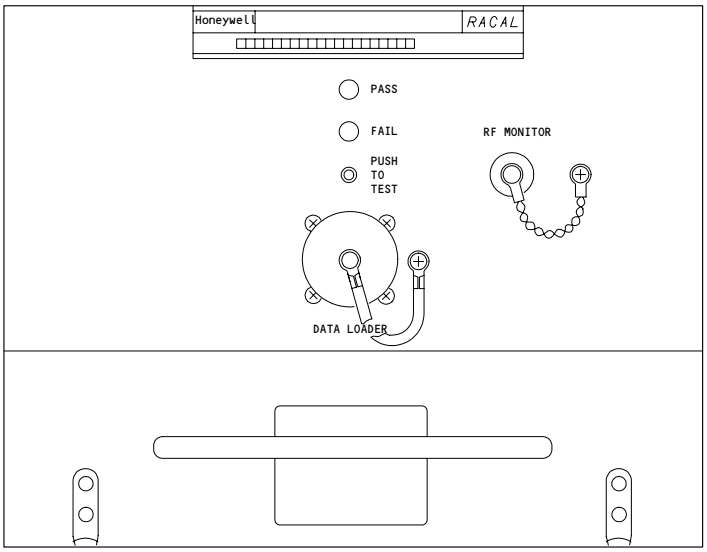
SAS (9) The front panel assembly is removable to permit access to the SRUs, with exception of the power supply unit, radio frequency module, channel filter module, and reference recovery module. The power supply unit and radio frequency module form the side panels of the RFU, which are removable to permit access to these modules. The channel filter and reference recovery modules are installed on the radio frequency module.

SAS C. The high power amplifier (HPA)

SAS (1) The high power amplifier is installed in the E10 equipment center. E10 is at Station 1070 above the center overhead stowage bins on the left side.

SAS (2) The HPA provides RF power amplification to the multiple L-band signals generated by the SDU/RFU to a power level required for transmission to the satellite. Since multiple signals are transmitted, the HPA is a linear device (i.e., operating class AB).

SAS



HIGH POWER AMPLIFIER

High Power Amplifier
Figure 5

SAS (3) The SDU controls the gain of the HPA to provide the desired output power or effective isotropic radiated power (EIRP) from the AES. The gain can be controlled over 25 dB range in 1 dB increments. The SDU also provides the HPA with power amplifier on/off commands. The HPA sends the SDU information on gain verification, standing wave ratio data, BITE information an temperature warnings. The HPA also measures output power and available power and reports it to the SDU, which uses the information to determine if additional calls can be accommodated.

SAS (4) The HPA is packaged as an ARINC 600 8 MCU.

SAS (5) The front panel assembly contains a push-to-test (PTT) switch to initiate BITE and a red (FAIL) and green (PASS) LED to indicate BITE status. The front panel also contains an ARINC 615 data loader connector and an RF monitor port.

SAS (6) The HPA is partitioned into functional SRUs that are electrically interconnected via the motherboard. A removable cover permits access to all SRUs. The major SRUs are:

SAS (a) Power supply unit

SAS (b) Splitter assembly

SAS (c) Driver assembly

SAS (d) Combiner assembly

SAS (e) Main processor module

SAS (f) Power amplifier assembly

SAS D. The high-gain antenna system (HGA)

SAS (1) The high-gain antenna subsystem consists of several items:

SAS (a) Two antenna arrays

SAS (b) Two beam steering units

SAS (c) Two low noise amplifier/diplexer units

SAS (d) One high power relay

SAS (2) The above items integrated with the remaining SATCOM equipment form the airplane earth station (AES). No BITE information is displayed by the antenna system. Instead all BITE information is sent to the SDU for display.

SAS (3) The SATCOM antennas are mounted outside on the port and starboard sides of the airplane at Station 1100. The remaining equipment is mounted on the inside. The antenna is a completely passive array of 20 circular polarized radiating elements. Each element is connected to the BSU via 20 RF coaxial cables that penetrate the airplane skin in two clusters of 10 cables each.

SAS (4) The beam steering units (BSU) are mounted directly behind the antennas. The BSU controls the actions of the high-gain antenna system based on inputs from the satellite data unit. The BSU contains 20 phase shifters that control the direction of the antenna beam. The transmit signal from the LNA/diplexer is divided into 20 signals by a 20-way power divider/combiner in the BSU and sent to the phase shifters. The BSU converts the azimuth and elevation of the airplane from the inertial reference units, provided by the SDU, into an array beam number. The BSU then looks up in a table the phase shifts for that beam number and steers the signal to the desired satellite. The same 20 phase shifters compensate for the difference in arrival times of the received signal from the desired satellite across the array elements. The signal is then sent throught the 20-way power divider/combiner, which combines the signal and sends it to the LNA/diplexer.

SAS (5) The low noise amplifier/diplexer has three RF ports that connect to the BSU (antenna port), HPA (transmit port) and RFU (receive port). The LNA/diplexer provides for signal routing and filtering functions.

SAS (a) Signals in the receive band are routed from the antenna port to the receive port. This receive path filters out the transmit band signals and other out-of-band signals to prevent the LNA/diplexer and other receive side components from being driven into nonlinear operation.

SAS (b) Transmit signals from the HPA are routed from the transmit port to the antenna port. This transmit path filters out the receive band signals so that noise and spurious signals from the HPA will not increase the noise floor of the receiver.

SAS (c) The LNA/diplexer establishes the noise floor of the communication system by boosting the signals and noise received from the antenna/BSU to a level much greater than the noise level of the subsequent components in the receive chain. It provides at least 55 dB gain and a noise figure of less than 0.8 dB. Since any transmission line losses between the antenna and the LNA decrease signal and increase the noise floor, the coax cable lengths between the antenna and LNA/diplexer should be kept to a minimum.

SAS (6) The high power relay is a single pole double throw (SPDT) RF switch whose position determines the active antenna. The switch connects the HPA output to the desired LNA/diplexer transmit port. The switch position is controlled by the port BSU, which makes decisions based on the position of the satellite. In addition, the RF switch contains a second set of SPDT contacts that reflect the position of the RF contacts. The switch position obtained from these contacts are routed to the BSUs, which monitor and report the health of the RF switch to the SDU.

SAS E. The radio frequency (RF) combiner
SAS (1) The RF combiner receives the medium level RF signals from the active low noise amplifier/diplexer and activates the corresponding impedance-matching network to distribute the RF signal from the LNA/diplexer to the RFU.
SAS F. The HF/SAT switch panel
SAS (1) The HF/SAT switch panel is installed on the pilots' overhead panel, P5
SAS (2) The HF/SAT switch panel connects the SATCOM audio circuits to the flight interphone system. The SATCOM system shares the connection to the flight interphone system with the HF communication system. Only the selected SATCOM voice communication or the HF communication system can operate at any specified time.
SAS G. The HF/SAT relays
SAS (1) The HF/SAT relays are installed on shelf 6 on the main equipment center rack, E2 (E2-6)
SAS (2) The HF/SAT relays connect the audio circuits to the flight interphone system for the SATCOM system or the HF communication system. The relay positions are controlled by the HF/SAT switch panel.
SAS H. The airplane address plug
SAS (1) The code used for the automatic identification of each airplane is installed in the plug on shelf 1 of the aft equipment center, E9-1.

SAS 3. Functional Description

SAS A. The functional description tells how the airplane earth station (AES) and the ground earth station (GES) exchange the messages and the data between each other. The ground earth stations are linked together to exchange information within the system, and to provide the information to the end user. The satellite is transparent to the users. The satellite basically provides a means to convert the L-band frequencies of the AES to the C-band frequencies of the GES, and vice versa.
SAS B. The ground earth stations provide system synchronization and coordination through ground to airplane transmissions. These ground to airplane transmissions are referred to as outbound messages. The return messages, from the airplane, are referred to as inbound messages.
SAS C. When first powered up, the airplane earth station (AES) scans a stored set of frequencies in the range of 1530-1559 MHz. This is the L-band frequency range where the satellite transmission will be received. The AES locates the satellite transmission and locks on to it. The AES then logs on to the ground earth station network. The log-on information is shared throughout the network, so that any of the ground earth stations can locate the AES. Once logged on to the system, communications between the AES and any user can begin. An airplane can only be logged on to one GES at a time. However, the airplane does not have to obtain all its communications services from that GES. The airplane may separately establish links with other GESs if desired.

SAS D. The RF signals used to communicate between the satellite and AES are defined as channels. The four SATCOM channels used are defined in Table 2, two special channel signals used for system management are also defined in Table 2.

Table 2

CHANNEL	CHANNEL DESCRIPTION
P-Channel	Packet mode time division multiplex (TDM) channel, used in outbound messages to carry signaling and user data.
R-Channel	Random access (slotted Aloha) channel, used in inbound messages to carry some signaling and user data. Signaling is generally confined to transaction initiation and request signals.
C-Channel	Circuit mode channel that is used for inbound messages and for outbound messages. C-Channels can be used for voice, for data, or for both. The use of C-Channels is controlled by assignment and release signaling at the beginning and end of each transaction. When a C-Channel is used for voice, it can also carry multiplex data for control and communication when necessary.
T-Channel	Reservation time division multiplex access (TDMA) channel is used for inbound messages. T-Channels are used for data or voice. The receiving GES reserves time slots for transmission requested by the AES, according to message length. The sending AES transmits the messages in the reserved time slots. The time allocation is variable and is defined by GES from transaction to transaction.
Psmc-Channel	P-Channel continuously transmitted by the GES containing timing and system management information.
Rsmc-Channel	R-Channel used by the AES to log-on to the GES network or to send short messages.

SAS E. The P-channel (Fig. 6, Fig. 7)

SAS (1) The GES uses the P-channel to transmit the ground-to-air messages in one of two modes: Mode 1 and Mode 2.

SAS (2) In Mode 1, each P-channel frame contains the set number of approved signal units (SU). Each SU contains 96 bits.

SAS (3) In Mode 2, frame transmits one combination of the SU (96 bits) and
SAS the extended SU (XSU. The XSU has 3 SUs [288 bits]).
SAS (4) The low bit rates [0.6-, 1.2-, 2.4-kilobaud (kB)] use the
SAS aeronautical binary phase-shift keying (ABPSK).
SAS (5) The high bit rates (4.8-, 0-, 8.4-, 10.5-, 21.0-, 32.0-, 64.0-, and
SAS 320-kB) use the aeronautical quadrature phase-shift keying (AQPSK).

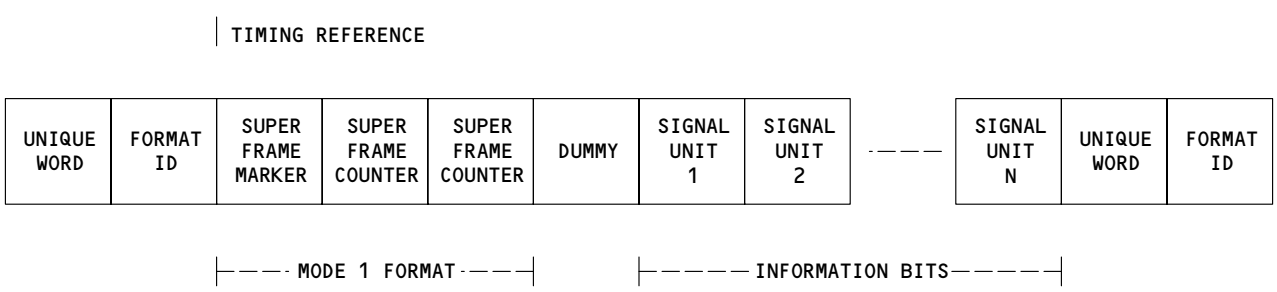
SAS
SAS Table 3
SAS

CHANNEL	CHANNEL DATA RATE (KILOBAUD)	CHANNEL SPACING (KILOHERTZ)	DIRECTION	REMARKS
T	320.0	320.0	OUT	
T	64.0	65.0	IN	
T	32.0	25.0	OUT	
C	8.4	7.5	IN	
C	21.0	17.5	E/B	E/B=EITHER/BOTH
P,R,T,C	10.5	7.5	E/B	
C	6.0	5.0	E/B	
P,R,T	4.8	5.0	E/B	
P,R,T	2.4	5.0	E/B	
P	1.2	5.0	E/B	
R,T	1.2	2.5	E/B	
P	0.6	5.0	E/B	
R,T	0.6	2.5	E/B	

SAS

SAS (6) P-channel signal units
SAS (a) Each data message for the Mode 1 P-channel and also for the
SAS T-channel and for the subband C-channels is formatted into one
SAS of the standard SU described before.

SAS



P-Channel Format (600,1200,2400 Bits/second)
Figure 6

F71645

SAS (b) The 96 bits are grouped into 12, 8-bit octets per SU. The bits
SAS of each octet are numbered 01 to 08 from right to left. An
SAS octet is numbered 01 to 12 from the header to the trailer.
SAS (c) Inside the SU, the octets are transmitted in ascending
SAS numerical order. Inside the octet, bit 1 is the first bit to
SAS be transmitted.
SAS (7) The P-channel
SAS (a) Each GES transmits a continuous signal on the Psmc-channel
SAS (P-channel for system management and communication). That
SAS message contains the system timing and the system management
SAS information.
SAS (b) Paired with each Psmc-channel is the set of Rsmc-channels
SAS (R-channel for system management and communications) that is
SAS used by the AES to log on to or to reply to the GES.

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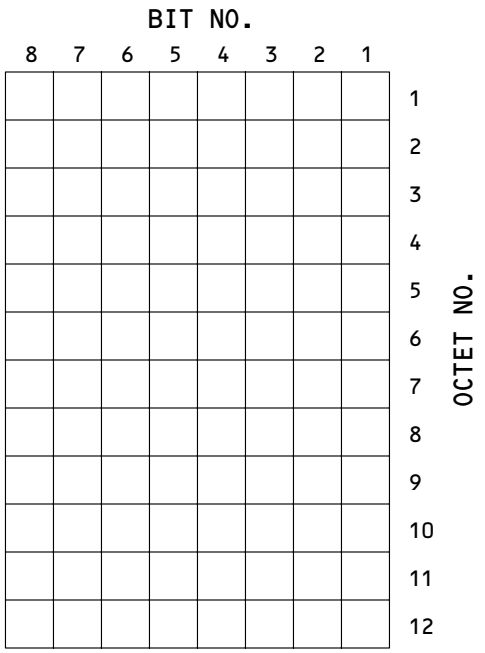


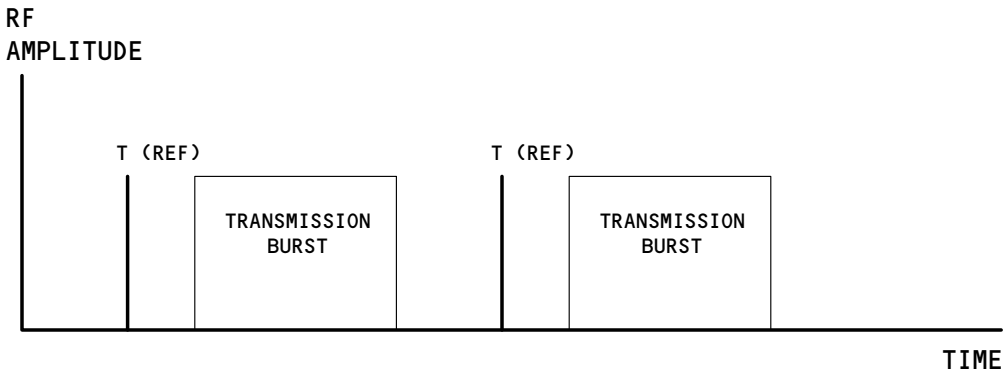
STANDARD SIGNAL UNIT

Signal Unit Format
Figure 7

F71656

SAS (c) The format field of the P-channel consists of the unique word, the format identifier, the superframe boundary, the dummy field, and the information field.
SAS 1) The unique word consists of two identical 44-bit sequences (0100 1000 1111 0110 1110 0010 1101 1100 0010 0100 0111). This defined bit sequence provides the timing mark pattern for the identified channel. The timing mark provides the AES with the timing reference that it needs to transmit the replay on the Rsmc-channel.
SAS 2) The format identifier (4 bits) defines mode 1 and mode 2 (0001 = mode 1, 0010 = mode 2).
SAS 3) The superframe boundary contains 12 bits that identify the start of a new superframe.
SAS a) In mode 1, the 12 bits identify the start of each new superframe and the frame number
SAS b) In mode 2, the 12 bits identify the start of each new superframe, the frame number, and the packing code.
SAS 4) The dummy field for mode 1 is 178 bits for the data rate of 10.5 kB, 16 bits for the data rate of 4.8 kB, and 0 bits for each other data rate.
SAS 5) The dummy field for mode 2 is 170 bits for the data rate of 10.5 kB, 8 bits for the data rate of 4.8 kB, and 0 bits for each other data rate.
SAS 6) The interleaver blocks of the information field have a column depth of 64 transmission bits and the row length is six columns for 0.6 Kb/s bit rate. Thus each interleaver block for the P-channel format (0.6 Kb/s bit rate) contains 384 bits. The row length (number of columns) is variable from 3 to 98 bits.
SAS (8) The automatic frequency compensation
SAS (a) The SDU uses the data that are transmitted on the Psmc-channel to get the log-on information and to set the frequency of the reply channel. The frequency of the reply channel is changed to make allowance for the Doppler shift that occurs between the AES and the satellite during the RF transmissions.

SAS (b) The AES adds automatic frequency compensation (AFC) to the outbound RF signals and to the inbound RF signals. That AFC reduces any frequency error added by the Doppler effect on the transmitted signal.
SAS (c) The SDU keeps an airplane system table. The airplane system table has the frequencies of the Psmc-channels for each satellite region. The SDU measures the difference between the assigned Psmc frequency from the table and the received signal frequency. The SDU then uses that difference to change the transmitted frequency to reduce the effects of the Doppler shift.
SAS (d) With the AFC, the Doppler effect does not change the performance of the receivers in the satellite.
SAS F. The R-channel
SAS (1) The AES logs on to the SATCOM system with a reply on the Rsmc-channel.
SAS (2) The R-channel is the random access channel used for short messages (up to three bursts). The R-channel uses the slotted transmission pattern (Fig. 8).
SAS (3) The air-to-ground message is formatted into one initial signal unit (burst) and not more than two subsequent signal units (SSU). This slotted pattern reduces interference during the transmissions by adjacent airplanes.



Slotted Transmission Pattern
Figure 8

SAS (4) The R-channel transmissions are used during certain time slots that
SAS are synchronized to the timing reference signal. Timing reference
SAS signals are provided by a unique word transmitted on the
SAS Psmc-channel.
SAS (5) The R-channel used by one specific SATCOM system may be designated
SAS by the GES. When the GES designates one system, the AES will replay
SAS to the GES on the Rd-channel (designated) instead of the
SAS Rsmc-channel. Up to four Rd-channels may be associated with each
SAS Pd-channel.
SAS (6) To transmit longer messages, the AES first tramsmits a T-channel
SAS reservation message on the R-channel.
SAS G. The T-channel
SAS (1) The T-channel is used for air-to-ground messages that are longer
SAS than 264 bits; therefore, too long to be transmitted on the
SAS R-channel.
SAS (2) The GES controls the use of the T-channel. Before an AES transmits
SAS a message on the T-channel, it transmits a T-channel reservation
SAS request over the R-channel previously described.
SAS (3) Each T-channel reservation request must include the length of the
SAS message.
SAS (4) After the reservation request arrives, the GES assigns enough
SAS channel slots and time slots to accommodate the message length that
SAS was requested.
SAS (5) When the start time of the assignment is within the 8-second
SAS superframe time window, the GES sends the reservation to the AES
SAS over the P-channel.
SAS (6) When the start time of the assignment is outside the 8-second
SAS superframe time window, the GES sends a reservation-forthcoming
SAS signal, and then it sends the reservation signal.
SAS (7) When a reservation is lost, the AES times out and starts another
SAS reservation request to the AES through the P-channel.
SAS (8) After the reservation signal unit is received, the AES transmits the
SAS initial signal unit (ISU) and each subsequent signal unit (SSU) that
SAS may be necessary.
SAS (9) After the message is received, the GES transmits the acknowledgment
SAS signal. If the message is received with an error, the GES tells the
SAS AES to retransmit each damaged signal unit and to transmit a new
SAS reservation assignment to send the signal units.

SAS (10) When the AES does not receive the acknowledge signal and the request for retransmission signal, it transmits a request for the acknowledgment on the R-channel.
SAS (11) When the GES does not transmit the acknowledgment to the AES, the AES repeats the reservation request and starts the process again.
SAS (12) The T-channel can be used by the GES through a poll request, in addition to the long messages initiated by the AES.
SAS H. The C-channel
SAS (1) The C-channel is used for outbound (ground-to-air) or inbound (air-to-ground) messages (voice, data, or voice and data).
SAS (2) Usage of the C-channel is controlled by assignment, and the C-channel frame format depends upon the format identifier of the P-channel that assigned the C-channel.
SAS I. The Log-on procedure
SAS (1) The log-on/log-off of an AES to/from the satellite communications system enables the GES to manage the number of AESs that can receive a P-channel (Pd) and transmit on each R-channel (Rd). The log-on data provides the SDU with the capability to provide the automatic log-on procedure and the automatic hand-over procedure.
SAS (2) When an AES is powered up, it enters a GES selection mode of operation, if the log-on policy is set to automatic. This permits the AES to select the most preferred satellite/GES. In manual log-on mode, the AES waits for the GES to be selected by the operator on the CDU.
SAS (3) After a GES is selected, the AES acquires one of the satellites identifying Pscm-channels until one of the system table's broadcast signal units is received. The AES determines whether the revision number of the system table stored in the SDUs nonvolatile memory is valid. If the revision is out of date, the AES initiates the table update procedure, the SDU gets an up-to-date one from the GES in the region the airplane is in.
SAS (4) The airplane system table contains:
SAS (a) The satellite identification
SAS (b) The number of the system table revision
SAS (c) The frequency of the two Psmc-channels to use for:
SAS 1) The satellite identification

SAS 2) The spot-beam identification
SAS 3) Each scanning frequency
SAS (d) The GES identification
SAS (e) The frequency for each Psmc-channel and each Rscm-channel
SAS (f) The spot-beam support table of the GES
SAS (g) The location of the satellite
SAS (5) The log-on sequence follows:
SAS (a) The AES sends a log-on request signal unit on the Rscm-channel corresponding to the Pscm-channel first selected by the AES. The log-on request signal unit provides the GES with the ICAO airplane address, the identification of the spot beam in which the AES is located, the number of C-channels the AES is equipped with, the bite rate/coding algorithm in use on the voice channels, and the data bit rate for the R-, T-, and P-channels.
SAS (b) The GES sends the log-on confirm signal to each GES/Network Control Station in the system.
SAS (c) The GES sends the log-on interrogation signal to the AES on a Pd-channel.
SAS (d) The AES sends the acknowledge signal to the GES on a Rd-channel to complete the SATCOM system log-on sequence.
SAS J. Log Off
SAS (1) The operation of the AES begins when the SATCOM system receives the outbound signal from a GES and logs on that GES to make a link to exchange information.
SAS (2) The operation ends when the AES logs off the SATCOM system. This occurs when the message exchange is completed or when the channel degradation results in more than 10-bit errors being detected for any 100,000 channel bit sample window. Should the bit error rate increase to this value, the AES system completes any message in process, and then logs off using the assigned R-channel. To send any further messages, the SDU will search for another Psmc-channel and log-on to another GES.
SAS K. The hand-over procedures
SAS (1) Hand-over procedures are needed. As an AES travels between air terminals, it leaves the space controlled by another GES.

SAS (2) Hand-over procedures are necessary after the loss of the signal or when the data are required by another AES that is logged on to a different GES.
SAS (3) Each hand-over is handled as the renewal of the log-on.
SAS L. Owner Requirement Table
SAS (1) The owner/operator requirements table (ORT) provides a means to customize the functionality of the SATCOM system.
SAS (a) The ORT format permits new generations of system software to be compatible with previous versions of the ORT.
SAS (b) The ORT is capable of being downloaded or uploaded to and from the airborne data loader (ADL) or portable data loader (PDL).
SAS (c) When the ORT is uploaded, the values of items that depend on the systems physical configuration are checked against the system configuration program pins. If any item is not compatible with the pin setting, the appropriate default value is substituted into the table and a failure is flagged.
SAS (d) The following table lists the characteristics of the ORT that can be changed. SAS engineering controls the values that are set in the ORT.

SAS Table 4

CHARACTERISTIC	DESCRIPTION
GES preference value/name string	The preference value is an integer in the range 1 to 9, where 9 corresponds to maximum value. Each satellite and GES listed in the system table has an associated name field, with five characters assigned to the satellite and 14 characters to the GESs. Names can consist of upper case letters, decimal digits, hyphens and spaces.
Log-on policy option	When the AES is powered up, it either initiates the automatic log-on procedure for the GES, or transfers to the user commanded mode to await a pilot stimulus to initiate log-on.

Table 4

CHARACTERISTIC	DESCRIPTION
Maintenance pages option	Determines whether the SCDU maintenance pages are accessible in the air or only on the ground.
Stored telephone numbers	Each number consists of up to 18 characters (including the optional trailing network ID separated by a slash). Each number has an associated priority value, protection, and a name field consisting of up to four user defined categories, with no more than 25 telephone numbers contained in each category. The ORT stores category names that do exceed 10 characters.
Dedicated codecs	The Codecs in the SATCOM avionics section of the AES can be dedicated to the cabin (analog or digital phones) or cockpit (headset). This dedication can be automatic, in which case availability and call priority determine codec allocation to calls. A codec is only capable of being dedicated to a wired interface (i.e., one that is indicated to be physically present).
Reserved resources	The resources required to transmit or receive a cockpit call can be reserved for that purpose (i.e., the AES can reserve one codec, one modem, and sufficient output from the high-power amplifier to support an extra C-channel transmission). These resources can be reserved for either of the two cockpit audio channels. This option overrides any specific codec dedication.
Ground-to-air public Correspondence calls option	Permits or disallows acceptance of ground-to-air public correspondence calls. If such calls are accepted and two or more AES voice user interfaces (i.e., digital phones, analog phones, or the cockpit headsets) are fitted to receive the calls, then this option specifies the destination for the incoming priority 4 calls.

SAS

Table 4	
CHARACTERISTIC	DESCRIPTION
Camp-on duration option	The camp-on duration (time period to wait for a channel to become available for use) contains an option to be either indefinite or a specified duration, with the specified time-out period in the range of 1 to 15 minutes. Camp-on time-out actions: - preempt (if a candidate call exists), cancel if no candidate exists - cancel
Maintained phone numbers for analog phone channels	Up to 10 stored phone numbers (9 numbers, plus last number redial) are maintained for each of the two analog phone channels. Each telephone number consists of up to 18 digits, with all such telephone numbers being priority 4, which cannot be changed. These two sets of stored phone numbers can be separate and distinct or identical depending on the common memory storage option. Common memory storage controls whether the stored phone numbers are separate or common (i.e., a phone number stored on one channel is accessible by the dial stored phone number command on the other channel.
Noise insertion option	Permits or disallows noise insertion in circuit-mode calls.
Automatic preemption for ground-to-air calls	Uses two setting to specify whether the incoming call has automatic preemption status for priority 2 or 3 calls. Priority 1 calls unconditionally preempt other calls of lower priority as necessary; no user option is provided.

Table 4

CHARACTERISTIC	DESCRIPTION
Route ground-initiated cockpit voice calls	Permits ground-initiated cockpit voice calls to be routed to a particular channel when two channels are available. This option does not affect which channel should be preempted if both channels are not available.
HGA Tx gains threshold	This threshold is used to stimulate automatic handover and transmit inhibit. The SDU inhibits all transmissions if the reported HGA Tx gain falls below this threshold. If the condition persists for 10 seconds and the AES is logged on in the automatic mode, then an automatic handover is initiated.
System management commands option	Permits system management commands via the analog phone channels.
Outgoing call barring level options	The outgoing call barring level option for the analog phone channel has three levels: Level 1 - Permits all outgoing calls along with the memory storage command. Level 2 - Permits only stored phone numbers, directly dialed short-code phone numbers, and long dialed phone numbers from the analog PBX with credit card data to initiate outgoing calls; the memory storage command is disallowed. Level 3 - All outgoing calls are disallowed. A four digit call barring security code must be entered via the analog phone channel before any call barring commands can be accepted. The outgoing call barring level option for the cockpit headsets has two states: State 1 - Permits all outgoing calls. State 2 - Permits only cockpit stored telephone numbers, manually dialed short-code telephone numbers, and manually dialed telephone numbers with a network ID other than 1. Also, the cockpit stored telephone are treated as being protected (i.e., they cannot be updated from the SCDU).

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Table 4	
CHARACTERISTIC	DESCRIPTION
RFU presence option	Specifies whether the current configuration includes an RFU.
Maximum HPA backoff values	The maximum HPA back-off values (linear and class C amplifiers) indicate the maximum back-off value that the high-power amplifier (HPA) implements. These values are automatically updated by non-zero values received in the HPA back-off range fields of valid HPA status words.
Minimum reported actual power output values	The minimum reported actual power output values (linear and class C amplifiers) indicate the minimum value of actual power output reported by the HPA via its status word. These values are complemented by the HPA output (in the actual power out fields in valid HPA status words) of the unique code 00100 to indicate when actual output power is below the measurable range of the HPA. If the HPA is capable of reporting the unique code, then these values are set to a value beyond the reporting range of the HPA.
Global beam default	The default global beam's initial C-channel EIRP is used to assess the power available for a C-channel call in the absence of any existing C-channels.
SCDU telephone preselect option	Initiates an immediate call when a telephone number is retrieved from a directory. This option precludes the necessity of displaying a telephone number on the SCDU screen and then dialing the number by selecting MAKE CALL from the menu.
ACP call initiation option	Permits a headset call to be initiated by an audio control panel (ACP). A call can be initiated using the phone number displayed on the SCDU main menu page (selected page) by pressing the cockpit voice microphone on switch when a headset channel is available. This option is available only if the latched ACP hookswitch signaling method is strapped and the SCDU telephone preselect option is selected.
Headset transit call option	Enables or disables transit calls from the headset.

SAS

SAS (2) The ORT default values
SAS (a) ORT default values are assigned when the ORT database is altered (i.e., when a software upgrade is loaded from an ARINC 615 data loader).
SAS (b) By default there are no telephone numbers stored for the analog or digital phone channels.
SAS (c) The ORT defaults are listed in Table 5 below:

Table 5

DEFAULT	DESCRIPTION
Log-on policy	Log-on policy goes to a standby state and wait for a pilot command.
Name string	The name string for a satellite or GES is all dashes.
GES preference	The preference value is a 1.
ORT maintenance page	The ORT maintenance pages become accessible on the ground only.
Codec dedication	The codec dedication becomes automatic for both codecs.
Perpetual resource reservation	The resources required to support one cockpit headset telephone call are not reserved.
Circuit mode data	The option is set to disallow circuit mode data on ground-to-air calls.
Public correspondence calls	The option is set to reject ground initiated public correspondence calls.
Camp-on time-out	The default value for the camp-on time-out period is indefinite. The camp-on time-out action is to cancel.

SAS 4. Operation

SAS A. System Management and Setup

SAS (1) The SATCOM system uses the Master Control Display Unit (MCDU) for information management and setup of the system. Access to the SATCOM system is from the main menu on the MCDU, via the MENU key. From the MCDU main menu, press the line select (LSK) 3L <SAT to display the SATCOM MAIN MENU.

SAS (2) Many of the SATCOM menu pages are unique compared to the FMS menu format. The Line Select Key (LSK) title lines are dynamic (frequently change while on the same page) and close attention is required to both the title line and the data line to monitor operation of the system. Additionally, unlike other FMS operations both the active and inactive components may be shown on the same page, identified by an enabling asterisk (*) next to the LSK.

SAS (3) The scratchpad is used for data entry and displaying system generated messages. If after a data entry is attempted and the system determines that the entry does not conform to format or acceptable requirements, the system issues a scratchpad message prompting the user for the correct data. The messages in Table 6 may be issued:

SAS

Table 6

MESSAGE TEXT	MEANING
NOT ALLOWED	This message is issued whenever (i) a LSK key is pressed adjacent to a blank field; (ii) an attempt is made to revert an unprotected priority field back to a non-existent default value; or (iii) an attempt is made to initiate a Data Loader action when no asterisk is displayed adjacent to the action prompt.
CHECK NETWORK ID	This message is issued whenever a phone number entry meets the format criteria prior to the optional network ID but it contains an invalid network ID. If an optional network ID is appended to a phone number entry, it must be preceded by a single slash "/", followed by one or two numeric characters.

SAS

Table 6

MESSAGE TEXT	MEANING
NUMBER REQUIRED	This message is issued when an entry requires a number. Examples include (i) a transit GES ID, a SATCOM channel, or a priority entry is not all numeric; (ii) a manual dial call is attempted when no phone number has been entered; or (iii) a phone number entry does not contain at least one numeric digit.
TOO MANY DIGITS	This message is issued whenever an entry is all numeric (as required) but more than the number of allowed digits are present. Examples include (i) a transit GES ID entry contains all octal digits but more than three are present; (ii) a phone number entry meets all other criteria except that it contains more than 18 digits; or (iii) a flight ID entry contains more than 8 characters.
*PROMPT REQUIRED	This message is issued whenever a call initiation or preselection is attempted and no asterisk is displayed adjacent to the left LS key.
OUT OF RANGE	This message is issued whenever an entry is out of range. Examples include (i) a transit GES ID entry is outside the range of 000-376; (ii) a SATCOM channel entry is not 1 or 2; or (iii) a priority entry is not 1-4.
PROTECTED NUMBER	This message is issued whenever an attempt is made to modify or delete a protected number.
NAME TOO LONG	This message is issued whenever a mnemonic entry is more than 14 characters.
ALPHA REQUIRED	This message is issued whenever a mnemonic entry does not contain at least one alpha character and the entry cannot be interpreted as a phone number by the SDU.
CHECK NEW NUMBER	This message is issued whenever a sort of a category phone list is attempted that contains a partial phone number entry. The user must either finish the new number entry or delete it before a sort can be performed.

SAS

Table 6

MESSAGE TEXT	MEANING
SHORT CODE REQUIRED	This message is issued whenever ORT item xxxv (HEADSET Outgoing Call Barring Level) is set to Level 1 and a manual dial phone numbe entry with a 01 network ID (either by default or manually entered) is not between 2 and 6 digits with the first two digits not "00".

(4) From the SATCOM MAIN MENU page several other status and configuration pages can be accessed. The MCDU page tree follows (Fig. 9):

(a) SATCOM MAIN MENU (Fig. 10)

1) LSK [2L] (label line) - SAT 1 is followed by the SATCOM channel 1 status described below. If there is only one channel in the cockpit, then SAT is displayed instead of SAT 1. The SATCOM channel 1 status depends on the status of the channel as follows:

a) AVAILABLE - The system is ready to support a call on this channel.

b) NOT AVAILABLE - Either the airplane is out of the satellite coverage area or equipment failures exist that prevent the channel from being used for a cockpit call.

c) NO RESOURCES - This is displayed when another call is using the resources (i.e., equipment or HPA power) preventing this channel from being able to place a call without camping on or pre-empting.

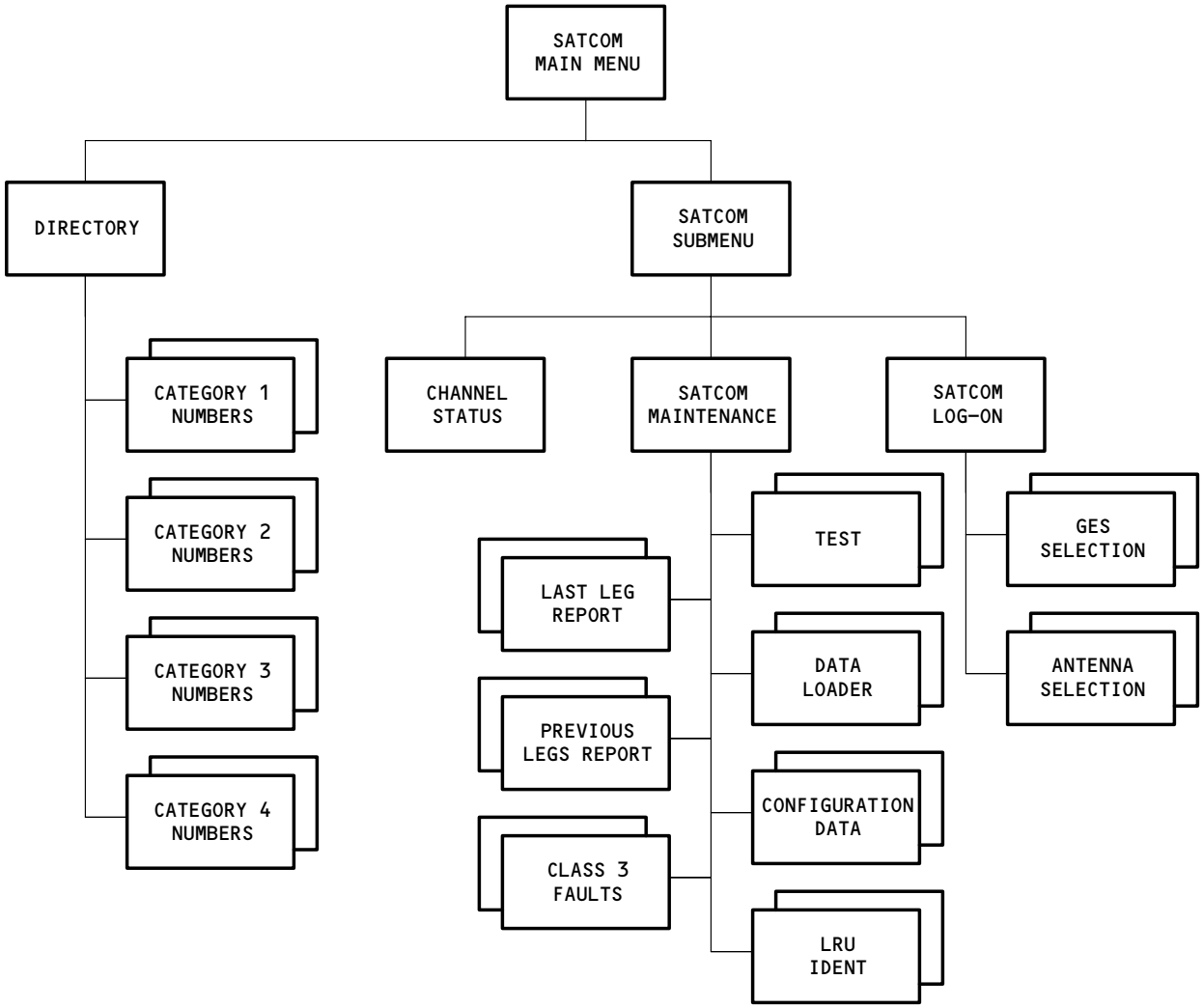
d) DIALING - Headset call is in progress. When connected, the status changes to CONNECTED.

e) CONNECTED - The circuit is connected.

f) INCOMING CALL - A ground-to-air call is set-up, ringing, and waiting to be answered or rejected.

g) CAMPED ON - A headset call is waiting for AVAILABLE channel status by reserving resources as they become available. There can be only one CAMPED-ON call at any given time.

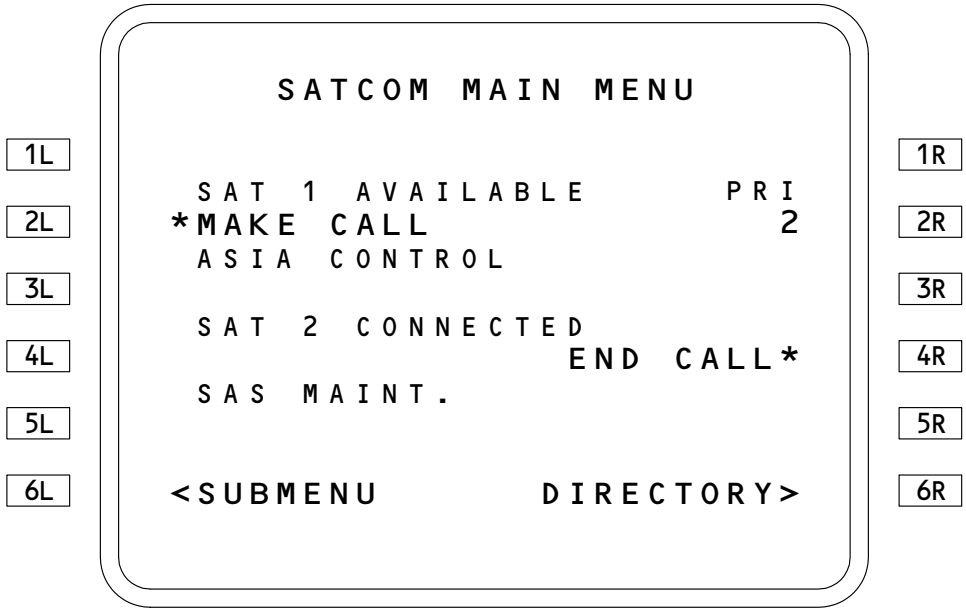
SAS



SATCOM Page Tree
Figure 9

F71666

SAS h) CALL FAIL - A call terminated abnormally (e.g., an air
SAS initiated call cannot be connected, can no longer be
SAS sustained, has been pre-empted by a higher priority
SAS ground-to-air call, or has experienced an equipment
SAS failure). The following CALL FAIL messages are
SAS displayed when appropriate:
SAS GRND FAILURE - GES equipment failure
SAS GRND CONGEST - No ground circuits available
SAS INVAL NUMBER - Invalid number dialed
SAS SERVICE N/A - Service not available



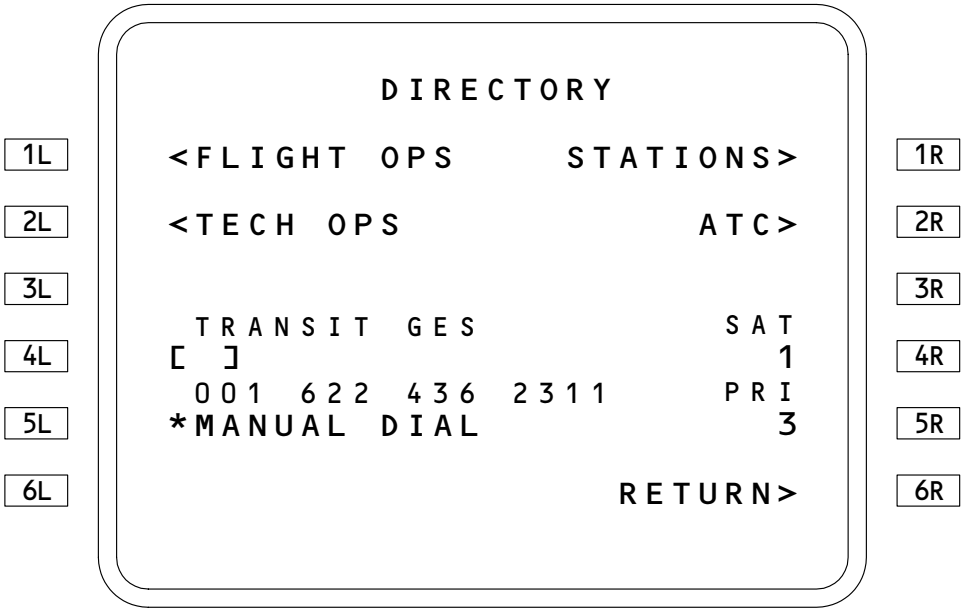
SATCOM Main Menu Page
Figure 10

F71707

SAS 2) LSK [2L] (data line) Prompts (*), and their resulting
SAS actions, are summarized as follows:
SAS a) *MAKE CALL - When displayed, this initiates a cockpit
SAS headset call when LSK 2L is pressed.
SAS b) *PREEMPT - This terminates calls in progress to make
SAS resources available for a pilot to make a call. If a
SAS call cannot be connected after all resources are
SAS exhausted, the channel status reverts to CALL FAIL.
SAS c) The availability and display of the following two
SAS prompts is dependent on the setting of the ORT.
SAS d) *ANSWER CALL - A ground-to-air call connection is
SAS established awaiting the pilot's ACP MIC connection and
SAS PTT greeting.
SAS e) *ACK CALL - The system acknowledges a connected
SAS air-to-ground call.
SAS 3) LSK [3L] (label line) ASIA CONTROL/MANUAL DIAL/GRND AIR
SAS CALL/PRIORITY N - This is data about the call on channel 1
SAS directly above. For air-to-ground calls, the mnemonic of
SAS the selected phone number is displayed unless it is a
SAS MANUAL DIAL number, in which case the manually dialed
SAS number is displayed. For ground-to-air calls, "GRND-AIR
SAS CALL is displayed when the channel status is CONNECTED.
SAS When the channel status is INCOMING CALL, this field
SAS displays "PRIORITY N" where N represents the priority level
SAS (1-4) of the incoming call.
SAS 4) LSK [4L] Data displayed in these fields is equivalent to
SAS LSK [5L] data displayed in LSK 2L and 3L except that
SAS it pertains to SATCOM channel 2.
SAS 5) LSK [6L] <SUBMENU - Provides access to the SATCOM SUBMENU
SAS page.
SAS 6) LSK [2R] (data line) Prompts (*), and their resulting
SAS actions, are summarized as follows:
SAS a) CANCEL CAMP* - Activating this prompt causes a headset
SAS call that is cued-up for subsequent call or camped-on
SAS in the cockpit, to be canceled, which unreserves the
SAS resources.

SAS b) The availability and display of the following two prompts is dependent on the setting of the ORT.
SAS c) END CALL* - Activating this prompt causes a HEADSET call to be terminated.
SAS d) REJECT* - Activating this prompt causes a ground-to-air call to be rejected, thus freeing up the channel and terminating an incoming call.
SAS
SAS WARNING: DO NOT USE PRIORITY 1/"PRI 1" FOR CALLS FOR EMERGENCY AIRCRAFT COMMUNICATIONS. THIS LEVEL ACTIVATES ALARMS IN GROUND EARTH STATIONS ALL AROUND THE WORLD.
SAS
SAS e) This field may also display the priority of the selected phone number for air-to-ground calls. The default priority values for protected numbers are displayed in small font while all manually entered priority values, including values for unprotected numbers and system assigned values, are displayed in large font. The priority level can be modified through the scratchpad by entering 1, 2, 3, or 4 and pressing LSK 2R.
SAS 7) LSK [4R] Data displayed in this field is equivalent to data displayed in LSK 2R except that it pertains to SATCOM channel 2.
SAS 8) LSK [6R] DIRECTORY> - Provides access to the DIRECTORY page.
SAS (b) DIRECTORY (Fig. 11) - This page provides access to one of four phone number lists and provides a means of manually dialing a phone number. Pilot entry of numbers may be inhibited in the ORT (CALL BARRING).
SAS 1) From the MCDU main menu, press:
SAS LSK 3L (<SAT) then,
SAS LSK 6R (DIRECTORY>)
SAS
SAS 2) LSK [1L] (data line) <FLIGHT OPS - This label is user definable in the ORT (cockpit telephone numbers). Pressing this line select key causes this display to go to "FLIGHT OPS" NUMBERS page.

SAS 3) LSK [2L] (data line) <TECH OPS - This label is user
SAS definable in the ORT (cockpit telephone numbers). Pressing
SAS this line select key causes this display to go to "TECH
SAS OPS" NUMBERS page.
SAS 4) LSK [4L] (label line) - TRANSIT GES
SAS (data line) - Brackets, [ ], in the data line
SAS prompting entry for three octal characters between
SAS 000 and 376. Entry of a valid transit GES ID
SAS results in the next call from the cockpit to be
SAS requested through this other GES, instead of the
SAS log-on GES after which, data entered into this
SAS field is cleared. If desired, an entry in this
SAS field can be cleared by pressing the clear or
SAS delete key with the scratchpad empty, and then
SAS LSK 4L. The display and availability of this
SAS field is dependent on the setting of ORT (HEADSET
SAS Transit Call).



Directory Page
Figure 11

SAS 5) LSK [5L] *MANUAL DIAL - When this prompt is pressed with a valid phone number entered in the scratchpad, the system either initiates a phone call or pre-selects the manual dial phone number depending on the setting of the ORT (System Telephone Number Preselect). This functionality may be inhibited in the ORT (CALL BARRING). An asterisk is only displayed when it is possible to initiate (or pre-select) a call. The page display automatically reverts to the SATCOM MAIN MENU Page. If the selected channel identified at LSK 4R is not available for the LSK 5R automatic pre-empt priority (in the NO RESOURCES state) and the other channel (if applicable) is not already camped-on (other calls cued), the call automatically uses the available resources unless the ORT specifies the CODEC CABIN DEDICATED. A manual pre-empt may be required.

a) Once a manual dial call has been either initiated or pre-selected, the last phone number entered is displayed in the label line. If the MANUAL DIAL prompt is pressed when a phone number is displayed in the label line, and the scratchpad is empty, the system initiates or pre-selects a manual phone call as previously described.

b) A valid number consists of all numeric characters with optional spaces (i.e., Country Code, Area Code, Local Number). Optionally, a network ID may be appended to the end of a phone number. The format for a network ID is a slash "/" followed by one or two numeric character(s). If no network ID is appended to a manually-entered phone number, then the system uses a default of 01 when making the call. The maximum entry allowed is 18 characters (including optional spaces and network ID).

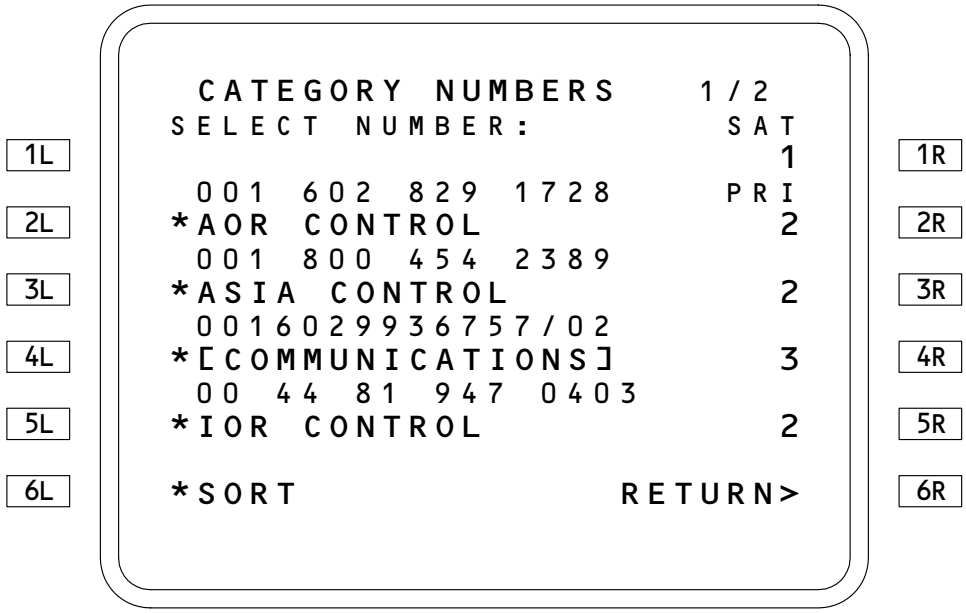
c) Manually-entered phone numbers are subject to ORT (HEADSET Outgoing Call Barring Level). ORT may be set where the only entries allowed are either manually entered phone numbers with a network ID other than 01, or manually entered short-code phone numbers (i.e., between 2 and 6 digits with the first two digits not "00").

SAS 6) LSK [1R] (data line) STATIONS> - This label is user definable in the ORT (cockpit telephone numbers). Pressing this line select key causes this display to go to "STATIONS" NUMBERS page.

SAS 7) LSK [2R] (data line) ATC> - This label is user definable in the ORT (cockpit telephone numbers). Pressing this line select key causes this display to go to "ATC" NUMBERS page.

SAS 8) LSK [4L] (label line) SAT
SAS (data line) 1/2 - Identifies the currently
SAS selected SATCOM channel as 1 or 2 depending on the
SAS current selection, with 1 the default. The SATCOM
SAS channel can be modified through the scratchpad by
SAS entering 1 or 2 and pressing LSK 4R. SATCOM
SAS channel selection in this field is also reflected
SAS on all CATEGORY NUMBERS pages at LSK 1R. SAT 1
SAS corresponds to the left channel and SAT 2
SAS corresponds to the right channel.
SAS
SAS WARNING: DO NOT USE PRIORITY 1/"PRI 1" FOR CALLS EXCEPT FOR
SAS EMERGENCY AIRCRAFT COMMUNICATIONS. THIS LEVEL
SAS ACTIVATES ALARMS IN GROUND EARTH STATIONS ALL AROUND
SAS THE WORLD.
SAS
SAS 9) LSK [5R] (label line) PRI
SAS (data line) N - This is the priority for the
SAS manual dial phone number as 1, 2, 3, or 4, with 1
SAS the highest priority, 4 the lowest. All priority
SAS values in this field are displayed in large font
SAS and modified by the scratchpad entry of 1, 2, 3,
SAS or 4 and pressing LSK 5R.
SAS
SAS NOTE: Priority 4 cockpit calls are enabled by pin
SAS option.
SAS
SAS 10) LSK [6R] RETURN> - Pressing this LSK returns you to the
SAS SATCOM MAIN MENU page.
SAS (c) CATEGORY NUMBERS (Fig. 12) - The "Category" numbers pages
SAS FLIGHT OPS/TECH OPS/STATIONS/ATC enable initiation of a phone
SAS call from a list similar to a phone book. These pages also
SAS allow modification of a phone number, priority, and SATCOM
SAS channel, and provide a means of adding and sorting phone
SAS numbers within the category.
SAS 1) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6R (DIRECTORY>), then
SAS LSK 1L, 2L, 1R, or 2R
SAS

SAS 2) LSK [1L] (label line) MAKE CALL/SELECT NUMBER - The display
SAS will show MAKE CALL: or SELECT NUMBER: depending on the
SAS ORT (System Telephone Number Preselect). This field is
SAS blank if there are no asterisks displayed beside the phone
SAS numbers on this same page indicating that initiating or
SAS selecting phone calls for the LSK 1R SAT channel is not
SAS possible.



Category Numbers Page
Figure 12

SAS 3) LSK [2L] (label line) PHONE NUMBER
SAS [3L] (data line) *MNEMONIC ID - The phone numbers for
SAS [4L] the category as contained in the ORT are
SAS [5L] displayed (cockpit telephone numbers). The
SAS The phone number is displayed in the label line
SAS while the mnemonic is displayed in the data
SAS line.
SAS a) A valid phone number consists of all numeric characters
SAS with optional spaces. Optionally, a network ID may be
SAS appended to the end of a phone number. The format for
SAS a network ID is a slash "/" followed by one or two
SAS numeric character(s). If no network ID is appended to
SAS a phone number, then the system uses a default of 01
SAS when making the call. The maximum entry allowed is 18
SAS characters (including optional spaces and network ID).
SAS A valid mnemonic consists of any character (i.e.,
SAS alphanumeric, spaces, dashes, etc.), but must contain
SAS at least one alpha character. The maximum entry
SAS allowed for a mnemonic is 14 characters.
SAS b) There are two types of numbers, protected and
SAS unprotected. Protected numbers, including the
SAS mnemonic, are not modifiable or deleteable.
SAS Unprotected numbers, including the mnemonic, are
SAS modifiable. Phone numbers that are unprotected are
SAS indicated by brackets surrounding the mnemonic. When
SAS unprotected phone numbers and mnemonics are modified,
SAS they are also modified in the ORT (cockpit telephone
SAS numbers). All numbers, independent of their protection
SAS status, are treated as protected (i.e., non-modifiable
SAS and non-deleteable) if ORT (HEADSET Outgoing Call
SAS Barring) is set to level 1.
SAS c) An unprotected phone number is modifiable by entering
SAS an all numeric character set, with optional spaces and
SAS network ID, in the scratchpad and pressing the left LSK
SAS associated with the desired number to be modified. The
SAS system interprets an entry of all numeric characters,
SAS with optional spaces and/or slash(es), as a phone
SAS number.

SAS d) An unprotected number is deleteable by pressing the clear or delete function keys when the scratchpad is empty and then pressing the left LSK next to the phone number desired to be deleted. When an unprotected number is deleted, the phone number, mnemonic, and priority associated with that number is also deleted. The unprotected number is also deleted from the ORT (cockpit telephone numbers).

SAS e) In the last position in the phone list on the last page of the "Category" of NUMBERS are displayed brackets prompting entry for a new phone number, including mnemonic and priority, to indicate that manual entry of a new number is permitted. Brackets are not displayed if the maximum number of allowed phone numbers for the category (i.e., 25) is reached or if the ORT (HEADSET Outgoing Call Barring) is set. The pilot may enter the number, mnemonic, or priority in any order. However, if the number is entered before the mnemonic the system automatically assigns mnemonics (using the category name followed by an index number) and assigns priority 3. The user may choose to overwrite these system assigned values; however, the user must at least enter a number or the phone number is only partially entered and therefore unusable. A manually entered number is treated as unprotected and therefore modifiable and/or deleteable through normal scratchpad usage.

SAS f) The asterisk displayed beside the adjacent LSK for each phone number indicates to the user that a call is initiated, or preselected, if the LSK is pressed. The scratchpad must be empty for the system to know that the user intends to initiate, or preselect, a call and is not attempting to modify either the mnemonic or the phone number. If a left LSK associated with a phone number is pressed, and the scratchpad is empty, the system either initiates a phone call or preselects the manual dial phone number depending on setting of the ORT item (System Telephone Number Preselect). An asterisk is only displayed when it is possible to initiate (or select) a call (note that the pilot may still review, modify, and sort the phone list). The page display then automatically reverts to the SATCOM MAIN MENU page. If the selected channel status was in the NO RESOURCES available and the other channel is not camped-on (cued with another outgoing call), the call automatically camps-on the resources.

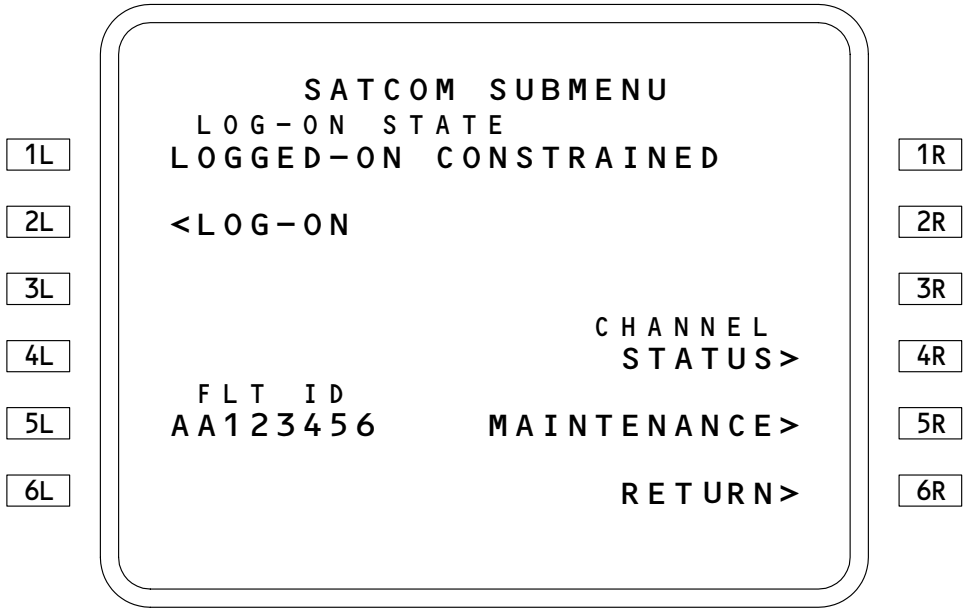
SAS 4) LSK [6L] (data line) *SORT - The phone numbers are sorted
SAS within the category in ASCII order by their mnemonic.
SAS 5) LSK [1R] (label line) SAT
SAS (data line) 1/2 - The currently selected SATCOM
SAS channels as 1 (default) or 2, if selected. The
SAS SATCOM channel can be modified through the
SAS scratchpad by entering a 1 or 2 and pressing
SAS LSK 1R. SATCOM channel selection in this field is
SAS also reflected on the DIRECTORY page, as well as
SAS all other CATEGORY NUMBERS pages.
SAS 6) LSK [3R] (label line) PRI
SAS [4R] (data line) 1/2/3/4 - The priority for each
SAS [5R] phone number, contained in the ORT (Cockpit
SAS [6R] Telephone Numbers), as 1, 2, 3, or 4, with 1
SAS the highest priority and 4 the lowest. Default
SAS priority values for protected numbers are
SAS displayed in small font, while all manually
SAS entered priority values, including values for
SAS unprotected numbers and system assigned values,
SAS are displayed in large font. Priority fields,
SAS including both protected and unprotected
SAS numbers, may be modified by entering 1, 2, 3, or
SAS 4 in the scratchpad and pressing the adjacent
SAS right LSK.
SAS a) Once modified, a protected number priority field
SAS reverts back to its original ORT value when the clear
SAS or delete function key is pressed with the scratchpad
SAS empty, and then the associated right LSK is pressed.
SAS Default priority values for unprotected numbers are not
SAS retained. Instead, once they are modified, the
SAS modified priority value is retained until changed
SAS again.

SAS NOTE: Priority 4 calls from the cockpit are
SAS enabled by pin programming.

SAS 7) LSK [6R] (data line) RETURN> - Pressing this LSK returns you to the DIRECTORY page.

SAS (d) SATCOM SUBMENU (Fig. 13) - The SATCOM submenu page provides a means to display the current log-on state, allow entry and display of the flight identifier and to provide access to the SATCOM LOG-ON, SATCOM CHANNEL STATUS, and SATCOM MAINTENANCE pages.

SAS 1) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU)
SAS
SAS 2) LSK [1L] (data line) - The log-on state is displayed as follows:
SAS a) LOGGED-OFF displayed when logged logged-off.
SAS b) LOGGED-OFF REJECTED displayed when a log-on reject has been received from the constrained log-on GES.
SAS c) LOGGING-ON displayed when in process of logging-on, including satellite acquisition and GES selection.
SAS d) LOGGED-ON AUTO displayed when logged-on as a result of automatic SDU selection of a GES.



SATCOM Submenu Page
Figure 13

SAS e) LOGGED-ON CONSTRAINED displayed when logged-on as a result of the user manually initiating log-on on the GES SELECTION page, constrained to a selected GES.

SAS 3) LSK [2L] (data line) <LOG-ON - Pressing this line select key causes the display to go to the SATCOM LOG-ON page.

SAS 4) LSK [5L] (data line) - The flight identifier that is sent to a GES in a log-on request is displayed here. Brackets, [ ], are displayed when no flight identifier entry has been made. Dashes, --, are displayed when the user has cleared the flight identifier field by pressing clear or delete function keys and pressing LSK 5L. Pressing clear or delete keys and LSK 5L again, while the dashes are displayed, causes this field to default to brackets. Each time the flight identifier is changed, log-on is renewed.

SAS 5) LSK [4R] (data line) CHANNEL> - Pressing this line select key causes the display to go to the SATCOM CHANNEL STATUS page.

SAS 6) LSK [5R] (data line) MAINTENANCE> - Pressing this line select key causes the display to go to the SATCOM MAINTENANCE page.

SAS 7) LSK [6R] (data line) RETURN> - Pressing this LSK returns you to the SATCOM MAIN MENU page.

SAS (e) SATCOM LOG-ON (Fig. 14) - The log-on page displays the current log-on state, logged-on GES/satellite, the antenna in use, and azimuth/elevation of the satellite in use. It provides a means for auto log-on and log-off and access to the GES SELECTION and ANTENNA SELECTION pages.

SAS 1) From the MCDU main menu, press:

SAS LSK 3L (<SAT), then

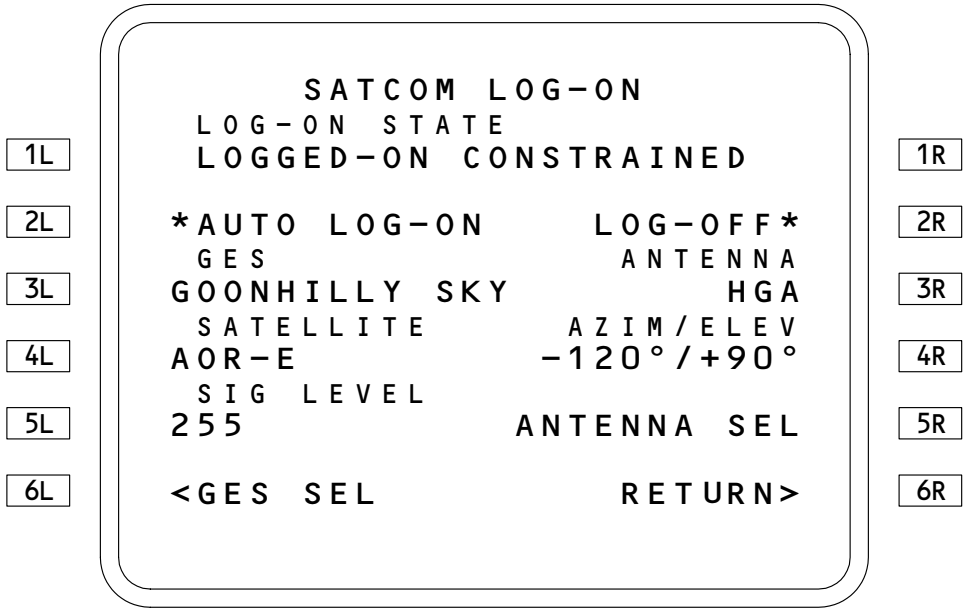
SAS LSK 6L (<SUBMENU), then

SAS LSK 2L (<LOG-ON)

SAS

SAS 2) LSK [1L] (data line) LOGGED-ON CONSTRAINED/LOGGED-OFF - SATCOM log-on state, which is identical to that displayed on the SATCOM SUBMENU page.

SAS 3) LSK [2L] (data line) *AUTO LOG-ON/LOG-OFF* - Pressing
SAS [2R] the line select key, 2L, adjacent to *AUTO
SAS LOG-ON causes an automatic log-on to be
SAS initiated and activated for future log-ons.
SAS Pressing LSK 2R when LOG-OFF* is displayed
SAS causes a log-off to be initiated, the system is
SAS disabled and the ORT is modified to reflect this
SAS condition. The pilots must return the system to
SAS AUTO LOG-ON (press LSK 2L, *AUTO LOG-ON) or the
SAS system remains disabled for subsequent power-up
SAS sequences. The normal condition at power-up
SAS should remain AUTO LOG-ON.
SAS 4) LSK [3L] (data line) - This prompt displays the
SAS logging-on/logged-on GES 14-character name as contained in
SAS the ORT (Satellite/GES Names). If the logging-on/logged-on
SAS GES has no name associated with it in the ORT, then the GES
SAS ID is displayed. If there is no logging-on/logged-on GES,
SAS then "NONE" is displayed.



SATCOM Log-On Page
Figure 14

SAS 5) LSK [4L] (data line) - This prompt displays the satellite five-character name associated with the logging-on/logged-on GES as contained in the ORT (Satellite/GES Names). If there is no logging-on/logged-on GES, then "NONE" is displayed. Additionally, the SDU appends "SPOT" to the display of the satellite name when the AES is currently logged-on via a spot beam.

SAS 6) LSK [5L] (data line) 000 TO 255 - The signal level of the satellite signal is displayed here. The range varies from 000 (worst signal quality) to 255 (best signal quality).

SAS 7) LSK [6L] (data line) <GES SEL - Pressing LSK 6L causes the display to go to the GES SELECTION page.

SAS 8) LSK [3R] (data line) HGA/LGA - The active antenna, high gain or low gain is shown.

SAS 9) LSK [4R] (data line) NNNNN/NNN - The azimuth, relative to airplane heading, and elevation of the logged-on satellite as ±180°/±90° is shown. If this information is not available, dashes are displayed.

SAS 10) LSK [5R] (data line) ANTENNA SEL> - Pressing this LSK causes the display to go to the ANTENNA SELECTION page. This prompt is displayed if there are two antennas in the installed SATCOM configuration.

SAS 11) LSK [6R] RETURN> - Pressing this LSK returns you to the SATCOM SUBMENU page.

SAS (f) GES SELECTION (Fig. 15) - The GES selection page provides a means for the pilot to initiate a constrained log-on to a selected GES. Once a GES is selected for a constrained log-on that selection will remain in effect until an AUTO LOG-ON is selected.

SAS 1) From the MCDU main menu, press:

SAS LSK 3L (<SAT), then

SAS LSK 6L (<SUBMENU), then

SAS LSK 2L (<LOG-ON), then

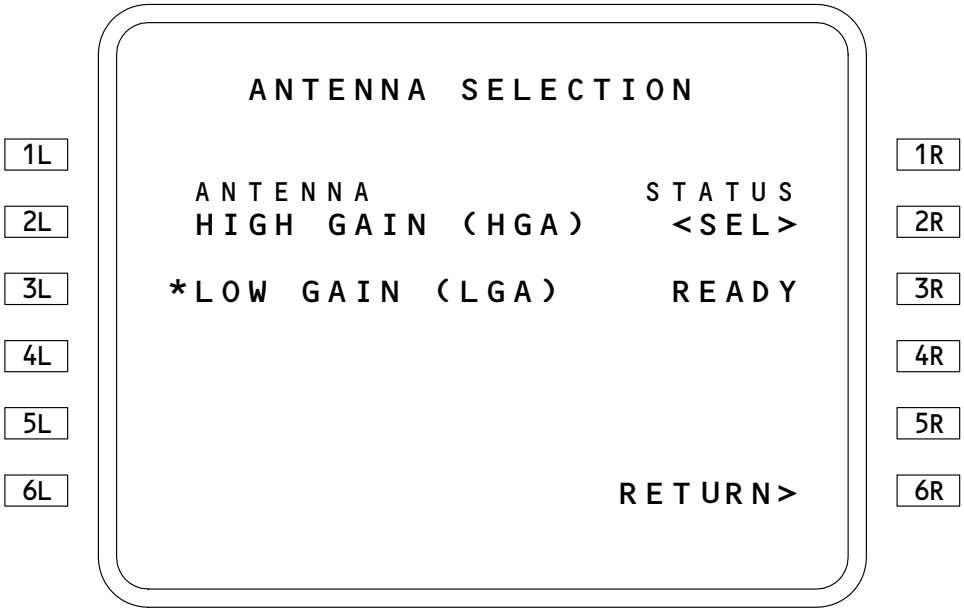
SAS LSK 6L (<GES SEL)

SAS

SAS 2) LSK [1L] (label line) AOR-E
SAS [2L] (data line) AUSSAGUEL SITA/103 - The
SAS [3L] 14-character GES name and three digit ID number,
SAS [4L] separated by a slash (/), in the data lines, and
SAS [5L] associated satellite five-character name in
SAS the label lines, as contained in the System
SAS Table and the ORT (Satellite/GES Names). If
SAS there is no 14-character name contained in the
SAS ORT for a GES ID, then dashes are displayed.
SAS Ground Earth Stations are displayed
SAS alphabetically.
SAS a) Selection of a GES is accomplished by pressing the LSK
SAS adjacent to the desired GES. Once the appropriate left
SAS LSK is pressed, <SEL> is displayed to the right of the
SAS selected GES name and ID number. There can only be one
SAS GES selected at a time. For example, if a GES is
SAS already selected and the pilot chooses to select a
SAS different one, the previously selected GES becomes
SAS unselected and the display of <SEL> moves to the right
SAS of the most recently selected GES. If no GES has been
SAS manually selected, <SEL> is not displayed to the right
SAS of any GES on the list.

GES Selection Page
Figure 15

SAS 3) LSK [6L] (data line) *LOG-ON - is displayed when the user
SAS has manually selected a GES for a constrained log-on.
SAS Pressing LSK 6L when this prompt is displayed initiates a
SAS constrained log-on to the selected GES and the page display
SAS auto-reverts to the SATCOM LOG-ON page. This prompt is not
SAS displayed unless a GES has been manually selected for a
SAS constrained log-on.
SAS 4) LSK [6R] (data line) RETURN> - Pressing this LSK returns
SAS you to the SATCOM LOG-ON page.
SAS (g) ANTENNA SELECTION (Fig. 16) - The antenna selection page is
SAS available in dual antenna SATCOM installation configuration.
SAS When only one antenna is installed, this page is not available.
SAS It provides a means for the user to select an antenna.
SAS 1) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 2L (<LOG-ON), then
SAS LSK 5L (ANTENNA SEL>)
SAS



Antenna Selection Page
Figure 16

SAS 2) LSK [2L] (data line) HIGH GAIN (HGA) - An asterisk is displayed when the high-gain antenna status is READY, indicating to the user that the HGA is available for selection. When LSK 2L is pressed with an asterisk displayed, the high-gain antenna is used and the status is changed to <SEL>.

SAS 3) LSK [3L] (data line) LOW GAIN (LGA) - An asterisk is displayed when the low-gain antenna status is READY, indicating to the user that the LGA is available for selection. When LSK 3L is pressed with an asterisk displayed, the low-gain antenna is used and the status is changed to <SEL>.

SAS 4) LSK [2R] (data line) <SEL>/READY/FAILED - <SEL> is
SAS [3R] displayed if the antenna is currently selected, unless the antenna is also FAILED, in which case FAILED is displayed. READY is displayed if the antenna is available for selection.

SAS 5) LSK [6R] (data line) RETURN> - Pressing this LSK returns you to the SATCOM LOG-ON page.

SAS (h) SATCOM CHANNEL STATUS (Fig. 17) - The status page displays the status and assignment information for SATCOM channel's modems and codecs.

SAS 1) From the MCDU main menu, press:
LSK 3L (<SAT), then
LSK 6L (<SUBMENU), then
LSK 2L (STATUS>)

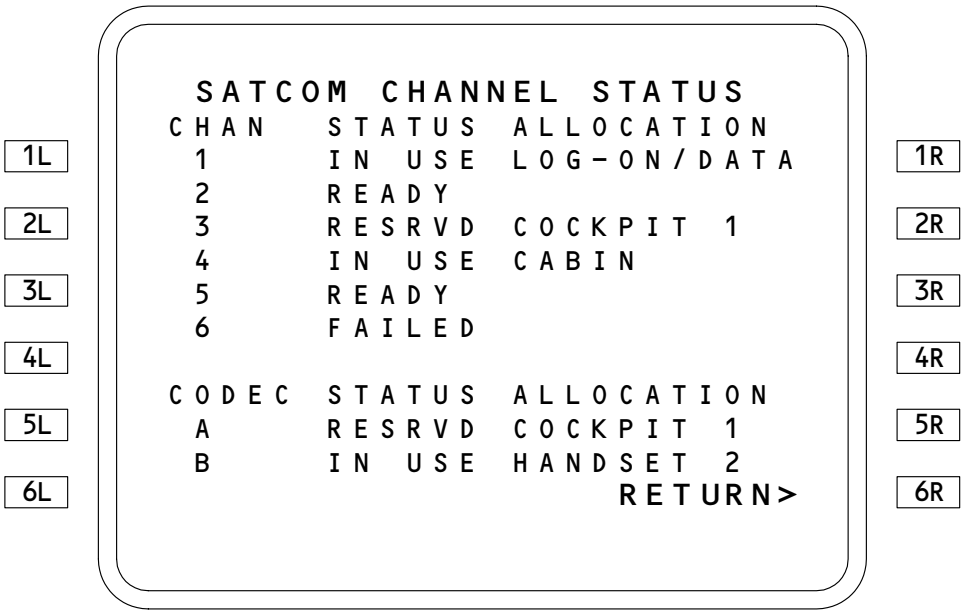
SAS

SAS 2) LSK [1L] Display the status and assignment information
[2L] for SATCOM channels 1 through 6. Only those
[3L] channels fitted for the installation are listed.
[4L]

SAS 3) LSK [1L] Display the status and allocations for codecs A
[2L] and B.

SAS 4) LSK [6R] (data line) RETURN> - Pressing this LSK returns you to the SATCOM SUBMENU page.

SAS B. System Maintenance
SAS (1) System BITE provides a number of maintenance functions. The detection of internal and external failures, storage of in-flight failure data and provide system level testing. The LRU BITE testing can be initiated automatically POST (power-on self-test), initiated manually PAST (person activated self-test) or continuously. Continuous monitoring BITE circuitry does not interfere with the normal operation of the system, but annunciates any failed condition.
SAS (a) Power-On Self-Test (POST) is a BITE test for the SDU, RFU, and HPA. POST is initiated by a cold start that occurs when primary power is removed from an LRU for longer tha 10 ±5 seconds and the airplane is on the ground. When POST is successfully completed, the individual LRU is declared fully functional. The following indications occur during a power-on self-test:



SATCOM Channel Status Page
Figure 17

SAS 1) The LED indicators on the front panels of the SDU, RFU, and HPA are tested. At a minimum, the LEDs flash on/off at a rate of 2 ±1 Hz during this test. The flashing continues until completion of the test or for 3 seconds, whichever is greater.

SAS 2) The SDU flashes the alphanumeric display on and off and displays testing.

SAS 3) At the end of POST, the following indications appear on the HPA and RFU:

SAS a) The green PASS LED on the front panel of the HPA or RFU comes on for 30 ±5 seconds if no failures occur.

SAS b) The red FAIL LED on the front panel of the HPA or RFU comes on for 30 ±5 seconds if a failure occurs.

SAS (b) After completing its own POST, the SDU commands a system-wide functional test of the RFU, HPA, and BSUs. The SDU then processes the test results from these LRUs and from the LNA/diplexers, high power relay and the high-gain antennas. At the end of the system-wide self-test, the SDU supplies pass/fail messages, inactive bus messages, and software confirmation numbers as follows:

SAS 1) If a SDU fails the test, then both the red SDU FAILURE and SYSTEM LRU FAILURE LEDs come on, until the alphanumeric display blanks.

SAS 2) Only the red SYSTEM LRU FAILURE comes on if the SDU passes its self-test but detects an inactive data bus or a failure by another LRU in the AES.

SAS 3) Both fail LEDs turn off if all LRUs in the AES pass POST. The alphanumeric display reads SYSTEM PASS for 30 ±5 seconds and then blanks unless the CM/SCROLL switch on the front panel is pushed within this period.

SAS 4) Push the CM/SCROLL switch to scroll the alphanumeric display through multiple LRU pass/fail messages, inactive bus messages, and software confirmation numbers. The CM/SCROLL steps through the messages sequentially each time the switch is pushed.

SAS (c) The SDU contains a non-volatile memory that serves as a system memory for recording system failures that occur during BITE testing of the HPA, RFU, BSUs and LNA/diplexers. The memory log is capable of being interrogated and/or cleared for each system LRU. The internal memory logs in each LRU and the system memory log are capable of logging 1000 BITE failures.

SAS (d) Person-Activated Self-Test (PAST) is a BITE test that performs the same functions as a power-on self-test, POST.

SAS 1) To perform a PAST test on the RFU, HPA or SDU, press the push to test switch on the front of the applicable LRU.

SAS 2) The pass/fail indications for the PAST test are the same as the POST test.

SAS 3) A system wide PAST test can be initiated as follows:

SAS a) The SDU front panel push to test switch is pressed.

SAS b) A command from the computer maintenance terminal.

SAS c) A command from the MCDU SATCOM MAINTENANCE pages.

SAS NOTE: The IRUs need to be aligned for the test prompt to be displayed.

SAS (e) Alphanumeric Display is a 20-character display on the SDU to generate messages for system pass, LRU fail, inactive bus, and software confirmation numbers.

SAS 1) The following is a list of LRU fail and data bus inactive messages displayed by the SDU:

SAS TABLE 7

LRU Messages	Inactive Bus Messages
TESTING	CMU 1 INPUT INOP
SYSTEM PASS	SCDU 1 INPUT INOP
SDU PASS	SCDU 2 INPUT INOP
SDU FAIL	SCDU 3 INPUT INOP

SAS

TABLE 7	
LRU Messages	Inactive Bus Messages
RFU FAIL	CFDS INPUT INOP
TOP HPA FAIL	PDL INPUT INOP
PORT HPA FAIL	SDU XTALK INPUT INOP
LGA HPA FAIL	RFU BITE INOP
LGA HPA FAIL	RFU BITE INOP
STBD HPA FAIL	RFU CCS PROCESS INOP
TOP BSU FAIL	RFU CCS RETURN INOP
PORT BSU FAIL	TOP HPA BITE INOP
PORT BSU FAIL	TOP HPA BITE INOP
STBD BSU FAIL	TOP HPA CNTRL INOP
ACU FAIL	PORT HPA BITE INOP
TOP LNA FAIL	PORT HPA CNTRL INOP
TOP LNA FAIL	PORT HPA CNTRL INOP
PORT LNA FAIL	STBD HPA BITE INOP
STBD LNA FAIL	STBD HPA CNTRL INOP
LGA LNA FAIL	HPA BITE INOP
LGA LNA FAIL	HPA BITE INOP
TOP HGA FAIL	LGA HPA CNTRL INOP
PORT HGA FAIL	TOP BSU BITE INOP
STBD HGA FAIL	TOP BSU CNTRL INOP

SAS

TABLE 7	
LRU Messages	Inactive Bus Messages
STBD HGA FAIL	TOP BSU CNTRL INOP
HPR FAIL	PORT BSU BITE INOP
IRS 1 FAIL	PORT BSU CNTRL INOP
IRS 2 FAIL	PORT BSU XTALK INOP
IRS 3 FAIL	STBD BSU BITE INOP
	STBD BSU CNTRL INOP
	STBD BSU XTALK INOP
	ACU FAIL INOP
	ACU CNTRL INOP
	PRI IRS INPUT INOP
	SEC IRS INPUT INOP
	CMU 2 INPUT INOP
	A/C ID INOP
	ADL INPUT INOP

SAS (f) Software confirmation numbers are displayed after the BITE information on the alphanumeric display as follows:

SAS SDbbbbbbb-hhsss-nn
SAS RFbbbbbbb-hhsss-nn
SAS HHbbbbbbb-hhsss-nn

SAS where: bbbbbbb is the 7-digit LRU end item base part number.
SAS hh is the 2-digit LRU end item hardware confirmation number.
SAS sss is the 3-digit LRU end item software confirmation number.
SAS nn is the 2-character LRU end item software modification level.

SAS (g) After the last software confirmation number is displayed, pushing the CM/SCROLL switch causes the ORT identification to be displayed as follows:

SAS ORT ID-XXXXXXXXXXXXX (first line)
SAS XXXXXXXXXX-MODIFIED (second line, after another activation of the CM/SCROLL switch.)

SAS where XXXXXXXXXXXXXXXXXXXXXXXX represents the ORT 24-character description (i.e., SAS ORTFILE VER 1 950227). The modified flag is only displayed if the state of ORT modified flag indicates that any item in the ORT has been modified since the ORT was created.

SAS (h) The message END OF LIST is displayed at the end of the display list after the ORT identification.

SAS (2) SATCOM Maintenance Pages

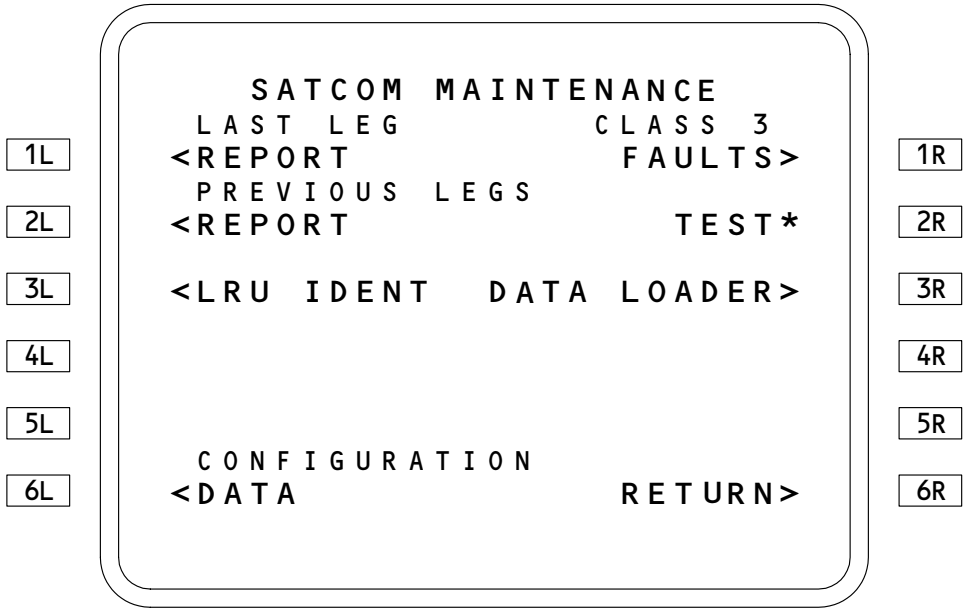
SAS (a) SATCOM MAINTENANCE (Fig. 18) - This page provides access to other maintenance pages.

SAS 1) From the MCDU main menu, press:
LSK 3L (<SAT), then
LSK 6L (<SUBMENU), then
LSK 5R (MAINTENANCE>)

SAS

SAS 2) LSK [1L] <REPORT - Pressing line select key 1L causes the display to go to the SAT-1 last leg fault report page.

SAS



SATCOM Maintenance Page
Figure 18

SAS 3) LSK [2L] <REPORT - Pressing line select key 2L causes the display to go to the SAT-1 previous legs fault report page.
SAS 4) LSK [3L] <LRU IDENT - Pressing line select key 3L causes the display to go to the SAT-1 LRU identification page.
SAS 5) LSK [6L] <DATA - Pressing line select key 6L causes the display to go to the SAT-1 configuration data page.
SAS 6) LSK [1R] FAULTS> - Pressing line select key 1R causes the display to go to the SAT-1 last leg class 3 faults page.
SAS
SAS CAUTION: ANY CALLS IN PROGRESS ARE TERMINATED WHEN THIS TEST IS INITIATED.
SAS
SAS 7) LSK [2R] TEST* - When LSK 2R is pressed, the SDU initiates a system wide test of the SATCOM system. The page display temporarily goes to the test page where TEST IN PROGRESS is displayed. However, the MCDU eventually times out and goes to the main menu. To display the test results, select LSK 3L <SAT from the main menu. The initial page displayed is the TEST page with the test results. See listing of failure messages in table 8. If the SATCOM subsystem is not selected on the MCDU within 5 minutes, the SATCOM main menu will be displayed and the test results will not be available.

SAS a) The TEST* prompt is suppressed if ORT item (maintenance page access) is set to always access these pages, disallowing execution of the self-test from the CDU. The TEST* prompt will also be suppressed if the IRUs are not aligned.
SAS 8) LSK [3R] DATA LOADER> - Pressing line select key 3R causes the display to go to the DATA LOADER MENU page.
SAS 9) LSK [6R] RETURN> - Pressing this LSK returns you to the SATCOM SUBMENU page.

SAS

Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2

SAS Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
(ACARS MU/CMU)1	LRU Failures	Non-SATCOM-Specific LRU's	Communications Management unit No.1 failed	
(ACARS MU/CMU)1/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP1G/H:Data Bus from CMU No.1	
(ACARS MU/CMU)2	LRU Failures	Non-SATCOM-Specific LRU's	Communications Management unit No.2 failed	
(CFDIU/CMC)	LRU Failures	Non-SATCOM-Specific LRU's	Central Maintenance Computer No.1 failed (not SAS applicable)	
(CFDIU/CMC)/ SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP4C/D:CFDS (Central Fault Display System) Interface (604) Input	
(CFS/CPDF)	LRU Failures	Non-SATCOM-Specific LRU's	Cabin Packet Data Function failed	
(CFS/CPDF)/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP1E/F: Data Bus from Cabin File Server/Cabin Packet Data Function bus	
(ACARS MU/CMU)2/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP3G/H: Data Bus from CMU No.2	
ARINC 429 ICAO ADDR	LRU Failures	Non-SATCOM-Specific LRU's	429 ICAO Address Source failed	
BAD GRPOUND STATION	Misc. Errors/ Failures Warnings		Invalid Frequency Command from the GES	

Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
BSU-(TOP/L)	LRU Failures	SATCOM LRU's	Left Beam Steering Unit failed	Means that any of a number of BSU-L failures (memory fail, power supply fail,parameter failure,etc.) have been reported to the SDU by the BSU-L
BSU-(Top/L)/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP7G/H:BITE input from Left Beam Steering unit	
BSU-L XTALK/ BSU-R	Inactive Input Buses	Starboard BSU Input Buses	Crosstalk bus to right BSU from left BSU	
BSU-R	LRU Failures	SATCOM LRU's	Right Beam Steering Unit failed	
BSU-R XTALK/ BSU-L	Inactive Input Buses	Port BSU Input Buses	Crosstalk bus to left BSU from right BSU	Means that the BSU-R reported to the SDU that could not hear BSU-L for greater than 3 seconds
BSU-R/SDU	Inactive Input Buses	BITE Input to SDU from other LRU	SDU MP7J/K:BITE Input from Right Beam Steering Unit	Means that the SDU reported to the BSU-R that the bite bus was not transmitting for a period of greater than 3 seconds

SAS Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
CTU	LRU Failures	Non-SATCOM-Specific LRU's	Cabin Telecommunications Unit failed	CTU defective or not powered or not ready from boot-up
CTU/SDU	Inactive Input Buses	BITE Input Buses	SDU MP2J/K:Cabin Digital Voice/Data In (CEPT E1 bus)	
CTU/SDU MPIOAB/RFU	Inactive Input Buses	RFU Input Buses	RFU IP1G/H:CEPT-E1 from CTU via SDU	
DLNA-(TOP/L)	LRU Failures	SATCOM LRU's	Left Diplexer/Low Noise Amplifier failed	
DLNA-LO GAIN	LRU Failures	SATCOM LRU's	Low Gain Antenna Diplexer/Low Noise Amplifier failed (not SAS applicable)	
DLNA-LO GAIN	LRU Failures	SATCOM LRU's	Low Gain Antenna Diplexer/Low Noise	
DLNA/(SDU/RFU)-(T/L)	Misc. Errors/ Failures Warnings		Left HGA LNA coax cable output to RFU or SDU	
DLNA/(SDU/RFU)-LO GN	Misc. Errors/ Failures Warnings		LGA LNA coax cable output to RFU or SDU	
DLNA/(SDU/RFU)-R	Misc. Errors/ Failures Warnings		Right HGA LNA coax cable output to RFU or SDU	

SAS Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
FMC1	LRU Failures	Non-SATCOM-Specific LRU's	Flight Management Computer No. 1 failed	
FMC1/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP12G/H:Data Bus from FMC No.1	
FMC2	LRU Failures	Non-SATCOM-Specific LRU's	Flight Management Computer No.2 failed	
FMC2/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP12J/K:Data bus from FMC No.2	
HI GAIN ANT (TOP/L)	LRU Failures	SATCOM LRU's	Left High Gain Antenna failed	
HI GAIN ANTENNA R	LRU Failures	SATCOM LRU's	Right High Gain Antenna failed	
HI GAIN SUBSYSTEM	Misc. Errors/ Failures Warnings		Slave HGA log-on functional test failure or could not initiate test	
HI POWER RELAY	LRU Failures	SATCOM LRU's	High Power Relay failed	
HPA HI (POC/ TOTC)	Misc. Errors/ Failures Warnings		HGA HPA Power On Counter or Total On Time counter has been reset	
HPA HI GAIN COAX	Misc. Errors/ Failures Warnings		SDU/RFU to HGA HPA Calibration Error (coax cable)	

SAS Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
HPA HI GAIN OVERTEMP	Misc. Errors/ Failures Warnings		HGA HPA Overtemperature Warning	
HPA HI GAIN/ SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP6E/F:Data input from HGA HPA	
HPA LO (POC/ TOTC)	Misc. Errors/ Failures Warnings		LGA HPA Power On Counter or Total On Time counter has been reset	
HPA LO GAIN COAX	Misc. Errors/ Failures Warnings		SDU/RFU to LGA HPA Calibration Error (coax cable)	
HPA LO GAIN OVERTEMP	Misc. Errors/ Failures Warnings		LGA HPA Overtemperature Warning	
HPA LO GAIN/ SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP6J/K:BITE input from LGA HPA	
HPA-HI GAIN	LRU Failures	SATCOM LRU's	High Gain Antenna High Power Amplifier failed	
HPA LO GAIN	LRU Failures	SATCOM LRU's	Low Gain Antenna High Power Amplifier failed (not SAS applicable)	
IRS PRI/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP6A/B:Data from IRS on Primary Input Bus	
IRS SEC/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP6C/D:Data from IRS on Secondary Input Bus	

SAS Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
IRS1	LRU Failures	Non-SATCOM-Specific LRU's	Inertial References System No.1 failed	
IRS2	LRU Failures	Non-SATCOM-Specific LRU's	Inertial References System No.2 failed	
IRS3	LRU Failures	Non-SATCOM-Specific LRU's	Inertial References System No.3 failed	
IRS4	LRU Failures	Non-SATCOM-Specific LRU's	Inertial References System No.4 failed	
LO GAIN ANTENNA	LRU Failures	SATCOM LRU's	Low Gain Antenna failed (not SAS applicable)	
LO GAIN SUBSYSTEM	Misc. Errors/ Failures Warnings		LGA log-on functional test failure or could not initiate test	
NO ACTIVE MU/ CMU	Misc. Errors/ Failures Warnings		At least one (C)MU (ACARS MU) is communicating, but none have declared themselve active	
OTHER SDU	Misc. Errors/ Failures Warnings	SATCOM LRU's	The other SDU (of a dual system) failed (not SAS applicable)	
OTHER SDU/ THIS SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP12A/B:SDU Cross Talk input from other SDU (not SAS applicable)	
OTHERS	Not defined		LEVEL 1 FAULT XX (where XX is the level 1 failure code)	

SAS Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
RFU	LRU Failures	SATCOM LRU's	Radio Frequency Unit failed	
RFU (POC/TOTC)	Misc. Errors/ Failures Warnings		RFU Power On Counter or Total On Time counter has been reset	
RFU COAX	Misc. Errors/ Failures Warnings		SDU TO RFU Calibrated Gain Out of Range (coax cable)	
RFU COAX/SDU	Misc. Errors/ Failures Warnings		SDU input coax cable from RFU	
RFU TP1AB/SDU MP9EF	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP9E/F:Data bus from RFU to SDU (BITE Signaling)	
RFU TP1EF/SDU MP9JK	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP9J/K:CEPT-E1s from CTU via SDU	
RFU TP3CD/SDU MP10GH	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP10G/H:ST Bus C2 Clock from RFU (Overflow Digital	
RFU TP3EF/SDU MP10JK	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP10J/K:ST Bus F0 Frame from RFU (Overflow Digital Audio)	
RFU TP1JK/SDU MP10CD	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP10C/D:ST Data Bus from RFU (Overflow Digital Audio)	
SCDU1	LRU Failures	SATCOM LRU's	Satellite Control/Display Unit No.1 failed	

Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
SCDU1/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP3C/D:Data from SCDU No.1	
SCDU2	LRU Failures	SATCOM LRU's	Satellite Control/Display Unit No.2 failed	
SCDU2/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP3E/F:Data from SCDU No.2	
SCDU3	LRU Failures	SATCOM LRU's	Satellite Control/Display No.3 failed	
SCDU3/SDU	Inactive Input Buses	BITE input to SDU from other LRU	SDU MP8J/K:Data from SCDU No.3	
SDU	LRU Failures	SATCOM LRU's	Satellite Data Unit failed	
SDU (POC/TOTC)	Misc. Errors/ Failures Warnings		SDU Power On Counter or Total On Time counter has been reset	
SDU DUA SEL/ DIABLE	Misc. Errors/ Failures Warnings		Dual system discrete inputs disagree	
SDU M CTRL/BSU (T/L)	Inactive Input Buses	Top/Port BSU or ACU Input Buses	Multicontrol Bus to Left Beam Steering Unit from SDU	
SDU M CTRL/BSU R	Inactive Input Buses	Starboard BSU Input Buses	Multicontrol Bus to right Beam Steering Unit from SDU	

Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
SDU M CTRL/HPA HI	Inactive Input Buses	HGA HPA Input Buses	HGA HPA TP1A/B:Multi-control bus to HGA HPA from SDU	
SDU M CTRL/HPA LO	Inactive Input Buses	LGA HPA Input Buses	LGA HPA TP1A/B:Multi-control bus to LGA HPA from SDU (not SAS applicable)	
SDU MP9GH/RFU TP1CD	Inactive Input Buses	RFU Input Buses	RFU TP1C/D:Data Bus to RFU from SDU (Control)	
SDU MP10EF/RFU TP3AB	Inactive Input Buses	RFU Input Buses	RFU TP3A/B:ST Bus Data from SDU (Overflow Digital Audio)	
SDU OWNER REQS-SECD	Misc. Errors Failures Warnings		Error in the secured ORT partition	
SDU OWNER REQS-USER	Misc. Errors Failures Warnings		Error in the user ORT partition	
SDU/DLNA LO GAIN	Misc. Errors Failures Warnings		LGA LNA Control Driver Fail	
TX PATH VSWR HI GAIN	Misc. Errors Failures Warnings		Excessive VSWR load at HGA HPA output	
TX PATH VSWR LO GAIN	Misc. Errors Failures Warnings		Excessive VSWR load at LGA HPA output (not SAS applicable)	

SAS Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
WOW1WOW2/SDU	Misc. Errors Failures Warnings		SDU MP5B/C:SDU Weight on Wheels discrete inputs disagree	
WRG:ICAO ADDR/ SDU	Misc. Errors Failures Warnings		SDU (ICAO) Address Bits (Straps) Error	
WRG:SDI/BSU (T/L)	Misc. Errors Failures Warnings		Left Beam Steering Unit identification strapped incorrectly	
WRG:SDI/BSU R	Misc. Errors Failures Warnings		Right Beam Steering Unit identification strapped incorrectly	
WRG:SDI/HPA HI GAIN	Misc. Errors Failures Warnings		HGA HPA identification strapped incorrectly	
WRG:SDI/HPA LO GAIN	Misc. Errors Failures Warnings		LGA HPA Invalid SDI Strapping	
WRG:SDI/HPA LO GAIN	Misc. Errors Failures Warnings		LGA HPA identification strapped incorrectly	
WRG:STRAPS/SDU	Misc. Errors Failures Warnings		SDU TP11A:SDU Straps (System Configuration Pins) Error	

SAS

Table 8

Failure Message (MCDU)	Failure category	Failure sub-category	Description 1	Description 2
WRG:STRAPS/SDU ORT	Misc. Errors Failures Warnings		Configuration pins and ORT settings disagree	

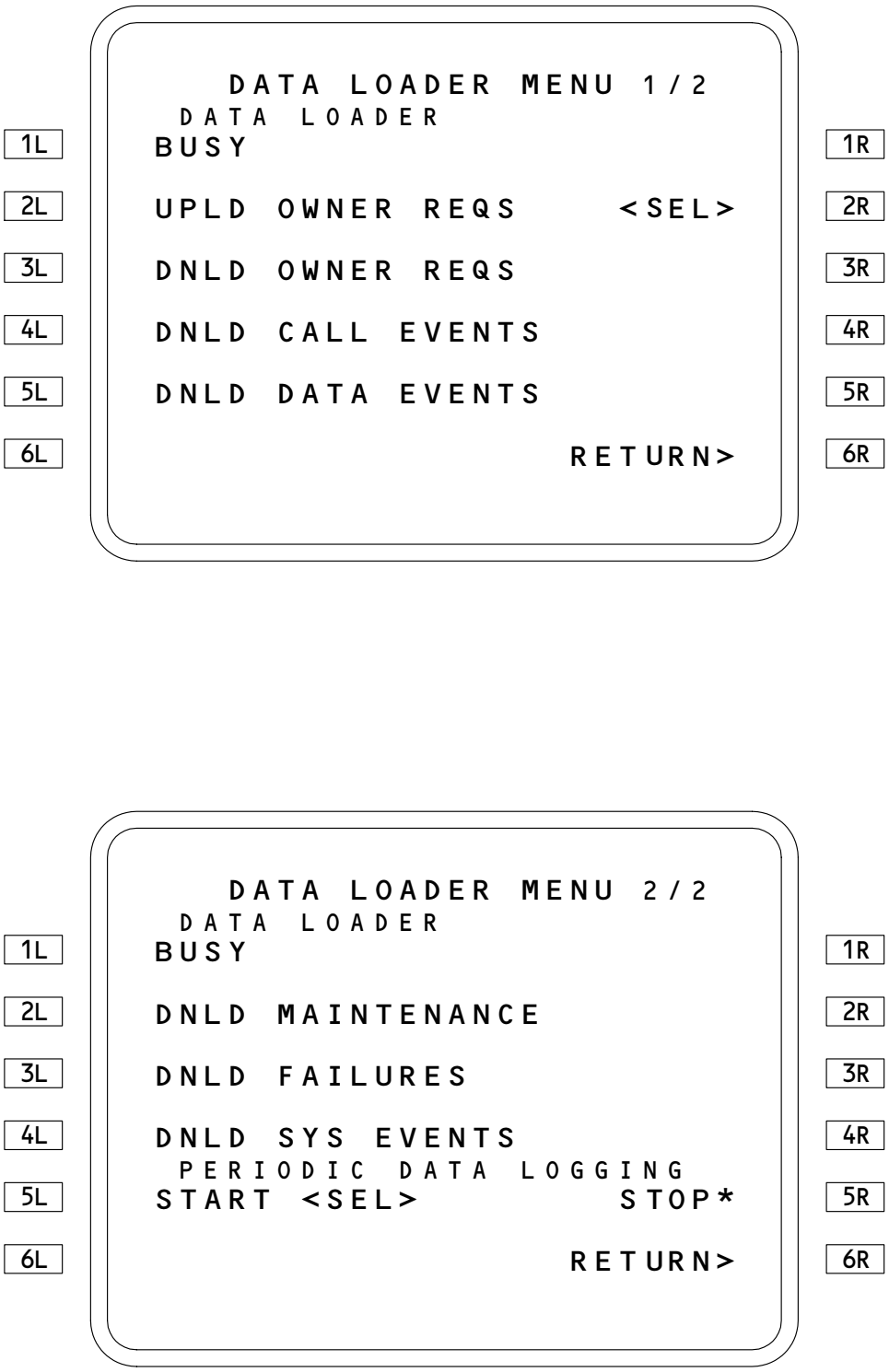
(b) DATA LOADER MENU (Fig. 19) - This page provides a means of commanding data loader actions for either an airborne data loader or a portable data loader.

1) From the MCDU main menu, press:
   LSK 3L (<SAT), then
   LSK 6L (<SUBMENU), then
   LSK 5R (MAINTENANCE>), then
   LSK 3R (DATA LOADER>)

2) LSK [1L] NONE/CONNECTED/READY/BUSY/ERROR - LSK 1L displays the status of the data loader. Possible statuses are:
   a) NONE - Displayed when no data loader is connected.
   b) CONNECTED - Displayed when a data loader is connected but the initial SDU data loader communications has not been completely established, and therefore data transfers cannot yet be supported.
   c) READY - Displayed when the SDU data loader communication is established and data transfers can be supported.
   d) BUSY - Displayed when the SDU and data loader are busy performing a data transfer after a user initiated action.
   e) ERROR - Displayed when an error occurs during the course of a data transfer. If the status becomes ERROR, then an error message describing the type of error is appended to the status.

3) LSK [2L] [3L] [4L] [5L] (DATA LOADER MENU pages 1 and 2) - LSK 2L-5L list prompts for commanding data loader actions. Asterisks are only displayed to prompt the user when the SDU can support the resulting action. Prompts and their resulting actions are summarized as follows:
   a) *UPLD OWNER REQS - Pressing the line select key adjacent to this prompt causes the ORT to be uploaded. An ORT upload is not permitted if the system is logging-on or is logged-on to a GES.

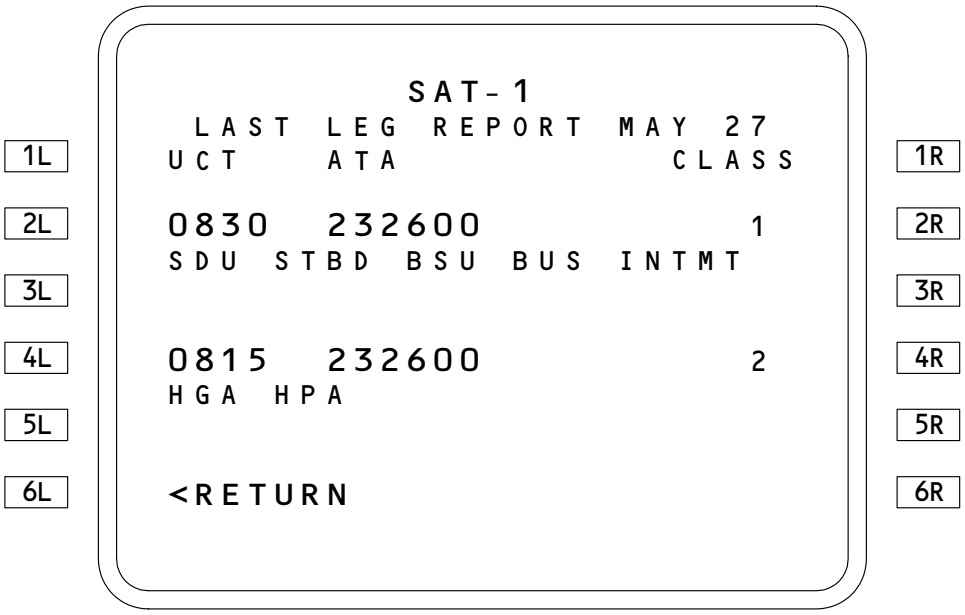
SAS



Data Loader Menu Page
Figure 19

SAS b) *DNLD OWNER REQS - Pressing the line select key adjacent to this prompt causes the ORT to be downloaded.
SAS c) *DNLD CALL EVENTS - Pressing the line select key adjacent to this prompt causes the call event log to be downloaded.
SAS d) *DNLD DATA EVENTS - Pressing the line select key adjacent to this prompt causes the data event log to be downloaded.
SAS e) *DNLD MAINTENANCE - Pressing the line select key adjacent to this prompt causes the maintenance activity log to be downloaded.
SAS f) *DNLD FAILURES - Pressing the line select key adjacent to this prompt causes the SDU/system failure log to be downloaded.
SAS g) *DNLD SYS EVENTS - Pressing the line select key adjacent to this prompt causes the system management event log to be downloaded.
SAS h) After the selection of an action, <SEL> is displayed to the right of the selected action, the data loader status changes to BUSY, and the data transfer begins. If the data loader status becomes error after initiation of an action, the display of <SEL> remains until the prompt *ACK ERROR is pressed. When data transfer is complete, or after an error has been acknowledged, the display of <SEL> is removed and the data loader status changes accordingly.
SAS 4) LSK [5L] (DATA LOADER MENU page 2) *START/STOP* - The [5R] prompts displayed are to start and stop periodic data logging. Asterisks are only displayed to prompt the user when the SDU can support the resulting action. If the *START prompt is selected by pressing 5L when the data loader status is READY, <SEL> is displayed to the right of the START prompt. A STOP* prompt is provided adjacent to LSK 5R, the data loader status changes to BUSY, and periodic data logging starts. Periodic data logging continues until 5R, STOP* is pressed.
SAS a) If the data loader status becomes ERROR after periodic data logging is started, the display of <SEL> remains and the STOP* prompt goes away. The error must be acknowledged by the user by pressing LSK 6L.

SAS 5) LSK [6L] *ACK ERROR - This prompt is displayed when the
SAS data loader status is ERROR. Pressing LSK 6L enables the
SAS SDU to reset. In order to enable the data loader to reset,
SAS the data loader power should be cycled or remove/insert the
SAS diskette.
SAS 6) LSK [6R] RETURN> - Pressing this LSK returns you to the
SAS SATCOM MAINTENANCE page.
SAS (c) SAT-1 (LAST LEG REPORT) (Fig. 20) - This page displays the
SAS Class 1 and 2, level 1 diagnosed failures reported during the
SAS last flight leg.
SAS 1) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 1L (<REPORT)
SAS



Last Leg Report Page
Figure 20

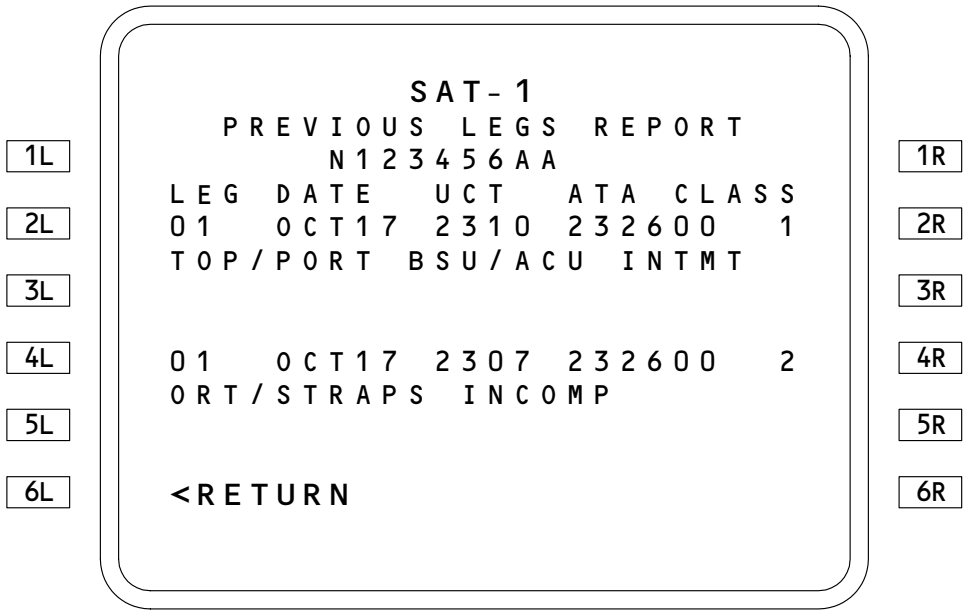
SAS 2) LSK [2L] The class 1 and 2, level 1 faults diagnosed on the last flight leg are displayed here. Failures are displayed in reverse chronological order (i.e., the most recent detected failure listed first). If there are no faults to report, the message NO FAULT DETECTED is displayed.

a) For each failure the UTC at the time of the failure occurrence, the ATA of the reported failure, and the class number of the reported failure. Dashes are displayed if no valid UTC is available. The line below displays the text message for the reported failure. If the failure is intermittent, INTMT is added to the end of the text message.

3) LSK [6L] <RETURN - Pressing this LSK returns you to the SATCOM MAINTENANCE page.

(d) SAT-1 (PREVIOUS LEGS REPORT) (Fig. 21) - This page displays the Class 1 and 2, level 1 diagnosed failures reported during previous flight legs.

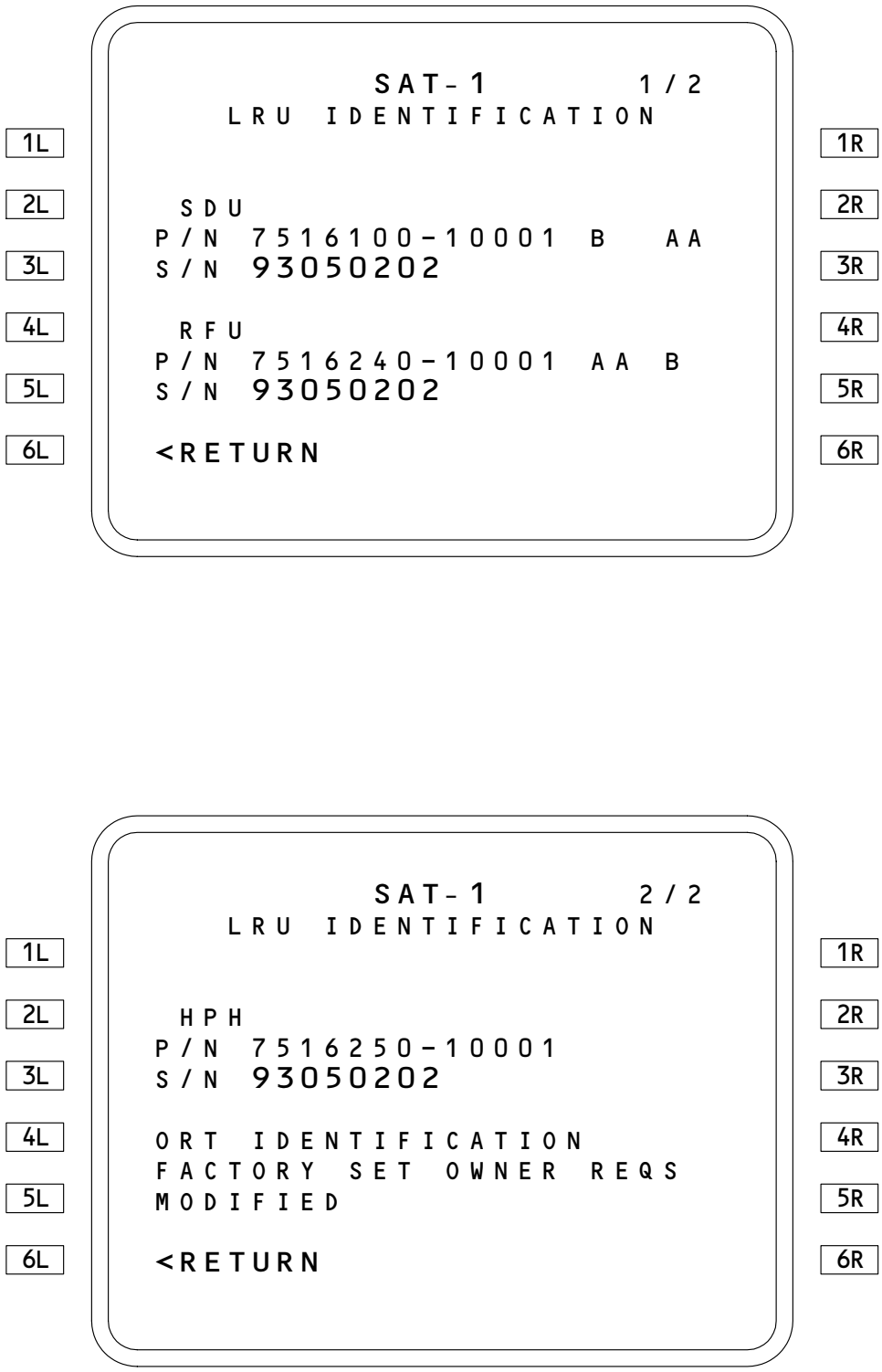
1) From the MCDU main menu, press:
LSK 3L (<SAT), then
LSK 6L (<SUBMENU), then
LSK 5R (MAINTENANCE>), then
LSK 2L (<REPORT)



Previous Legs Report Page
Figure 21

SAS 2) LSK [1L] This line displays the aircraft identification as recorded in the failure memory log for the flight leg. This line is blank if there are no failures to report.
SAS 3) LSK [2L] The class 1 and 2, level 1 faults diagnosed on previous legs for up to 64 flight legs are displayed here. Failures are displayed in reverse chronological order (i.e., the most recent detected failure listed first). Failures from different flight legs are not mixed on the same page. If there are no faults to report, message NO FAULT DETECTED is displayed. For intermittent failures, INTMT is appended to the end of the test message.
SAS 4) LSK [6L] <RETURN - Pressing this LSK returns you to the SATCOM MAINTENANCE page.
SAS (e) SAT-1 (LRU IDENTIFICATION) (Fig. 22) - This page displays a list of all installed LRUs with their associated part numbers, modification levels, serial numbers, and ORT identification data.
SAS 1) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 3L (<LRU IDENT)
SAS
SAS 2) This two page display lists the LRUs along with their associated part/serial number data. The LRU acronyms are as follows:
SAS SDU -Satellite Data Unit
SAS RFU - Radio Frequency Unit
SAS HPH - High Power Amplifier - High-Gain Antenna
SAS 3) The LRU part number consists of a seven-digit LRU base P/N, a two-digit hardware configuration number, and a three-digit software configuration number, bbbbbbb-hhsss. Where bbbbbbb is the LRU end item base part number, hh is the LRU end item hardware confirmation number and sss is the LRU end item software confirmation number. Dashes are displayed if no valid data is available.
SAS 4) The hardware then software modification level is displayed after the LRU P/N. The modification level is displayed in one to two characters. Dashes are displayed if no valid data is available.
SAS 5) For Honeywell/Racal MCS, the two-digit hardware configuration number, two character hardware modification level, and LRU serial number must be manually entered through the computer maintenance terminal (CMT) for valid data to be available. Dashes will be shown in these locations if no data was entered.

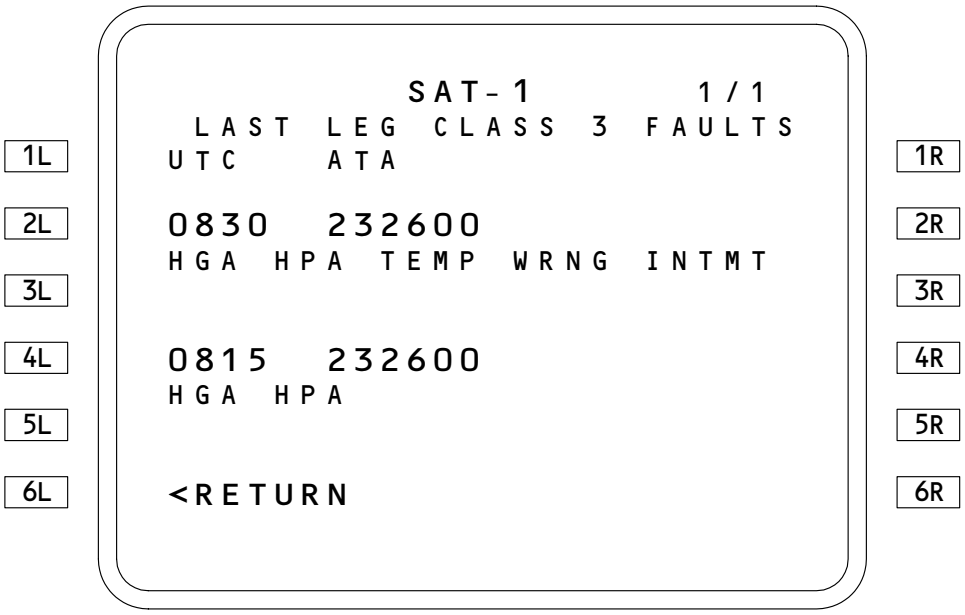
SAS



LRU Identification Page
Figure 22

F72367

SAS 6) The ORT description is displayed at the end of the LRU
SAS list. If the ORT has been modified, MODIFIED is displayed.
SAS (f) SAT-1 (LAST LEG CLASS 3 FAULTS) (Fig. 23) - This page displays
SAS the Class 3, Level 1 diagnosed failures reported during the
SAS last leg.
SAS 1) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 1R (FAULTS>)
SAS
SAS 2) The class 3, level 1 faults diagnosed on the last flight
SAS leg are displayed here. Failures are displayed in reverse
SAS chronological order (i.e., the most recent detected failure
SAS listed first). If there are no faults to report, the
SAS message NO FAULT DETECTED is displayed.



Last Leg Class 3 Faults Page
Figure 23

SAS 3) For each failure the UTC at the time of the failure occurrence, and the ATA of the reported failure are displayed. Dashes are displayed if no valid UTC is available. The line below displays the text message for the reported failure. If the failure is intermittent, INTMT is added to the end of the text message.

SAS 4) LSK [6L] <RETURN - Pressing this LSK returns you to the SATCOM MAINTENANCE page.

SAS (g) SAT-1 (CONFIGURATION DATA) (Fig. 24) - This page displays the status of SATCOM configuration input parameters.

SAS 1) From the MCDU main menu, press:

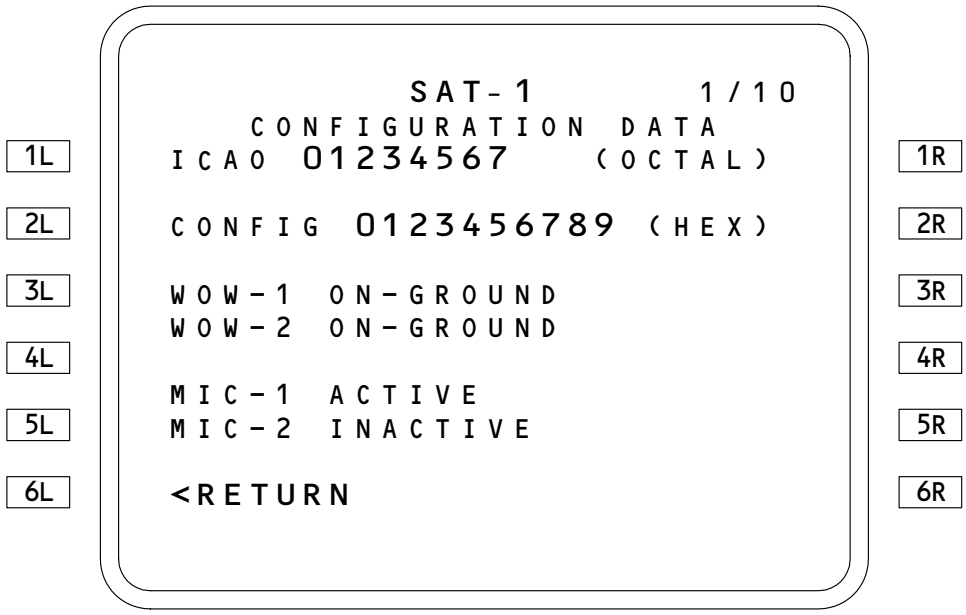
SAS LSK 3L (<SAT), then

SAS LSK 6L (<SUBMENU), then

SAS LSK 5R (MAINTENANCE>), then

SAS LSK 6L (<DATA)

SAS



Configuration Data Page
Figure 24

F72315

SAS 2) The CONFIGURATION DATA pages (1 of 10) provides the users with program pin information and status of various inputs. The first page lists the airplane address in octal format, the program pin configuration, the status of the weight on wheel inputs and the cockpit voice mics.

SAS 3) The remaining pages provide a detailed breakout of the program pins and the functions they control (i.e., call notification chime/light configuration, codec configuration and if a maintenance computer is installed or not). Listed in Figure 25 is a breakdown of how the configuration pin relates to the HEX digits. The SAS configuration is also listed.

CONFIGURATION PINS											
TP10			TP11			TP12			TP13		
ABCD	EFGH	JK	AB	CDEF	GHJK	ABCD	EFGH	JK	AB	CDEF	GHJK
HEX DIGITS											
0	1	2		3	4	5	6	7		8	9
SAS CONFIGURATION PINS											
F	F	E		7	B	F	F	3		E	1

Configuration Pins
Figure 25

SAS WARNING: TO AVOID POTENTIALLY DANGEROUS EXPOSURE TO RADIO FREQUENCY
SAS ENERGY ABOVE THE ANSI C95.1 LIMIT AND OTHER WORLD STANDARDS
SAS WHEN USING A HIGH-GAIN ANTENNA (12dB NOMINAL ANTENNA), DO NOT
SAS OPERATE THE MCS SATCOM SYSTEM WHEN ANY PERSONNEL ARE WITHIN
SAS 8.5 FEET OF THE ANTENNA OR WITHIN 20 FEET OF THE ANTENNA FOR
SAS PERIODS OF LONGER THAN 3 MINUTES PER HOUR.
SAS
SAS (3) Maximum permissible exposure level
SAS (a) The radio frequency (RF) energy generated by the MCS SATCOM
SAS system may be hazardous to personal health. To eliminate the
SAS potential danger, Honeywell recommends that operators of the
SAS MCS SATCOM system implement safety procedures.
SAS (b) When the MCS SATCOM system is in operation, personnel should
SAS remain at a distance from the antenna that is greater than the
SAS maximum permissible exposure level (MPEL) radius. It is the
SAS responsibility of the operator to ascertain the MPEL radius for
SAS their SATCOM system and train their personnel in safe ground
SAS procedures. The warning above states Honeywell's MPEL
SAS recommendation.
SAS C. Cockpit Communications
SAS (1) Cockpit communications becomes available to the flight crew after
SAS the SDU logs-on to a GES in its visible satellite region. A flight
SAS crew member makes a telephone call using the MCDU. The MCDU
SAS provides the pilot with an annunciation of the current system
SAS status, as well as the capability to enter the necessary commands.
SAS Although it is possible to enter the telephone number of the party
SAS being called, most calls are made by selecting the parties
SAS programmed number.
SAS (2) A maximum of two independent channels are provided in the cockpit.
SAS These channels operate independently and are switched with the HF-L
SAS and HF-R radio channels such that when either or both SAT channels
SAS are selected by the HF/SAT XFER switch(s) the corresponding HF
SAS channels are not available. The HF/SAT SELECT panel is located on
SAS the P5, pilots' overhead panel.
SAS (3) The MIC SELECTION and Push-to-Talk (PTT) functions for the HF/SAT-L
SAS or HF/SAT-R operate just like the other cockpit radio equipment
SAS controlled on the audio select panels (ASP).
SAS (4) The IRS must be aligned before cockpit voice or cabin passenger
SAS voice is available. The SATCOM system will not be able to log-on
SAS for voice communications unless the SDU can provide the antenna
SAS steering information, calculated from the IRS input.

SAS (5) Ground-to-Air Calls
SAS (a) Incoming calls to the aircrew are annunciated by the SELCAL chime and illumination of the "SAT" lamp on the HF/SAT select panel in the P5 overhead.
SAS (b) To answer the call, the HF/SAT XFER switch must be in the SATCOM position with SATCOM illuminated for the channel the call was annunciated.
SAS (c) Activate the proper MIC on the Audio Select Panel, use the PTT function to effect communications.
SAS (d) Termination of the call occurs when the illuminated SAT call light on the HF/SAT select panel is pressed.
SAS (6) Air-to-Ground Calls
SAS (a) To initiate a call, the system must be logged-on. The SATCOM MCDU menu pages provide a means to verify the log-on status or initiate log-on commands.
SAS (b) To make a call, select one of the stored numbers listed in the directory.
SAS (c) The HF/SAT XFER switch, for the desired channel -L or -R, must be in the SATCOM position with the SATCOM lamp illuminated. SAT 1 corresponds to left channel and SAT 2 corresponds to right channel
SAS (d) Press *MAKE CALL, LSK 2L for SAT 1 or LSK 4L for SAT 2. When the call is connected, a chime will sound and the SAT 1 or SAT 2 call light will illuminate.
SAS (e) Activate the proper MIC on the Audio Select Panel, use the PTT function to effect communications.
SAS (f) Termination of the call occurs when the illuminated SAT call light on the HF/SAT select panel is pressed.
SAS D. Cabin Communications
SAS (1) The cabin handsets operate like terrestrial telephones. An international number is called by entering the international prefix, country code, the city or area code and then the local number.
SAS (2) All cabin telephone calls go through the cabin telecommunications unit (CTU), which interfaces to the SATCOM system via a CEPT E-1 bus from the CTU to the SDU.

SAS

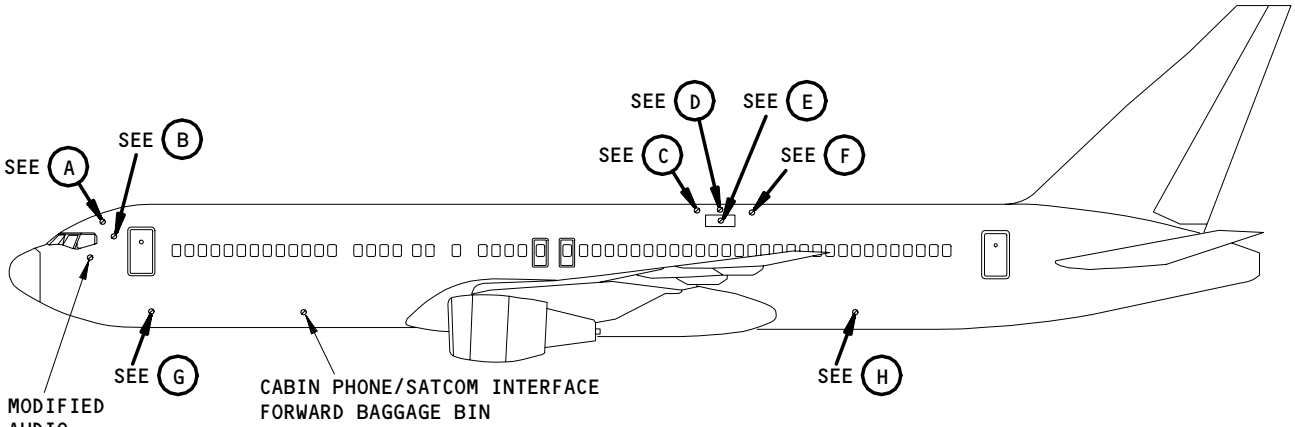
SATCOM SYSTEM - COMPONENT INDEX

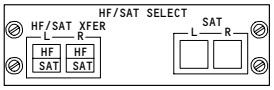
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
AMPLIFIER - HIGH POWER - HGA, M1782	1	1	E10, ABOVE CEILING, L MID, STA 1070	23-25-14
ANTENNA - HIGH GAIN - PORT, M1793	1	1	L/H OVERHEAD BIN, STA 1100	23-25-19
ANTENNA - HIGH GAIN - STARBOARD, M1794	1	1	R/H OVERHEAD BIN, STA 1100	23-25-19
CIRCUIT BREAKER -				
HF/SAT AUDIO SW, 11H7 OR 11G2, C724		1	FLT COMPT, P11	
SATCOM, 11H8, C506		1	FLT COMPT, P11	
SATCOM DC, 11G1, C901		1	FLT COMPT, P11	
SATCOM HGA, 11H9, C902		1	FLT COMPT, P11	
COMBINER, RF, M1786	1	1	E10, ABOVE CEILING, L MID, STA 1060	23-25-02
LNA/DIPLEXER - PORT, M1789	1	1	ABOVE CEILING, L MID, STA 1100	23-25-09
LNA/DIPLEXER - STARBOARD, 1790	1	1	ABOVE CEILING, R MID, STA 1100	23-25-09
PANEL - HF/SAT SW, M1798	1	1	FLT COMPT, P5	
PANEL - SATCOM TEST RECEPTICLE, P9601	1	1	FLT COMPT, P61	
RCPT - ADDRESS PLUG, M1835	1	1	822, AFT CARGO CMPT, E9	
RELAY -				
L HF/SAT, M1803	1	1	MAIN EQUIP CTR, E2-6	23-25-26
R HF/SAT, M1805	1	1	MAIN EQUIP CTR, E2-6	23-25-26
HIGH POWER, RF, M1787	1	1	E10, ABOVE CEILING, L MID, STA 1060	23-25-22
UNIT - (FIM 34-21-00/101)				
L INTERTIAL REFERENCE				
R INTERTIAL REFERENCE				
UNIT - BEAM STEERING - PORT, M1795	1	1	L/H OVERHEAD BIN, STA 1090	23-25-17
UNIT - BEAM STEERING - STARBOARD, M1796	1	1	R/H OVERHEAD BIN, STA 1090	23-25-17
UNIT - RADIO FREQUENCY, M1781	1	1	822, AFT CARGO CMPT, E9-1	23-25-11
UNIT - SATELITE DATA, M1780	1	1	822, AFT CARGO CMPT, E9-1	23-25-10

SAS

SATCOM System - Component Index
Figure 101

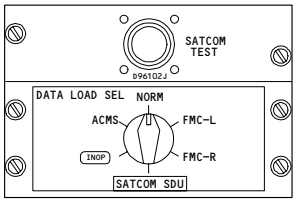
SAS





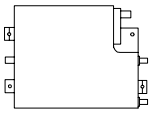
HF/SATCOM SELECT CONTROL PANEL
(PANEL P5)

A



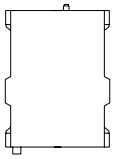
ADL/SAT CONTROL PANEL
SATCOM TEST PANEL
(PANEL P61)

B



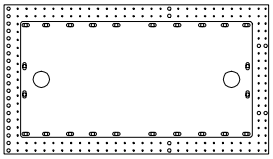
LOW NOISE AMP/DIPLEXER
(STA 1100, TWO INSTALLED)

C



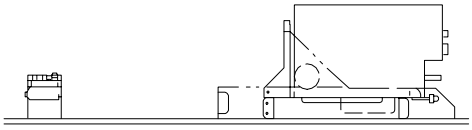
BEAM STEERING UNIT
(STA 1090, TWO INSTALLED)

D



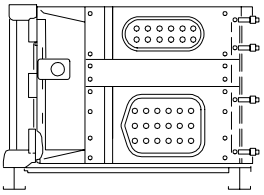
HIGH GAIN ANTENNA
(STA 1100, TWO INSTALLED)

E



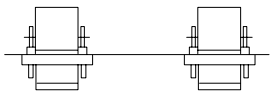
HIGH POWER AMPLIFIER
HIGH POWER RELAY/COMBINER
(SHELF E10, STA 1069)

F



LRU, SATELLITE DATA UNIT
LRU, RADIO FREQUENCY UNIT
AIRPLANE ADDRESS PLUG
(SHELF E9, STA 1210)

H

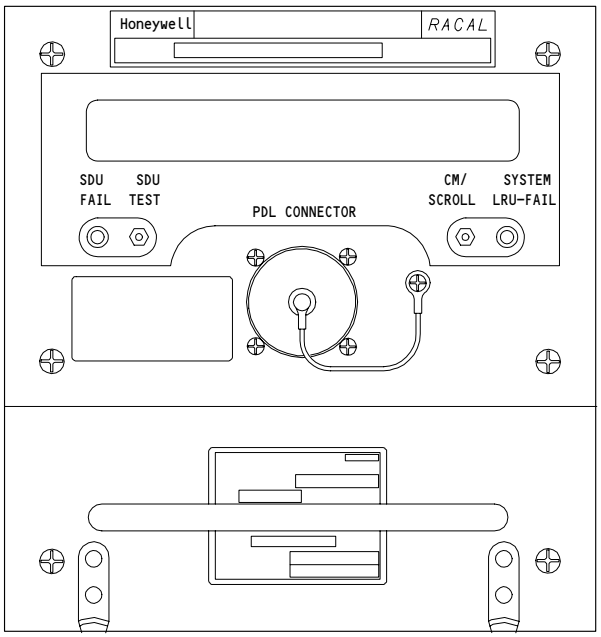


HF/SAT RELAYS
(SHELF E2-6)

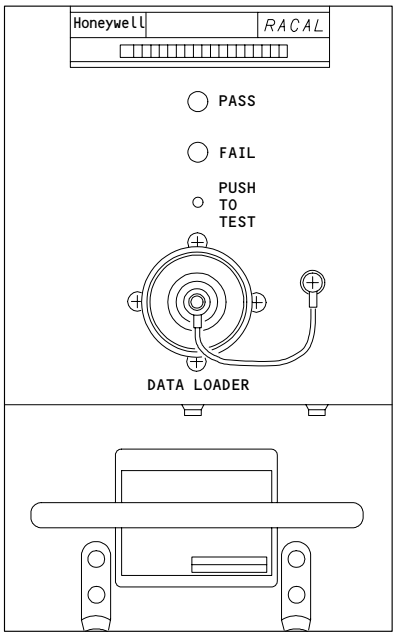
G

SATCOM System - Component Location
Figure 102 (Sheet 1)

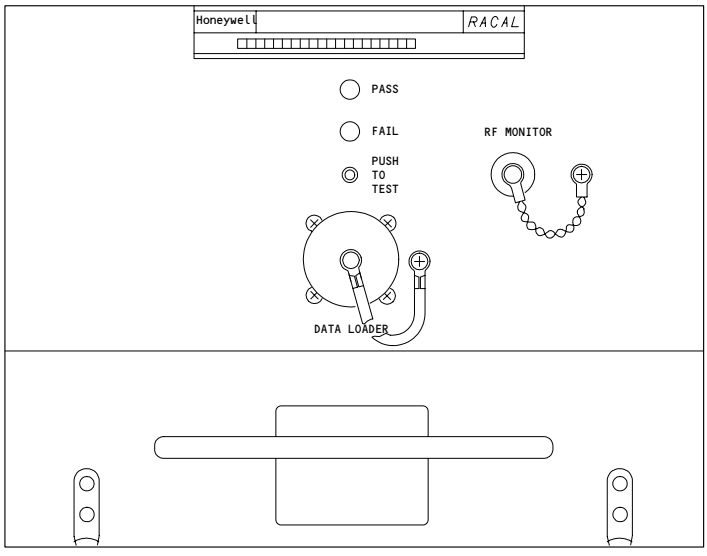
SAS



SATELLITE DATA UNIT



RADIO FREQUENCY UNIT



HIGH POWER AMPLIFIER

SATCOM System - Component Location
Figure 102 (Sheet 2)

SAS SATCOM - MAINTENANCE PRACTICES

SAS 1. General

SAS A. The Dataloading process is controlled from the MCDU. To enable ORT uploading, LOG-OFF must be selected.

SAS B. To enable ORT verification, the left IRU must be aligned because only with IRS input will there be access to the MCDU SATCOM MAINTENANCE page which the LRU IDENT page is accessed.

SAS C. The ORT for the SDU is normally partitioned in two parts contained on two diskettes. These diskettes are:

SAS (1) "Secure ORT" - OPC (Operational Program Configuration data), the airframe OEM specific ORT (SATCOM transmission power, etc).

SAS (2) "User ORT" - AMI (Airline Modifiable Information), the airline specific ORT options configuration (Telephone directory, etc).

SAS D. Before upgrading the SDU from 7516100-19034 to -20050, there was just one ORT (AMI) contained on one disk.

SAS TASK 23-25-00-402-001

SAS 2. Load the ORT (Owner Requirement Table) With the Airbone Data Loader (ADL) (Fig. 201)

SAS A. Equipment

SAS (1) Diskette(s) with SATCOM software (AMI or OPC+AMI), most current version.

SAS B. References

SAS (1) AMM 24-22-00/201, Electrical Power - Control

SAS C. Access

SAS (1) Location Zones
211/212 Flight Compartment

SAS D. Prepare to Load the ORT

SAS S 862-006

SAS (1) Supply electrical power (AMM 24-22-00/201).

SAS S 472-013

SAS (2) Align the left IRU. While alignment takes place, continue as follows.

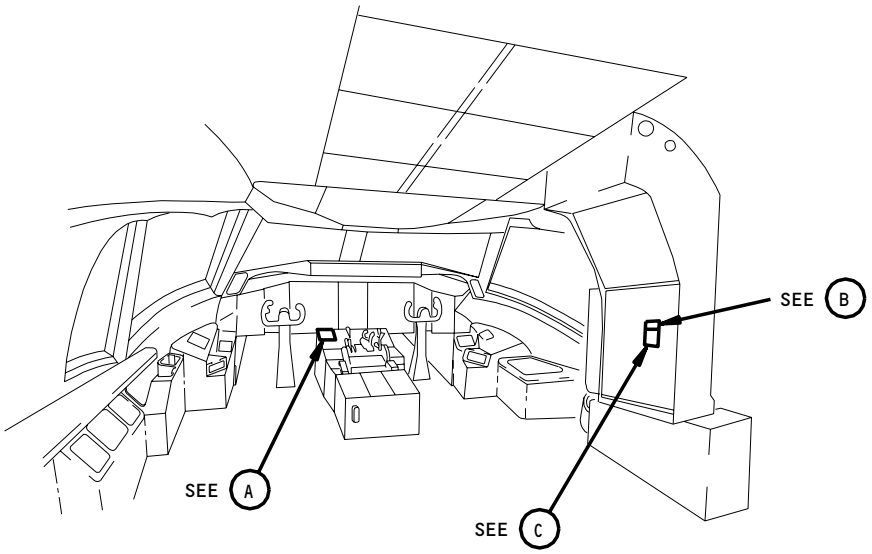
SAS S 472-008

SAS (3) Verify that the diskette(s) has the correct software identification.

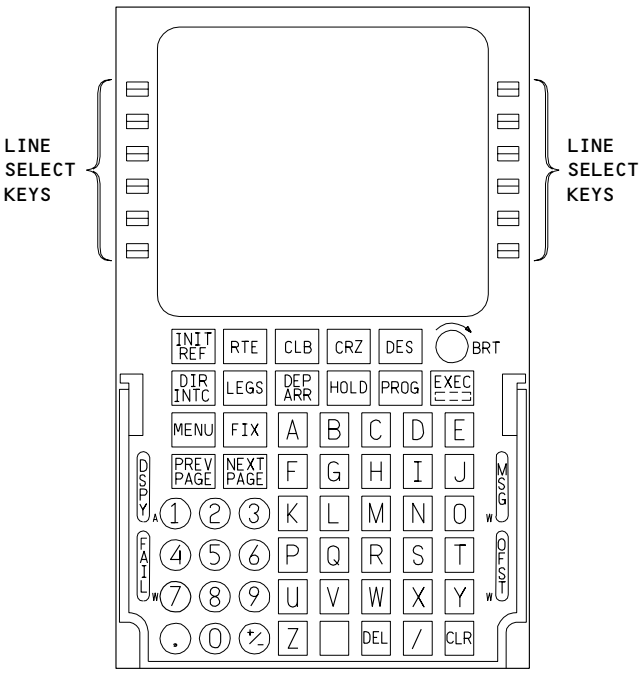
SAS S 472-014

SAS (4) Press the MENU button on the MCDU.

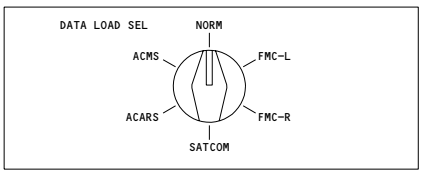
SAS



FLIGHT COMPARTMENT

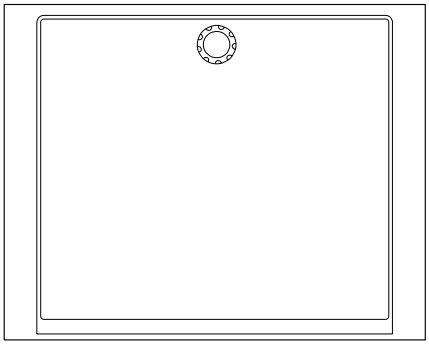


A



DATA LOADER CONTROL PANEL

B



AIRBORNE DATA LOADER

C

ORT (Owner Requirement Table) with the Airborne Data Loader (ADL)
Figure 201

SAS

K14228

SAS
SAS S 472-015
SAS (5) Go through the selections SAT - SUBMENU - LOG-ON to the SATCOM
SAS LOG-ON page.
SAS
SAS S 472-016
SAS (6) Select the LOG-OFF*.
SAS (this must be performed even though the system is not logged on to a
SAS satellite).
SAS E. Load the ORT
SAS
SAS S 472-017
SAS (1) Go through the selections RETURN - (MAINTENANCE) - DATA LOADER to
SAS the DATA LOADER page.
SAS (MAINTENANCE will appear if left IRU is aligned, if not DATA LOADER
SAS selection is directly available).
SAS
SAS S 472-018
SAS (2) Insert first ORT diskette in ADL and rotate the selector to SATCOM
SAS (The disk order should not matter but start with the SECURE one).
SAS
SAS NOTE: If installing an ORT contained on just one disk, insert
SAS this single disk.
SAS
SAS
SAS S 472-019
SAS (3) When prompt marks (*) appear next to the text lines on the MCDU,
SAS select *UPLD OWNER REQS.
SAS
SAS S 472-020
SAS (4) When the message INSERT NEXT DISK appears, insert second ORT
SAS diskette.
SAS
SAS NOTE: If installing an ORT contained on just one disk, there
SAS will be no INSERT NEXT DISK MESSAGE.
SAS
SAS
SAS S 472-021
SAS (5) When the message LOAD COMPLETE appears on the ADL, remove the
SAS diskette and return the rotary selector to NORM.
SAS
SAS S 472-022
SAS (6) Wait until IRU alignment is completed.

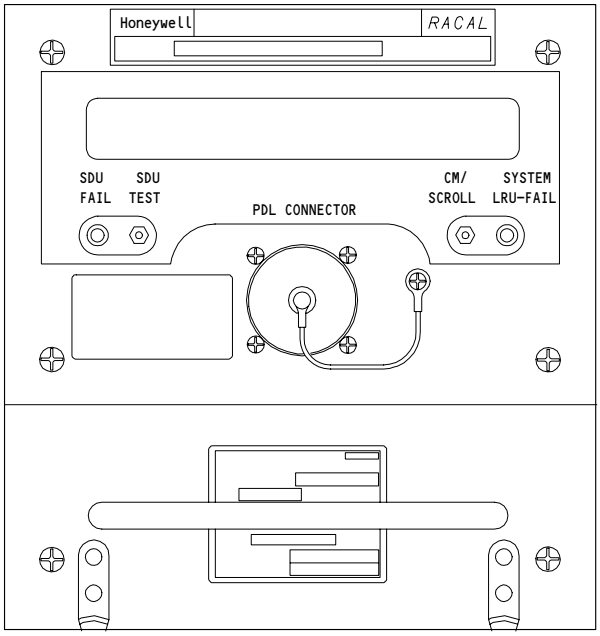
SAS
SAS S 472-023
SAS (7) Go through the selections RETURN - RETURN - SUB MENU - MAINTENANCE - LRU IDENT to page 2 of the LRU IDENTIFICATION page.
SAS
SAS S 472-024
SAS (8) Verify that the ORT IDENTIFICATION shown on the MCDU is the same as indicated on the diskette(s).
SAS
SAS S 472-025
SAS (9) Press the MENU button on the MCDU.
SAS
SAS S 472-026
SAS (10) Turn the IRU's off.
SAS
SAS S 472-027
SAS (11) Return the diskette(s) to their place.
SAS F. Put the Airplane Back to Its Usual Condition
SAS
SAS S 862-028
SAS (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

SAS SATELLITE COMMUNICATION (SATCOM) SYSTEM - ADJUSTMENT/TEST
SAS
SAS 1. General
SAS A. The satellite communications (SATCOM) adjustment/test includes the
SAS following tasks:
SAS (1) The BITE test performed at the satellite data unit (SDU)
SAS (2) The BITE test performed from the Master Control Display Unit (MCDU)
SAS (3) System functional check from the MCDU
SAS (4) Maintenance call to a GES
SAS
SAS TASK 23-25-00-745-001
SAS 2. BITE Test at SDU
SAS A. General
SAS (1) The BITE that does a check of the following components:
SAS
SAS - Satellite data unit
SAS - Radio frequency unit
SAS - High power amplifier
SAS - High gain antenna (port/starboard)
SAS - Beam steering unit (port/starboard)
SAS - Low nose amplifier/diplexer (port/starboard)
SAS - High power relay
SAS B. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS C. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Compartment
SAS 211 Control Cabin, Left

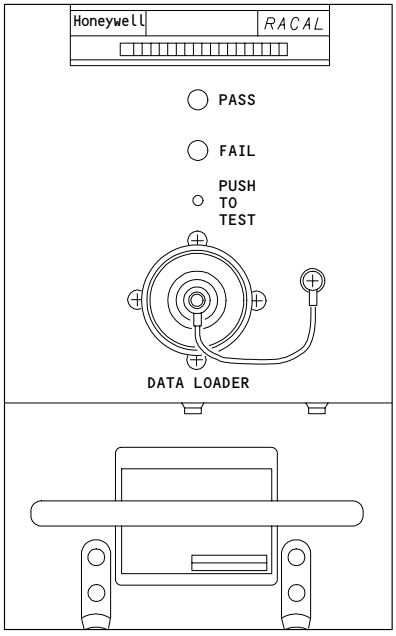
SAS (2) Access Panel
SAS 822 Aft Cargo Door

SAS D. Procedure
SAS
SAS S 865-002
SAS (1) Make sure these circuit breakers are closed:
SAS (a) SAS 156, 157, 166, 167;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11H7, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS (b) SAS 150, 153, 154, 155, 162, 163, 164, 165;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11G2, HF/SAT AUDIO SW

SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 865-003
SAS (2) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 865-004
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 015-005
SAS (4) Open the aft cargo door.
SAS
SAS S 015-006
SAS (5) Remove the access panel for the SATCOM (E9) rack near STA 1200
SAS (right side).



SATELLITE DATA UNIT



RADIO FREQUENCY UNIT

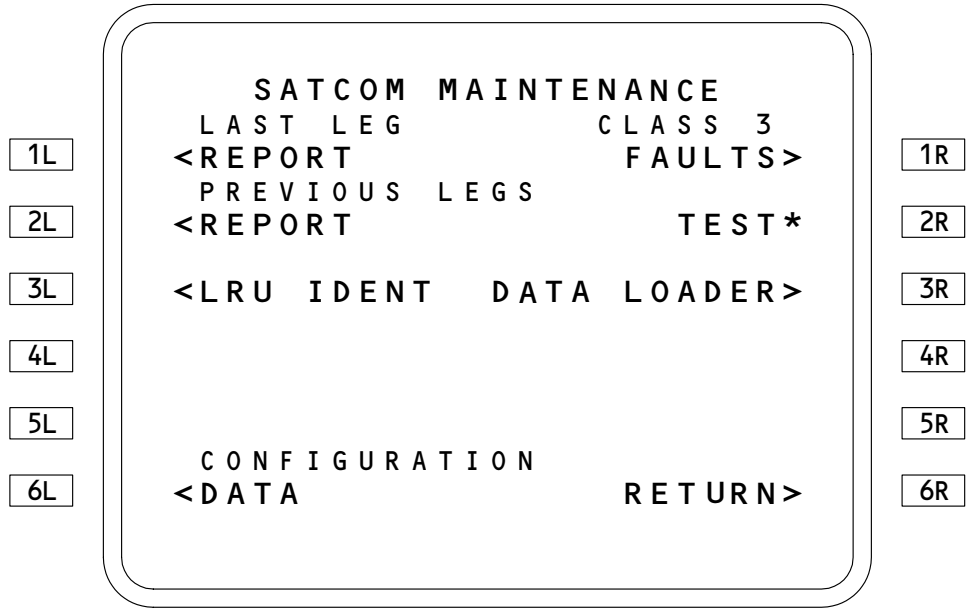
BITE Test at SDU
Figure 501

F73154

SAS
SAS S 745-007
SAS (6) Press the SDU TEST switch on the front panel of the satellite data unit on the E9-1 shelf (Fig. 501).
SAS (a) Make sure the LEDs flash on/off at a rate of 2 ±1 Hz during the test. The alphanumeric display flashes on and off and displays testing.
SAS (b) Make sure the red SDU FAIL and SYSTEM LRU FAIL LEDs turn off.
SAS (c) Make sure the alphanumeric display reads SYSTEM PASS.
SAS
SAS S 415-008
SAS (7) Install the access panel for the SATCOM (E9) rack.
SAS
SAS S 415-009
SAS (8) Close the aft cargo door.
SAS
SAS S 865-010
SAS (9) Set the IRS L mode select switch to the OFF position on the pilots' overhead panel, P5 (AMM 34-21-00/201).
SAS E. Put the Airplane In Its Usual Condition
SAS
SAS S 865-011
SAS (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).
SAS
SAS TASK 23-25-00-745-012
SAS 3. BITE Test at MCDU
SAS A. General
SAS (1) The BITE test from the MCDU does a check of the following components:
SAS
SAS This is the same test performed by the SDU when the front panel test switch is pressed.
SAS
SAS - Satellite data unit
SAS - Radio frequency unit
SAS - High power amplifier
SAS - High gain antenna (port/starboard)
SAS - Beam steering unit (port/starboard)
SAS - Low nose amplifier/diplexer (port/starboard)
SAS - High power relay
SAS B. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System

SAS C. Access
SAS (1) Location Zone
SAS 211 Control Cabin, Left

SAS D. Procedure
SAS
SAS S 865-013
SAS (1) Make sure these circuit breakers are closed:
SAS (a) SAS 156, 157, 166, 167;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11H7, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS (b) SAS 150, 153, 154, 155, 162, 163, 164, 165;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC



BITE Test at MCDU
Figure 502

SAS
SAS S 865-014
SAS (2) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 865-015
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 865-044
SAS (4) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>)
SAS
SAS S 745-016
SAS (5) Press line select key (LSK) 2R TEST* to perform a SATCOM system
SAS self-test (Fig. 502).
SAS (a) Make sure the page display temporarily goes to the test page
SAS where TEST IN PROGRESS is displayed. When the MCDU times out
SAS and goes to the main menu page, do the next step.
SAS (b) Select LSK 3L <SAT from the main menu. The initial page
SAS displayed is the TEST page with the test results. Make sure
SAS the page reads TEST OK.

SAS NOTE: The TEST prompt will be suppressed if the IRUs are not
SAS aligned.
SAS
SAS
SAS S 865-017
SAS (6) Set the IRS L mode select switch to the OFF position on the pilots
SAS overhead panel, P5 (AMM 34-21-00/201).
SAS E. Put the Airplane In Its Usual Condition
SAS
SAS S 865-018
SAS (1) Remove the electrical power if it is not necessary
SAS (AMM 24-22-00/201).
SAS
SAS TASK 23-25-00-725-019
SAS 4. Functional Check
SAS A. General
SAS (1) The functional check makes sure the SATCOM system has a link to the
SAS ground earth station (GES). The link makes it possible for the
SAS SATCOM system to send and receive signals to and from the ground
SAS earth station.

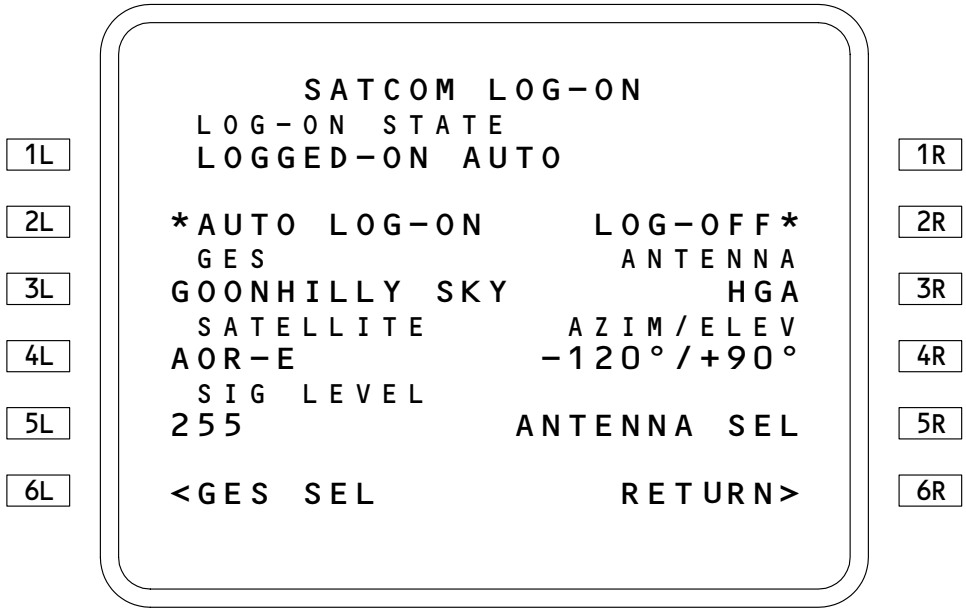
SAS (2) When you do the functional check, make sure the airplane is not in a
SAS hanger. The SATCOM antenna must have a clear view to the applicable
SAS satellite to make a link with a ground earth station.
SAS (3) The functional check uses the SATCOM pages on the MCDU to verify the
SAS system is logged-on.
SAS (4) Do the functional check 5 to 10 minutes after you close the SATCOM
SAS circuit breakers. Five to ten minutes are usually required for the
SAS SATCOM system to log-on and establish a link with the ground earth
SAS station.
SAS B. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS C. Access
SAS (1) Location Zone
SAS 211 Control Cabin, Left
SAS
SAS D. Procedure

S 865-020

SAS WARNING: TO AVOID POTENTIALLY DANGEROUS EXPOSURE TO RADIO FREQUENCY
SAS ENERGY ABOVE THE ANSI C95.1 LIMIT AND OTHER WORLD STANDARDS
SAS WHEN USING A HIGH GAIN ANTENNA (12 DECIBELS NOMINAL ANTENNA),
SAS DO NOT OPERATE THE MCS SATCOM SYSTEM WHEN ANY PERSONNEL ARE
SAS WITHIN 8.5 FEET OF THE ANTENNA OR WITHIN 20 FEET OF THE ANTENNA
SAS FOR PERIODS OF LONGER THAN 3 MINUTES PER HOUR.
SAS

(1) Make sure these circuit breaker are closed:
SAS (a) SAS 156, 157, 166, 167;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11H7, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS (b) SAS 150, 153, 154, 155, 162, 163, 164, 165;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 865-022
SAS (2) Supply the electrical power (AMM 24-22-00/201).

SAS
SAS S 865-023
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 865-024
SAS (4) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU),
SAS LSK 2L (<LOG-ON)
SAS
SAS
SAS S 725-025
SAS (5) Make sure the log-on state at line select key (LSK) 1L shows
SAS LOGGED-ON (Fig. 503) AUTO will follow the log-on state if the SDU
SAS controlled the GES selection. CONSTRAINED will follow the log-on
SAS state if the logged-on GES was selected manually on the GES
SAS selection page. The logged-on GES is shown at LSK 3L.

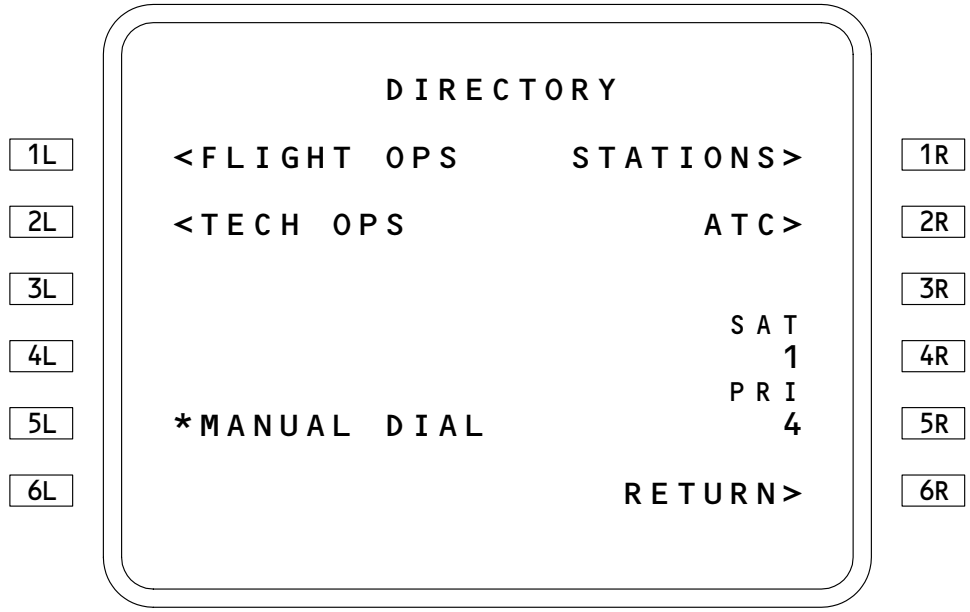


Functional Check
Figure 503

SAS
SAS S 865-026
SAS (6) Set the IRS L mode select switch to the OFF position on the pilots' overhead panel, P5 (AMM 34-21-00/201).
SAS E. Put the Airplane In Its Usual Condition
SAS
SAS S 865-027
SAS (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).
SAS
SAS TASK 23-25-00-725-028
SAS 5. Maintenance Call (Fig. 504)
SAS A. General
SAS (1) The maintenance call allows the operator to verify the entire SATCOM system including the audio interface is functioning properly.
SAS (2) When you make the call, make sure the airplane is not in a hanger. The SATCOM antenna must have a clear view to the applicable satellite to make a link with a ground earth station.
SAS (3) The maintenance call is made by manually entering a maintenance number from SATCOM pages on the MCDU. The maintenance numbers to be used are:
SAS (a) 91 - Which gets a recorded message.
SAS (b) 92 - Which connects you to a maintenance operator.
SAS (4) The system must be logged-on prior to attempting the call. Five to ten minutes are usually required for the SATCOM system to log-on and establish a link with the ground earth station after the circuit breakers are closed.
SAS B. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS C. Access
SAS (1) Location Zone
SAS 211 Control Cabin, Left
SAS
SAS D. Procedure
SAS
SAS S 865-043
SAS
SAS WARNING: TO AVOID POTENTIALLY DANGEROUS EXPOSURE TO RADIO FREQUENCY ENERGY ABOVE THE ANSI C95.1 LIMIT AND OTHER WORLD STANDARDS WHEN USING A HIGH GAIN ANTENNA (12 DECIBELS NOMINAL ANTENNA), DO NOT OPERATE THE MCS SATCOM SYSTEM WHEN ANY PERSONNEL ARE WITHIN 8.5 FEET OF THE ANTNENA OR WITHIN 20 FEET OF THE ANTENNA FOR PERIODS OF LONGER THAN 3 MINUTES PER HOUR.
SAS
SAS (1) Make sure these circuit breakers are closed:
SAS (a) SAS 156, 157, 166, 167;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11H7, HF/SAT AUDIO SW

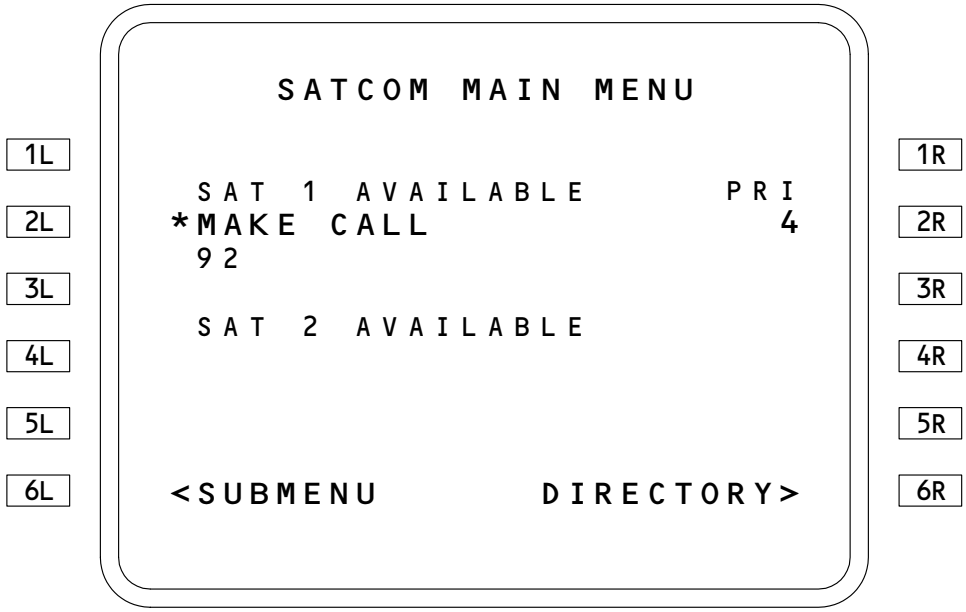
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS (b) SAS 150, 153, 154, 155, 162, 163, 164, 165;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 865-030
SAS (2) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 865-031
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 865-032
SAS (4) At the HF/SAT select panel in the P5 overhead make sure the HF/SAT
SAS XFER switch, for the desired channel left or right, is in the SATCOM
SAS position with the SAT lamp illuminated. SAT 1 corresponds to left
SAS channel and SAT 2 corresponds to right channel.
SAS
SAS S 865-033
SAS (5) From the MCDU main menu you press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (DIRECTORY>)
SAS
SAS
SAS S 865-042
SAS
SAS WARNING: PRIORITY 1 CALLS ARE FOR EMERGENCY CALLS ONLY.
SAS
SAS (6) Make sure the priority at line select key (LSK) 5R is 4. The
SAS priority can be changed by entering 4 in the scratchpad and pressing
SAS LSK 5R.

SAS
SAS S 865-045
SAS (7) Make sure the correct channel is selected at LSK 4R. Channel 1 is
SAS for the left HF/SAT channel. Channel 2 is for the right HF/SAT
SAS channel. The channel can be changed by entering the desired channel
SAS (1 or 2) in the scratchpad and pressing LSK 4R.
SAS
SAS S 725-035
SAS (8) Type 92 into the MCDU scratchpad, then press LSK 5L *MANUAL DIAL.
SAS The MCDU page automatically returns to the SATCOM MAIN MENU page.



Maintenance Call
Figure 504 (Sheet 1)

SAS
SAS S 725-036
SAS (9) Press *MAKE CALL for the desired channel, LSK 2L for SAT 1 or LSK 4L
SAS for SAT 2. The status of the call can be observed on the label line
SAS at line select key (LSK) 2L for SAT 1 AND LSK 4L for SAT 2.
SAS CONNECTED will be displayed when the circuit is connected. Also an
SAS audible chime will sound and the SAT call light will illuminate on
SAS the HF/SAT select panel.
SAS
SAS S 725-037
SAS (10) At the Audio Control Panel in the P8 aft pilot control stand,
SAS activate the HF/SAT MIC for the desired channel. Use the PTT
SAS function to effect communications.
SAS
SAS S 725-039
SAS (11) Terminate the call by pressing the illuminated SAT call light on the
SAS HF/SAT select panel on the pilots' overhead panel, P5.



Maintenance Call
Figure 504 (Sheet 2)

SAS
SAS S 865-040
SAS (12) Set the IRS L mode select switch to the OFF position on the pilots' overhead panel, P5 (AMM 34-21-00/201).
SAS E. Put the Airplane In Its Usual Condition
SAS
SAS S 865-041
SAS (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

SAS RF COMBINER - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. The RF combiner takes the RF signals from the port and starboard LNA/Diplexers and sends them to the radio frequency unit.
SAS B. This procedure includes two tasks:
SAS (1) Removal of the RF combiner
SAS (2) Installation of the RF combiner
SAS C. The RF combiner is on the same mounting bracket as the high power relay, located above the center overhead stowage bins on the left side at STA 1060 forward of the E10 equipment center.
SAS
SAS TASK 23-25-02-004-001
SAS 2. RF Combiner Removal
SAS A. Standard Tools and Equipment
SAS (1) Stepladder
SAS B. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling, Left
SAS
SAS C. Procedure
SAS
SAS S 864-002
SAS (1) Open the these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-004
SAS (2) Remove the applicable left-hand aisle ceiling panel (Fig. 401).
SAS
SAS S 024-003
SAS (3) Remove connectors D2665, D2667, and D2669 from the ports of the RF combiner M1786.
SAS
SAS S 024-005
SAS (4) Remove the combiner.
SAS
SAS TASK 23-25-02-404-017
SAS 3. RF Combiner Installation
SAS A. General
SAS (1) When you do the installation test, make sure the airplane is not in a hanger. The SATCOM antenna must hav a clear view to the applicable satellite to make a link with the ground earth station.

SAS (2) The installation test is performed from the Master Control Display Unit (MCDU) in the cockpit.
SAS (3) Do the installation test 5 to 10 minutes after you close the SATCOM circuit breakers. Five to ten minutes are usually required for the SATCOM system to log-on and establish a link with the ground earth station (GES).
SAS B. Standard Tools and Equipment
SAS (1) Stepladder
SAS C. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00, Inertial Reference System
SAS D. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling, Left
SAS
SAS E. Procedure
SAS
SAS S 424-006
SAS (1) Install the RF combiner.

SAS
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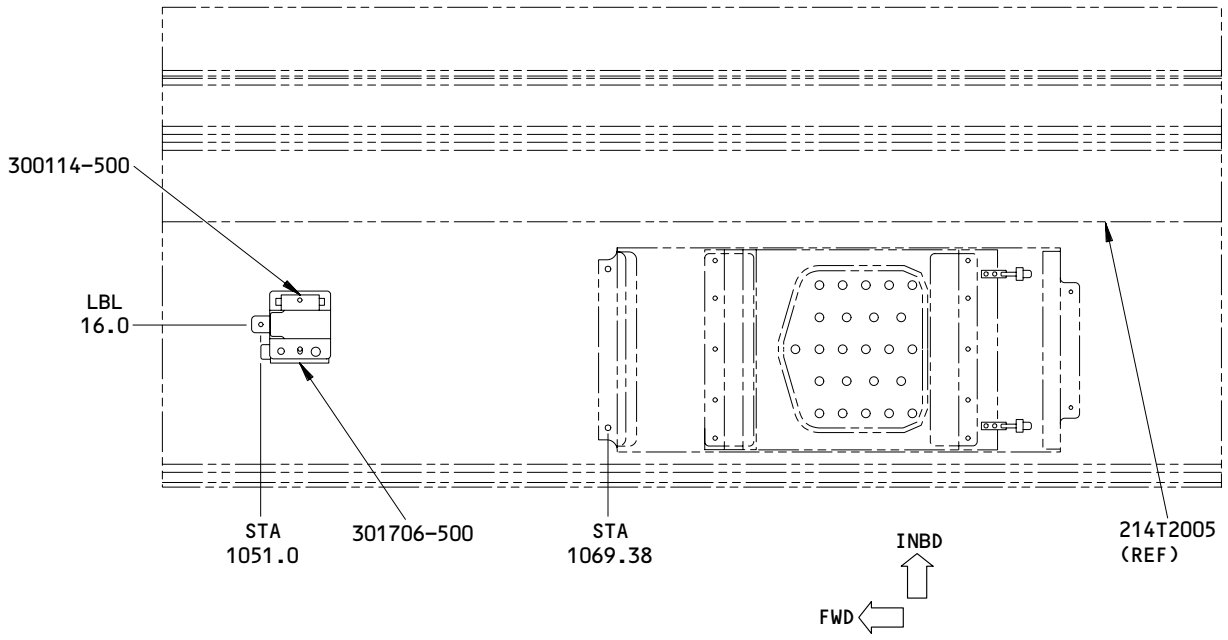
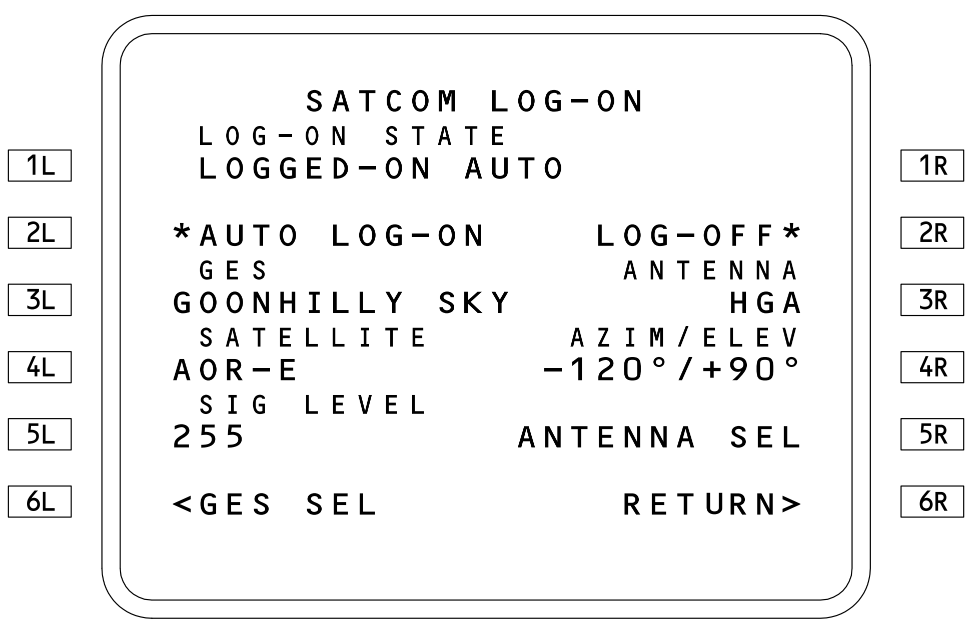


RF Combiner Installation
Figure 401

SAS
SAS S 424-007
SAS (2) Install connectors D2665, D2667, and D2669 on the ports of the RF
SAS combiner M1786.
SAS
SAS S 414-008
SAS (3) Install the ceiling panel.
SAS
SAS S 864-009
SAS (4) Remove the DO-NOT-CLOSE- tags and close the these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS F. Installation Test
SAS
SAS S 864-010
SAS (1) Make sure these circuit breakers are closed:
SAS (a) On the P11 panel:
SAS 1) 11H7 OR 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 864-011
SAS (2) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 864-012
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 864-013
SAS (4) From the MCDU main menu you press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU),
SAS LSK 2L (<LOG-ON)
SAS
SAS
SAS S 724-014
SAS (5) Make sure the log-on state at line select key (LSK) 1L shows LOGGED
SAS ON (Fig. 402). AUTO will follow the log-on state if the SDU
SAS controlled the GES selection. CONSTRAINED will follow the log-on
SAS state if the logged-on GES is shown at LSK 3L.

SAS
SAS S 864-015
SAS (6) Set IRS L mode select switch to the OFF position on the pilots' overhead panel, P5 (AMM 34-21-00/201).
SAS G. Put the Airplane In Its Usual Condition
SAS
SAS S 864-016
SAS (1) Remove the electrical power if it is necessary (AMM 24-22-00/201).



RF Combiner Installation Test
Figure 402

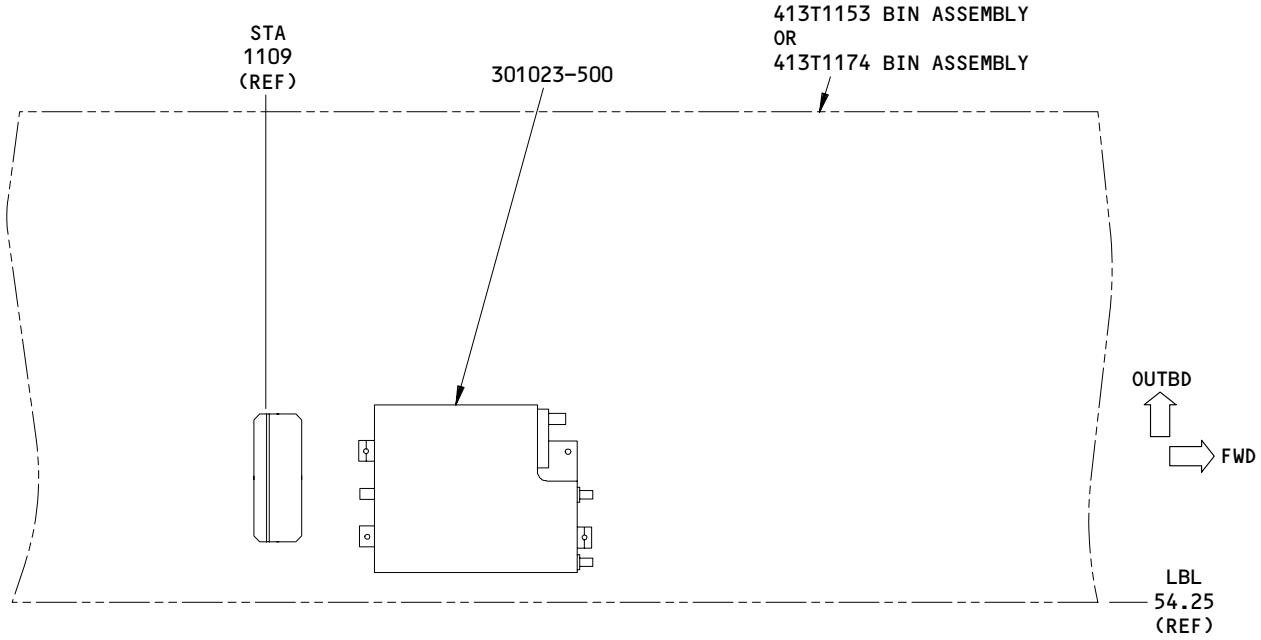
F73317

SAS LOW NOISE AMPLIFIER/DIPLEXER - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. This procedure includes two tasks:
SAS (1) Removal of the low noise amplifier LNA/diplexer for the high gain antenna (HGA) subsystem.
SAS (2) Installation of the LNA/diplexer for the HGA subsystem.
SAS B. There are two LNA/diplexers installed, one each for the left hand and right hand antenna installations. The LNA/diplexers are located above the ceiling on top of the outboard overhead stowage bins at STA 1100. The removal of the left hand LNA/diplexer is provided in the procedure below. The procedure for removing the right hand LNA/diplexer is the same as the left hand procedure except the location is changed to the right hand side of the airplane.
SAS
SAS TASK 23-25-09-004-001
SAS 2. Low Noise Amplifier/Diplexer Removal
SAS A. Standard Tools and Equipment
SAS (1) Stepladder
SAS B. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling, Left
SAS
SAS C. Procedure
SAS
SAS S 864-002
SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-003
SAS (2) Remove the applicable left-hand aisle ceiling panel at STA 1100.
SAS
SAS S 024-004
SAS (3) Remove the following connectors from the LNA/diplexer:
SAS

Port LNA/diplexer M1789	D2703(J1)	coax
	D2705(J2)	coax
	D2707(J3)	coax
	D2709(J4)	harness
Starboard LNA/diplexer M1790	D2711(J1)	coax
	D2713(J2)	coax
	D2715(J3)	coax
	D2717(J4)	harness

SAS

SAS
SAS S 024-005
SAS (4) Remove the low noise amplifier/diplexer (screw and washer at
SAS 4 locations)(Fig. 401).
SAS
SAS TASK 23-25-09-404-006
SAS 3. Low Nosie Amplifier/Diplexer Installation
SAS A. Standard Tools and Equipment
SAS (1) Stepladder
SAS B. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS C. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area ABove Passenger Cabin Ceiling, Left
SAS



TOP VIEW

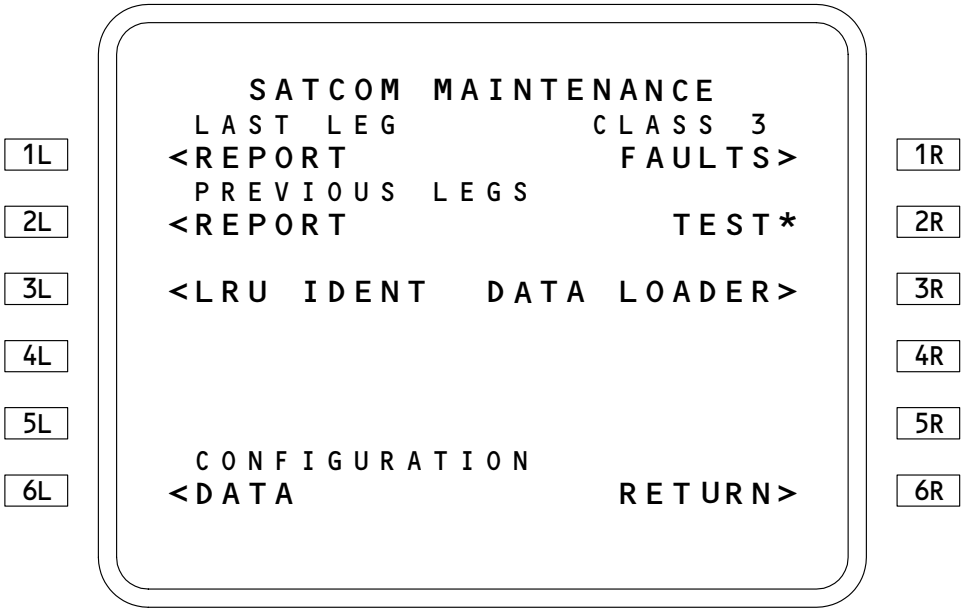
Low Noise Amplifier/Diplexer Installation
Figure 401

SAS D. Procedure
SAS
SAS S 424-007
SAS (1) Install the low noise amplifier/diplexer (screw and washer at four
SAS locations).
SAS
SAS S 424-008
SAS (2) Connect the following connectors from the LNA/diplexer:
SAS

Port LNA/diplexer M1789	D2703(J1)	coax
	D2705(J2)	coax
	D2707(J3)	coax
	D2709(J4)	harness
Starboard LNA/diplexer M1790	D2711(J1)	coax
	D2713(J2)	coax
	D2715(J3)	coax
	D2717(J4)	harness

SAS
SAS
SAS S 414-009
SAS (3) Install the ceiling panel.
SAS
SAS S 864-017
SAS (4) Remove the DO-NOT-CLOSE tags and close the following circuit
SAS breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS E. Installation Test
SAS
SAS S 864-010
SAS (1) Make sure these circuit breakers are closed:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H7 or 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 864-011
SAS (2) Supply the electrical power (AMM 24-22-00/201)
SAS
SAS S 864-012
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).

SAS
SAS S 864-013
SAS (4) From the Master Control Display Unit (MCDU) main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>)
SAS
SAS
SAS S 744-014
SAS (5) Press line select key (LSK) 2R TEST* to perform a SATCOM system
SAS self-test (Fig. 402).
SAS (a) Make sure the page display temporarily goes to the test page
SAS where TEST IN PROGRESS is dipslayed. When the MCDU eventually
SAS times out and goes to the main menu page, do the next step.

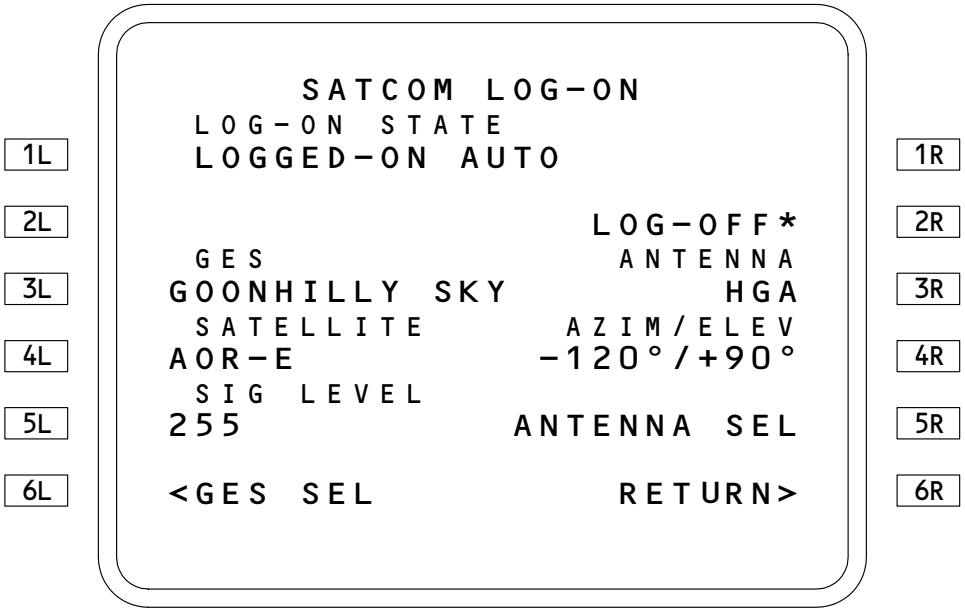


Low Noise Amplifier/Diplexer Installation Test
Figure 402

SAS (b) Select LSK 3L <SAT from the main menu. The initial page
SAS displayed is the TEST page with the test results. Make sure
SAS the page reads TEST OK.
SAS
SAS NOTE: The TEST* prompt will be supressed if the IRU's are not
SAS aligned.
SAS
SAS
SAS S 864-016
SAS (6) Set the IRL L mode select switch to the OFF position on the pilots
SAS overhead panel, P5 (AMM 34-21-00/201).
SAS F. Put the Airplane In Its Usual Condition
SAS
SAS S 864-015
SAS (1) Remove the electrical power if it is not necessary
SAS (AMM 24-22-00/201).

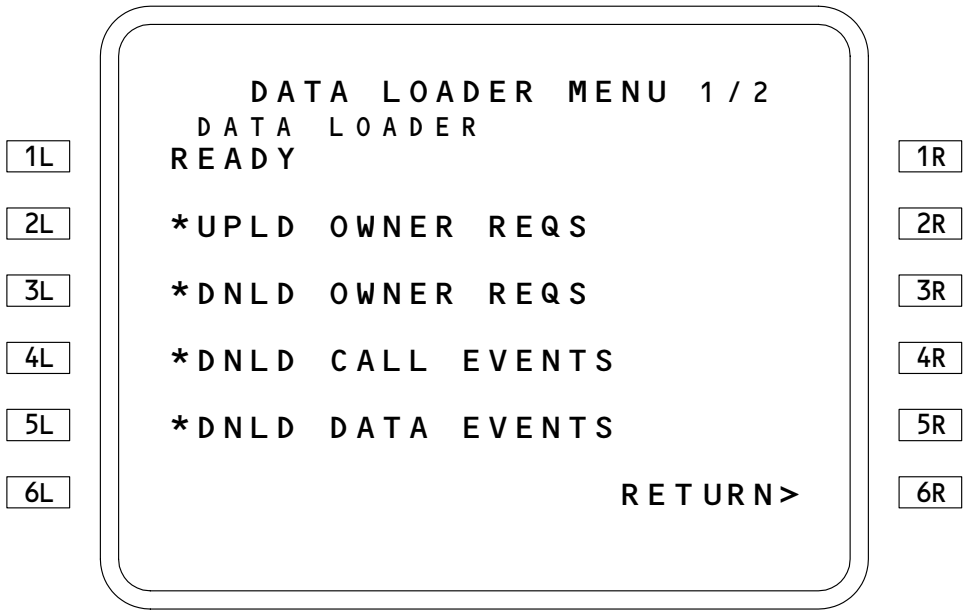
SAS SATELLITE DATA UNIT - MAINTENANCE PRACTICES
SAS
SAS 1. General
SAS A. This procedure includes this task:
SAS (1) Uploading the Owner Requirements Table (ORT) into the SDU.
SAS B. The ORT provides a means to customize the functionality of the SATCOM
SAS system.
SAS (1) The ORT format permits new generations of system software to be
SAS compatible with previous versions of the ORT.
SAS (2) The ORT is capable of being downloaded or uploaded to and from the
SAS airborne data loader or portable data loader.
SAS (3) When the ORT is uploaded, the values of items that depend on the
SAS systems physical configuration are checked against the system
SAS configuration pins. If any item is not compatible with the pin
SAS setting, the appropriate default value is substituted into the table
SAS and a failure is flagged.
SAS (4) SAS Engineering controls the values set in the ORT.
SAS C. The ORT table cannot be uploaded while the SATCOM system is logged on to
SAS a GES.
SAS
SAS TASK 23-25-10-402-001
SAS 2. Owner Requirements Table (ORT) Upload (Fig. 201)
SAS A. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS B. Access
SAS (1) Location Zone
SAS 211 Control Cabin, Right
SAS
SAS C. Procedure
SAS
SAS S 862-015
SAS (1) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 2L (<LOG-ON)
SAS
SAS
SAS S 862-002
SAS (2) From the SATCOM LOG ON menu press: LSK 2R (LOG-OFF*)
SAS (a) This initiates a log-off and the SATCOM LOG-ON state at LSK 1L
SAS should change to LOGGED-OFF.
SAS
SAS S 862-004
SAS (3) Panel P61, at the Airborne Data Loader control panel rotate the
SAS select switch to: SATCOM SDU.

SAS
SAS S 422-005
SAS (4) Insert the latest copy of the ORT to be uploaded.
SAS
SAS S 862-006
SAS (5) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 3R (DATA LOADER>)
SAS



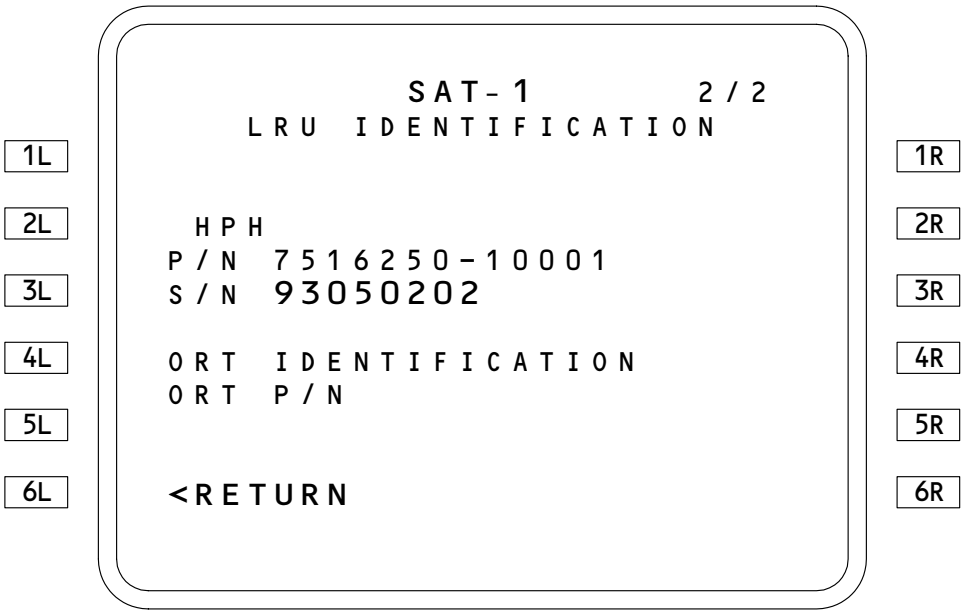
Owner Requirements Table (ORT) Upload
Figure 201 (Sheet 1)

SAS
SAS S 422-007
SAS (6) From the MCDU DATA LOADER menu press:
SAS
SAS LSK 2L (*UPLD OWNER REQS)
SAS
SAS (a) After pressing LSK 2L, <SEL> will appear and the data loader
SAS status at LSK 1L will change to BUSY. When the data transfer
SAS is complete, the <SEL> will disappear and the data loader
SAS status will change.
SAS
SAS S 862-008
SAS (7) When the software load is complete the airborne data loader will
SAS show COMPLETE.
SAS (a) Push the eject button and remove the diskette.
SAS
SAS S 862-009
SAS (8) Panel P61, at the Airborne Data Loader control panel rotate the
SAS select switch to: NORM.



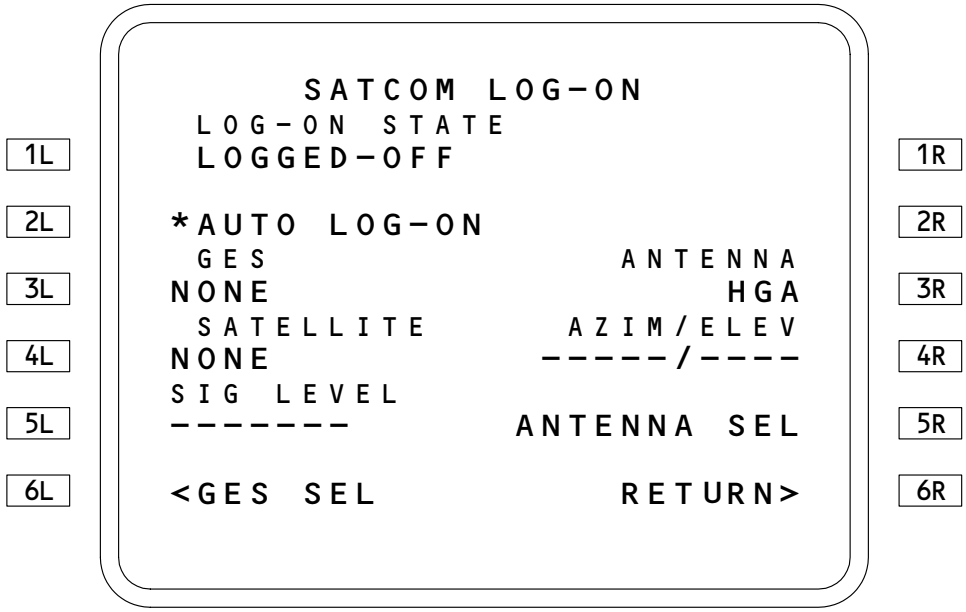
Owner Requirements Table (ORT) Upload
Figure 201 (Sheet 2)

SAS
SAS S 862-010
SAS (9) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 3L (<LRU IDENT)
SAS
SAS
SAS S 712-011
SAS (10) The last entry in the LRU IDENTIFICATION pages is the ORT P/N.
SAS (a) Verify the ORT P/N corresponds to the P/N software loaded.
SAS (Example of expected ORT file name: SAS ORTFILE VER 1 950227)



Owner Requirements Table (ORT) Upload
Figure 201 (Sheet 3)

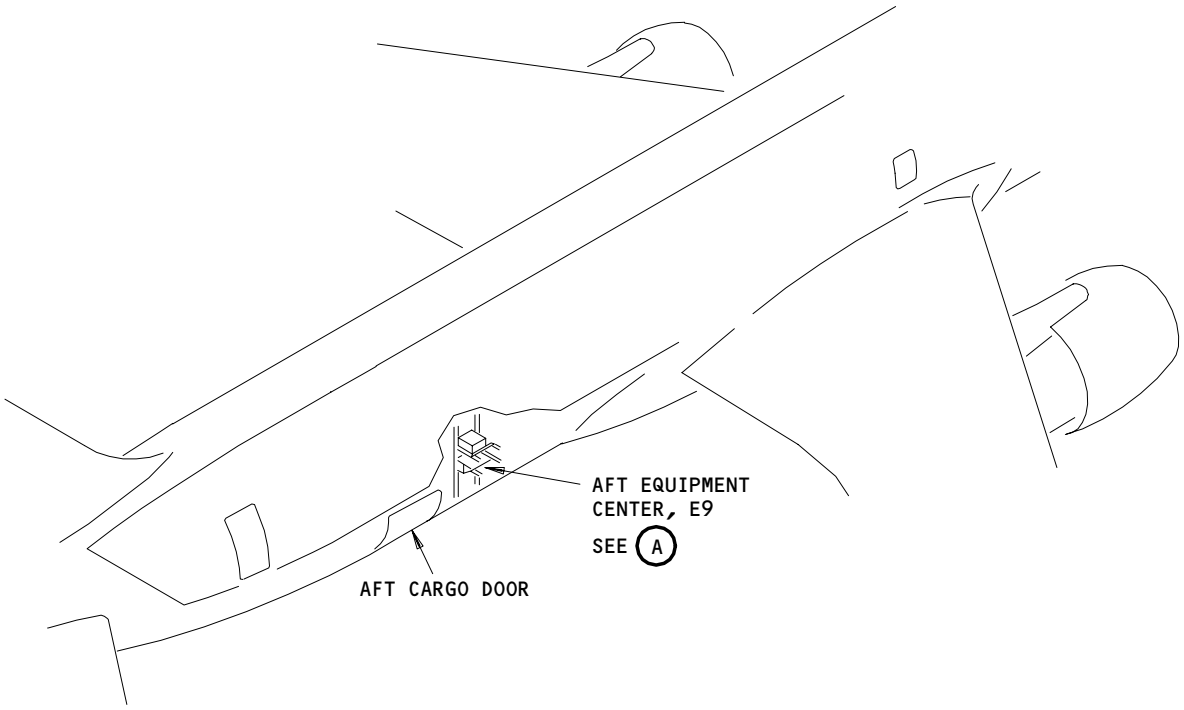
SAS
SAS S 862-012
SAS (11) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 2L (<LOG-ON)
SAS
SAS
SAS S 862-013
SAS (12) From the SATCOM LOG-ON main menu press: LSK 2L (*AUTO LOG-ON).
SAS (a) This initiates an auto SDU log-on and the SATCOM LOG-ON state
SAS at LSK 1L should change to LOGGED-ON AUTO.

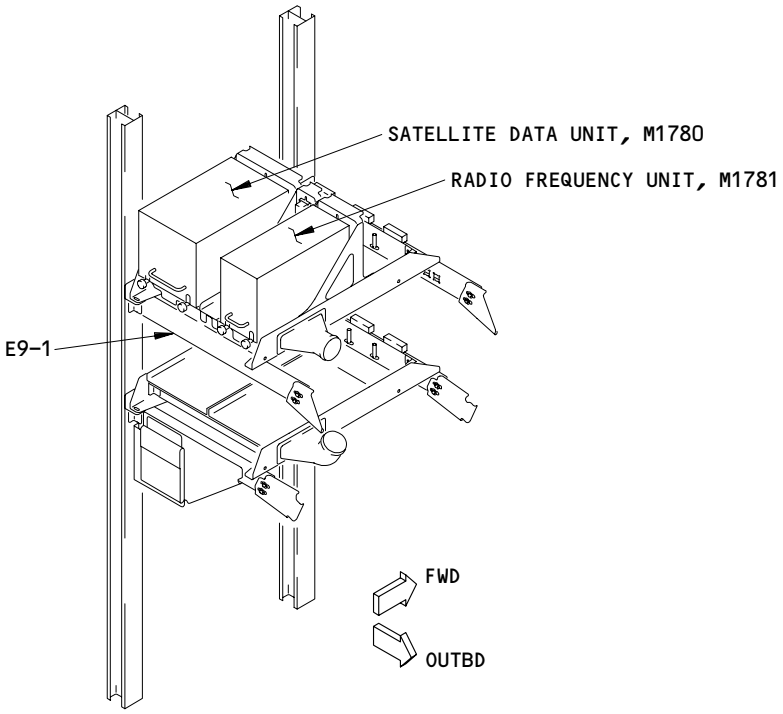


Owner Requirements Table (ORT) Upload
Figure 201 (Sheet 4)

SAS SATELLITE DATA UNIT - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. This procedure includes the following tasks:
SAS (1) Removal of the satellite data unit
SAS (2) Installation of the satellite data unit
SAS (3) Software loading of the satellite data unit
SAS B. The satellite data unit, M1780 is installed on shelf 1 of the aft equipment rack, E9. E9 is forward of the aft cargo door on the right side of the aft cargo compartment.
SAS
SAS TASK 23-25-10-004-001
SAS 2. Satellite Data Unit Removal
SAS A. Reference
SAS (1) AMM 20-10-01/401, E/E Rack Mounted Components
SAS B. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Compartment
SAS 211 Control Cabin, Left
SAS
SAS (2) Access Panel
SAS 822 Aft Cargo Door
SAS
SAS C. Procedure
SAS
SAS S 864-030
SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-002
SAS (2) Open the aft cargo door.
SAS
SAS S 014-003
SAS (3) Remove the access panel for the SATCOM (E9) rack near STA 1200 (right side).
SAS
SAS S 024-004
SAS (4) Remove the satellite data unit (AMM 20-10-01/401) (Fig. 401).
SAS
SAS TASK 23-25-10-404-005
SAS 3. Satellite Data Unit Installation
SAS A. References
SAS (1) AMM 20-10-01/401, E/E Rack Mounted Components
SAS (2) AMM 24-22-00/201, Manual Control

SAS





AFT EQUIPMENT CENTER, E9

(A)

Satellite Data Unit Installation
Figure 401

SAS (3) AMM 34-21-00/201, Inertial Reference System
SAS B. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Compartment
SAS 211 Control Cabin, Left
SAS
SAS (2) Access Panel
SAS 822 Aft Cargo Door
SAS
SAS C. Procedure
SAS
SAS S 424-006
SAS (1) Install the satellite data unit (AMM 20-10-01/401).
SAS
SAS S 864-031
SAS (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA

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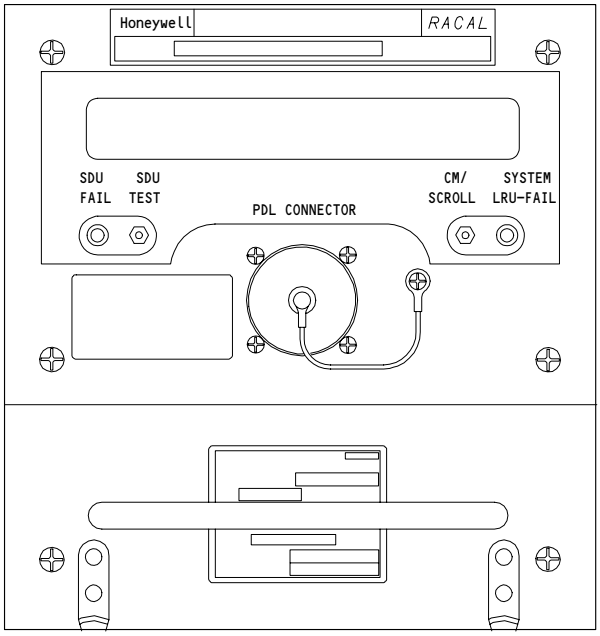
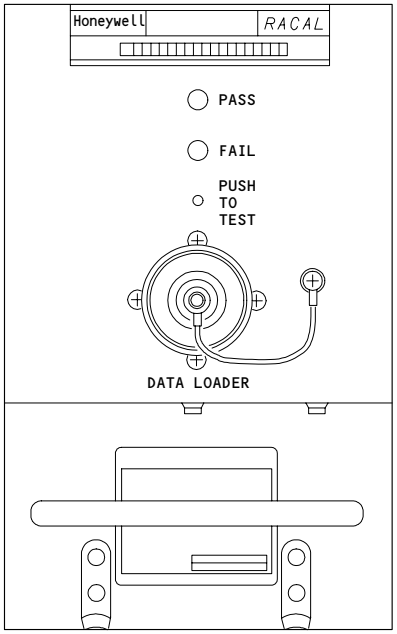


SATELLITE DATA UNIT

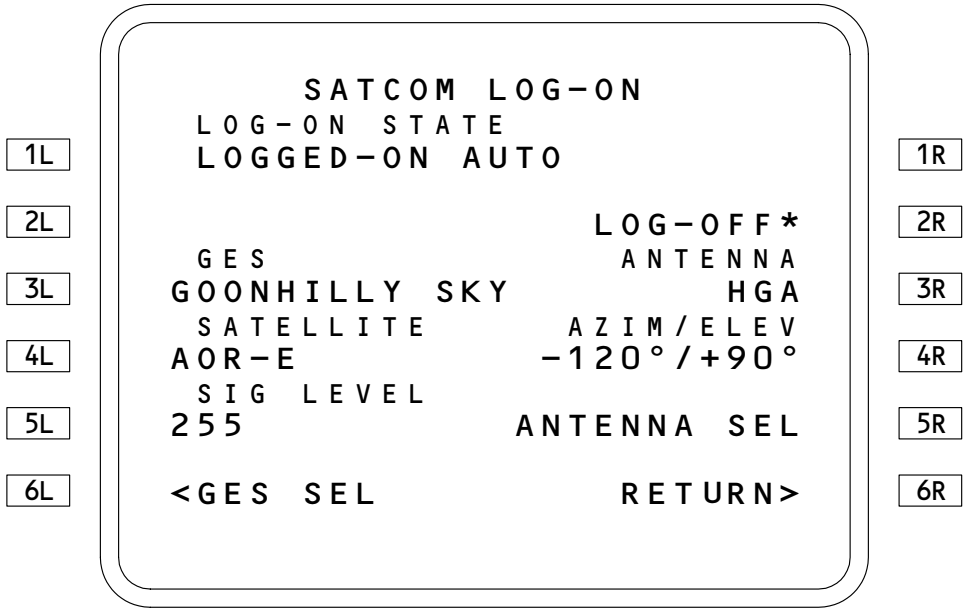


RADIO FREQUENCY UNIT

SATCOM Equipment
Figure 402

SAS D. Installation Test
SAS
SAS S 864-007
SAS (1) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 864-008
SAS (2) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 744-009
SAS (3) Press the SDU TEST switch on the front panel of the satellite data
SAS unit on the E9-1 shelf (Fig. 402).
SAS (a) Make sure the LED's flash on/off at a rate of 2 ±1 Hz during
SAS the test and the alphanumeric display flashes on and off and
SAS displays TESTING.
SAS (b) Make sure the red SDU FAIL and SYSTEM LRU FAIL LED's turn off.
SAS (c) Then make sure the alphanumeric display reads SYSTEM PASS.
SAS
SAS S 414-010
SAS (4) Install the access panel for the SATCOM (E9) rack.
SAS
SAS S 414-011
SAS (5) Close the aft cargo door.
SAS
SAS S 864-012
SAS (6) Set the IRS L mode select switch to the OFF position on the pilots
SAS overhead panel, P5 (AMM 34-21-00/201).
SAS E. Put the Airplane In Its Usual Condition
SAS
SAS S 864-013
SAS (1) Remove the electrical power if it is not necessary
SAS (AMM 24-22-00/201).
SAS
SAS TASK 23-25-10-404-014
SAS 4. Satellite Data Unit Software Installation (Fig. 403)
SAS A. General
SAS (1) This task contains the steps to load new operational software into
SAS the satellite data unit, (SDU) and verify the software loaded.
SAS (2) Steps are also included to upload the ORT after the operational
SAS software load is complete.
SAS (3) The SDU will not load the new software while the SDU is logged-on to
SAS a GES.
SAS B. Equipment
SAS (1) ARINC 615 Airborne Data Loader
SAS (2) The most up to date diskette of the SDU SATCOM software to be
SAS loaded.

SAS (3) Diskette with the current ORT file.
SAS C. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS D. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Compartment
SAS 211 Control Cabin, Left
SAS
SAS (2) Access Panel
SAS 822 AFt Cargo Door
SAS
SAS E. Procedure
SAS
SAS S 864-015
SAS (1) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 2L (<LOG-ON)
SAS

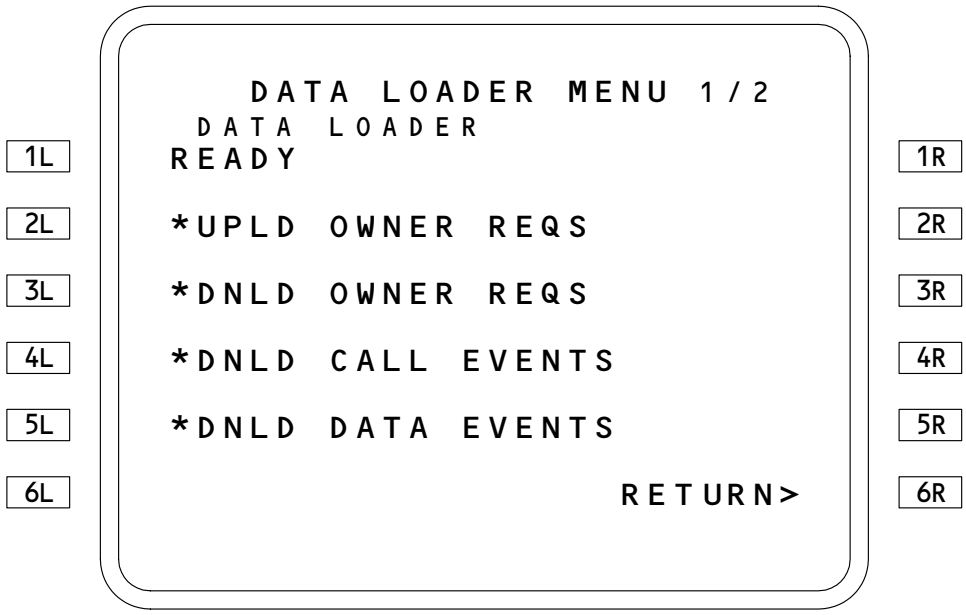


Satellite Data Unit Software Installation
Figure 403 (Sheet 1)

F73319

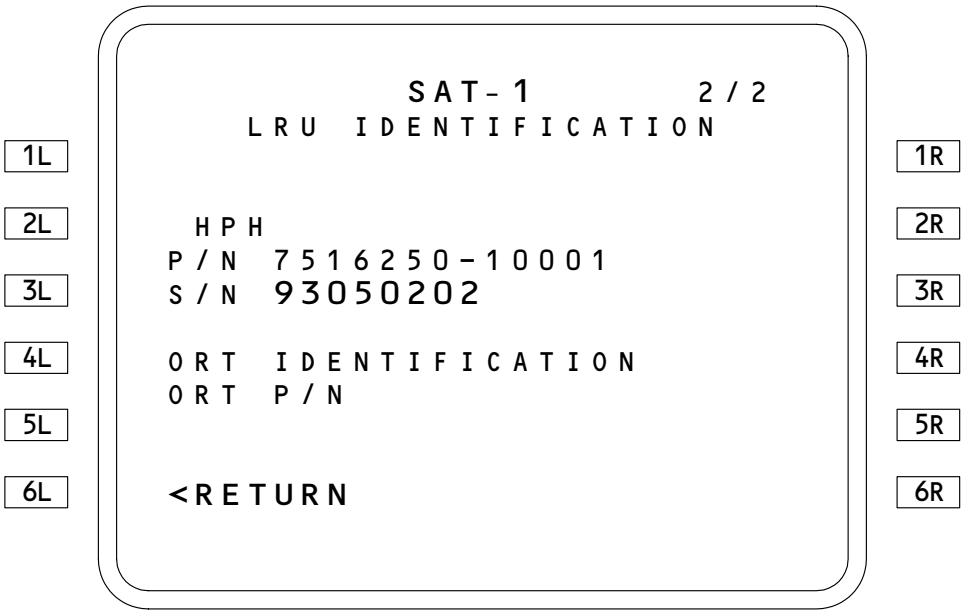
SAS
SAS S 864-016
SAS (2) From the SATCOM LOG-ON menu press: LSK 2R (LOG-OFF*)
SAS (a) This initiates a log-off and the SATCOM LOG-ON state at LSK 1L should change to LOGGED-OFF.
SAS
SAS S 864-017
SAS (3) Panel P61, at the Airborne Data Loader control panel rotate the select switch to: SATCOM SDU.
SAS
SAS S 424-018
SAS (4) Perform the operational software installation.
SAS (a) Make sure the INSERT DIS #1 is shown on the airborne data loader.
SAS (b) Verify the software P/N on the diskette is the correct number to be installed.
SAS (c) Put the diskette into the drive.
SAS (d) During data movement the airborne data loader will cause these effects to occur for each file on the diskette.
SAS 1) The data loader shows the filename and the percentage of the file that has been moved.
SAS 2) The data loader shows the number of blocks moved adjacent to the title TRANSFERRED after the complete file has been moved.
SAS (e) If the data loader shows the message INSERT DISK #2, then do these steps:
SAS
SAS NOTE: The INSERT DISK #2 display shows that it is necessary for the LRU to use more than one diskette to complete data input.
SAS
SAS 1) Push the eject button and remove the diskette from the disk drive. Make sure the display goes blank.
SAS 2) Inser the subsequent diskette into the disk drive.
SAS 3) Make sure the data loader goes through the same indications as it did for diskette No. 1.
SAS (f) When the software load is complete the data loader will show COMPLETE.
SAS 1) Push the eject button and remove the diskette.
SAS
SAS S 424-020
SAS (5) Insert the latest copy of the ORT to be uploaded into the airborne data loader.

SAS
SAS S 864-019
SAS (6) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 3R (DATA LOADER>)
SAS
SAS
SAS S 424-021
SAS (7) From the MCDU DATA LOADER menu press:
SAS
SAS LSK 2L (*UPLD OWNER REQS)
SAS
SAS After pressing LSK 2L, <SEL> will appear and the data loader status
SAS at LSK 1L will change from READY to BUSY. When the data transfer is
SAS complete, the <SEL> will disappear and the data loader status will
SAS change.



Satellite Data Unit Software Installation
Figure 403 (Sheet 2)

SAS
SAS S 864-032
SAS (8) When the software load is complete the airborne data loader will
SAS show COMPLETE.
SAS (a) Push the eject button and remove the diskette.
SAS
SAS S 864-022
SAS (9) Panel P61, at the Airborne Data Loader control panel move the select
SAS switch to: NORM.
SAS
SAS S 864-023
SAS (10) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 864-033
SAS (11) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 3L (<LRU IDENT)
SAS



Satellite Data Unit Software Installation
Figure 403 (Sheet 3)

S 714-024

(12) On the LRU IDENTIFICATION pages, under the SDU, verify the three digit software configuration number corresponds to the P/N software loaded.

P/N SDU bbbbbbb-hhss
where: bbbbbbb is the 7-digit LRU end item base part number
hh is the 2-digit LRU end item hardware configuration number
sss is the 3-digit LRU end item software configuration number

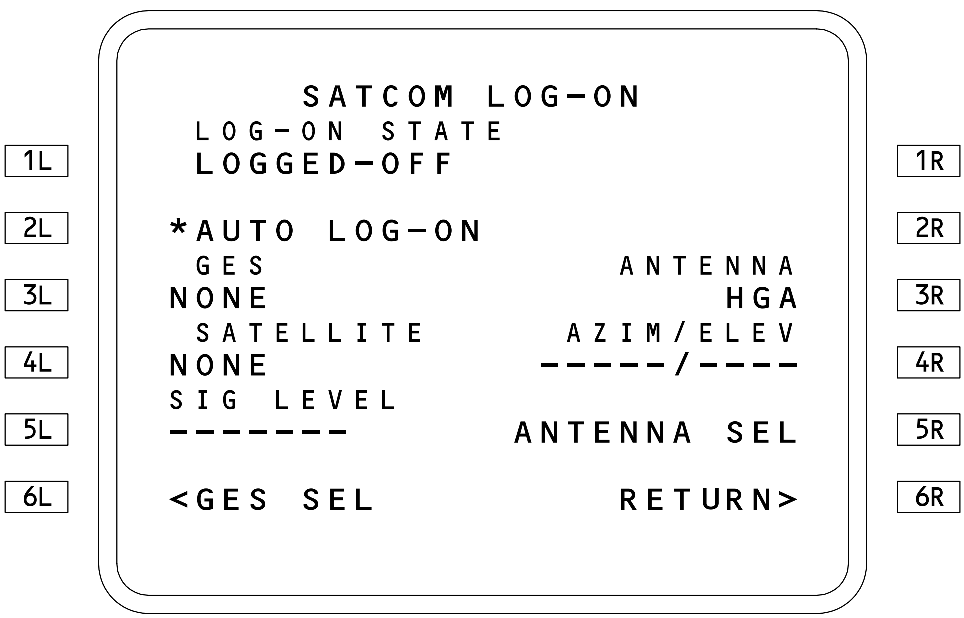
S 864-025

(13) The last entry in the LRU IDENTIFICATION pages is the ORT P/N.
(a) Verify the ORT P/N corresponds to the P/N software loaded. (Example of ORT file name: SAS ORTFILE VER 1 950227)

S 864-034

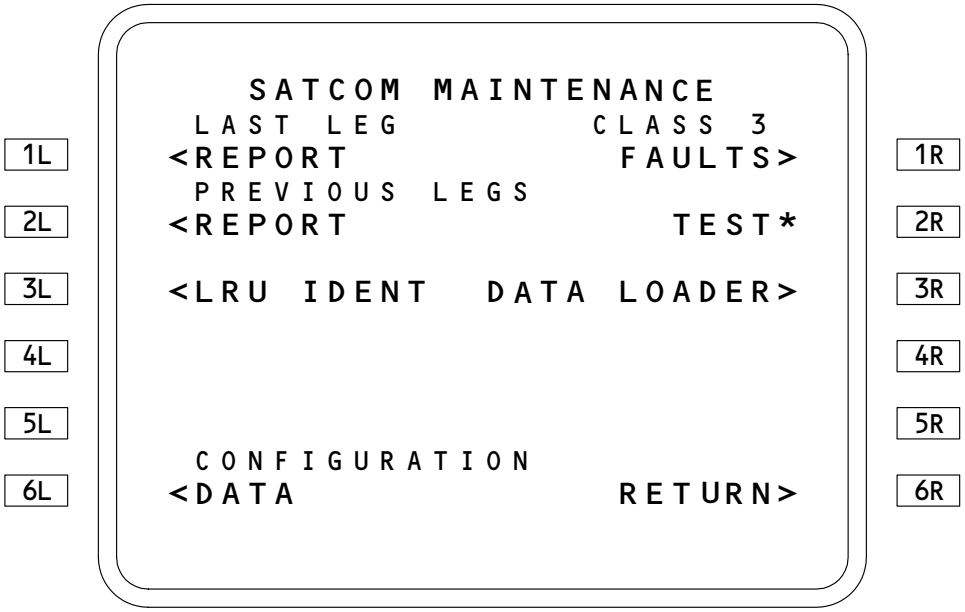
(14) From the MCDU main menu press:

LSK 3L (<SAT), then
LSK 6L (<SUBMENU), then
LSK 2L (<LOG-ON)



Satellite Data Unit Software Installation
Figure 403 (Sheet 4)

SAS
SAS S 864-026
SAS (15) From the SATCOM LOG-ON menu press: LSK 2L (*AUTO LOG-ON)
SAS (a) This initiates an auto SDU log-on and the SATCOM LOG-ON state at LSK 1L should change to LOGGED-ON AUTO.
SAS
SAS NOTE: The SATCOM antenna must have a clear view of the satellite to log onto a GES. It takes 5-10 minutes for the system to log-on.
SAS
SAS
SAS S 864-027
SAS (16) From the MCDU main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>)
SAS

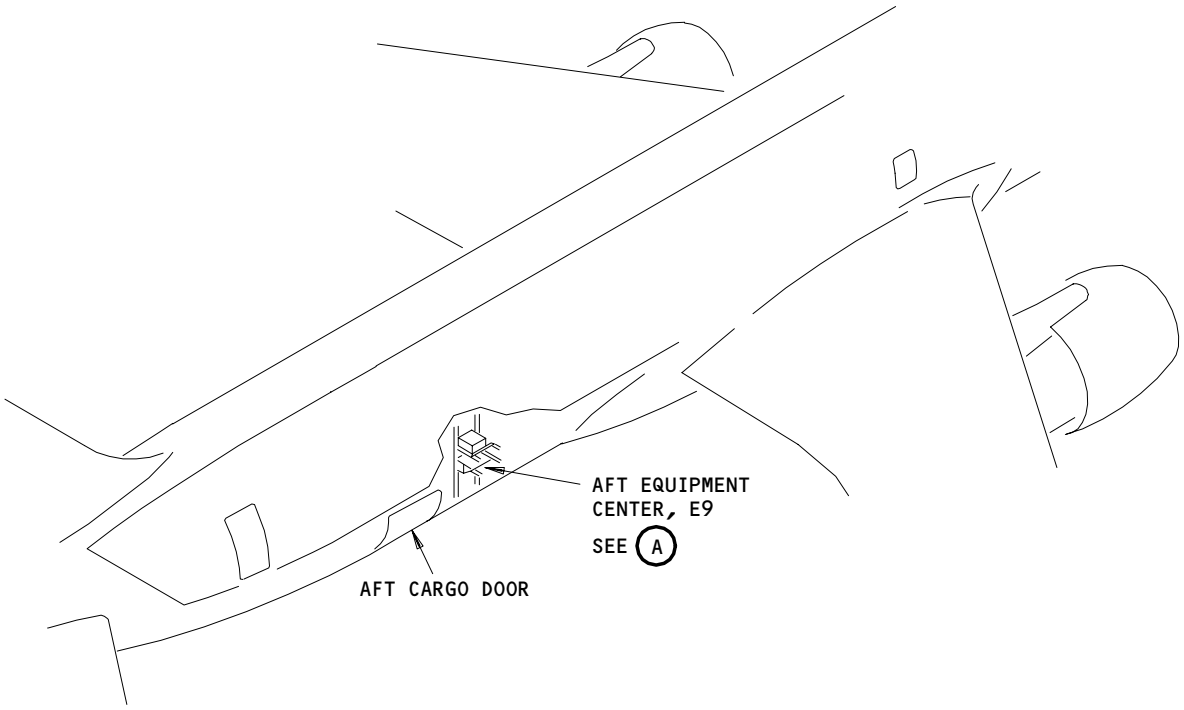


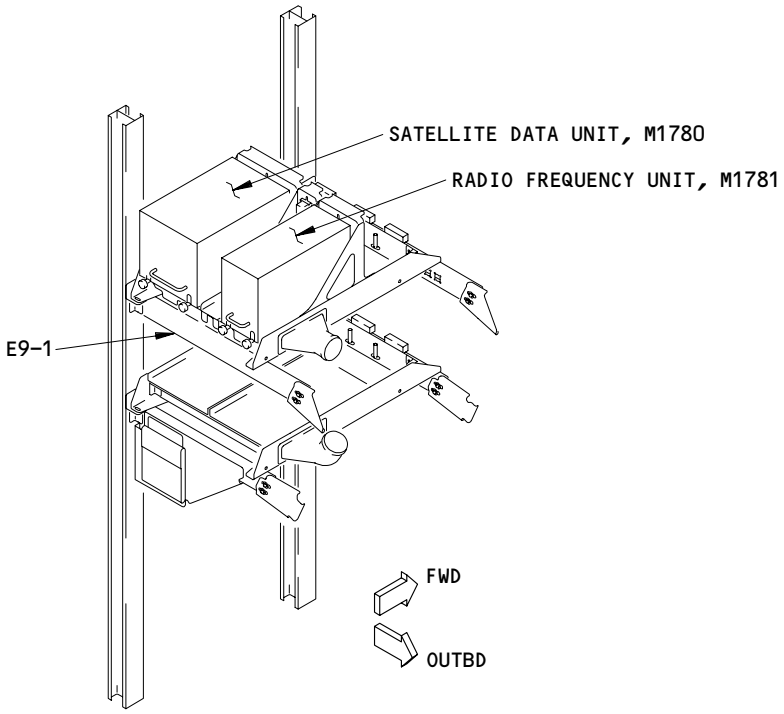
Satellite Data Unit Software Installation
Figure 403 (Sheet 5)

SAS
SAS S 744-028
SAS (17) Press line select key (LSK) 2R TEST* to perform a SATCOM system self test.
SAS (a) Make sure the page display temporarily goes to the test page where TEST IN PROGRESS is displayed. If the MCDU times out and goes to the main menu page.
SAS (b) Select LSK 3L <SAT from the main menu. The initial page displayed is the TEST page with the test results. Make sure the page reads TEST OK.
SAS
SAS NOTE: The TEST* prompt will be suppressed if the IRU's are not aligned.
SAS
SAS
SAS S 864-029
SAS (18) Set the IRL L mode select switch to the OFF position on the pilots' overhead panel, P5 (AMM 34-21-00/201).
SAS F. Put the Airplane In Its Usual condition
SAS
SAS S 864-035
SAS (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

SAS RADIO FREQUENCY UNIT - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. This procedure includes the following tasks:
SAS (1) Removal of the radio frequency unit
SAS (2) Installation of the radio frequency unit
SAS (3) Software loading of the radio frequency unit
SAS B. The radio frequency unit, M1781 is installed on shelf 1 of the aft
SAS equipment rack, E9. E9 is forward of the aft cargo door on the right
SAS side of the aft cargo compartment.
SAS
SAS TASK 23-25-11-004-001
SAS 2. Radio Frequency Unit Removal
SAS A. Reference
SAS (1) AMM 20-10-01/401, E/R Rack Mounted Components
SAS B. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Comparment
SAS 211 Control Cabin, Left
SAS
SAS (2) Access Panel
SAS 822 Aft Cargo Door
SAS
SAS C. Procedure
SAS
SAS S 864-002
SAS (1) Open these circuit breakers and attach DO-NOT-Close tags:
SAS (a) On the overhead circuit braker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-004
SAS (2) Open the aft cargo door.
SAS
SAS S 014-003
SAS (3) Remove the access panel for the SATCOM (E9) rack near STA 1200
SAS (right side) (Fig. 401).
SAS
SAS S 024-005
SAS (4) Remove the radio frequency unit (AMM 20-10-01/401).
SAS
SAS TASK 23-25-11-404-006
SAS 3. Radio Frequency Unit Installation
SAS A. References
SAS (1) AMM 20-10-01/401, E/E Rack Mounted Components
SAS (2) AMM 24-22-00/201, Manual Control

SAS





AFT EQUIPMENT CENTER, E9

A

Radio Frequency Unit Installation
Figure 401

SAS (3) AMM 34-21-00/201, Inertial Reference System
SAS B. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Compartment
SAS 211 Control Cabin, Left
SAS
SAS (2) Access Panel
SAS 822 Aft Cargo Door
SAS
SAS C. Procedure
SAS
SAS S 424-007
SAS (1) Install the radio frequency unit (AMM 20-10-01/401).
SAS
SAS S 864-008
SAS (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SACOM HGA

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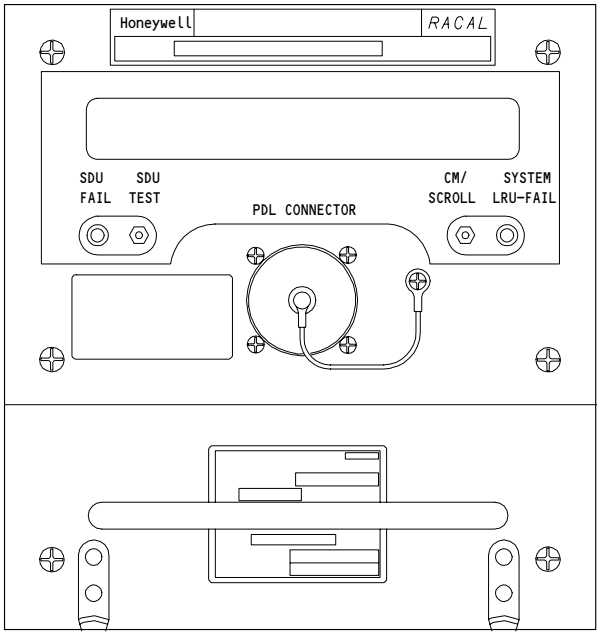
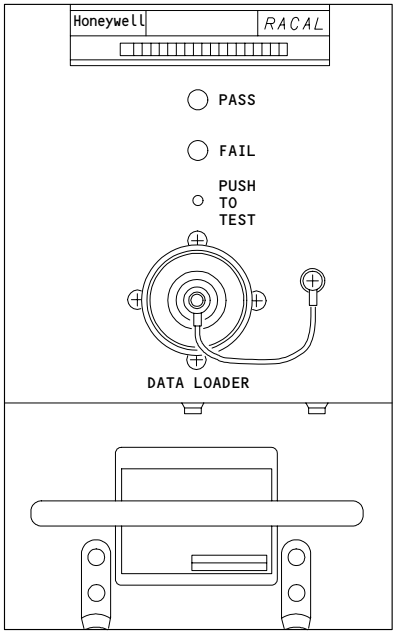


SATELLITE DATA UNIT



RADIO FREQUENCY UNIT

SATCOM Equipment
Figure 402

SAS D. Installation Test
SAS
SAS S 864-009
SAS (1) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 864-010
SAS (2) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 744-011
SAS (3) Press the RFU TEST switch on the front panel of the radio frequency
SAS unit (Fig. 402).
SAS (a) Make sure the LED's flash on/off at a rate of 2 ±1 Hz during
SAS the test.
SAS (b) Make sure the red FAIL LED turns off and the green pass LED
SAS remains on.
SAS
SAS S 744-012
SAS (4) Press the SDU TEST switch on the front panel of the satellite data
SAS unit on the E9-1 shelf.
SAS (a) Make sure the LED's flash on/off at a rate of 2 ±1 Hz during
SAS the test. The alphanumeric display flashes on and off and
SAS displays TESTING.
SAS (b) Make sure the red SDU FAIL and SYSTEM LRU FAIL LED's turn off.
SAS (c) Then make sure the alphanumeric display reads SYSTEM PASS.
SAS
SAS S 414-013
SAS (5) Install the access panel for the SATCOM (E9) rack.
SAS
SAS S 414-014
SAS (6) Close the aft cargo door.
SAS
SAS S 864-034
SAS (7) Set the IRS L mode select switch to the OFF position on the pilots'
SAS overhead panel, P5 (AMM 34-21-00/201).
SAS E. Put the Airplane In Its Usual Condition
SAS
SAS S 864-015
SAS (1) Remove the electrical power if it is not necessary
SAS (AMM 24-22-00/201).
SAS
SAS TASK 23-25-11-404-016
SAS 4. Radio Frequency Unit Software Installation
SAS A. General
SAS (1) This task contains the steps to load new operational software into
SAS the radio frequency unit and verify the software loaded.

SAS B. Equipment
SAS (1) ARINC 615 Portable Data Loader
SAS (2) The most up to date diskette of the RFU SATCOM software to be loaded.
SAS C. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS D. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Compartment
SAS 211 Control Cabin, Left
SAS
SAS (2) Access Panel
SAS 822 Aft Cargo Door
SAS
SAS E. Procedure
SAS
SAS S 864-035
SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-017
SAS (2) Open the aft cargo door.
SAS
SAS S 014-018
SAS (3) Remove the access panel for the SATCOM (E9) rack near STA 1200 (right side).
SAS
SAS S 484-019
SAS (4) Connect the interface cable between the radio frequency unit data loader connector and the portable ARINC 615 data loader (Fig. 402).
SAS
SAS S 864-020
SAS (5) Open the disk drive and remove the protective disk from the drive.
SAS
SAS S 864-021
SAS (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 864-022
SAS (7) Supply the electrical power (AMM 24-22-00/201).

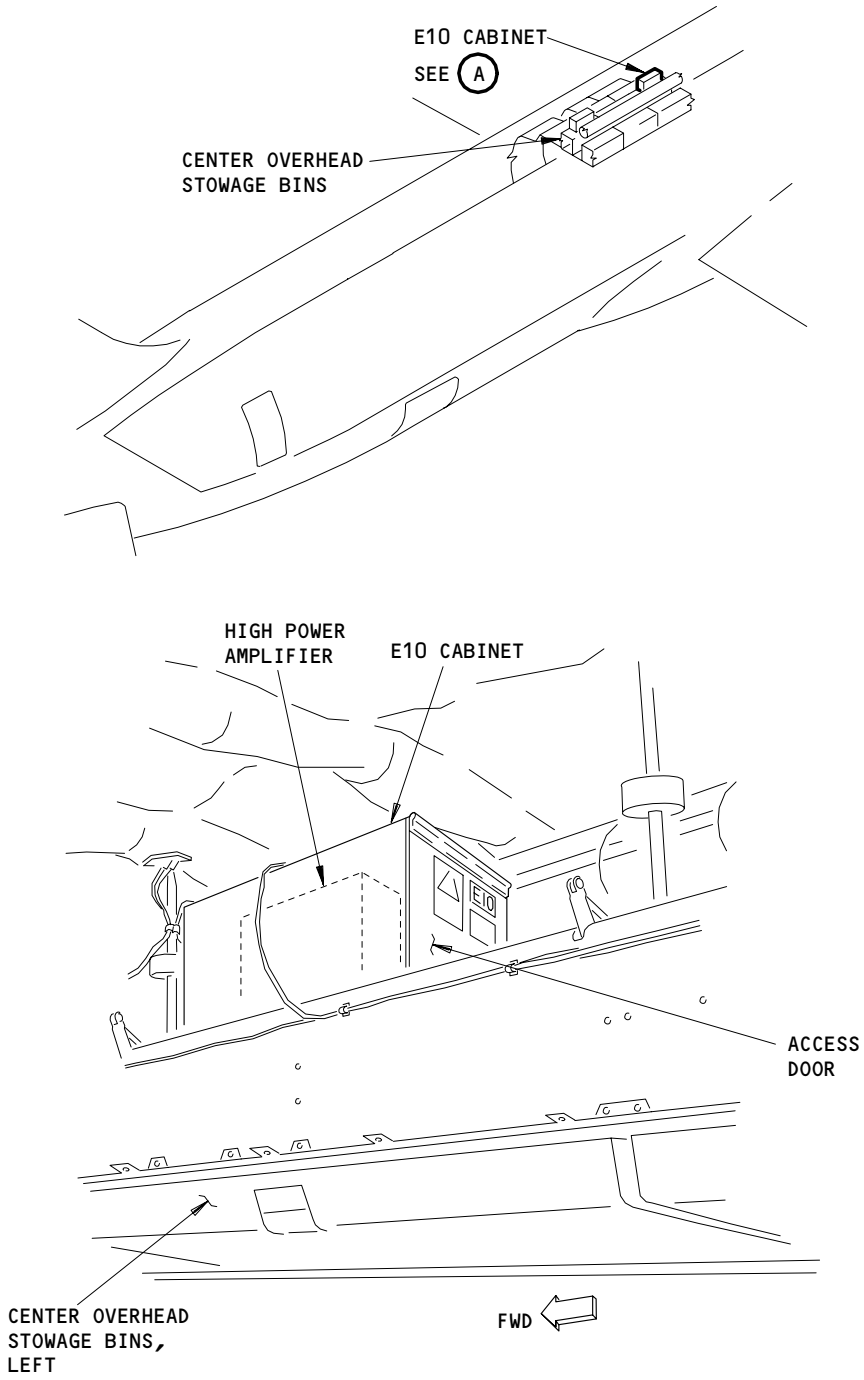
SAS
SAS S 424-023
SAS (8) Perform software installation.
SAS (a) Turn power on the portable data loader.
SAS (b) Make sure the INSERT DISK #1 is shown on the data loader.
SAS (c) Verify the software P/N on the diskette is the correct number to be installed.
SAS (d) Put the diskette into the drive.
SAS (e) During data movement the PDL will cause these effects to occur for each file on the diskette.
SAS 1) The data loader shows the filename and the percentage of the file that has been moved.
SAS 2) The data loader shows the number of blocks moved adjacent to the title TRANSFERRED after the complete file has been moved.
SAS (f) If the data loader shows the message INSERT DISK #2, then do these steps:
SAS
SAS NOTE: The INSERT DISK #2 display shows that it is necessary for the LRU to use more than one diskette to complete data input.
SAS
SAS 1) Push the eject button and remove the diskette from the drive. Make sure the display goes blank.
SAS 2) Insert the subsequent diskette into the disk drive.
SAS 3) Make sure the data loader goes through the same indications as it did for diskette No. 1.
SAS (g) When the software load is complete the data loader will show COMPLETE.
SAS 1) Push the eject button and remove the diskette.
SAS (h) Turn power off the portable data loader.
SAS
SAS S 864-025
SAS (9) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 084-024
SAS (10) Disconnect the interface cable between the radio frequency unit data loader connector and the portable ARINC 615 data loader.
SAS
SAS S 864-026
SAS (11) Open the disk drive and insert the protective disk into the drive.

SAS
SAS S 864-027
SAS (12) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 864-028
SAS (13) Align the left inertial reference system in the NAV mode (AMM 34-21-00/201).
SAS
SAS S 744-029
SAS (14) Press the RFU TEST switch on the front panel of the radio frequency unit.
SAS (a) Make sure the LED's flash on/off at a rate of 2 ±1 Hz during the test.
SAS (b) Make sure the red FAIL LED turns off and the green pass LED remains on.
SAS
SAS S 744-030
SAS (15) Press the SDU TEST switch on the front panel of the satellite data unit on the E9-1 shelf.
SAS (a) Make sure the LED's flash on/off at a rate of 2 ±1 Hz during the test. The alphanumeric display flashes on and off and displays TESTING.
SAS (b) Make sure the red SDU FAIL and SYSTEM LRU FAIL LED's turn off.
SAS (c) Then make sure the alphanumeric display reads SYSTEM PASS.
SAS (d) Press the CM/SCROLL switch until the software confirmation numbers are displayed. The radio frequency unit should be displayed as RFbbbbbbb-hhsss-nn where:
SAS 1) RF is for the radio frequency unit.
SAS 2) bbbbbbb is the end item base part number (seven decimal digits).
SAS 3) hh is the end item hardware confirmation number (two decimal digits).
SAS 4) sss is the end item software confirmation number (three decimal digits).
SAS 5) nn is the software modification level (up to two letters including a leading space).
SAS (e) Make sure the software confirmation number is correct for the software loaded.
SAS
SAS NOTE: The software confirmation numbers can also be verified on the MCDU SATCOM page LRU IDENTIFICATION.
SAS

SAS
SAS S 414-032
SAS (16) Install the access panel for the SATCOM (E9) rack.
SAS
SAS S 414-031
SAS (17) Close the aft cargo door.
SAS
SAS S 864-033
SAS (18) Set the IRS L mode select switch to the OFF position on the pilots' overhead panel, P5 (AMM 34-21-00/201).
SAS F. Put the Airplane In Its Usual Condition
SAS
SAS S 864-036
SAS (1) Remove the electrical power if it is necessary (AMM 24-22-00/201).

SAS HIGH POWER AMPLIFIER (HGA SUBSYSTEM) - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. This procedure includes the following tasks:
SAS (1) Removal of the high power amplifier
SAS (2) Installation of the high power amplifier
SAS (3) Software loading of the high power amplifier
SAS B. The high power amplifier, M1782, is installed on the E10 avionics shelf assembly located above the center overhead stowage bins on the left side at approximately STA 1070.
SAS
SAS TASK 23-25-14-004-001
SAS 2. High Power Amplifier Removal
SAS A. Standard Tools and Equipment
SAS (1) Step ladder
SAS B. Reference
SAS (1) AMM 20-10-01/401, E/E Rack-Mounted Components
SAS C. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling - Section 46 (Left)
SAS
SAS D. Procedure
SAS
SAS S 864-003
SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-002
SAS (2) Remove the applicable aisle ceiling panel (Fig. 401).
SAS
SAS S 024-034
SAS (3) Remove the high power amplifier (AMM 20-10-01/401).
SAS
SAS TASK 23-25-14-404-004
SAS 3. High Power Amplifier Installation
SAS A. Standard Tools and Equipment
SAS (1) Step ladder

SAS



AREA ABOVE THE PASSENGER CABIN CEILING
(THE AISLE CEILING PANEL IS REMOVED)

A

High Power Amplifier (HGA Subsystem) Installation
Figure 401

SAS B. References
SAS (1) AMM 20-10-01/401, E/E Rack-Mounted Components
SAS (2) AMM 24-22-00/201, Manual Control
SAS (3) AMM 34-21-00/201, Inertial Reference System
SAS C. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling - Section 46 (Left)
SAS
SAS D. Procedure
SAS
SAS S 424-005
SAS (1) Install the high power amplifier (AMM 20-10-01/401).
SAS
SAS S 864-031
SAS (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA

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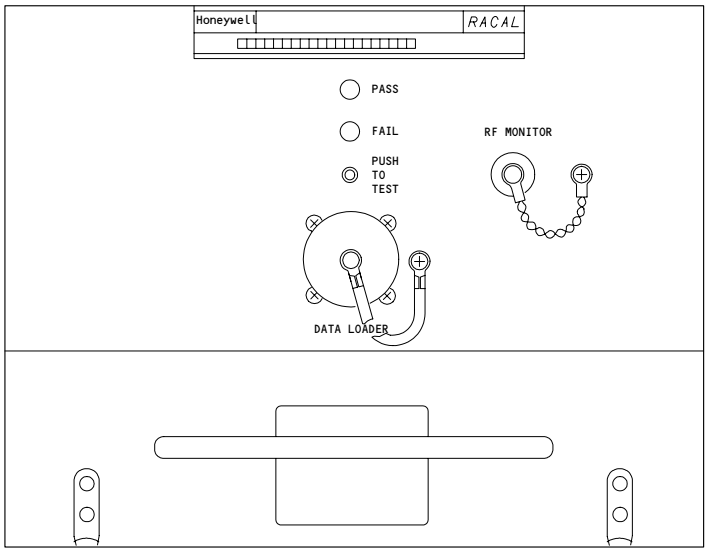
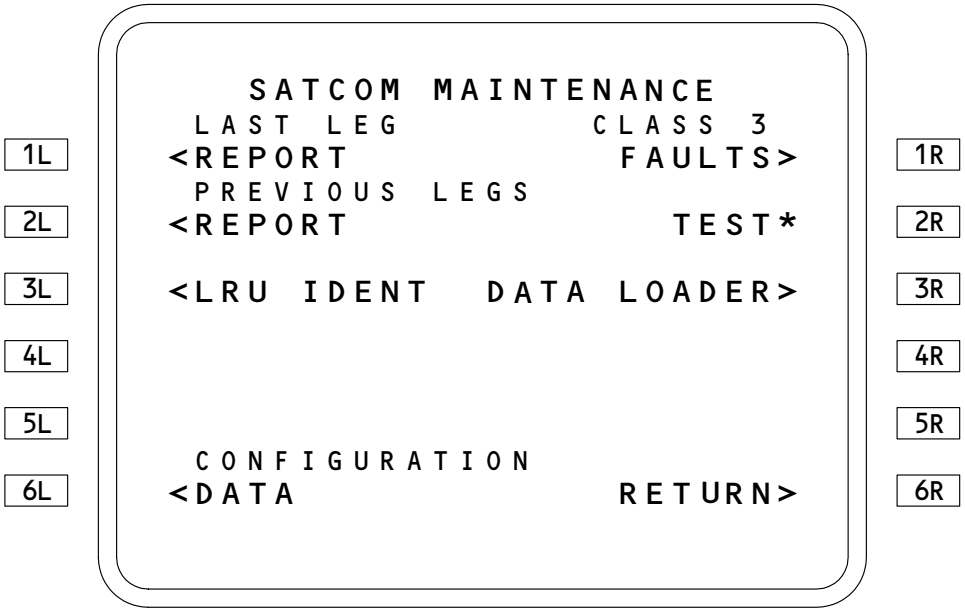


HIGH POWER AMPLIFIER

High Power Amplifier
Figure 402

SAS E. Installation Test
SAS
SAS S 864-006
SAS (1) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 864-007
SAS (2) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 744-008
SAS (3) Press the HPA TEST switch on the front panel of the high power
SAS amplifier (Fig. 402).
SAS (a) Make sure the LEDs flash on/off at a rate of 2 ±1 Hz during the
SAS test.
SAS (b) Make sure the red FAIL LED turns off and the green pass LED
SAS remains on.
SAS
SAS S 414-009
SAS (4) Install the aisle ceiling panel.
SAS
SAS S 864-010
SAS (5) From the Master Control Display Unit (MCDU) main menu press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>)
SAS



High Power Amplifier Installation Test
Figure 403

SAS
SAS S 744-032
SAS (6) Press line select key (LSK) 2R TEST* to perform a SATCOM system
SAS self-test (Fig. 403).
SAS (a) Make sure the page display temporarily goes to the test page
SAS where TEST IN PROGRESS is displayed. When the MCDU times out
SAS and goes to the main menu page, do the next step.
SAS (b) Select LSK 3L <SAT from the main menu. The initial page
SAS displayed is the TEST page with the test results. Make sure
SAS the page reads TEST OK.
SAS
SAS NOTE: The TEST* prompt will be suppressed if the IRUs are not
SAS aligned.

SAS
SAS S 864-011
SAS (7) Set the IRS L mode select switch to the OFF position on the pilots'
SAS overhead panel, P5 (AMM 34-21-00/201).
SAS F. Put the airplane in its usual condition.
SAS
SAS S 864-012
SAS (1) Remove the electrical power if it is not necessary
SAS (AMM 24-22-00/201).
SAS
SAS TASK 23-25-14-404-014
SAS 4. High Power Amplifier Software Installation
SAS A. General
SAS (1) This task contains the steps to load new operational software into
SAS the high power amplifier and verify the software loaded.
SAS B. Standard Tools and Equipment
SAS (1) Step ladder
SAS (2) ARINC 615 Portable Data Loader
SAS (3) The most up to date diskette of the HPA SATCOM software to be loaded
SAS C. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS D. Access
SAS (1) Location Zones
SAS 154 Aft Cargo Compartment
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling - Section 46 (Left)
SAS
SAS (2) Access Panel
SAS 822 Aft Cargo Door
SAS

SAS E. Procedure
SAS
SAS S 864-013
SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-015
SAS (2) Remove the applicable aisle ceiling panel.
SAS
SAS S 484-016
SAS (3) Connect the interface cable between the high power amplifier data
SAS loader connector and the portable ARINC 615 data loader (Fig. 402).
SAS
SAS S 864-017
SAS (4) Open the disk drive and remove the protective disk from the drive.
SAS
SAS S 864-018
SAS (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the P11 panel:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 864-019
SAS (6) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 424-020
SAS (7) Perform software installation.
SAS (a) Turn power on the portable data loader.
SAS (b) Make sure the INSERT DISK #1 is shown on the data loader.
SAS (c) Verify the software P/N on the diskette is the correct number
SAS to be installed.
SAS (d) Put the diskette into the drive.
SAS (e) During data movement, the PDL will cause these effects to occur
SAS for each file on the diskette.
SAS 1) The data loader shows the file name and the percentage of
SAS the file that has been moved.
SAS 2) The data loader shows the number of blocks moved adjacent
SAS to the title TRANSFERRED after the complete file has been
SAS moved.

SAS (f) If the data loader shows the message INSERT DISK #2, then do these steps:

SAS NOTE: The INSERT DISK #2 display shows that it is necessary for the LRU to use more than one diskette to complete data input.

SAS 1) Push the eject button and remove the diskette from the disk drive. Make sure the display goes blank.
SAS 2) Insert the subsequent diskette into the disk drive.
SAS 3) Make sure the data loader goes through the same indications as it did for diskette No. 1.
SAS (g) When the software load is complete, the data loader will show COMPLETE.
SAS 1) Push the eject button and remove the diskette.
SAS (h) Turn power off the portable data loader.

SAS S 864-021
SAS (8) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the P11 panel:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA

SAS S 084-022
SAS (9) Disconnect the interface cable between the high power amplifier data loader connector and the portable ARINC 615 data loader.

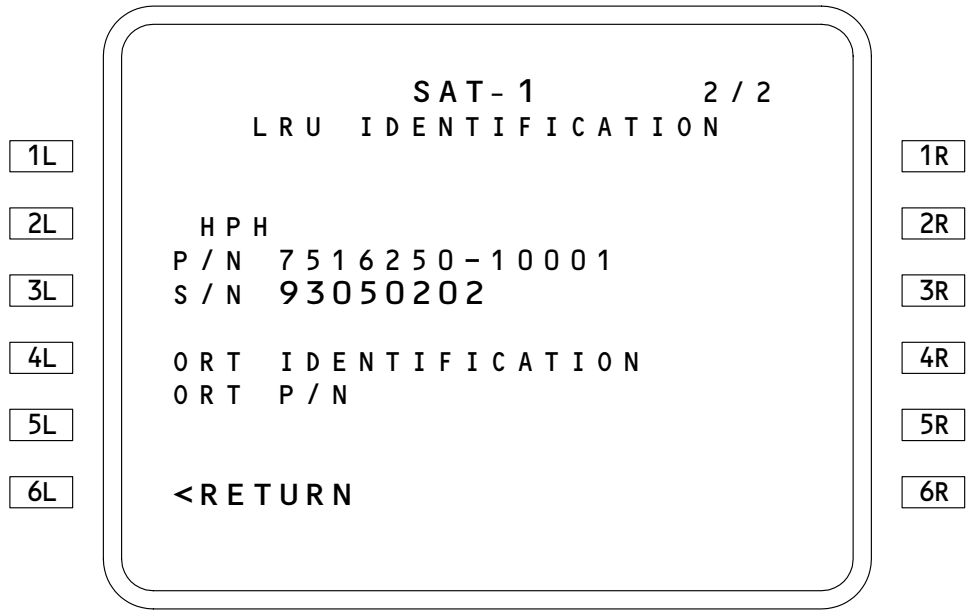
SAS S 864-023
SAS (10) Open the disk drive and insert the protective disk into the drive.

SAS S 864-024
SAS (11) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the P11 panel:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA

SAS S 864-025
SAS (12) Align the left inertial reference system in the NAV mode (AMM 34-21-00/201).

SAS S 744-026
SAS (13) Press the TEST switch on the front panel of the high power amplifier.
SAS (a) Make sure the LEDs flash on/off at a rate of 2 ±1 Hz during the test.

SAS (b) Make sure the red FAIL LED turns off and the green pass LED
SAS remains on.
SAS
SAS S 414-027
SAS (14) Install the aisle ceiling panel.
SAS
SAS S 864-033
SAS (15) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>), then
SAS LSK 3L (<LRU IDENT)



High Power Amplifier Software Installation
Figure 404

F73263

SAS
SAS S 714-028
SAS (16) On the LRU IDENTIFICATION pages, under the HPA, verify the three digit software configuration number corresponds to the P/N software loaded (Fig. 404).
SAS P/N HPA bbbbbbb-hhsss
SAS where: bbbbbbb is the 7-digit LRU end item base part number.
SAS hh is the 2-digit LRU end item hardware configuration number.
SAS sss is the 3-digit LRU end item software configuration number.
SAS
SAS S 864-029
SAS (17) Set the IRS L mode select switch to the OFF position on the pilots' overhead panel, P5 (AMM 34-21-00/201).
SAS F. Put the airplane in its usual condition.
SAS
SAS S 864-030
SAS (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

SAS BEAM STEERING UNIT - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. This procedure includes two tasks:
SAS (1) Removal of the beam steering unit.
SAS (2) Installation of the beam steering unit
SAS B. There are two beam steering units (BSU) installed, one each for the left-hand and right-hand antenna installations. The BSU's are mounted on airplane structure behind the outboard overhead stowage bins at STA 1100. An access panel in the back of the storage bin is removed to reach the BSU's. The removal of the left-hand beam steering unit is provided in the procedure below. The procedure for removing the right-hand BSU is the same as the left-hand procedure except the location is on the right side of the airplane.
SAS
SAS TASK 23-25-17-004-001
SAS 2. Beam Steering Unit Removal
SAS A. Standard Tools and Equipment
SAS (1) Stepladder
SAS B. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Behind the Outboard Stowage Bin, Left at STA 1100
SAS
SAS C. Procedure
SAS
SAS S 864-002
SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-003
SAS (2) Remove the antenna access panel in the back left-hand outboard stowage bin at STA 1100.

SAS
SAS S 024-004
SAS (3) Remove the following connectors from the beam steering unit:
SAS

Port beam steerin unit M1789	D2691(J1)	coax
	D2693(J2)	harness
	M1799	Aft coax assembly
	M1800	FWd coax assembly
Starboard beam steerin Unit M1790	D2687(J1)	coax
	D2689(J2)	harness
	M1801	Aft coax assembly
	M1802	FWd coax assembly

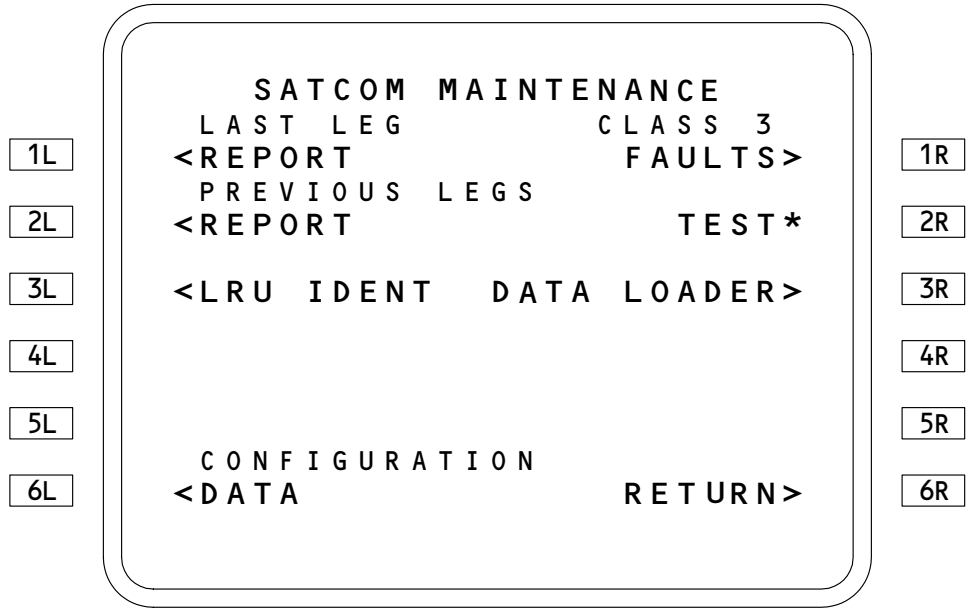
SAS
SAS S 024-005
SAS (4) Remove the beam steering unit (screw, washer, and nut at 4 locations).
SAS
SAS TASK 23-25-17-404-006
SAS 3. Beam Steering Unit Installation
SAS A. Standard Tools and Equipment
SAS (1) Stepladder
SAS B. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS C. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Behind the Outboard Stowage Bin, Left at STA 1100
SAS
SAS D. Procedure
SAS
SAS S 424-007
SAS (1) Install the beam steering unit (screw, washer, and nut at four locations).

SAS
SAS S 424-008
SAS (2) Connect the following connectors from the beam steering unit:
SAS

Port beam steerin unit M1789	D2691(J1)	coax
	D2693(J2)	harness
	M1799	Aft coax assembly
	M1800	FWd coax assembly
Starboard beam steerin Unit M1790	D2687(J1)	coax
	D2689(J2)	harness
	M1801	Aft coax assembly
	M1802	FWd coax assembly

SAS
SAS S 414-009
SAS (3) Install the antenna access panel on the back of the outboard storage bin.
SAS
SAS S 864-010
SAS (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS E. Installation Test
SAS
SAS S 864-011
SAS (1) Make sure these circuit breakers are closed:
SAS (a) On the P11 panel:
SAS 1) 11H7 or 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 864-013
SAS (2) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 864-012
SAS (3) Align the left inertial reference system in the NAV mode (AMM 34-21-00/201).

SAS
SAS S 864-017
SAS (4) From the Master Control Display Unit (MCDU) main menu press:
SAS
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>)
SAS
SAS
SAS S 744-014
SAS (5) Press line select key (LSK) 2R TEST* to perform a SATCOM system self
SAS test (Fig. 401).
SAS (a) Make sure the page display temporarily goes to the test page
SAS where TEST IN PROGRESS is displayed. When the MCDU times out
SAS and goes to the main menu, do the next step.



Beam Steering Unit Installation Test
Figure 401

SAS (b) Select LSK 3L <SAT from the main menu. The initial page
SAS displayed is the TEST page with the test results. Make sure
SAS the page reads TEST OK.
SAS
SAS NOTE: The TEST* prompt will be suppressed if the IRU's are not
SAS aligned.
SAS
SAS
SAS S 864-015
SAS (6) Set the IRS L mode select switch to the OFF position on the pilots'
SAS overhead panel, P5 (AMM 34-21-00/201).
SAS F. Put the Airplane In Its Usual Condition
SAS
SAS S 864-016
SAS (1) Remove the electrical power if it is necessary (AMM 24-22-00/201).

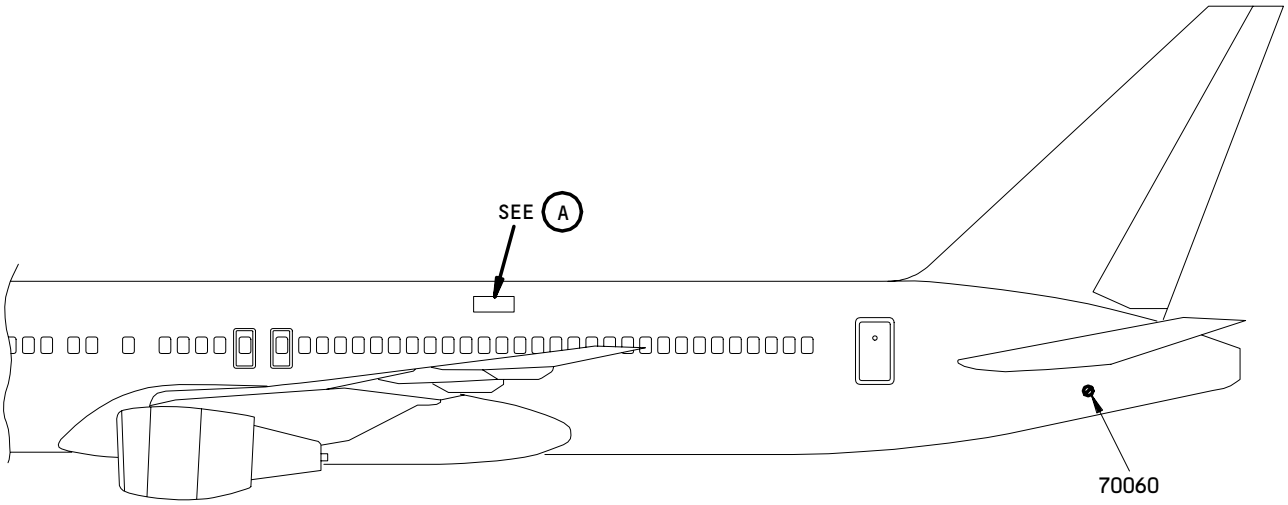
SAS HIGH GAIN ANTENNA - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. This procedure includes two tasks:
SAS (1) Removal of the high gain antenna.
SAS (2) Installation of the high gain antenna.
SAS B. There are two high gain antennas (HGA) installed, one on the left and one on the right side of the airplane. The antennas are mounted on the outside airplane surface at STA 1100. An access panel in the back of the outside storage bin is removed to reach the antenna connectors. The removal of the left antenna is provided in the procedure below. The procedure for removing the right antenna is the same as the left procedure except the location is opposite.
SAS
SAS TASK 23-25-19-004-001
SAS 2. High Gain Antenna Removal (Fig. 401)
SAS A. Standard Tools and Equipment
SAS (1) Step ladder
SAS (2) Mobile platform to access antenna
SAS B. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Behind the Outboard Stowage Bin, Left at STA 1100
SAS
SAS C. Procedure

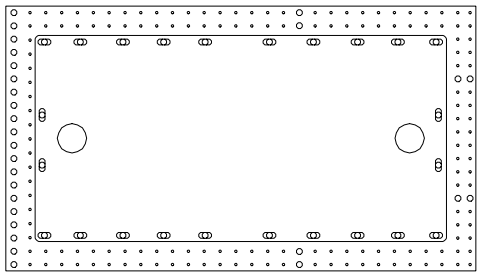
S 864-002

SAS WARNING: MAKE SURE THE POWER IS REMOVED FROM THE HIGH GAIN ANTENNA.
SAS RADIO FREQUENCY (RF) ENERGY CAN CAUSE INJURY TO PERSONS.

SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA

SAS





HIGH GAIN ANTENNA
(STA 1100, TWO INSTALLED)

A

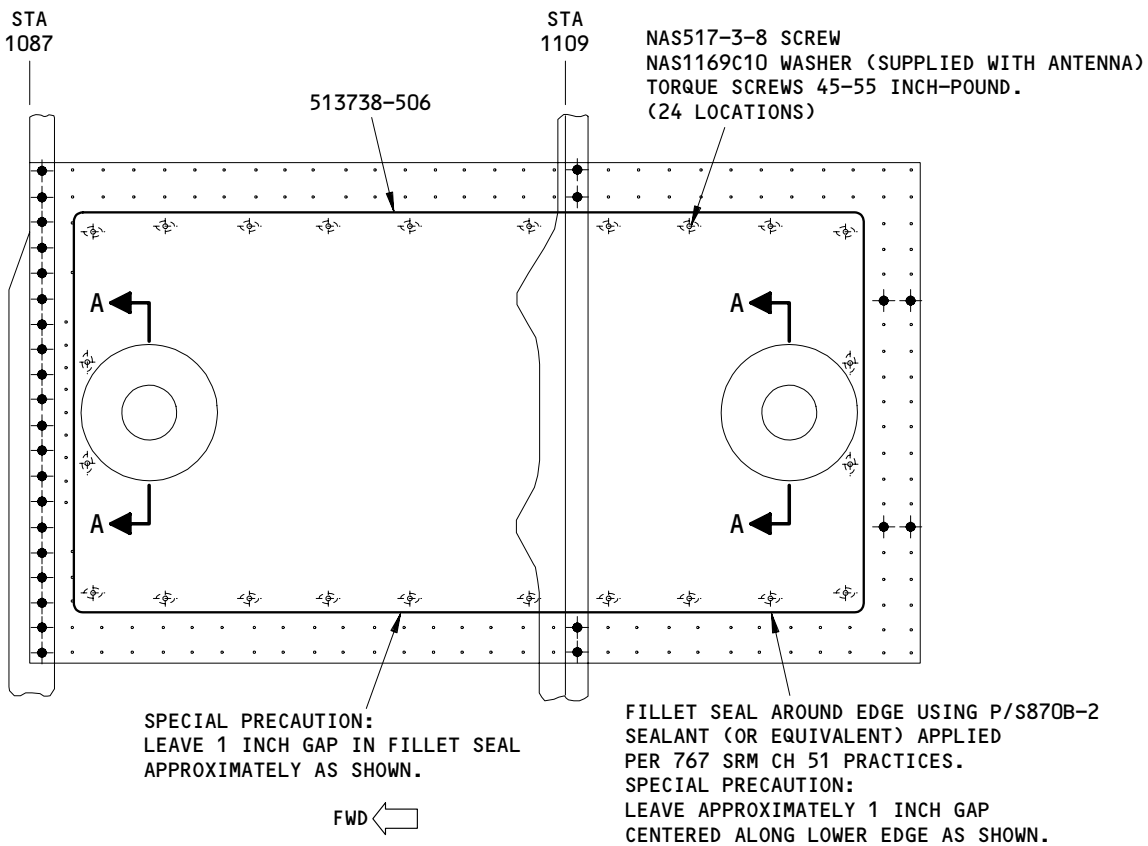
High Gain Antenna
Figure 401

SAS
SAS S 014-003
SAS (2) Remove the antenna access panel in the back of the left outboard
SAS stowage bin at STA 1100.
SAS
SAS S 024-004
SAS (3) Disconnect the following connectors from the high gain antenna being
SAS removed:
SAS

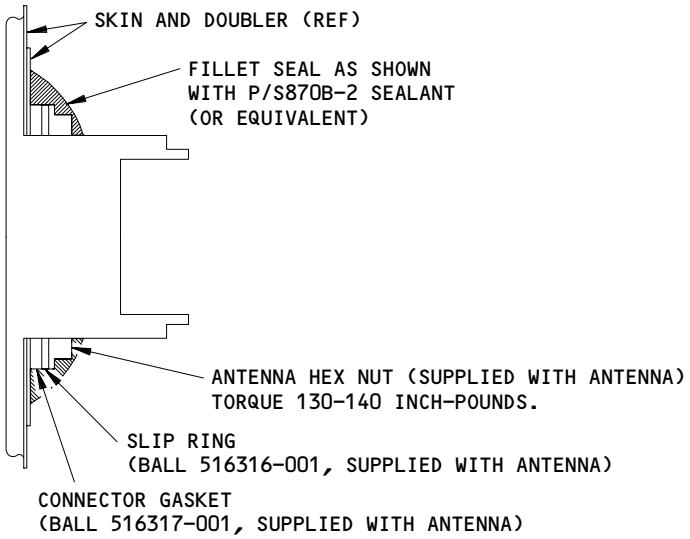
Port Antenna, M1793	M1799 M1800	Aft coax assembly Fwd coax assembly
Starboard Antenna, M1794	M1801 M1802	Aft coax assembly Fwd coax assembly

SAS
SAS
SAS S 864-005
SAS (4) Cap coax and antenna connectors to prevent damage during antenna
SAS removal.
SAS
SAS S 164-006
SAS (5) Remove sealant from around the two connector feedthroughs.
SAS
SAS S 024-007
SAS (6) Loosen and remove the hex nut, slip ring and gasket on both antenna
SAS connectors.
SAS
SAS S 024-008
SAS (7) On the outside of the airplane at the antenna, loosen and remove the
SAS screws and washers around the outside of the antenna (24 locations)
SAS (Fig. 402).
SAS
SAS S 024-009
SAS (8) Remove the high gain antenna.
SAS
SAS S 114-010
SAS (9) Clean the airplane surface of any remaining sealant.

SAS



-501 HIGH GAIN ANTENNA INSTALLATION, LEFT SIDE SHOWN
-502 INSTALLATION, RIGHT SIDE OPPOSITE
(VIEW LOOKING DOWN AND IN FROM LEFT SIDE)



A-A

High Gain Antenna Installation
Figure 402

SAS
SAS TASK 23-25-19-404-011
SAS 3. High Gain Antenna Installation
SAS A. Standard Tools and Equipment
SAS (1) Step ladder
SAS (2) Mobile platform to access antenna
SAS B. Consumable Materials
SAS (1) PR-1436-G B-1/2 (Stock # RMC 302-078-XX)
SAS C. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS D. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Behind the Outboard Stowage Bin, Left at STA 1100
SAS
SAS E. Procedure
SAS
SAS S 424-012
SAS (1) Install the high gain antenna and hold in place using screws and
SAS washers (24 locations). Do not tighten the screws.
SAS
SAS S 424-013
SAS (2) Install the antenna gasket, then slip ring, then hex nut on both RF
SAS antenna connectors. Torque to 130-140 pound-inches (Fig. 402).
SAS
SAS S 424-014
SAS (3) Torque the screws to 45-55 pound-inches (24 locations).
SAS
SAS S 394-015
SAS (4) Apply a fillet seal using PR-1436-G B-1/2 sealant around the RF
SAS connector hex nut and airplane skin. Exercise caution to ensure no
SAS sealant invades the threads for the coax array cable connections.
SAS
SAS S 394-016
SAS (5) Apply a fillet seal using PR-1436-G B-1/2 Sealant around the edge of
SAS the high gain antenna applied per 767 SRM CH 51 practices. Leave
SAS approximately a 1-inch gap in the fillet seal centered along the
SAS lower edge of the antenna (Fig. 402).

SAS
SAS S 424-017
SAS (6) Connect the following connectors to the high gain antenna that was
SAS replaced:

SAS NOTE: While tightening the knurled connector and the RF connections
SAS begin to mate, the rotational resistance will increase
SAS dramatically. This can be mistaken as seated when it is not.
SAS As you continue to mate the connector, the resistance will
SAS decrease and the connector will complete an additional 1 1/2
SAS turns at which time it is properly seated.

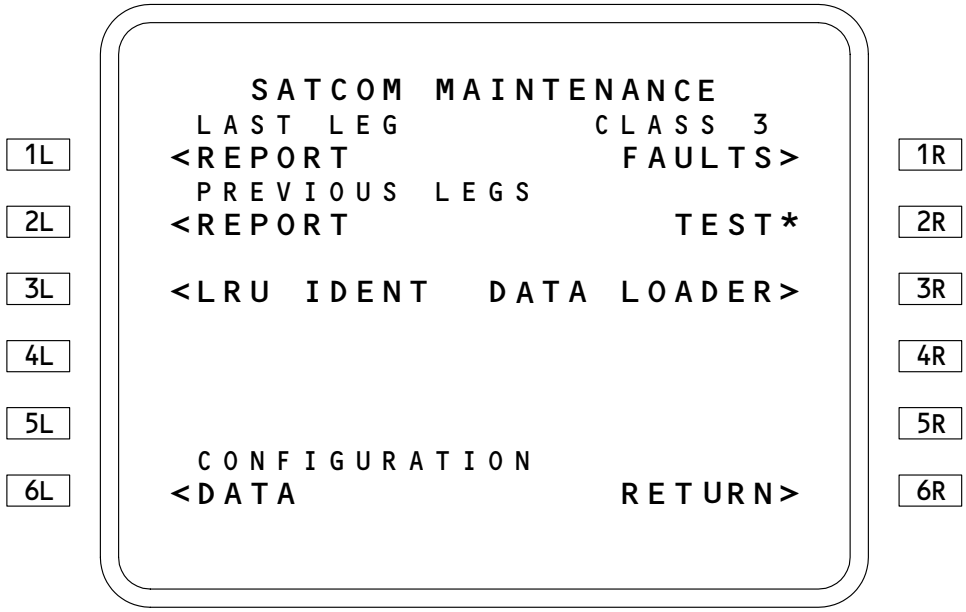
SAS
SAS

Port Antenna, M1793	M1799 M1800	Aft coax assembly Fwd coax assembly
Starboard Antenna, M1794	M1801 M1802	Aft coax assembly Fwd coax assembly

SAS
SAS
SAS
SAS S 414-018
SAS (7) Install the antenna access panel on the back of the outboard storage
SAS bin.
SAS
SAS S 864-019
SAS (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS F. Installation Test (Fig. 403)
SAS
SAS S 864-020
SAS (1) Make sure these circuit breakers are closed:
SAS (a) On the P11 panel:
SAS 1) 11H7 or 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 864-021
SAS (2) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 864-022
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).

SAS
SAS S 864-023
SAS (4) From the Master Control Display Unit (MCDU) main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>)

SAS
SAS S 744-024
SAS (5) Press line select key (LSK) 2R TEST* to perform a SATCOM system
SAS self-test (Fig. 403).
SAS (a) Make sure the page display temporarily goes to the test page
SAS where TEST IN PROGRESS is displayed. When the MCDU times out
SAS and goes to the main menu, do the next step.



High Gain Antenna Installation Test
Figure 403

SAS (b) Select LSK 3L <SAT from the main menu. The initial page
SAS displayed is the TEST page with the test results. Make sure
SAS the page reads TEST OK.

SAS NOTE: The TEST* prompt will be suppressed if the IRUs are not
SAS aligned.

SAS G. Maintenance Call (Fig. 404)
SAS
SAS S 864-025
SAS (1) From the main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 2L (<LOG ON)

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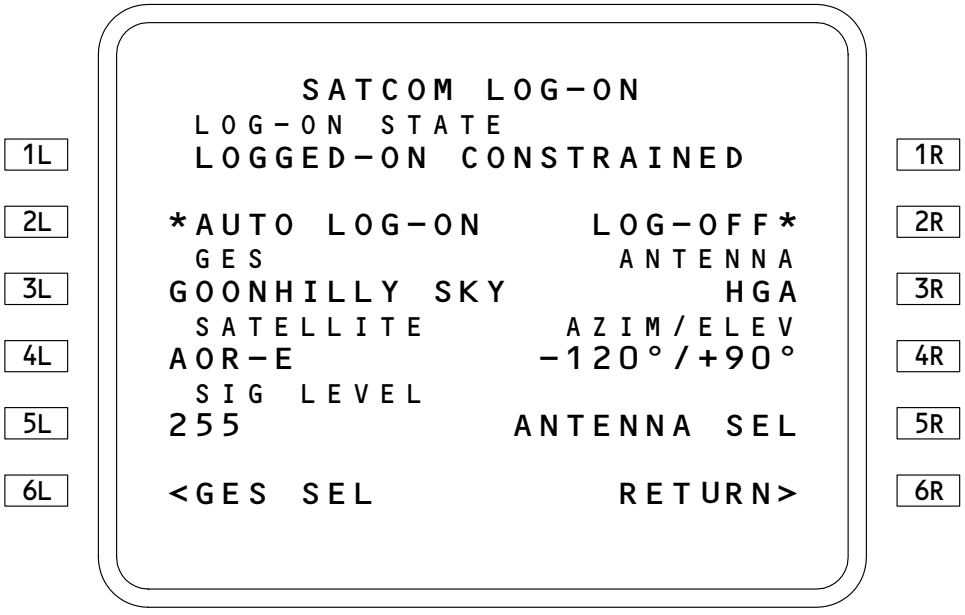


High Gain Antenna - Maintenance Call
Figure 404 (Sheet 1)

SAS
SAS S 864-036
SAS (2) Position the airplane so the SATCOM system is logged-on using the
SAS antenna that was replaced. Azimuth position provided at LSK 4R of
SAS the SATCOM LOG-ON page.

SAS Port antenna: The azimuth should be between -180° to 0°
SAS Starboard antenna: The azimuth should be between 0° to +180°

S 864-026

SAS WARNING: TO AVOID POTENTIALLY DANGEROUS EXPOSURE TO RADIO FREQUENCY
SAS ENERGY ABOVE THE ANSI C95.1 LIMIT AND OTHER WORLD STANDARDS
SAS WHEN USING A HIGH GAIN ANTENNA (12 DECIBELS NOMINAL ANTENNA),
SAS DO NOT OPERATE THE MCS SATCOM SYSTEM WHEN ANY PERSONNEL ARE
SAS WITHIN 8.5 FEET OF THE ANTENNA OR WITHIN 20 FEET OF THE ANTENNA
SAS FOR PERIODS OF LONGER THAN 3 MINUTES PER HOUR.

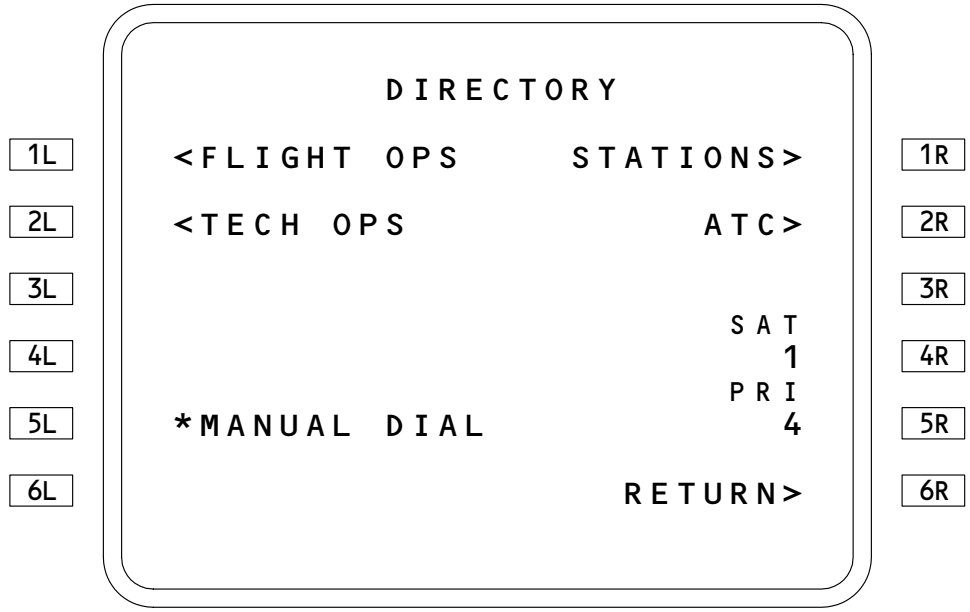
SAS (3) At the HF/SAT SELECT panel in the P5 overhead, make sure the HF/SAT
SAS XFER switch, for the desired channel-L or -R, is in the SATCOM
SAS position with the SAT lamp illuminated. SAT 1 corresponds to the
SAS left channel, SAT 2 corresponds to the right channel.
SAS
SAS S 864-037
SAS (4) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (DIRECTORY>)

S 864-028

SAS WARNING: PRIORITY 1 CALLS ARE FOR EMERGENCY CALLS ONLY.

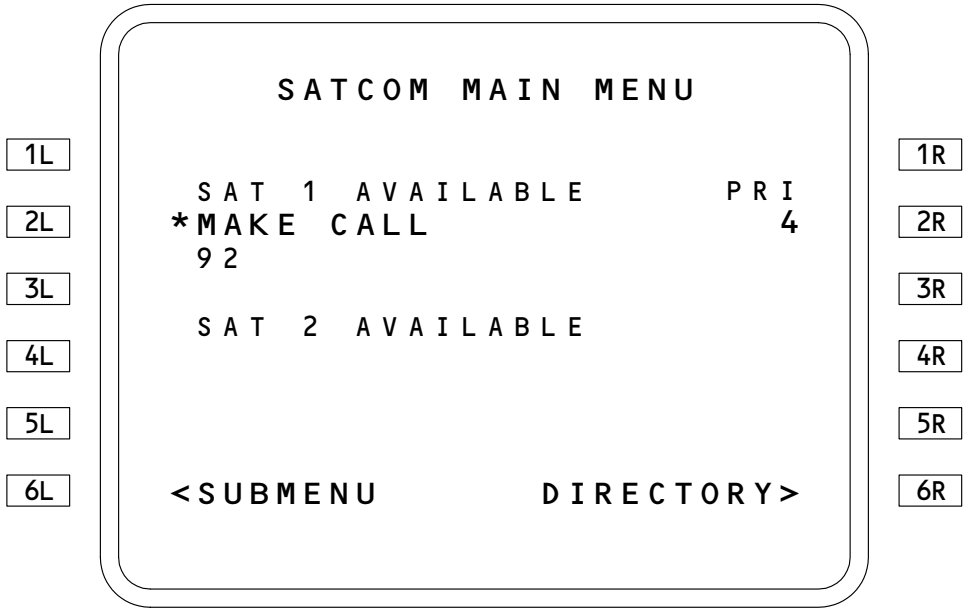
SAS (5) Make sure the priority at line select key (LSK) 5R is 4. The
SAS priority can be changed by entering 4 in the scratchpad and pressing
SAS LSK 5R.
SAS
SAS S 714-029
SAS (6) Make sure the correct channel is selected at LSK 4R. Channel 1 is
SAS for the left SAT channel. Channel 2 is for the right SAT channel.
SAS The channel can be changed by entering the desired channel in the
SAS scratchpad and pressing LSK 4R.

SAS
SAS S 714-030
SAS (7) Type 92 into the MCDU scratchpad, then press LSK 5L *MANUAL DIAL.
SAS The MCDU page automatically returns to the SATCOM MAIN MENU page.
SAS
SAS S 714-031
SAS (8) Press *MAKE CALL for the desired channel, LSK 2L for SAT 1 or LSK 4L
SAS for SAT 2. The status of the call can be observed on the label line
SAS at line select key (LSK) 2L for SAT 1 and LSK 4L for SAT 2.
SAS CONNECTED will be displayed when the circuit is connected. Also, an
SAS audible chime will sound and the SAT call light will illuminate on
SAS the HF/SAT select panel on the P5 overhead.
SAS
SAS S 714-032
SAS (9) At the Audio Control Panel in the P8 aft pilot control stand,
SAS activate the HF/SAT MIC for the desired channel. Use the PTT
SAS function to effect communications.



High Gain Antenna - Maintenance Call
Figure 404 (Sheet 2)

SAS
SAS S 714-033
SAS (10) Terminate the call by pressing the illuminated SAT call light on the
SAS HF/SAT select panel on the pilots' overhead panel, P5.
SAS
SAS S 864-034
SAS (11) Set the IRS L mode select switch to the OFF position on the pilots'
SAS overhead panel, P5 (AMM 34-21-00/201).
SAS H. Put the airplane in its usual condition.
SAS
SAS S 864-035
SAS (1) Remove the electrical power if it is not necessary
SAS (AMM 24-22-00/201).



High Gain Antenna - Maintenance Call
Figure 404 (Sheet 3)

SAS HIGH POWER RELAY - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. The high power relay sends the RF signals from the high power amplifier
SAS to the port or starboard LNA/Diplexers depending on which antenna is
SAS active.
SAS B. This procedure includes two tasks:
SAS (1) Removal of the high power relay
SAS (2) Installation of the high power relay
SAS C. The high power relay is on the same mounting bracket as the RF combiner,
SAS located above the center overhead stowage bins on the left side at
SAS STA 1060 forward of the E10 equipment center.
SAS
SAS TASK 23-25-22-004-001
SAS 2. High Power Relay Removal
SAS A. Standard Tools and Equipment
SAS (1) Step ladder
SAS B. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling, Left

SAS C. Procedure
SAS
SAS S 864-002
SAS (1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS
SAS S 014-003
SAS (2) Remove the applicable left aisle ceiling panel (Fig. 401).
SAS
SAS S 024-004
SAS (3) Disconnect the following connectors from the high power relay,
SAS M1787:
SAS D2671 coax
SAS D2673 coax
SAS D2675 coax
SAS D2677 harness

SAS
SAS S 024-005
SAS (4) Remove the high power relay.
SAS
SAS TASK 23-25-22-404-006
SAS 3. High Power Relay Installation
SAS A. General
SAS (1) The installation test is performed from the Master Control Display
SAS Unit (MCDU) in the cockpit.
SAS B. Standard Tools and Equipment
SAS (1) Step ladder
SAS C. References
SAS (1) AMM 24-22-00/201, Manual Control
SAS (2) AMM 34-21-00/201, Inertial Reference System
SAS D. Access
SAS (1) Location Zones
SAS 211 Control Cabin, Left
SAS 253 Area Above Passenger Cabin Ceiling, Left

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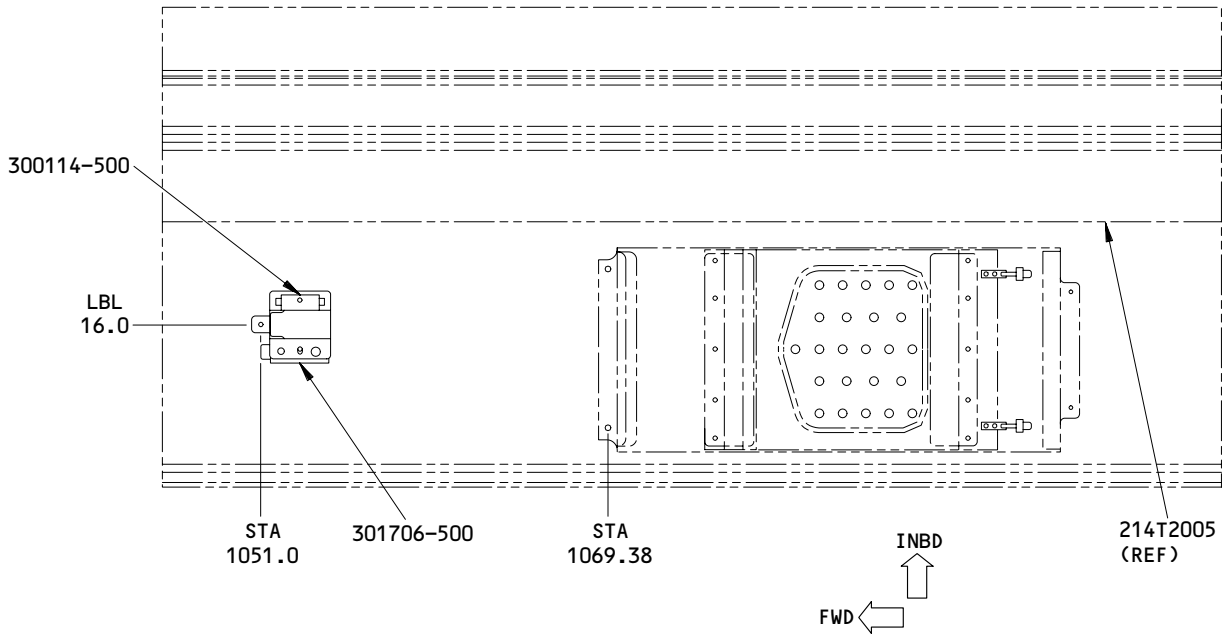

High Power Relay Installation
Figure 401

SAS E. Procedure
SAS
SAS S 424-007
SAS (1) Install the high power relay.
SAS
SAS S 424-008
SAS (2) Disconnect the following connectors from the high power relay,
SAS M1787:
SAS D2671 coax
SAS D2673 coax
SAS D2675 coax
SAS D2677 harness
SAS
SAS S 414-009
SAS (3) Install the ceiling panel.
SAS
SAS S 864-010
SAS (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
SAS (a) On the overhead circuit breaker panel P11:
SAS 1) 11H8, SATCOM
SAS 2) 11H9, SATCOM HGA
SAS F. Installation Test
SAS
SAS S 864-017
SAS (1) Make sure these circuit breakers are closed:
SAS (a) On the P11 panel:
SAS 1) 11H7 or 11G2, HF/SAT AUDIO SW
SAS 2) 11H8, SATCOM
SAS 3) 11H9, SATCOM HGA
SAS 4) 11G1, SATCOM DC
SAS
SAS S 864-011
SAS (2) Supply the electrical power (AMM 24-22-00/201).
SAS
SAS S 864-012
SAS (3) Align the left inertial reference system in the NAV mode
SAS (AMM 34-21-00/201).
SAS
SAS S 864-013
SAS (4) From the MCDU main menu, press:
SAS LSK 3L (<SAT), then
SAS LSK 6L (<SUBMENU), then
SAS LSK 5R (MAINTENANCE>)
SAS

SAS
SAS S 744-014
SAS (5) Press line select key (LSK) 2R TEST* to perform a SATCOM system self
SAS test (Fig. 402).
SAS (a) Make sure the page display temporarily goes to the test page
SAS where TEST IN PROGRESS is displayed. When the MCDU times out
SAS and goes to the main menu page, do the next step.
SAS (b) Select LSK 3L <SAT from the main menu. The initial page
SAS displayed is the TEST page with the test results. Make sure
SAS the page reads TEST OK.

SAS NOTE: The TEST* prompt will be suppressed if the IRUs are not
SAS aligned.

SAS
SAS S 864-015
SAS (6) Set the IRS L mode select switch to the OFF position on the pilots
SAS overhead panel, P5 (AMM 34-21-00/201).

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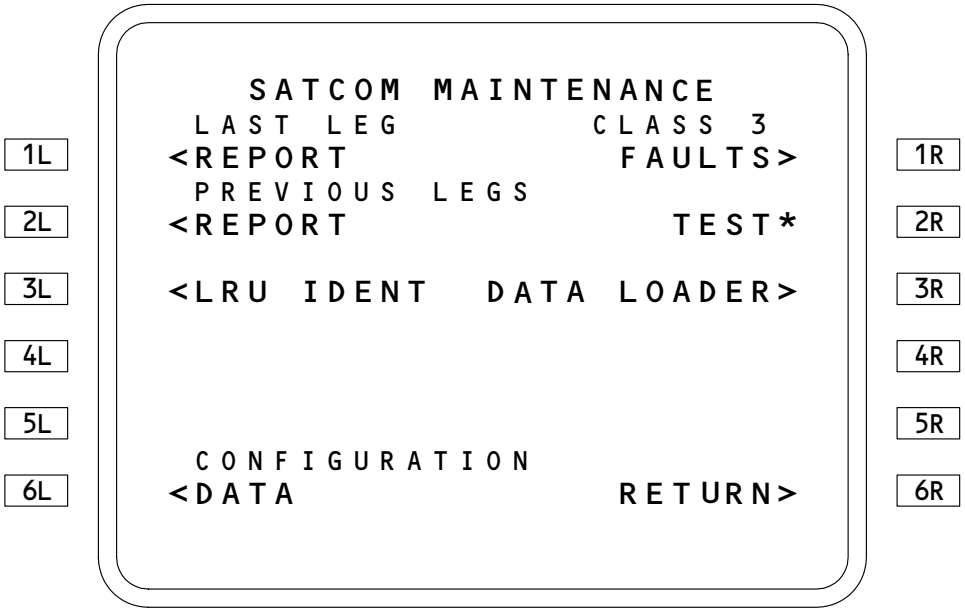


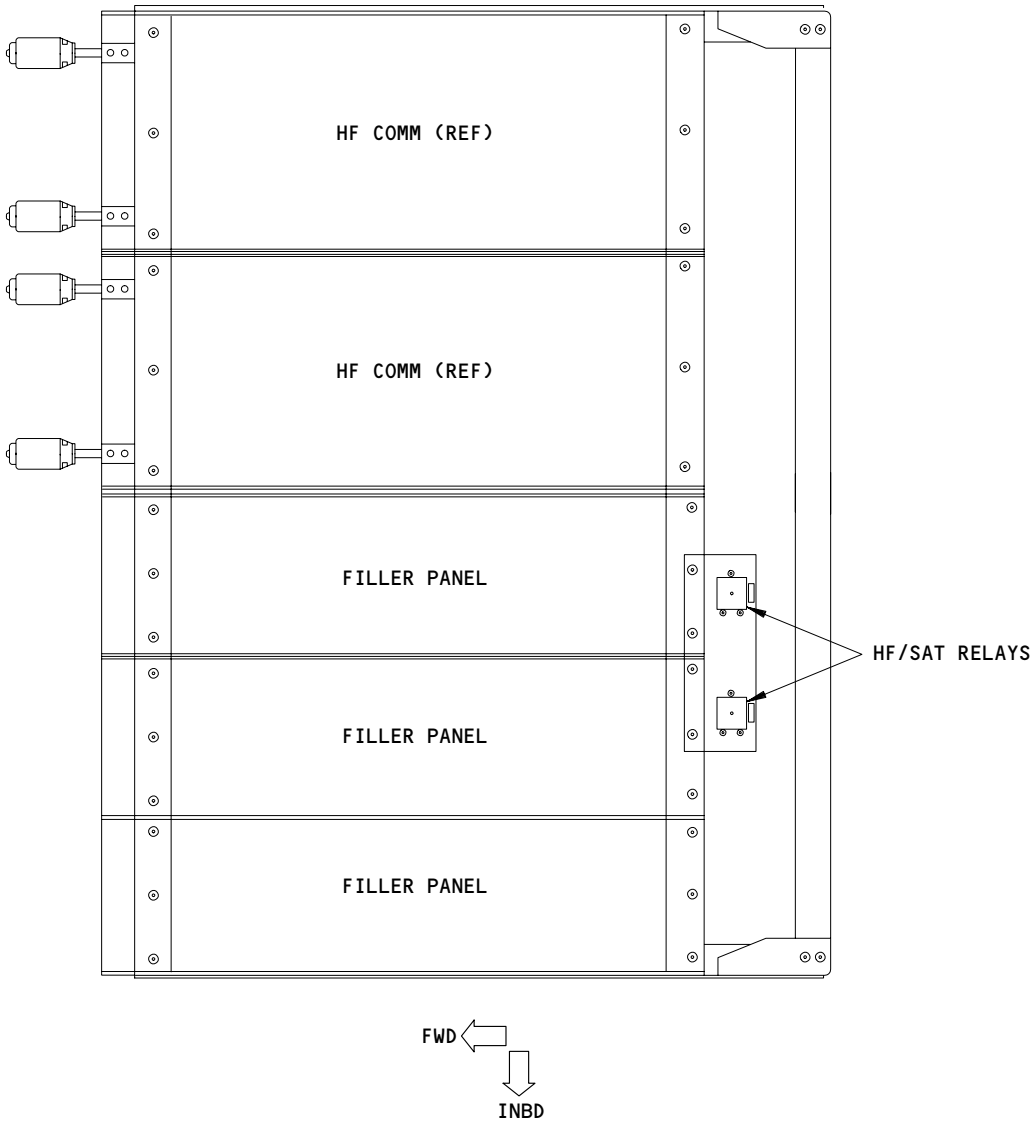
High Power Relay Installation Test
Figure 402

SAS G. Put the airplane in its usual condition.
SAS
SAS S 864-016
SAS (1) Remove the electrical power if it is not necessary
SAS (AMM 24-22-00/201).

SAS HF/SAT RELAYS - REMOVAL/INSTALLATION
SAS
SAS 1. General
SAS A. This procedure has these tasks:
SAS (1) Removal of an HF/SAT relay
SAS (2) Installation of an HF/SAT relay
SAS B. The left and right HF/SAT relays, M1803 and M1805, are installed in the main equipment center on the rear of shelf 6 of electronic equipment rack E2.
SAS
SAS TASK 23-25-26-004-010
SAS 2. HF/SAT Relay Removal
SAS A. Access
SAS (1) Location Zones
SAS 120 Main Equipment Center, Right
SAS 122 Forward Cargo Compartment
SAS 211 Control Cabin, Left

SAS B. Procedure
SAS
SAS S 864-001
SAS (1) Open the following circuit breaker and attach a DO-NOT-CLOSE tag:
SAS (a) SAS 156, 157, 166, 167;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11H7, HF/SAT AUDIO SW
SAS (b) SAS 150, 153, 154, 155, 162, 163, 164, 165;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11G2, HF/SAT AUDIO SW
SAS
SAS S 014-002
SAS (2) Open the forward cargo door.
SAS
SAS S 014-003
SAS (3) In the forward cargo compartment, remove the access panel to get to the aft side of electronic equipment rack, E2.
SAS
SAS S 024-004
SAS (4) Remove the HF/SAT relay (Fig. 401).

SAS



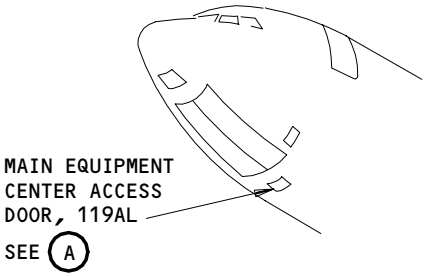
HF/SAT Relays Installation
Figure 401

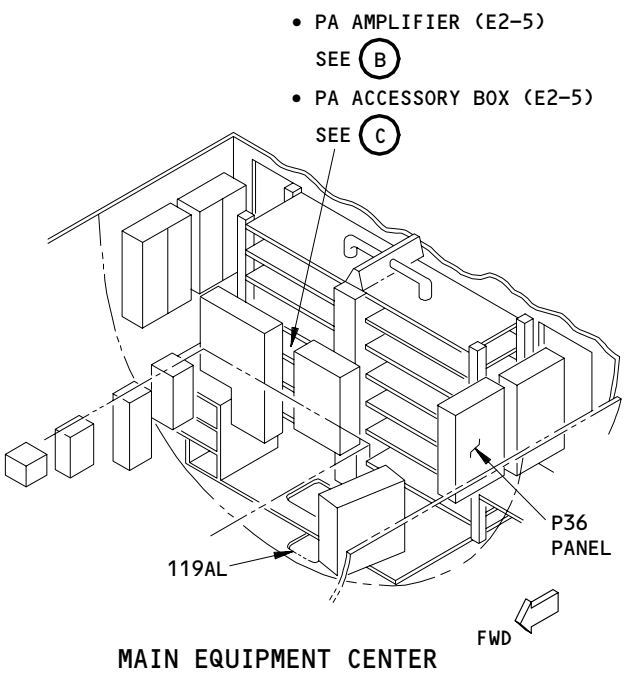
SAS
SAS TASK 23-25-26-404-005
SAS 3. HF/SAT Relay Installation
SAS A. Access
SAS (1) Location Zones
SAS 120 Main Equipment Center, Right
SAS 122 Forward Cargo Compartment
SAS 211 Control Cabin, Left

SAS B. Procedure
SAS
SAS S 424-006
SAS (1) Install the HF/SAT relay.
SAS
SAS S 414-007
SAS (2) Install the access panel.
SAS
SAS S 414-008
SAS (3) Close the forward cargo door.
SAS
SAS S 864-009
SAS (4) Remove the DO-NOT-CLOSE tag and close the following circuit breaker.
SAS (a) SAS 156, 157, 166, 167;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11H7, HF/SAT AUDIO SW
SAS (b) SAS 150, 153, 154, 155, 162, 163, 164, 165;
SAS On the overhead circuit breaker panel P11:
SAS 1) 11G2, HF/SAT AUDIO SW

PASSENGER ADDRESS SYSTEM - DESCRIPTION AND OPERATION

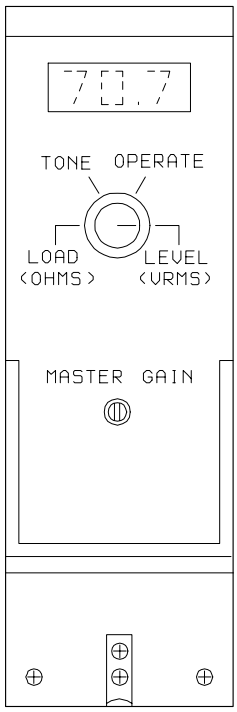
1. General
   A. The passenger address system provides voice announcements, boarding music, video audio, and passenger sign and alert chimes to the passengers and attendants via passenger cabin speakers.
   B. The passenger address system consists of a PA amplifier, PA boarding music tape reproducer, PA volume level indicator card, PA switching cards, the purser's PA hand mic and panel, and speakers. The speakers are located in the PSU, galley lavatory and attendant areas of the passenger cabin.
   C. The passenger address system receives power from the 28v dc battery bus and the 115v ac left bus. Power to the system is controlled by circuit breakers on overhead panel P11 and left miscellaneous electrical equipment panel P36.
      (1) The pilots, attendants and purser make PA announcements to the passengers via the passenger address system. The PA system also distributes boarding music and video audio throughout the passenger cabin. Automatic gain controls are provided to compensate for varying noise levels.
      (2) The PA amplifier amplifies audio inputs to the system. It also establishes priorities for system use and generates test tones and passenger sign and alert chimes. Outputs from the PA amplifier are provided to the PA system speakers in the passenger cabin. Sidetone outputs from the PA amplifier are routed to the audio selector panels for flight crew headsets. Output signals from the amplifier are also routed to the volume level indicator card.
      (3) The PA amplifier, PA volume level indicator card, and PA switching cards are located in the main equipment center, shelf E2-5. The PA boarding music tape reproducer, PA hand mic, and purser panel are located in the passenger cabin at the purser station. Controls for the boarding music audio are provided on the PA boarding music tape reproducer.
         (a) Three audio selector panels are located in the flight compartment. Two of the audio selector panels (ASP's) are located on the P8 control stand. The third ASP is located on the P61 right sidewall panel.
         (b) The audio accessory unit is located in the main equipment center (E2-5).
         (c) Attendant handsets (5) are located at each attendant's station (FWD, MID, AFT).
         (d) The pilots' handset is locted on pilots aft control stand P8. The purser handset is located at the purser station.
2. Component Details (Fig. 1)





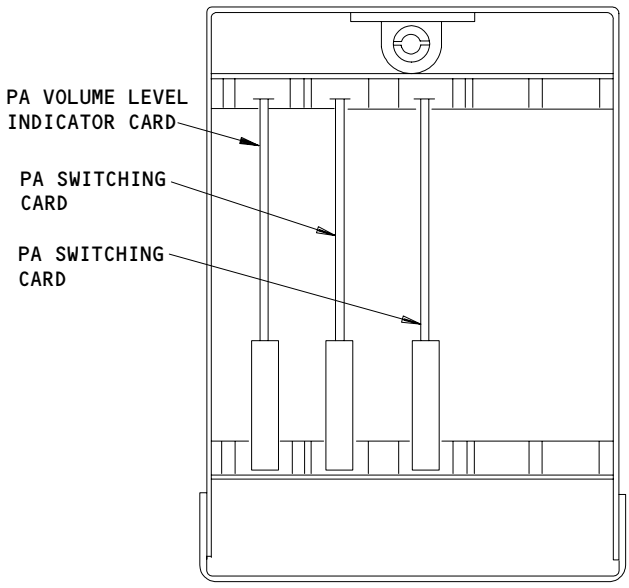
MAIN EQUIPMENT CENTER

A



PA AMPLIFIER

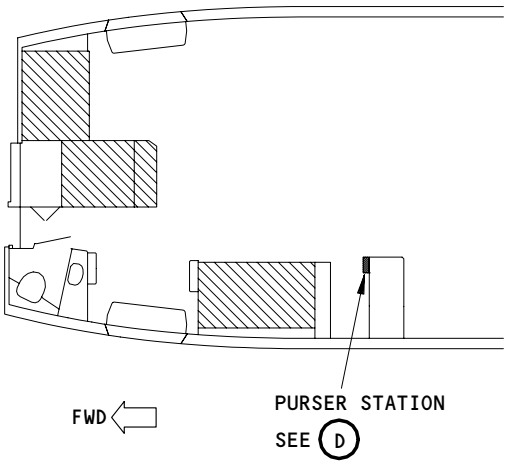
B



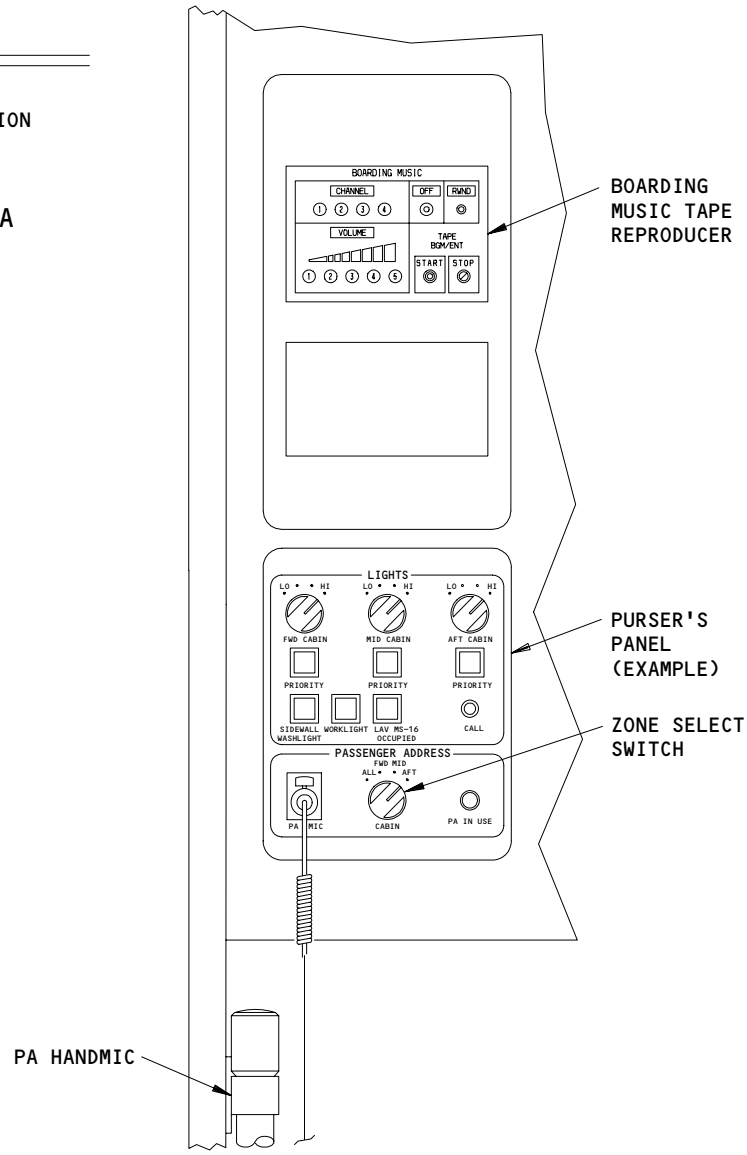
PA ACCESSORY BOX
(FRONT COVER SHOWN REMOVED)

C

Passenger Address System - Component Location
Figure 1 (Sheet 1)



FORWARD ENTRY DOOR AREA



PARTIAL VIEW OF PURSER STATION
D

Passenger Address System – Component Location
Figure 1 (Sheet 2)

F53508

A. PA Amplifier

(1) The passenger address (PA) amplifier is a 2 MCU shelf-mounted unit weighing approximately 6.5 pounds. The PA amp is located on shelf 5 of main equipment center rack E2 (E2-5). Cooling air is supplied by the equipment cooling system via inlet and exhaust ports at the bottom and top of the unit respectively.

(2) The PA amplifier provides audio power amplification for driving the passenger cabin speakers. Separate outputs provide audio to the passenger cabin speakers, sidetone to the flight compartment audio selector panels and output signals to the volume level indicator card.

(3) Voice announcements, video audio, and boarding music are amplified from priority inputs. Passenger sign and alert chimes are generated from discrete inputs. External inputs automatically increase the PA volume level during flight mode operation and decompression situations.

(4) The PA amplifier receives audio inputs from the following:

(a) Attendant, pilot or purser handsets via the audio accessory unit (Ref 23-42-00).

(b) PA hand mic.

(c) Video tape reproducer (Ref 23-32-00)

(d) PA boarding music tape reproducer

(5) The PA amplifier front panel has a three character LED display. The front panel also has a four position function select switch which is spring loaded from LOAD back to TONE and from LEVEL back to OPERATE. The LED display is off when the switch is in the OPERATE or TONE position. In the LOAD position the amplifier measures the magnitude of the load impedance at 587 Hz and shows the result on the front panel LED display. In the TONE position a 587 Hz test tone is produced throughout the passenger cabin on all speakers. In the LEVEL position the main power amplifier output is measured across an internal load with all speakers disconnected. The result is shown on the front panel display. Normal operation of the PA amplifier requires the function select switch to be in the OPERATE position.

B. Passenger Address Speakers

(1) Speakers with matching transformers are located in the galleys, lavatories, passenger service units (PSUs) and at the attendant stations.

(a) The PSU speakers are located in every-other seat row in all three columns of passenger seats. The alternate rows of PSUs are equipped with the oxygen/light assemblies.

C. PA Boarding Music Tape Reproducer

(1) The PA boarding music tape reproducer is located at the purser station. The tape reproducer provides boarding music to the PA amplifier and entertainment audio to the passenger entertainment system.

(2) The PA boarding music tape reproducer front panel has the following features:
  (a) Four CHANNEL switches to select which channel of boarding music is provided to the PA amplifier.
  (b) Five VOLUME switches to control the volume level of the boarding music over the PA system.
  (c) An OFF switch to turn off boarding music inputs to the PA amplifier while entertainment audio inputs to the passenger entertainment system remain on.
  (d) A RWND light to indicate when the cassette tape is being automatically rewound.
  (e) START and STOP switches to start and stop tape play.

(3) A single 4-track Philips-type cassette is installed in the PA boarding music tape reproducer. The electronically locked tape access door is located on the lower half of the tape deck.

D. Pilot, Attendant and Purser Handsets

(1) Attendant handsets are located at the left and right forward, mid, and left and right aft attendant stations. The pilot handset is located on the aft face of the P8 control stand and the purser handset is located at the purser station. All handsets are the same. Each handset contains a microphone, earpiece, push-to-talk (PTT) switch, reset switch and six dialing switches.

(2) Pressing the PA switch interfaces the handset with the PA amplifier via the audio accessory unit. Pressing the ALERT switch causes the PA amplifier to sound three Hi/Lo chimes over the cabin speakers.

E. Purser Panel

(1) The purser panel is located at the purser station. The PA portion of the panel allows the purser to select which section(s) of the passenger cabin (FWD, MID, AFT, ALL) a PA announcement, made with the PA hand mic, is broadcast to. The panel contains a jack for the PA hand mic, a CABIN switch to select which section(s) of the passenger cabin receive the announcement and a PA IN USE light. The PA IN USE light comes on during PA announcements, as a type of feedback signal to show that the PA amplifier is working properly.

F. PA Switching Cards

(1) The PA switching cards contain relays which control the muting of PA announcements. These relays are controlled by the CABIN switch on the purser panel. The cards also contain a relay that mutes the PA hand mic at the purser station. This relay is controlled by the PTT switches on the handsets.

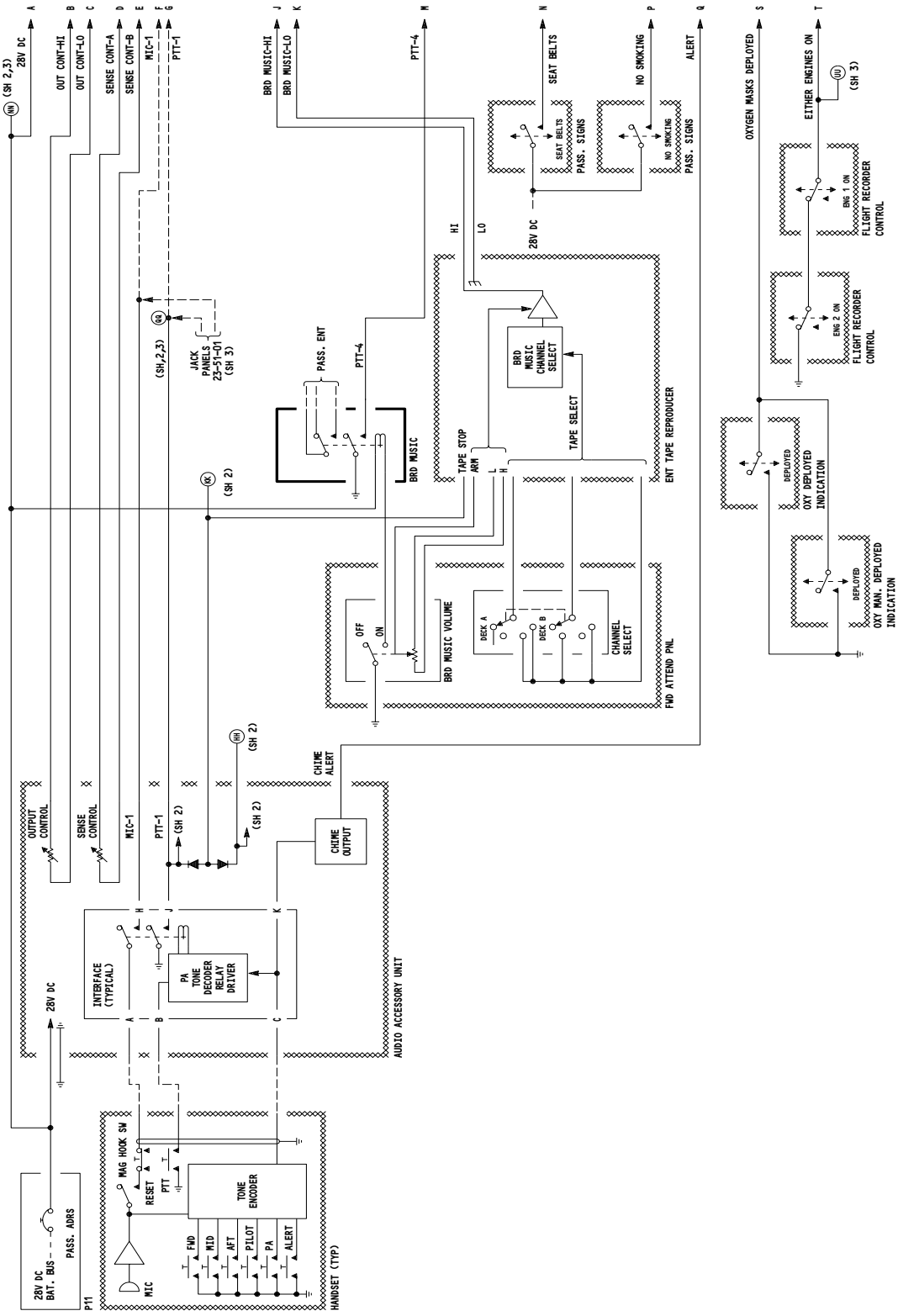
(2) The PA switching cards are located on the E2-5 shelf in the main equipment center.

G. Volume Level Indicator Card
   (1) The volume level indicator card is enabled by the PTT switch on the PA hand mic. The card monitors the output level of the PA amplifier and provides a voltage to illuminate the PA IN USE light on the purser panel.
   (2) The volume level indicator card is located on the E2-5 shelf in the main equipment center.

H. Audio Accessory Unit
   (1) The audio accessory unit contains the cabin interphone circuits that interface the handsets with the PA system. These circuits monitor the cabin interphone power supply and, in the event of a power failure, automatically switch the handsets to PA operation.
   (2) The PA LEVEL control on the front of the audio accessory unit provides adjustment of PA speaker output. The PA override relay for the passenger entertainment system is within the audio accessory unit.

3. Operation (Fig. 2)

A. Functional Description
   (1) General
      (a) The PA system supplies boarding music, voice messages and chime signals via speakers to all passengers and attendants in the passenger cabin. PA sidetone is provided to the flight deck crew members via their audio selector panels.
      (b) The PA amplifier outputs each type of audio on an input priority basis.
      (c) Discrete signals from the passenger signs system cause a low tone chime signal to be sounded on all PA speakers. A single low chime occurs whenever the NO SMOKING or the FASTEN SEAT BELT signs are switched on or off.
      (d) Pressing the ALERT call switch at a handset or pilot's call panel causes the PA amplifier to generate three Hi/Lo chimes which are output over the PA speakers.
      (e) Voice announcements from the flight compartment are made using the pilots' handset. The PA listen switch on the audio selector panel allows the flight compartment crew members to monitor PA announcements or sidetone. With the switch on, PA announcements or sidetone will be provided to the flight crew headsets and speakers at a fixed volume.
      (f) The output of the PA amplifier is provided to the volume level indicator card in the main equipment center. This card monitors the output level of the PA amplifier during voice announcements from the PA hand mic. If the output level is high enough to indicate proper system operation, the card will provide a voltage to illuminate the PA IN USE light on the purser panel.



Passenger Address System Schematic
Figure 2 Sheet 1)

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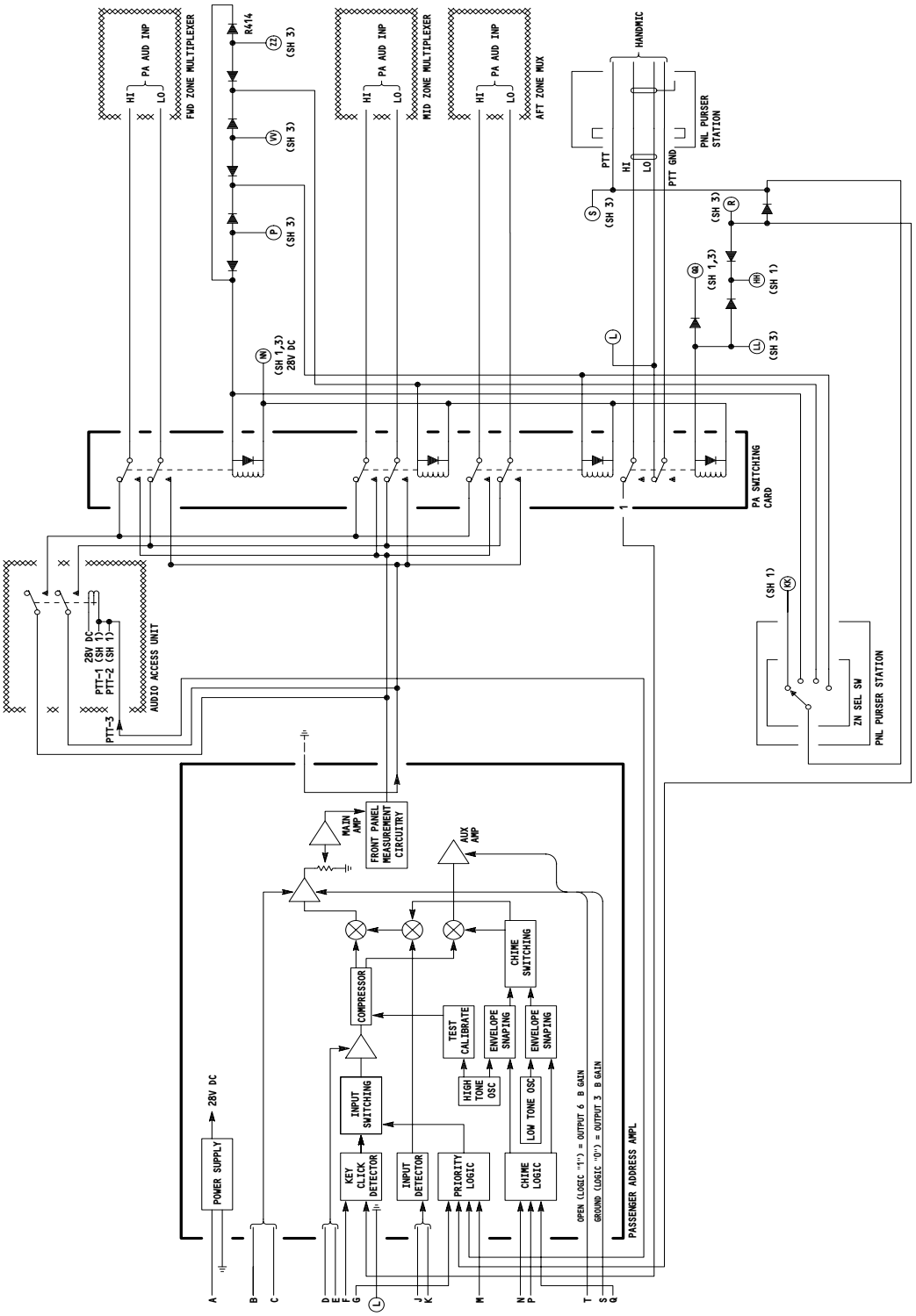
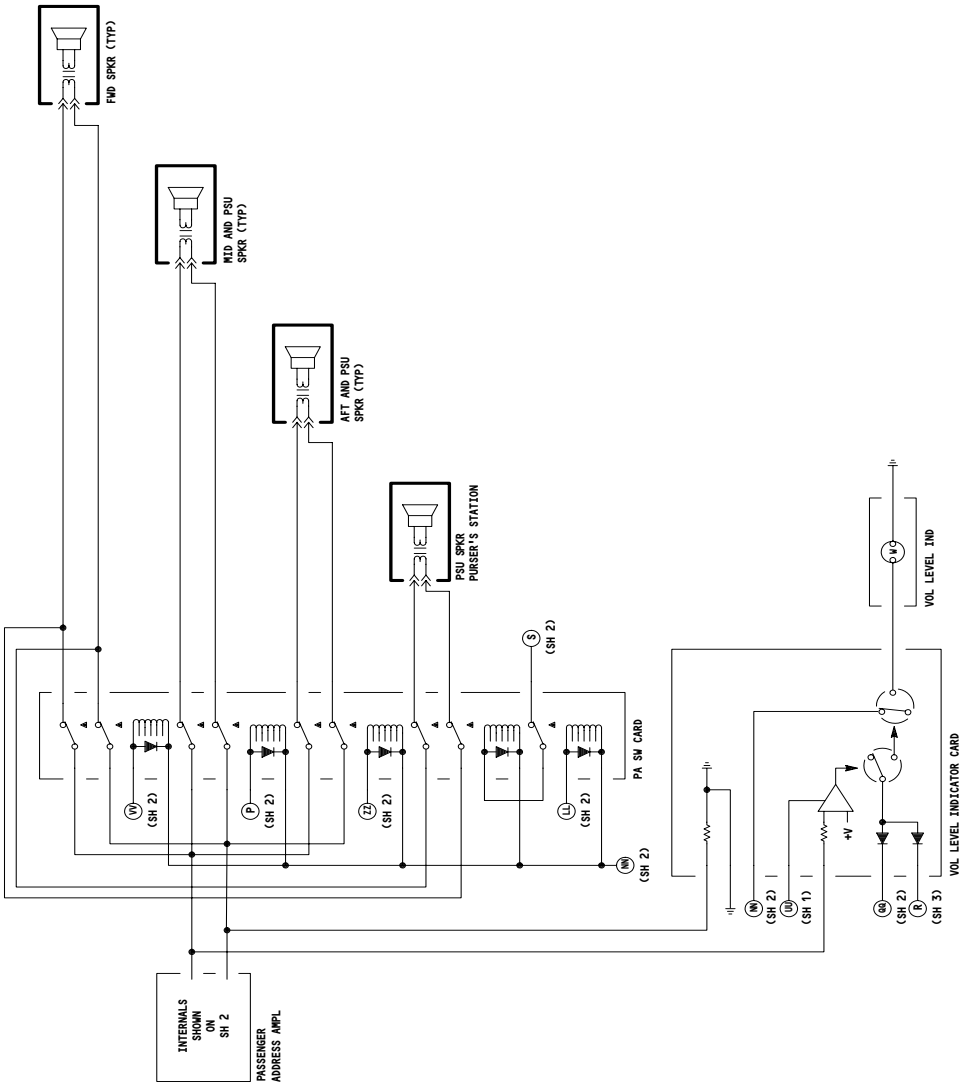


Passenger Address System Schematic
Figure 2 (Sheet 2)



Passenger Address System Schematic
Figure 2 (Sheet 3)

(g) Sidetone outputs are supplied by the PA amplifier to the audio selector panels for flight crew headsets. The amplification circuits are enabled by the push-to-talk (PTT) inputs.

(h) The PA amplifier has circuitry to provide system testing. All PA speakers can be checked. Loads on the amplifier output circuit can be measured. Output levels of the amplifier can be measured to allow for adjustments.

(i) Relays control amplifier gain increases that compensate for increased noise levels when the oxygen masks are deployed and/or when either engine is running.

(j) The passenger address system receives 28v dc power from the battery bus through the PASS ADRS circuit breaker located on the P11 panel. Power from this circuit breaker is supplied to the PA amplifier, volume level indicator card, PA switching cards, and audio accessory unit. The PA boarding music tape reproducer receives 115v ac power from the left bus through the PRE RECD ANNCT circuit breaker located on the P36 panel.

(2) Passenger Address Audio

(a) Each audio input into the PA amplifier has a PTT control signal. Priorities within the PA amplifier are in numerical order with No. 1 as the highest priority input.

(b) The audio accessory unit detects the PA select signal from the handsets. Handset microphone and PTT signals are routed to the PA amplifier when the handset PTT switch is pressed.

(c) PA hand mic PTT and microphone signals are routed directly to the PA amplifier through a relay on the PA switching card.

(d) The PA amplifier provides outputs to the PSU, galley, lavatory and ceiling speakers through the PA switching cards. The amplifier provides direct outputs to the audio accessory unit, audio selector panels and the volume level indicator card. PA amp outputs to the audio accessory unit are routed to the zone multiplexers through the PA switching cards.

(e) The PA switching cards are controlled by the CABIN switch on the PA panel. The cards mute the PA amplifier output to passenger cabin speakers. The cards also mute the PA output from the audio accessory unit to the zone multiplexers.

(f) The PA amplifier contains switching logic to control priority of audio output. Inputs with higher priority override those with lower priority in the following order:

1) PA announcements from the flight compartment.
2) PA announcements from the attendant or purser handset.
3) PA announcements from the PA hand mic at the purser station.
4) Audio from the video tape reproducer.
5) Boarding music.

(g) The handset interface circuits of the audio accessory unit decode the handset chime requests (attendant call, alert call or pilot call), and routes the signal to either the electronic chimes, passenger address amplifier or bell chime aural warning module. The chime requests for passenger signs are provided by the passenger sign relays.

(h) All passenger sign and alert chime requests are input to the chime logic module in the PA amplifier. The high and low tone oscillators in the PA amplifier operate continuously. The chime output is controlled by the envelope shaping and chime switching circuits. The chime signals are routed to the main amplifier.

(i) Gain changes, as a result of oxygen mask deployment and engine operation, are provided by the passenger address amplifier. Oxygen mask deployment causes a 3dB increase in gain. When either engine is operating, the gain increase is 6dB. Gain control signals caused by oxygen mask deployment or engine operation are provided by relays.

(j) The output level of all PA speakers is adjusted with the PA LEVEL control on the front of the audio accessory unit (E2-5).

(3) Boarding Music Selection and Control (Fig. 3)

B. BITE

(1) PA Amplifier Front Panel - General

(a) The function select switch and three-character LED display enable proper operation of the PA system to be checked. The switch selects one of four operating or test modes.

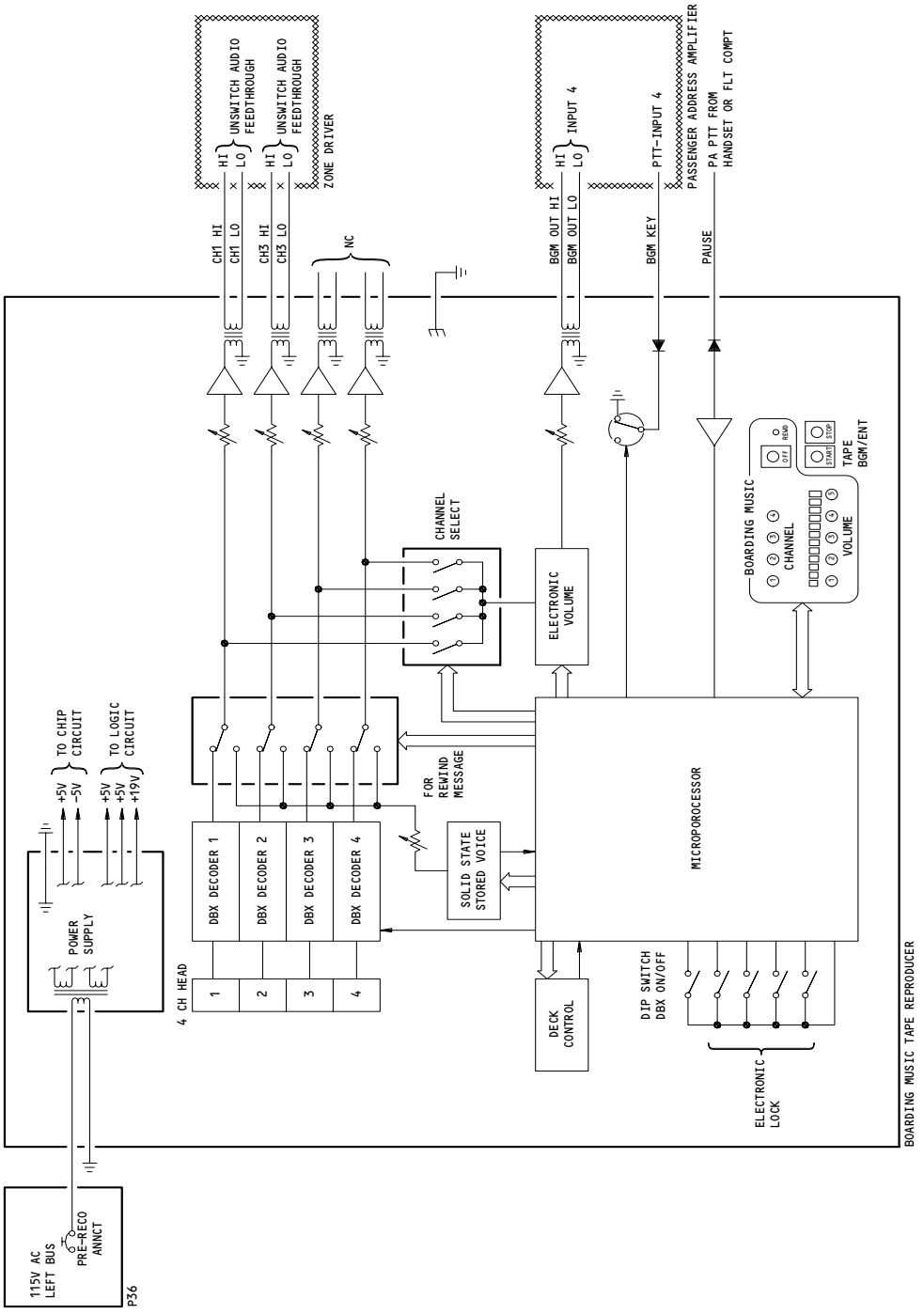
1) OPERATE - Normal operating mode for the PA amplifier. Switch should always remain in this detented position whenever tests are complete. The LED display remains off in this mode.

2) TONE - This mode provides a functional test of all speakers. A high chime tone (587 Hz) is continuously generated out to all speakers in this detented position. The LED display remains off in this mode.

3) LOAD (OHMS) - This mode measures the impedence of the speaker network at 587 Hz. No audible tone is heard on the speakers. The LED display shows 000 to 999 ohms. This position is spring-loaded and will return to the TONE position when released.

4) LEVEL (VRMS) - This mode measures the PA amplifier output voltage to the speakers. The output is dissipated into an internal dummy load and the speakers are disconnected. The LED display shows 00.0 to 99.9 VRMS. This position is spring-loaded and will return to the OPERATE position when released.

(b) The function select switch should always be returned to the OPERATE position for normal system operation.



Boarding Music Schematic
Figure 3

(2) PA Amplifier Test
  (a) Holding the test switch to the spring-loaded LEVEL (VRMS) positions provides an internal test of the PA amplifier.
  (b) Releasing the spring-loaded switch should return it to the OPERATE position.
(3) Speaker Network Test
  (a) Setting the test switch to the TONE position provides a continuous high chime tone (587 Hz) that is audible on all PA speakers.
  (b) Holding the test switch to the LOAD (OHMS) position provides a measurement of the speaker network impedence.
  (c) Rotate the test switch to the OPERATE position for normal system operation.

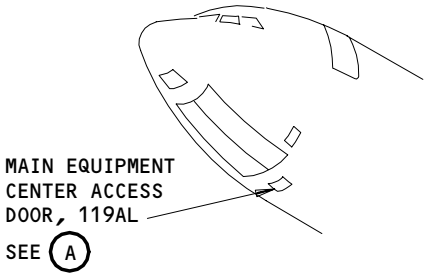
C. Control
(1) Turn-On Procedure
  (a) Provide electrical power (Ref 24-22-00)
  (b) Check that the PASS ADRS circuit breaker is closed on overhead panel P11.
  (c) Check that PRE-RECD ANNCT circuit breaker is closed on left miscellaneous electrical equipment panel P36.
(2) Access for Voice Announcements
  (a) Remove handset from cradle and press PA switch.
  (b) Press PTT switch.
  (c) Speak into microphone.
(3) Access for Boarding Music
  (a) At the PA boarding music tape reproducer located at the purser station:
    1) Press CHANNEL 1, 2, 3 or 4.
    2) Press START.
    3) Adjust VOLUME as desired.

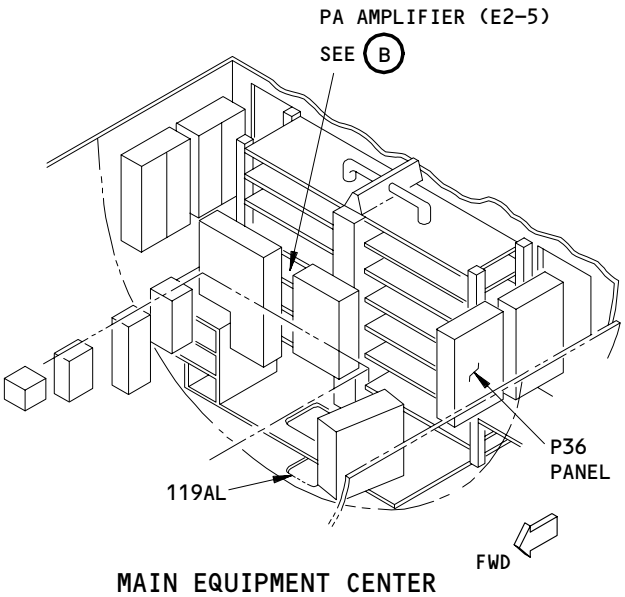
PASSENGER ADDRESS SYSTEM - DESCRIPTION AND OPERATION

1. General
   A. The passenger address system provides voice announcements, boarding music and chime signals to the passengers and attendants via cabin speakers.
   B. The passenger address system consists of a PA amplifier, pre-recorded annct tape reproducer, announce select panel, and speakers. The speakers are located in the PSU, galley, lavatory, and attendant areas of the passenger cabin.
   C. The PA amplifier gets 28v dc power from the battery bus via the PASS ADRS circuit breaker on the overhead panel P11. The PA tape deck gets 115v ac from the left AC bus via the PRE-RECD ANNCT circuit breaker on the forward left miscellaneous equipment panel P36.
      (1) The pilots and attendants make PA announcements to the passengers via the passenger address system. The passenger address system gives boarding music and video system audio. Gain controls for boarding music and video audio are given to make allowance for noise levels that change.
      (2) Pre-recorded announcements are available to the PA system. When a cabin decreases pressure in flight, one announcement starts automatically. The other announcement selections are available on the PA tape deck in the forward closet.
      (3) The PA amplifier amplifies audio inputs to the system. It also establishes priorities for system use and generates chimes and test tones. Outputs from the PA amplifier are provided to the PA system speakers. Sidetone outputs from the PA amplifier are routed to the audio selector panels for the flight crew headsets and cockpit speakers.
      (4) The PA amplifier is located in the main equipment center (rack E2-5). Speakers are located at the attendants stations, lavatories, galleys, and in the passenger service units (PSU).
         (a) Three audio selector panels are located in the flight compartment. Two audio selector panels (ASP's) are on the P8 control stand and one is on the first observer's P61 sidewall console.
         (b) The pilots' call panel is located on the P5 pilots' overhead panel.
         (c) The pilots' handset is located on the P8 pilots' aft control stand.

(d) The PA amplifier and the audio accessory unit are located in the main equipment center (rack E2-5).
(e) Attendant handsets (5) are located at each attendant's station (FWD, MID, AFT).

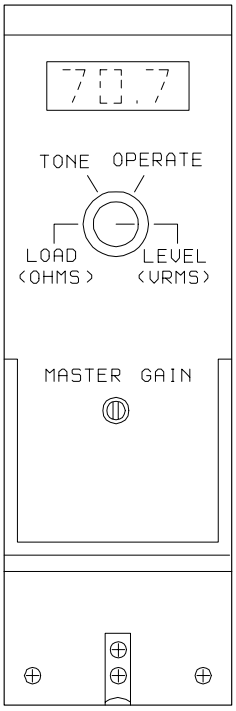
2. Component Details (Fig. 1)
A. PA Amplifier
(1) The passenger address (PA) amplifier is a 2 MCU shelf-mounted unit weighing approximately 6.5 pounds. It is located on the E2-5 shelf in the main equipment center (MEC). Cooling air is supplied by the equipment cooling system via inlet and exhaust ports at the bottom and top of the unit respectively.
(2) The PA amplifier provides audio power amplification for driving the passenger cabin speakers. Three separate outputs provide audio to the passenger speakers, attendant speakers and sidetone to the audio selector panels (ASPs).
(3) The PA amplifier receives audio inputs from the following:
(a) Flight compartment microphones via the audio selector panels (Ref 23-51-00)
(b) Attendant or pilot's handsets via the audio accessory unit (Ref 23-42-00)
(c) PA hand mics
(d) Video tape reproducer (Ref 23-32-00
(e) Entertainment tape reproducer
(f) PA tape deck
(4) Voice announcements, pre-recorded announcements, and boarding music are amplified from priority inputs. Chime signals are generated from discrete inputs. External inputs automatically increase the PA volume level for flight mode operation and decompression situations. In-flight decompression also automatically activates the pre-recorded emergency procedures.
(5) The PA amplifier accepts signals from microphones located at flight and cabin stations. It amplifies and distributes audio from the entertainment tape reproducer, video tape reproducer, and PA tape deck through the PA system speakers. The amplifier includes circuitry for generating and controlling chime signals. The PA amplifier sidetone circuits supply PA announcements to the flight deck ASPs.





MAIN EQUIPMENT CENTER

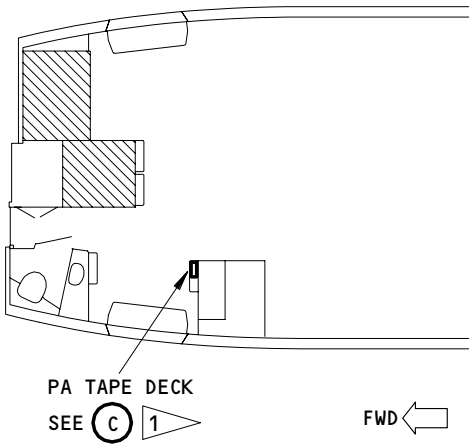
(A)



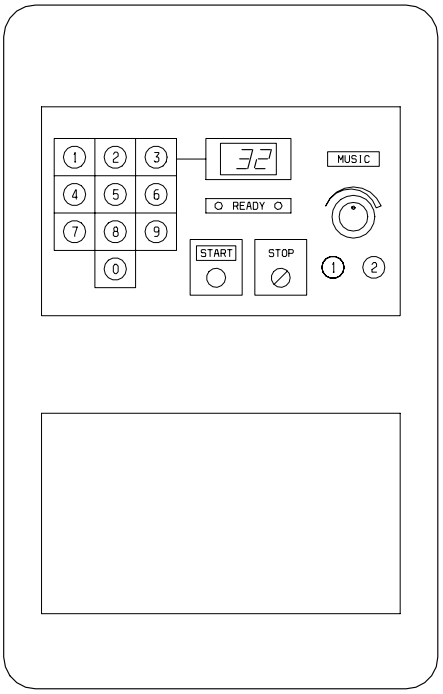
PA AMPLIFIER

(B)

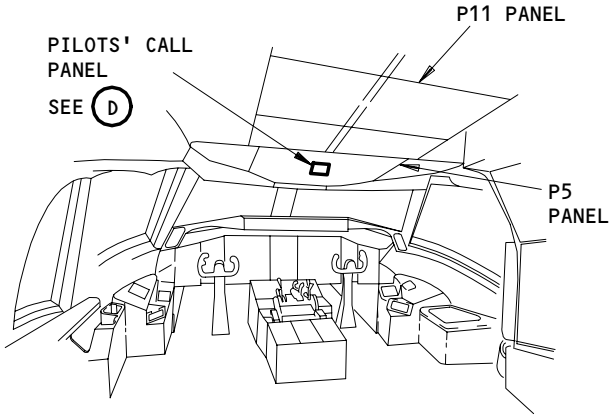
Passenger Address System - Component Location
Figure 1 (Sheet 1)



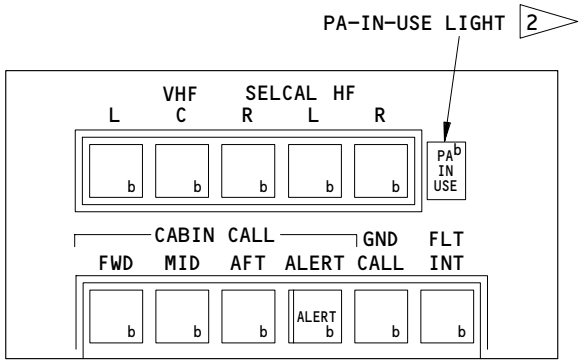
FORWARD ENTRY DOOR AREA



PA TAPE DECK
C



FLIGHT COMPARTMENT



PILOTS' CALL PANEL
(EXAMPLE)
D

1 MTH 275-278,281-999
2 MTH 279,280

Passenger Address System - Component Location
Figure 1 (Sheet 2)

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(6) The amplifier has a three character LED for test meter readouts. A four position function switch is spring loaded from LOAD back to TONE and from LEVEL back to OPERATE. The LED is off when the TONE and OPERATE positions are selected. In the LOAD position, the amplifier measures the magnitude of the load impedance at 587 Hz. In the TONE position, a 587 Hz test tone is produced in the cabin and at attendant stations. In the LEVEL position, the switch measures main power amplifier output at 587 Hz into an internal load with the speakers disconnected as a reference for setting the gain controls. Normal operation of the PA amplifier requires the switch to be in the OPERATE position.

B. Passenger Address Speakers

(1) Speakers with matching transformers are located in the galleys, lavatories, passenger service units (PSUs) and at the attendant stations.

(a) The PSU speakers are located in every-other seat row in all three columns of passenger seats. The alternate rows of PSUs are equipped with the oxygen/light assemblies.

(2) All passenger address speakers are 6 1/2 inches in diameter and can be adapted to larger panel provisions when necessary. Speaker impedance is 8 ohms at 400 Hz.

C. Video/Annct Relay

(1) The video/annct relay is located in the MEC at the rear of shelf E2-5. The relay determines the source of priority 3 audio inputs into the PA amplifier.

(2) The relay is operated by the PTT output of the PA tape deck causing the video audio to be overridden by the prerecorded announcements.

D. PA Tape Deck

(1) The PA tape deck is installed in the forward closet. The PA tape deck supplies boarding music, prerecorded announcements and an emergency decompression announcement to the PA amplifier.

(2) The PA tape deck front panel has features as follows:

(a) START and STOP switches to start and stop the tape

(b) A ten-key numeric key pad used to make a selection of the prerecorded announcements

(c) A two-digit seven-segment display to show the message selection
(d) A READY light which comes on when the message search completes
(e) START and STOP switches
(f) MUSIC 1 and 2 switches used to make a selection of one of the two boarding music tracks
(g) Volume control used to control the boarding music volume

(3) A single 4-track Philips-type cassette is installed in the PA tape deck. The electronically locked tape access door is on the lower half of the tape deck. The tape access door is opened by entering a preprogrammed two-digit access code and then pressing the MUSIC 1 and 2 switches simultaneously. The access code will be 90, 91, 92, or 93 dependent on DIP switch settings internal to the tape deck.

(4) The emergency decompression announcement is provided by solid state stored voice memory circuits. Deployment of passenger oxygen masks will cause a relay within the passenger oxygen system to provide a ground to the cabin decompression sensor pin on the PA tape deck. The PA tape deck will then output the emergency announcement to the PA amplifier.

E. Forward Attendant Panel (P21)

(1) The fwd attendant panel is located at the fwd left entry door. A PTT input is also provided to the priority 4 input of the PA amplifier.

F. Attendant Handsets

(1) Attendant handsets are located in the passenger cabin at the L and R fwd, mid, and the L and R aft attendant stations. All handsets are identical, including the pilot handset. Each handset contains a microphone, earpiece, PTT (push-to-talk) switch, reset switch and dialing pushbuttons.

(2) Pressing the PA pushswitch interfaces the handset with the PA amplifier via the audio accessory unit. Pressing the ALERT switch causes the PA amplifier to sound three Hi-Lo chimes over the cabin speakers.

G. Audio Accessory Unit

(1) The audio accessory unit contains the cabin interphone circuits that interface the handsets with the PA system. These circuits monitor the cabin interphone power supply and handsets for automatically switching the handsets to PA operation.

(2) Output and sense control adjustments for the PA system are within the audio accessory unit. The PA override relay for the passenger entertainment system is also within the audio accessory unit.

3. Operation

A. Functional Description

(1) General

(a) The PA system supplies boarding music, crewmember and pre-recorded voice messages and chime signals via speakers to all passengers and attendants in the passenger cabin. PA sidetone is provided to the flight deck crew members via their audio selector panels.

(b) The PA amplifier outputs each type of audio on an input priority basis.

(c) Discrete signals from the passenger signs system cause a low tone chime signal to be sounded on all PA speakers. A single low chime occurs whenever the NO SMOKING or the FASTEN SEAT BELT signs are switched on or off.

(d) Discrete signals from the attendant call system cause HI-LO tone chime signals to be sounded on the attendant speakers. A HI-LO chime occurs when an attendant call switch is pressed at a seat passenger control unit (PCU) or from a lavatory.

(e) Pressing the ALERT call switch at a handset or pilot's call panel causes the PA amplifier to generate three HI-LO chimes which are output over the PA speakers.

(f) Discrete signals from the cabin interphone system cause high-low chimes to be sounded on the attendant speakers. A single high-low chime occurs when attendant call is dialed. Three high-low chimes occur when an ALERT call is dialed.

(g) Voice announcements from the pilots are either using the pilot handset or the flight interphone system (Ref 23-51-00) via the audio selector panels (ASPs). Voice announcements from the attendants are via the attendant handsets of the cabin interphone system (Ref 23-42-00). These announcements are amplified by the PA amplifier onto the speakers.

(h) Side tone outputs are provided from the PA amplifier to the audio selector panels for flight crew headsets and interphone cockpit speakers. The amplification circuits are enabled by the PTT (push-to-talk) inputs.

(i) The PA amplifier has circuitry to provide system testing. All PA speakers can be checked. Loads on the amplifier output circuit can be measured. Output levels of the amplifier can be measured to allow for adjustments.

(j) The system controls amplifier gains and compensates for increased noise levels when the oxygen masks are deployed and/or whenever either engine is operating.

(k) The system receives power from the 28-volt dc battery bus. The PASS ADRS circuit breaker is located on the P11 overhead circuit breaker panel. Power is supplied to the audio accessory unit, and passenger address amplifier.

(2) Passenger Address Audio

(a) Each audio input into the PA amplifier has a PTT control signal. Priorities within the PA amplifier are in numerical order with No. 1 as the highest priority input.

(b) The audio accessory unit detects the PA select signal from the handsets. Handset microphone and PTT signals are routed to the PA amplifier when the handset PTT switch is pressed to energize the priority logic and input switching.

(c) Audio selector panel microphone and PTT signals are routed directly to the PA amplifier.

(d) The main amplifier within the PA amplifier provides outputs to PSU speakers, galley speakers, lavatory speakers, audio selector panels, and to the PA amplifier front panel performance measurement circuits. The auxiliary amplifier within the PA amplifier provides outputs to all attendants' speakers.

(e) The PA amplifier contains switching logic to control priority of audio output. Inputs with higher priority override those with lower priority in the following order:

1) PA announcements from the flight compartment.
2) PA announcements from attendant's handsets.
3) Pre-recorded announcements.
4) Audio from the video tape reproducer.
5) Boarding music.

(f) The handset interface circuits of the audio accessory unit decode the handset chime requests (attendant call, alert call or pilot call), and routes the signal to either the passenger address amplifier or cockpit bell chime. The chime requests for passenger signs are provided by the passenger sign relays.

(g) All chime requests are input to the chime logic module in the PA amplifier. The high and low tone oscillators in the PA amplifier operate continuously. The chime output is controlled by the envelope shaping and chime switching circuits. The chime signals are routed to summing pre-amplifiers before the signal is sent to the main or auxiliary amplifier.

(h) Gain changes, as a result of oxygen mask deployment and engine operation, are provided by the passenger address amplifier. Oxygen mask deployment causes a 3dB increase in gain. When either engine is operating, the gain increase is 6dB. Gain control signals caused by oxygen mask deployment or engine operation are provided by relays.

(i) The output level of all PA speakers is adjusted with the PA LEVEL control on the front of the audio accessory unit (E2-5).

(3) Pre-recorded Announcements Selection and Control

B. BITE

(1) PA Amplifier Front Panel - General

(a) The function select switch and the three-character LED display test meter enable proper operation of the PA system to be verified. The switch selects one of four operating or test modes.

1) OPERATE - Normal operating mode for the PA amplifier. Switch should always remain in this detented position whenever tests are complete. The LED display remains off in this mode.

2) TONE - This mode provides a functional test of all speakers. A high chime tone (587 Hz) is continuously generated out to all speakers in this detented position. The LED display remains off in this mode.

3) LOAD (OHMS) - This mode measures the impedence of the speaker network at 587 Hz. No audible tone is heard on the speakers. The LED display shows 000 to 999 ohms. This position is spring-loaded and will return to the TONE position when released.

4) LEVEL (VRMS) - This mode measures the PA amplifier output voltage to the speakers. The output is dissipated into an internal dummy load and the speakers are disconnected. The LED display shows 00.0 to 99.9 VRMS. This position is spring-loaded and will return to the OPERATE position when released.

(b) The function select switch should always be returned to the OPERATE position for normal system operation.

(2) PA Amplifier Test

(a) Holding the test switch to the spring-loaded LEVEL (VRMS) positions provides an internal test of the PA amplifier.

(b) Releasing the spring-loaded switch should return it to the OPERATE position.

(3) Speaker Network Test
  (a) Setting the test switch to the TONE position provides a continuous high chime tone (587 Hz) that is audible on all PA speakers.
  (b) Holding the test switch to the LOAD (OHMS) position provides a measurement of the speaker network impedence.
  (c) Rotate the test switch to the OPERATE position for normal system operation.

C. Control
(1) Turn-On Procedure
  (a) Provide electrical power (Ref 24-22-00)
  (b) Check that the PASS ADRS circuit breaker is closed on overhead panel P11.
  (c) Check that PRE-RECD ANNCT circuit breaker is closed on the left miscellaneous electrical equipment panel P36.
  (d) Make sure the PA VOLUME switch is in the OFF position on the system control unit in the forward closet.
(2) Access for Voice Announcements
  (a) Lift attendant handset.
  (b) Press PA pushswitch.
  (c) Press PTT switch.
  (d) Speak into microphone.
(3) Access for Pre-recorded Announcements
  (a) At the PA tape deck installed in the forward closet:
    1) Select the desired announcement using numeric key pad per program card. (Announcement 1 thru 9 are entered 01 thru 09.)
    2) When the READY Light comes on press START.
(4) Access for Boarding Music
  (a) At the PA tape deck installed in the forward closet:
    1) Press MUSIC 1 or 2.
    2) Press START.
    3) Adjust VOLUME as desired.

D. For more details on the Passenger Address System, refer to these wiring diagrams and functional schematics (as applicable):
   WDM 23-31-11: Passenger Address - Voice Input Circuitry
   WDM 23-31-12: Passenger Address - Boarding Music/Pre-Recorded Announcement and Attendant Panel
   WDM 23-31-13: Passenger Address - Output Circuitry and Control
   WDM 23-31-14: Passenger Address - Speakers - Attendant, Galley and Lavatory
   WDM 23-31-15: Passenger Address - Speakers - Left PSU Section
   WDM 23-31-16: Passenger Address - Speakers - Center PSU Section
   WDM 23-31-17: Passenger Address - Speakers - Right PSU Section
   WDM 23-31-18: Passenger Address - Speakers - Main Ceiling Panel
   WDM 23-31-21: Passenger Address - Pre-Recorded Taped Announcements
   SSM 23-31-01: Passenger Address
   SSM 23-31-02: Pre-Recorded Announcements
   SSM 23-31-10: Passenger Address System - Microphone and Input Controls
   SSM 23-31-20: Passenger Address System - Boarding Music
   SSM 23-31-30: Passenger Address System - Speakers - Bus 1
   SSM 23-31-40: Passenger Address System - Speakers - Bus 2

PASSENGER ADDRESS SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
AMPLIFIER - PASSENGER ADDRESS, M177	1	1	119AL, MAIN EQUIP CTR, E2-5	23-31-01
CIRCUIT BREAKER -	2		FLT COMPT, P11	
PASS ADRS, C548		1	11C22	*
CIRCUIT BREAKER -			119AL, MAIN EQUIP CTR, P36	
PRE-RECD ANNCT, C534		1	37J7	*
DIODE - R409-R418,R431-R438, 1> R475,R655		20	119AL, MAIN EQUIP CTR E2-5	*
HANDSET - (REF 23-42-00, FIG. 101)				
ATTENDANTS, B61				
PILOTS', B61				
MULTIPLEXER - (REF 23-34-00, FIG. 101)				
AFT ZONE, M1307				
FWD ZONE, M642				
MID ZONE, M1321				
RELAY - (REF 31-01-19, FIG. 101)				
OXYGEN DEPLOYED INDICATION, K8				
OXYGEN MANUAL DEPLOYED INDICATION, K42				
PASSENGER SIGNS, K383, K384				
RELAY - (REF 31-01-36, FIG. 101)				
FLIGHT RECORDER CONTROL, K163				
RELAY - (REF 31-01-37, FIG. 101)				
FLIGHT RECORDER CONTROL, K164				
REPRODUCER - BOARDING MUSIC TAPE, M1708	2	1	PURSER STATION	23-31-10
REPRODUCER - (REF 23-34-00, FIG. 101)				
ENTERTAINMENT TAPE, M170				
SPEAKER - CEILING AFT L, B235	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING, FWD L, B289	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING, FWD L, B293	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING, FWD R, B292	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING MID, B243	1	1	PASS CABIN	23-31-08
SPEAKER - GALLEY, AFT L, B229	1	1	PASS CABIN	23-31-04
SPEAKER - GALLEY, AFT R, B230	1	1	PASS CABIN	23-31-04
SPEAKER - GALLEY, FWD, B70	1	1	PASS CABIN	23-31-04
SPEAKER - LAVATORY, FWD, M289	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID-CTR AFT, M1588	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID-CTR FWD, M1585	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID L AFT, M1587	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID L FWD, M1584	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID R AFT, M1589	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID R FWD, M1586	1	1	PASS CABIN	23-31-05
SPEAKER - PSU, B69	1			
SWITCHING CARDS - PASSENGER ADDRESS, M1634, M1635	2	2	119AL, MAIN EQUIP CTR E2-5	23-31-11
VOLUME LEVEL INDICATOR CARD - PASSENGER ADDRESS, M1633	2	1	119AL, MAIN EQUIP CTR E2-5	23-31-11
UNIT - (REF 23-42-00, FIG. 101)			PASS CABIN	23-31-02
AUDIO ACCESSORY, M108				

* SEE THE WDM EQUIPMENT LIST

1> SAS 153-999

Passenger Address System - Component Index
Figure 101 (Sheet 1)

610969

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
AMPLIFIER - PASSENGER ADDRESS, M177	1	1	119AL, MAIN EQUIP CTR, E2-5	23-31-01
CIRCUIT BREAKER -	2		FLT COMPT, P11	
PASS ADRS, C548		1	11C22	*
CIRCUIT BREAKER -			119AL, MAIN EQUIP CTR, P36	
PRE-RECD ANNCT, C534		1	37J7	*
DIODE - R409-R418,R431-R438,R475,R655		20	119AL, MAIN EQUIP CTR E2-5	
HANDSET - (REF 23-42-00, FIG. 101)				
ATTENDANTS, B61				
PILOTS', B61				
MULTIPLEXER - (REF 23-34-00, FIG. 101)				*
AFT ZONE, M1307				
FWD ZONE, M642				
MID ZONE, M1321				
RELAY - (REF 31-01-19, FIG. 101)				
OXYGEN DEPLOYED INDICATION, K8				
OXYGEN MANUAL DEPLOYED INDICATION, K42				
PASSENGER SIGNS, K383, K384				
RELAY - (REF 31-01-36, FIG. 101)				
FLIGHT RECORDER CONTROL, K163				
RELAY - (REF 31-01-37, FIG. 101)				
FLIGHT RECORDER CONTROL, K164				
REPRODUCER - BOARDING MUSIC TAPE, M1708	2	1	PURSER STATION	23-31-10
REPRODUCER - (REF 23-34-00, FIG. 101)				
ENTERTAINMENT TAPE, M170				
SPEAKER - ATTENDANT, AFT L, B76	1	1	PASS CABIN	23-31-03
SPEAKER - ATTENDANT, AFT R, B77	1	1	PASS CABIN	23-31-03
SPEAKER - ATTENDANT, FWD L, B72	1	1	PASS CABIN	23-31-03
SPEAKER - ATTENDANT, FWD R, B73	1	1	PASS CABIN	23-31-03
SPEAKER - ATTENDANT, MID L, B74	1	1	PASS CABIN	23-31-03
SPEAKER - ATTENDANT, MID R, B75	1	1	PASS CABIN	23-31-03
SPEAKER - CEILING, FWD L, B289	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING, FWD R, B292	1	1	PASS CABIN	23-31-08
SPEAKER - GALLEY, AFT L, B229	1	1	PASS CABIN	23-31-04
SPEAKER - GALLEY, AFT R, B230	1	1	PASS CABIN	23-31-04
SPEAKER - GALLEY, FWD, B70	1	1	PASS CABIN	23-31-04
SPEAKER - LAVATORY, FWD, M289	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID-CTR FWD, M1585	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID L AFT, M1587	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID L FWD, M1584	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID R AFT, M1589	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID R FWD, M1586	1	1	PASS CABIN	23-31-05
SPEAKER - PSU, B69	1			
SWITCHING CARDS - PASSENGER ADDRESS, M1634, M1635	2	2	119AL, MAIN EQUIP CTR E2-5	23-31-11
VOLUME LEVEL INDICATOR CARD - PASSENGER ADDRESS, M1633	2	1	119AL, MAIN EQUIP CTR E2-5	23-31-11
UNIT - (REF 23-42-00, FIG. 101)			PASS CABIN	23-31-02
AUDIO ACCESSORY, M108				

* SEE THE WDM EQUIPMENT LIST

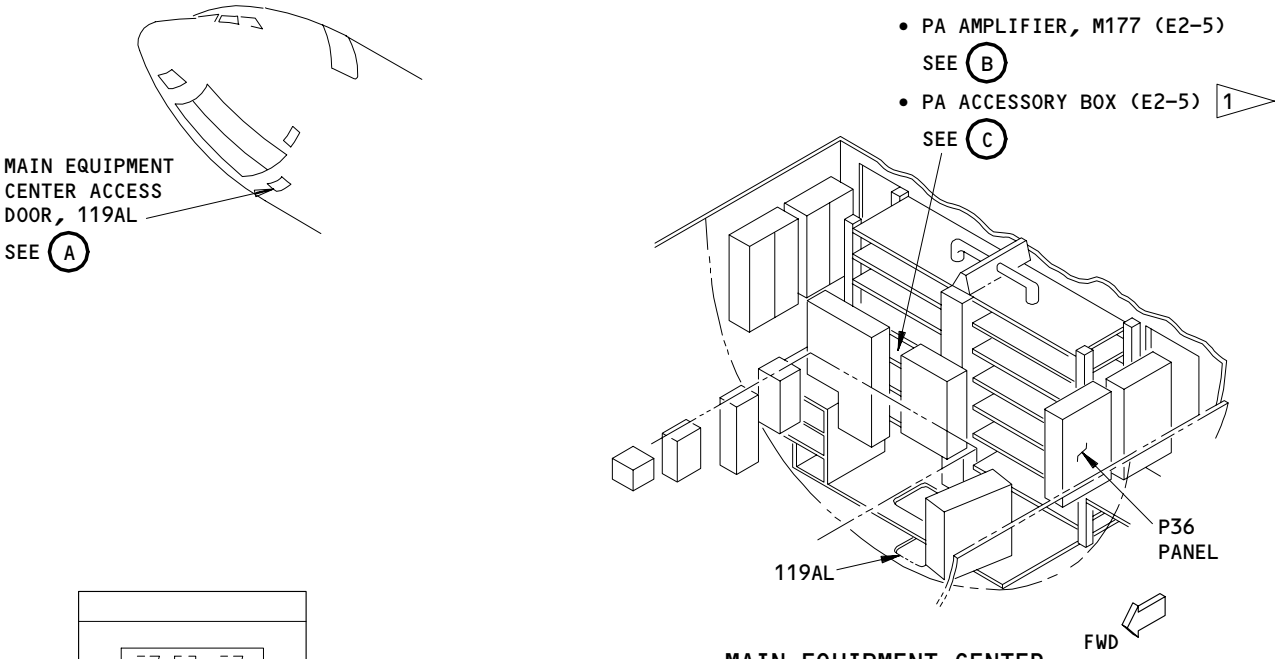
Passenger Address System - Component Index
Figure 101 (Sheet 2)

699137

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
AMPLIFIER - PASSENGER ADDRESS, M177	1	1	119AL, MAIN EQUIP CTR, E2-5	23-31-01
CIRCUIT BREAKER -	2		FLT COMPT, P11	
PASS ADRS, C548		1	11C22	*
CIRCUIT BREAKER -	1		119AL, MAIN EQUIP CTR, P36	
PRE RECD ANNCT, C534		1	36J7	*
DECK - PA TAPE, M1523	4	1	PASS CABIN, FWD CLOSET	23-31-10
DIODE - R126	2	1	119AL, MAIN EQUIP CTR E2-5	*
HANDSET - (REF 23-42-00, FIG. 101)				
ATTENDANTS, B61				
PILOTS', B61				
MULTIPLEXER - (REF 23-34-00, FIG. 101)				
AFT ZONE, M1307				
FWD ZONE, M642				
MID ZONE, M1321				
RELAY - (REF 31-01-19, FIG. 101)				
OXYGEN DEPLOYED INDICATION, K8				
OXYGEN MANUAL DEPLOYED INDICATION, K42				
PASSENGER SIGNS, K383, K384				
RELAY - (REF 31-01-36, FIG. 101)				
FLIGHT RECORDER CONTROL, K163				
RELAY - (REF 31-01-37, FIG. 101)				
FLIGHT RECORDER CONTROL, K164				
RELAY - VIDEO ANNCT, K671	2	1	119AL, MAIN EQUIP CTR, E2-5	*
REPRODUCER - (REF 23-34-00, FIG. 101)				
ENTERTAINMENT TAPE, M170				
SPEAKER - CEILING AFT, B235	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING, FWD L, B246	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING, FWD L, B289	1	1	PASS CABIN	23-31-08
SPEAKER - CEILING MID, B243	1	1	PASS CABIN	23-31-08
SPEAKER - GALLEY, AFT L, B229	1	1	PASS CABIN	23-31-04
SPEAKER - GALLEY, AFT R, B230	1	1	PASS CABIN	23-31-04
SPEAKER - GALLEY, FWD, B70	1	1	PASS CABIN	23-31-04
SPEAKER - LAVATORY, AFT L, M1186	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, AFT R, M1188	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, FWD, M289	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID CTR, M1312	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID L, M1156	1	1	PASS CABIN	23-31-05
SPEAKER - LAVATORY, MID R, M1157	1	1	PASS CABIN	23-31-05
SPEAKER - PSU, B69	1			*
UNIT - (REF 23-42-00, FIG. 101)			PASS CABIN	23-31-02
AUDIO ACCESSORY, M108				

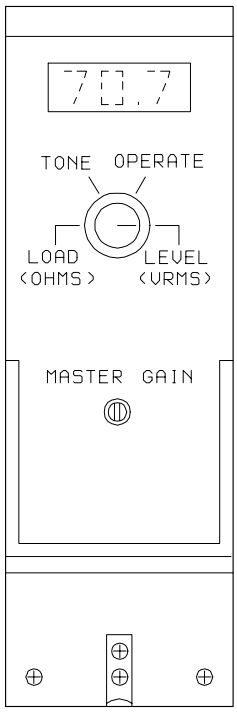
* SEE THE WDM EQUIPMENT LIST

Passenger Address System - Component Index
Figure 101 (Sheet 3)



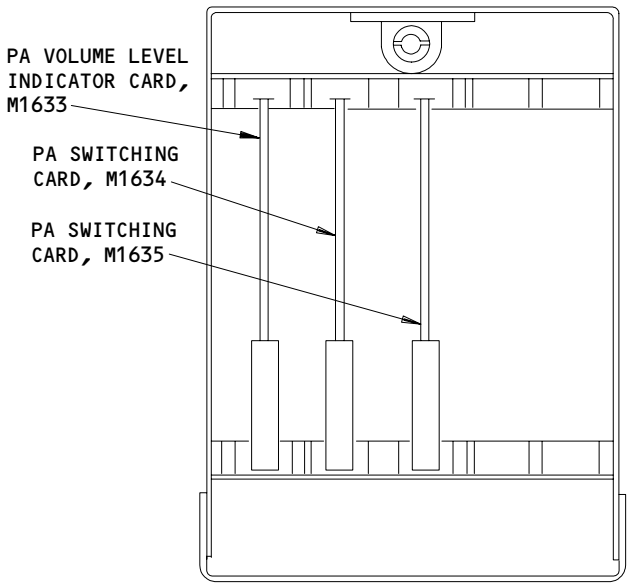
MAIN EQUIPMENT CENTER

A



PA AMPLIFIER, M177

B

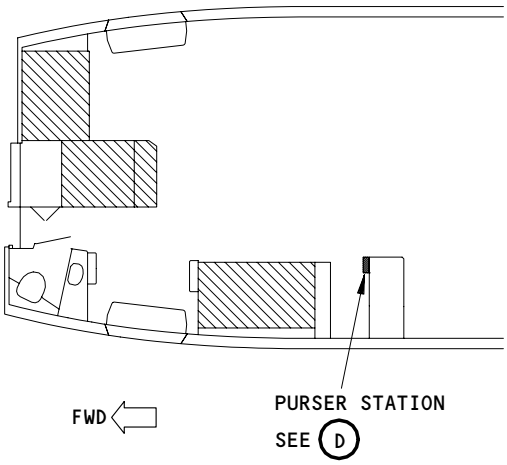


PA ACCESSORY BOX
(FRONT COVER SHOWN REMOVED)

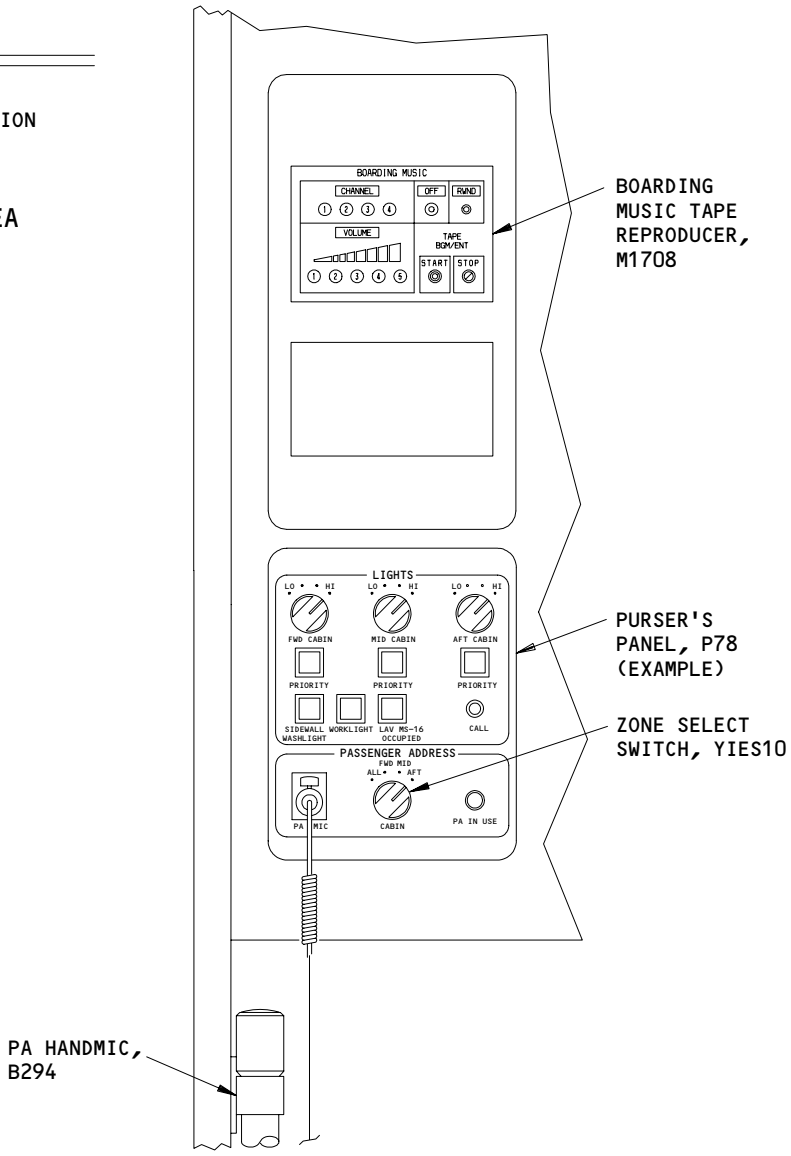
C

1 SAS ALL

Passenger Address System - Component Location
Figure 102 (Sheet 1)



FORWARD ENTRY DOOR AREA

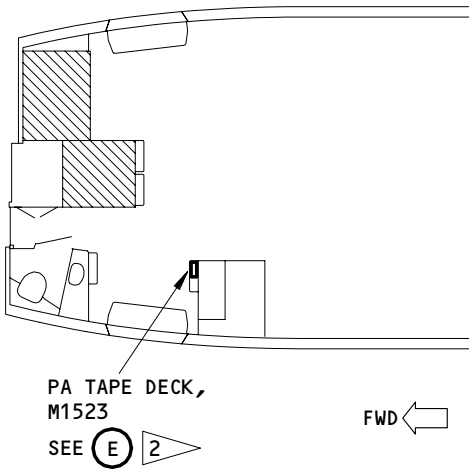


PARTIAL VIEW OF PURSER STATION

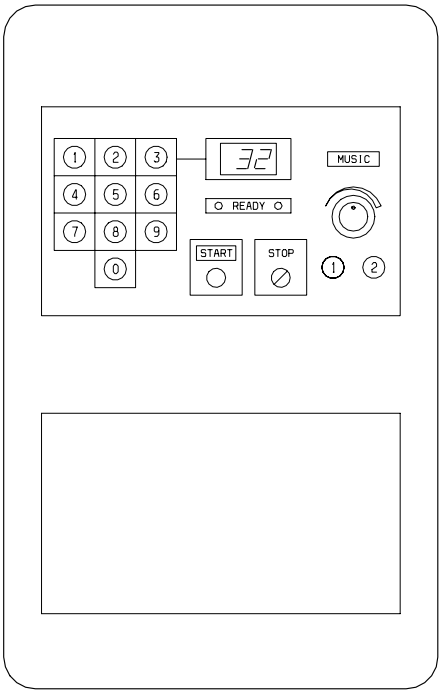
D

Passenger Address System – Component Location
Figure 102 (Sheet 2)

F52307

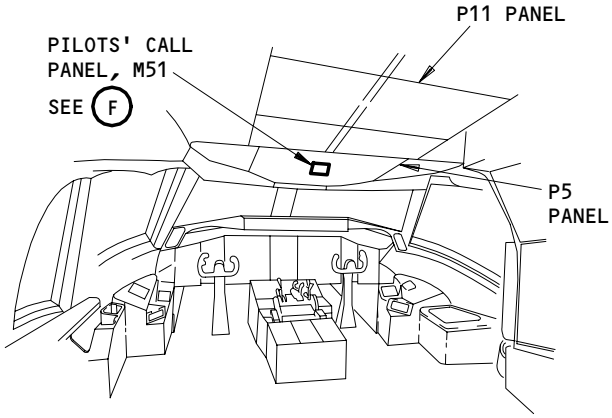


FORWARD ENTRY DOOR AREA

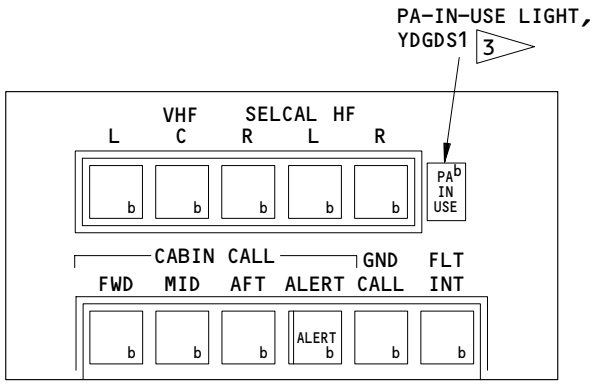


PA TAPE DECK, M1523

E



FLIGHT COMPARTMENT



PILOTS' CALL PANEL, M51
(EXAMPLE)

F

2 MTH 275-278,281-999

3 MTH 279,280

Passenger Address System - Component Location
Figure 102 (Sheet 3)

F52352

PASSENGER ADDRESS SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains three tasks. The first task is an operational test of the passenger address system. The second task is a system test of the passenger address system. The third task is to adjust the speaker output level. The third task is included in the second task. Thus, if you do the second task, then it is not necessary to do the third task.
   B. The operational test makes sure the passenger address system operates correctly in a minimum of time.
   C. The system test increases the range of the operational test to make sure the system operates correctly.

TASK 23-31-00-715-002

2. Operational Test - Passenger Address System
   A. General
      (1) The operational test does a test for each of these systems:
          (a) The Passenger Address Amplifier
          (b) The Boarding Music Operation
          (c) ALL MTH AIRPLANES;
              The Prerecorded Announcements
          (d) The Chime Operation
          (e) The Passenger Entertainment Override
          (f) Does a test of the Voice Annunciations (this includes override and muting).
   B. References
      (1) AMM 23-42-00/501, Cabin Interphone
      (2) AMM 23-51-00/501, Flight Interphone
      (3) AMM 24-22-00/201, Electrical Power - Control
   C. Access
      (1) Location Zones

119/120	Main Equipment Center
200	Upper Half of the Fuselage

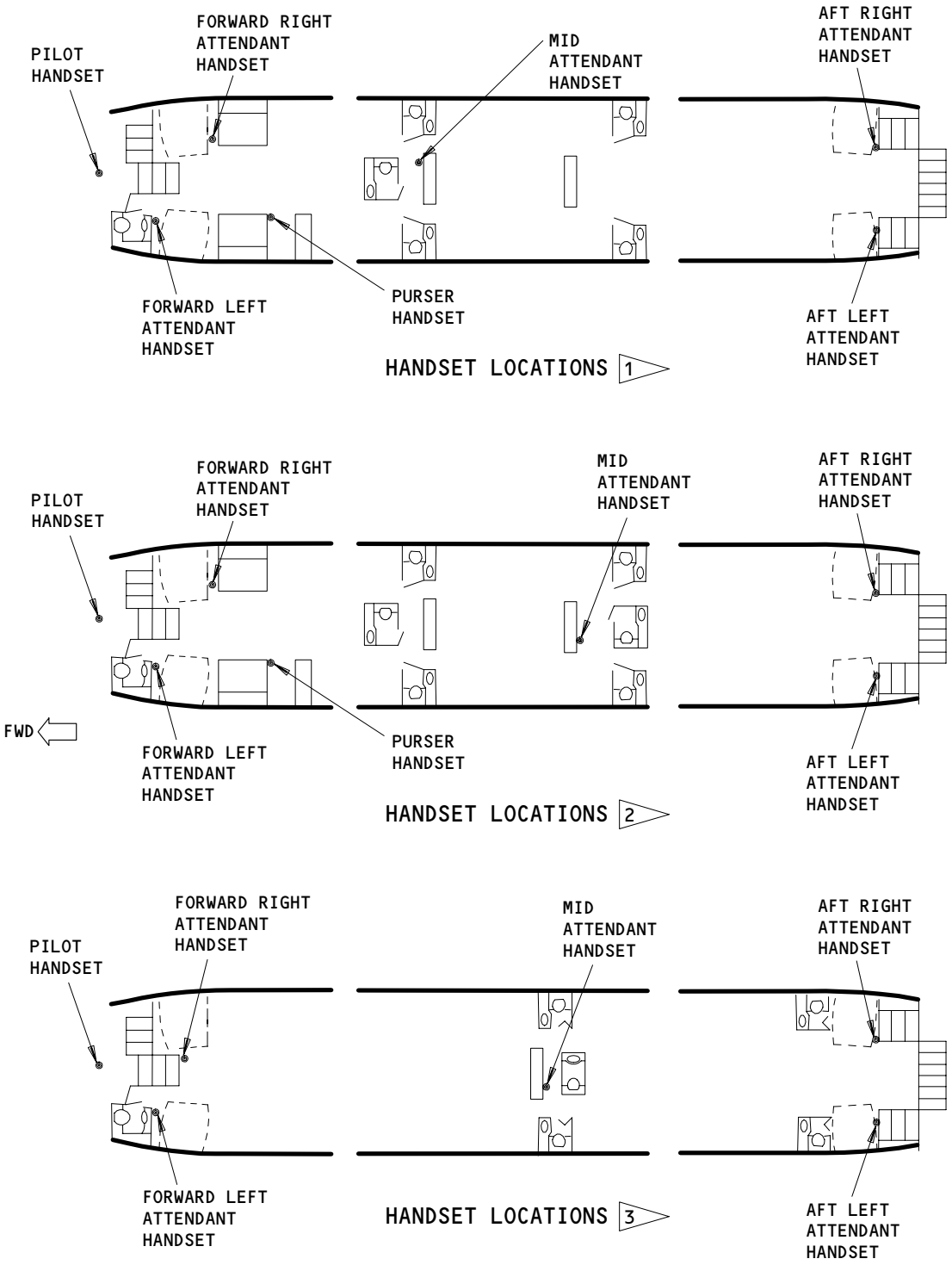
      (2) Access Panel

119AL	Main Equipment Center

   D. Prepare for the Operational Test

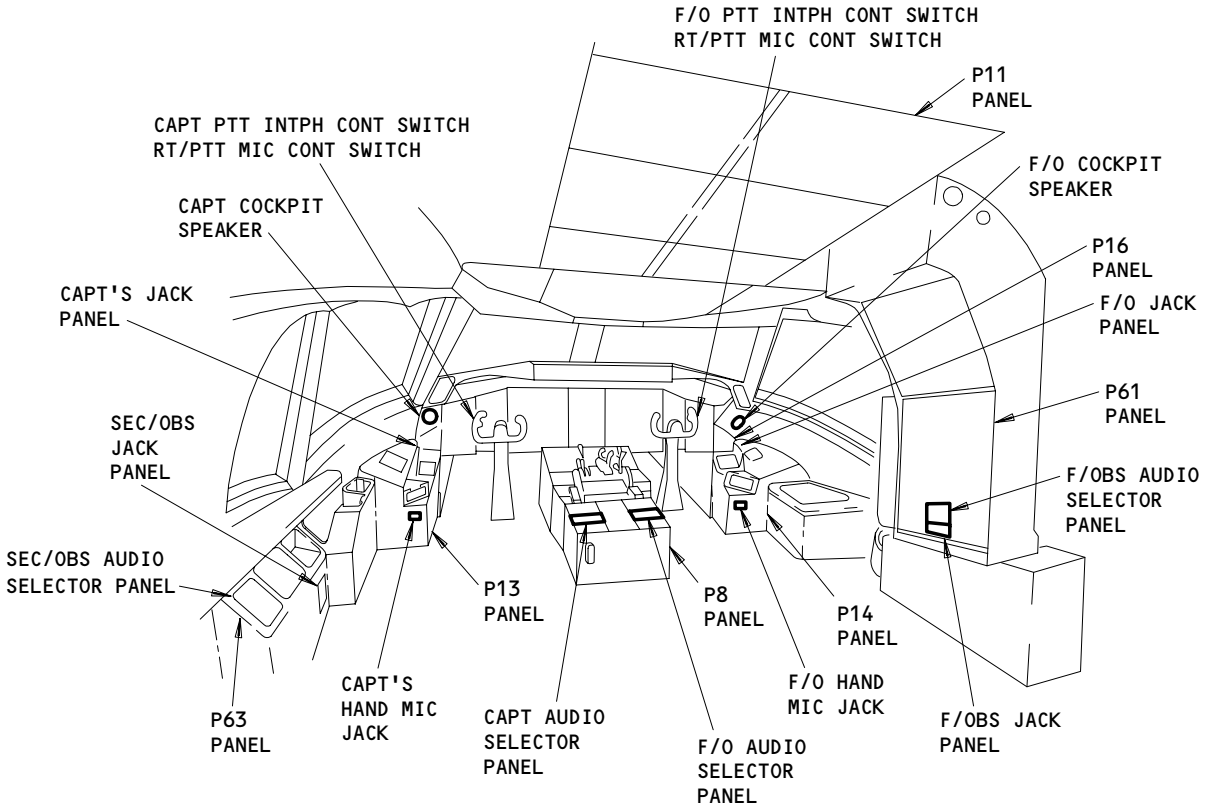
      S 865-003
      (1) Supply electrical power (AMM 24-22-00/201).

      S 865-004
      (2) Make sure the cabin interphone system is serviceable (AMM 23-42-00/501).



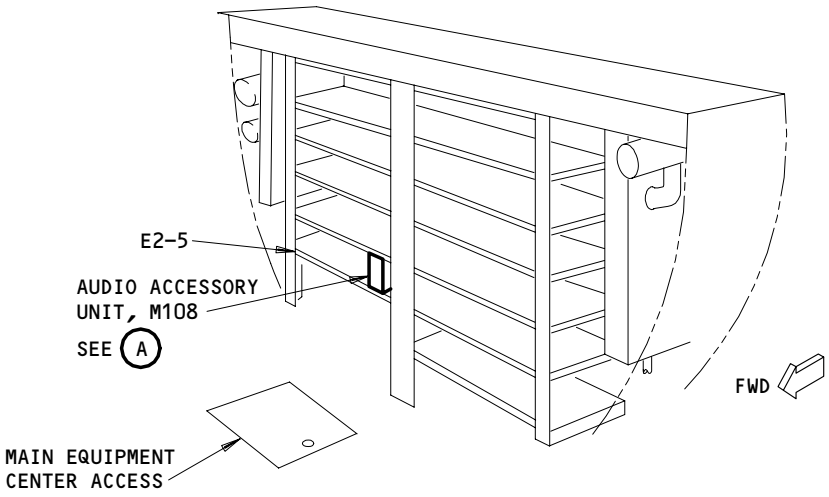
1 ALL SAS 767-200 AIRPLANES
2 ALL SAS 767-300 AIRPLANES
3 ALL MTH AIRPLANES

Passenger Address System Component Location
Figure 501 (Sheet 1)

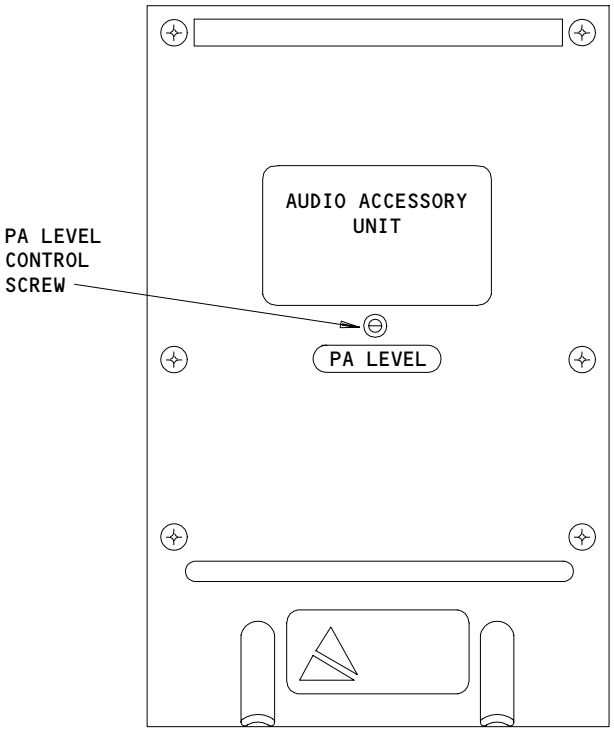


AUDIO SELECTOR PANEL LOCATIONS

Passenger Address System Component Location
Figure 501 (Sheet 2)



MAIN EQUIPMENT CENTER



AUDIO ACCESSORY UNIT

A

Passenger Address System Component Location
Figure 502

S 865-129
(3) Make sure the flight interphone system is serviceable (AMM 23-51-00/501).

S 865-005
(4) Make sure these circuit breakers are closed on the overhead circuit breaker panel, P11:
(a) 11C22, PASS ADRS
(b) 11T8, PASS ENTMT/SERVICE CONT

S 865-008
(5) Make sure these circuit breakers are closed on the left miscellaneous electrical equipment panel, P36:
(a) 36J5, MUX/TAPE REPRO
(b) MTH 281-999;
36J6, PRE-RECD ANNCT
(c) SAS ALL;
MTH 275-280;
36J7, PRE-RECD ANNCT

S 865-153
(6) MTH 281-999;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37J6, AFT CTD
(b) 37J7, FWD CTD

S 865-175
(7) SAS ALL;
MTH 275-280;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

E. The Passenger Address System Operational Test

S 715-011
(1) Do these steps to do a test of the passenger address amplifier:
(a) Do these steps on the front panel of the passenger address amplifier installed on rack E2-5 in the main equipment center:
1) Set the function selector switch to the TONE position.
a) Make sure a high chime tone is heard from all of the PA speakers.
2) Turn and hold the function selector switch to the LOAD position.
a) Make sure the front panel shows a minimum of 30 OHMS.

3) Turn and hold the function selector switch to the LEVEL position.
   a) Make sure the front panel shows 69 to 71 VRMS.

      NOTE: The VRMS can be adjusted with the MASTER GAIN control on the front panel of the PA amplifier.

4) Set the function selector switch to the OPERATE position.

S 715-012

(2) Do these steps to do a test of the boarding music operation:
   (a) ALL SAS AIRPLANES;
   Make sure the PA SEL volume control is in the OFF mode on the control distribution unit at the video control center.
   (b) ALL MTH AIRPLANES;
   Make sure the MASTER POWER switch is off at system control unit in the video control center.
   (c) ALL MTH AIRPLANES;
   Do these steps at the PA tape deck installed in the forward closet:
   1) Make sure the PA tape deck contains a cassette tape.
   2) Push the MUSIC 1 switch.
   3) Push the START switch.
   4) Make sure the boarding music is clear in the passenger cabin.
   5) Make sure the sound level changes when you turn the MUSIC volume control clockwise and counter-clockwise.
   6) Turn the MUSIC volume control to the usual position.
   7) Push the MUSIC 2 switch.
   8) Make sure a different track of boarding music is heard in the passenger cabin.
   9) Push the STOP switch.
   (d) ALL SAS AIRPLANES;
   Do these steps at the boarding music tape reproducer (referred to as the tape reproducer) installed at the purser station:
   1) Make sure the OFF switch on the tape reproducer does not come on.
   2) Make sure the tape reproducer contains a cassette tape.
   3) Push the CHANNEL 1 switch on the tape reproducer.
   4) Push the START switch on the tape reproducer.
   5) Make sure the boarding music is clear in the passenger cabin.
   6) Make sure the sound level changes when you push the VOLUME control switch right and left.
   7) Set the volume control to the usual position.
   8) Push the STOP switch on the tape reproducer.
   9) Make sure the boarding music stops.

S 715-018
(3) ALL MTH AIRPLANES;
Do these steps to do a test of the prerecorded announcements:
(a) ALL MTH AIRPLANES;
Do these steps at the PA tape deck installed in the forward closet:
1) Push the number switches for a known prerecorded announcement.
a) Make sure the display shows the number you pushed.
b) Make sure the READY light comes on.
2) Push the START switch.
a) Make sure the announcement is heard clearly in the passenger cabin.
3) Push the STOP switch.
4) Push the number switches for a second prerecorded announcement.
a) Make sure the display shows the number you pushed.
b) Make sure the READY light comes on.
5) Push the START switch.
a) Make sure the announcement is heard clearly in the passenger cabin.
6) Push the STOP switch.

S 715-020
(4) Do these steps to do a test of the chime operation:
(a) Make sure this circuit breaker is closed on the P11 panel:
1) 11P9, PASS SIGN CONT
(b) Do these steps on the overhead panel, P5:
1) Set the NO SMOKING switch from the OFF to the ON position.
2) Make sure you hear a low chime sound from the PA speakers.
3) Set the NO SMOKING switch from the ON to the OFF position.
4) Make sure you hear a low chime sound from the PA speakers.
5) Set the FASTEN SEAT BELT switch from the OFF to the ON position.
6) Make sure you hear a low chime sound from the PA speakers.
7) Set the FASTEN SEAT BELT switch from the ON to the OFF position.
8) Make sure you hear a low chime sound from the PA speakers.

S 715-021
(5) Do these steps to do a test of the passenger entertainment override:
(a) Do these steps at the forward attendant's panel, P21:
1) Push the PASS ENT SYST PWR switch-light.
a) Make sure the switch-light is on.
2) Push the PASS SERV SYST PWR switch-light.
a) Make sure the switch-light is on.
(b) Do these test steps for a seat in the forward passenger zone:
1) At a seat in the forward passenger zone, use a headset to make sure you hear the passenger entertainment.

2) Do these steps at an attendant's handset to make an announcement on the PA system:
   a) Push the PA switch
   b) Push and hold the PTT switch
   c) Speak into the handset.
3) Make sure the passenger entertainment stops and that you hear the announcement clearly in the headset.
4) Release the handset PTT switch.
5) Make sure you hear the passenger entertainment in the headset.

(c) Do the test steps again for a seat in the mid passenger zone.
(d) Do the test steps again for a seat in the aft passenger zone.

S 715-022

(6) Do these steps to make sure voice announcements are clear (this test includes override and muted speakers):

NOTE: Make sure there is no feedback with the voice announcements.

(a) Continue the operation of the boarding music.
(b) Lift the forward attendant's handset.
(c) Do these steps to do a test of the handset:
1) Push the PA switch.
2) Push and hold the PTT switch.
3) Make sure the video or boarding music audio stops without much of a click.
4) Speak into the handset microphone and make sure the announcement is heard clearly in the passenger cabin.
5) At each audio selector panel, set the PA LISTEN switch on PA.
6) Make sure the announcement is heard by each of the flight crew through their headsets.
7) Release the handset PTT switch.
8) Put the handset back in the holder.
9) Make sure you can hear the video or boarding music audio.
(d) Do the procedure, do these steps to do a test of the handset, at these locations:
1) The purser's station
2) The forward right attendant handset
3) The aft left attendant handset
4) The aft right attendant handset.
(e) Do these steps to do a test of the pilots' handset.
1) Lift the pilots' handset from the holder.
2) Push the PA switch.
3) Push and hold the PTT switch.
4) Speak into the handset.

5) Make sure the announcement is heard clearly in the passenger cabin.
6) ALL SAS AIRPLANES;
During the announcement from pilots' handset, make sure an announcement cannot be made from an attendant or purser handset.
7) Release the handset PTT switch.
8) Put the pilots' handset back in the holder.

(f) Open this circuit breaker on the P11 panel, and attach a DO-NOT-CLOSE tag:
1) 11C23, INTERPHONE CABIN SERVICE

(g) Do these steps at each handset:
1) Lift the handset from the holder.
2) Push and hold the PTT switch.
3) Do not push the PA switch and make sure you can make an announcement.
4) Release the handset PTT switch.
5) Put the handset back in the holder.

(h) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
1) 11C23, INTERPHONE CABIN SERVICE

(i) Do these steps at each jack panel:
1) Push and hold the PA MIC switch to the PA MIC position.
2) Use the boom microphone to make a voice announcement.
3) Make sure the announcement is heard clearly in the passenger cabin.
4) Make sure a sidetone is heard in the headset.
5) Set the BOOM/OXY switch to the BOOM position on the audio selector panel.
6) While the headphones are on, use the oxygen mask microphone to make a voice announcement.
a) Make sure the announcement is heard clearly in the passenger cabin.
b) Make sure you hear a sidetone in the headset.
7) Put the oxygen mask back in the holder.
8) Close the stowage doors.
9) Push the reset test switch.

F. Put the Airplane Back to Its Initial Condition

S 865-095
(1) Put all of the handsets back in their holders.

S 865-096
(2) Put all of the circuit breakers back to their usual condition.

S 865-097
(3) ALL SAS AIRPLANES;
Do these steps at the PA tape deck:
(a) Set the boarding music control to the 1 position.
(b) Push the OFF switch.
(c) Make sure the light goes off.

S 865-100
(4) Do these steps at the forward attendant's panel, P21:
(a) Push the PASS ENT SYST PWR switch-light to the off position (the light goes off).
(b) Push the PASS SERV SYST PWR switch-light to the off position (the light goes off).

S 865-024
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-31-00-735-115

3. System Test - Passenger Address System

A. General
(1) This test does a check of the passenger address system with all system adjustment specifications that are necessary for the best performance.
(2) The system test does a test for each of these systems:
(a) The Passenger Address Amplifier
(b) The Speaker Sound Level
(c) The Flight Mode
(d) The Decompression Mode
(e) ALL MTH AIRPLANES;
The Prerecorded Announcements
(f) The Boarding Music Operation
(g) The Video Audio Operation
(h) The Chime Operation
(i) The Passenger Entertainment Override

B. References
(1) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
(2) AMM 23-42-00/501, Cabin Interphone
(3) AMM 23-42-01/401, Audio Accessory Unit
(4) AMM 23-51-00/501, Flight Interphone
(5) AMM 24-22-00/201, Electrical Power - Control
(6) AMM 36-00-00/201, Pneumatic Power - Apply and Remove

C. Equipment
(1) Random noise generator - 543-1, Pacific Electro Dynamics, 11465 Willows Rd. N.E., Redmond, WA 98052
(2) Adapter Cable, Random noise generator - Local manufacture - per Pacific Electro Dynamics Random Noise Generator Service Manual
(3) AC voltmeter, capable of reading 1.0 ±0.05 volts rms

(4) Sound Level Meter - 1565, IET Labs, Inc. (formerly manufactured by Genrad) or equivalent.
(5) Headset - Electrical or Pneumatic (Stethoscope) as required - commercially available
(6) ALL MTH AIRPLANES;
DEMO TAPE RD-AM9429, Matsushita, One Panasonic Way, Secaucus, NJ 07094
(7) Video Entertainment Test Tape (Optional)

D. Access
(1) Location Zones

119/120	Main Equipment Center
200	Upper Half of the Fuselage

(2) Access Panel

119AL	Main Equipment Center

E. Prepare for the System Test

S 865-025
(1) Supply electrical power (AMM 24-22-00/201).

S 865-026
(2) Make sure the cabin interphone system is serviceable (AMM 23-42-00/501).

S 865-027
(3) Make sure the flight interphone system is serviceable (AMM 23-51-00/501).

S 865-130
(4) Make sure these circuit breakers are closed on the overhead circuit breaker panel, P11:
(a) 11C22, PASS ADRS
(b) 11P9, PASS SIGN CONT

(c) 11T8, PASS ENTMT/SERVICE CONT
(d) 11T34, VIDEO PROJ

S 865-234
(5) Make sure these circuit breakers are closed on the left miscellaneous electrical equipment panel, P36:
(a) 36J5, MUX/TAPE REPRO
(b) MTH 281-999;
36J6, PRE-RECD ANNCT
(c) SAS ALL;
MTH 275-280;
36J7, PRE-RECD ANNCT

S 865-249
(6) MTH 281-999;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37J6, AFT CTD
(b) 37J7, FWD CTD

S 865-271
(7) SAS ALL;
MTH 275-280;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 865-332
(8) Make sure this circuit breaker is closed on the P37 panel:
(a) SAS ALL;
37K5, FWD VIDEO PROJECTOR PASS ENTERTAINMENT

S 735-032
(9) Do these steps to do a test of the passenger address amplifier:
(a) Do these steps on the front panel of the passenger address amplifier installed on rack E2-5 in the main equipment center:
1) Set the function selector switch to the TONE position.
a) Make sure a high chime tone is heard from all of the PA speakers.

2) Turn and hold the function selector switch to the LOAD position.
3) Make sure the front panel shows a minimum of 30 OHMS.
4) Turn and hold the function selector switch to the LEVEL position.
   a) Make sure the front panel shows 69 to 71 VRMS.

      NOTE: The VRMS can be adjusted with the MASTER GAIN control on the front panel of the passenger address amplifier.

5) Set the function selector switch to the OPERATE position.

S 735-033

(10) Do these steps to do a test of the speaker sound level:
   (a) Do these steps to calibrate the random noise generator:

      1) Connect the AC voltmeter to the SIGNAL OUTPUT jacks on the random noise generator.
      2) On the random noise generator, set the PWR/PTT switch to the ON position.
      3) Set the OUTPUT switch to the SIG position.
         a) Make sure 1.0 ±0.05 volts rms is shown on the AC voltmeter.
      4) Adjust the SIGNAL ADJUST potentiometer (found on the end of the random noise generator) if necessary.
   (b) At the captain's or the first officer's sidewall, use an adapter cable to connect the random noise generator to the hand microphone jack (Ref Fig. 501).
   (c) Set the PWR/PTT switch to the ON position on the random noise generator.
   (d) Set the OUTPUT switch to the SIG position on the random noise generator.
   (e) At each jack panel, push and hold the PA MIC switch to the PA MIC position.
   (f) Set the sound level meter to the SLOW and "C" positions.

(g) Do these steps to do a test of a speaker output level:

1) Slowly move the sound level meter across the speaker panel.

(h) Adjust the speaker output level, if necessary (Fig. 502).

(i) Do these steps to adjust the PA LEVEL control screw on the front of the audio accessory unit M108 installed on shelf E2-5 in the main equipment center:

1) Turn the control screw clockwise to increase the speaker output level.

2) Turn the control screw counterclockwise to decrease the speaker output level.

S 735-037

(11) Do these steps to do a test of the flight mode:

(a) Open these circuit breakers on the P11 panel, and attach DO-NOT-CLOSE tags:

1) 11D7, STANDBY IGNITION 1

2) 11D8, STANDBY IGNITION 2

3) 11M1, LEFT ENG IGNITION 1

4) 11M28, LEFT ENG IGNITION 2

(b) Make sure these circuit breakers are closed on the P11 panel:

1) 11D19, LEFT CONT ENGINE START

2) 11D25, LEFT ENGINE FUEL CONTROL VALVE

WARNING: MAKE SURE THAT PNEUMATIC POWER IS NOT AVAILABLE TO THE ENGINES. IF YOU DO NOT REMOVE PNEUMATIC POWER TO THE ENGINES, YOU CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Set the L FUEL CONTROL switch to the CUTOFF position.

(d) Set the ENG START switch to the 1 position, on the engine start control panel (on the P5 panel).

(e) Set the left engine start switch to the GND position.

(f) Set the sound level meter to the SLOW and ALL PASS positions.

(g) Move the sound level meter across a speaker panel.

1) Make sure the sound level increased by 6 ± 2db.

NOTE: It is only necessary to compare the sound level of one speaker to a speaker sound level measured before.

(h) Set the left engine start switch to the OFF position.

(i) Set the ENG START switch to the BOTH position.

(j) Set the L FUEL CONTROL switch to the off position.

(k) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
1) 11D7, STANDBY IGNITION 1
2) 11D8, STANDBY IGNITION 2
3) 11M1, LEFT ENG IGNITION 1
4) 11M28, LEFT ENG IGNITION 2

S 735-046
(12) Do these steps to do a test of the decompression mode:

CAUTION: OPEN THESE CIRCUIT BREAKERS ON THE P11 PANEL: PASSENGER OXYGEN L (11A21), PASSENGER OXYGEN C (11A22), AND PASSENGER OXYGEN R (11A23). IF THESE CIRCUIT BREAKERS ARE CLOSED THE PSU OXYGEN MASKS CAN ACCIDENTALLY FALL FROM THE PSU PANELS.

(a) Open these circuit breakers on the P11 panel, and attach DO-NOT-CLOSE tags:
1) 11A21, PASSENGER OXYGEN L
2) 11A22, PASSENGER OXYGEN C
3) 11A23, PASSENGER OXYGEN R
4) 11A24, PASSENGER OXYGEN CONT
5) 11A25, PASSENGER OXYGEN MANUAL DEPLOY
(b) After five seconds, close these circuit breakers on the P11 panel:
1) 11A24, PASSENGER OXYGEN CONT
2) 11A25, PASSENGER OXYGEN MANUAL DEPLOY
(c) On the overhead panel, P5, push the PASS OXY switch to the ON position.
1) Make sure the PASS OXY ON light comes on.
(d) At the PA speaker, move the sound level meter across the speaker panel.
1) Make sure the sound level has increased by 3 ± 1db.

NOTE: It is only necessary to compare one speaker sound level to a speaker sound level measured before.

(e) Open these circuit breakers on the P11 panel:
1) 11A24, PASSENGER OXYGEN CONT
2) 11A25, PASSENGER OXYGEN MANUAL DEPLOY
(f) After five seconds, close these circuit breakers on the P11 panel:
1) 11A24, PASSENGER OXYGEN CONT
2) 11A25, PASSENGER OXYGEN MANUAL DEPLOY
(g) On the overhead panel P5, make sure the PASS OXY ON light goes off.
(h) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
1) 11A21, PASSENGER OXYGEN L
2) 11A22, PASSENGER OXYGEN C
3) 11A23, PASSENGER OXYGEN R

(i) At the random noise generator, set the PWR/PTT switch to the OFF position.
(j) Disconnect the generator from the hand microphone.
(k) ALL MTH AIRPLANES;
Push the STOP switch on the PA tape deck installed in the forward closet and make sure the emergency announcement stops.

S 735-048
(13) ALL MTH AIRPLANES;
Do these steps to do a test of the prerecorded announcements:
(a) Put the demo tape into the PA tape deck installed in the forward closet.
(b) Push the 0 and 1 keys on the keyboard of the PA tape deck.
1) Make sure the display shows 01.
(c) After the READY light comes on, push the START switch on the PA tape deck.
(d) Make sure the announcement is heard clearly in all of the passenger cabin.
(e) Push the STOP switch on the PA tape deck.
(f) Push the 0 and 2 keys on the keyboard of the PA tape deck.
1) Make sure the display shows 02.
(g) After the READY light comes on, push the START switch on the PA tape deck.
(h) Make sure the announcement is heard clearly in all of the passenger cabin.
(i) Push the STOP switch on the PA tape deck.

S 735-054
(14) ALL SAS AIRPLANES;
Do these steps to do a test of the boarding music operation:
(a) Push the CHANNEL 1 switch on the PA boarding music tape reproducer installed at the purser station.
(b) Push the START switch on the PA boarding music tape reproducer.
(c) Make sure the music is heard clearly in all of the passenger cabin.
(d) Make sure the sound level changes when you push the VOLUME control switches from left to right.
(e) Set the VOLUME control to the usual position.

(f) Push the CHANNEL 2 switch on the PA boarding music tape reproducer.
(g) Make sure you hear a different track of music in the passenger cabin.
(h) Push the STOP switch on the PA boarding music tape reproducer.

S 735-058
(15) ALL MTH AIRPLANES;
Do these steps to do a test of the boarding music operation:
(a) Push the MUSIC 1 switch on the PA tape deck installed in the forward closet.
(b) Push the START switch on the PA tape deck.
(c) Make sure the music is heard clearly in all of the passenger cabin.
(d) Make sure the sound level changes when you turn the MUSIC volume control switch clockwise and counterclockwise.
(e) Turn the MUSIC volume control to the usual position.
(f) Push the MUSIC 2 switch on the PA tape deck.
(g) Make sure you hear a different track of boarding music in the passenger cabin.
(h) Push the STOP switch on the PA tape deck.

S 735-061
(16) Do these steps to do a test of the video audio operation:
(a) ALL SAS AIRPLANES;
Do these steps at the control distribution unit (referred to as the CDU) in the video control center (at the purser station):
1) Push the SYSTEM POWER switch to the on position (the light in the switch comes on).
2) Push the zone 1 SOURCE SEL switch until indication shows VTR 1.
3) Turn the PA SEL volume control clockwise from the OFF position to the middle position.
4) Push the PA SEL switch until the indication shows 1 PRI.
(b) ALL MTH AIRPLANES;
Do these steps at the system control unit (referred to as the SCU) in the video control center (in the forward closet):

1) Push the MASTER POWER switch to the on position (the light in the switch comes on).
2) Push the CLASS switch until this display is shown on the SCU monitor:

NOTE: The characters in the [ ] brackets will flash. The [ ] brackets are used only to identify the characters that flash and will not be shown on the SCU monitor.

CLASS	[F]	[C]	[M]
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CHI OFF	CHI OFF	CHI OFF

a) Push the CLASS switch again until this display is shown on the SCU monitor:

CLASS	[F]	C	M
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CHI OFF	CHI OFF	CHI OFF

b) Push the VIDEO INPUT switch until this display is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	[VCP1] OFF	VCP1 OFF	VCP1 OFF
PA	CHI OFF	CHI OFF	CHI OFF

c) Push the ON/OFF switch and make sure this display is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 [ON]	VCP1 OFF	VCP1 OFF
PA	CHI OFF	CHI OFF	CHI OFF

d) Push the PA switch and make sure this display is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 ON	VCP1 OFF	VCP1 OFF
PA	[CHI] OFF	CHI OFF	CHI OFF

e) Push the ON/OFF switch and make sure this display is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 ON	VCP1 OFF	VCP1 OFF
PA	CHI [ON]	CHI OFF	CHI OFF

(c) Do these steps at the video tape reproducer 1 (VTR-1) in the video control center:
1) Insert the video cassette tape.
2) Push the PLAY switch.

(d) Make sure the boarding music stops.

(e) ALL SAS AIRPLANES;
Make sure the video sound is clear and increases when you turn the PA SEL volume control on the CDU clockwise.

(f) ALL MTH AIRPLANES;
Make sure the video sound is clear and increases when you push the upper PA VOLUME switch on the SCU.

(g) Adjust video sound to the usual sound level.
1) Set the passenger address volume control to the usual sound level.

S 735-063
(17) Do these steps to do a test of the chime operation:
(a) Make sure this circuit breaker is closed on the P11 panel:
1) 11P9, PASS SIGN CONT
(b) Do these steps on the overhead panel, P5:
1) Set the NO SMOKING switch from the OFF to the ON position.
a) Make sure you hear a low chime sound from the PA speakers.
2) Set the NO SMOKING switch from the ON to the OFF position.
a) Make sure you hear a low chime sound from the PA speakers.
3) Set the FASTEN SEAT BELT switch from the OFF to the ON position.
a) Make sure you hear a low chime sound from the PA speakers.
4) Set the FASTEN SEAT BELT switch from the ON to the OFF position.
a) Make sure you hear a low chime sound from the PA speakers.

S 735-064
(18) Do these steps to do a test of the passenger entertainment override:
(a) Do these steps at the forward attendant's panel, P21:
1) Push the PASS ENT SYST PWR switch-light.
a) Make sure the switch-light is on.
2) Push the PASS SERV SYST PWR switch-light.
a) Make sure the switch-light is on.
(b) Do these test steps for a seat in the forward passenger zone:
1) At a seat in the forward passenger zone, use a headset to make sure you hear the passenger entertainment.
2) Do these steps at an attendant's handset to make an announcement on the PA system:
a) Push the PA switch
b) Push and hold the PTT switch
c) Speak into the handset.
3) Make sure the passenger entertainment stops and that you hear the announcement clearly in the headset.
4) Release the handset PTT switch.
a) Make sure you hear the passenger entertainment in the headset.
(c) Do the test steps again for a seat in the mid passenger zone.
(d) Do the test steps again for a seat in the aft passenger zone.

F. Put the Airplane Back to Its Initial Condition

S 865-132
(1) Remove the headset.

S 865-066
(2) Put all of the handsets back in their holders.

S 865-067
(3) Put all of the circuit breakers back to their usual condition.

S 865-068
(4) Put all of the audio selector panels back to their usual condition.

S 865-073
(5) ALL SAS AIRPLANES;
Do these steps at the purser station to put the video system back to the usual condition:

S 865-077
(6) ALL MTH AIRPLANES;
Do these steps at the video control center installed in the forward closet to put the video system back to the usual condition:
(a) ALL SAS AIRPLANES;
Remove the cassette tape from the VTR-1.
(b) Push the SYSTEM power switch at the video control center.
(c) ALL MTH AIRPLANES;
Remove the cassette tape from the VTR-1.
(d) Push the MASTER POWER switch on the SCU to the off position (the light in the switch goes off).

S 865-081
(7) Remove this test equipment:
(a) The random noise generator
(b) The sound level meter.

S 865-083
(8) ALL MTH AIRPLANES;
Remove the demo tape from the PA tape deck installed in the forward closet.

S 865-089
(9) ALL SAS AIRPLANES;
Push the OFF switch on the boarding music tape reproducer (the light in the switch goes off).

S 865-091
(10) Do these steps at the forward attendant's panel, P21:
(a) Push the PASS ENT SYST PWR switch-light to the off position (the light goes off).

(b) Push the PASS SERV SYST PWR switch-light to the off position (the light goes off).

S 865-001

(11) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-31-00-825-101

4. Speaker Output Level Adjustment

NOTE: This is a scheduled maintenance task.

A. References
(1) AMM 23-42-00/501, Cabin Interphone
(2) AMM 23-51-00/501, Flight Interphone
(3) AMM 24-22-00/201, Electrical Power - Control

B. Equipment
(1) Random noise generator - 543-1, Pacific Electro Dynamics, 11465 Willows Rd. N.E., Redmond, WA 98052
(2) Adapter Cable, Random noise generator - Local manufacture - per Pacific Electro Dynamics Random Noise Generator Service Manual
(3) AC voltmeter, capable of reading 1.0 ±0.05 volts rms

(4) Sound Level Meter - GR 1565, Genrad Inc., 300 Baker Av., Concord, MA 01742
(5) Headset - Electrical or Pneumatic (Stethoscope) as required - commercially available

C. Prepare for Speaker Output Level Adjustment

S 865-104

(1) Supply electrical power (AMM 24-22-00/201).

S 865-105

(2) Make sure the cabin interphone system is serviceable (AMM 23-42-00/501).

S 865-103

(3) Make sure the flight interphone system is serviceable (AMM 23-51-00/501).

S 865-102

(4) Make sure these circuit breakers are closed on the overhead circuit breaker panel, P11:
(a) 11C22, PASS ADRS
(b) 11P9, PASS SIGN CONT

(c) 11T8, PASS ENTMT/SERVICE CONT
(d) 11T34, VIDEO PROJ

S 865-283
(5) Make sure these circuit breakers are closed on the left miscellaneous electrical equipment panel, P36:
(a) 36J5, MUX/TAPE REPRO
(b) MTH 281-999;
36J6, PRE-RECD ANNCT
(c) SAS ALL;
MTH 275-280;
36J7, PRE-RECD ANNCT

S 865-298
(6) MTH 281-999;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37J6, AFT CTD
(b) 37J7, FWD CTD

S 865-320
(7) SAS ALL;
MTH 275-280;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 865-333
(8) Make sure this circuit breaker is closed on the P37 panel:
(a) SAS ALL;
37K5, FWD VIDEO PROJECTOR PASS ENTERTAINMENT

D. Speaker Output Level Adjustment

S 725-128
(1) Do these steps to do a test of the speaker sound level:
(a) Do these steps to calibrate the random noise generator:

1) Connect the AC voltmeter to the SIGNAL OUTPUT jacks on the random noise generator.
2) On the random noise generator, set the PWR/PTT switch to the ON position.
3) Set the OUTPUT switch to the SIG position.
a) Make sure 1.0 ±0.05 volts rms is shown on the AC voltmeter.
4) Adjust the SIGNAL ADJUST potentiometer (found on the end of the random noise generator) if necessary.

(b) At the captain's or the first officer's sidewall, use an adapter cable to connect the random noise generator to the hand microphone jack (Fig. 501).

(c) Set the PWR/PTT switch to the ON position on the random noise generator.
(d) Set the OUTPUT switch to the SIG position on the random noise generator.
(e) At each jack panel, push and hold the PA MIC switch to the PA MIC position.
(f) Set the sound level meter to the SLOW and "C" positions.
(g) Do these steps to do a test of a speaker output level:

1) Slowly move the sound level meter across the speaker panel.
2) Identify the highest value on the sound level meter.

NOTE: These are the recommended sound levels for each PA speaker:

PSU	109 ± 2db
Galley - Fwd ceiling	112 ± 2db
Galley - Aft ceiling	115 ± 2db
Attendant - ceiling	106 ± 2db
Lavatory	109 ± 2db

(h) Adjust the speaker output level, if necessary (Fig. 502).
(i) Do these steps to adjust the PA LEVEL control screw on the front of the audio accessory unit M108 installed on shelf E2-5 in the main equipment center:
1) Turn the control screw clockwise to increase the speaker output level.
2) Turn the control screw counterclockwise to decrease the speaker output level.

E. Put the Airplane Back to Its Initial Condition

S 865-109
(1) Put all of the handsets back in their holders.

S 865-110
(2) Put all of the circuit breakers back to their usual condition.

S 865-111
(3) Put all of the audio selector panels back to their usual condition.

S 865-139
(4) Remove this test equipment:
(a) The random noise generator
(b) The sound level meter.

S 865-112

(5) Do these steps at the forward attendant's panel, P21:

(a) Push the PASS ENT SYST PWR switch-light to the off position (the light goes off).

(b) Push the PASS SERV SYST PWR switch-light to the off position (the light goes off).

S 865-114

(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PASSENGER ADDRESS AMPLIFIER - REMOVAL/INSTALLATION

1. General
   A. The passenger address (PA) amplifier, M177, is installed on shelf 5 of the E2 rack (E2-5) in the main equipment center.
   B. This procedure contains two tasks. The first task removes the PA amplifier. The second task installs the PA amplifier and does a test of the installation.

TASK 23-31-01-004-001

2. Remove the Passenger Address Amplifier (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

      (2) Access Panel
          119AL Main Equipment Center

   C. Remove the PA Amplifier

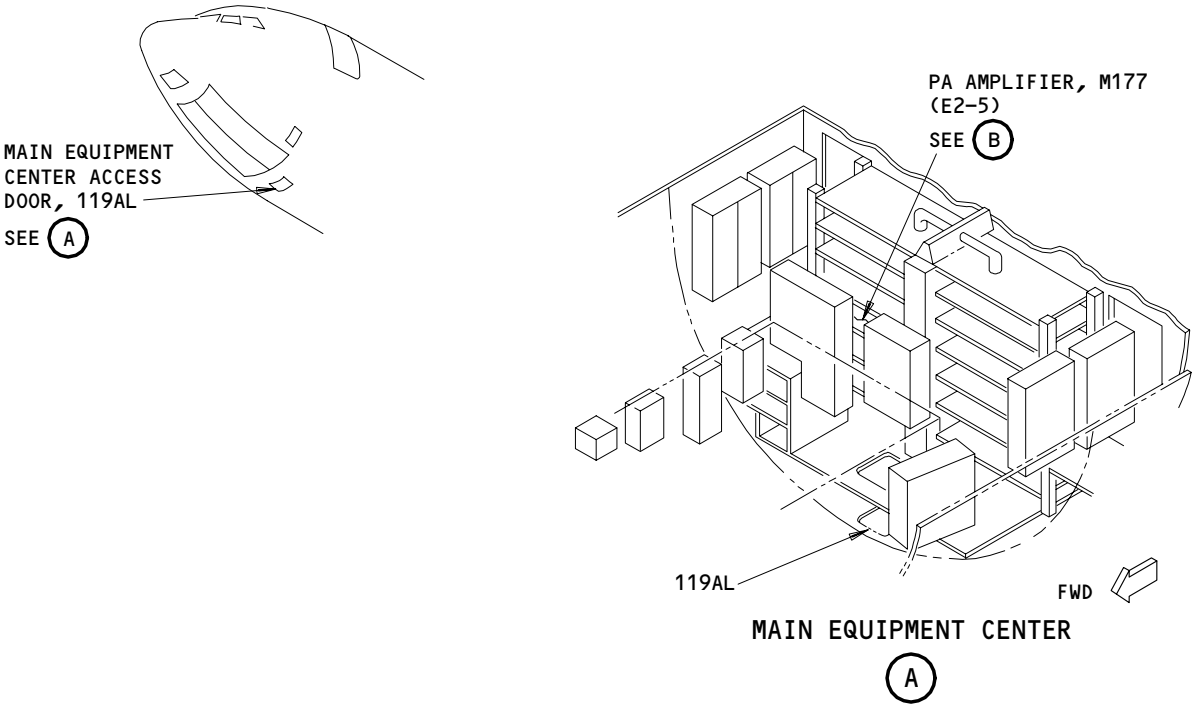
      S 864-003
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
      (a) 11C22, PASS ADRS

      S 014-003
      (2) Open the access door, 119AL, for the PA amplifier (AMM 06-41-00/201).

      S 024-005
      (3) Remove the PA amplifier (AMM 20-10-01/401).

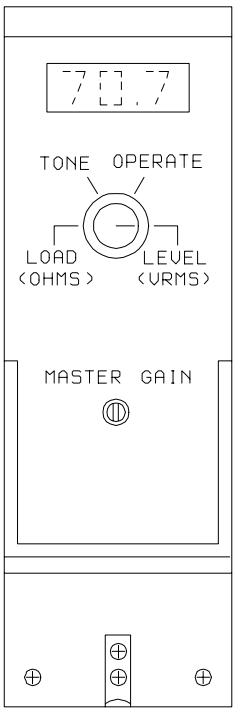
TASK 23-31-01-404-006

3. Install the Passenger Address Amplifier (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
      (3) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment



MAIN EQUIPMENT CENTER

A



PA AMPLIFIER, M177

B

Passenger Address Amplifier - Installation
Figure 401

(2) Access Panel
119AL Main Equipment Center

C. Install the PA Amplifier

S 424-007
(1) Install the PA amplifier (AMM 20-10-01/401).

S 864-008
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

D. Do a Test of the PA Amplifier Installation

S 864-010
(1) Supply electrical power (AMM 24-22-00/201).

S 714-007
(2) Do these steps to do a test of the PA amplifier installation:
(a) Turn and hold the rotary switch on the PA amplifier to the LEVEL position.
1) Make sure the display shows 69 to 71 VRMS.

NOTE: You can adjust the VRMS with the MASTER GAIN switch on the PA amplifier.

(b) Release the rotary switch.
1) Make sure the switch goes back to the OPERATE position.
2) Make sure the display goes off.

E. Put the Airplane Back to Its Initial Condition

S 414-008
(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-020
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PSU SPEAKER - REMOVAL/INSTALLATION

1. General
   A. A PSU speaker is installed at each second passenger service unit (PSU) in the passenger compartment.
   B. This procedure contains two tasks. The first task removes the PSU speaker. The second task installs the PSU speaker and does a test of the installation.

TASK 23-31-02-004-001

2. Remove the PSU Speaker (Fig. 401)
   A. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

   B. Remove the PSU Speaker

      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11C22, PASS ADRS

      S 014-004
      (2) Do these steps to open the assembly for the PSU oxygen/light panel (referred to as the PSU panel):
          (a) Hold the PSU panel.
          (b) Push a small screwdriver (or other applicable tool) into the access hole on each side of the PSU panel.
          (c) Lower the PSU panel.

      S 034-005
      (3) Disconnect the electrical connector for the speaker.

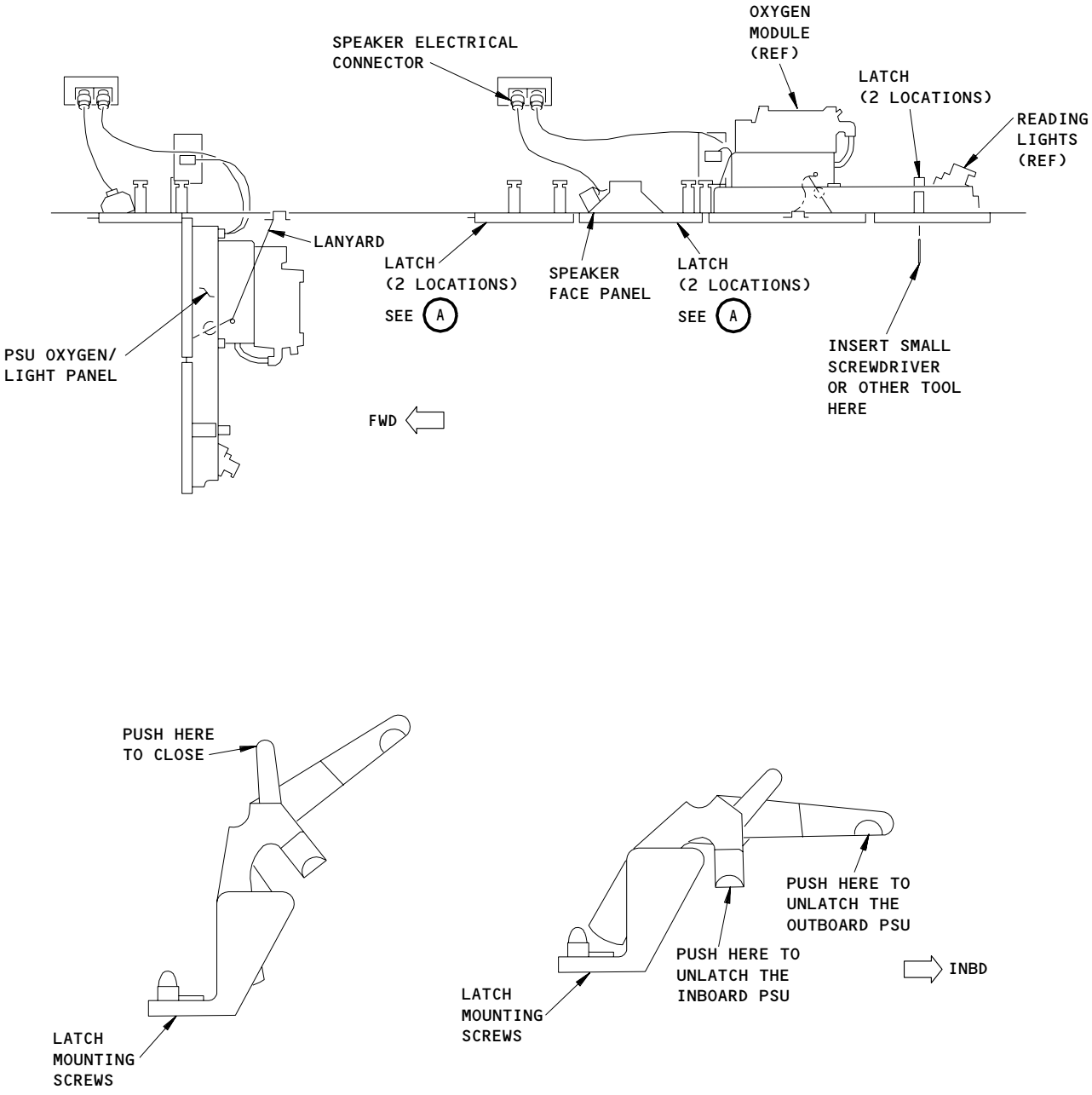
      S 014-006
      (4) Hold the speaker panel, and release the four latches.

      S 014-007
      (5) Lower the speaker panel.

      S 974-008
      (6) Identify the location of the speaker wires necessary for installation.

      S 034-009
      (7) Disconnect the speaker wires.

      S 034-010
      (8) Remove the washers, nuts, and lock washers (four locations) that hold the speaker on the PSU panel.



PSU LATCH

A

PSU Speaker - Installation
Figure 401

S 024-011
(9) Remove the speaker.

TASK 23-31-02-404-012

3. Install the PSU Speaker (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zone
200 Upper Half of the Fuselage

C. Install the PSU Speaker

S 424-013
(1) Install the speaker on the PSU panel with the washers, nuts, and lock washers (four locations).

S 434-014
(2) Tighten the nuts to 12-18 inch-pounds.

S 434-015
(3) Connect the speaker wires to the speaker transformer.

S 864-028
(4) Set the four latches on the speaker panel.

S 414-029
(5) Install the speaker panel.

S 434-017
(6) Connect the electrical connector for the speaker.

S 414-018
(7) Close the PSU panel.

D. Do a Test of the PSU Speaker Installation

S 864-019
(1) Supply electrical power (AMM 24-22-00/201).

S 864-020
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-022
(3) Make a PA announcement.

S 714-026
(4) Make sure you hear the voice through the new speaker.

S 864-024
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

ATTENDANT SPEAKER - REMOVAL/INSTALLATION

1. General
   A. Two attendant speakers are installed in each of the lowered ceiling installations in the forward, mid, and aft passenger compartment.
   B. This procedure contains two tasks. The first task removes the attendant speaker. The second task installs the attendant speaker and does a test of the installation.

TASK 23-31-03-004-022

2. Remove the Attendant Speaker (Fig. 401)
   A. References
      (1) AMM 33-22-00/201, Passenger Loading Lights
      (2) AMM 52-11-13/201, Entry/Service Door Ground Lock
   B. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

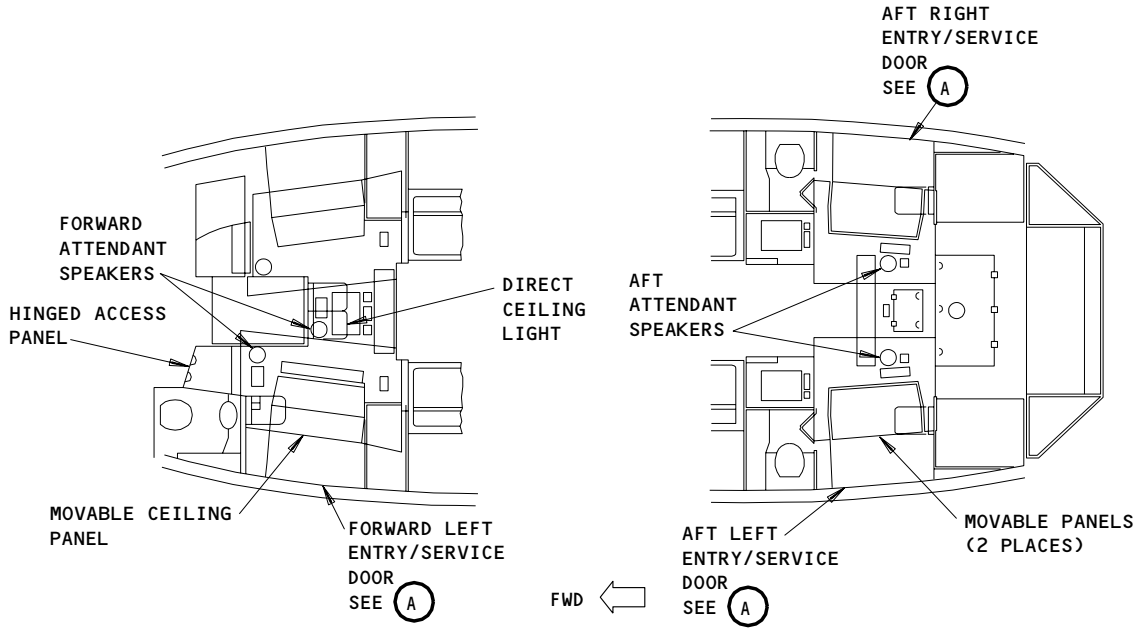
   C. Remove the Attendant Speaker

      S 864-001
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11C22, PASS ADRS

      S 014-026
      (2) For the forward left or aft speakers, do the procedure to install the entry/service door ground lock to access the speaker (AMM 52-11-13/201).

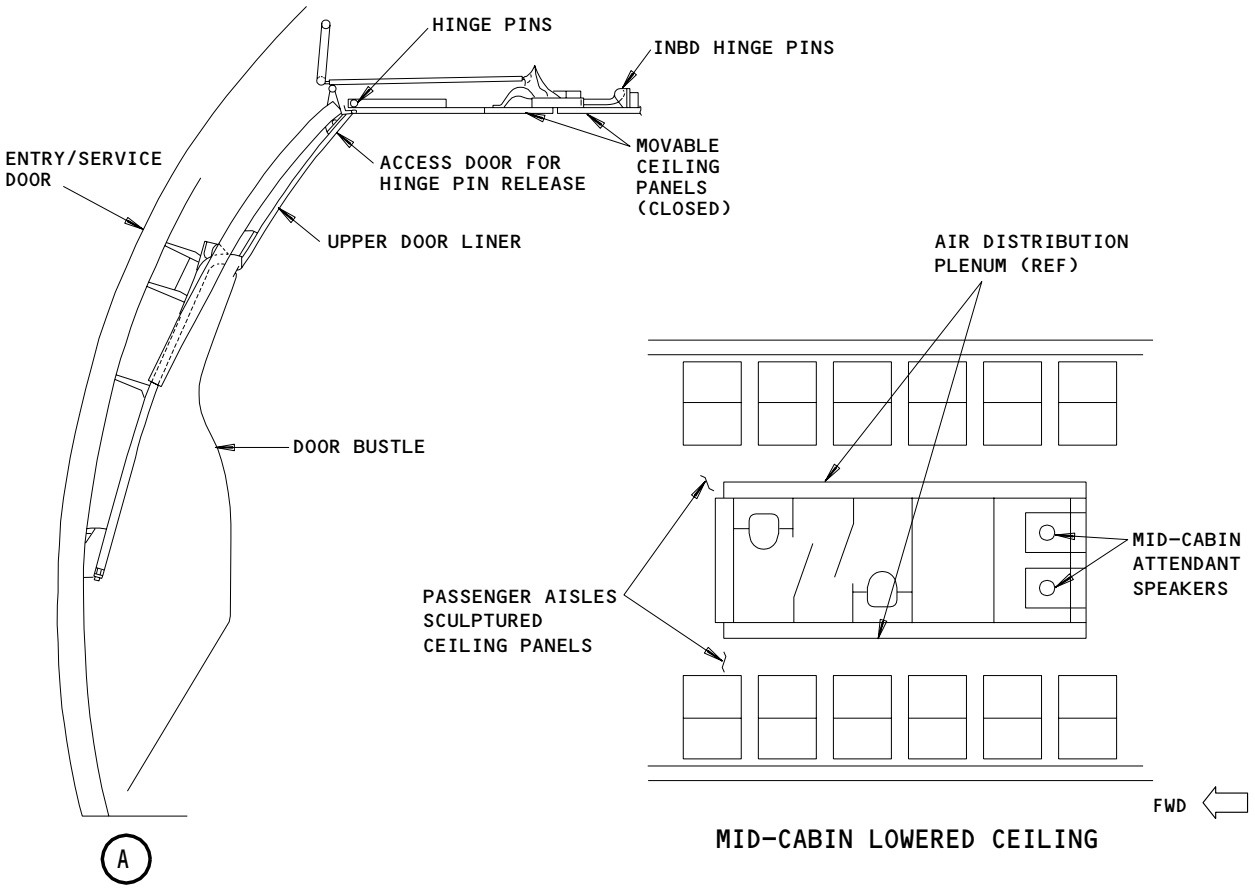
      S 014-005
      (3) For the forward center speaker, remove the lens and reflector assembly of the direct ceiling light in the crossaisle (AMM 33-22-00/201).

      S 014-006
      (4) Open the applicable sculptured ceiling panel adjacent to the speaker in the passenger aisle in the mid passenger compartment.
          (a) Release the two hinge/latches on the edge adjacent to the speaker.



FORWARD LOWERED CEILING

AFT LOWERED CEILING



MID-CABIN LOWERED CEILING

Attendant Speaker Installation
Figure 401

(b) Turn the panel up.

S 014-018

(5) To remove the ceiling panel, disconnect the fasteners that attach the support angles to the air supply plenum.

S 974-024

(6) Identify the location of the speaker wires necessary for installation.

S 034-020

(7) Remove the speaker wires.

S 034-021

(8) Remove the two screws and washers that hold the speaker on the ceiling panel.

S 024-004

(9) Remove the speaker.

TASK 23-31-03-404-023

3. Install the Attendant Speaker (Fig. 401)

A. References

(1) AMM 24-22-00/201, Electrical Power - Control

(2) AMM 33-22-00/201, Passenger Loading Lights

(3) AMM 52-11-13/201, Entry/Service Door Ground Lock

B. Access

(1) Location Zone

200 Upper Half of the Fuselage

C. Install the Attendant Speaker

S 424-007

(1) Install the speaker on the ceiling panel with the two screws and washers.

S 434-008

(2) Connect the speaker wires to the speaker.

S 414-027
(3) For the forward left or aft speakers, do the procedure to remove the entry/service door ground lock (AMM 52-11-13/201).

S 414-011
(4) For the forward center speaker, install the lens and reflector assembly of the direct ceiling light in the crossaisle (AMM 33-22-00/201).

S 414-010
(5) For the mid attendant speaker, close and latch the sculptured ceiling panel.

D. Do a Test of the Attendant Speaker Installation

S 864-012
(1) Supply electrical power (AMM 24-22-00/201).

S 864-013
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-016
(3) Make a PA announcement.

S 714-025
(4) Make sure you hear the voice through the new speaker.

S 864-017
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

GALLEY SPEAKER - REMOVAL/INSTALLATION

1. General
   A. A speaker is installed in the lowered ceiling of the forward galley.
   B. Two speakers are installed in the lowered ceiling of the aft galley.
   C. This procedure contains these tasks:
      (1) Remove and Install the Forward Galley Speaker
      (2) Remove and Install the Aft Galley Speaker

TASK 23-31-04-004-001

2. Remove the Forward Galley Speaker (Fig. 401)
   A. References
      (1) AMM 52-11-13/201, Entry/Service Door Ground Lock
   B. Access
      (1) Location Zones

211/212	Flight Compartment
222	Passenger Compartment

   C. Remove the Forward Galley Speaker

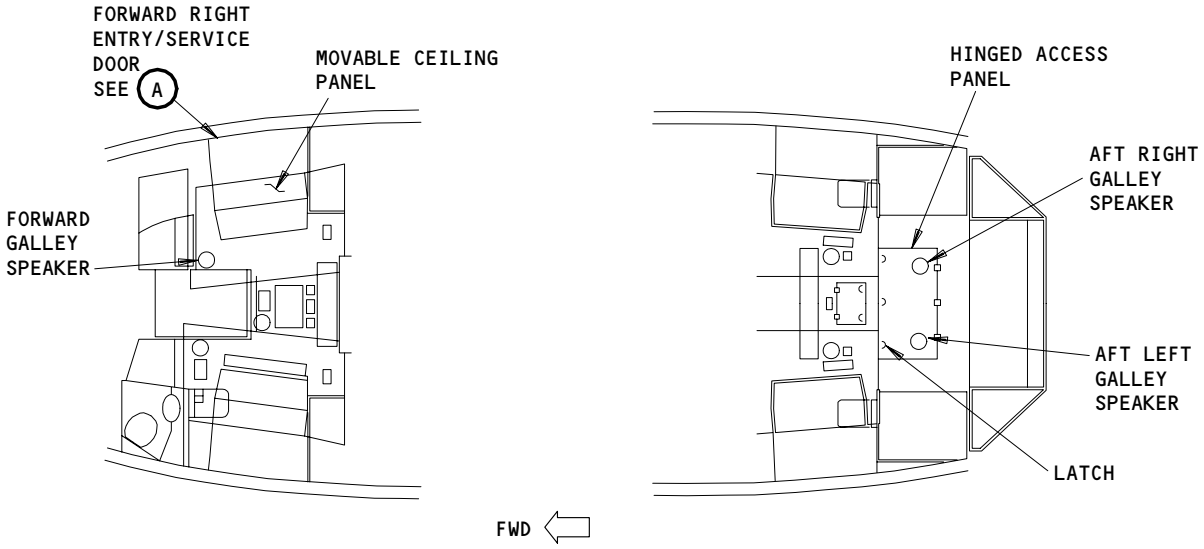
S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
      (a) 11C22, PASS ADRS

S 014-004
      (2) Do the procedure to install the entry/service door ground lock to access the speaker (AMM 52-11-13/201).

S 974-005
      (3) Identify the location of the speaker wires necessary for installation.

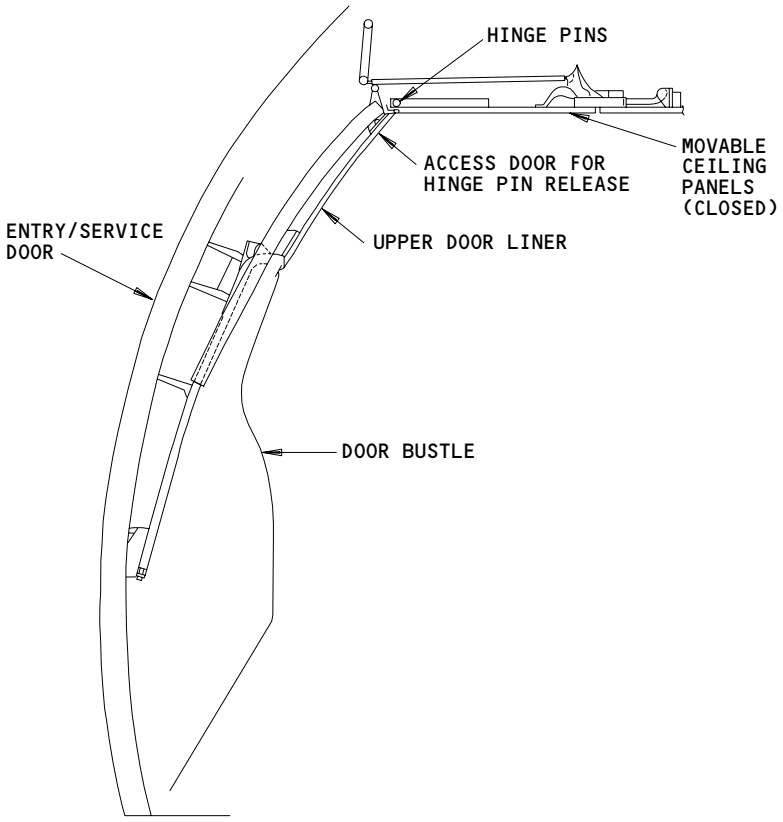
S 034-006
      (4) Remove the speaker wires.

S 034-007
      (5) Remove the two screws and washers that hold the speaker on the ceiling panel.



FORWARD GALLEY AREA

AFT GALLEY AREA



FORWARD RIGHT ENTRY SERVICE DOOR

A

Galley Speaker Installation
Figure 401

S 024-096
(6) Remove the speaker.

TASK 23-31-04-404-009

3. Install the Forward Galley Speaker (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 52-11-13/201, Entry/Service Door Ground Lock

B. Access
(1) Location Zones

211/212	Flight Compartment
222	Passenger Compartment

C. Install the Forward Galley Speaker

S 424-010
(1) Install the speaker on the ceiling panel with the two screws and washers.

S 434-012
(2) Connect the speaker wires to the speaker transformer.

S 414-112
(3) Do the procedure to remove the entry/service door ground lock (AMM 52-11-13/201).

D. Do a Test of the Forward Galley Speaker Installation

S 864-014
(1) Supply electrical power (AMM 24-22-00/201).

S 864-015
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-097
(3) Make a PA announcement.

S 714-098
(4) Make sure you hear the voice through the new speaker.

S 864-032
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-31-04-004-055
4. Remove the Aft Galley Speaker (Fig. 401)
A. Access
(1) Location Zones
211/212 Flight Compartment
251/252 Passenger Compartment

B. Remove the Aft Galley Speaker

S 864-083
(1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11C22, PASS ADRS

S 014-056
(2) Do these steps to open the access panel:
(a) Release the latches on the forward edge.
(b) Hold the panel and push the lanyard spring clip through the hole in the latch (two locations).
(c) Lower the panel.

S 974-057
(3) Identify the location of the speaker wires necessary for installation.

S 034-058
(4) Remove the speaker wires.

S 034-059
(5) Remove the two screws and washers that hold the speaker on the access panel.

S 024-060
(6) Remove the speaker.

TASK 23-31-04-404-061
5. Install the Aft Galley Speaker (Fig. 401)
A. References
(1) AMM 24-22-00/201, Electrical Power - Control
B. Access
(1) Location Zones
211/212 Flight Compartment
251/252 Passenger Compartment

C. Install the Aft Galley Speaker

S 424-062
(1) Install the speaker on the access panel with the two screws and washers.

S 434-063
(2) Connect the speaker wires to the speaker transformer.

S 414-064
(3) Do these steps to close the access panel:
(a) Lift the panel and attach the two lanyard spring clips to the latch assembly holes.
(b) Close and latch the panel.
D. Do a Test of the Aft Galley Speaker Installation

S 864-065
(1) Supply electrical power (AMM 24-22-00/201).

S 864-066
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-102
(3) Make a PA announcement.

S 714-103
(4) Make sure you hear the voice through the new speaker.

S 864-078
(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

LAVATORY SPEAKER - REMOVAL/INSTALLATION

1. General
   A. The lavatory speaker is installed in the passenger service unit (PSU) in the lavatory ceiling.
   B. This procedure contains two tasks. The first task removes the lavatory speaker. The second task installs the lavatory speaker and does a test of the installation.

TASK 23-31-05-004-028

2. Remove the Lavatory Speaker (Fig. 401)
   A. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

   B. Remove the Lavatory Speaker

      S 864-001
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11C22, PASS ADRS

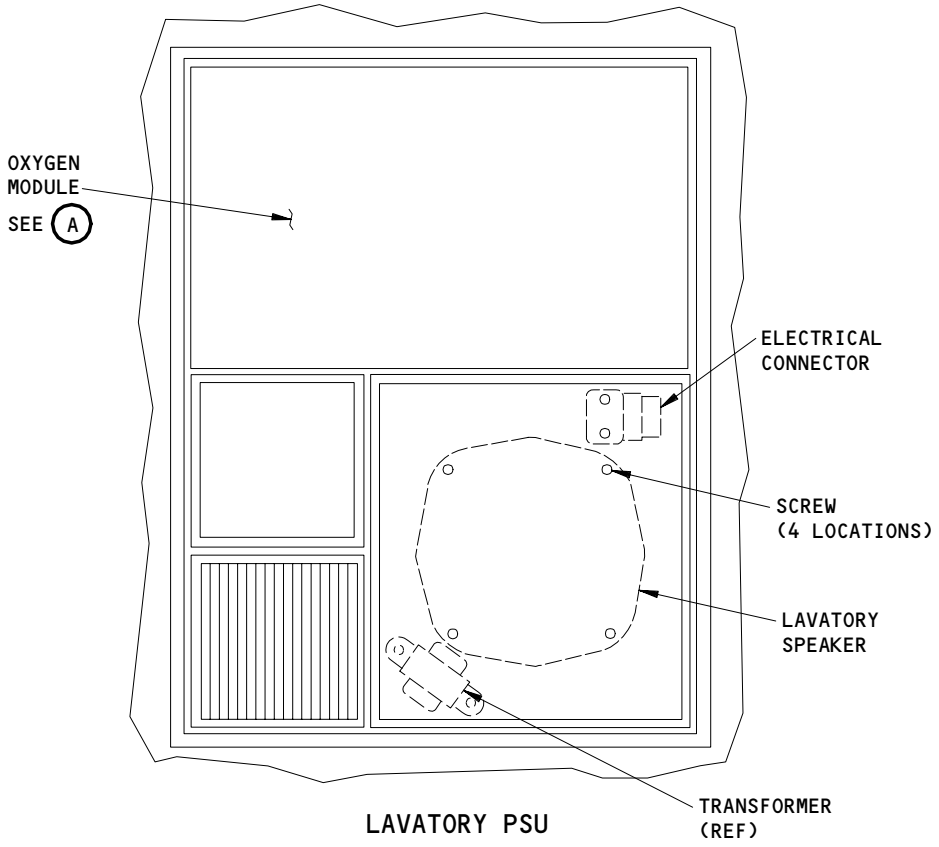
      S 014-003
      (2) Do these steps to remove the oxygen module in the lavatory PSU:
          (a) Open the oxygen module door but do not let the masks fall.
          (b) Hold the masks in the oxygen module, and release the four quarter-turn fasteners.
          (c) Lower the oxygen module by approximately 12 inches.
          (d) Disconnect the electrical connector.
          (e) Remove the oxygen module.

      S 034-004
      (3) Disconnect the electrical connectors for the speaker and the light.

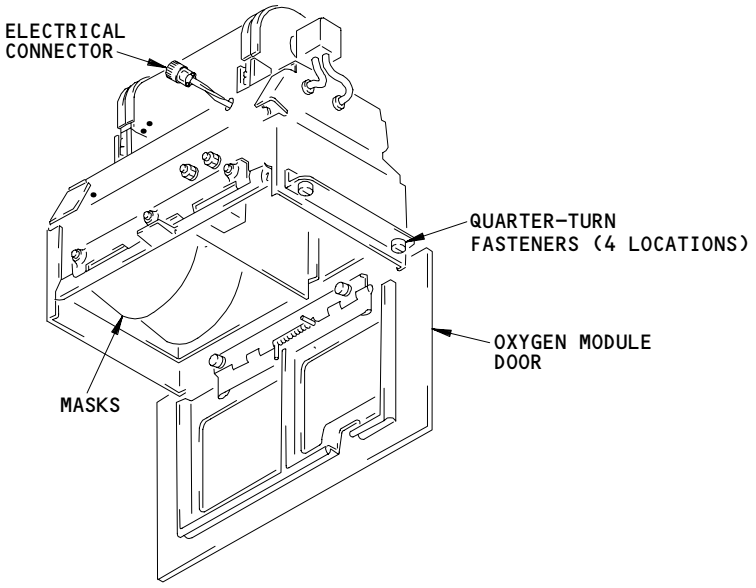
      S 014-037
      (4) Hold the PSU panel, and remove the four screws.

      S 014-006
      (5) Lower the PSU panel.

      S 034-038
      (6) Remove the four screws that hold the speaker on the PSU panel.



LAVATORY PSU



OXYGEN MODULE

A

Lavatory Speaker - Installation
Figure 401

S 024-039
(7) Remove the speaker.

TASK 23-31-05-404-008

3. Install the Lavatory Speaker (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 35-21-00/501, Passenger Oxygen System

B. Access
(1) Location Zone
200 Upper Half of the Fuselage

C. Install the Lavatory Speaker

S 424-009
(1) Install the speaker on the PSU panel with the four screws.

S 414-040
(2) Install the PSU panel with the four screws.

S 434-011
(3) Connect the electrical connectors for the speaker and the light.

S 414-012
(4) Do these steps to install the oxygen module:
(a) Hold the masks in the oxygen module, and set the module near the ceiling.
(b) Connect the electrical connector.
(c) Install the oxygen module with the four quarter-turn fasteners.
(d) Close the oxygen module door.
(e) Make sure the oxygen module door operates correctly (AMM 35-21-00/501).

D. Do a Test of the Lavatory Speaker Installation

S 864-013
(1) Supply electrical power (AMM 24-22-00/201).

S 864-014
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-041
(3) Make a PA announcement.
(a) Make sure you hear the voice through the new speaker.

S 864-024

(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

CEILING SPEAKER - REMOVAL/INSTALLATION

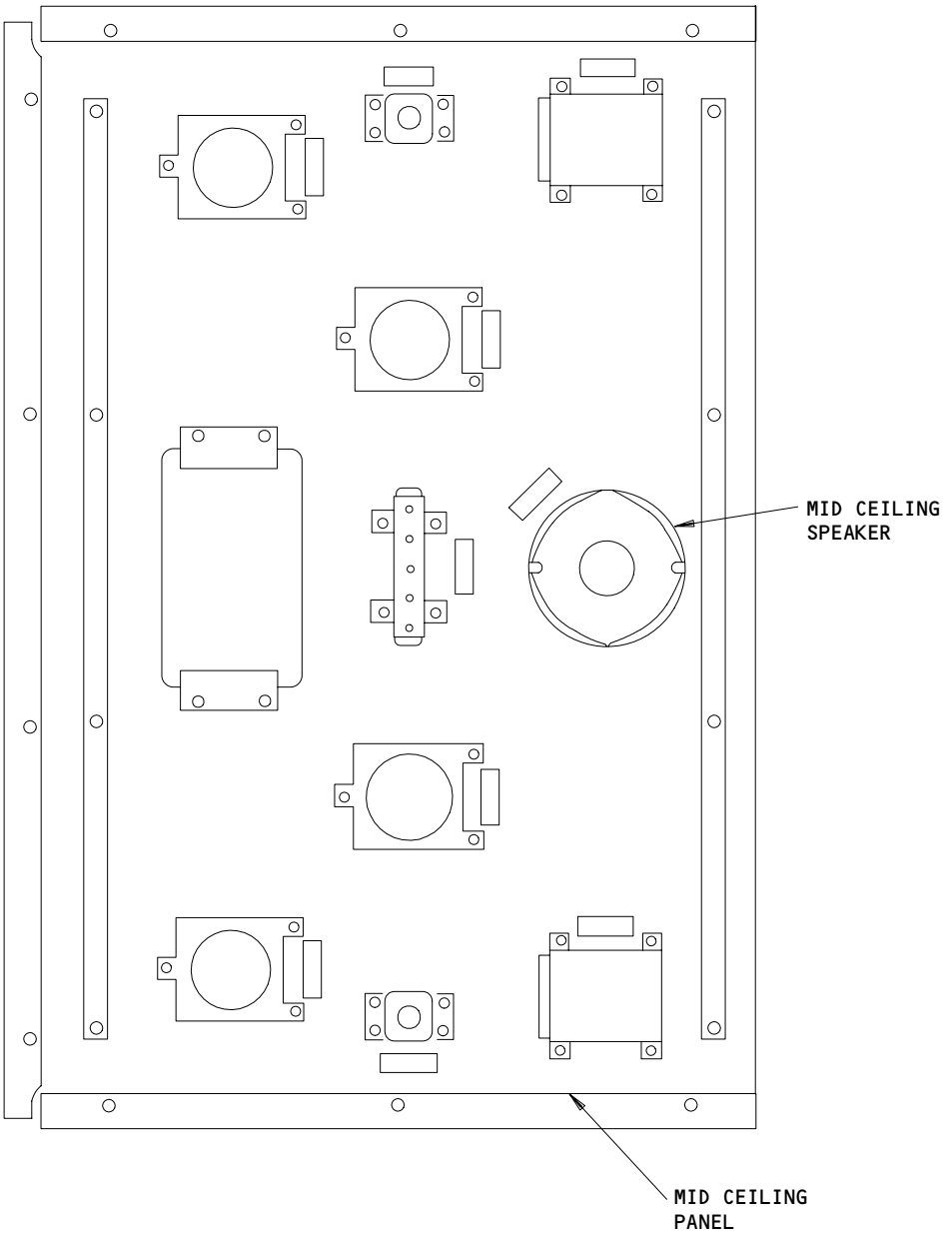
1. General
   A. SAS 050-149 AND ALL MTH AIRPLANES;
      Two speakers are installed in the forward lowered ceiling.
   B. SAS 150-999;
      Three speakers are installed in the forward lowered ceiling.
   C. SAS 150-999 AND ALL MTH AIRPLANES;
      A speaker is installed in the mid lowered ceiling.
   D. SAS 150-999 AND MTH 275-278, 281-999;
      A speaker is installed in the aft lowered ceiling.
   E. MTH 279, 280;
      Two speakers are installed in the aft lowered ceiling.
   F. This procedure contains these tasks:
      (1) Remove and Install the Forward Ceiling Speaker
      (2) SAS 150-999 AND ALL MTH AIRPLANES;
          Remove and Install the Mid Ceiling Speaker
      (3) SAS 150-999 AND ALL MTH AIRPLANES;
          Remove and Install the Aft Ceiling Speaker

TASK 23-31-08-004-001

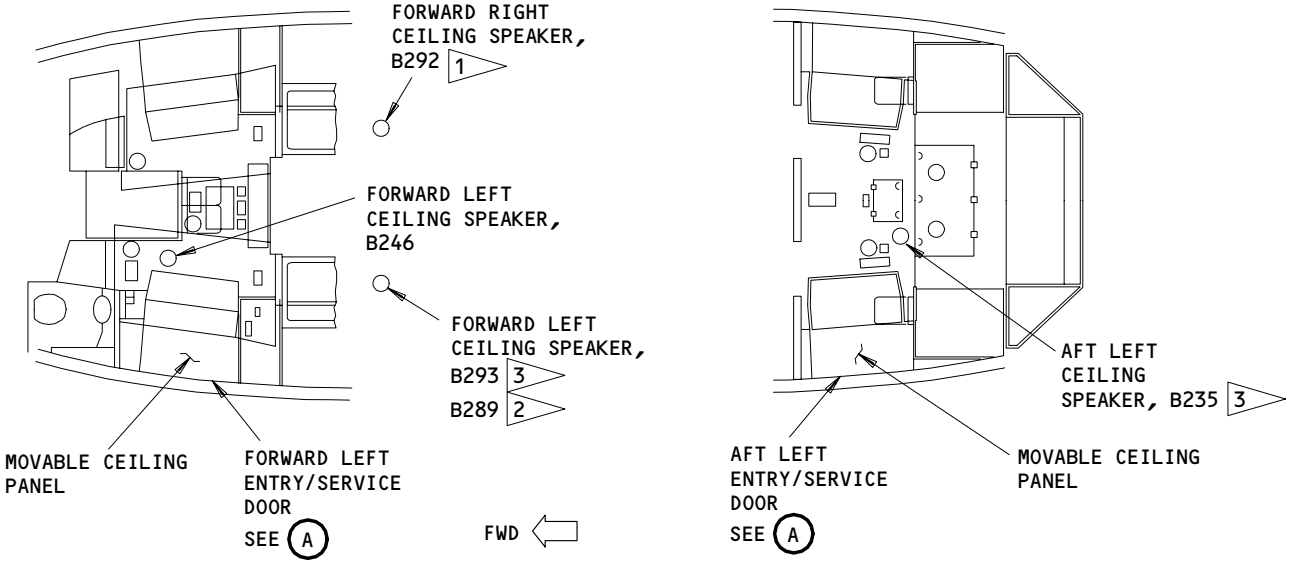
2. Remove the Forward Ceiling Speaker (Fig. 401)
   A. References
      (1) AMM 52-11-13/201, Entry/Service Door Ground Lock
   B. Access
      (1) Location Zones
          211/212 Flight Compartment
          221/222 Passenger Compartment

   C. Remove the Forward Ceiling Speaker

      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11C22, PASS ADRS

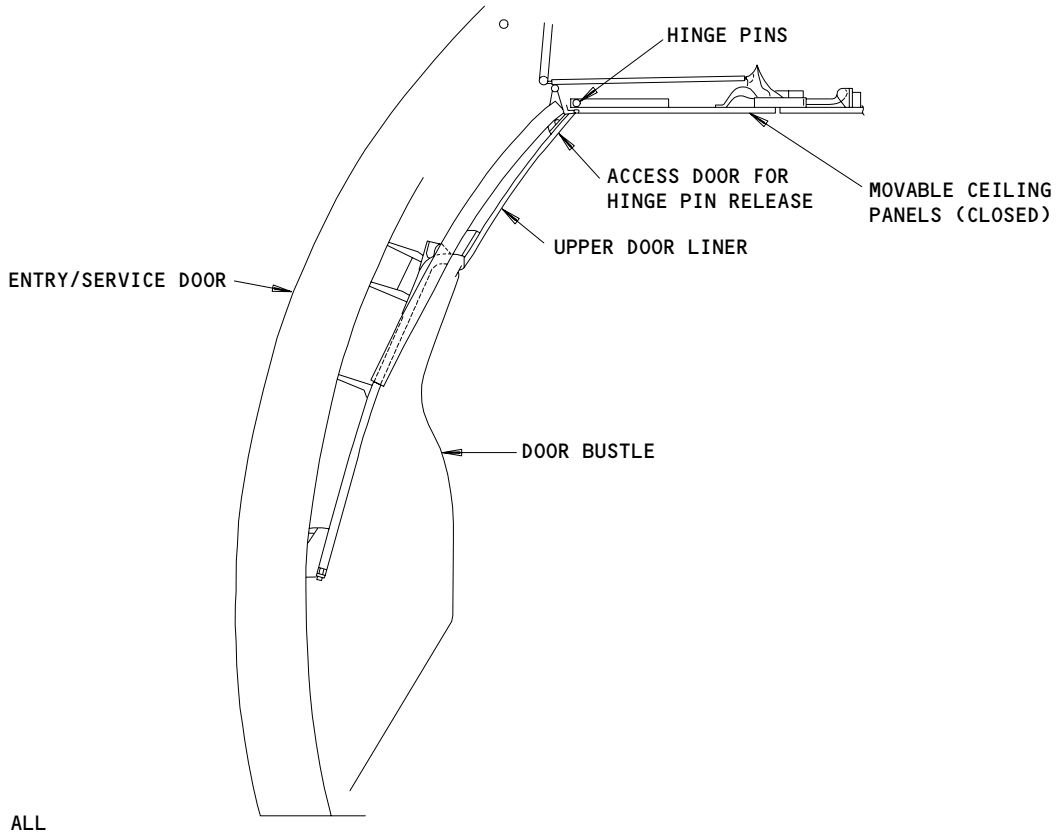


Mid Ceiling Speaker Installation
Figure 401 (Sheet 1)



FORWARD LEFT LOWERED CEILING

AFT LEFT LOWERED CEILING



1 SAS ALL
2 MTH ALL
3 SAS 150-999

ENTRY/SERVICE DOOR
A

Ceiling Speaker - Installation
Figure 401 (Sheet 2)

605063

S 014-140
(2) Do the procedure to install the entry/service door ground lock to access the speaker (AMM 52-11-13/201).

S 974-005
(3) Identify the location of the speaker wires necessary for installation.

S 034-111
(4) Remove the speaker wires.

S 034-006
(5) Remove the two screws and washers that hold the speaker on the ceiling panel.

S 024-119
(6) Remove the speaker.

TASK 23-31-08-404-008

3. Install the Forward Ceiling Speaker (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 52-11-13/201, Entry/Service Door Ground Lock

B. Access
(1) Location Zones
211/212 Flight Compartment
221/222 Passenger Compartment

C. Install the Forward Ceiling Speaker

S 424-120
(1) Install the speaker on the ceiling panel with the two screws and washers.

S 434-009
(2) Connect the speaker wires to the correct speaker terminals.

S 414-141
(3) Do the procedure to remove the entry/service door ground lock (AMM 52-11-13/201).

D. Do a Test of the Forward Ceiling Speaker Installation

S 864-011
(1) Supply electrical power (AMM 24-22-00/201).

S 864-012
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-112
(3) Make a PA announcement.
(a) Make sure you hear the voice through the new speaker.

S 864-095
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-31-08-004-035
4. SAS 150-999 AND ALL MTH AIRPLANES;
Remove the Mid Ceiling Speaker (Fig. 401)
A. Access
(1) Location Zones
211/212 Flight Compartment
241/242 Passenger Compartment

B. Remove the Mid Ceiling Speaker

S 864-037
(1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11C22, PASS ADRS

S 014-038
(2) Open the mid ceiling panel.

S 974-039
(3) Identify the location of the speaker wires necessary for installation.

S 034-040
(4) Remove the speaker wires.

S 034-041
(5) Remove the two screws and washers that hold the speaker on the ceiling panel.

S 024-124
(6) Remove the speaker.

TASK 23-31-08-404-118
5. SAS 150-999 AND ALL MTH AIRPLANES;
Install the Mid Ceiling Speaker (Fig. 401)
A. References
(1) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones
211/212 Flight Compartment
241/242 Passenger Compartment

C. Install the Mid Ceiling Speaker

S 424-090
(1) Install the speaker on the ceiling panel with the two screws and washers.

S 434-091
(2) Connect the speaker wires to the correct speaker terminals.

S 414-092
(3) Close the mid ceiling panel.

D. Do a Test of the Mid Ceiling Speaker Installation

S 864-042
(1) Supply electrical power (AMM 24-22-00/201).

S 864-043
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-114
(3) Make a PA announcement.
(a) Make sure you hear the voice through the new speaker.

S 864-099
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-31-08-004-100

6. SAS 150-999 AND ALL MTH AIRPLANES;
Remove the Aft Ceiling Speaker (Fig. 401)

A. References
(1) AMM 52-11-13/201, Entry/Service Door Ground Lock

B. Access
(1) Location Zones
211/212 Flight Compartment
251/252 Passenger Compartment

C. Remove the Aft Ceiling Speaker

S 864-107
(1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11C22, PASS ADRS

S 014-142
(2) Do the procedure to install the entry/service door ground lock to access the speaker (AMM 52-11-13/201).

S 974-086
(3) Identify the location of the speaker wires necessary for installation.

S 034-087
(4) Remove the speaker wires.

S 034-088
(5) Remove the two screws and washers that hold the speaker on the ceiling panel.

S 024-130
(6) Remove the speaker.

TASK 23-31-08-404-063

7. SAS 150-999 AND ALL MTH AIRPLANES;
Install the Aft Ceiling Speaker (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 52-11-13/201, Entry/Service Door Ground Lock

B. Access
(1) Location Zones
211/212 Flight Compartment
251/252 Passenger Compartment

C. Install the Aft Ceiling Speaker

S 424-064
(1) Install the speaker on the ceiling panel with the two screws and washers.

S 434-065
(2) Connect the speaker wires to the correct speaker terminals.

S 414-143
(3) Do the procedure to remove the entry/service door ground lock (AMM 52-11-13/201).

D. Do a Test of the Aft Ceiling Speaker Installation

S 864-067
(1) Supply electrical power (AMM 24-22-00/201).

S 864-068
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 714-116
(3) Make a PA announcement.
(a) Make sure you hear the voice through the new speaker.

S 864-133
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

BOARDING MUSIC TAPE REPRODUCER - REMOVAL/INSTALLATION

1. General
   A. The boarding music tape reproducer, M1708, is installed at the purser's station.
   B. This procedure contains two tasks. The first task removes the tape reproducer. The second task installs the tape reproducer and does a test of the installation.

TASK 23-31-10-004-019-001

2. Remove the Boarding Music Tape Reproducer (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          221/222 Passenger Compartment

      (2) Access Panel
          119AL Main Equipment Center

   C. Prepare to Remove the Tape Reproducer

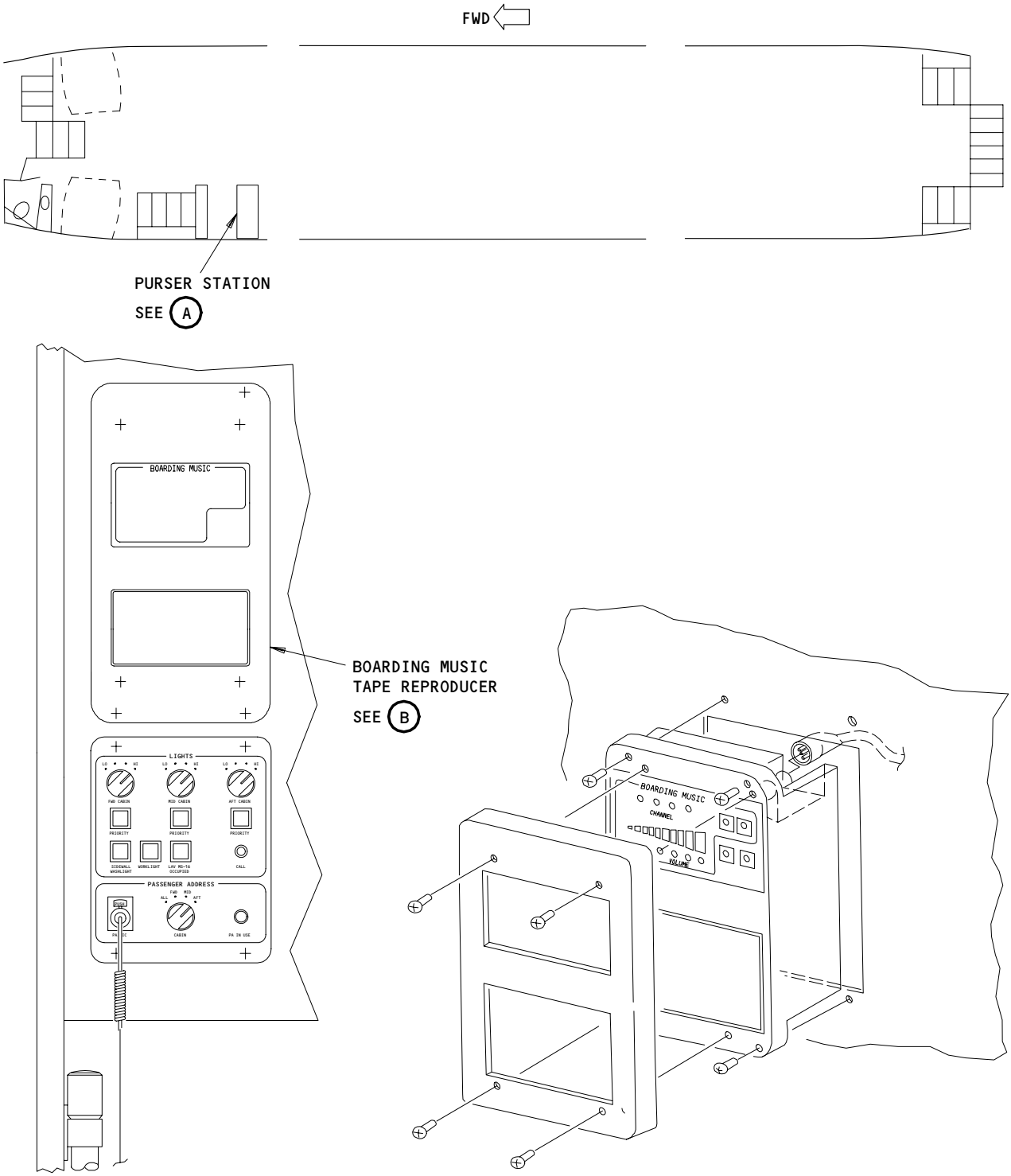
      S 864-004-001
      (1) Supply electrical power (AMM 24-22-00/201).

      S 864-005-001
      (2) Push and hold the START and STOP switches on the tape reproducer.

      S 864-006-001
      (3) Push the access code (135, 241, 352 or 413) with the VOLUME number switches.

      S 864-007-001
      (4) Release the START and STOP switches.

      S 034-021-001
      (5) Remove the cassette from the tape reproducer and close the access door.



PARTIAL VIEW OF PURSER'S STATION

A

BOARDING MUSIC TAPE REPRODUCER

B

Boarding Music Tape Reproducer Installation
Figure 401

S 014-026-001
(6) Open the access door, 119AL, for the left miscellaneous electrical equipment panel, P36 (AMM 06-41-00/201).

S 864-020-001
(7) Open this circuit breaker on the P36 panel, and attach a DO-NOT-CLOSE tag:
(a) 36J7, PRE-RECD ANNCT

D. Remove the Tape Reproducer

S 034-008-001
(1) Remove the four screws on the front cover of the tape reproducer.

S 034-022-001
(2) Remove the front cover from the tape reproducer.

S 034-009-001
(3) Remove the four screws on the tape reproducer.

S 034-027-001
(4) Remove the tape reproducer from the wall until you can get to the electrical connector behind the tape reproducer.

S 034-024-001
(5) Disconnect the electrical connector.

S 024-028-001
(6) Remove the tape reproducer.

TASK 23-31-10-404-010-001

3. Install the Boarding Music Tape Reproducer (Fig. 401)

A. References
(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment
221/222	Passenger Compartment

(2) Access Panel

119AL	Main Equipment Center

C. Install the Tape Reproducer

S 434-029-001
(1) Connect the electrical connector behind the tape reproducer.

S 424-030-001
(2) Install the tape reproducer in the wall.

S 434-001-001
(3) Install the four screws on the tape reproducer.

S 434-013-001
(4) Install the front cover on the tape reproducer.

S 434-002-001
(5) Install the four screws on the front cover of the tape reproducer.

D. Do a Test of the Tape Reproducer Installation

S 864-031-001
(1) Supply electrical power (AMM 24-22-00/201).

S 864-014-001
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36J7, PRE-RECD ANNCT

S 864-015-001
(3) Make sure this circuit breaker is closed on the overhead circuit breaker panel, P11:
(a) 11C22, PASS ADRS

S 864-032-001
(4) Do these steps at the tape reproducer to start the boarding music:
(a) Turn on the tape reproducer (the light in the OFF switch goes off).
(b) Push and hold the START and STOP switches.
(c) Push the access code (135, 241, 352 or 413) with the VOLUME number switches.
(d) Release the START and STOP switches.
(e) Install the cassette in the tape reproducer and close the access door.
(f) Push the START switch.

S 714-033-001
(5) Make sure the boarding music is clear through the PA speakers.

S 714-034-001
(6) Make sure the volume changes when you push the VOLUME number switches.

S 864-025-001
(7) Push the STOP switch.

E. Put the Airplane Back to Its Initial Condition

S 414-035-001
(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-018-001
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PA TAPE DECK - REMOVAL/INSTALLATION

1. General
   A. The PA tape deck, M1523, is installed in the forward closet, to the aft of the forward passenger doors.
   B. This procedure contains two tasks. The first task removes the PA tape deck (referred to as the tape deck). The second task installs the tape deck and does a test of the installation.

TASK 23-31-10-004-001-002

2. Remove the PA Tape Deck (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          221/222 Passenger Compartment

      (2) Access Panel
          119AL Main Equipment Center

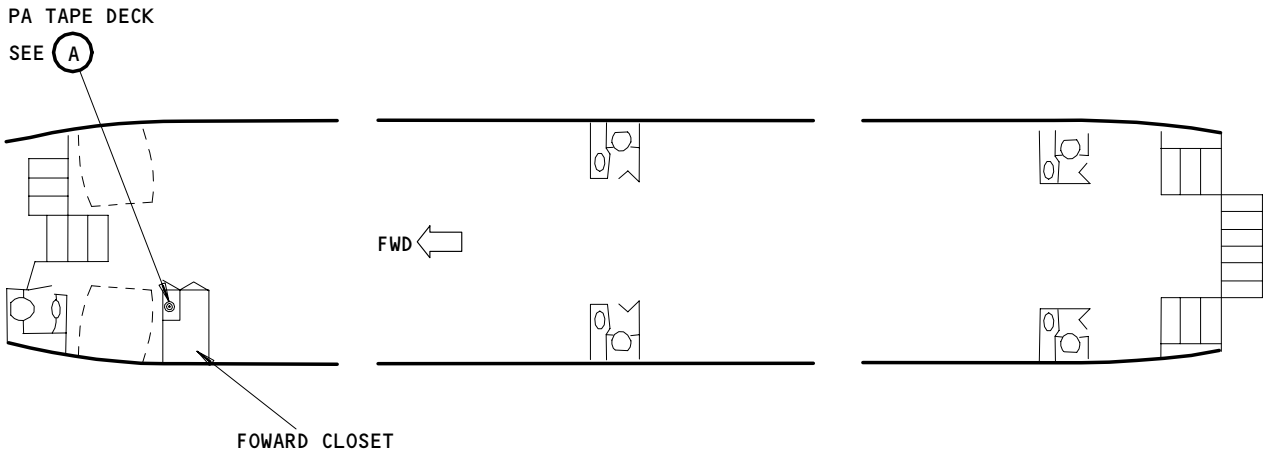
   C. Prepare to Remove the Tape Deck

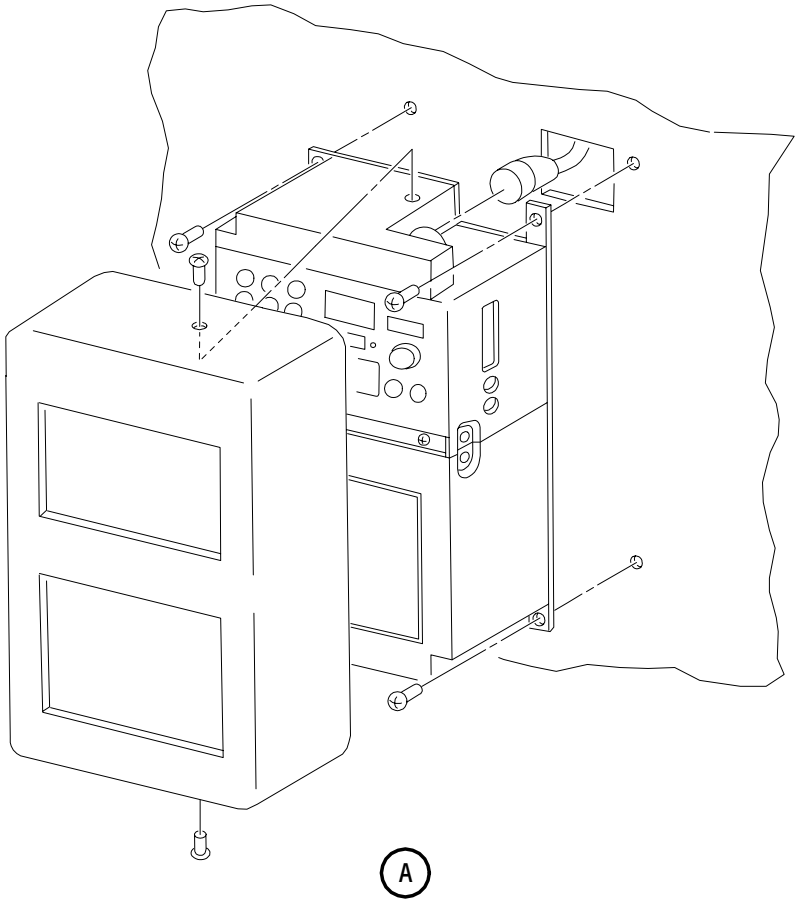
      S 864-002-002
      (1) Supply electrical power (AMM 24-22-00/201).

      S 864-003-002
      (2) Push the access code (90, 91, 92 or 93) on the tape deck.

      S 864-017-002
      (3) Push the MUSIC 1 switch to open the tape access door.

      S 034-024-002
      (4) Remove the cassette from the tape deck and close the access door.





PA Tape Deck Installation
Figure 401

S 014-026-002
(5) Open the access door, 119AL, for the left miscellaneous electrical equipment panel, P36 (AMM 06-41-00/201).

S 864-005-002
(6) Open this circuit breaker on the P36 panel, and attach a DO-NOT-CLOSE tag:
(a) 36J6 or 36J7, PRE-RECD ANNCT

D. Remove the Tape Deck

S 034-006-002
(1) Remove the screws at the top and bottom of the tape deck.

S 034-018-002
(2) Remove the cover from the tape deck.

S 034-007-002
(3) Remove the screws at each corner of the tape deck.

S 034-008-002
(4) Disconnect the electrical connector behind the tape deck.

S 024-027-002
(5) Remove the tape deck.

TASK 23-31-10-404-009-002

3. Install the PA Tape Deck (Fig. 401)

A. References
(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment
221/222	Passenger Compartment

(2) Access Panel

119AL	Main Equipment Center

C. Install the Tape Deck

S 434-020-002
(1) Connect the electrical connector behind the tape deck.

S 424-028-002
(2) Install the screws at each corner of the tape deck to install the tape deck.

S 434-022-002
(3) Install the cover on the tape deck.

S 434-023-002
(4) Install the screws at the top and bottom of the tape deck.

D. Do a Test of the Tape Deck Installation

S 864-010-002
(1) Supply electrical power (AMM 24-22-00/201).

S 864-011-002
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36J6 or 36J7, PRE-RECD ANNCT

S 864-012-002
(3) Make sure this circuit breaker is closed on the overhead circuit breaker panel, P11:
(a) 11C22, PASS ADRS

S 864-029-002
(4) Do these steps at the tape deck to start the boarding music:
(a) Push the access code (90, 91, 92 or 93).
(b) Push the MUSIC 1 switch to open the tape access door.
(c) Install the cassette in the tape deck and close the access door.
(d) Push the MUSIC 1 switch-light.
1) Make sure the MUSIC 1 switch-light comes on.
2) Make sure the READY light comes on.
(e) Push the START switch-light.
1) Make sure the READY light goes off.
2) Make sure the START switch-light comes on.

S 714-030-002
(5) Make sure the boarding music is clear through the PA speakers.

S 714-031-002
(6) Make sure the volume changes when you turn the VOLUME control.

S 864-015-002
(7) Push the STOP switch.

E. Put the Airplane Back to Its Initial Condition

S 414-032-002
(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-016-002
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PASSENGER ADDRESS PRINTED-CIRCUIT CARDS - REMOVAL/INSTALLATION

1. General
   A. The passenger address printed-circuit cards (referred to as the circuit cards) are the switching cards and the volume level indicator card.
   B. The circuit cards, M1633, M1634 and M1635, are installed in the PA accessory box. The PA accessory box is installed on shelf 5 of rack E2 in the main equipment center.
   C. This procedure contains two tasks. The first task removes a circuit card. The second task installs a circuit card and does a test of the installation.

TASK 23-31-11-004-008

2. Remove the Passenger Address Printed-Circuit Card (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

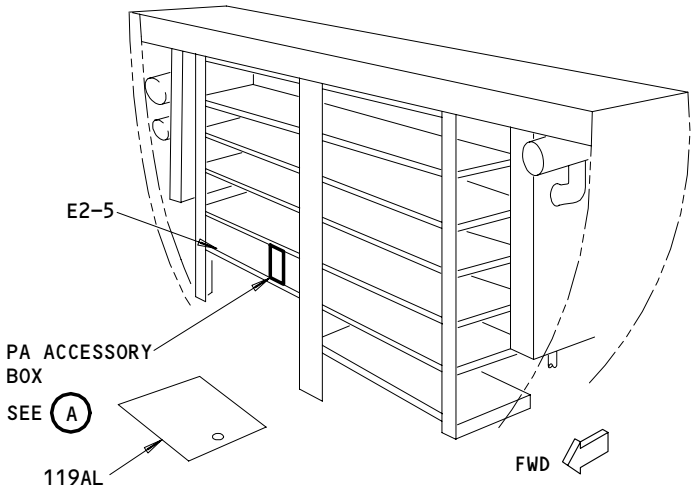
      (2) Access Panel
          119AL Main Equipment Center

   C. Remove the Circuit Card

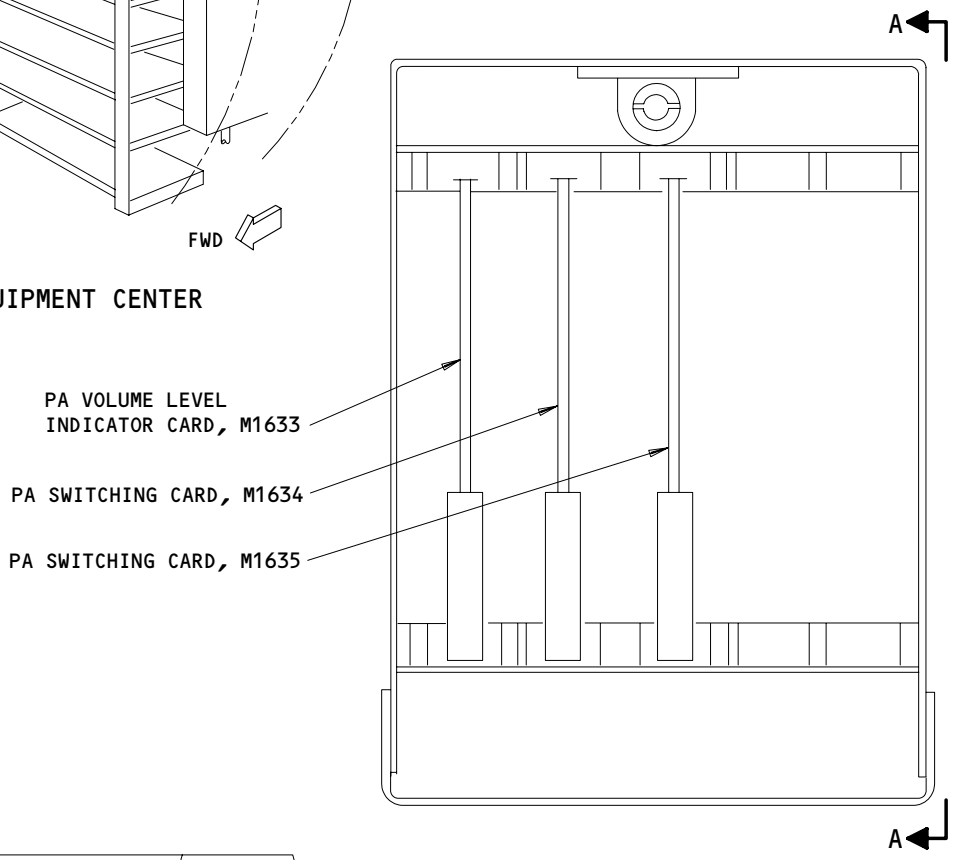
      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11C22, PASS ADRS

      S 014-014
      (2) Open the access door, 119AL, for the PA accessory box (AMM 06-41-00/201).

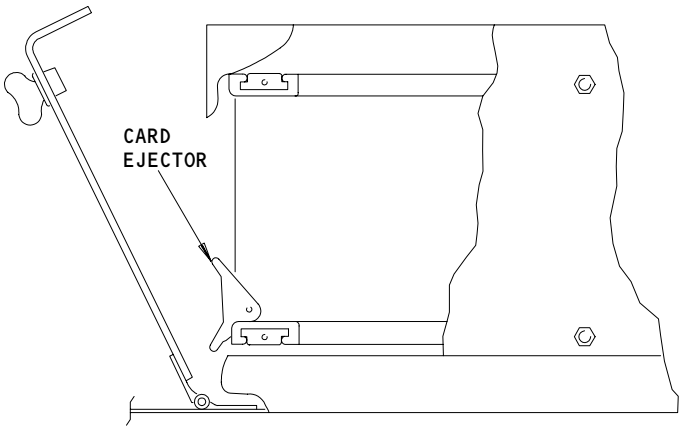
      S 014-003
      (3) Open the front cover of the PA accessory box.



MAIN EQUIPMENT CENTER



PA ACCESSORY BOX
(FRONT COVER SHOWN REMOVED)
(A)



CUTOUT SIDE-VIEW OF PA ACCESSORY BOX
(CARDS SHOWN INSTALLED)
A-A

Passenger Address Printed Circuit Cards - Installation
Figure 401

S 864-001
(4) Find the circuit card that you will remove.

S 034-015
(5) Turn the ejector on the circuit card until the card is loose in the guides.

S 024-009
(6) Slowly remove the circuit card along the guides (AMM 20-10-01/401).

TASK 23-31-11-404-004

3. Install the Passenger Address Printed-Circuit Card (Fig. 401)

A. References
(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 20-10-01/401, E/E Rack Mounted Components
(3) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment
221/222	Passenger Compartment

(2) Access Panel

119AL	Main Equipment Center

C. Install the Circuit Card

S 424-005
(1) Install the circuit card in the PA accessory box (AMM 20-10-01/401).
(a) Make sure you install the card correctly.
(b) Make sure the card is not loose.

S 414-012
(2) Close the front cover of the PA accessory box.

D. Do a Test of the Circuit Card Installation

S 864-007
(1) Supply electrical power (AMM 24-22-00/201).

S 864-006
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C22, PASS ADRS

S 864-016
(3) Do these steps at an attendant's handset:
(a) Lift the attendant's handset.
(b) Push the PA switch.
(c) Push and hold the PTT switch.

(d) Speak into the attendant's handset.

S 714-017

(4) Make sure you hear the voice clearly through the PA speakers.

E. Put the Airplane Back to Its Initial Condition

S 414-018

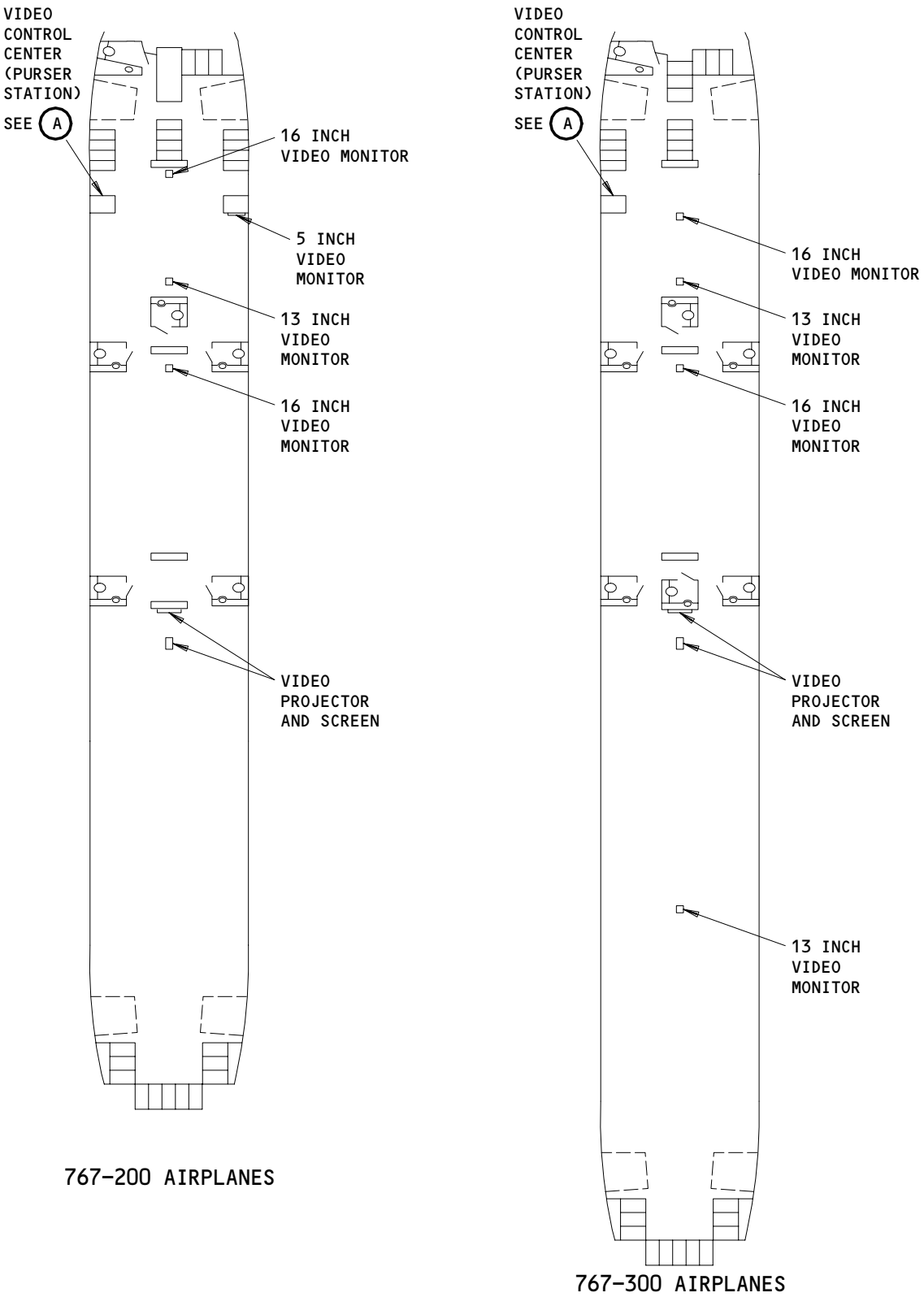
(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-013

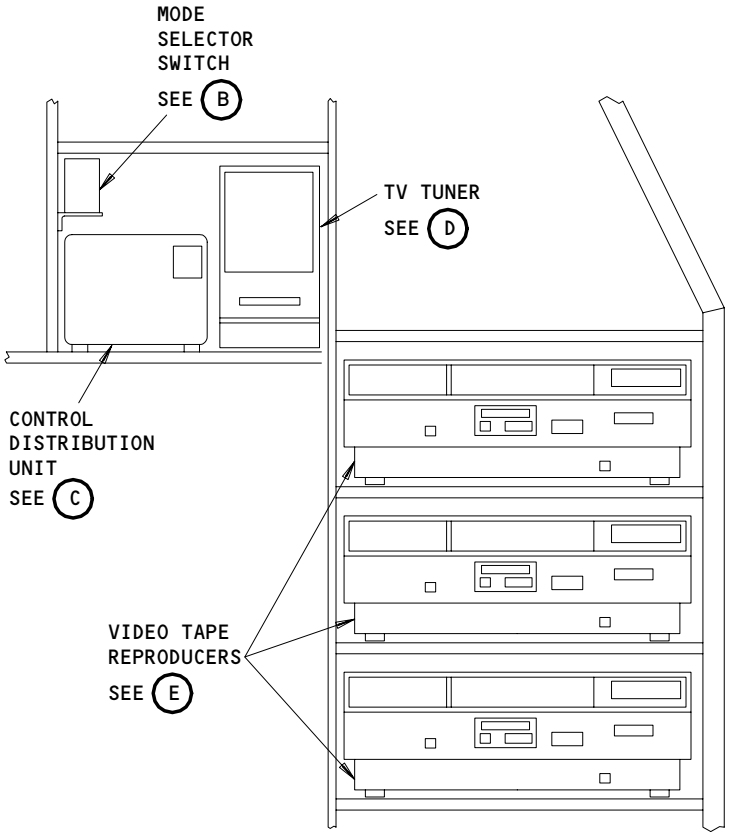
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PASSENGER ENTERTAINMENT (VIDEO PROJECTION) - DESCRIPTION AND OPERATION

1. General
   A. The passenger entertainment video projection system provides live television, informational displays, and prerecorded video programs for passenger viewing. Video monitors and a projector are located throughout the passenger cabin. The prerecorded video is obtained from a cassette tape inserted into one of three video tape reproducers (VTR). Live television is provided via a TV tuner and antennas located in the vertical stabilizer. Informational displays are provided by the digital interface unit.
   B. 767-200 AIRPLANES;
      The passenger entertainment video projection system is comprised of four video monitors, a video projector with associated screen, a digital interface unit, a mode selector switch, three video tape reproducers, a control distribution unit, a TV tuner and four TV antennas built into the vertical stabilizer. A VIDEO ON light is located on pilots' overhead panel P5 to indicate when power is applied to the system.
   C. 767-300 AIRPLANES;
      The passenger entertainment video projection system is comprised of five video monitors, a video projector with associated screen, a digital interface unit, a mode selector switch, three video tape reproducers, a control distribution unit, a TV tuner, and four TV antennas built into the vertical stabilizer. A VIDEO ON light is located on pilots' overhead panel P5 to indicate when power is applied to the system.
   D. The video monitors and video projector receive 115v ac power, from the right bus, through three circuit breakers on right misc electrical equipment panel P37. One of these circuit breakers also provides 115v ac to the video tape reproducers and the TV tuner. The control distribution unit and digital interface unit receive 28v dc power from the right bus through a circuit breaker on overhead panel P11.
2. Component Details (Fig. 1)
   A. Video Projector
      (1) The video projector is located in the tourist section of the passenger cabin. The projector is mounted to the cabin ceiling along the center PSU rails. The location of the projector is determined by its required distance from the viewing screen. The projector is enclosed within a two piece shroud. Access to the projector is gained by removing the lower shroud.
      (2) Control of the projector is provided by the control distribution unit (CDU) at the video control center. On/off control and video source selection control is provided by the CDU. There are no adjustment controls accessible to flight personnel on the projector.
   B. Video Screen
      (1) The video screen is located in the tourist section of the passenger cabin. The screen is a rigid flip over type located for optimum viewing.

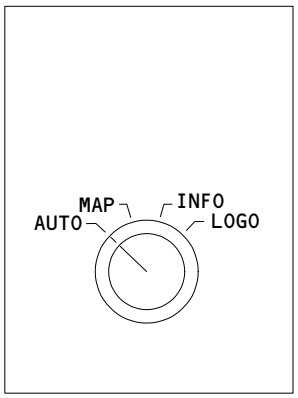


Passenger Entertainment (Video Projection) System Component Location
Figure 1 (Sheet 1)



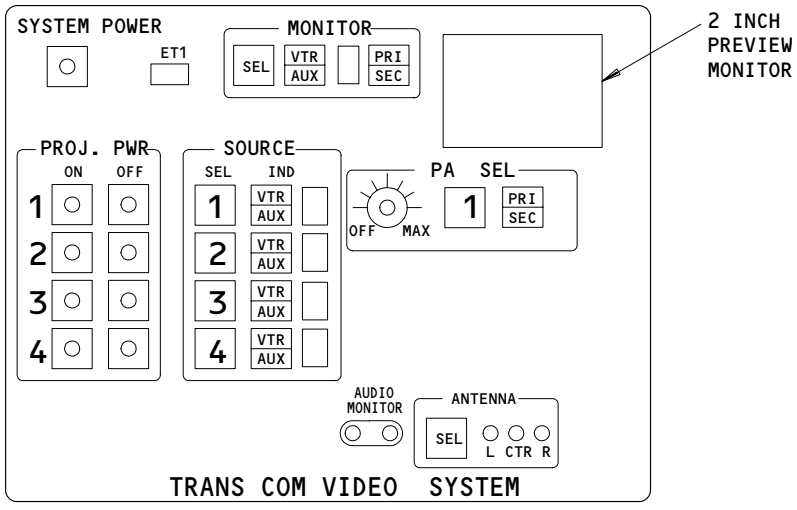
VIDEO CONTROL CENTER

A



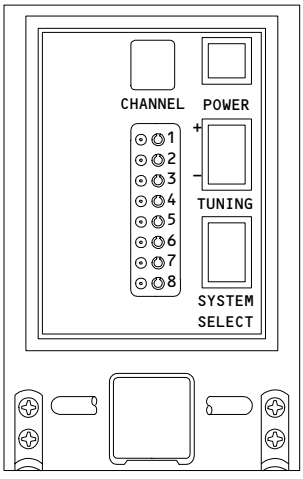
MODE SELECTOR SWITCH

B



CONTROL DISTRIBUTION UNIT

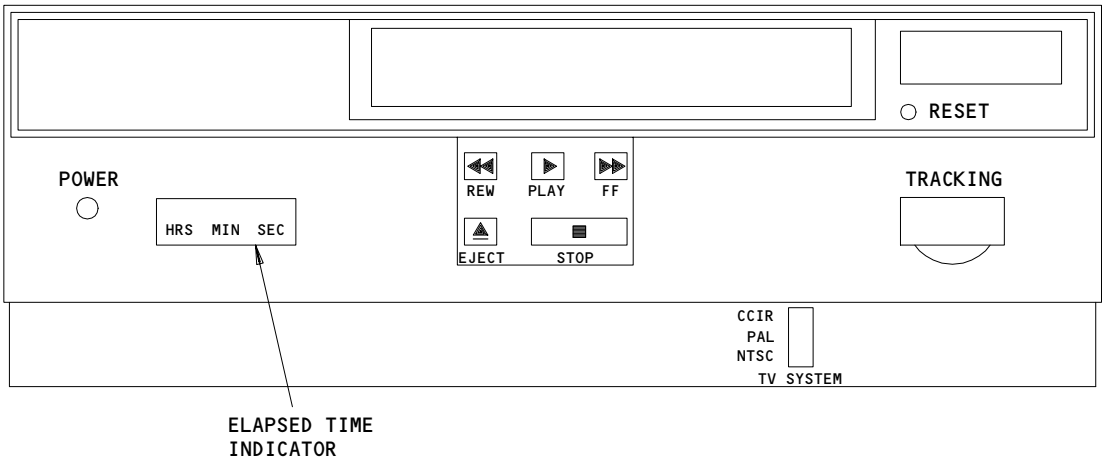
C



TV TUNER

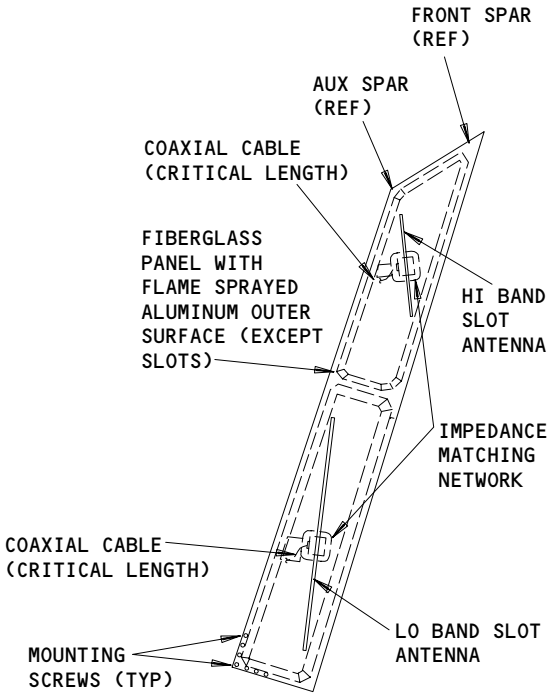
D

Passenger Entertainment (Video Projection) Component Location
Figure 1 (Sheet 2)



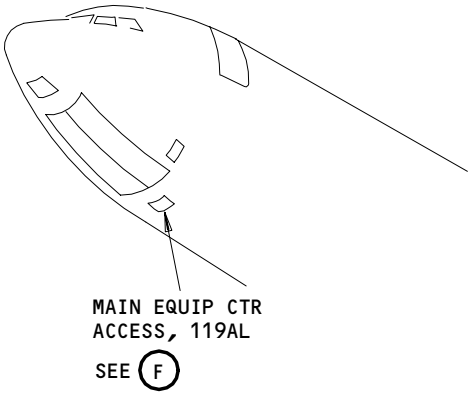
VIDEO TAPE REPRODUCER (VTR)

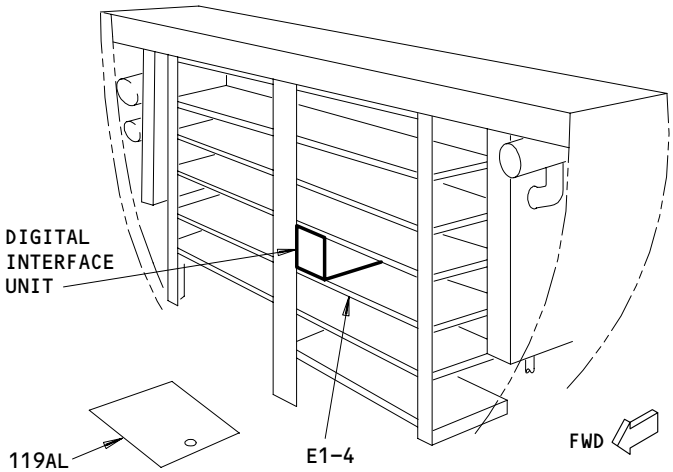
E



TV ANTENNAS
(LEFT AND RIGHT SIDES
OF VERTICAL STABILIZER)

G





MAIN EQUIP CTR

F

Passenger Entertainment (Video Projection) Component Location
Figure 1 (Sheet 3)

(2) 767-200 AIRPLANES;
The video screen is located on the aft face of the class divider.
(3) 767-300 AIRPLANES;
The video screen is located on the aft face of the aft center lavatory.

C. Video Monitors
(1) 767-200 AIRPLANES;
One five-inch, one 13-inch and two 16-inch video monitors are located throughout the passenger cabin. The five inch monitor is located on the aft face of the forward right closet. The remaining monitors are mounted to the passenger cabin ceiling along the center PSU rails. On/off control for the monitors is provided by the control distribution unit. There are no adjustment controls accessible to flight crew personnel on the monitors.
(2) 767-300 AIRPLANES;
Two 16-inch and three 13-inch video monitors are located throughout the passenger cabin. The monitors are mounted in the cabin ceiling along the center PSU rails. The forward and mid business class sections each have a 16 and a 13-inch monitor. The tourist section has a 13-inch monitor. On/off control for the monitors is provided by the control distribution unit. There are no adjustment controls accessible to flight crew personnel on the monitors.

D. Video Tape Reproducer (VTR)
(1) Three video tape reproducers (VTRs) are located in the video control center. Each VTR is secured to a shelf by means of an adapter plate bolted to the bottom of the unit. Each VTR provides prerecorded video and audio signals to the control distribution unit. The front panel of each VTR contains the controls for cassette tape operation.
(2) The REW (rewind), PLAY, FF (fast forward), EJECT, and STOP controls are used for cassette tape operation. The POWER light indicates when power is applied to the VTR. The elapsed time indicator shows total VTR operating time, and cannot be reset. The TV SYSTEM switch selects the VTR operating format. The TRACKING control is used to correct minor picture disturbances. The TRACKING control is detented in the center position. The RESET switch resets the tape counter directly above it. The tape counter shows the relative position of the tape in the VTR.

E. Digital Interface Unit
(1) The digital interface unit (DIU) is located on shelf 4 of main equipment center rack E1. The DIU receives inputs from the left flight management computer (FMC) and the right air data computer (ADC). The DIU combines these inputs with data stored in memory to generate informational displays on the video screen and monitors.
(2) Video signals from the DIU are routed directly to the control distribution unit through an isolation transformer. DIU video can be selected for viewing in any zone by selecting AUX 2 on the CDU, as the source for the desired zone(s).

F. Mode Selector Switch
(1) The mode selector switch is located in the video control center above the CDU. The switch controls which display the DIU provides to the video system.

(2) The mode selector switch is a four position control switch. The positions are as follows:

(a) AUTO: With the switch in this position the following displays will be cycled and shown every 15 seconds:

1) For approximately 10 seconds the copyright page and software revision level will be shown. This page is shown only if the switch is in the AUTO position when power is applied to the DIU. This page will not be repeated until power is removed and reapplied to the DIU.
2) The SAS airline logo will be shown if the airplane is on the ground. If the airplane is in the air the relative location indicator showing the two closest cities or points of interest will be shown.
3) The SAS terminal chart will be displayed if the airplane is within a fixed distance of the terminal.
4) The information page giving such data as altitude and ground speed will be shown. If the airplane is on the ground, values may not be given on this page.
5) The map pages will be shown, starting with the lowest resolution map and cycling to the highest. At the top of each map will be the airplanes altitude and ground speed cycling between english and metric units. On the map an airplane symbol, representing the airplanes current position, and a red line, showing the airplanes previous flight path will be given. At the bottom of the highest resolution map will be the names of the two closest points of interest, corresponding to the two circles on the map.
6) After the highest resolution map has been shown, the cycle will begin again with either the SAS airline logo, or relative location indicator.

(b) MAP: With the switch in this position the highest resolution map available for the area over which the airplane is flying will be shown. At the top of the map will be the airplanes ground speed and altitude cycling between english and metric units. Displays on the map will cycle between the current position/previous flight path and the two closest points of interest.

(c) INFO: With the switch in this position an information page giving data such as ground speed, outside air temperature and altitude will be shown. Values in this table may be blank if the airplane is on the ground.

(d) LOGO: With the switch in this position one of two displays will be shown. If the airplane is on the ground the SAS airline logo will be shown. If the airplane is in the air the relative location indicator, showing the two closest cities or points of interest will be shown.

G. Control Distribution Unit

(1) The control distribution unit (CDU) is located in the video control center at the purser station. The CDU distributes video signals to the monitors and projector. The CDU also distributes audio signals to the passenger entertainment (Ref 23-34-00) and/or passenger address (Ref 23-31-00) systems. Video signals from any VTR, the TV tuner, or the passenger flight information display system (PFIDS) can be distributed to the monitors and projector.

(2) Control switches and indicators on the CDU front panel provide the following functions:

SWITCH	FUNCTION
SYSTEM POWER	Provides 28v dc operating power for the CDU and antenna coupler, and 28v dc control power for the VTRs, TV tuner, video monitors and video projector. Switch is illuminated when on.
ETI Meter	Shows total operating time of CDU. ETI meter cannot be reset.
MONITOR Controls	Control video source selection for preview monitor. Also controls which audio channel (primary or secondary) is provided to AUDIO MONITOR jack.
Preview Monitor	Two inch, black and white monitor that allows operator to preview video before broadcasting it to the passengers.
PROJ PWR ON/OFF	Provide on/off control for video monitors and projector in each zone of passenger cabin. Switches are illuminated when selected and zone 4 switches are inop.
SOURCE SEL/IND	Control video source selection for video monitors and projector in each zone of passenger cabin. Indicator light and display show video source selected for each zone. Zone 4 switches are inop.
PA SEL Controls	Keys PA amplifier and controls volume of video audio broadcast over PA system. Also controls which audio channel (primary or secondary) is provided to the PA amp. Video audio source is selected by zone 1 SEL control.

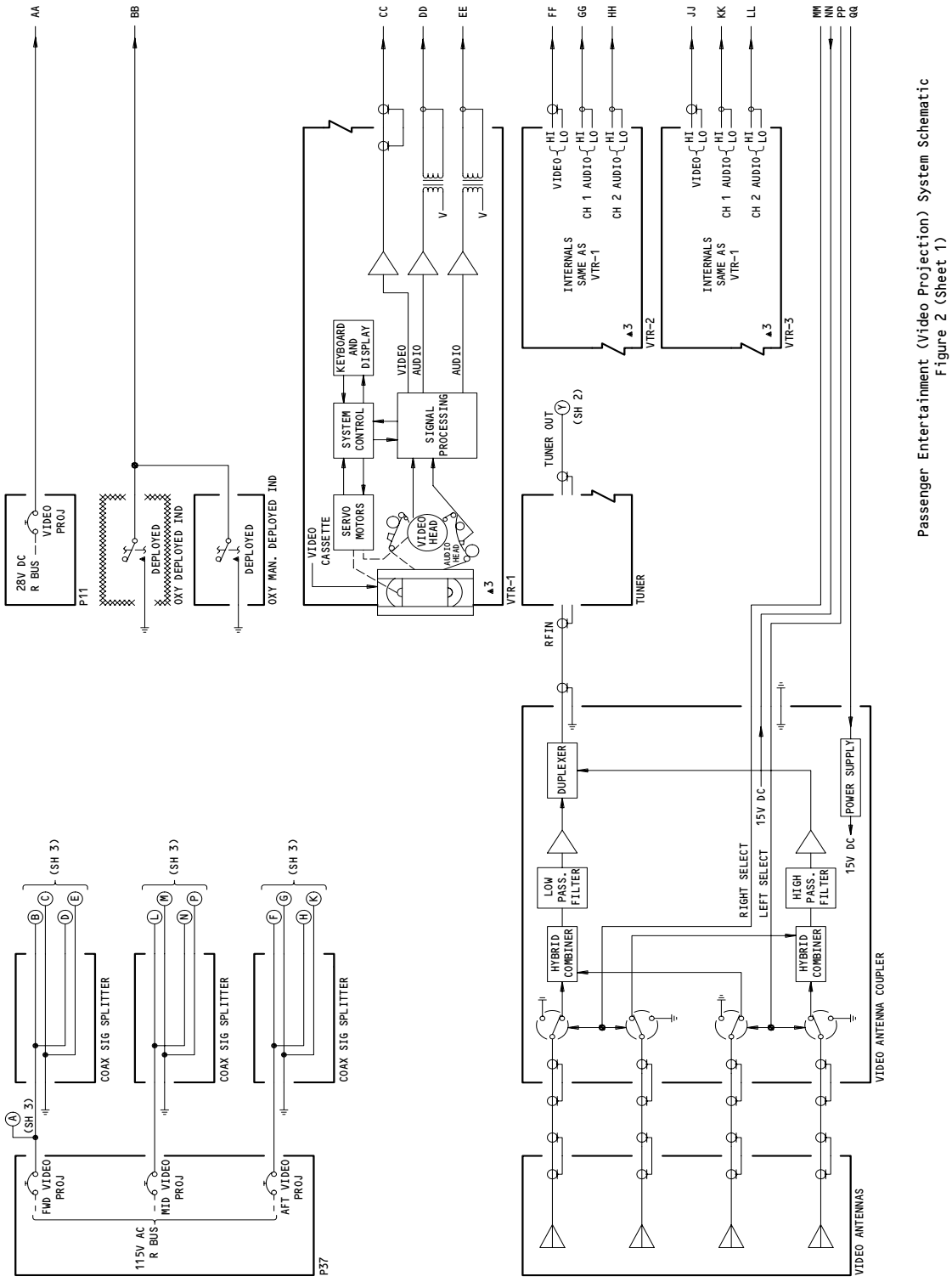
SWITCH	FUNCTION
AUDIO MONITOR Headset Jack	Provides for monitoring of audio channel selected by MONITOR controls.
ANTENNA	Controls selection of antenna that provides live TV signals to the video system. Indicator lights show which antenna is selected.

H. TV Tuner
(1) The TV tuner is located in the video control center at the purser station. The TV tuner receives television signals from the video antennas via the video antenna coupler. Video and audio information detected from the television signal is output from the TV tuner to the control distribution unit.
(2) The TV tuner front panel has the following controls:
(a) POWER on/off switch.
(b) CHANNEL indicator to show selected channel (1 through 8).
(c) TUNING rockerswitch to select next higher (+) or lower (-) channel.
(d) SYSTEM SELECT switch to select TV signal.
(e) Band select and tuning controls used to preset which television stations are selected by TUNING rockerswitch.

I. Vertical Stabilizer Upper Panel Assemblies (Video Antennas)
(1) The left and right vertical stabilizer upper panel assemblies are constructed of fiberglass. Each panel is flame sprayed with aluminum and contains a high and a low band slot antenna. The high band (174-216 MHZ) antennas receive channels 7-13. The low band (54-88 MHZ) antennas receive channels 2-6. An impedance matching network is included on each antenna. A metallic grid is installed between the panels to provide left-right antenna isolation.

J. Video Antenna Coupler
(1) The video antenna coupler is located in the HF comm antenna coupler bay of the vertical stabilizer. The access door is on the left side below the left video antennas. A coaxial cable from each of the four antennas is routed to the antenna coupler. The coaxial cable lengths are critical. The high band cables are the same length and the low band cables are the same length. The antenna signals are combined, filtered and amplified as selected by the ANTENNA SEL switch on the control distribution unit. The coupler's output is provided to TV tuner via a coaxial cable.

3. Operation
A. Functional Description (Fig. 2)
(1) The video system uses power from the 115v ac right bus and the 28v dc right bus.



Passenger Entertainment (Video Projection) System Schematic
Figure 2 (Sheet 1)

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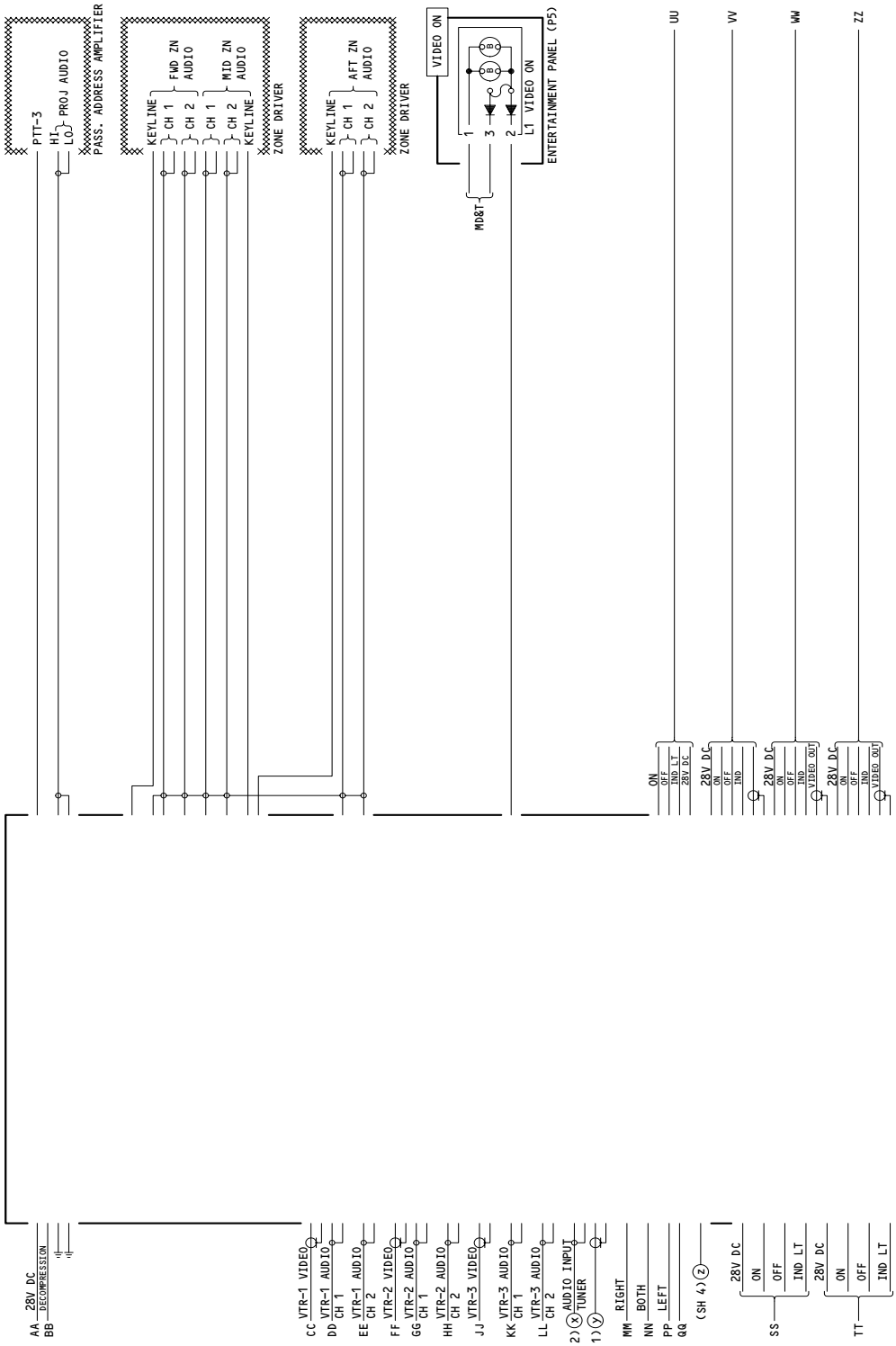

Passenger Entertainment (Video Projection) System Schematic
Figure 2 (Sheet 2)

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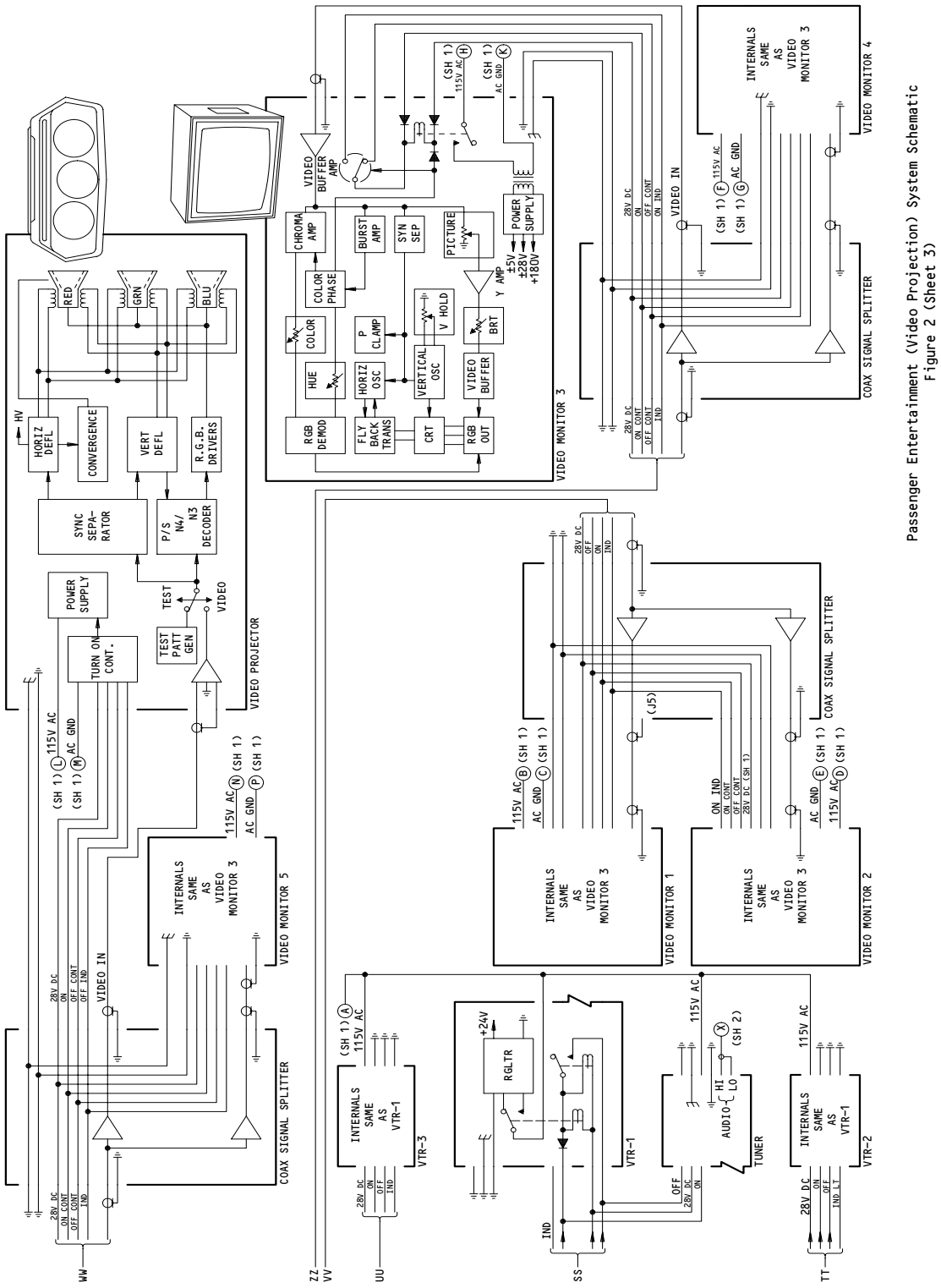
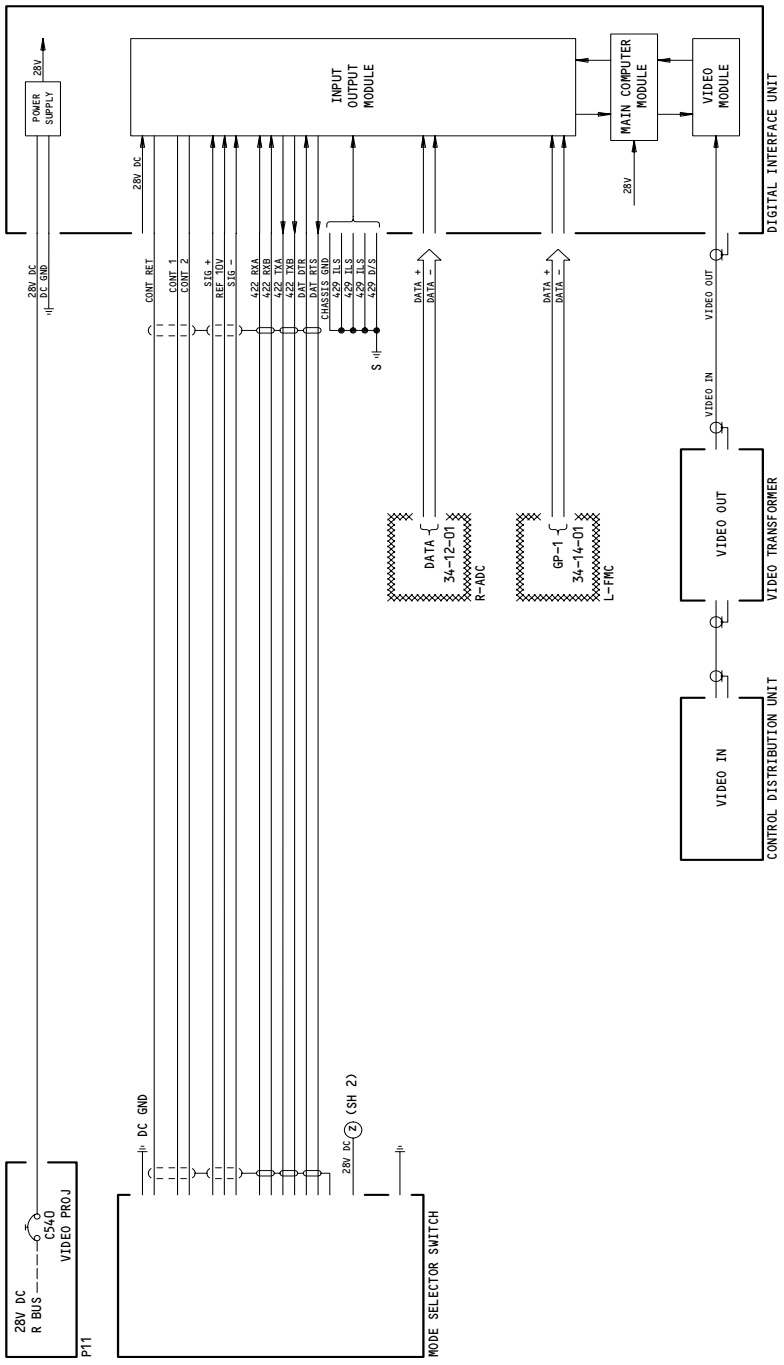


Passenger Entertainment (Video Projection) System Schematic
Figure 2 (Sheet 3)



Passenger Entertainment (Passenger Flight Information System) System Schematic
Figure 2 (Sheet 4)

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(2) The 28v dc VIDEO PROJ circuit breaker is located on overhead panel P11. The VIDEO PROJ circuit breaker provides 28v dc to the control distribution unit (CDU) and digital interface unit (DIU). The CDU provides 28v dc to the remaining video components. The 115v ac FWD, MID and AFT VIDEO PROJECTOR circuit breakers are located on right miscellaneous electrical equipment panel P37. The FWD VIDEO PROJECTOR circuit breaker provides power to the two forward video monitors via a signal splitter. It also provides power directly to the VTRs and the TV tuner. The MID VIDEO PROJECTOR circuit breaker provides power to the two mid video monitors via a second signal splitter. The AFT VIDEO PROJECTOR circuit breaker provides power to the video projector and aft video monitor via a third signal splitter.

(3) Power to the video system is controlled by the SYSTEM POWER switch on the CDU. The VIDEO ON light on overhead panel P5 comes on when the system is powered. A relay in the CDU monitors the passenger oxygen system. If the passenger oxygen masks are deployed, either automatically or manually, system power is removed. The power and video inputs to the projector and monitors are controlled by the respective switches on the CDU.

(4) SAS 162-167 POST-SB 24-0152;
The UTILITY BUS - R switch on the electrical system control panel P5 can remove power from the IFE system. When selected off, the switch will remove power from the IFE video and audio circuit breakers.

(5) The prerecorded video signal originates in the video tape reproducers. The video signal and two audio channels are detected from the tape in the VTR. The video and audio signals go to isolation amplifiers in the CDU which distributes them. Three CDU video amplifiers supply the video signal separately to each entertainment zone (fwd, mid, aft) in the passenger cabin.

(6) The prerecorded video audio output of each VTR is amplified out to the CDU in two channels. Isolation amplifiers in the CDU output each channel to the fwd, mid and aft zone multiplexers of the PES/PSS (Ref 23-34-00). Via the PA SEL controls on the CDU, either channel of audio (primary or secondary) can be provided to the passenger address system (Ref 23-31-00).

(7) The live TV signal originates in the antennas and is supplied to the CDU by the TV tuner. Signals from the tuner are distributed the same as prerecorded video signals with the exception that there is only one channel of audio.

(8) The passenger flight information display system (PFIDS) signals originate in the DIU and are supplied directly to CDU through an isolation transformer. Signals from the DIU are distributed the same as prerecorded video signals with the exception that there is no audio signal.

(9) The CDU distributes signals from three VTRs (VTR 1, 2, and 3), the TV tuner (AUX 1) and the DIU (AUX 2). Distribution of these signals is controlled by the SOURCE SEL switches on the CDU. As the SEL switch is pressed the VTR light next to the switch comes on and the LED display counts 1, 2, 3, indicating which VTR is supplying the video signals. Once VTR 3 is reached, pressing the SEL switch again will cause the AUX light to come on and the LED display will count 1, 2. Once AUX 2 is reached, pressing the SEL switch again will cause the VTR light to come on and the LED display will show 1. The cycle will continue as the SEL switch is pressed.

(10) 767-200 AIRPLANES;
The zone 1 SOURCE switch controls the video source selection for the three forward video monitors. The switch also controls the video audio source selection for the forward zone multiplexer (mux) (Ref 23-34-00) and the PA amplifier (Ref 23-31-00). The zone 2 switch controls the video source selection for the mid video monitor and the audio source selection for the mid zone mux. The zone 3 switch controls the video source selection for the video projector and the audio source selection for the aft zone mux. The zone 4 switch is inop.

(11) 767-300 AIRPLANES;
The zone 1 SOURCE switch controls the video source selection for the two forward video monitors. The switch also controls the video audio source selection for the forward zone multiplexer (mux) (Ref 23-34-00) and the PA amplifier (Ref 23-31-00). The zone 2 switch controls the video source selection for the two mid video monitors and the audio source selection for the mid zone mux. The zone 3 switch controls the video source selection for the video projector and aft monitor and the audio selection for the aft zone mux. The zone 4 switch is inop.

(12) The MONITOR SEL switch controls the video source selection for the two inch preview monitor and the audio source selection for the AUDIO MONITOR jack. The switch works similar to the SOURCE SEL switches except that the sequence goes VTR 1 PRI, VTR 1 SEC, VTR 2 PRI, VTR 2 SEC continuing up to AUX 2. Since the TV tuner (AUX 1) has only one audio channel, and the DIU (AUX 2) does not have any audio channels, the PRI and SEC lights are not active while the AUX light is on. Also there will not be any audio available at the AUDIO MONITOR jack when AUX 2 is selected. Once AUX 2 is reached, pressing the MONITOR SEL switch will cause the VTR and PRI lights to come on and the LED display will read 1. The cycle will be repeated as the SEL switch is pressed.

(13) The PA SEL switches control the broadcast of video audio over the PA system. The video audio source selection is controlled by the zone 1 SOURCE SEL switch. Turning the PA SEL volume control switch clockwise from OFF provides a PTT-3 signal to the PA amplifier, allowing video audio to be broadcast over the PA system (Ref 23-31-00). Video audio volume will vary accordingly as the switch is rotated towards MAX. The primary (PRI) or secondary (SEC) audio channel can be selected by pressing the SEL switch. The indicator lights will show which channel is being broadcasted.

B. Control

(1) Turn-On Procedure

(a) Apply electrical power (Ref 24-22-00).

(b) SAS 162-167 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

(c) Check that the passenger entertainment/passenger service system is operational (Ref 23-34-00).

(d) Check that the following overhead panel P11 circuit breakers are closed:
1) 11C21, PASS ADRS
2) 11C23, INTERPHONE CABIN SERVICE
3) 11T34, VIDEO PROJ

(e) Check that the following right miscellaneous electrical equipment panel P37 circuit breakers are closed:
1) 37K5, FWD VIDEO PROJECTOR
2) 37K6, MID VIDEO PROJECTOR
3) 37K7, AFT VIDEO PROJECTOR

(f) At the control distribution unit in the video control center:
1) Press SYSTEM POWER switch to on (switchlight on).
2) Press zone 1, 2, and 3 PROJ PWR ON switches. Check that switchlights come on.

(2) Prerecorded Video Procedure

(a) At the control distribution unit:
1) Press zone 1, 2 and 3 SOURCE SEL switches until indicators read VTR 1, 2, or 3, as desired.
2) Press MONITOR SEL switch until indicators read VTR 1, 2, or 3, PRI or SEC, as appropriate.

(b) At the appropriate VTR:
1) Press EJECT control to check that VTR does not already contain a cassette tape.
2) Insert cassette tape into VTR.
3) Press REW control to check that cassette tape is fully rewound.
4) Press PLAY control.

(c) View video picture on CDU preview monitor and adjust VTR TRACKING control, if needed.

(3) Live TV Procedure

(a) At the control distribution unit:
1) Press zone 1, 2, and 3 SOURCE SEL switches until indicators read AUX 1.
2) Press MONITOR SEL switch until indicators read AUX 1.

(b) At the TV tuner:
1) Press POWER switch to on (switchlight on).
2) Check that SYSTEM SELECT switch is set for proper format.
3) Press TUNING rocker switch to select a known television station.

(c) View picture on CDU preview monitor and press ANTENNA SEL switch on CDU to select TV antenna that gives best picture.

(4) Passenger Flight Information Display System (PFIDS) Procedure
  (a) At the control distribution unit:
    1) Press zone 1, 2, and 3 SOURCE SEL switch until indicators read AUX 2.
    2) Press MONITOR SEL switch until indicators read AUX 2.
  (b) Select desired display mode on mode selector switch and view picture on CDU preview monitor.
(5) PA Procedure
  (a) At the control distribution unit:
    1) Turn the PA SEL volume control clockwise from OFF to midpoint.
    2) Press the PA SEL switch to select primary or secondary channel audio, as desired.
(6) Access for Audio Monitoring
  (a) Connect stethoscope headset to passenger control unit (PCU) at any passenger seat.
    1) Set channel selector on PCU to 1 or 2.
    2) Adjust volume control on PCU to obtain a comfortable listening level.
  (b) Connect headset to AUDIO MONITOR jack on the CDU.

PASSENGER ENTERTAINMENT (VIDEO PROJECTION) - DESCRIPTION AND OPERATION

1. General
   A. The passenger entertainment video system provides live television, informational displays and prerecorded feature motion pictures or short subject movies for passenger viewing. Video monitors are located throughout the cabin. The prerecorded video is obtained from a VHS cassette tape inserted into one of the two video tape reproducers. Live television is provided via the Video System Control Unit (VSCU) and antennas located in the vertical stabilizer.
   B. Video program audio is provided to each passenger through the passenger entertainment music system or can be provided through the Passenger Address (PA) system. Informational displays are provided by the Digital Interface Unit (DIU).
   C. The passenger entertainment video projection system is comprised of 25 Video Monitors, a Digital Interface Unit, an Airshow Control Unit, two Video Tape Reproducers, a Video System Control Unit, thirteen Video Distribution Un its, an Antenna Coupler and four TV antenna elements built into the vertical stab ilizer. A VIDEO ON light is located on pilots overhead panel P5 to indicate when power is applied to the system.
2. Component Details (Fig. 1)
   A. Video Monitors
      (1) Twenty-five video monitors are located throughout the passenger cabin. Fourteen, 16-inch video monitors are mounted in the passenger cabin ceiling above the left and right main aisles. A total of nine 7 inch LCD video monitors is mounted on bulkheads and lavatories in the front of each seatrow in FWD-, MID- and AFT-cabin. Two more 14-inch monitors are mounted in the ceiling area between the MID lavatories. ON/OFF control of all of the monitors is provided by the Video System Control Unit. No adjustment controls are accessible to flight crew personnel on any of the monitors. In full economy configuration a 14 inch monitor is mounted along the center PSU rails just aft of the forward windscreen.
   B. Video Tape Reproducer (VTR)
      (1) Two video tape reproducers (VTRs) are located in the video control center. Each VTR is secured to a shelf by means of an adapter bracket bolted to the bottom of the unit. Each VTR provides prerecorded video and audio signals to the Video System Control Unit. The front panel of each VTR contains the controls for cassette tape operation.

(2) VTR Functional operating controls

CONTROLS	FUNCTIONS
CASSETTE COMPT	For cassette loading/unloading Cassette is pulled in automatically when inserted Press EJECT button to remove cassette
REW	Press the REW utton to rewind the tape. When in rewind, the tape will stop automatically when fully rewound. The LED above the REW control will light during rewind and extinguish when rewind is complete.
PLAY	Press the PLAY button to play back a recorded tape. When tape is complete the VTR will stop and rewind automatically.
FF	Press the FF button to transport the tape fast forward.
STOP	Press the STOP button to stop the playback, rewind or fast forward modes at any position. The LED above the STOP control will light while in the STOP mode.
COUNTER	Indicates hours, minutes and seconds of cassette playing time.
TRACKING	Normally positioned in FIX, maybe rotated to obtain maximum picture quality.
PAL/NTSC	Selects video standard for playback.

(3) Random access

(a) The Random Access Control section allows the user to select up to 15 different video segments of a maximum of 64 segments on a single video cassette. These precoded segments may be played in any selected order. The order in which the segments are entered on the keypad determines the sequence. The operator may also key in just one selection to playback one segment at a time. Other features include a "REPEAT" function and a "SKIP" function which are described herein. When used, the Random Access functions as a remote control for all operations of the VTR when playing a programmed tape sequence.

(b) Random access operation controls are listed below:

CONTROLS	FUNCTIONS
REPEAT	For indefinite repeated playback of programs. When pressed, the REPEAT light comes on and the VTR is set to repeat playback. When pressed again, the function is released and the light extinguishes.
START	To start the programmed playback to entered segment(s).
ENTER	To load the displayed program segment into memory.
CLR (C)	When used with FUNC key clears program from memory. When used without FUNC, it will clear only the current segment being displayed.
0 to 9	Input keys for the memory data. Used to select program segments.
SKIP	Stops a program and skips to the next programmed segment and stops if no other segment is programmed.
FUNC	Function key. Must be pressed before pressing either RESET or CLR keys.
RESET	When used with the FUNC key, resets the control to first selected program segment. Used for verifying the accuracy of a program sequence. This key is the "8" key if FUNC is not pressed first.
READY light	When lit, indicates program sequence is ready to be entered.
REPEAT light	When lit, indicates controller is in REPEAT mode.
PROGRAM ORDER	Displays the order in which the segment will be played.
SEGMENT display	Displays the segment in position to play or segment playing on the VTR.

C. Digital Interface Unit

(1) The Digital Interface Unit (DIU) is located on shelf 4 of the main equipment center rack E1. The DIU receives inputs from the left flight management computer (FMC) and the right air data computer (ADC). The DIU combines data from FMC and ADC with data stored in it's memory to generate informational displays on the video monitors.

(2) Video signals from the DIU are routed directly to the Video System Control Unit through an isolation transformer.

D. AIRSHOW CONTROL UNIT

(1) The Airshow Control Unit (ACU) is an interactive menu-driven control box for the AIRSHOW system. The ACU is operated by four push-button switches located below the display. After power up, the main menu is shown on the display after approximately 45 seconds. Typical items of the main menu are:

(a) Select display modes
(b) Set time to destination
(c) Select destination
(d) Select languages
(e) Set Greenwich Mean Time.

(2) From the main menu, items may be selected by scrolling to the desired item. This is done by touching the UP switch or DOWN switch. When the desired item is aligned next tothe arrow, pess the ENTER switch to choose the selection.

(3) For the main menu, the right switch is not used. For most of the other menus, the right switch is labeled "MENU". Pressing the "MENU" switch will return the display to the main menu. If no switches are touched for three minutes, the CCU screen display will blank automatically. To recall the display, press any of the switches.

(4) ACU modes

(a) Select the DISPLAY MODE from the Main Menu by aligning the arrow next to "SELECT DISPLAY MODE" with the UP or DOWN and ENTER switches as described in "operation" section of this chapter.

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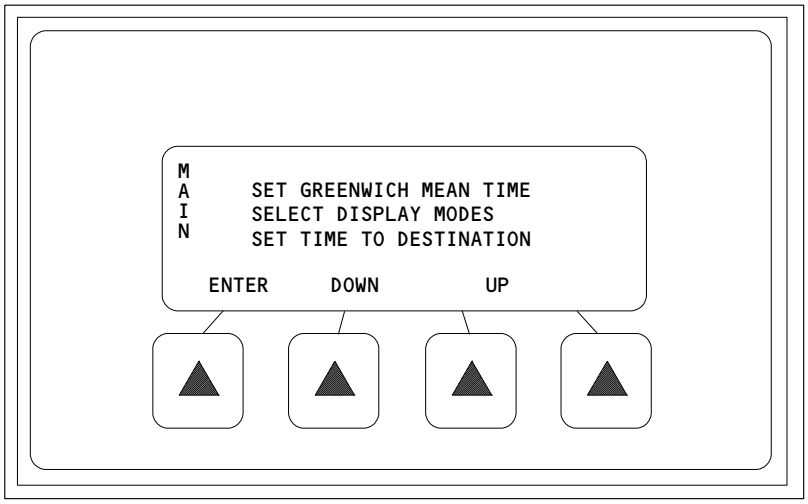
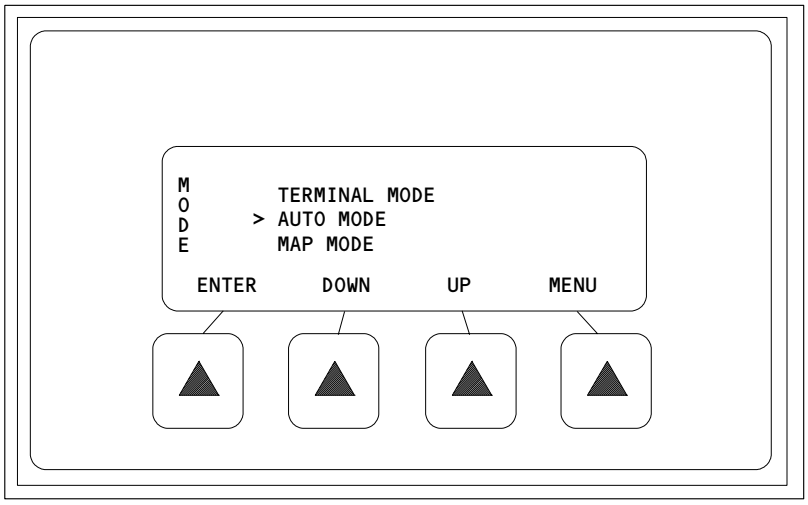


TYPICAL APPEARANCE OF THE MAIN MENU



DISPLAY MODES

CCU Screen Displays
Figure 1

(b) The following modes can be selected by using UP or DOWN or ENTER key keys:
1) AUTO MODE: Continuous cycling between MAP, INFO and LOGO
2) MAP MODE: The aircraft's position, flight path and heading are shown on most accurate map.
3) INFO MODE: Information, such as heading, speed, temperature, time and distance are shown.
4) LOGO MODE: The Martinair logo is displayed.

NOTE: When the MENU switch is pressed, the display returns to the main menu.

(c) Set time to destination. Select the TIME TO DESTINATION MODE from the main menu by aligning the arrow next to "SET TIME TO DESTINATION" with the UP or DOWN and ENTER switches as described in the "operation" section of this chapter. When the SET TIME TO DESTINATION is selected the menu shown in Figure 2 is displayed:

(d) To set time, the cursor must first be positioned under the digit to be changed.
1) Press switch **D** to make the cursor appear under the tens of hours digit.
2) Press the SCROLL switch to set the tens digit to the desired value.
3) Press the **D** switch again to move the cursor to the right.
4) Repeat the process until the time entry is completed.
5) Press the ENTER switch to send the desired time to the airshow computer and to make the cursor stop flashing.

NOTE: The time to destination is internally counted down while the aircraft is in flight. Time to destination must be changed when the route is changed during flight.

(e) Select the DESTINATION MODE from the main menu by aligning the arrow next to "SELECT DESTINATION" with the UP or DOWN and ENTER switches as described in the "operation" section of this chapter. When the "SELECT DESTINATION" mode is selected, the menu shown in Figure 2 is displayed.
1) The menu will have many items to scroll through. When a destination is selected by using UP or DOWN and ENTER switches a black diamond is displayed on the map or maps on which the selected destination is located. The selected destination is used together with the flights starting point to calculate the distance to destination.

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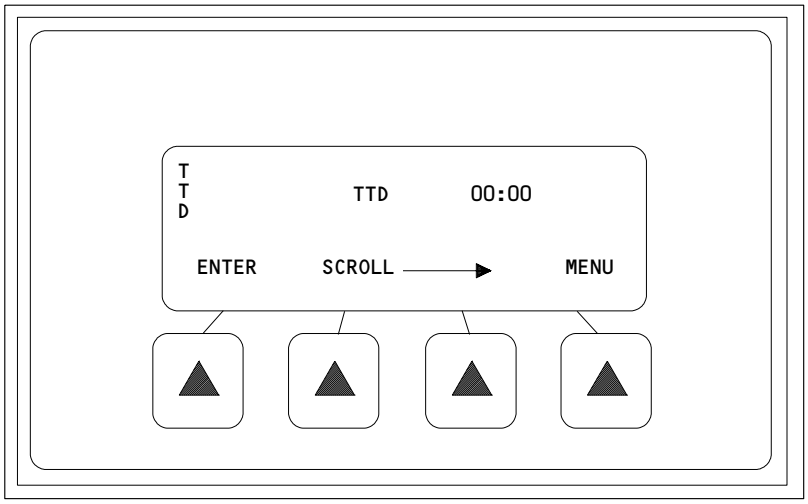
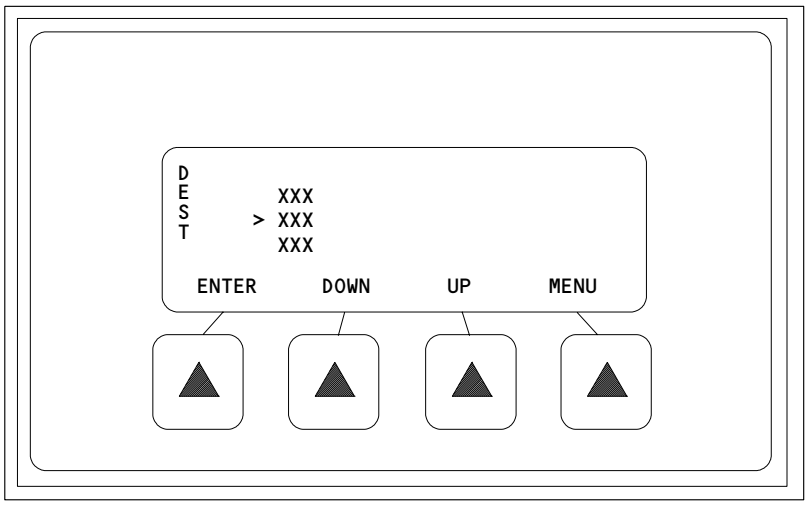


TIME TO DESTINATION DISPLAY



SELECT DESTINATION DISPLAY

CCU Screen Displays
Figure 2

(f) Select the LANGUAGE mode from the main menu by aligning the arrow next to "SELECT LANGUAGES" with UP or DOWN and ENTER keys. When the SELECT LANGUAGES mode is selected, the menu in Figure 3 is shown.

1) In Martinair aircraft the following selections can be made:
   a) English
   b) Dutch
   c) German
   d) Reset to English only
2) To select or deselect a language:
   a) Press the UP or DOWN to align the arrow next to the desired language.
3) Press the ON/OFF switch to toggle the language ON or OFF.

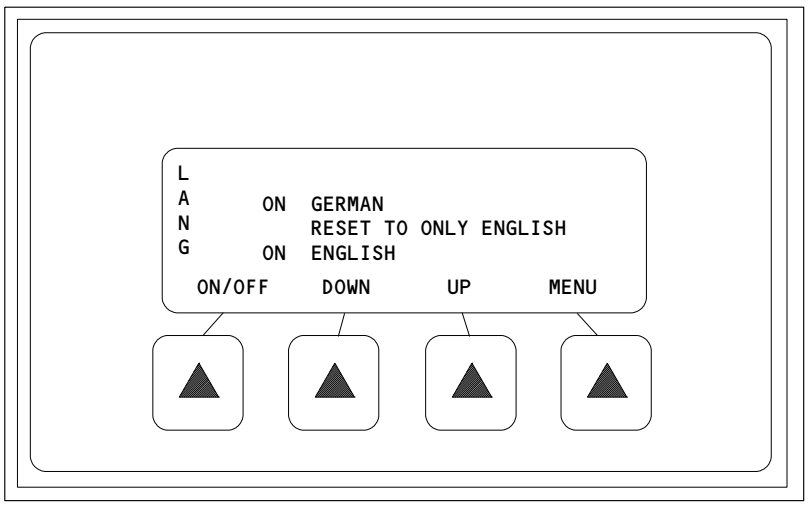
NOTE: When "RESET TO ENGLISH" is aligned, next to the arrow and the ENTER switch is pressed all languages are deselected except for the English language.

(g) Select the GREENWICH MEAN TIME mode from the main menu by aligning the arrow next to SET GREENWICH MEAN TIME with the UP or DOWN and ENTER keys. When the GREENWICH MEAN TIME mode is selected, the menu shown in Figure 3 is displayed.

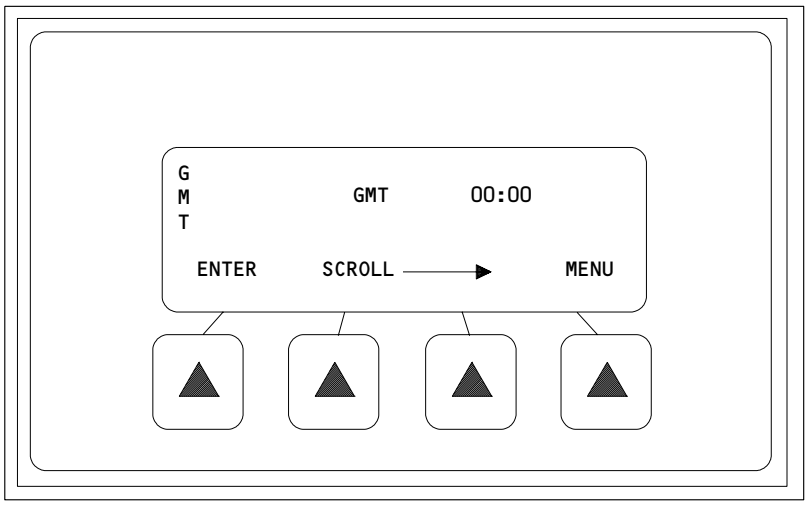
1) To set the time, the cursor must first be positioned under the digit to be changed.
   a) Press the **D** switch to make the cursor appear under the tens of hours digit.
   b) Press the SCROLL switch to set the tens of hours digit to the desired value.
   c) Press the **D** switch again to move the cursor to the right.
   d) Repeat the process until the time entry has been completed.
   e) Press the ENTER switch when the desired time is set on the CCU display.

NOTE: The GMT-clock is a 24 hours clock, so the clock can be set from 00:00 to 23:59 hours.

SAS



SELECT LANGUAGES MENU



GREENWICH MEAN TIME SET MENU

CCU Screen Displays
Figure 3

E. Video System Control Unit

(1) The Video System Control Unit (VSCU) is located in the video control center at the forward closet. The VSCU distributes video signals via the Video Distribution Units to the monitors in the passenger cabin. Video/audio signals are routed via the passenger entertainment (AMM 23-34-00) and/or Passenger Address (AMM 23-31-00) systems.

(2) The monitor on the VSCU has two functions. The monitor can function as a preview monitor. This allows the operator to preview a video program and make any necessary adjustments before providing the video to the passengers. The monitor also displays the various programming menus used to control the video system.

(3) Control switches on the SCU front panel provide the following functions:

<table>
<tr><th>SWITCH</th><th>FUNCTION</th></tr>
<tr><td>MASTER POWER</td><td>Provides 28VDC operating power for the VSCU and antenna coupler. Also provides 28VDC control power for the VTRs and Passenger Cabin monitors.</td></tr>
<tr><td>CLASS</td><td>Brings up the following display on the VSCU monitor:

<table><tr><th>CLASS</th><th>F</th><th>M</th><th>C</th></tr><tr><td>VIDEO</td><td>VCP1
OFF</td><td>VCP1
OFF</td><td>VCP1
OFF</td></tr><tr><td>PA</td><td>CH1
OFF</td><td>CH1
OFF</td><td>CH1
OFF</td></tr></table>
The display allows the operator to select the video source for each entertainment zone in the passenger cabin. This display also allows the operator to select channel 1 or 2 video audio for broadcast over the PA system.

NOTE: Passenger cabin entertainment zones are defined on the VSCU monitor as follows:

F = Forward Zone
C = Mid Zone
M = Aft Zone</td></tr>
<tr><td>VIDEO INPUT</td><td>With the appropriate displays shown on the VSCU monitor, this switch can be used to select the video source for each entertainment zone or for preview. The video sources are defined as follows:

VCP1 = Video Tape Reproducer 1
VCP2 = Video Tape Reproducer 2
TV = Live Television
PFID = Passenger flight information display system</td></tr>
</table>

SWITCH	FUNCTION
PREVIEW	Brings up the following display on the VSCU monitor: PREVIEW VIDEO VCP1 This display allows operator to select any of the video sources for preview, using the VIDEO INPUT switch.
P.A.	With the appropriate display shown on the VSCU monitor, this switch can be used to select the video audio channel (1 or 2) for broadcast over the PA system.
STATUS	Brings up a display that shows the status of the monitors in each zone (on/off). Also brings up a display that shows the status of video audio on the PA system (on/off, audio source, volume).
ON/OFF	Provides on/off control for the various functions of the VSCU as the different displays are shown on the monitor.
MONITOR	With the appropriate display shown on the VSCU monitor, this switch can be used to select the monitors in an entertainment zone so that they may be turned on/off.
PA VOLUME	These switches control the volume of video audio broadcast over the PA system.

SWITCH	FUNCTION
TV CHANNEL	These switches control the selection of live TV channels.
TV CHANNEL EARPHONES	These switches control the selection of live TV channels. Provide for monitoring of audio channel Headset jacks corresponding to video selected for preview. Audio is provided to these jacks at a fixed level.
ANTENNA	Controls selection of antenna that provides live TV signals to the video system.

F. Vertical Stabilizer Upper Panel Assemblies (Video Antennas)

(1) The left and right vertical stabilizer upper panel assemblies are constructed of fiberglass. Each panel is flame sprayed with aluminum and contains a high and a low band slot antenna. The high band (174-216 MHZ) antennas receive channels 7-13. The low band (54-88 MHZ) antennas receive channels 2-6. An impedance matching network is included on each antenna. A metallic grid is installed between the panels to provide left-right antenna isolation.

G. Video Antenna Coupler

(1) The video antenna coupler is located in the HF comm antenna coupler bay of the vertical stabilizer. The access door is on the left side below the left video antennas. A coaxial cable from each of the four antennas is routed to the antenna coupler. The coaxial cable lengths are critical. The high band cables are the same length and the low band cables are the same length. The antenna signals are combined, filtered and amplified as selected by the ANTENNA switch on the system control unit. The coupler's output is provided to the video system control unit. See Fig. 7 for location of the Video Antenna Coupler.

H. VIDEO DISTRIBUTION UNIT

(1) The Video Distribution Unit (VDU) acts as an interface between the VSCU and the video monitors. The video system is divided in F, C and M in concert with FWD, MID and AFT zone division of the passenger cabin. The relationship between monitors, VDUs and the VSCU is shown on the configuration sheet (Ref. fig. 4).

(2) The VDU performs channel selection and ON/OFF control of the attached monitors through VSCU commands. Control data from the VSCU is distributed to the VDUs over two data lines. Both data lines contain the same channel selection and monitor ON/OFF control data. This redundant data line prevents total video shut down in case of data line breaking or VDU failure.

3. Operation

A. Functional Description

(1) The video system uses power from the 115v ac right bus and the 28v dc right bus.

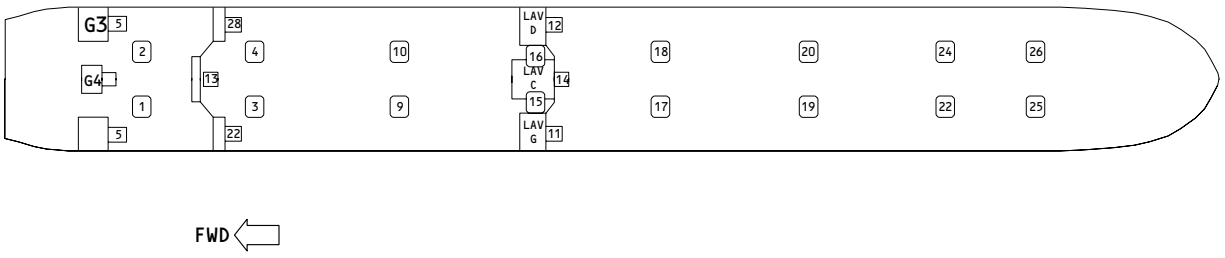
(2) The 28VDC VIDEO PROJ circuit breaker is located on overhead panel P11. The VIDEO PROJ circuit breaker provides 28VDC power to the Video System Control Unit (VSCU) and Digital Interface Unit (DIU). The VSCU provides 28VDC to the remaining video components. The 115VAC VIDEO AC CONT CTR and VIDEO AC 1, 2, 3 and 4 circuit breakers are located on right misc electrical equipment panel P37. The VIDEO AC CONT CTR circuit breaker provides power to the VSCU and Video Tape Reproducers (VTRs). The VIDEO AC 1, 2, 3, and 4 circuit breakers provide power to the passenger cabin video monitors.

(3) Power to the video system is controlled by the MASTER POWER switch on the VSCU. The VIDEO ON light, on pilots' overhead panel P5, comes on when the video system is operating. A relay in the VSCU monitors the passenger oxygen system. If the oxygen masks are deployed, either manually or automatically, video system power is removed. The power and video inputs to the monitors are controlled from the respective displays on the VSCU monitor.

(4) SAS 276-280 POST-SB 24-0152;
The UTILITY BUS - R switch on the electrical system control panel P5 can remove power from the IFE system. When selected off, the switch will remove power from the IFE video and audio circuit breakers.

(5) The prerecorded video signal originates in the video tape reproducers. The video signal and two audio channels are detected from the tape in the VTR. The video and audio signals go to isolation amplifiers in the VSCU which distributes them. Three VSCU video amplifiers supply the video signal separately to each entertainment zone in the passenger cabin.

SAS

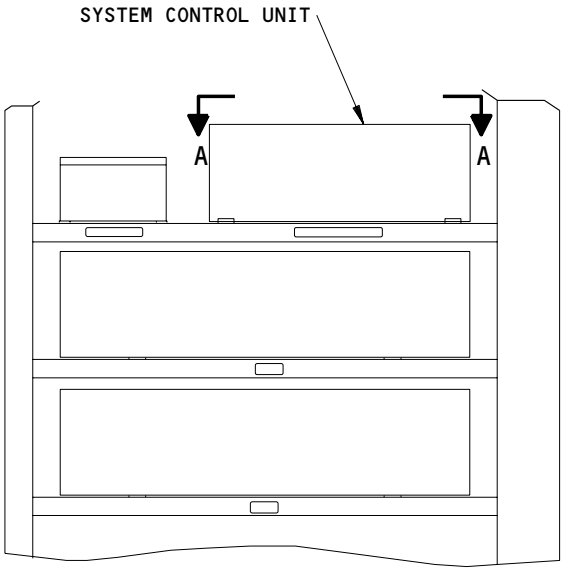


NOTES: □ 7" MONITOR
▢ 14"/16" MONITOR

F = FORWARD ZONE (STAR - CLASS)
C = MID ZONE (ECONOMY CLASS)
M = AFT ZONE (ECONOMY CLASS)

Passenger Entertainment (Video) Component Location
Figure 4

SAS

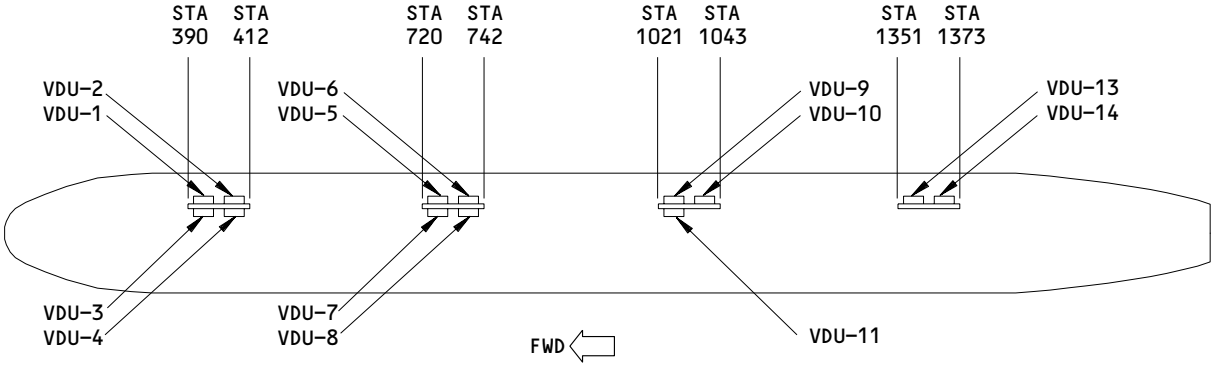


VIDEO CONTROL CENTER

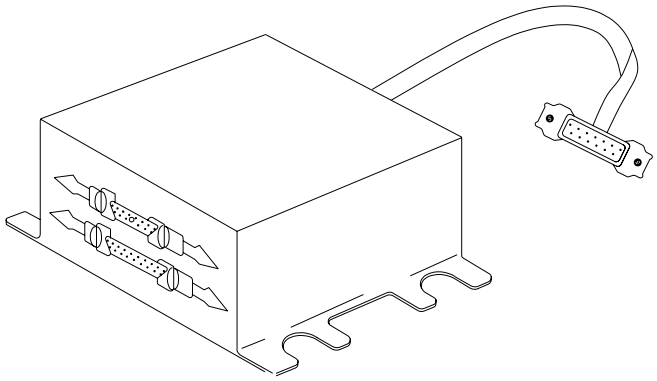
(A)

Martinair Boeing 767 Video Control Center (Forward Closet)
Figure 5

SAS



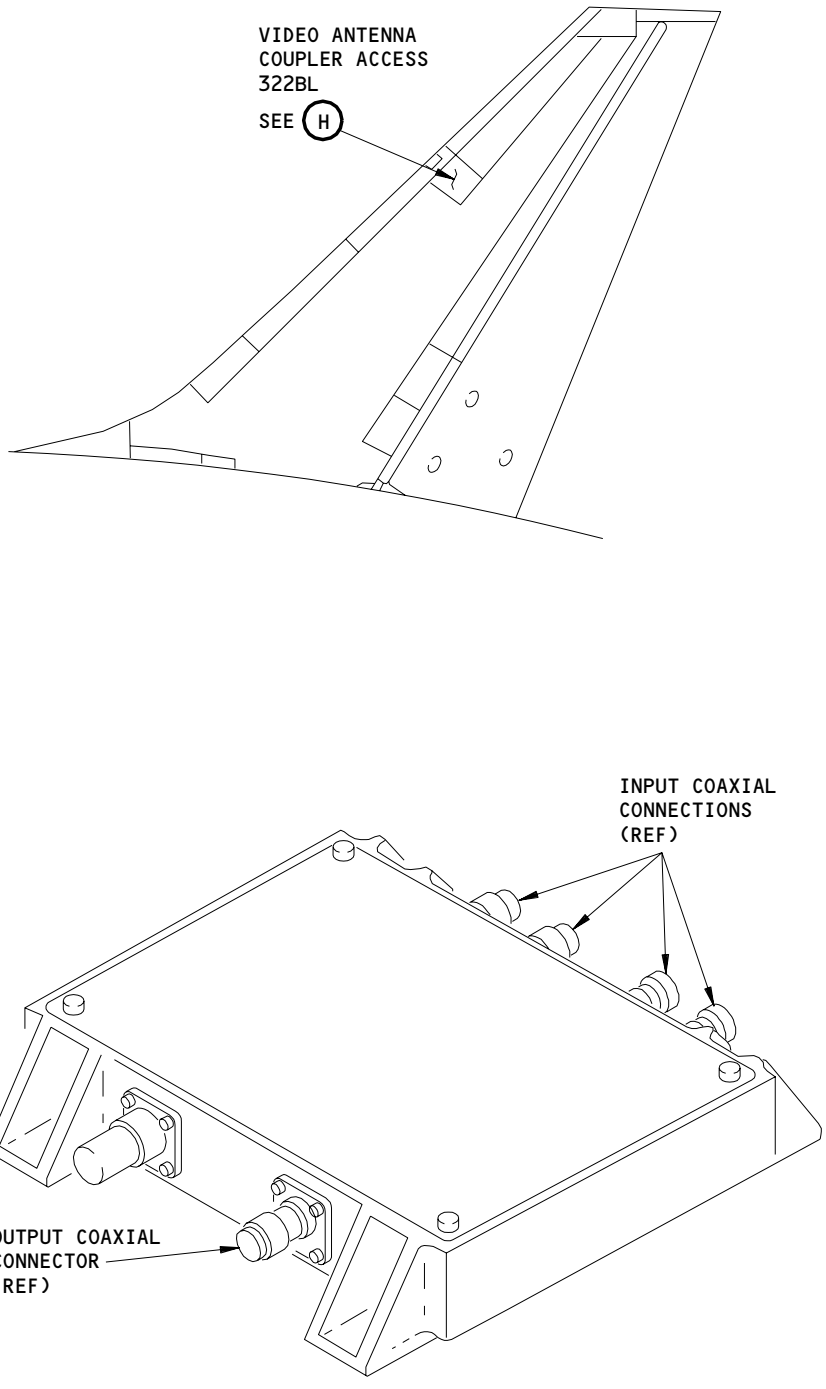
VDU INSTALLATION



VDU DISTRIBUTION UNIT

Video Distribution Unit Locations and Typical Unit
Figure 6

SAS



VIDEO ANTENNA COUPLER, M820

H

Video Antenna Coupler Installation
Figure 7

(6) The prerecorded video audio output of each VTR is amplified out to the SCU in two channels. Isolation amplifiers in the SCU output each channel to the fwd, mid and aft zone multiplexers of the PES/PSS (Ref 23-34-00). Video audio can also be broadcast over the PA speakers.

(7) The live TV signal originates in the antennas and is supplied to the VSCU. Live TV signals are distributed the same as prerecorded video signals with the exception that there is only one channel of audio.

(8) The passenger flight information display (PFID) signals originate in the DIU and are supplied directly to the VSCU through an isolation transformer. Signals from the DIU are distributed the same as prerecorded video signals with the exception that there is no audio signal.

(9) The VSCU distributes video and audio separately to each entertainment zone in the passenger cabin. Displays, which are shown on the VSCU monitor, allows the operator to select the video source for each zone. Video from the selected source will be shown on the appropriate video monitors in the passenger cabin. The corresponding audio will be routed to the appropriate zone multiplexer (Ref 23-34-00) and will be available on passenger control unit channels 1 and 2. The video source selected for the forward zone will provide audio to the passenger address amplifier. This audio can be broadcast over the PA speakers.

B. Control

(1) Turn-On Procedure

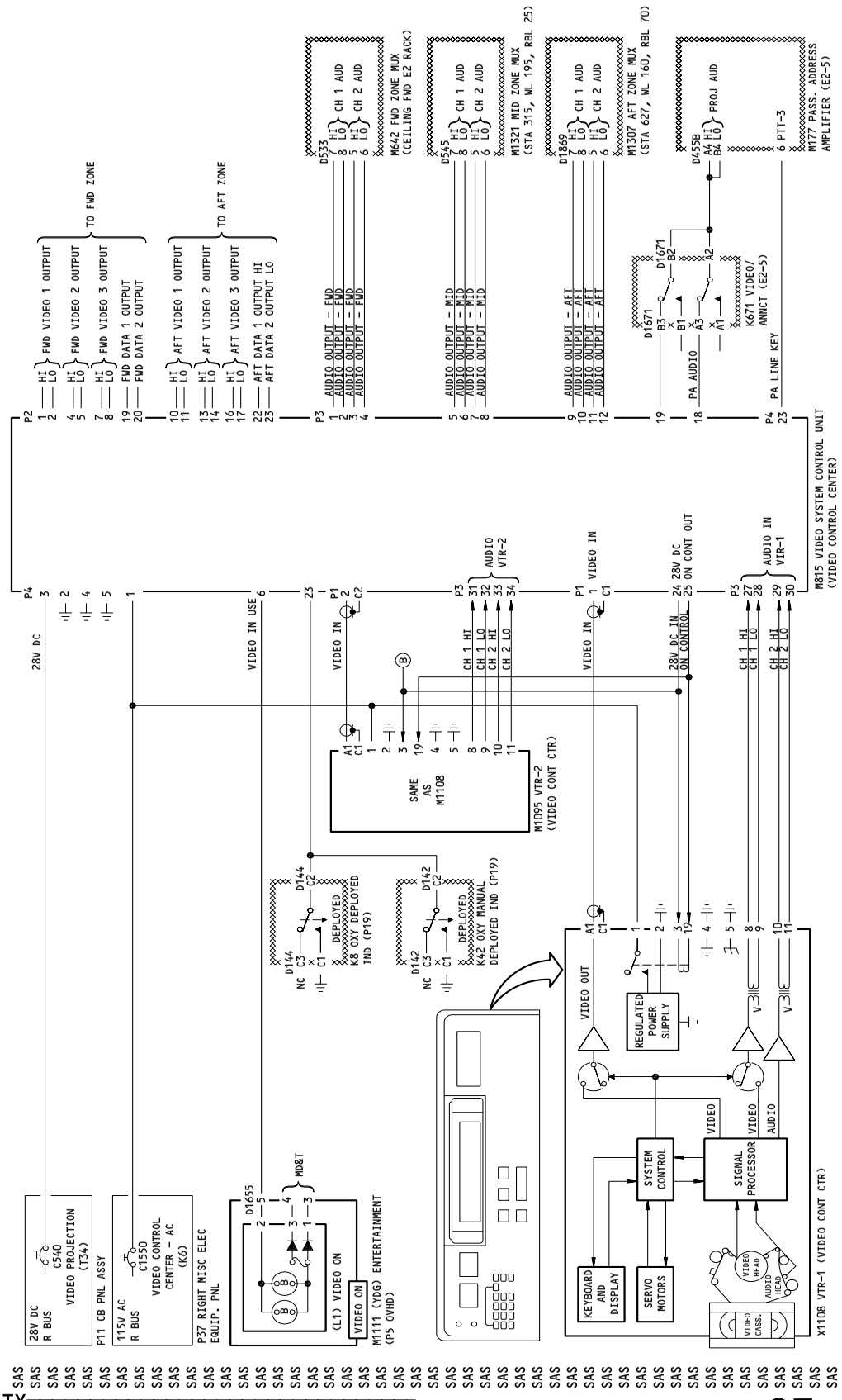
(a) Apply electrical power (Ref 24-22-00)

(b) SAS 275-280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

(c) Check that the passenger entertainment/passenger service system is operational (Ref 23-34-00).

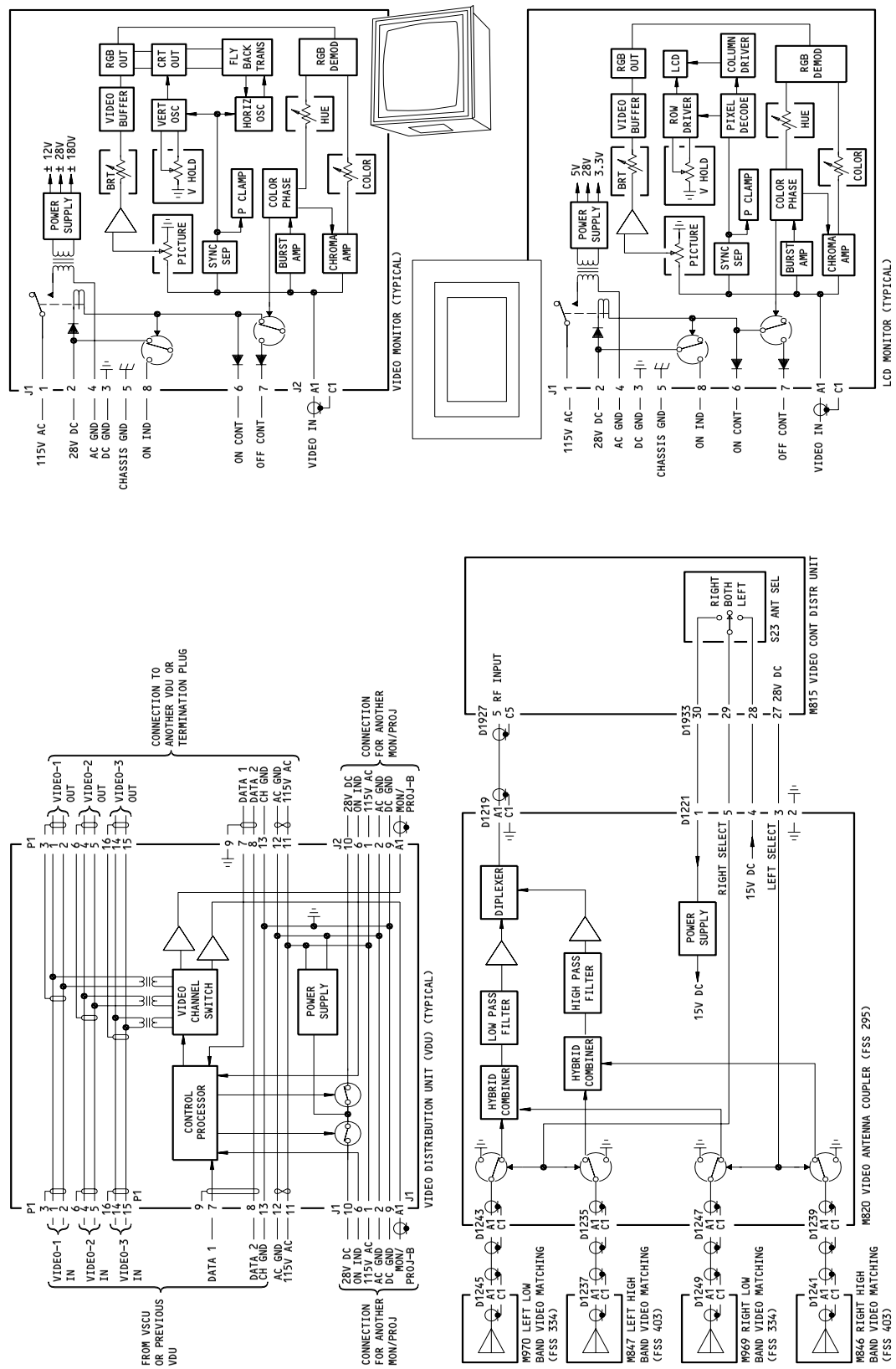
(d) Check that the following overhead panel P11 circuit breakers are closed:
1) 11C21, PASS ADRS
2) 11C23, INTERPHONE CABIN SERVICE
3) 11T34, VIDEO PROJ

(e) Check that the following right miscellaneous electrical equipment panel P37 circuit breakers are closed:
1) 37K6, VIDEO AC CONT CTR

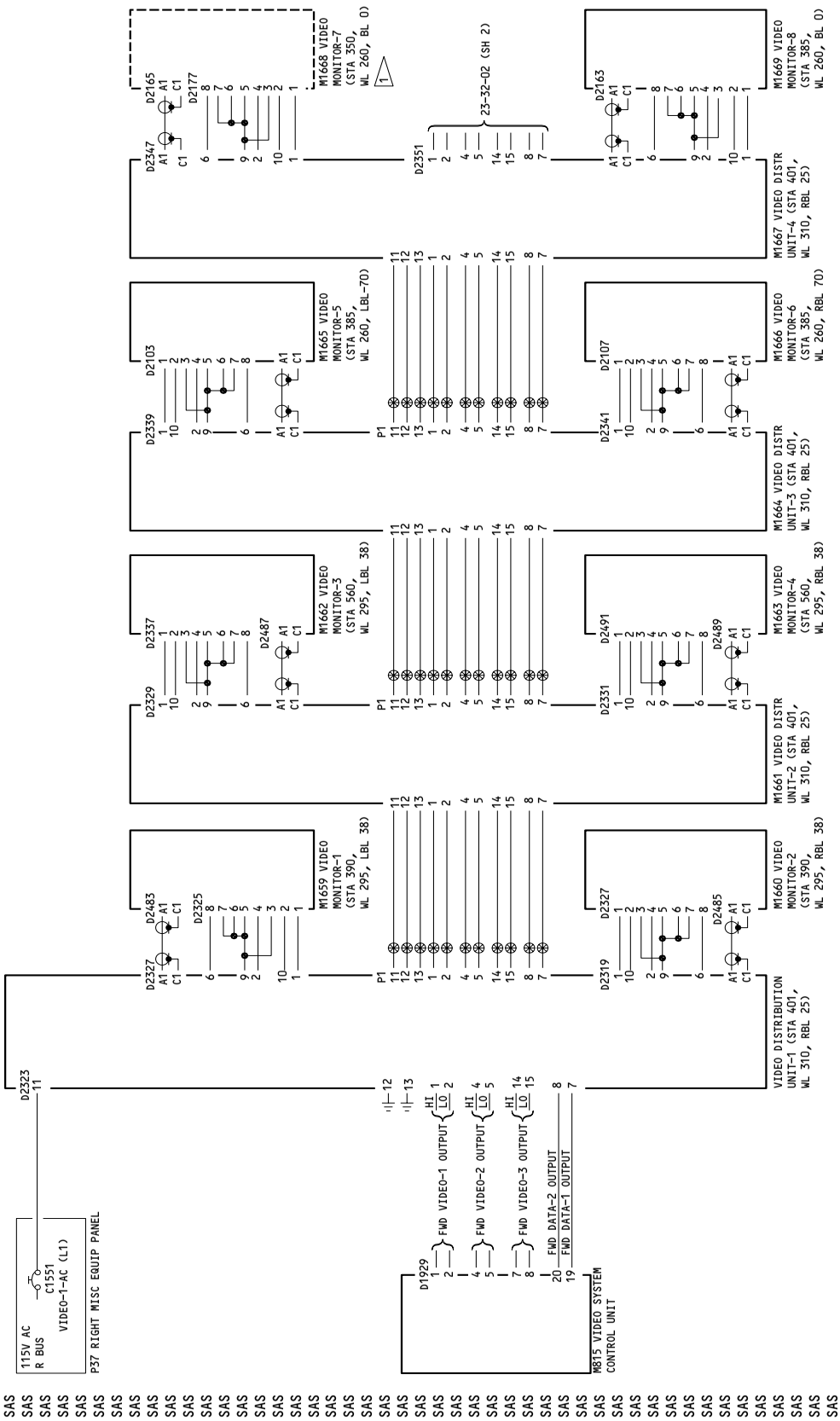


Video System Schematic
Figure 8 (Sheet 1)

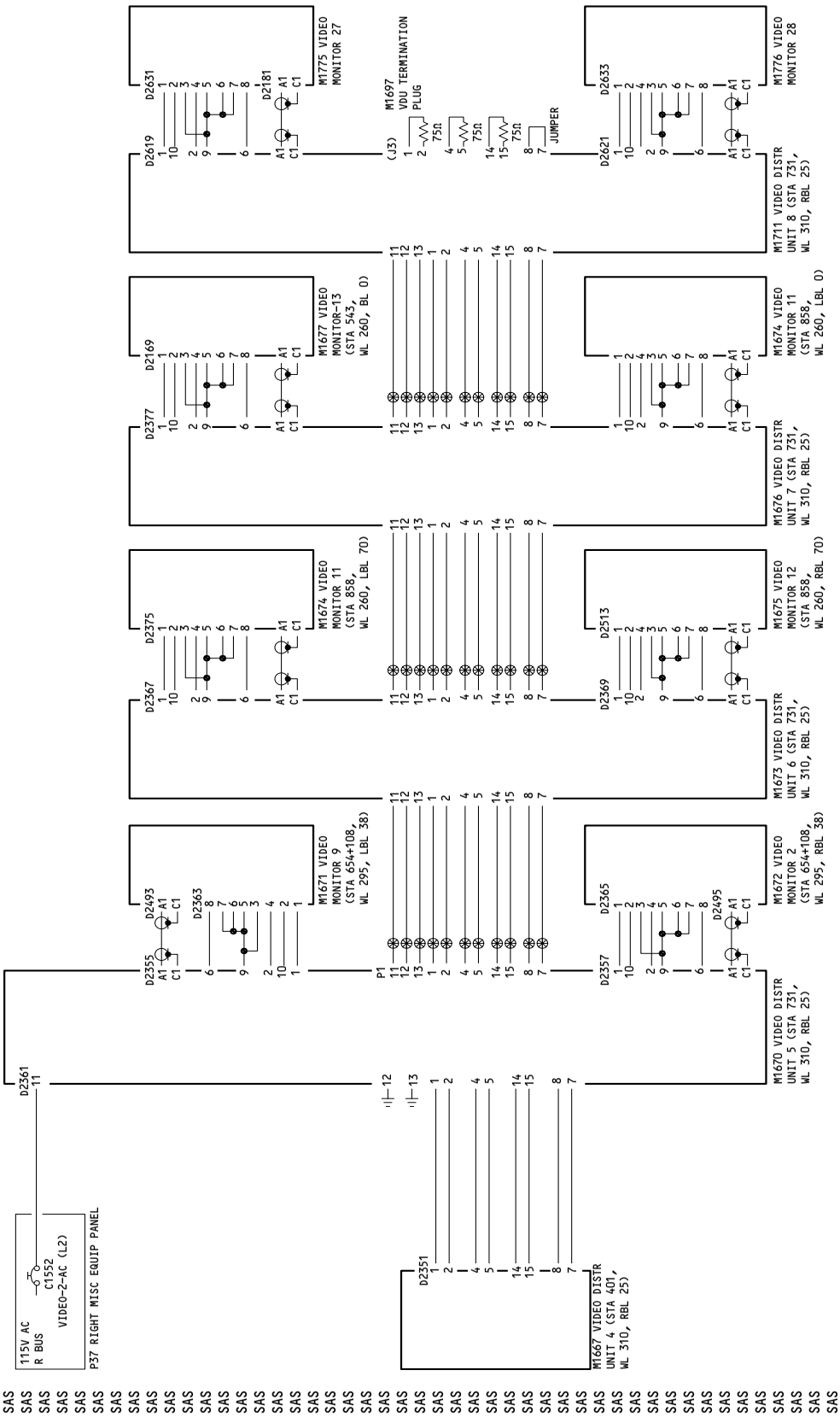
652307



Video System Schematic
Figure 8 (Sheet 2)

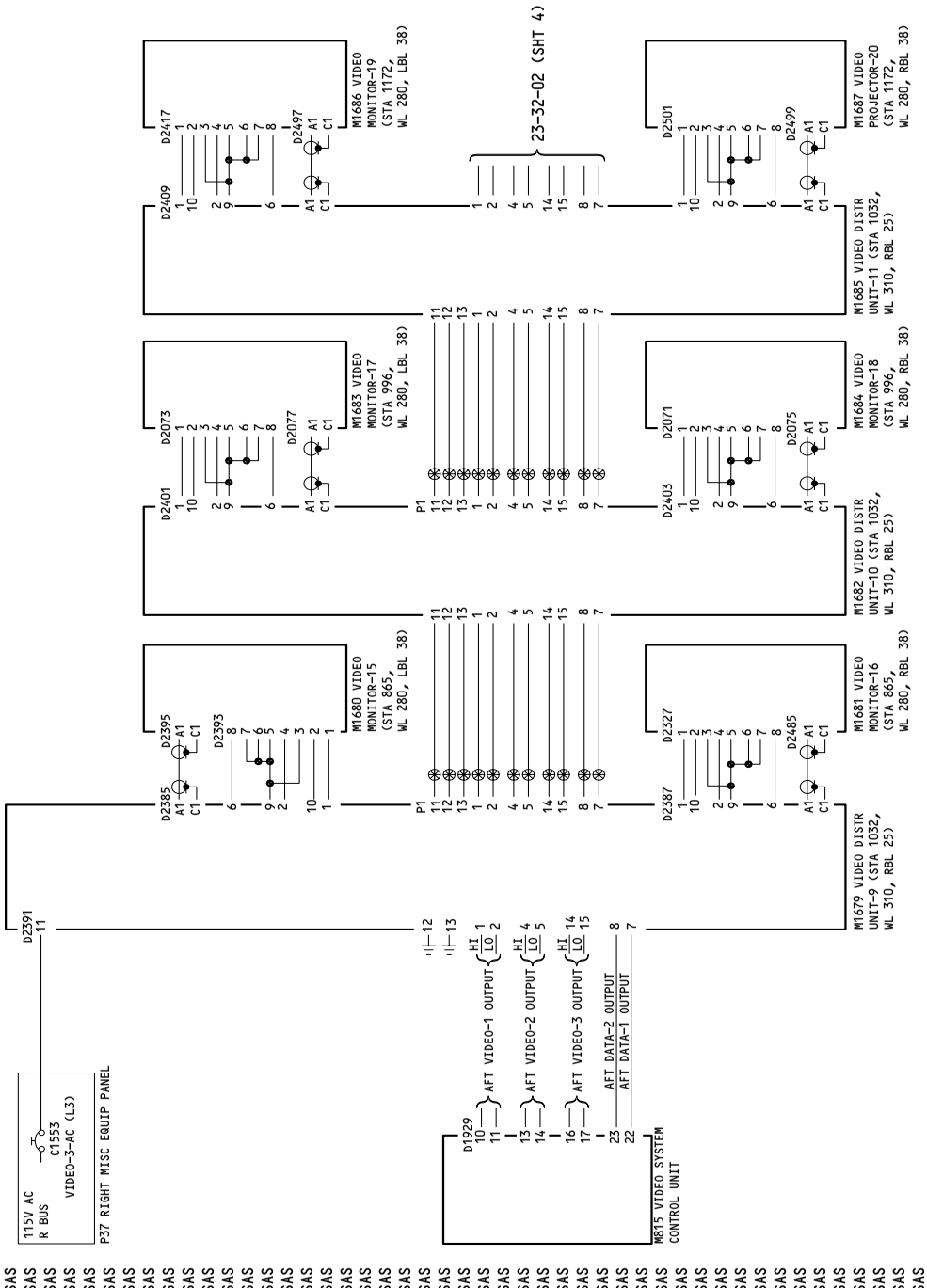


Video System Schematic
Figure 8 (Sheet 3)



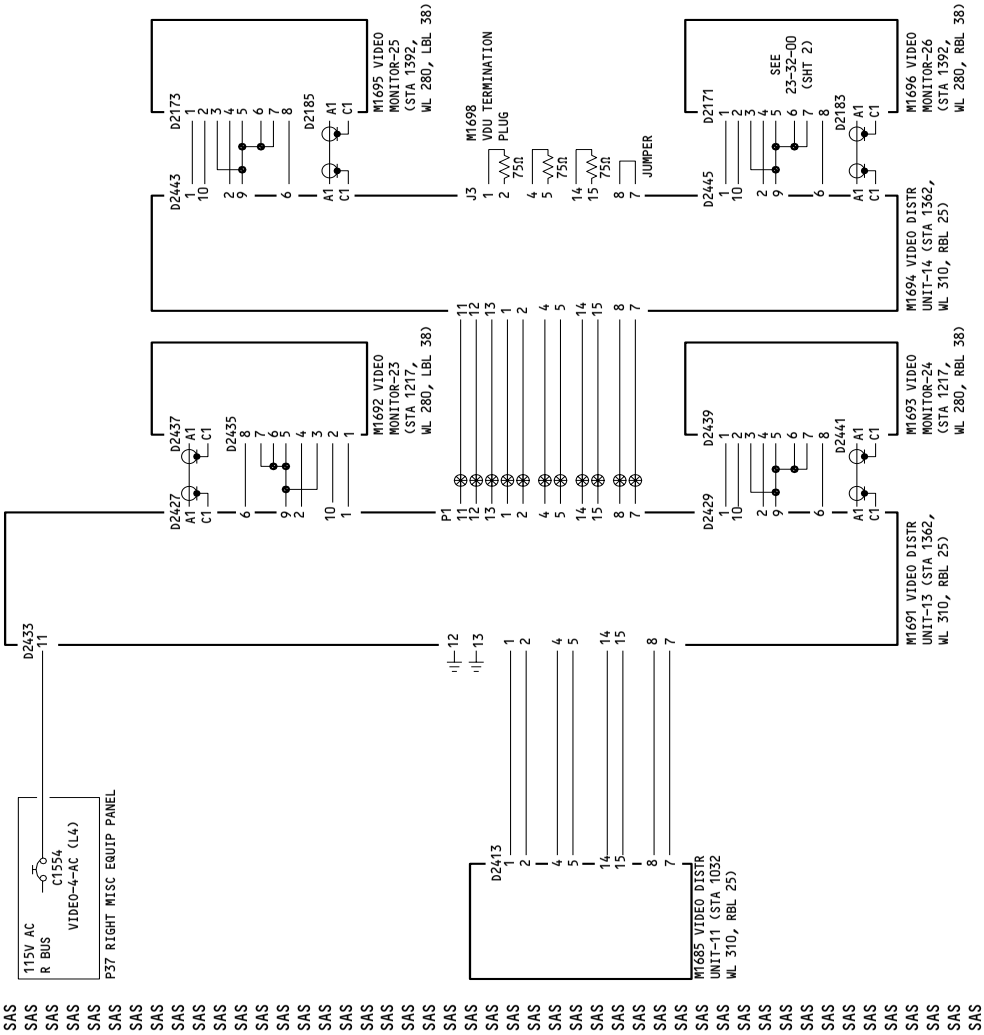
Video System Schematic
Figure 8 (Sheet 4)

652604



Video System Schematic
Figure 8 (Sheet 5)

652607



Video System Schematic
Figure 8 (Sheet 6)

652610

2) 37L1, VIDEO AC 1
3) 37L2, VIDEO AC 2
4) 37L3, VIDEO AC 3
5) 37L4, VIDEO AC 4

(2) Select proper video format.

NOTE: ONLY WHEN PLAYING BACK A VIDEO TAPE.

(a) Before playing back a video tape, the proper format of the video tape to be played back has to be determined. The Video tape reprodcuer is capable of playing back tapes recorded on the American standard (NTSC) and the European standard (PAL).
1) Determine the video format of the video tape to be played back.
2) Check if the switch on the VTR is in the correct position: for NTSC films the video format switch must be in NTSC 3.58 position, for PAL films, the video format switch must be in AUTO position.

(3) Switch video system on
(a) Press the MASTER POWER key. The frontpanel lights will illuminate and the Video Tape Players will switch on. Verify that the LCD - screen displays the information shown in Fig. 9.

NOTE: "X" can be character A (Boeing 767 configuration) or character B (MD-11 configuration). See chapter AMM 23-32-03, par.3.D.(3) for proper selection of the configuration.

(4) Preview of a prerecorded tape, airshow or live TV program.
(a) Press the PREVIEW key. Verify that the LCD-screen displays the information shown in Fig. 9.
(b) Press the VIDEO INPUT key until the desired video source selection is displayed. Possible selections are:
1) VCP1 = VIDEO PLAYER 1
2) VCP2 = VIDEO PLAYER 2
3) VCP3 = NOT USED

SAS

SAS

SAS

LCD Screen Displays
Figure 9

4) VCP4 = NOT USED
5) TV = LIVE TV PROGRAM
6) CAM = NOT USED
7) PFIDS = AIRSHOW

(c) Press the ON/OFF key to switch between the preview function screen (see fig. 9) and the source to be previewed.
(d) Insert video cassette into the selected Video Tape Player.
(e) Run video tape to beginning of the video presentation.
(f) Press STOP button on the Video Tape Player.

(5) To select a TV-channel (only if desired)
(a) Before selecting a TV-channel on the Video Control Unit check that TV is not selected as a video source in one of the zones. Having TV selected as a video source int eh cabin makes selection of the TV-channel visible in the cabin, which is very disturbing for passengers.
(b) Press the PREVIEW key and select TV with the VIDEO INPUT key.
(c) Press the ON/OFF key to see selections of the TV-channel on the LCD-screen.
(d) Press TV-CHANNEL √ or ∠ key until proper TV-channel is selected.
(e) Turn antenna knob to L or R to have the best possible picture.
(f) Press OFF key to end preview of TV-channel.

(6) Select a video source in a class
(a) Press the CLASS key. Verify that the LCD-screen displays the information shown in fig. 10 and that all class identifiers (F, C and M) flash.

NOTE: The flashing class identifiers (F, C and M) on the control unit are those that can have VIDEO and PA settings changed.

NOTE: Pressing the CLASS key again results in 1 class identifier to stop flashing. No changes can be made in a class when the class identifiers do not flash. Each time the CLASS key is pressed a different combination will be shown.

SAS

CLASS	F	C	M
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

CLASS	F	C	M
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

Class Video Selection Screens
Figure 10

(7) Press the VIDEO INPUT key. Pressing the VIDEO INPUT key results in flashing of VCP 1 identifier.
(8) Press the VIDEO INPUT key until the desired source is displayed. Possible selections are:
    (a) VCP1 = VIDEO PLAYER 1
    (b) VCP2 = VIDEO PLAYER 2
    (c) VCP3 = NOT USED
    (d) VCP4 = NOT USED
    (e) TV = LIVE TV PROGRAM
    (f) CAM = NOT USED
    (g) PFIDS = AIRSHOW
(9) Press the ON/OFF key to allow selected video source to be displayed on the monitors in the cabin. LIVE TV or AIRSHOW will be displayed immediately.
(10) When ready to start video tape (No video audio on PA):
    (a) Press the PLAY key on the selected Video Tape Player to start video presentation.
    (b) Check picture quality on monitors in all zones.
(11) To allow video sound on PA system
    (a) Press the PA key. Pressing the PA key results in CH! flashing (Ref. fig. 11).
    (b) Press the PA key to make a selection between CH 1 or CH 2.
    (c) Press the ON/OFF key to switch selected channel ON or OFF.

        NOTE: When ON is selected, the message "VCP MAY BE STARTED" will appear at the bottom of the LCD-screen.

    (d) When ready to start video tape.
        1) Press the PLAY key on selected video tape player to start video presentation.
        2) Check picture quality on all monitors in all zones.
(12) PA volume adjustment
    (a) This function allows adjustment of PA volume for one or all classes. The PA volume adjustment is kept in the memory of the control unit when power is turned OFF.

(b) Press either PA VOLUME UP or PA VOLUME DOWN key, until desired volume level is obtained. The screen appears with all class level is obtained. The screen appears with all class identifiers (F, C and M) flashing (see fig. 11).

(13) To end video tape presentation

(a) Press CLEAR key. Verify that LCD screen displays the information shown in fig. 11.

(b) Press ENTER key. The VIDEO and PA settings reset and the screen displays the READY message (Ref. fig. 11).

(c) Press STOP REWIND and EJECT keys on videotape players.

(d) Press MASTER POWER key to switch OFF video system.

(14) Random Access Control operating procedure

(a) Load a preprogrammed tape. The VTR goes automatically into REW, FF, PLAY for RAC (Random Access Control) load; REW (READY LIGHT COMES ON), FF (to the beginning) and STOP modes.

CAUTION: DO NOT ATTEMPT TO OPERATE THE VTR RANDOM ACCESS CONTROL UNTIL THE MACHINE STOPS AND THE READY LIGHT IS ON.

(b) Playback of one segment only.

1) Press FUNC and CLR keys.
2) Press segment number.
3) Press START key.

NOTE: The VTR will not function even if the start key is pressed unless the segment numbers are in memory.

(c) Programming the VTR

1) Press FUNC and CLR keys.
2) Press first segment number.

NOTE: If a mistake is made, press CLR key and re-enter.

3) Press ENTER key.
4) For each additional segment, input segment number followed by ENTER key (max. 15 segments).

(d) To verify the sequence:

1) Press FUNC and RESET PROGRAM ORDER displays "1" and SEGMENT dislays first segment entered.
2) Press ENTER for each segment entered. After the last segment, SEGMENT indicates "0".
3) Press START to begin play-back.

NOTE: Pressing FUNC and CLR keys will always erase memory.

(e) Special functions

SAS

```
CLASS      F         C         M

VIDEO      VCP1      VCP1      VCP1
           OFF       OFF       OFF

PA         CH1       CH1       CH1
           OFF       OFF       OFF
```

```
PA VOLUME

CLASS
F          VCP1      CH2       OFF
######
C          VCP2      CH1       ON
#########
M          VCP2      CH1       OFF
###############

MIN                            MAX
```

```
PRESS ENTER TO CLEAR
   ALL VIDEO/PA
 SETTINGS, OR ANY
   OTHER KEY TO
     CONTINUE
```

```
- READY -
VIDEO CONFIG. X
```

Class Audio Selection Screens
Figure 11

SKIP function	To skip present segment while the VTR is playing. The VTR plays the next programmed segement.
REPEAT function	To repeat the segment/sequence. RAC will continue repeating the program sequence until the REPEAT key is pressed again to release it. The REPEAT light will stay lit as long as the REPEAT function is activated.
Uncoded cassette	An uncoded cassette can be recognized by the removed record protection. When an uncoded cassette has been inserted into the VTR, the RAC will not function and the "SEGMENT" and "PROGRAM ORDER" displays will be blank. Only the counter will be on.

(f) Select the desired display mode on the mode selector switch.

(15) PA Procedure

(a) At the system control unit:

1) Press the CLASS switch and check that the following display is shown on the SCU monitor:

CLASS	[F]	[C]	[M]
VIDEO	PFID ON	PFID ON	PFID ON
PA	CH1 OFF	CH1 OFF	CH1 OFF

2) Press the CLASS switch again until the following display is shown on the SCU monitor:

CLASS	[F]	C	M
VIDEO	PFID ON	PFID ON	PFID ON
PA	CH1 OFF	CH1 OFF	CH1 OFF

3) Press the VIDEO INPUT switch until the following display is is shown on the SCU monitor:

NOTE: The following display indicates that audio from video tape reproducer 1 (VTR-1) will be provided to the PA amplifier. If audio from VTR-2 or live TV is desired, press the VIDEO INPUT switch until either [VCP2] or [TV] replaces [VCP1] on the SCU monitor.

CLASS	F	C	M
VIDEO	[VCP1] ON	PFID ON	PFID ON
PA	CH1 OFF	CH1 OFF	CH1 OFF

4) Press the PA switch and check that the following display is shown on the SCU monitor:

NOTE: The following display indicates that channel 1 audio will be provided to the PA amplifier. If channel 2 audio is desired press the P.A. switch again and check that [CH2] replaces [CH1] on SCU monitor.

CLASS	F	C	M
VIDEO	VCP1 ON	PFID ON	PFID ON
PA	[CH1] OFF	CH1 OFF	CH1 OFF

PASSENGER ENTERTAINMENT (VIDEO PROJECTION)

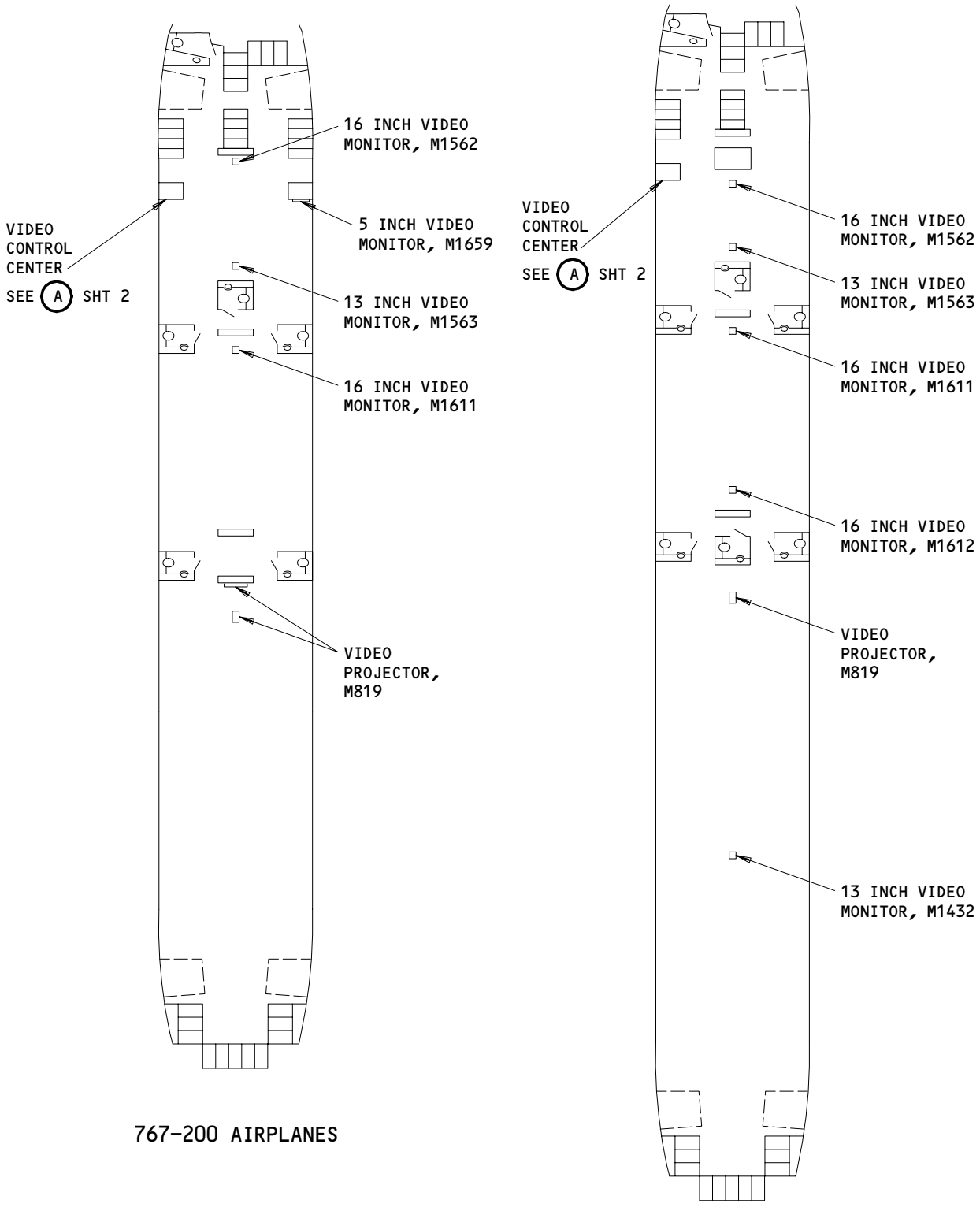
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
AMPLIFIER - (REF 23-31-00, FIG. 101)				
PASS ADRS, M177				
CIRCUIT BREAKERS	1		FLT COMPT, P11	
VIDEO PROJECTION, C540		1	11T34	*
CIRCUIT BREAKERS	1		119AL, MAIN EQUIP CTR, P37	
AFT VIDEO PROJECTOR, C555		1	37K7	*
FWD VIDEO PROJECTOR, C549		1	37K5	*
MID VIDEO PROJECTOR, C550		1	37K6	*
COUPLER - VIDEO ANTENNA, M820	1	1	VERT STAB, 322 BL	23-32-04
COMPUTER - (REF 34-12-00, FIG. 101)				
RIGHT AIR DATA, M101				
COMPUTER - (REF 34-61-00, FIG. 101)				
LEFT FLIGHT MANAGEMENT, M134				
DRIVER - (REF 23-34-00, FIG. 101)				
ZONE, M1308,M1710				
MONITOR - PASSENGER VIDEO, M1432 [2] ,M1562, M1563,M1611,M1612 [2] , M1659 [1]	1	5	PASS CABIN	*
MULTIPLEXER - (REF 23-34-00, FIG. 101)				
AFT ZONE, M1307				
FWD ZONE, M642				
MID ZONE, M1321				
PANEL - ENTERTAINMENT, M1111	1	1	FLT COMPT, P5	*
PROJECTOR - VIDEO, M819	1	1	PASS CABIN	23-32-02
RELAY - (REF 31-01-19, FIG. 101)				
OXY DEPLOYED IND, K8				
OXY MAN DEPLOYED IND, K42				
REPRODUCER - VIDEO TAPE, M1108,M1059,M1613	3	3	PASS CABIN, VIDEO CONTROL CTR	23-32-01
SPLITTER - COAX SIGNAL, M1526,M1527 [2] , M1615 [2]		3	PASS CABIN, ABOVE CEILING	*
SWITCH - MODE SELECTOR, M1614	2	1	PASS CABIN, VIDEO CONTROL CTR	*
TRANSFORMER - VIDEO, T232	3	1	119AL, MAIN EQUIP CTR, E1-4	*
TUNER - TV, M1113	1	1	PASS CABIN, VIDEO CONTROL CTR	23-32-06
UNIT - CONTROL DISTRIBUTION, M815	3	1	PASS CABIN, VIDEO CONTROL CTR	23-32-03
UNIT - DIGITAL INTERFACE, M1457	3	1	119AL, MAIN EQUIP CTR, E1-4	23-32-07
UNIT - LEFT HI BAND VIDEO MATCHING, M847	1	1	VERT STAB	*
UNIT - LEFT LO BAND VIDEO MATCHING, M970	1	1	VERT STAB	*
UNIT - RIGHT HI BAND VIDEO MATCHING, M846	1	1	VERT STAB	*
UNIT - RIGHT LO BAND VIDEO MATCHING, M969	1	1	VERT STAB	*

* SEE THE WDM EQUIPMENT LIST

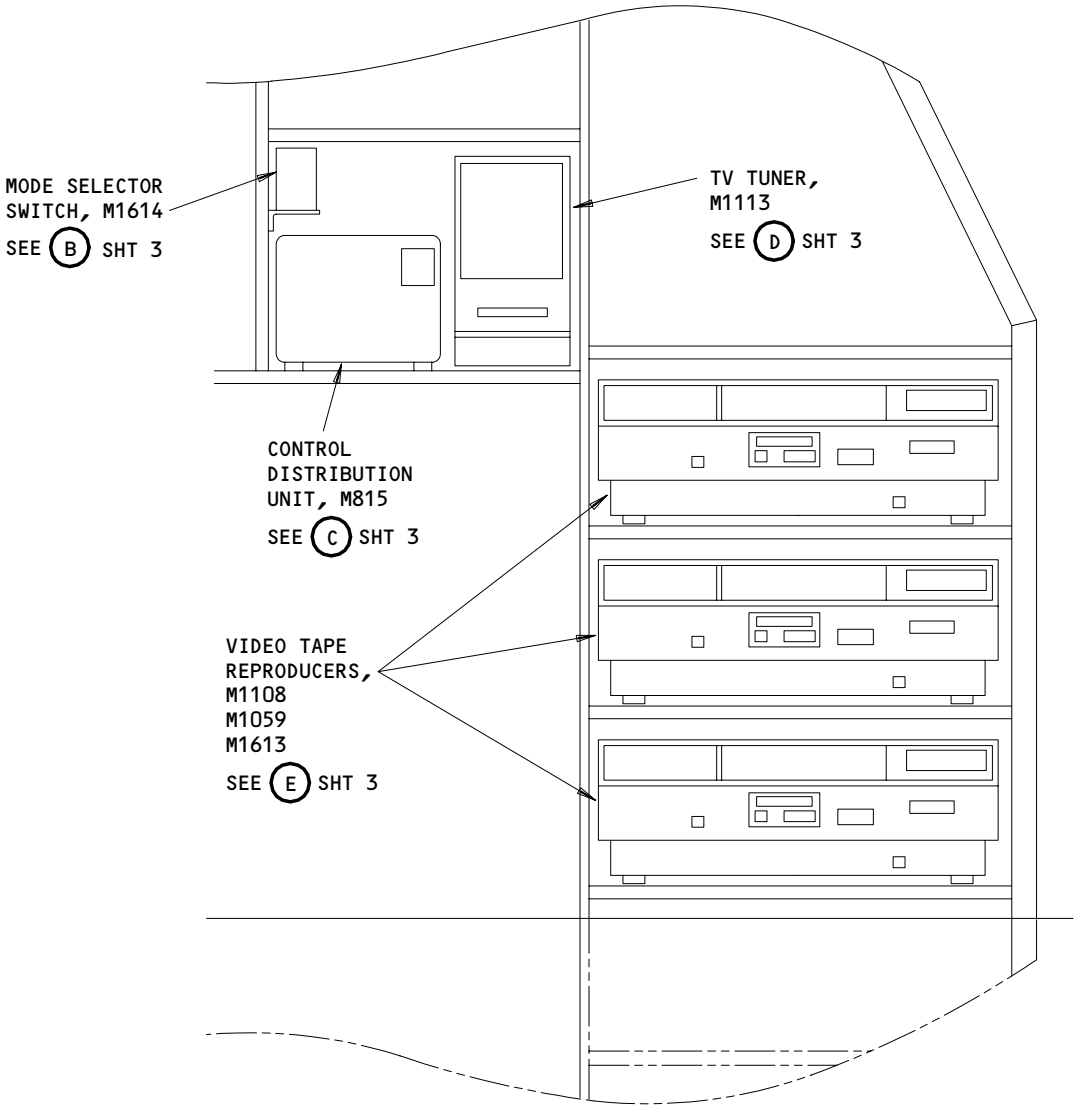
[1] 767-200 AIRPLANES

[2] 767-300 AIRPLANES

Passenger Entertainment (Video Projection) - Component Index
Figure 101



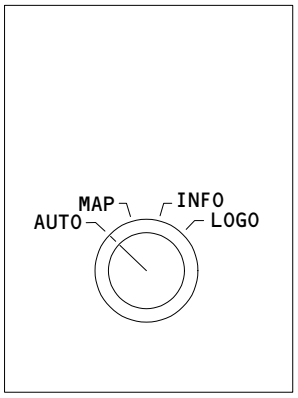
Passenger Entertainment (Video Projection) - Component Location
Figrue 102 (Sheet 1)



VIDEO CONTROL CENTER

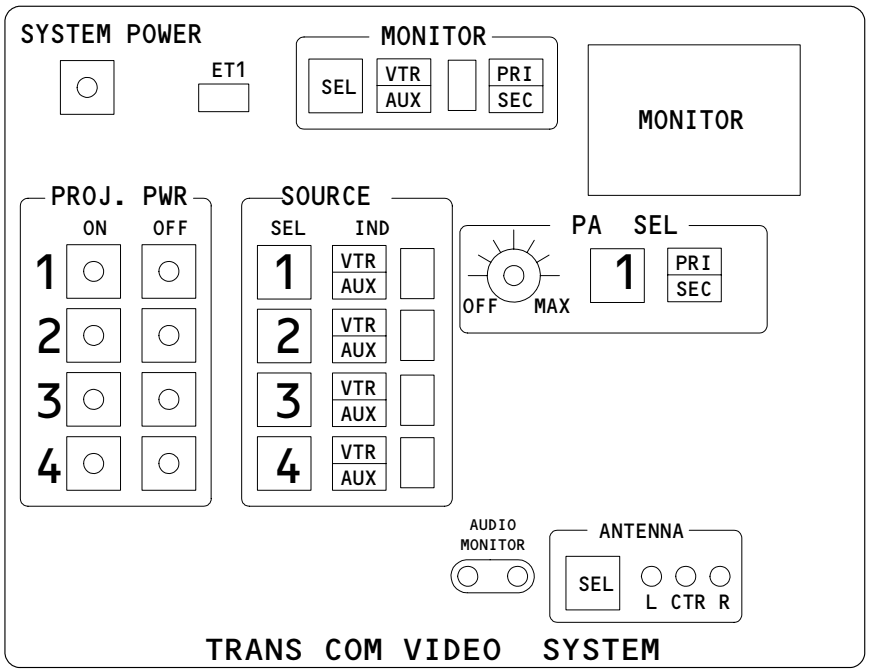
A

Passenger Entertainment (Video Projection) –
Component Location (Detail from Sheet 1)
Figrue 102 (Sheet 2)



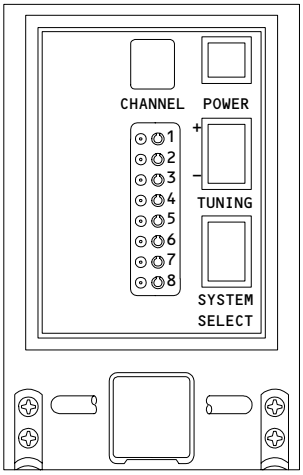
MODE SELECTOR
SWITCH, M1614

B



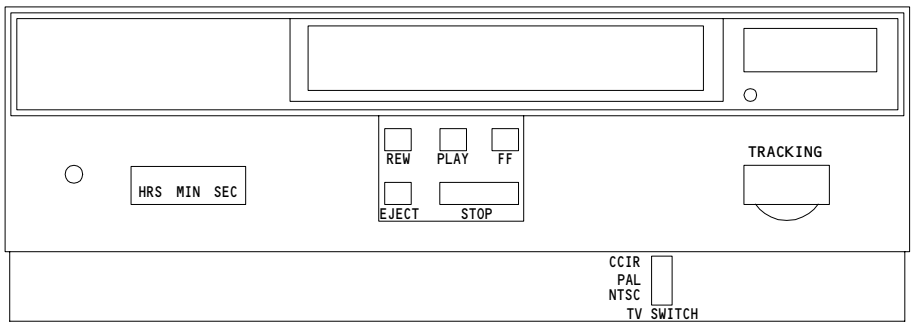
CONTROL DISTRIBUTION UNIT, M815

C



TV TUNER, M1113

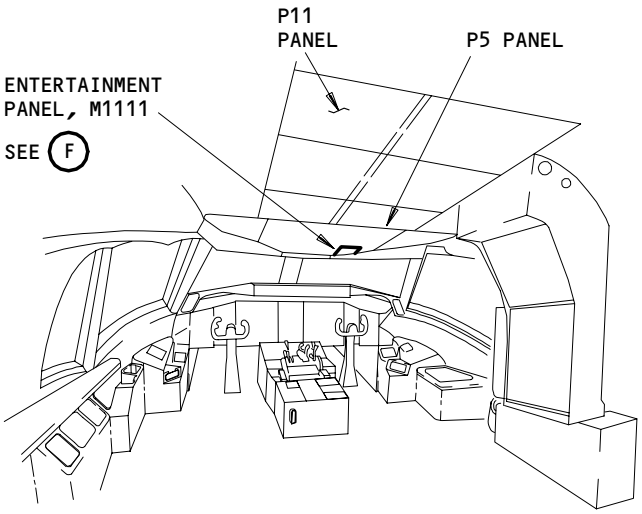
D



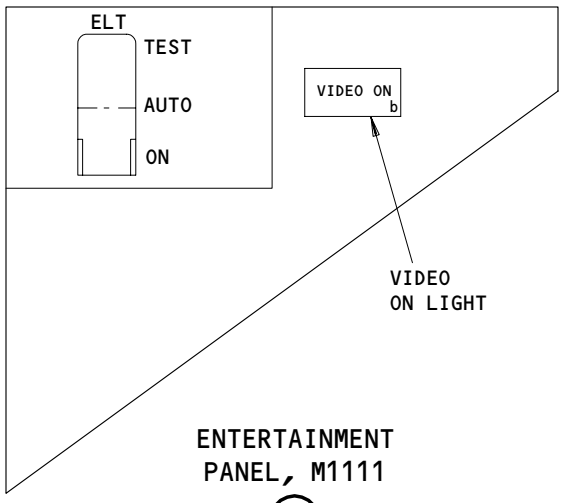
VIDEO TAPE REPRODUCER,
M1108,M1059,M1613

E

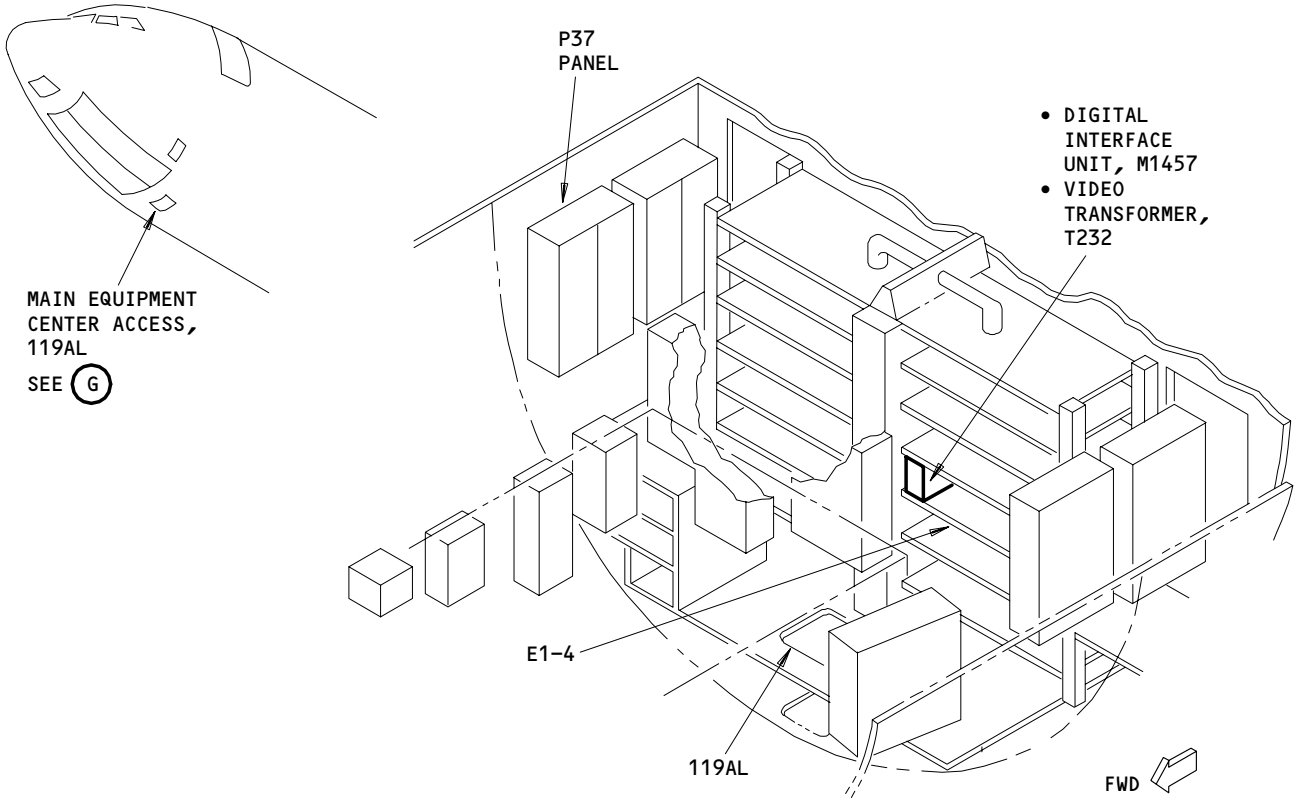
Passenger Entertainment (Video Projection) -
Component Location (Details from Sht 2)
Figure 102 (Sheet 3)



FLIGHT COMPARTMENT

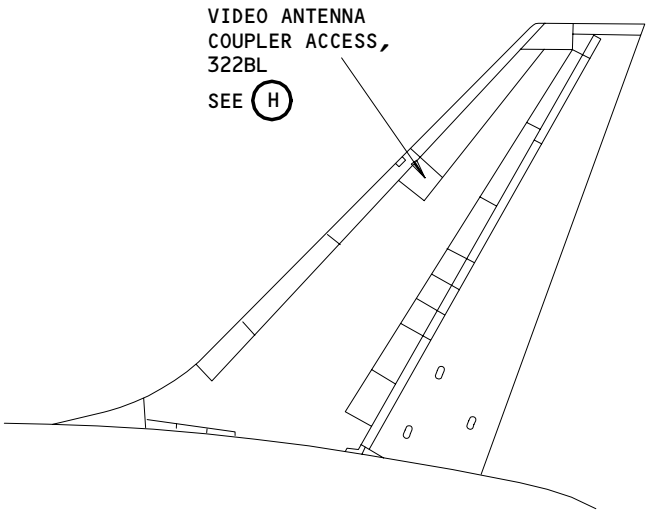


ENTERTAINMENT
PANEL, M1111
F

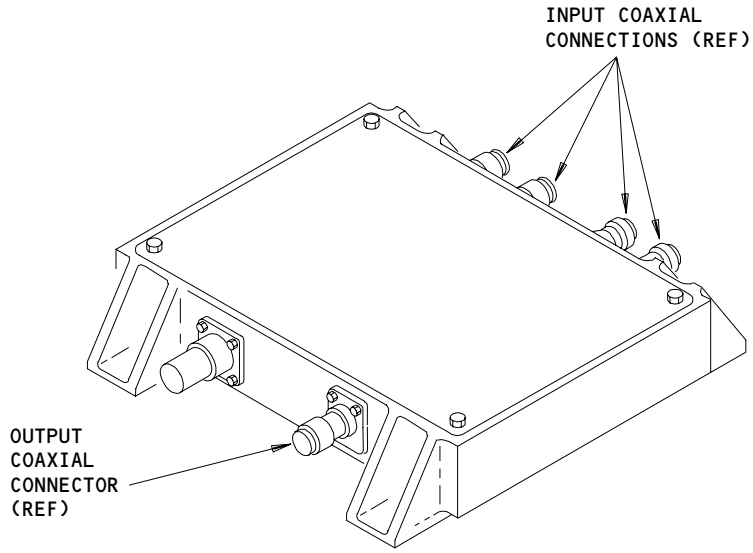


MAIN EQUIPMENT CENTER
G

Passenger Entertainment (Video Projection) - Component Location
Figure 102 (Sheet 4)



VERTICAL STABILIZER



VIDEO ANTENNA COUPLER, M820

(H)

Passenger Entertainment (Video Projection) - Component Location
Figure 102 (Sheet 5)

PASSENGER ENTERTAINMENT (VIDEO PROJECTION)

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
AMPLIFIER - (23-31-00/101)				
PASS. ADRS, M177				
CIRCUIT BREAKER -	6		FLT COMPT, P11	
VIDEO PROJ, C540		1	11T34	*
CIRCUIT BREAKERS -	6		119AL, MAIN EQUIP CTR, P37	
VIDEO AC CONT CTR, C1550		1	37K6	*
VIDEO AC 1, C1551		1	37L1	*
VIDEO AC 2, C1552		1	37L2	*
VIDEO AC 3, C1553		1	37L3	*
VIDEO AC 4, C1554		1	37L4	*
COUPLER - VIDEO ANTENNA, M820	7	1	VERT STAB, 322 BL	23-32-04
COMPUTER - (34-12-00/101)				
RIGHT AIR DATA, M101				
COMPUTER - (34-61-00/101)				
LEFT FLIGHT MANAGEMENT, M134				
MONITOR-1 - VIDEO, M1659	1,3	1	PASS. CABIN	23-32-10
MONITOR-2 - VIDEO, M1660	1,3	1	PASS. CABIN	23-32-10
MONITOR-3 - VIDEO, M1662	1,3	1	PASS. CABIN	23-32-10
MONITOR-4 - VIDEO, M1663	1,3	1	PASS. CABIN	23-32-10
MONITOR-5 - VIDEO, M1665 1 (PROV 2)	1,3	1	PASS. CABIN	23-32-10
MONITOR-6 - VIDEO, M1666	1,3	1	PASS. CABIN	23-32-10
MONITOR-7 - VIDEO, M1668	1,3	1	PASS. CABIN	23-32-10
MONITOR-8 - VIDEO, M1669 (PROV)	1,3	1	PASS. CABIN	23-32-10
MONITOR-9 - VIDEO, M1671 1 (PROV 2)	1,3	1	PASS. CABIN	23-32-10
MONITOR-10 - VIDEO, M1672 1 (PROV 2)	1,3	1	PASS. CABIN	23-32-10
MONITOR-11 - VIDEO, M1674 1 (PROV 2)	1,3	1	PASS. CABIN	23-32-10
MONITOR-12 - VIDEO, M1675 1 (PROV 2)	1,3	1	PASS. CABIN	23-32-10
MONITOR-13 - VIDEO, M1677 2 (PROV 1)	1,3	1	PASS. CABIN	23-32-10
MONITOR-14 - VIDEO, M1908 2	3	1	PASS. CABIN	23-32-10
MONITOR-15 - VIDEO, M1680	1,3	1	PASS. CABIN	23-32-10
MONITOR-16 - VIDEO, M1681	1,3	1	PASS. CABIN	23-32-10
MONITOR-17 - VIDEO, M1683	1,3	1	PASS. CABIN	23-32-10
MONITOR-18 - VIDEO, M1684	1,3	1	PASS. CABIN	23-32-10
MONITOR-19 - VIDEO, M1686	1,3	1	PASS. CABIN	23-32-10
MONITOR-20 - VIDEO, M1687	1,3	1	PASS. CABIN	23-32-10
MONITOR-21 - VIDEO, M1689 2	3	1	PASS. CABIN	23-32-10
MONITOR-22 - VIDEO, M1690 2	3	1	PASS. CABIN	23-32-10
MONITOR-23 - VIDEO, M1692	1,3	1	PASS. CABIN	23-32-10
MONITOR-24 - VIDEO, M1693	1,3	1	PASS. CABIN	23-32-10
MONITOR-25 - VIDEO, M1695	1,3	1	PASS. CABIN	23-32-10
MONITOR-26 - VIDEO, M1696	1,3	1	PASS. CABIN	23-32-10
MONITOR-27 - VIDEO, M1775 (PROV) 2	3	1	PASS. CABIN	23-32-10
MONITOR-28 - VIDEO, M1776 2	3	1	PASS. CABIN	23-32-10
MULTIPLEXERS - (23-34-00/101)				
AFT ZONE, M1307				
FWD ZONE, M642				
MID ZONE, M1321				
PANEL - ENTERTAINMENT, M1111	6	1	FLT COMPT, P5	*
PLUG - TERMINATION, M1697,M1698	1,3	2	PASS. CABIN, ABOVE CEILING	*
RELAY - (23-31-00/101)				
VIDEO ANNCT, K671				
RELAYS - (31-01-19/101)				
OXY DEPLOYED IND, K8				
OXY MAN DEPLOYED IND, K42				

* SEE THE WDM EQUIPMENT LIST

1 MTH 275-278
2 MTH 279-299
3 MTH 275-276
4 MTH 277-299

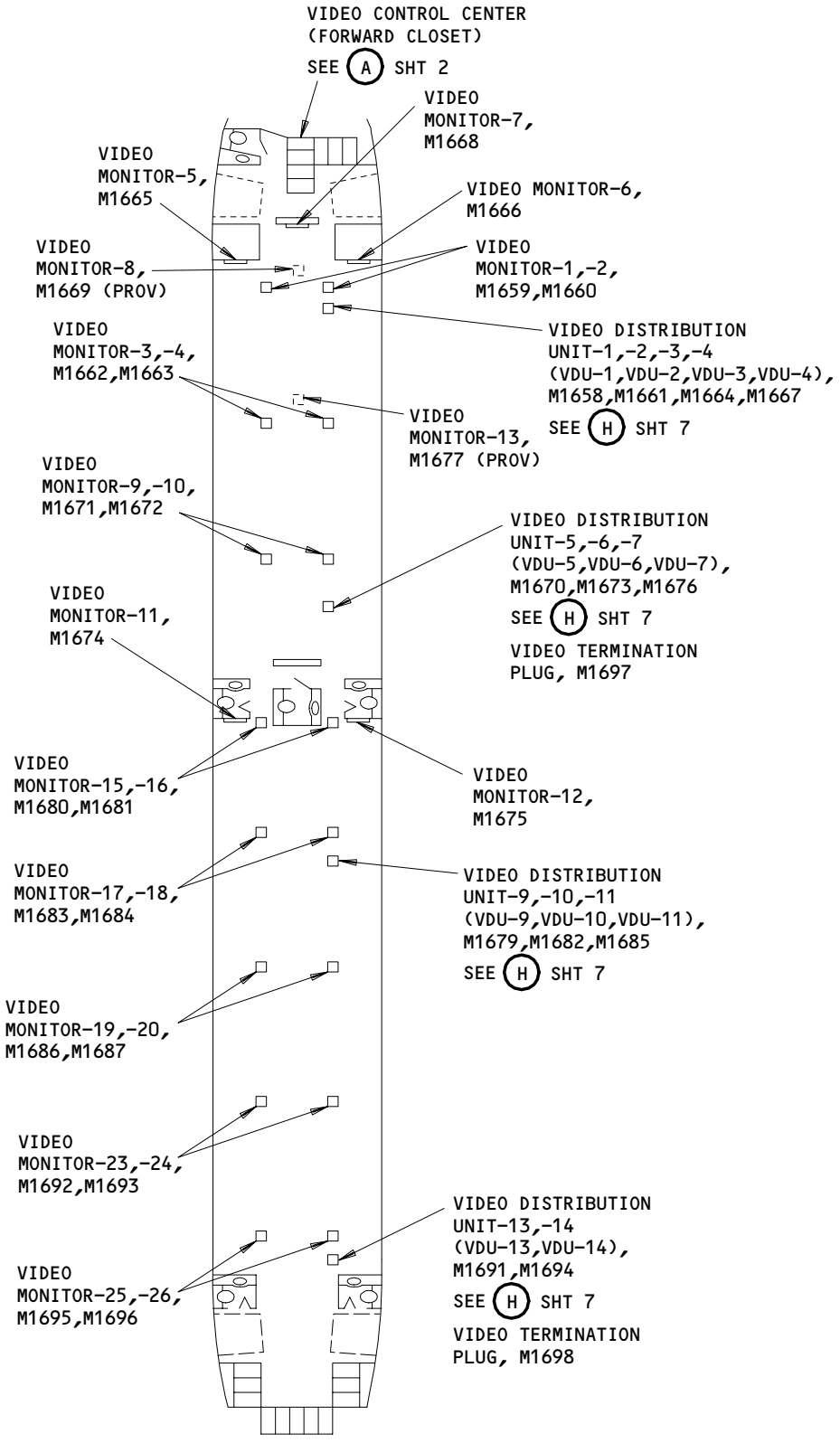
Passenger Entertainment (Video Projection) - Component Index
Figure 101 (Sheet 1)

PASSENGER ENTERTAINMENT (VIDEO PROJECTION)

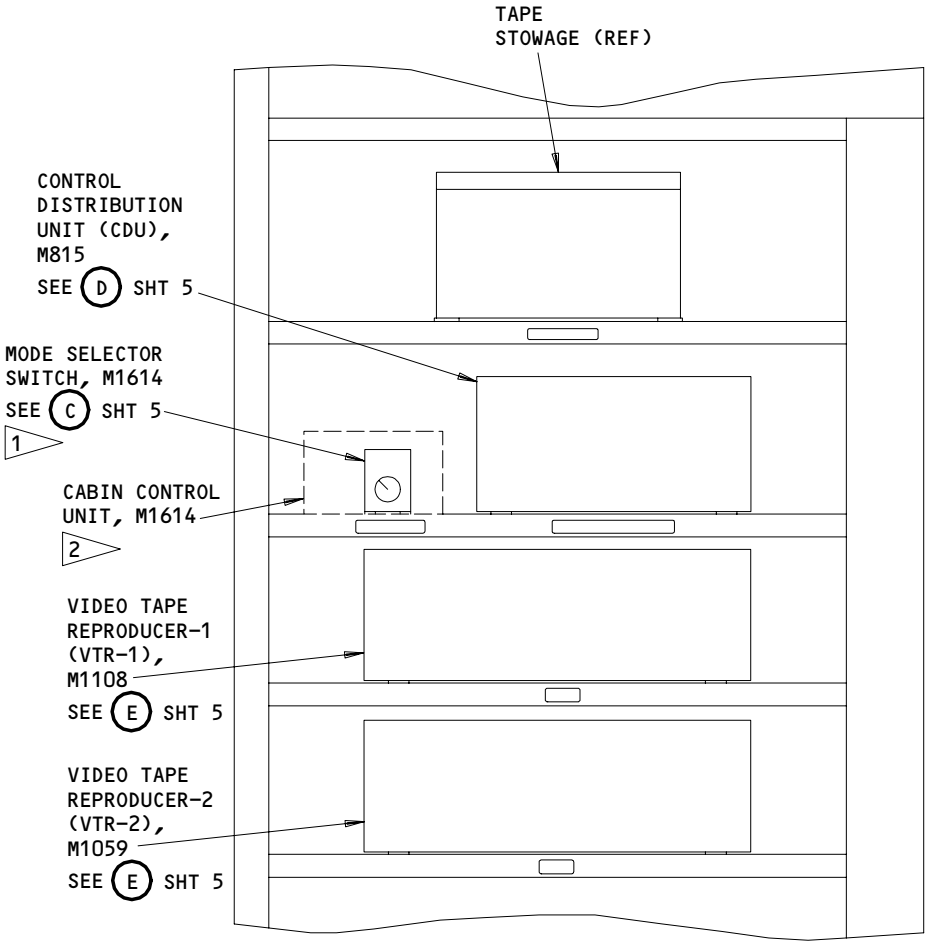
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
REPRODUCER-1 - VIDEO TAPE (VTR-1), M1108	2,4	1	PASS. CABIN, VIDEO CONTROL CTR, FWD CLOSET	23-32-01
REPRODUCER-2 - VIDEO TAPE (VTR-2), M1059	2,4	1	PASS. CABIN, VIDEO CONTROL CTR, FWD CLOSET	23-32-01
REPRODUCER-3 - VIDEO TAPE (VTR-3), M1613 (PROV) 2				
SWITCH - MODE SELECTOR, M1614 3	5	1	PASS. CABIN, VIDEO CONTROL CTR, FWD CLOSET	*
TRANSFORMER - VIDEO, T232	6	1	119AL, MAIN EQUIP CTR, E1-4 IN DIU TRAY	*
UNIT - CABIN CONTROL (CCU), M1614 4	2	1	PASS. CABIN, VIDEO CONTROL CTR, FWD CLOSET	23-32-09
UNIT - CONTROL DISTRIBUTION (CDU), M815	2,4	1	PASS. CABIN, VIDEO CONTROL CTR, FWD CLOSET	23-32-03
UNIT - DIGITAL INTERFACE (DIU), M1457	6	1	119AL, MAIN EQUIP CTR, E1-4	23-32-07
UNIT - LEFT HI BAND VIDEO MATCHING, M847	--	1	VERT STAB	*
UNIT - LEFT LO BAND VIDEO MATCHING, M970	--	1	VERT STAB	*
UNIT - RIGHT HI BAND VIDEO MATCHING, M846	--	1	VERT STAB	*
UNIT - RIGHT LO BAND VIDEO MATCHING, M969	--	1	VERT STAB	*
UNIT-1 - VIDEO DISTRIBUTION (VDU-1), M1658	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-2 - VIDEO DISTRIBUTION (VDU-2), M1661	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-3 - VIDEO DISTRIBUTION (VDU-3), M1664	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-4 - VIDEO DISTRIBUTION (VDU-4), M1667	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-5 - VIDEO DISTRIBUTION (VDU-5), M1670	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-6 - VIDEO DISTRIBUTION (VDU-6), M1673	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-7 - VIDEO DISTRIBUTION (VDU-7), M1676	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-8 - VIDEO DISTRIBUTION (VDU-8), M1711 2	3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-9 - VIDEO DISTRIBUTION (VDU-9), M1679	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-10 - VIDEO DISTRIBUTION (VDU-10), M1682	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-11 - VIDEO DISTRIBUTION (VDU-11), M1685	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-12 - VIDEO DISTRIBUTION (VDU-12), M1688 2	3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-13 - VIDEO DISTRIBUTION (VDU-13), M1691	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08
UNIT-14 - VIDEO DISTRIBUTION (VDU-14), M1694	1,3	1	PASS. CABIN, ABOVE CEILING	23-32-08

* SEE THE WDM EQUIPMENT LIST

Passenger Entertainment (Video Projection) - Component Index
Figure 101 (Sheet 2)

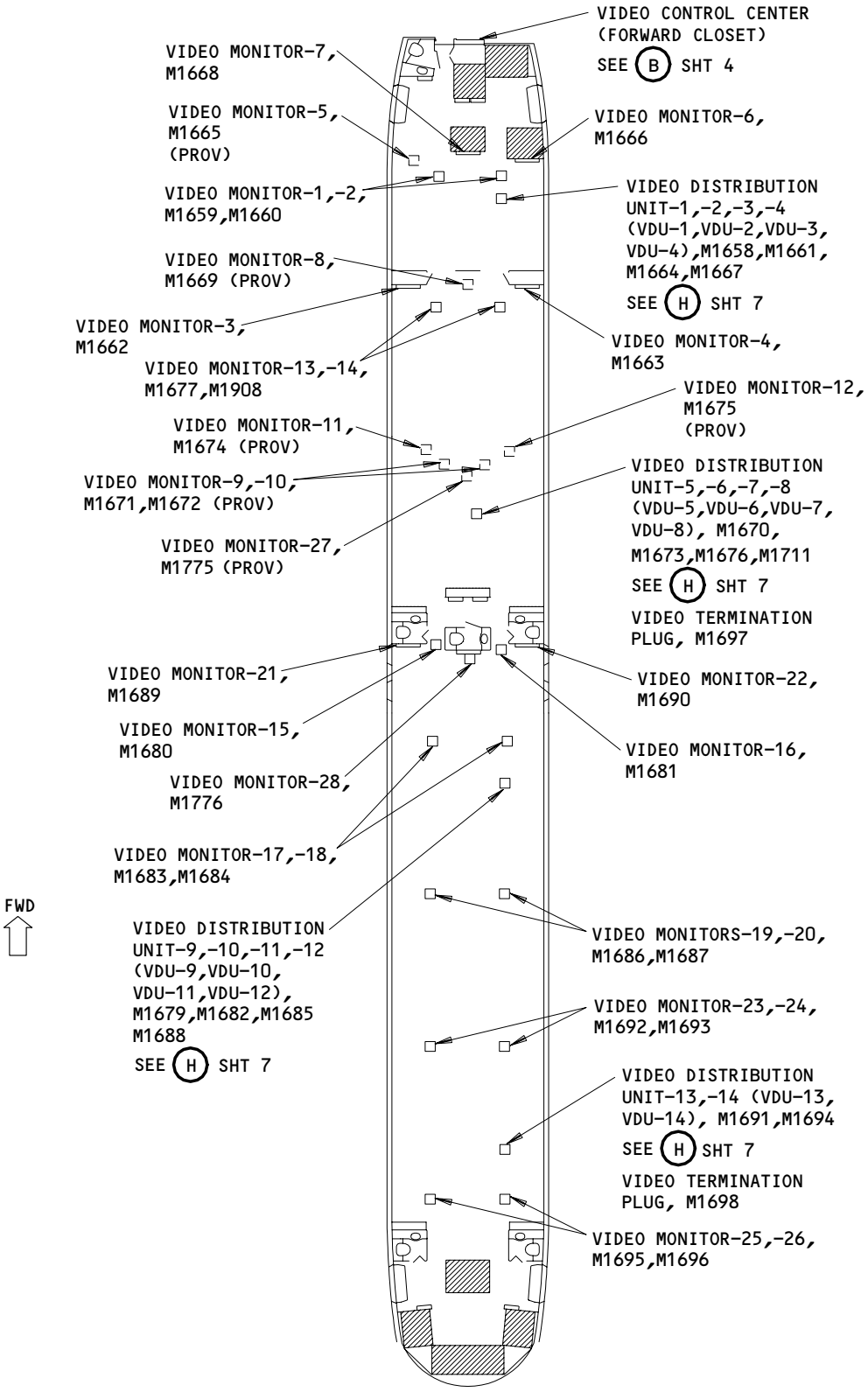


Passenger Entertainment (Video Projection) - Component Location
Figrue 102 (Sheet 1)

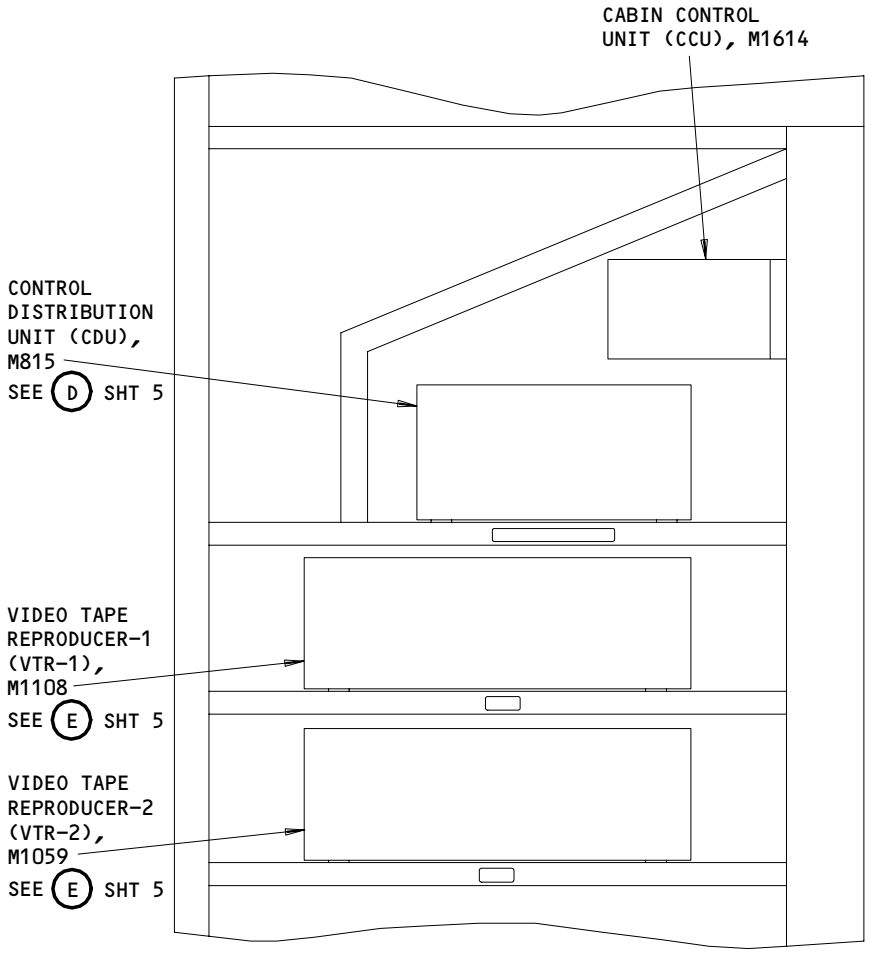


1 MTH 275,276
2 MTH 277,278

Passenger Entertainment (Video Projection) - Component Location (Detail from Sht 1)
Figrue 102 (Sheet 2)

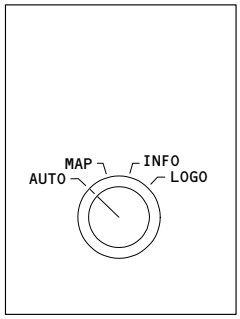


Passenger Entertainment (Video Projection) - Component Location
Figrue 102 (Sheet 3)



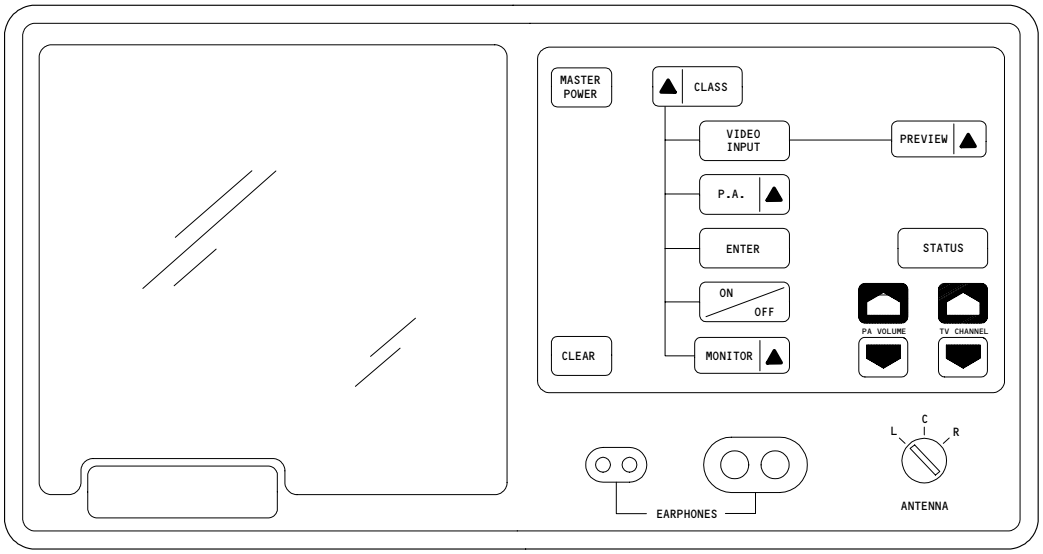
VIDEO CONTROL CENTER
(FORWARD CLOSET)
B

Passenger Entertainment (Video Projection) - Component Location (Detail from Sht 3)
Figrue 102 (Sheet 4)



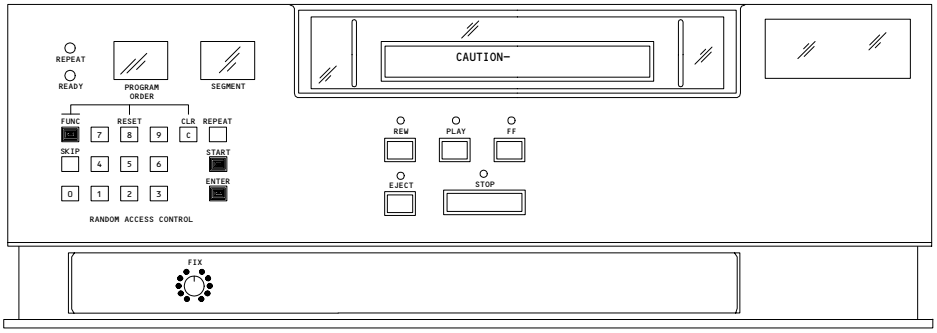
MODE SELECTOR SWITCH, M1614

C 1



CONTROL DISTRIBUTION UNIT (CDU), M815

D

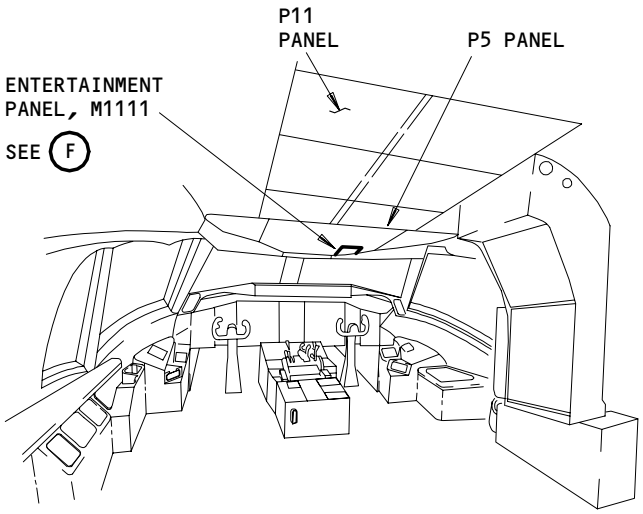


VIDEO TAPE REPRODUCER–1,–2 (VTR–1,VTR–2), M1108,M1059

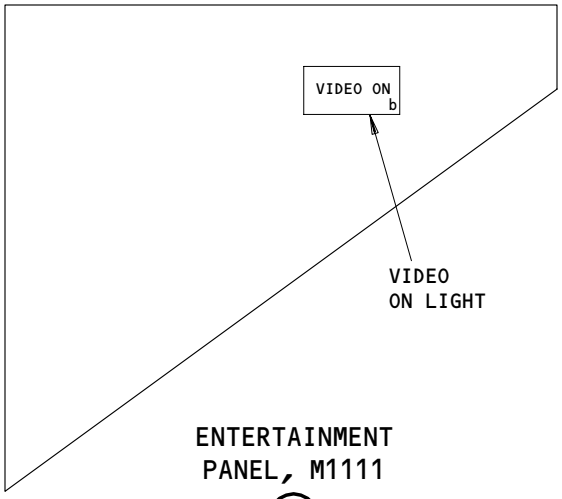
E

1 MTH 275,276

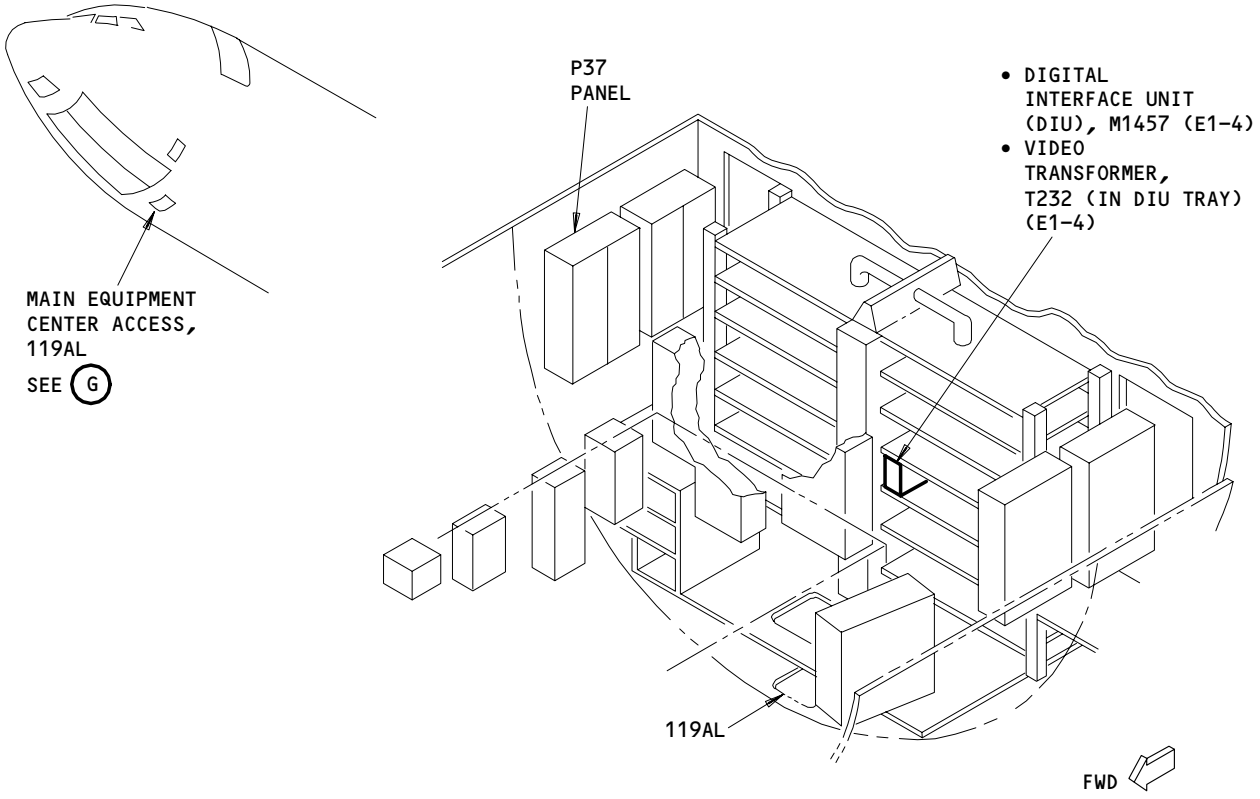
Passenger Entertainment (Video Projection) – Component Location
(Details from Shts 2 and 4)
Figure 102 (Sheet 5)



FLIGHT COMPARTMENT

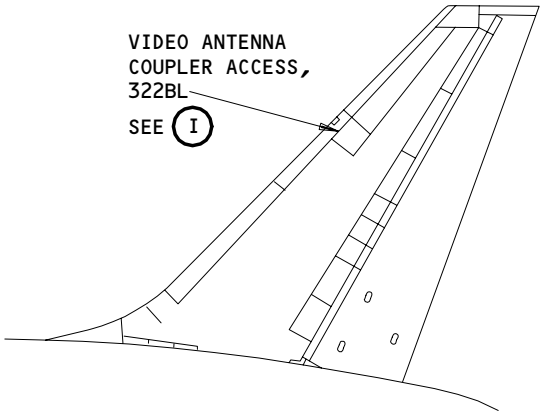


ENTERTAINMENT
PANEL, M1111
F

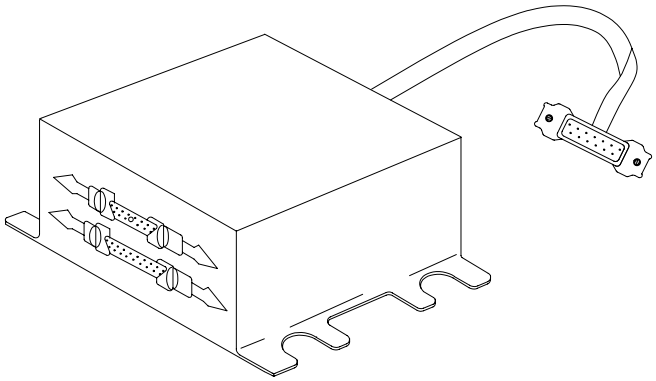


MAIN EQUIPMENT CENTER
G

Passenger Entertainment (Video Projection) - Component Location
Figure 102 (Sheet 6)

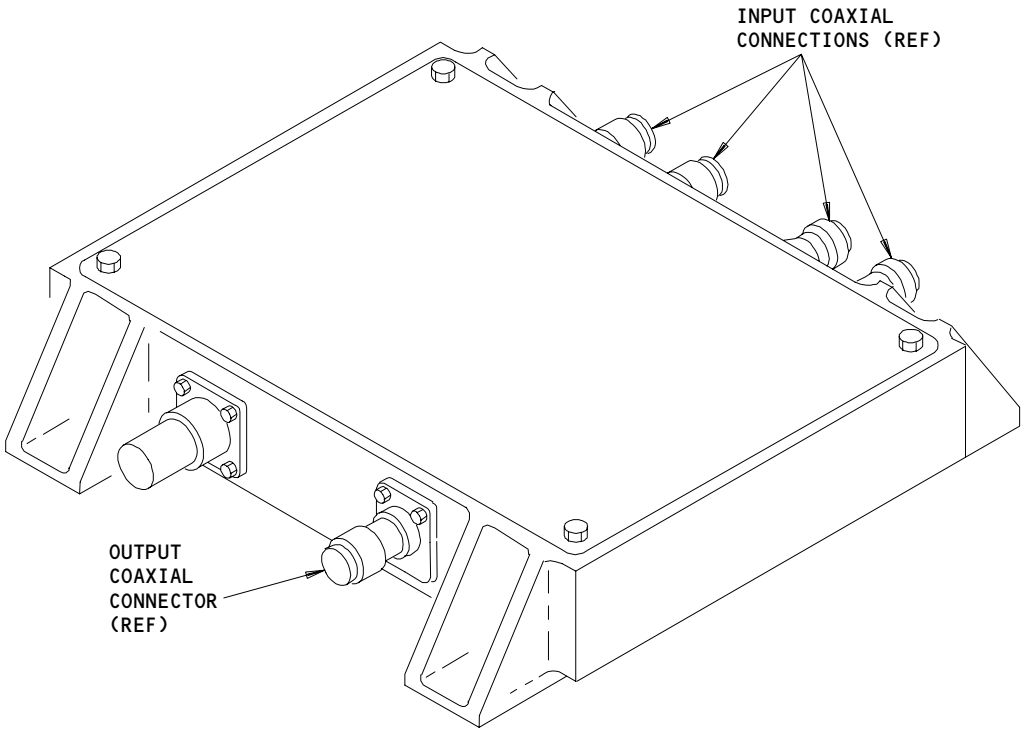


VERTICAL STABILIZER



VIDEO DISTRIBUTION UNIT (VDU)
(EXAMPLE)

(H) FROM SHTS 1 AND 3



VIDEO ANTENNA COUPLER, M820

(I)

Passenger Entertainment (Video Projection) - Component Location
Figure 102 (Sheet 7)

PASSENGER ENTERTAINMENT (VIDEO) - ADJUSTMENT/TEST

1. General
   A. This procedure is derived from SAS COC data.
   B. This procedure contains material information and instructions for:
      (1) Adjustment of 7" LCD Monitor RD-AV7073
      (2) Adjustment of 14" and 16" CRT Monitors
      (3) Demagnetizing of 14" and 16" CRT monitors

TASK 23-32-00-825-017

2. 7" LCD Monitor RD-AV7073 - Adjustment
   A. General
      (1) The RD-AV7073 is a 7" Liquid Crystal Display unit, capable of displaying both PAL and NTSC color video signals.
      (2) Figure 501 shows the front view of the display unit. Also it is shown where the four adjustment screws are situated.
      (3) Figure 502 shows the bottom view of the display unit. Also it shows the function of the adjustment screws.
   B. Equipment
      (1) Phillips screwdriver #2
      (2) Flat blade screwdriver 2.5 mm
      (3) MPH162303-401, Tool kit, video adjustment
      (4) MPH162302-001, NTSC test tape
      (5) 492899-0002, PAL test tape
      (6) MPH162301-001, Blue filter
   C. Accomplishment Instructions

      S 845-018
      (1) Preparations
         (a) SAS 276-280 POST-SB 24-0152;
         Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.
         (b) Make sure following circuit breakers on the right miscellaneous equipment panel, P37, are closed:
            1) 37L1, VIDEO AC1
            2) 37L2, VIDEO AC2
            3) 37L3, VIDEO AC3
            4) 37L4, VIDEO AC4
            5) 37K6, VIDEO AC CONTR CTR
            6) 37P11, VIDEO PROJ
         (c) Switch the video system to ON and select picture of VTR 1 on the cabin screens.
         (d) Insert 1X test tape MPH162302-001 (NTSC) in VTR 1 and rewind the tape fully.
         (e) Make sure the PAL/NTSC switch on the VTR is in position NTSC.
         (f) Remove 4X screws from the shroud around the monitor to be adjusted. Retain screws and washers.
         (g) Remove 1X shroud. Retain shroud.

S 825-019

(2) Adjustment

(a) Start the tape in VTR 1.

(b) Make sure the following test pattern is shown on the monitor to be adjusted (see figure 503):

NOTE: Before starting the adjustment, allow at least three minutes for warming-up.

NOTE: Dim the cabin lights and close the window shutters for best results.

NOTE: During adjustment, view the screen from a normal sitting position on the seat nearest the display unit.

(c) Turn the COLOR control fully clockwise.

(d) Turn the TINT control fully clockwise.

(e) Turn the CONTRAST control fully counter-clockwise.

(f) Turn the BRIGHTNESS control first fully clockwise, and then slowly counter-clockwise, until the first white blocks appear.

NOTE: During adjustment, view the screen from a normal sitting position on the seat nearest the display unit.

(g) Adjust CONTRAST in such a way that the blocks D, E, and F in section C of figure 504 are respectively black, barely visible and just visible. Blocks B, D and F in section B of figure 504 must be black. If necessary, adjust BRIGHTNESS control slightly.

(h) Slowly turn COLOR control counter-clockwise until colors are saturated.

NOTE: Over saturation gives noise and unnatural colors!

(i) Looking through the blue filter, first adjust COLOR and then TINT controls to get an equal shade of gray between Cyan bar C in section A and magenta block C in section B (see figure 505).

(j) The magenta bar E in section A and Cyan block E in section B should be an equal shade of gray when looking through the blue filter.

NOTE: Be sure not to over-saturate the colors, for the picture will be blurred.

(k) Rewind the test tape in VTR 1.

(l) Check the quality of the picture of the monitor with a PAL tape P/N 492899-0002, and with Airshow.
(m) If the picture is not clear with natural colors, re-perform the COLOR and TINT adjustment with the blue filter (above) using NTSC test tape P/N MPH162302-001.
(n) Install 1X shroud using 4X screws and 4X washers.
(o) Switch video system off.

TASK 23-32-00-825-020

3. Adjustment of 14" and 16" CRT monitors

A. General

(1) The 14" and 16" CRT screens are capable of displaying both PAL and NTSC video signals. Since the NTSC adjustment is most critical, the monitor will be adjusted using an NTSC test tape.
(2) Figure 506 shows the side view of the monitor. Also it shows the location and function of the control panel.

B. Equipment

(1) Phillips screwdriver #2
(2) Flat blade screwdriver 2.5 mm
(3) MPH162303-401, Tool kit, video adjustment
(4) MPH162302-001, NTSC test tape
(5) 492899-0002, PAL test tape
(6) MPH162301-001, Blue filter

C. Accomplishment Instructions

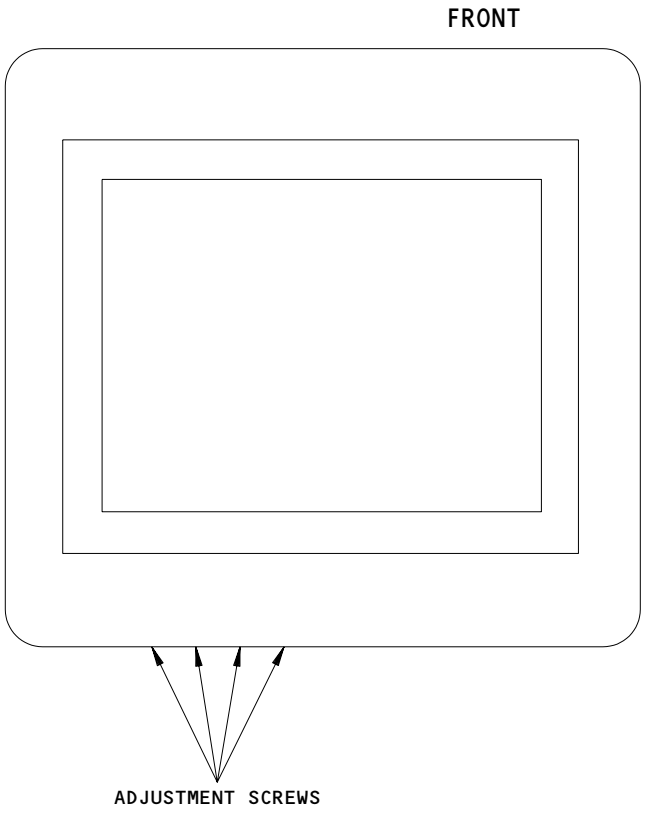
S 845-021

(1) Preparations
(a) SAS 276-280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.
(b) Make sure these circuit breakers on the right miscellaneous equipment panel, P37, are closed:
1) 37L1, VIDEO AC1
2) 37L2, VIDEO AC2
3) 37L3, VIDEO AC3
4) 37L4, VIDEO AC4
5) 37K6, VIDEO AC CONTR CTR
6) 37L11, VIDEO PROJ
(c) Switch the video system to ON and select picture of VTR 1 on the cabin screens.
(d) Insert 1X test tap MPH162302-001 (NTSC) in VTR 1 and rewind the tape fully.
(e) Make sure the PAL/NTSC switch on the VTR is in position NTSC.
(f) Open the shroud around the monitor to be adjusted.

S 825-022

(2) Adjustment
(a) Start the tape in VTR 1.

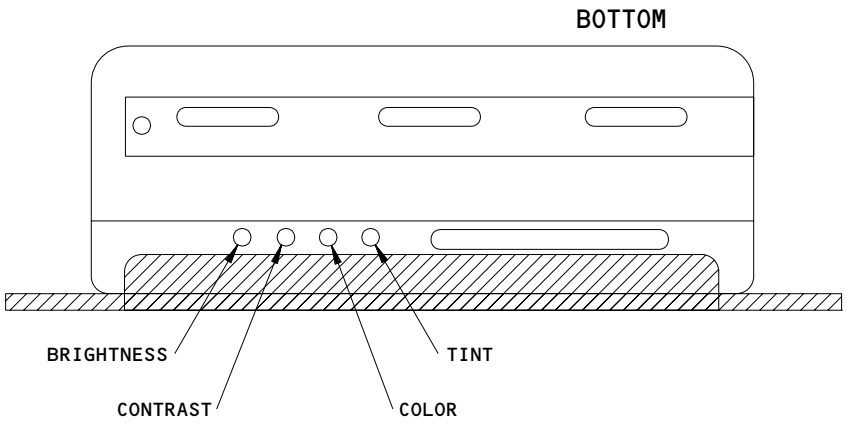
SAS



Front View 7" LCD
Figure 501

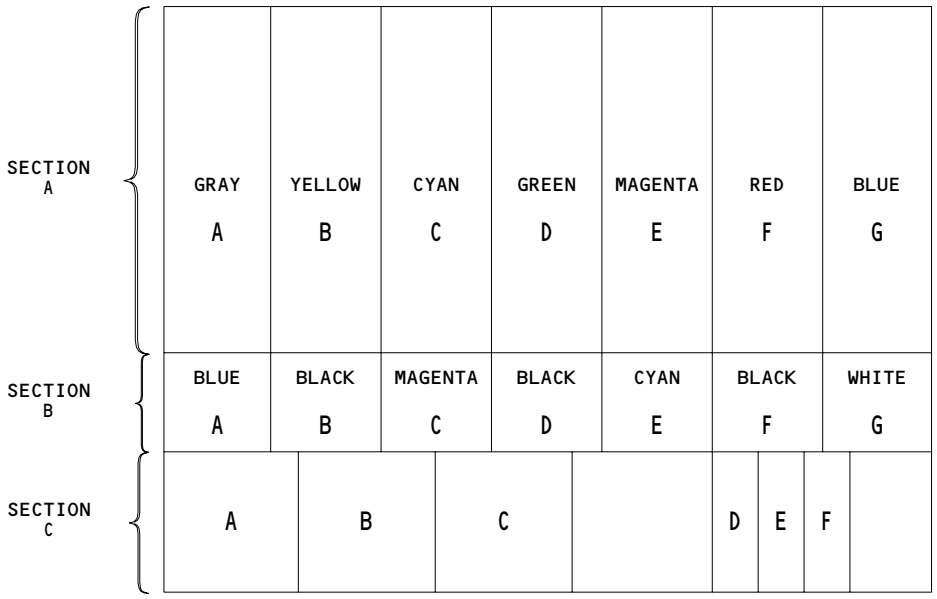
G52699

SAS



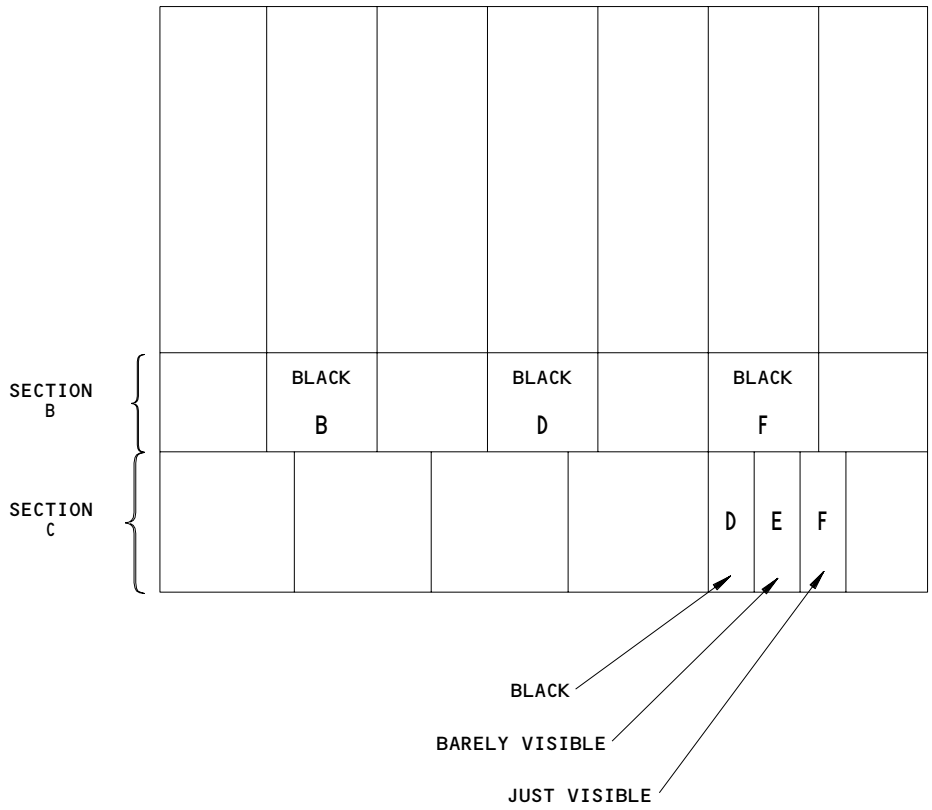
Bottom View 7" LCD
Figure 502

SAS



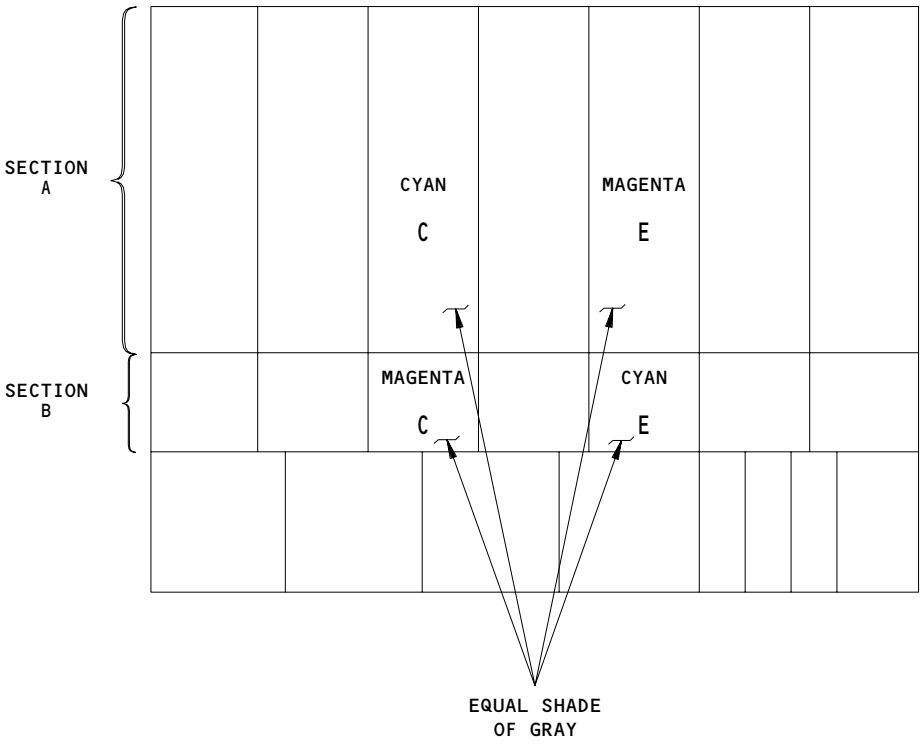
NTSC Test Pattern
Figure 503

SAS



Test Pattern
Figure 504

SAS



Test Pattern Looking Through Blue Filter
Figure 505

(b) Make sure the following test pattern is shown on the monitor to be adjusted (see figure 507):

NOTE: Before starting the adjustment, allow at least three minutes for warming-up.

NOTE: Dim the cabin lights and close the window shutters for best results.

(c) Turn the COLOR control fully counter-clockwise
(d) Turn the TINT control fully counter clockwise.
(e) Adjust BRIGHTNESS and CONTRAST in such a way that the blocks D, E, and F in section C of figure 508 are respectively black, barely visible and just visible. Blocks B, D and F in section B of figure 509 must be black.
(f) Slowly turn COLOR control clockwise until colors are saturated.

NOTE: Over saturation gives noise and unnatural colors!
(g) Check if red bar F in section A is as black as black block F in section B, when looking through blue filter P/N MPH162301-001, as shown in figure 509. If not so, adjust colors.
(h) Looking through the blue filter, adjust TINT control to get an equal shade of gray between Cyan bar C in section A and magenta block C in section B (see figure 510).
(i) The magenta bar E in section A and Cyan block E in section B should be an equal shade of gray looking through the blue filter.

NOTE: TINT and COLOR controls interact. Repeat TINT and COLOR adjustments for optimal results.

(j) Rewind the test tape in VTR 1.
(k) Check the quality of the picture of the monitor with a PAL tape P/N 492899-0002, and with Airshow.
(l) If the picture is not clear with natural colors, re-perform the COLOR and TINT adjustment with the blue filter (above) using NTSC test tape P/N MPH162302-001.
(m) Close 1X shroud.
(n) Switch the video system off.

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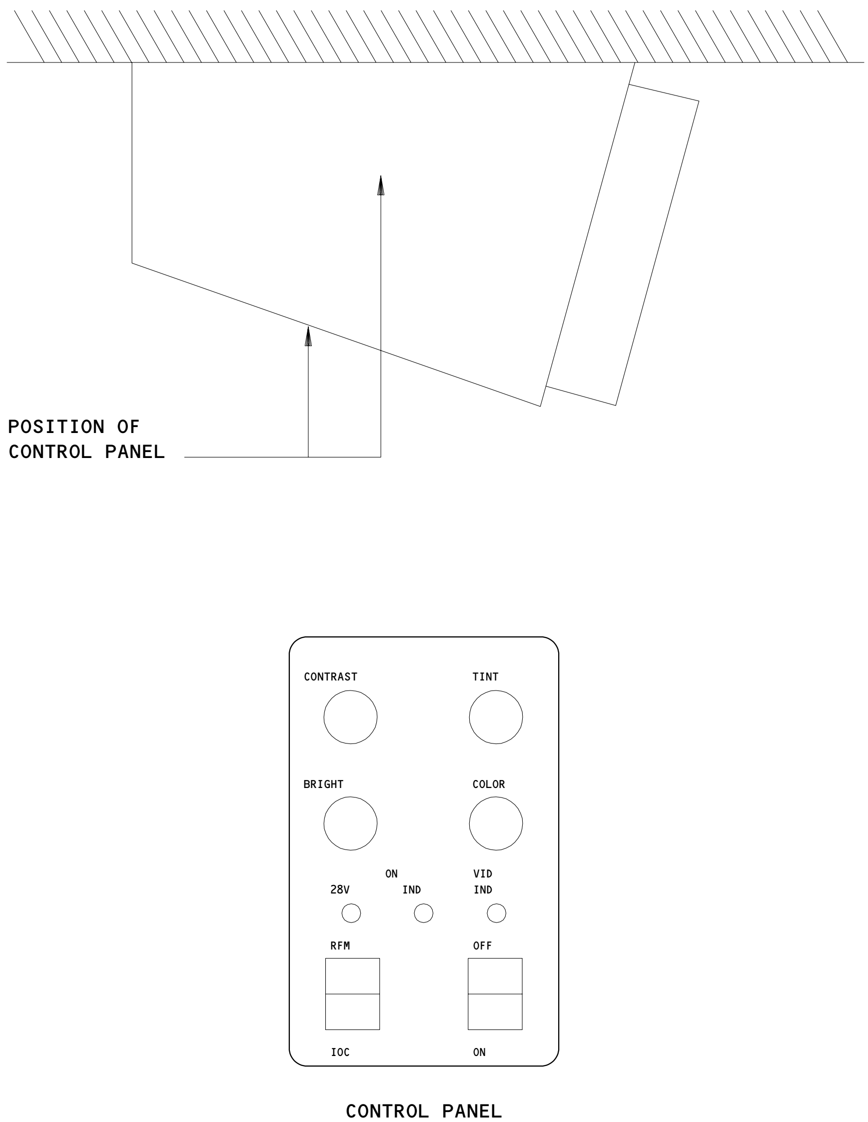
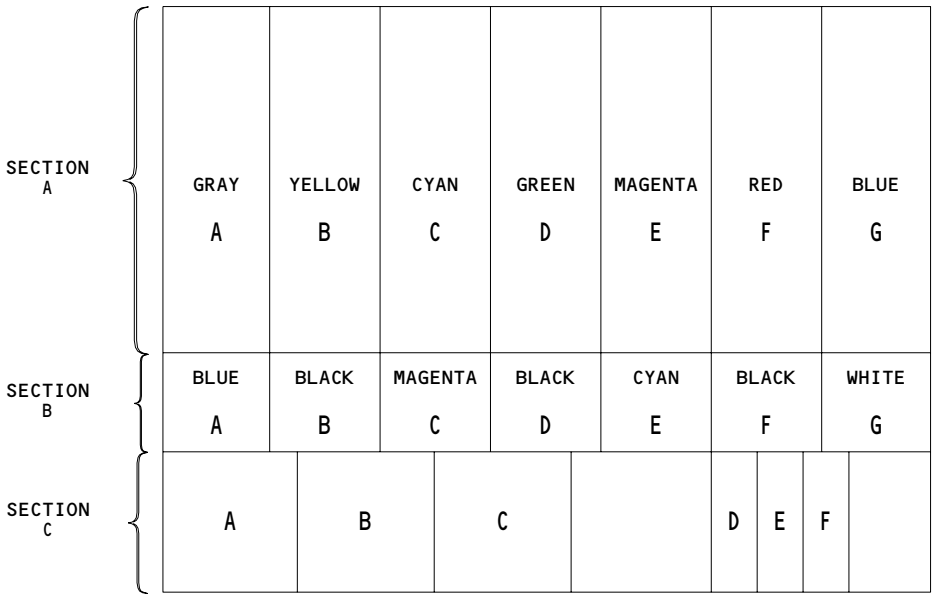


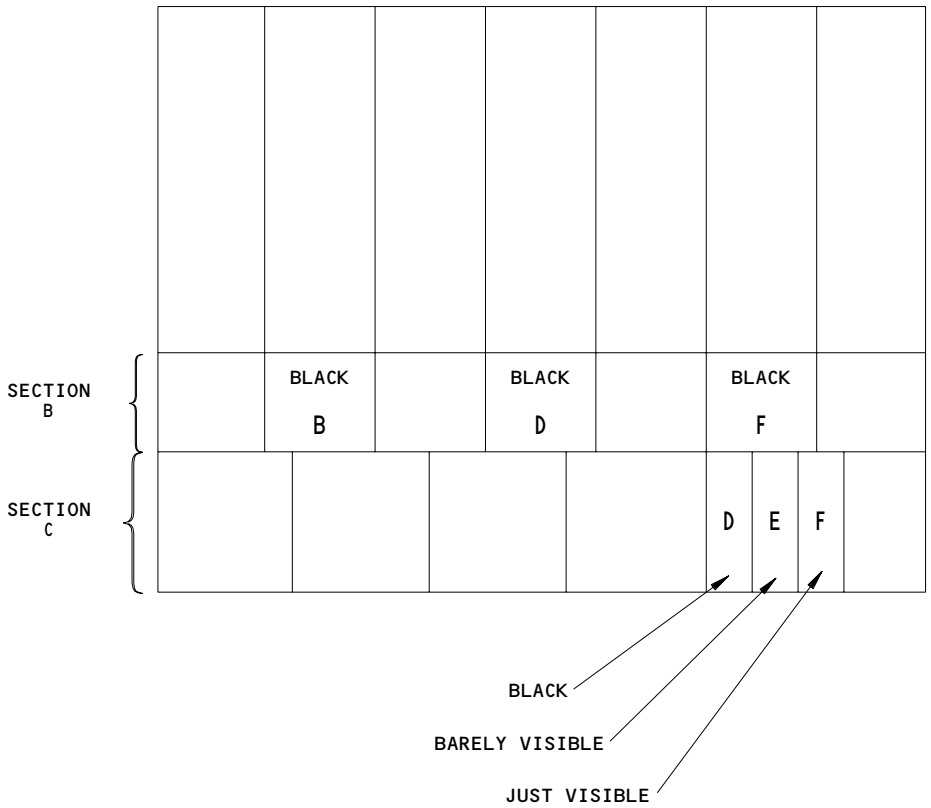
Side View CRT Monitor
Figure 506

SAS



NTSC Test Pattern
Figure 507

SAS



Test Pattern
Figure 508

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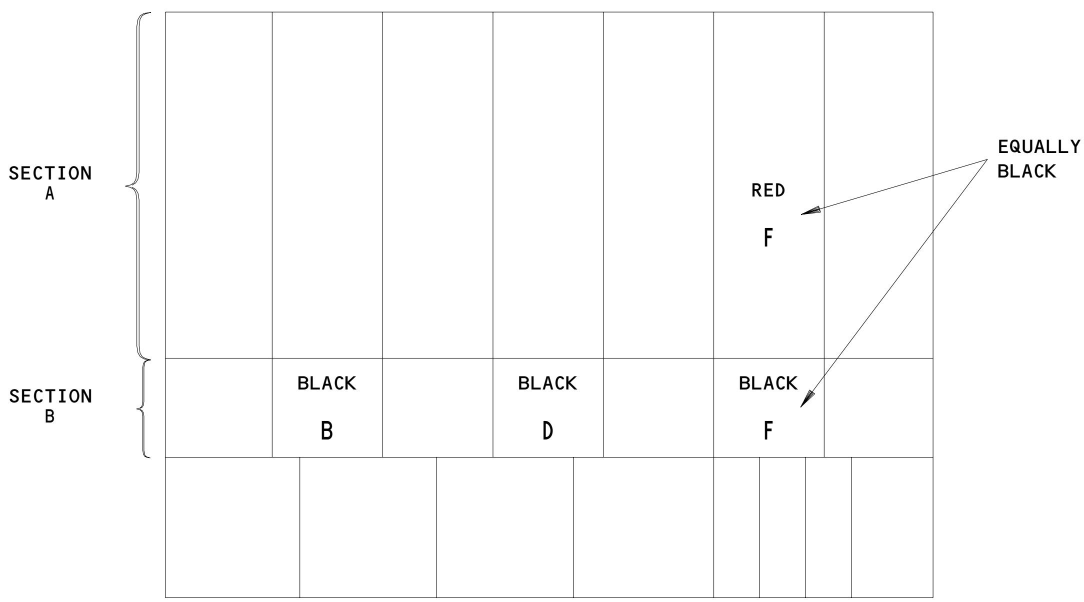
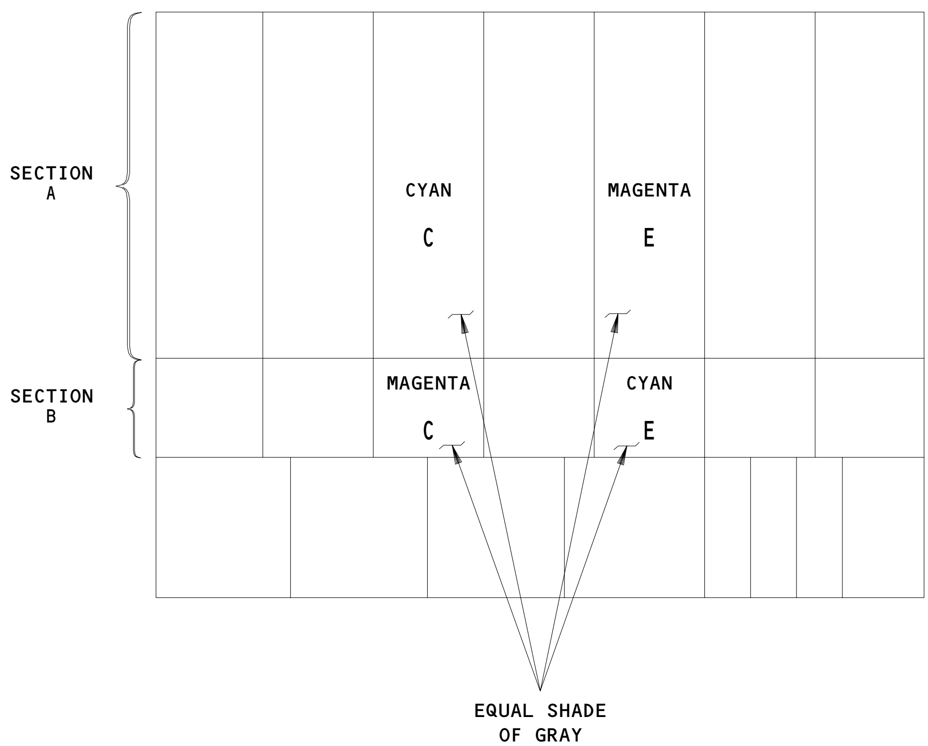


Test Pattern
Figure 509

SAS



Test Pattern
Figure 510

TASK 23-32-00-825-025

4. Demagnetizing 14" and 16" CRT monitors

A. General

(1) CRT monitors can be effected by external magnetic fields. These fields will result in deviations in the displayed colors. If a stronger magnetic field is (or was) present, the CRT will be magnetized, resulting in a permanent discoloration of the screen. This discoloration will be visible as one or more spots on the screen.

NOTE: If the entire screen has equal discoloration, the monitor should be adjusted, not demagnetized. (See section II of this chapter).

(2) Effectivity
This procedure may ONLY be used on passenger entertainment video CRTs.

B. Equipment

(1) MPH162306-001, Demagnetizing spool
(2) MPH162303-401, Tool kit, video adjustment
(3) MPH162302-001, NTSC test tape
(4) 492899-0002, PAL test tape
(5) MPH162301-001, Blue filter

C. Accomplishment Instructions

S 845-023

(1) Preparations
(a) SAS 276-280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.
(b) Verify following circuit breakers on the right miscellaneous equipment panel, P37, are closed:
1) 37L1, VIDEO AC1
2) 37L2, VIDEO AC2
3) 37L3, VIDEO AC3
4) 37L4, VIDEO AC4
5) 37K6, VIDEO AC CONTR CTR
6) 37P11, VIDEO PROJ
(c) Switch the video system to ON and select picture of VTR1 on the cabin screens.
(d) Insert 1X test tape P/N MPH162302-001 (NTSC) in VTR1 and rewind the tape completely.
(e) Verify the PAL/NTSC switch on the VTR is in NTSC position.
(f) Verify 220 VAC/50 Hz is present at the monitor to be demagnetized.

S 825-026

(2) Demagnetizing

(a) Start the tape in VTR1.

(b) Verify if the discoloration is clearly visible on the monitor.

(c) Select the picture of AIRSHOW on the cabin screens.

(d) Verify if the discoloration is clearly visible on the monitor.

(e) Select the source that most distinctively shows the discoloration.

(f) Connect the demagnetizing spool to the mains, 220 VAC/50 Hz.

(g) Switch on the spool approximately 2 meters from the monitor. Keep the switch depressed.

(h) Make a spiral like movement towards the monitor starting with a radius of about 1 meter, and end approximately 1 cm from the monitor with a radius of 0.

NOTE: The monitor will now display a very strange color pattern, DO NOT BE ALARMED!

NOTE: Move the spool very gently, NOT abruptly.

(i) Make a spiral like movement away from the monitor starting with a radius of 0 near the monitor and end approximately 2 meters from the monitor with a radius of about 1 meter.

(j) Release the demagnetizer switch.

(k) Verify the result on the monitor.

(l) Repeat the demagnetization steps if necessary.

(m) Perform section II of this chapter, Adjustment of 14" and 16" CRT monitors, if necessary.

VIDEO TAPE REPRODUCER - REMOVAL/INSTALLATION

1. General
   A. Video tape reproducers 1, 2 and 3, M1108, M1059 and M1613 (referred to as VTR-1, VTR-2 and VTR-3) are in the video contro center. Each VTR is held in the video control center by an adapter panel bolted to the bottom of the unit. The removal and installation procedures are the same for all units.

   TASK 23-32-01-004-001-001
2. Remove the Component (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          200 Upper Half of the Fuselage

      (2) Access Panel
          119AL Main Equipment Center

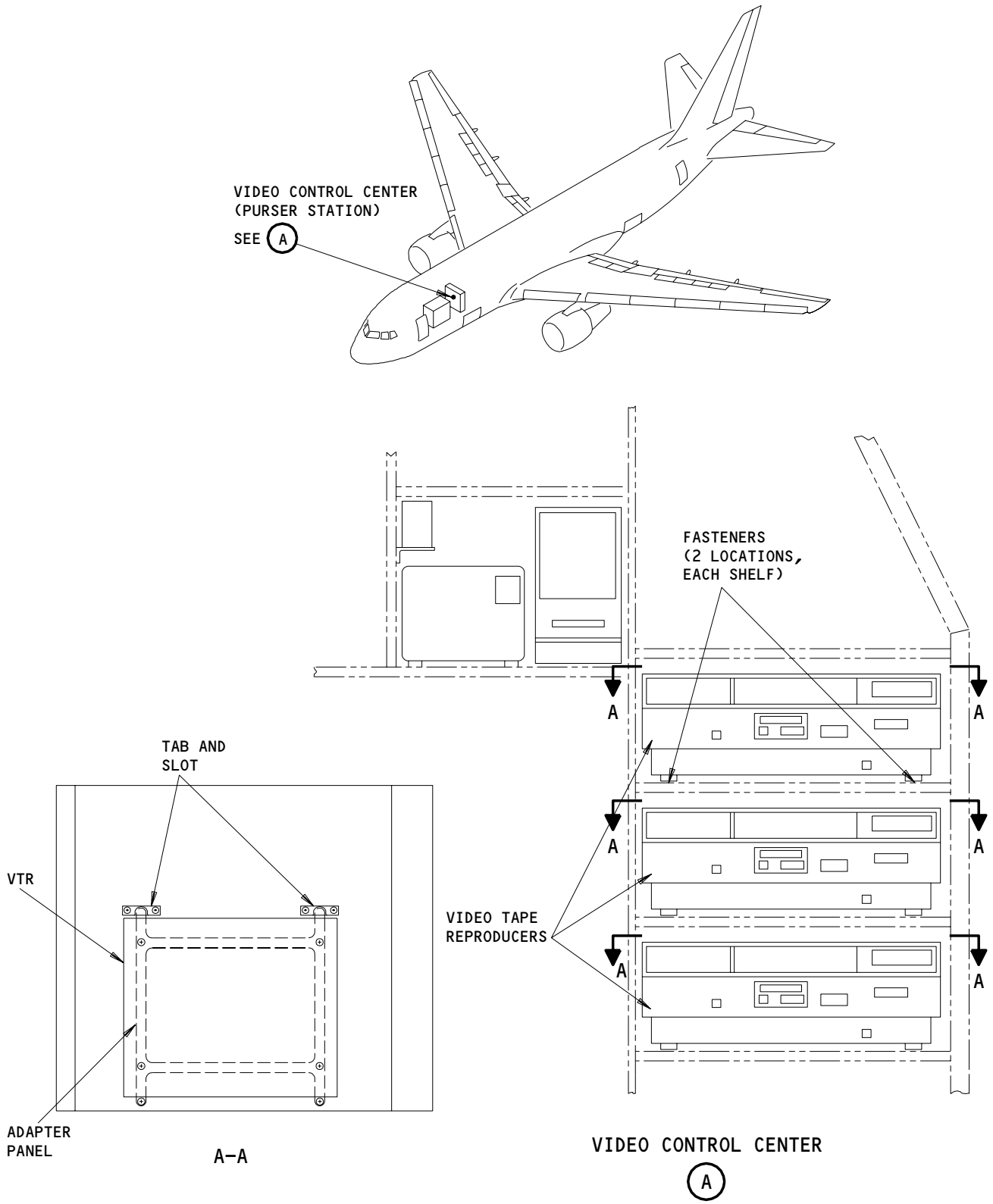
   C. Prepare for Removal

      S 014-002-001
      (1) Open the access door, 119AL, for the right miscellaneous electrical equipment panel, P37 (AMM 06-41-00/201).

      S 864-003-001
      (2) Open this circuit breaker on the P37 panel, and attach a DO-NOT-CLOSE tag:
          (a) 37K5, FWD VIDEO PROJECTOR

      S 864-004-001
      (3) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T34, VIDEO PROJ
   D. Remove the Component

      S 024-005-001
      (1) Do these steps to remove the component:
          (a) Remove the two fasteners along the front edge of the VTR adapter panel.
          (b) Remove the VTR far enough to get access to the electrical connectors on the rear of the unit.
          (c) Identify the electrical connectors for installation.



Video Tape Reproducer – Removal/Installation
Figure 401

(d) Remove the electrical connectors.
(e) Remove the four screws that hold the adapter panel to the VTR.
(f) Remove the adapter panel and keep it for installation.

TASK 23-32-01-404-006-001

3. Install the Component (Fig. 401)

A. References
(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones

119/120	Main Equipment Center
200	Upper Half of the Fuselage

(2) Access Panel

119AL	Main Equipment Center

C. Install the Component

S 424-007-001
(1) Do these steps to install the component:
(a) Put the adapter in position on the bottom of the VTR.
(b) Install the four screws that hold the adapter panel on the VTR.
(c) Put the adapter panel assembly in the video control center and connect the electrical connectors to the rear of the VTR.
(d) Move the VTR back into the video control center. Make sure the tabs on the adapter panel engage the slots at the rear of the shelf.
(e) Install the two fasteners along the front edge of the adapter panel.

S 864-008-001
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11T34, VIDEO PROJ

S 864-009-001
(3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P37 panel:
(a) 37K5, FWD VIDEO PROJECTOR

D. Do a Test of the VTR Installation

S 864-010-001
(1) Supply electrical power (AMM 24-22-00/201).

S 864-015-001
(2) SAS 162-167 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-016-001
(3) SAS 162-167 POST-SB 24-0152;
Make sure that the following circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37J4, FWD VIDEO PROJECTOR
(b) 37J5, AFT VIDEO PROJECTOR

S 714-011-001
(4) Do these steps to do a test of the VTR installation:
(a) Do these steps:
1) Do these steps at the control distribution unit (CDU):
a) Push the SYSTEM POWER switch to the on position (switchlight on).
b) Push the MONITOR SEL switch until the indicators read VTR 1, 2, or 3 PRI, as applicable.
2) Do the steps at the applicable video tape reproducer (VTR):
a) Put in a video cassette tape.
b) Push the PLAY switch.
3) Look for a clear video picture on the CDU preview monitor.

NOTE: The preview monitor picture will be black and white.

4) Push the STOP switch on the VTR.
5) Push the EJECT switch on the VTR and remove the tape.
6) Push the SYSTEM POWER switch at the CDU to the off position.

E. Put the Airplane Back to Its Initial Condition

S 414-012-001
(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-013-001
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VIDEO TAPE REPRODUCER - REMOVAL/INSTALLATION

1. General
   A. Video tape reproducers 1 and 2, M1108 and M1059 (referred to as VTR-1 and VTR-2) are in the video control center. The two units are held in the video control center by an adapter panel bolted to the bottom of each unit. The removal and installation procedures are the same for the two units.

TASK 23-32-01-004-001-002

2. Video Tape Reproducer (VTR) Removal
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          200 Upper Half of the Fuselage

      (2) Access Panel
          119AL Main Equipment Center

   C. Prepare for Removal

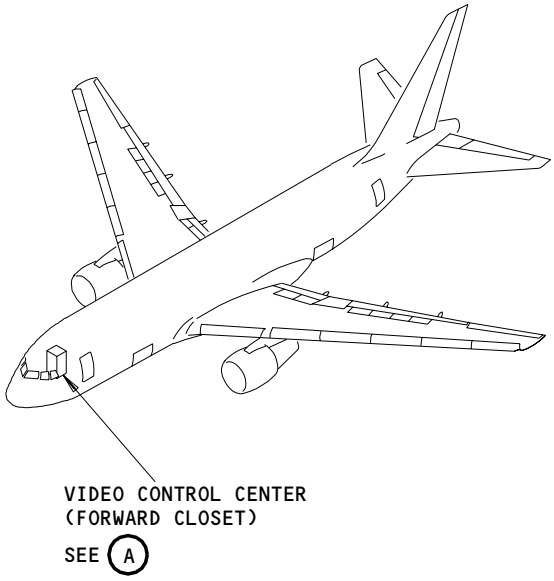
      S 014-002-002
      (1) Open the access door, 119AL, for the right miscellaneous electrical equipment panel, P37 (AMM 06-41-00/201).

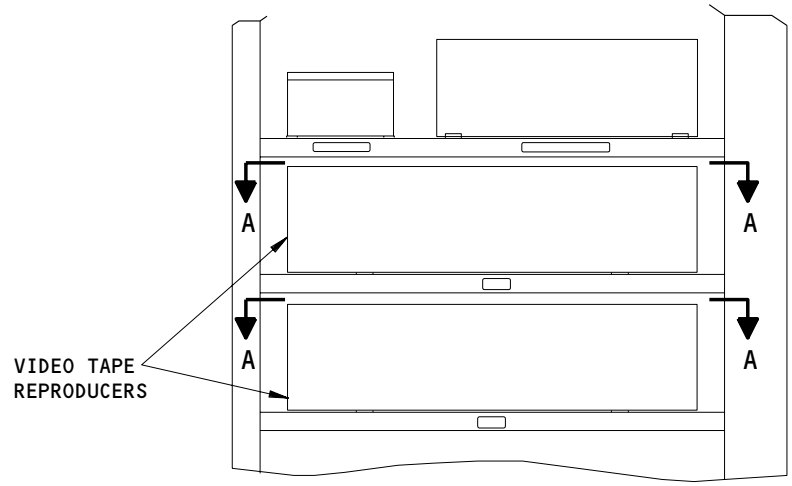
      S 864-003-002
      (2) Open this circuit breaker on the P37 panel, and attach a DO-NOT-CLOSE tag:
          (a) 37K6, VIDEO CONT CTR

      S 864-004-002
      (3) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T34, VIDEO PROJ
   D. Remove the Component

      S 024-005-002
      (1) Do these steps to remove the component:
          (a) Remove the two fasteners along the front edge of the VTR adapter panel.
          (b) Remove the VTR far enough to get access to the electrical connectors on the rear of the unit.
          (c) Identify the electrical connectors for installation.

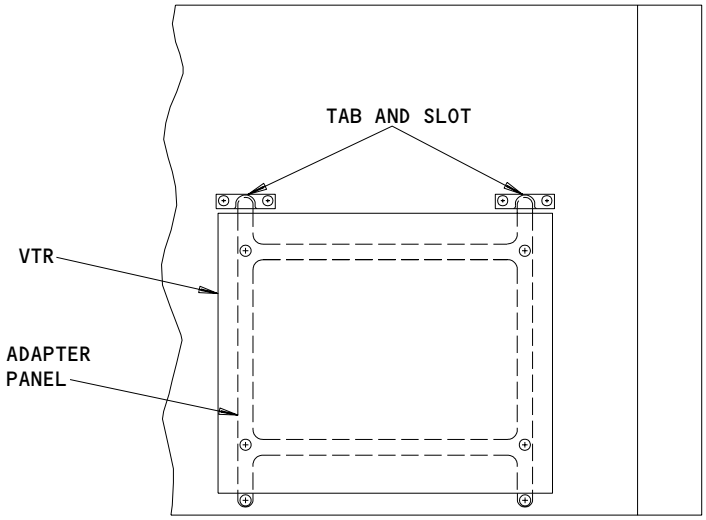
SAS





VIDEO CONTROL CENTER

A



A-A

Video Tape Reproducer - Removal/Installation
Figure 401

(d) Remove the electrical connectors.
(e) Remove the four screws that hold the adapter panel to the VTR.
(f) Remove the adapter panel and keep it for installation.

TASK 23-32-01-404-006-002

3. Video Tape Reproducer Installation

A. References
(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones
119/120 Main Equipment Center
200 Upper Half of the Fuselage

(2) Access Panel
119AL Main Equipment Center

C. Install the Component

S 424-007-002
(1) Do these steps to install the component:
(a) Put the adapter in position on the bottom of the VTR.
(b) Install the four screws that hold the adapter panel on the VTR.
(c) Put the adapter panel assembly in the video control center and connect the electrical connectors to the rear of the VTR.
(d) Move the VTR back into the video control center. Make sure the tabs on the adapter panel engage the slots at the rear of the shelf.
(e) Install the two fasteners along the front edge of the adapter panel.

S 864-008-002
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11T34, VIDEO PROJ

S 864-009-002
(3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P37 panel:
(a) 37K6, VIDEO CONT CTR

D. Do a Test of the VTR Installation

S 864-010-002
(1) Supply electrical power (AMM 24-22-00/201).

S 864-015-002

(2) SAS 276-280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-016-002

(3) SAS 276-280 POST-SB 24-0152;
Make sure that the following circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K6, VIDEO CONT CTR
(b) 37L1, VIDEO 1
(c) 37L3, VIDEO 3

S 714-011-002

(4) Do these steps to do a test of the VTR installation:
(a) At the video system control unit (VSCU):
1) Push the MASTER POWER switch to the ON position (switchlight on).
2) Push the VIDEO INPUT switch to select the applicable VTR. Make sure this display shows on the VSCU monitor.

PREVIEW
VIDEO [VCP1] or [VCP2]

NOTE: Characters in [] brackets will flash on and off. The [] brackets are used to show the flashing characters and will not show on the VSCU monitor.

3) Push the ON/OFF switch.
(b) At the applicable video tape reproducer:
1) Put in a video cassette tape.
2) Select the proper video format.
3) Push the PLAY switch.
(c) Look for a clear video picture on the SCU monitor.
(d) Push the STOP switch on the VTR.
(e) Push the EJECT switch on the VTR and remove the tape.
(f) Push the MASTER POWER switch to the off position (switchlight off) at the VSCU.

E. Put the Airplane Back to Its Initial Condition

S 414-012-002

(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-013-002

(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VIDEO PROJECTOR - REMOVAL/INSTALLATION

1. General
   A. A video projector is in the passenger cabin. The video projector is installed on the passenger cabin ceiling along the center passenger-service-unit rails. The location of the projector is given by its necessary distance from the video screen. The video projector is in a two-piece shroud. The bottom half of the shroud is opened with quick-release latches to get access to the video projector.

TASK 23-32-02-004-001

2. Remove the Video Projector (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          200 Upper Half of the Fuselage

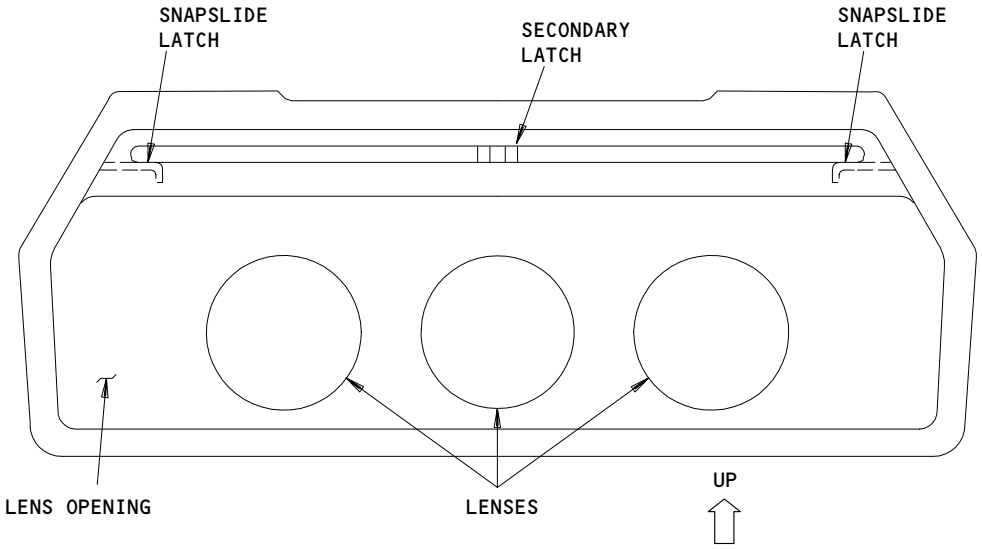
      (2) Access Panel
          119AL Main Equipment Center

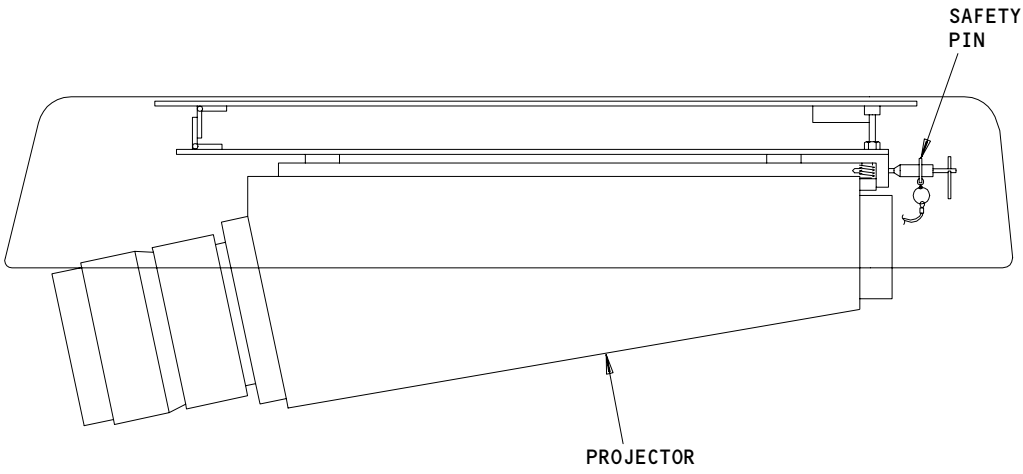
   C. Prepare for Removal

      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T34, VIDEO PROJ

      S 014-032
      (2) Open the access door, 119AL, for the right miscellaneous electrical equipment panel, P37 (AMM 06-41-00/201).

      S 864-003
      (3) Open these circuit breakers on the P37 panel, and attach DO-NOT-CLOSE tags:
          (a) 37K5, FWD VIDEO PROJECTOR
          (b) 37K6, MID VIDEO PROJECTOR
          (c) 37K7, AFT VIDEO PROJECTOR





Video Projector Installation
Figure 401

D. Remove the Video Projector

S 024-004

(1) Do these steps to remove the video projector:
   (a) Put your hands through the lens opening at the front of the shroud and move the two snapslide latches inboard.
   (b) Lower the bottom half of the shroud to the end of the lanyards.
   (c) Release the lanyards and lower the bottom half of the shroud.
   (d) Remove the electrical connectors from the rear of the video projector.

WARNING: THE VIDEO PROJECTOR IS HEAVY AND TWO MECHANICS ARE NECESSARY FOR REMOVAL. INJURY TO PERSONS CAN OCCUR IF REMOVAL IS DONE WITHOUT AID.

CAUTION: PREPARE TO HOLD THE WEIGHT OF THE VIDEO PROJECTOR BEFORE YOU DO THE NEXT STEP. THE VIDEO PROJECTOR CAN BE DAMAGED IF YOU ARE NOT PREPARED.

   (e) Remove the safety pin from the rear of the bracket that holds the video projector.
   (f) Move the video projector aft to release the lip at the rear of the video projector from the ceiling assembly.
   (g) Remove the video projector.

TASK 23-32-02-404-009

3. Install the Video Projector (Fig. 401)

A. References
   (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
   (2) AMM 24-22-00/201, Electrical Power - Control

B. Access
   (1) Location Zones
   119/120 Main Equipment Center
   200 Upper Half of the Fuselage

   (2) Access Panel
   119AL Main Equipment Center

C. Install the Video Projector

S 424-027

WARNING: THE VIDEO PROJECTOR IS HEAVY AND TWO MECHANICS ARE NECESSARY FOR INSTALLATION. INJURY TO PERSONS CAN OCCUR IF INSTALLATION IS DONE WITHOUT AID.

CAUTION: HOLD THE VIDEO PROJECTOR UNTIL ALL OF THE FASTENERS ARE INSTALLED. THE VIDEO PROJECTOR CAN BE DAMAGED IF IT IS NOT HELD.

(1) Do these steps to install the video projector:
   (a) Lift the video projector into position on the ceiling assembly. Make sure all four bullet pins on the ceiling assembly are in the holes on top of the video projector.
   (b) Push forward on the video projector until the latchplate falls into position.
   (c) Install the safety pin.
   (d) Connect the electrical connectors to the video projector.
   (e) Raise the bottom shroud and connect the lanyards to the shroud.
   (f) Close the bottom shroud and make sure all latches are engaged.

S 864-016

(2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P37 panel:
   (a) 37K5, FWD VIDEO PROJECTOR
   (b) 37K6, MID VIDEO PROJECTOR
   (c) 37K7, AFT VIDEO PROJECTOR

S 864-017

(3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
   (a) 11T34, VIDEO PROJ

D. Video Projector Installation Test

S 864-018

(1) Supply electrical power (AMM 24-22-00/201).

S 864-269
(2) SAS 162-167 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-270
(3) SAS 162-167 POST-SB 24-0152;
Make sure that the following circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K5, FWD VIDEO PROJECTOR
(b) 37K7, AFT VIDEO PROJECTOR

S 714-011
(4) Do these steps to do a test of the video projector installation:
(a) Put the video screen in the viewing position.
(b) Do these steps at the video control center:
1) At the control distribution unit (referred to as the CDU):
2) Push the SYSTEM POWER switch to the on position.
a) Push the PROJ PWR ON switch for zone 3.
b) Push the SOURCE SEL 3 switch until the displays show VTR 1.
3) Turn the mode selector switch to the LOGO position:
(c) Make sure the SAS airline logo shows on the video screen.
(d) Push the SYSTEM POWER switch to the off position at the CDU.
(e) Put the video screen in the stowed position.

E. Put the Airplane Back to Its Initial Condition

S 414-037
(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-026
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

CONTROL DISTRIBUTION UNIT - REMOVAL/INSTALLATION

1. General
   A. The Control Distribution Unit (referred to as the CDU), M815 is installed in the video control center at the purser station. The CDU is attached to a shelf with an adapter panel attached to the bottom of the CDU.
   B. This procedure contains two tasks. The first task removes the CDU. The second task installs the CDU and does a test of the installation.

TASK 23-32-03-004-001-001

2. Remove the Control Distribution Unit
   A. Access
      (1) Location Zones
          211/212 Flight Compartment
          221 Passenger Cabin - Section 41 (Left)

   B. Remove the CDU

      S 864-002-001
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T34, VIDEO PROJ

      S 034-003-001
      (2) Remove the two fasteners on the front edge of the CDU adapter panel.

      S 014-004-001
      (3) Pull the CDU forward until you can get to the electrical connectors behind the CDU.

      S 974-005-001
      (4) Make a note of the location of the connectors behind the CDU.

      S 034-006-001
      (5) Disconnect the electrical connectors.

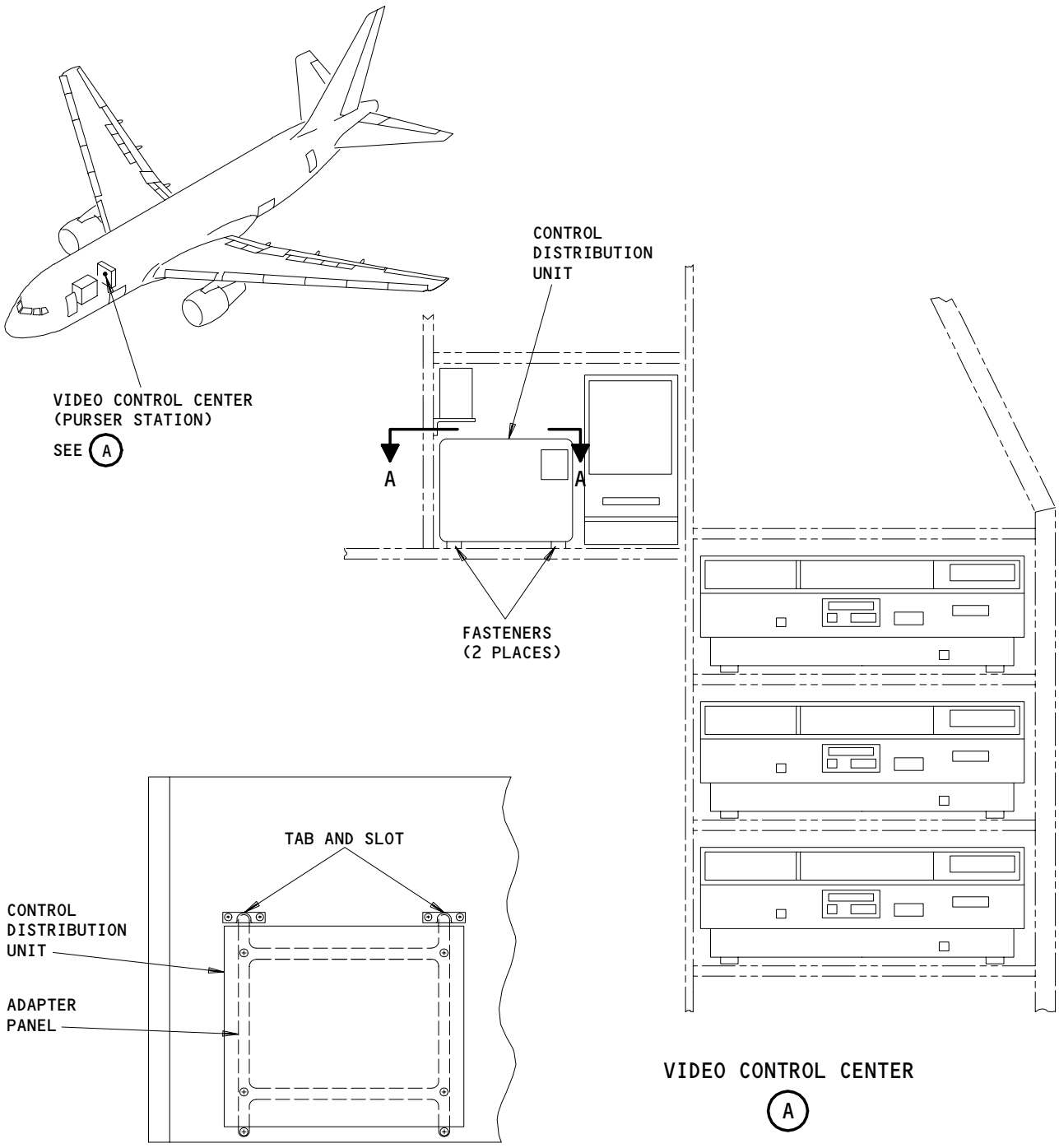
      S 024-007-001
      (6) Remove the CDU from the video control center.

      S 014-008-001
      (7) Remove the adapter panel from the bottom of the CDU.

          NOTE: Keep the adapter panel for the installation of a CDU.

TASK 23-32-03-404-009-001

3. Install the Control Distribution Unit
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control



Video Tape Reproducer – Removal/Installation
Figure 401

B. Access

(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment
221	Passenger Cabin - Section 41 (Left)

(2) Access Panel

119AL	Main Equipment Center Access

C. Install the CDU

S 434-010-001

(1) Install the adapter panel on the bottom of the CDU.

S 024-011-001

(2) Put the CDU on the shelf.

S 434-012-001

(3) Connect the electrical connectors to the correct locations behind the CDU.

S 424-013-001

(4) Push the CDU on the shelf.

S 424-014-001

(5) Make sure the tabs on the adapter panel engage the slots at the rear of the shelf.

S 434-015-001

(6) Install the two fasteners on the front edge of the adapter panel.

S 864-016-001

(7) Remove the DO-NOT-CLOSE tag, and close this circuit breaker on the P11 panel:

(a) 11T34, VIDEO PROJ

D. The Test of the CDU

S 864-017-001
(1) Supply electrical power (AMM 24-22-00/201).

S 864-048-001
(2) SAS 162-167 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-018-001
(3) Make sure these circuit breakers on the right miscellaneous electrical equipment panel, P37, are closed:
(a) 37K5, FWD VIDEO PROJECTOR
(b) 37K6, MID VIDEO PROJECTOR
(c) 37K7, AFT VIDEO PROJECTOR

S 714-019-001
(4) Do these steps at the CDU to do a test:
(a) Push the SYSTEM POWER switch to the on position (the light comes on).
(b) Push the MONITOR SEL switch until the indication shows AUX 2.
(c) Push the zone 1, 2, and 3 PROJ PWR ON switches.
(d) Make sure the lights in the switches come on.
(e) Push the zone 1, 2, and 3 SOURCE SEL switches until the indication shows AUX 2.

S 864-020-001
(5) Set the mode selector switch to LOGO.

S 714-021-001
(6) Make sure the SAS airline logo shows on the CDU preview monitor and the passenger cabin video monitors.

S 864-022-001
(7) Push the CDU SYSTEM POWER switch to the off position (the light in the switch goes off).

S 864-023-001
(8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

SYSTEM CONTROL UNIT - REMOVAL/INSTALLATION

1. General
   A. The Video System Control Unit (referred to as the VSCU) Equipment number M815 is installed in the video control center at the forward closet. The SCU is attached to a shelf with an adapter panel attached to the bottom of the VSCU.
   B. This procedure contains two tasks. The first task removes the VSCU. The second task installs the VSCU and does a test of the installation.

TASK 23-32-03-004-001-002

2. Remove the Video System Control Unit
   A. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment
          221/222 Passenger Cabin - Section 41

      (2) Access Panel
          119AL Main Equipment Center Access

   B. Remove the VSCU

      S 864-002-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T34, VIDEO PROJ

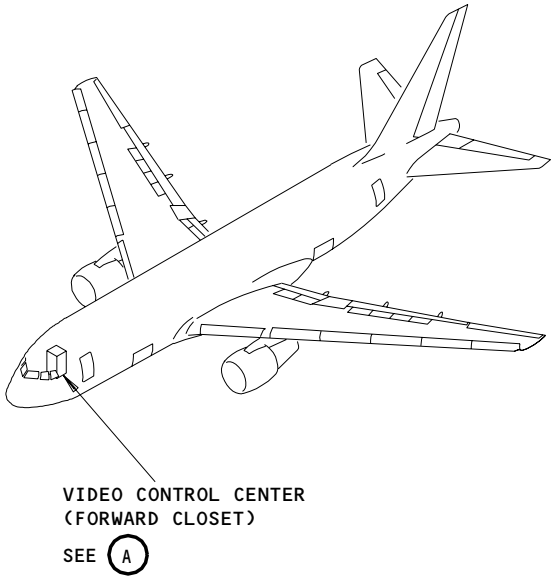
      S 864-003-002
      (2) Open this circuit breaker on the right miscellaneous electrical equipment panel, P37, and attach a DO-NOT-CLOSE tag:
          (a) 37K6, VIDEO AC CONT CTR

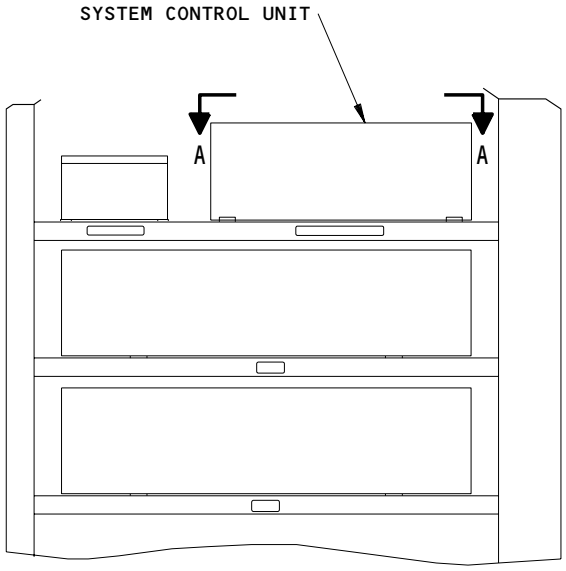
      S 034-004-002
      (3) Remove the two fasteners on the front edge of the VSCU adapter panel.

      S 014-005-002
      (4) Pull the VSCU forward until you can get to the electrical connectors behind the VSCU.

      S 974-006-002
      (5) Make a note of the location of the electrical connectors behind the VSCU.

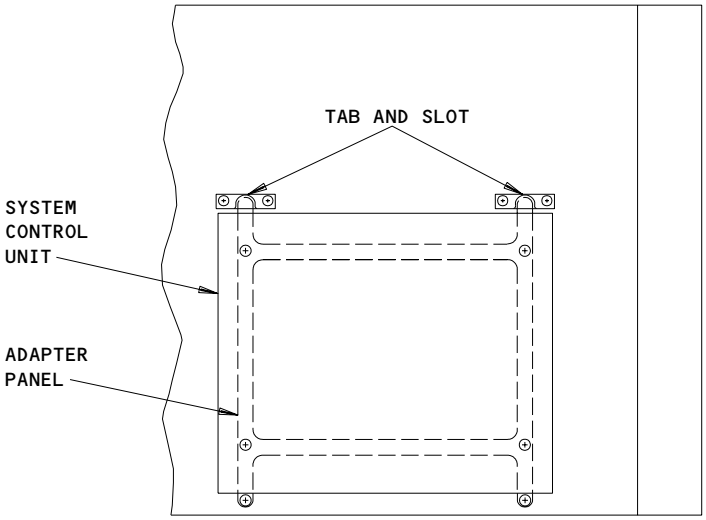
SAS





VIDEO CONTROL CENTER

(A)



A-A

Video System Control Unit - Removal/Installation
Figure 401

S 034-007-002
(6) Disconnect the electrical connectors.

S 024-008-002
(7) Remove the VSCU from the video control center.

S 024-029-002
(8) Remove the adapter panel from the bottom of the VSCU.

NOTE: Keep the adapter panel until you install the VSCU.

TASK 23-32-03-404-009-002

3. Install the Video System Control Unit

A. References
(1) 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment
221/222	Passenger Cabin - Section 41

(2) Access Panel

119AL	Main Equipment Center Access

C. Install the VSCU

S 434-010-002
(1) Install the adapter panel on the bottom of the VSCU.

S 424-011-002
(2) Put the VSCU on the shelf.

S 434-012-002
(3) Connect the electrical connectors correctly behind the VSCU.

S 424-013-002
(4) Push the VSCU on the shelf.

S 424-014-002
(5) Make sure the tabs on the adapter panel engage the slots at the rear of the shelf.

S 434-015-002
(6) Install the two fasteners on the front edge of the adapter panel.

S 864-016-002
(7) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11T34, VIDEO PROJ

S 864-017-002
(8) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P37 panel:
(a) 37K6, VIDEO AC CONT CTR

D. VSCU Installation Test

S 864-018-002
(1) Supply electrical power (Ref 24-22-00).

S 864-034-002
(2) SAS 276-280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-019-002
(3) Make sure these circuit breakers on the P37 panel are closed:
(a) 37L1, VIDEO AC 1
(b) 37L2, VIDEO AC 2
(c) 37L3, VIDEO AC 3
(d) 37L4, VIDEO AC 4

S 844-032-002
(4) Verification/Reload of configuration
(a) Press the Master Power key.
(b) If the display

READY
VIDEO CONFIG A

is shown the Boeing 767 configuration is selected. Continue with the steps in the next task at the VSCU to perform the test.

(c) If the display

READY
VIDEO CONFIG B

is shown the MD-11 Video configuration has been selected.
Proceed as follows to load the Boeing 767 video configuration:
1) Switch OFF the VSCU with the Master Power key.
2) At the same time push the PA and ENTER keys and push the Master Power key ON.
3) Make sure that the VSCU display shows CONFIG AIRCRAFT.
4) Go to VDU adress 01.

NOTE: Push VIDEO INPUT for counting up or the CLEAR key for counting down.

5) Push the PA button.
6) Make sure that LOAD CONFIG [x] appears at the bottom of the screen with [x] flashing.
7) Push PA VOLUME UP/DOWN buttons to adjust [x] to A.
8) Push ENTER to load the configuration.
9) Make sure the message CONFIGURATION LOADED appears at the bottom of the screen to confirm the load action.
10) Push ENTER three times to return to the initial screen.

S 714-020-002

(5) Do these steps at the VSCU to do a test:
(a) Push the MASTER POWER switch to the on position (the light in the switch comes on).
(b) Make sure the VSCU monitor shows READY.
(c) Push the STATUS switch until the monitor status display shows on the VSCU monitor.
(d) Make sure all of the monitors show as ON.
(e) If a monitor shows as OFF, do these steps:
1) Push the MONITOR switch until the first monitor that shows as OFF is set (OFF will flash when the monitor is set).
2) Push the ON/OFF switch.
3) Make sure the monitor shows as ON.
4) Do this procedure again for all of the monitors that show as OFF.
(f) Push the CLASS switch.

(g) Make sure this display shows on the VSCU preview monitor:

CLASS	[F]	[C]	[M]
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

NOTE: The characters in [ ] brackets flash on and off. The [ ] brackets are used only to show the characters that flash and do not show on the SCU monitor.

(h) Push the CLASS button until this display shows on the VSCU monitor:

CLASS	F	C	M
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

(i) Push the VIDEO INPUT switch until this display shows on the VSCU monitor:

CLASS	F	C	M
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

(j) Push the ON/OFF switch.

(k) Make sure this display shows on the VSCU monitor:

CLASS	F	C	M
VIDEO	VCP1 [ON]	VCP1 [ON]	VCP1 [ON]
PA	CH1 OFF	CH1 OFF	CH1 OFF

(l) Push the PREVIEW switch.
(m) Make sure this display shows on the VSCU monitor:

```
PREVIEW
VIDEO
```

(n) Push the VIDEO INPUT switch until this display shows on the VSCU monitor:

```
PREVIEW
VIDEO     [VCP1]
```

(o) Push the ON/OFF switch.

S 864-021-002
(6) Do these steps at the video tape reproducer 1 (VTR-1) to prepare for the test:
(a) Put the video cassette tape into the tape reproducer.
(b) Push the PLAY switch.

S 714-022-002
(7) Make sure the video display is clear on the VSCU monitor and the forward monitors in the passenger cabin.

S 864-030-002
(8) Put the headset into the EARPHONE jack on the VSCU.

S 714-023-002
(9) Make sure you hear the sound clearly.

S 864-024-002
(10) Push the STOP switch on VTR-1.

S 864-025-002
(11) Push the EJECT switch on VTR-1.

S 864-026-002
(12) Remove the tape from VTR-1.

S 864-027-002

(13) Push the MASTER POWER switch to the off position (the light in the switch goes off) at the VSCU.

S 864-028-002

(14) Remove electrical power if it is not necessary (Ref 24-22-00).

VIDEO ANTENNA COUPLER - REMOVAL/INSTALLATION

1. General
   A. The video antenna coupler, M820, is installed in the HF comm antenna coupler bay of the vertical stabilizer. Access to the coupler bay is through access panel 322BL on the left side of the vertical stabilizer.

TASK 23-32-04-004-001

2. Remove the Video Antenna Coupler (Fig. 401)
   A. References
      (1) AMM 06-42-00/201, Empennage (Major Zone 300) Access Doors and Panels
   B. Access
      (1) Location Zones
          211/212 Flight Compartment
          322 Vertical Stabilizer - auxiliary spar to front spar

      (2) Access Panel
          322BL HF Comm Antenna Coupler Bay

   C. Prepare for Removal

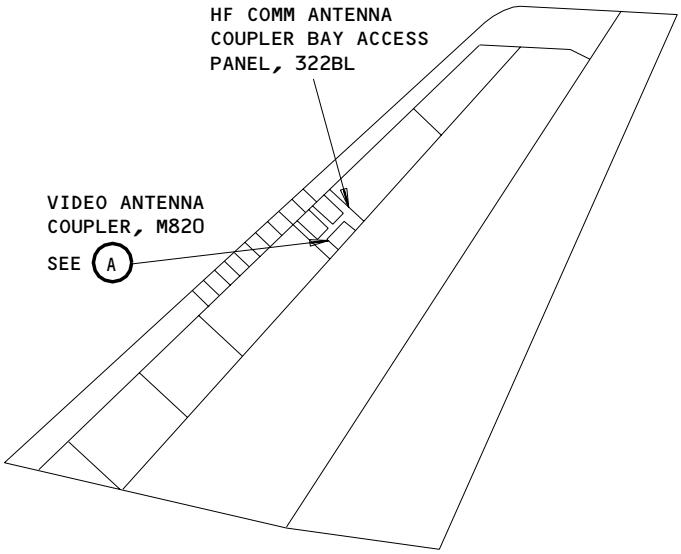
      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11G8, LEFT HF COMM
          (b) 11G35, RIGHT HF COMM
          (c) 11T34, VIDEO PROJ

      S 014-005

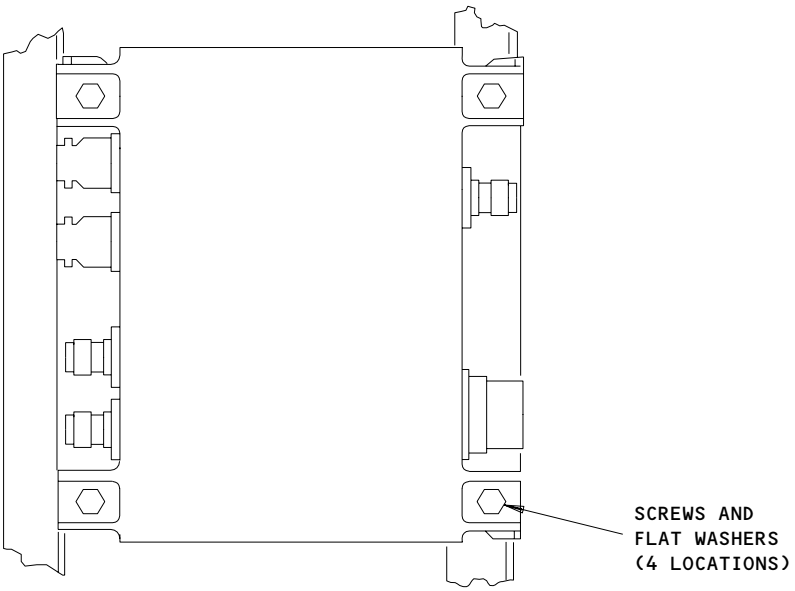
      WARNING: MAKE SURE THE POWER IS REMOVED FROM THE TWO HF COMM SYSTEMS BEFORE YOU OPEN THE ACCESS PANEL FOR THE HF COMM ANTENNA COUPLER BAY. IF THE HF COMM SYSTEM TRANSMITS, AN ELECTRICAL SHOCK CAN OCCUR THAT CAN INJURE PERSONS OR DAMAGE EQUIPMENT.

      (2) Remove the access panel, 322BL, to get access to the antenna coupler (AMM 06-42-00/201).

          NOTE: You must remove approximately 60 screws to remove this access panel.



VERTICAL STABILIZER



VIDEO ANTENNA COUPLER, M820

A

Video Antenna Coupler - Installation
Figure 401

D. Remove the Antenna Coupler

S 024-007

(1) Do these steps to remove the antenna coupler:
  (a) Identify each electrical connector on the antenna coupler for installation.
  (b) Remove the electrical connectors from the antenna coupler.
  (c) Remove the four screws and flat washers.
  (d) Remove the antenna coupler.

TASK 23-32-04-404-008

3. Install the Video Antenna Coupler (Fig. 401)

A. Equipment
  (1) Resistance measuring bridge or ohmmeter capable of measuring 0.0025 ohm
  (2) Stainless steel brush

B. Consumable Materials
  (1) B00184 Solvent - BMS 11-7

C. References
  (1) AMM 06-42-00/201, Empennage (Major Zone 300) Access Doors and Panels
  (2) AMM 24-22-00/201, Electrical Power - Control
  (3) AMM 51-21-03/701, Corrosion Removal and Control

D. Access
  (1) Location Zones
    211/212 Flight Compartment
    322 Vertical Stabilizer - auxiliary spar to front spar

  (2) Access Panel
    322BL HF Comm Antenna Coupler Bay

E. Install the Antenna Coupler

S 424-009

(1) Do these steps to install the antenna coupler:
  (a) Do a visual check of the faying surfaces on the antenna coupler and airplane for corrosion and dirt.
  (b) Clean the faying surfaces with a stainless steel brush until each surface has no corrosion or dirt (AMM 51-21-03/701).

    NOTE: If you use a material other than stainless steel you can increase the risk of corrosion at a subsequent time.

  (c) Apply a large quantity of solvent to each faying surface.

  CAUTION: MAKE SURE EACH FAYING SURFACE IS CLEAN. AN UNSATISFACTORY GROUND WILL CAUSE A SYSTEM MALFUNCTION.

  (d) Wipe each faying surface clean.

(e) Put the antenna coupler in position.
(f) Install the four screws and flat washers that hold the antenna coupler.
(g) Make sure the resistance from the antenna coupler to the airplane structure is not larger than 0.0025 ohm.
(h) Connect the electrical connectors to the antenna coupler.

S 414-021
(2) Install the access panel, 322BL (AMM 06-42-00/201).

S 864-010
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11G8, LEFT HF COMM
(b) 11G35, RIGHT HF COMM
(c) 11T34, VIDEO PROJ

F. Test the Antenna Coupler

S 864-013
(1) Supply electrical power (AMM 24-22-00/201).

S 864-060
(2) SAS 162-167, 275-280 POST-SB 24-152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 714-016
(3) ALL SAS AIRPLANES;
Do a test of the antenna coupler installation as follows:
(a) Make sure this circuit breaker on the right miscellaneous electrical equipment panel, P37, is closed:
1) 37K5, FWD VIDEO PROTECTOR
2) SAS 162-167 POST-SB 24-0152;
37K7, AFT VIDEO PROJECTOR
(b) Do these steps at the control distribution unit (referred to as the CDU) in the video control center:
1) Push the SYSTEM POWER switch to the on position.
2) Push the MONITOR SEL switch until the displays show AUX 1.
(c) Do these steps at the TV tuner in the video control center:
1) Push the POWER switch to the on position.
2) Push the SYSTEM SELECT switch to the applicable format position.
3) Push the TUNING switch to tune in a local TV station.

(d) Make sure a picture shows on the preview moniotor on the CDU.

NOTE: The location of the airplane may prevent a high quality picture.

(e) Push the POWER switch to the off position on the TV tuner.
(f) Push the SYSTEM POWER switch to the off position.

S 714-018
(4) ALL MTH AIRPLANES;
Do a test of the antenna coupler installation as follows:
(a) Make sure this circuit breaker on the right miscellaneous electrical equipmnet panel, P37, is closed:
1) 37K6, VIDEO AC CONT CTR
2) SAS 276-280 POST-SB 24-0152;
37L1, VIDEO 1
37L3, VIDEO 3
(b) Do these steps at the system control unit (referred to as the SCU) in the video control center:
1) Push the MASTER POWER switch to the on position.
2) Push the PREVIEW switch and make sure this shows on the SCU monitor:

PREVIEW
VIDEO

3) Push the VIDEO INPUT switch until this shows on the SCU monitor:

PREVIEW
VIDEO {TV}

NOTE: The letters in the { } brackets will flash on and off. The { } brackets are used only to show the letters that flash and they will not show on the SCU monitor.

4) Push the ON/OFF switch.
5) Push the TV CHANNEL switches to tune in a local TV station. The number of the station will temporarily show at the bottom of the SCU monitor.

(c) Make sure a picture shows on the SCU monitor. Rotate the ANTENNA switch on the SCU to obtain the best possible picture.

NOTE: The location of the airplane may prevent a high quality picture.

(d) Push the MASTER POWER switch to the off position on the SCU.

S 864-020

(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TV TUNER - REMOVAL/INSTALLATION

1. General
   A. The TV tuner, M1113, (referred to as the tuner) is in the video control center at the purser station. The tuner is a rack-mounted unit.

TASK 23-32-06-004-001

2. Remove the Tuner (Fig. 401)
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
   B. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

   C. Prepare for Removal

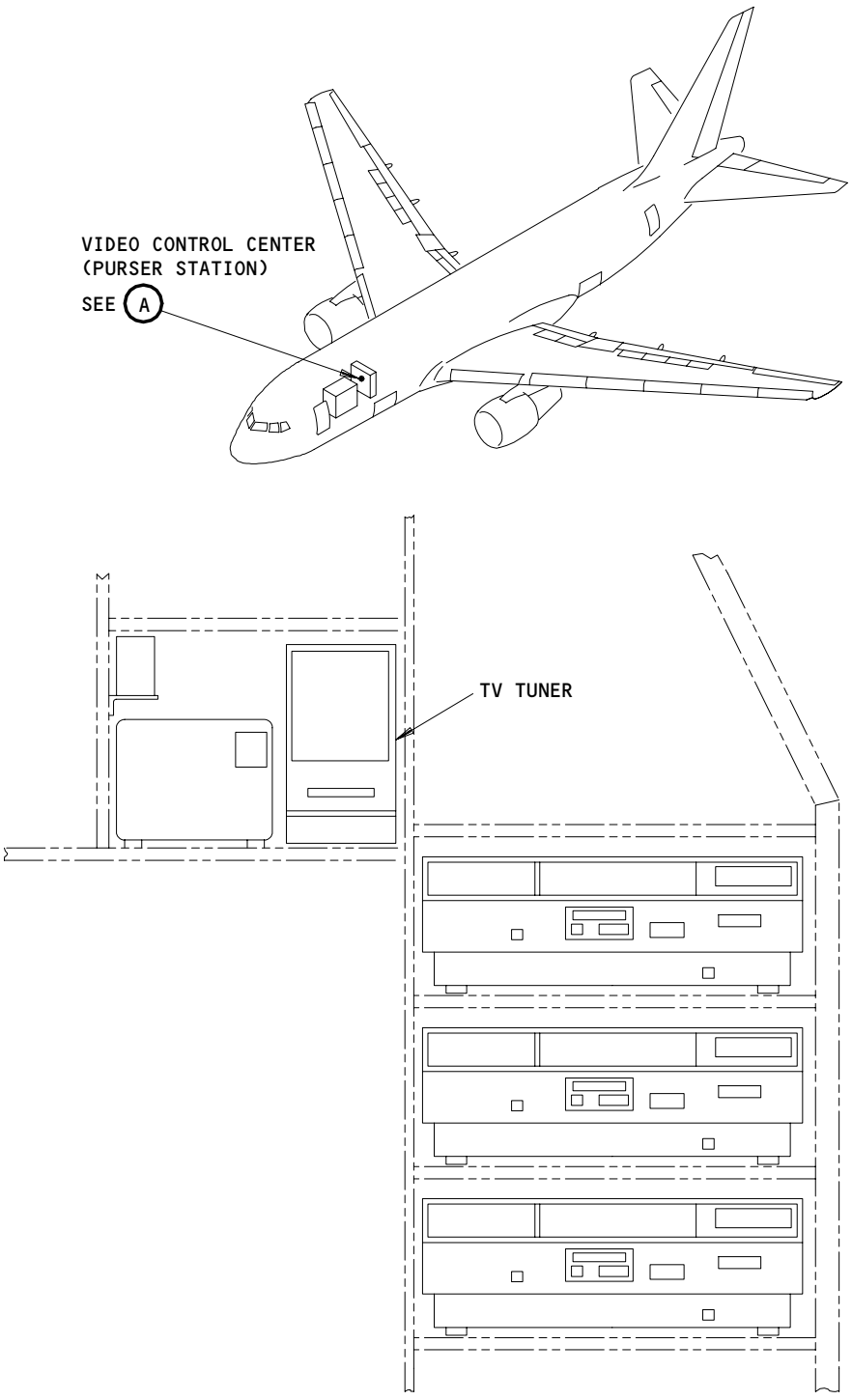
      S 864-002
      (1) Open this circuit breaker on the right miscellaneous electrical equipment panel, P37, and attach a DO-NOT-CLOSE tag:
          (a) 37K5, FWD VIDEO PROJECTOR

      S 864-003
      (2) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T34, VIDEO PROJ
   D. Remove the Tuner

      S 024-005
      (1) Remove the tuner (AMM 20-10-01/401).

TASK 23-32-06-404-009

3. Install the Tuner (Fig. 401)
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 24-22-00/201, Electrical Power - Control



VIDEO CONTROL CENTER

A

Video Tape Reproducer - Removal/Installation
Figure 401

B. Access
(1) Location Zone
200 Upper Half of the Fuselage

C. Install the Tuner

S 424-011
(1) Install the tuner (AMM 20-10-01/401).

S 864-013
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the right miscellaneous electrical equipment panel, P37:
(a) 37K5, FWD VIDEO PROJECTOR

S 864-014
(3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11T34, VIDEO PROJ

D. Tuner Installation Test

S 864-015
(1) Supply electrical power (AMM 24-22-00/201).

S 864-087
(2) SAS 162-167 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-089
(3) SAS 162-167 POST-SB 24-0152;
Make sure that the following circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K5, FWD VIDEO PROJECTOR
(b) 37K7, AFT VIDEO PROJECTOR

S 714-016
(4) Do a test of the tuner, as follows:
(a) Do these steps at the control distribution unit (referred to as the CDU) in the video control center:
1) Push the MONITOR SEL switch until the displays show AUX 1.
(b) Do these steps at the tuner:
1) Push the POWER switch to the on position.
2) Set the SYSTEM SELECT switch to the applicable format.
3) Use the TUNING switch to set a local TV station.
4) Check for picture on CDU preview monitor.

NOTE: High quality picture may not be possible due to location of airplane.

5) Press POWER switch to off (switchlight off) at TV tuner.
6) Press SYSTEM POWER switch to off (switchlight off) at CDU.

S 864-023

(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

DIGITAL INTERFACE UNIT - MAINTENANCE PRACTICES

1. General

A. This procedure contains the following task:

SAS (1) Installation of Airshow 210 Database Software With a Portable Data
SAS Loader (PDL) (MTH only).

B. The dataloading of Airshow 210 software is performed using an ARINC 615 Portable Data Loader connected to the front connector of the DIU. The software to be uploaded is contained on diskettes. The number of disks can be up to 4 depending on the size of the softwareload. When more than 1 disk is to be loaded the elapsed time from completion of one disk load to insertion of next disk should be less than 5 minutes.

SAS
SAS TASK 23-32-07-402-001

SAS 2. Installation of Airshow 210 Database Software With a Portable Data Loader
SAS (PDL) (MTH only)

A. Equipment

(1) ARINC 615 Portable Dataloader (PDL), Demo Systems, P/N 30100 (At least version 4.50 software installed).

(2) Airshow database 3 1/2 inch diskette (LDB; loadable database), P/N 9149025105.x (where x represents the latest version).

B. Reference

(1) AMM 24-22-00/201, Electrical Power - Control

C. Access

(1) Location Zones
119 Main Equipment Center, left, Shelf E1-4

D. Prepare to Load the Airshow 210 software.

S 862-002

(1) Supply electrical power (AMM 24-22-00/201).

SAS
SAS S 222-003

SAS (2) Verify that AIRSHOW DIU is powered down by pulling circuit breaker
SAS C540, VIDEO PROJ on pos. T34 on the P11 panel.
SAS
SAS S 212-004

SAS (3) Verify that the supplied LDB diskette is labeled with most recent
SAS part number (P/N 914902-5105.x) and LDB version (LDB; 5105.x where x
SAS represents the latest version).

E. Upload of the Airshow 210 software

S 862-005

(1) Connect one end of the Portable Dataloader (PDL) cable to the DIU front panel connector J2.

S 862-006

(2) Connect the other end of the cable to the PDL.

SAS
SAS S 862-007
SAS (3) Power on the Airshow DIU by pushing the circuit breaker C540. This
SAS action will also apply electrical power to the PDL.

S 862-008
(4) Switch PDL to ON and wait at least 1 minute after power ON before inserting the inserting the diskette.

S 212-009
(5) Insert the 3 1/2 inch diskette into the PDL and verify that data is being uploaded (This may take up to 7 minutes).

S 082-010
(6) Remove diskette from the downloader after upload.
SAS
SAS S 862-011
SAS (7) Switch off AIRSHOW DIU by pulling circuit breaker C540.

S 862-012
(8) Disconnect PDL from DIU.
SAS
SAS S 862-013
SAS (9) Push circuit breaker C540 again to restore the video system.

F. Verification of Loadable Database Disk

S 862-014
(1) Switch on the aircraft video system and select Airshow for display in the cabin or PFID preview on the VSCU.
SAS
SAS S 862-015
SAS (2) Cycle the AIRSHOW DIU circuit breaker C540.
SAS
SAS S 212-016
SAS (3) The AIRSHOW DIU will display the Airshow copyright page during
SAS initialization after power up. Verify that the following software
SAS identifier is shown on the monitor in the cabin; LDB 5105.x (where x
SAS represents the latest software version). The software identifier is
SAS displayed on this page directly beneath the software revision number
SAS near Page bottom. Display of this number ensures successful upload
SAS of the LDB data.

S 862-017
(4) Switch off the video system.

G. Put the Airplane Back to Its Usual Condition

S 862-018

(1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

DIGITAL INTERFACE UNIT - REMOVAL/INSTALLATION

1. General
   A. The digital interface unit (DIU) is installed on the E1-4 shelf in the main equipment center.

TASK 23-32-07-004-001

2. Remove the Digital Interface Unit (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack-Mounted Components
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

      (2) Access Panel
          119AL Main Equipment Center

   C. Remove the DIU

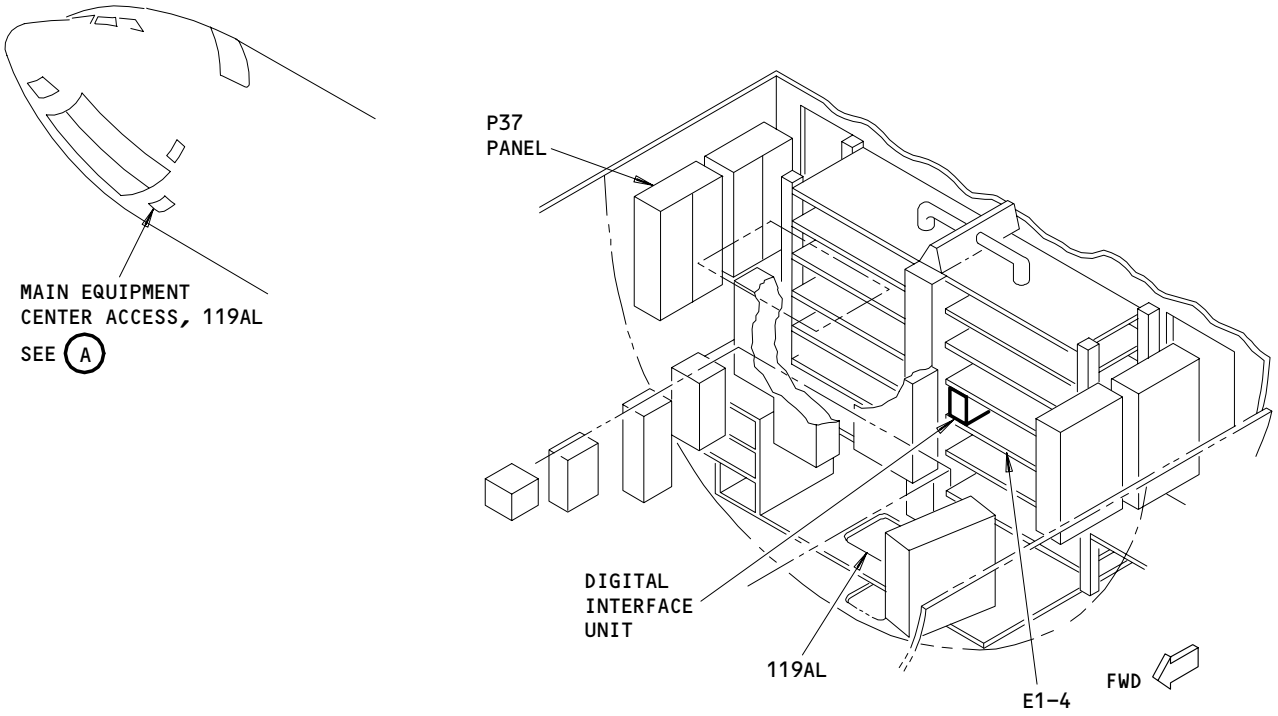
      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T34, VIDEO PROJ

      S 014-003
      (2) Open the access door, 119AL, for the DIU (AMM 06-41-00/201).

      S 024-004
      (3) Remove the DIU (AMM 20-10-01/401).

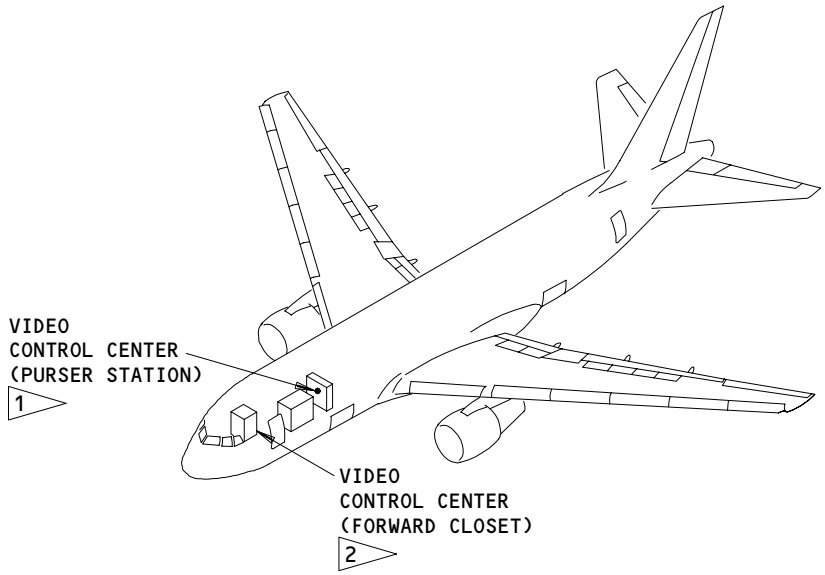
TASK 23-32-07-404-005

3. Install the Digital Interface Unit (Fig. 401)
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels



MAIN EQUIPMENT CENTER

(A)



VIDEO CONTROL CENTER LOCATION

1 ALL SAS AIRPLANES
2 ALL MTH AIRPLANES

Digital Interface Unit Installation
Figure 401

(2) AMM 20-10-01/401, E/E Rack-Mounted Components
(3) AMM 24-22-00/201, Electrical Power - Control

B. Access

(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment

(2) Access Panel

119AL	Main Equipment Center

C. Install the DIU

S 424-006
(1) Install the DIU (AMM 20-10-01/401).

S 864-028
(2) Perform Airshow data loading per Maintenance Practices section 200.

D. Do a Test of the DIU Installation

S 864-007
(1) Supply electrical power (AMM 24-22-00/201).

S 864-104
(2) SAS 162-167, 276-278, 280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-119
(3) SAS 276-278, 280 POST-SB 24-0152;
Make sure that the following circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K6, VIDEO CONT CTR
(b) 37L1, VIDEO 1 AC
(c) 37L3, VIDEO 3 AC

S 864-120
(4) SAS 162-167 POST-SB 24-0152;

Make sure that the following circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K5, FWD VIDEO PROJECTOR
(b) 37K7, AFT VIDEO PROJECTOR

S 864-008
(5) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11T34, VIDEO PROJ

S 714-009
(6) Do the DIU test that follows:
(a) ALL SAS AIRPLANES;
Do the steps that follow:
1) At the control distribution unit (CDU) in the video control center, do the steps that follow:
a) Push the SYSTEM POWER switch-light on.
b) Make sure that the SYSTEM POWER switch-light comes on.
c) Push the MONITOR SEL switch until the indicators show AUX 2.
2) Set the mode selector switch (in the video control center) to the LOGO position.
3) Make sure that the CDU preview monitor shows the airline logo (the logo will be in black and white).
4) Push the SYSTEM POWER switch-light off on the CDU.
5) Make sure that the SYSTEM POWER switch-light goes off.
(b) ALL MTH AIRPLANES;
Do the steps that follow:
1) Make sure this circuit breaker on the right miscellaneous electrical equipment panel, P37, is closed:
a) 37K6, VIDEO AC CONT CTR
2) At the system control unit (SCU) in the video control center, do the steps that follow:
a) Push the MASTER POWER switch-light on.
b) Make sure that the MASTER POWER switch-light comes on.
c) Push the PREVIEW switch.
d) Make sure that the SCU monitor shows:

PREVIEW
VIDEO

e) Push the VIDEO INPUT switch until the SCU monitor shows:

PREVIEW
VIDEO PFID

NOTE: The indication PFID will flash on and off.

f) Push the ON/OFF switch.

3) Set the mode selector switch (in the video control center) to the LOGO position.
4) Make sure that the SCU monitor shows the airline logo.
5) Push the MASTER POWER switch-light off on the SCU.
6) Make sure that the MASTER POWER switch-light goes off.

E. Put the Airplane Back to Its Initial Condition

S 414-010

(1) Close the access door, 119AL (AMM 06-41-00/201).

S 864-011

(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VIDEO DISTRIBUTION UNIT - REMOVAL/INSTALLATION

1. General
   A. The video distribution unit (VDU) divides and applies the video signal in the airplane.
   B. There can be a maximum of four groups of four VDUs (for a maximum total of 16) in the airplane.
   C. The VDUs are installed on a bracket assembly. The bracket assembly is in the upper half of the fuselage, between stringers 2 and 3. A VDU is held in its position on the bracket by four screws.

TASK 23-32-08-004-031

2. Remove the Video Distribution Unit
   A. References
      (1) AMM 06-21-00/201, Body Station Diagram
      (2) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (3) AMM 25-22-02/401, Lowered Ceiling Panels
   B. Access
      (1) Location Zones

119/120	Main Equipment Center
200	Upper Half of the Fuselage

      (2) Access Panel

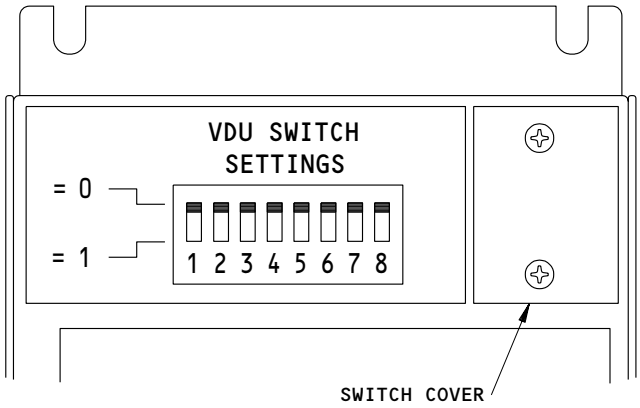
119AL	Main Equipment Center

   C. Prepare to Remove the VDU

      S 014-042
      (1) Open the access door, 119AL, for the right miscellaneous electrical equipment panel, P37 (AMM 06-41-00/201).

      S 864-040
      (2) Open these circuit breakers on the P37 panel, and attach DO-NOT-CLOSE tags:
      (a) 37L1, VIDEO 1
      (b) 37L2, VIDEO 2
      (c) 37L3, VIDEO 3
      (d) 37L4, VIDEO 4

SAS



VDU DIP Switch
Figure 401

S 864-041
(3) Find the VDU in Table 401 (AMM 06-21-00/201):

TABLE 401
VDU LOCATIONS

STA	WL	STGR	VDU
401	310	3	M1658 M1661 M1664 M1667
731	310	2	M1670 M1673 M1676
1032	310	2	M1679 M1682 M1685
1362	310	2	M1691 M1694

D. Remove the VDU

S 014-033
(1) Remove the lowered ceiling panel to get to the VDU (AMM 25-22-02/401).

S 024-034
(2) Do these steps to remove the VDU:
(a) Identify the VDU that you will remove.
(b) Tag the electrical cables from the VDU.
(c) Disconnect the electrical cables from the VDU.
(d) Remove and keep the four screws that hold the VDU.
(e) Remove the VDU.
(f) Remove and keep the termination plug, if one is installed.

TASK 23-32-08-404-032
3. Install the Video Distribution Unit
A. References
(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 25-22-02/401, Lowered Ceiling Panels

B. Access

(1) Location Zones

119/120	Main Equipment Center
200	Upper Half of the Fuselage

(2) Access Panel

119AL	Main Equipment Center

C. Install the VDU

S 864-114

(1) Make sure that the dipswitch settings (Fig. 401) on the VDU are as shown in the table that follows:

VDU	Equipment no.	Address setting
1	M1658	10000000
2	M1661	01000000
3	M1664	11000000
4	M1667	00100000
5	M1670	10100000
6	M1673	01100000
7	M1676	11100000
9	M1679	10010000
10	M1682	01010000
11	M1685	11010000
13	M1691	10110000
14	M1694	01110000

S 424-037

(2) Do these steps to install the VDU:

(a) Install the termination plug on the VDU, if it is necessary.

(b) Install the four screws that hold the VDU.

(c) Connect the electrical cables to the VDU.

(d) Remove the tags from the electrical cables.

S 864-038
(3) Remove the DO-NOT-CLOSE tags, and close these circuit breakers on the P37 panel:
(a) 37L1, VIDEO 1
(b) 37L2, VIDEO 2
(c) 37L3, VIDEO 3
(d) 37L4, VIDEO 4

D. Put the Airplane Back to Its Initial Condition

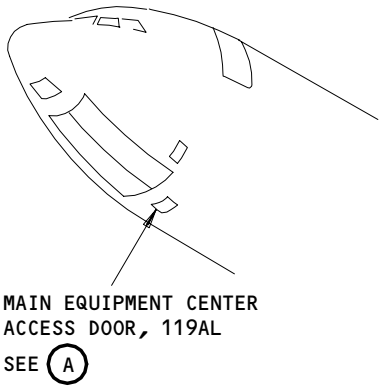
S 414-238
(1) Install the lowered ceiling panel (AMM 25-22-02/401).

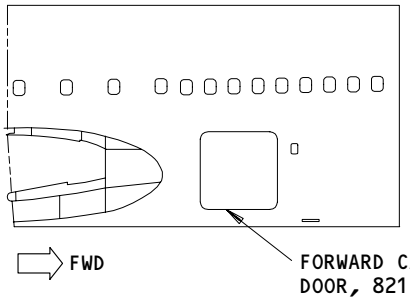
S 414-239
(2) Close the access door, 119AL (AMM 06-41-00/201).

PASSENGER ENTERTAINMENT/PASSENGER SERVICE SYSTEM - DESCRIPTION AND OPERATION

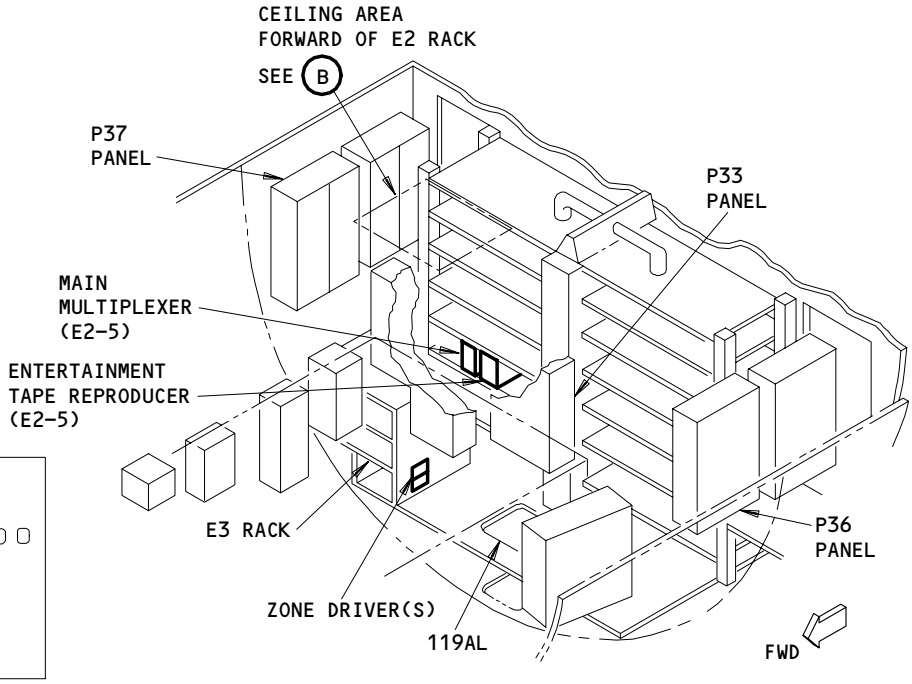
1. General
   A. The passenger entertainment system provides selectable recorded entertainment to each individual passenger seat. Passenger headsets and passenger address system speakers supply the sound throughout the passenger cabin. The passenger entertainment system (PES) provides selectable audio entertainment which is available in monophonic and stereophonic formats. Music from a tape deck and audio from the video entertainment system is available. Passenger address announcements override all PES audio programs.
   B. The passenger service system (PSS) multiplexes programming and control signals. This enables passengers to control their individual reading lights or call a cabin attendant. The system also provides reset and control functions and a BITE test at the forward attendant panel.
   C. The PES/PSS consists of one main multiplexer, three zone multiplexers, three column timer decoders (CTDs), two zone drivers and a tape reproducer. A passenger control unit (PCU) is located in the armrest of each passenger seat. Underneath each seat group is a seat electronics box (SEB). Above each seat group at the passenger service unit is a passenger service unit decoder (PSUD).
      (1) Forward attendant panel P21 is located at the forward left attendant's station. Blue master call lights are located on the ceiling throughout the passenger cabin.
      (2) Seat-to-seat cabling is installed in the raceways adjacent to each seat track. Termination plugs are connected to the last SEB and PSUD in each column.
      (3) The main multiplexer is located on shelf 5 of main equipment center rack E2 (E2-5). The entertainment tape reproducer is also located on E2-5 next to the main multiplexer. The zone drivers are located on the inboard side of the E3 rack. The forward and mid zone multiplexers are located on the main equipment center ceiling, forward of the E2 rack. The forward and mid column timer decoders (CTDs) are also located on the ceiling forward of the E2 rack. The aft zone multiplexer and aft column timer decoder are located beneath the E5 rack in the forward cargo compartment.
      (4) Special wiring connects each zone multiplexer to three columns of seat electronic boxes (SEBs). Each column timer decoder is connected to three columns of passenger service unit decoders (PSUDs) which are installed above the passenger seats.

2. Component Details (Fig. 1)
   A. Main Multiplexer
      (1) The main multiplexer (main mux) is located on the E2-5 shelf in the main equipment center (MEC). The main mux is a 1/4 ATR dwarf box with closed case weighing 1.4 pounds. The main mux does not require cooling air. Power and ten channels of analog audio are input through the multipin connector at the rear of the unit. The coaxial connector on the front of the unit outputs audio in a multiplexed serial digital format to the zone multiplexers. Inside the top cover of the unit are seven stereo tag switches which determine the number of monaural and/or stereo output channels.
   B. Entertainment Tape Reproducer
      (1) The entertainment tape reproducer is located on the E2-5 shelf in the main equipment center. The tape reproducer provides entertainment music to the main multiplexer for distribution to the passenger seats. The tape reproducer has an access door on each side for loading and unloading the cassette tapes. The tape reproducer has no exterior controls.
      (2) The tape reproducer contains six Phillips type audio cassette magazines. Three magazines are installed on each side of the unit. Each magazine on the left side is paired with the corresponding magazine on the right side providing a total of 12 continuous tracks of taped entertainment audio. Each cassette tape magazine is color coded, solid colors on left side and striped colors on the right side.
      (3) When the tape reproducer is turned on, the left magazine begins play and the right magazine rewinds and enters a standby mode. When the left magazine reaches its end the right magazine begins play and the left magazine rewinds and enters a standby mode. The left magazine will begin play when the right magazine reaches its end. This process is repeated to provide continuous audio.
   C. Zone Multiplexer
      (1) The fwd and mid zone multiplexers (zone muxes) are located on the main equipment center ceiling forward of the E2 equipment rack. The aft zone mux is located beneath the E5 equipment rack in the forward cargo compartment. The zone muxes are yellow alodine units weighing 0.9 pounds. Each unit has six coaxial and one multipin connector.
      (2) The zone muxes provide multiplexed digital audio to the left, right, and center columns of seat electronic boxes. Each zone mux receives ten channels of digital audio from the main mux. The zone muxes also receive analog inputs. The analog inputs consist of PA override audio and two channels of audio from the entertainment tape reproducer.
   D. Column Timer Decoder (CTD)
      (1) The fwd and mid column timer decoders (CTDs) are located on the main equipment center ceiling forward of the E2 equipment rack. The aft CTD is located beneath the E5 equipment rack in the forward cargo compartment. The CTDs are yellow alodine units weighing 2.9 pounds. Each unit has seven multipin connectors.



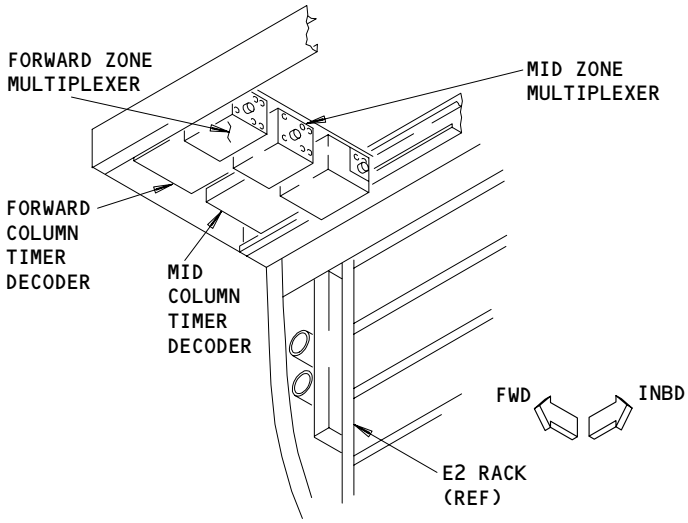


RIGHT SIDE



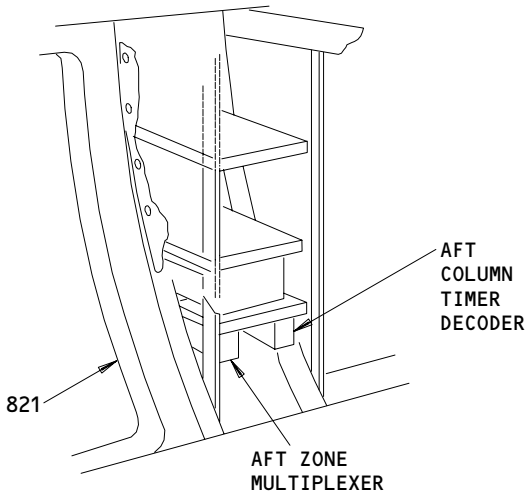
MAIN EQUIPMENT CENTER

A



CEILING AREA FORWARD OF E2 RACK

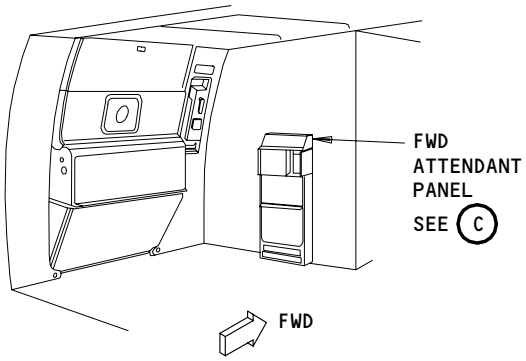
B



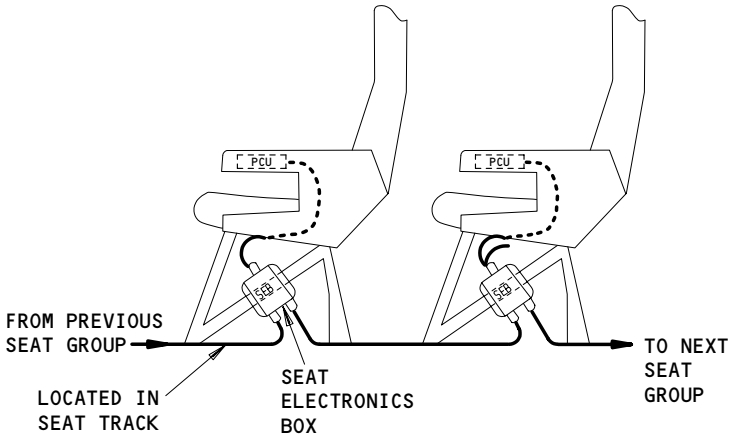
MID EQUIPMENT CENTER, E5

C

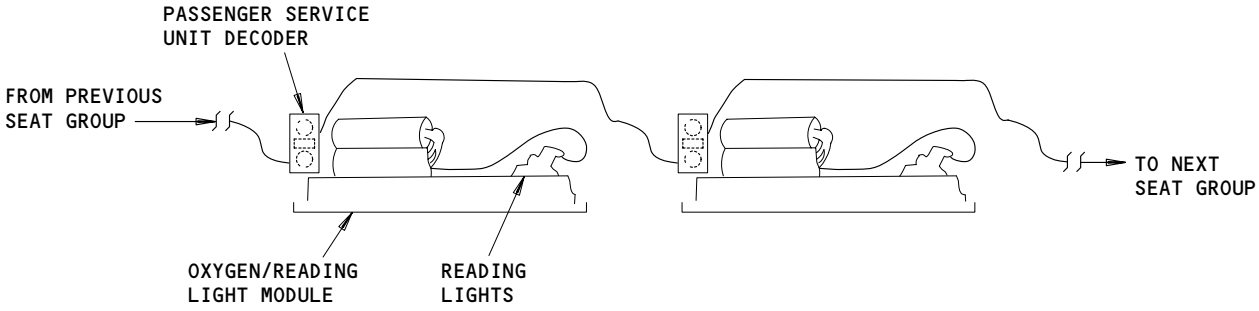
Passenger Entertainment/Passenger Service System - Component Location
Figure 1 (Sheet 1)



FWD ENTRY DOOR AREA

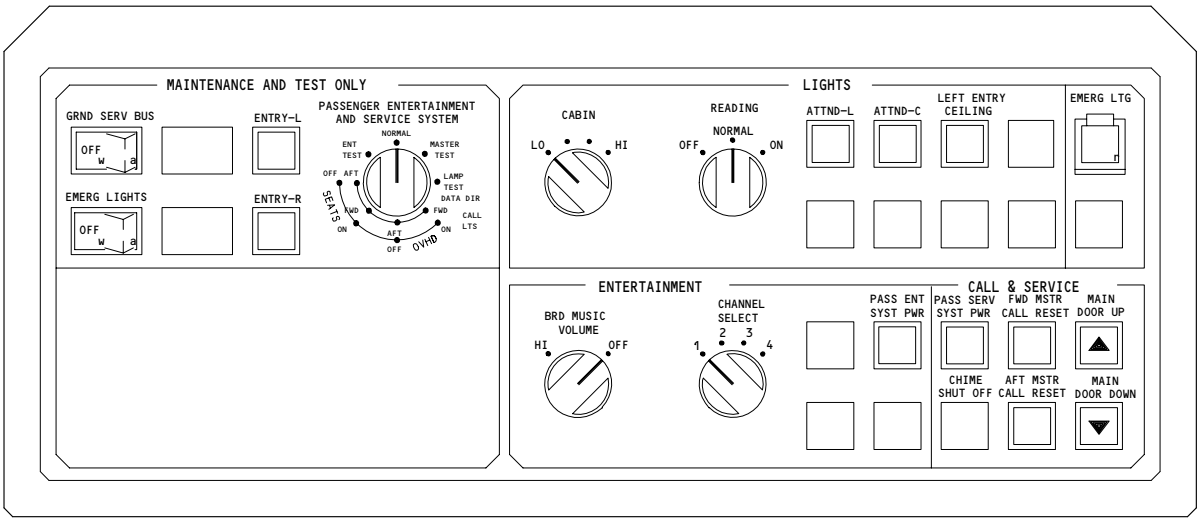


TYPICAL SEAT ARRANGEMENT



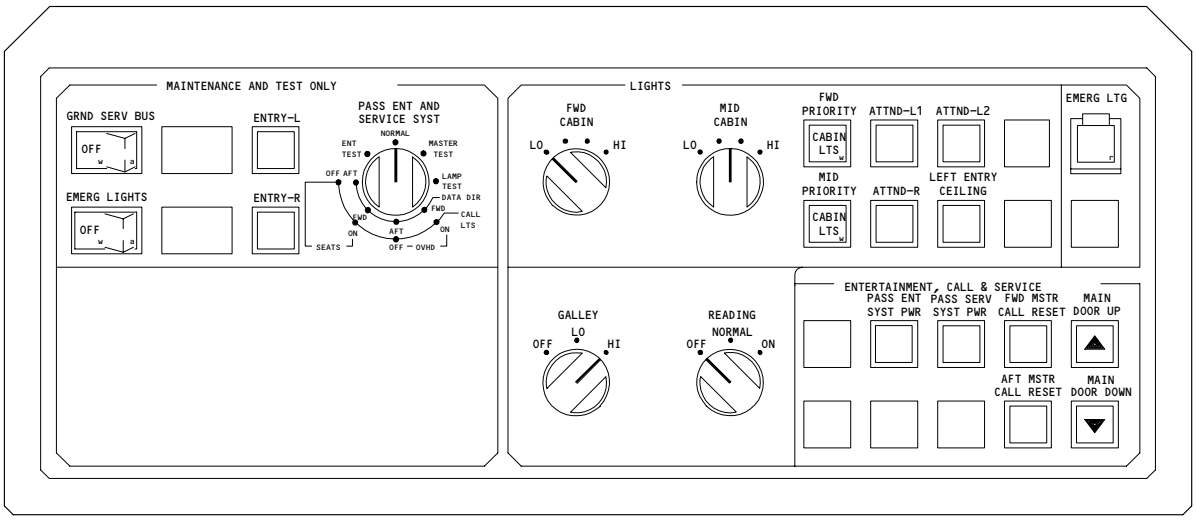
TYPICAL PSU ARRANGEMENT

PES/PSS Component Locations
Figure 1 (Sheet 2)



FOWARD ATTENDANT PANEL P21

C 2



FWD ATTENDANT PANEL P21 (REF)

C 1

PES/PSS Component Locations
Figure 1 (Sheet 3)

(2) SAS 150-999;
The CTDs provide power and PSS timing logic to the three columns of seat electronic boxes (SEBs). Reading light and attendant call digital outputs from the SEB are transmitted by the CTD to the corresponding left, right, or center column of passenger service unit decoders (PSUDs) which operate the lights. The CTD also outputs a discrete signal to the electronic chime modules (AMM 23-42-00) for a high chime to accompany attendant calls.

(3) SAS 050-149;
The CTDs provide power and PSS timing logic to the three columns of seat electronics boxes (SEBs). Reading light and attendant call digital outputs from the SEB are transmitted by the CTD to the corresponding left, right, and center columns of passenger service unit decoders (PSUDs) which operate the lights. The CTD also outputs a discrete signal to the PA amplifier for a high chime to accompany attendant calls.

(4) ALL MTH AIRPLANES;
The CTDs provide power and PSS timing logic to the three columns of seat electronics boxes (SEBs). Reading light and attendant call digital inputs from the SEB are transmitted out to the corresponding left, right, and center columns of passenger service unit decoders (PSUDs) which operate the lights. The CTD also outputs a discrete to the PA amplifier for a HI-LO chime to accompany attendant calls.

E. Forward Attendant Panel (P21)

(1) The forward attendant panel, P21, is located above the attendant seat adjacent to the forward left entry door. The P21 panel contains controls for the PES/PSS.

(2) Controls for the PSS include the PASS SERV SYST PWR on/off switch, the FWD MSTR CALL RESET and AFT MSTR CALL RESET switches, and the READING LIGHTS OFF/NORMAL/ON switch.

(3) Control for the PES is provided by the PASS ENT SYST PWR on/off switch. The PASS ENT AND SERVICE SYST switch controls the BITE test for the PES/PSS. The FWD MSTR CALL RESET and AFT MSTR CALL RESET lights indicate system status during the BITE test.

F. Seat Electronics Box (SEB)

(1) A seat electronics box (SEB) is located at each seat group. The SEB is secured with NYLATCH fasteners to the underside of the inboard seat in the left and right columns and the left seat in the center column. Each SEB has the capability of operating in a four seat group.

(2) The seat electronics box contains the demultiplexing electronics for the PES as well as encoding/decoding electronics for the PSS. The seat electronics box has three connectors that provide signal interface with other units. The two connectors on one end interface with the next forward and next aft SEBs in the column. The third connector interfaces with the passenger control units in the seat group. The last SEB in a column provides a feedback loop for the passenger service system, and is connected to a termination plug grounded to the seat track.

(3) The zone mux supplies serial digital audio to the seat electronics box. The SEB demultiplexes the channel selected on the passenger control unit (PCU) and provides analog audio to the headset jack in the seat armrest. The attendant call/reset and reading light commands from the PCUs are multiplexed by the SEB and sent to the column timer decoder.

G. PES/PSS Seat Cable Routing

(1) The SEB disconnects are located in the sidewall of the airplane, and in the floor thru box under the cable assembly raceway. The cable assembly runs along the raceway to the SEB. Refer to schematic 23-34-02 for cable routing and disconnect locations.

H. Passenger Control Unit (PCU)

(1) A PCU is located in the armrest of each passenger seat. The PCU allows passenger control of reading light, attendant call, attendant call reset, PES channel select and volume control. A headset jack is provided on the unit. A connector provides signal interface with the seat electronics box.

I. Passenger Service Unit Decoder (PSUD)

(1) A passenger service unit decoder (PSUD) is located at the forward end of each passenger service unit (PSU) in the ceiling above each seat group. To access the PSUD, release the latch on the oxygen module/light panel. The panel swings down to the limit of the lanyard. The lanyard must be disengaged to allow the panel to drop to a vertical position. The PSUD can then be reached for removal/installation above the oxygen module.

(2) The PSUD accepts timing and data information through the column timer decoder and its associated seat electronics box. The PSUD provides control of reading lights and attendant call lights for each seat row. The PSUD has three cable connections on the front of the unit. The PSUDs in a column are series connected by loop-to-loop cables connecting the two larger connectors on the end of the unit. The connections are interchangeable. The smaller connector provides interface with the reading and row call lights.

(3) A termination plug is connected to the last PSUD in each column or divided section of a column. This plug contains a jumper for returning clock and data information via the loop-to-loop cables, to the CTD. The first PSUD in a column or divided section of a column is connected to the CTD. Refer to schematic 23-34-02 for cable routing and disconnect locations.

J. Zone Drivers

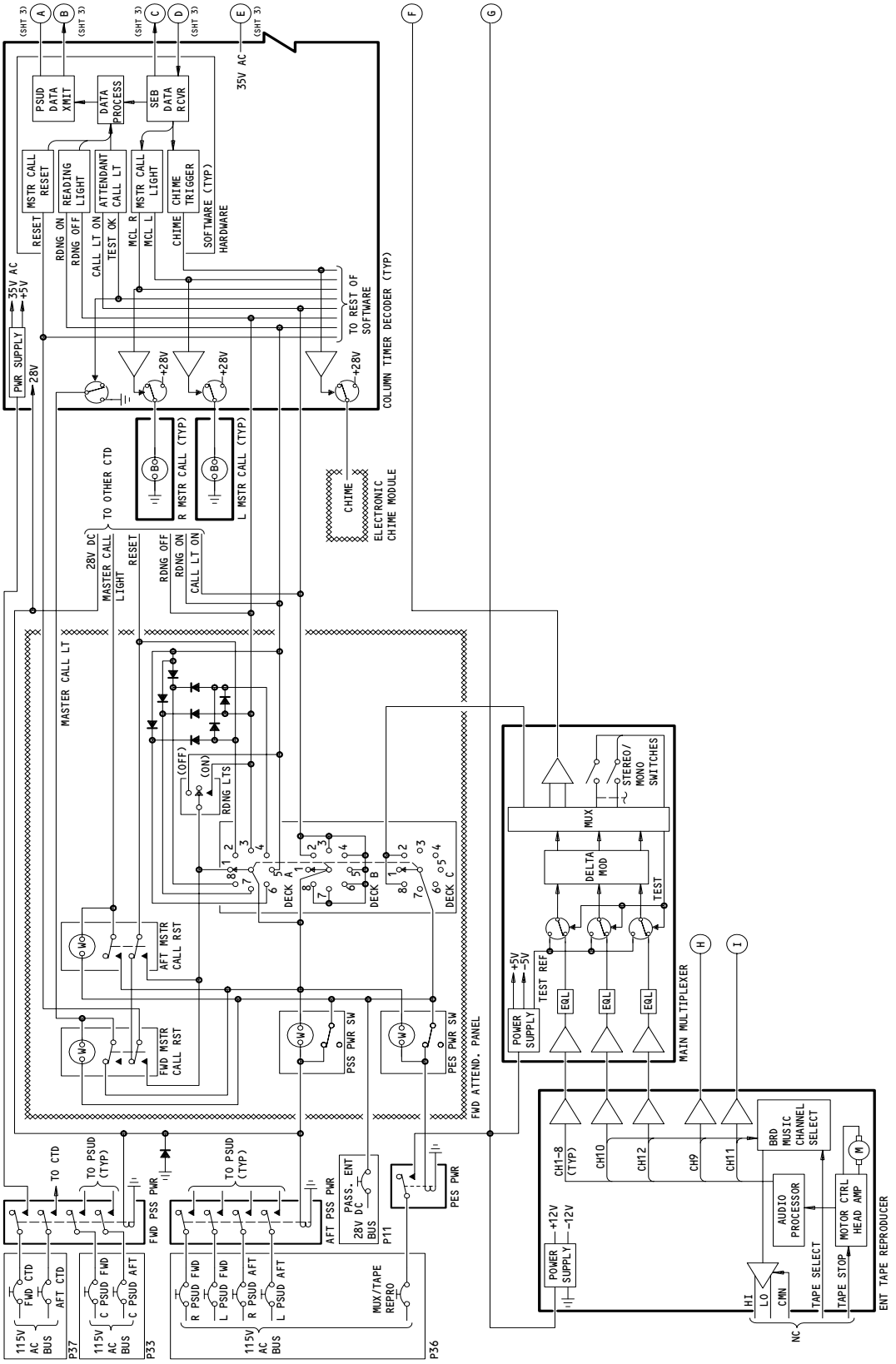
(1) ALL SAS AIRPLANES;
The zone drivers amplify signal inputs from the entertainment tape reproducer, boarding music tape reproducer and control distribution unit and sends the signals to the zone multiplexers.

(2) ALL MTH AIRPLANES;
The zone driver amplifies the signal inputs from the entertainment tape reproducer and sends them to the mid and aft zone muxes.

3. Operation (Fig. 2)

A. Functional Description

(1) PES/PSS Power and Control



Passenger Entertainment Schematic
Figure 2 (Sheet 1)

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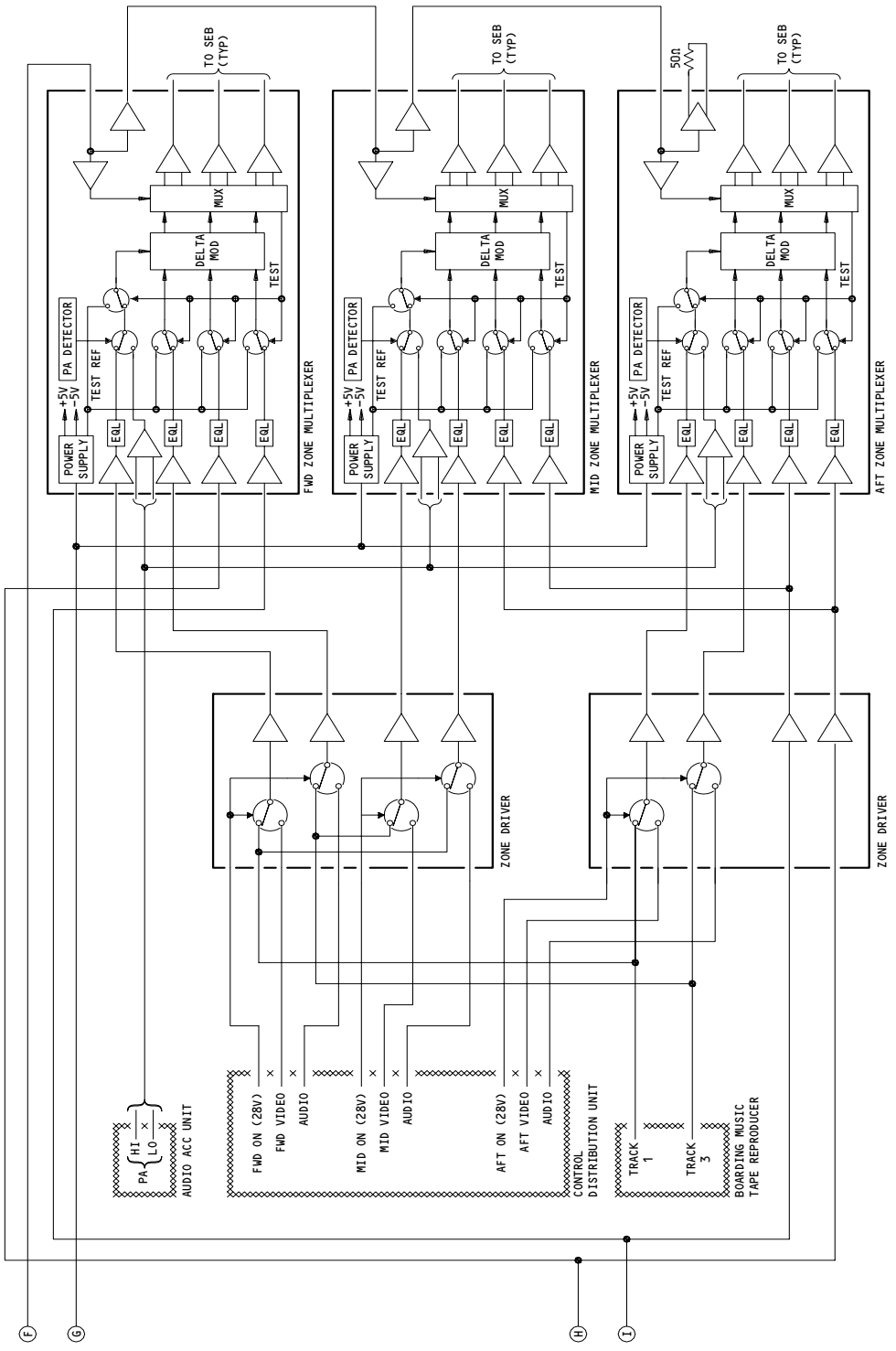
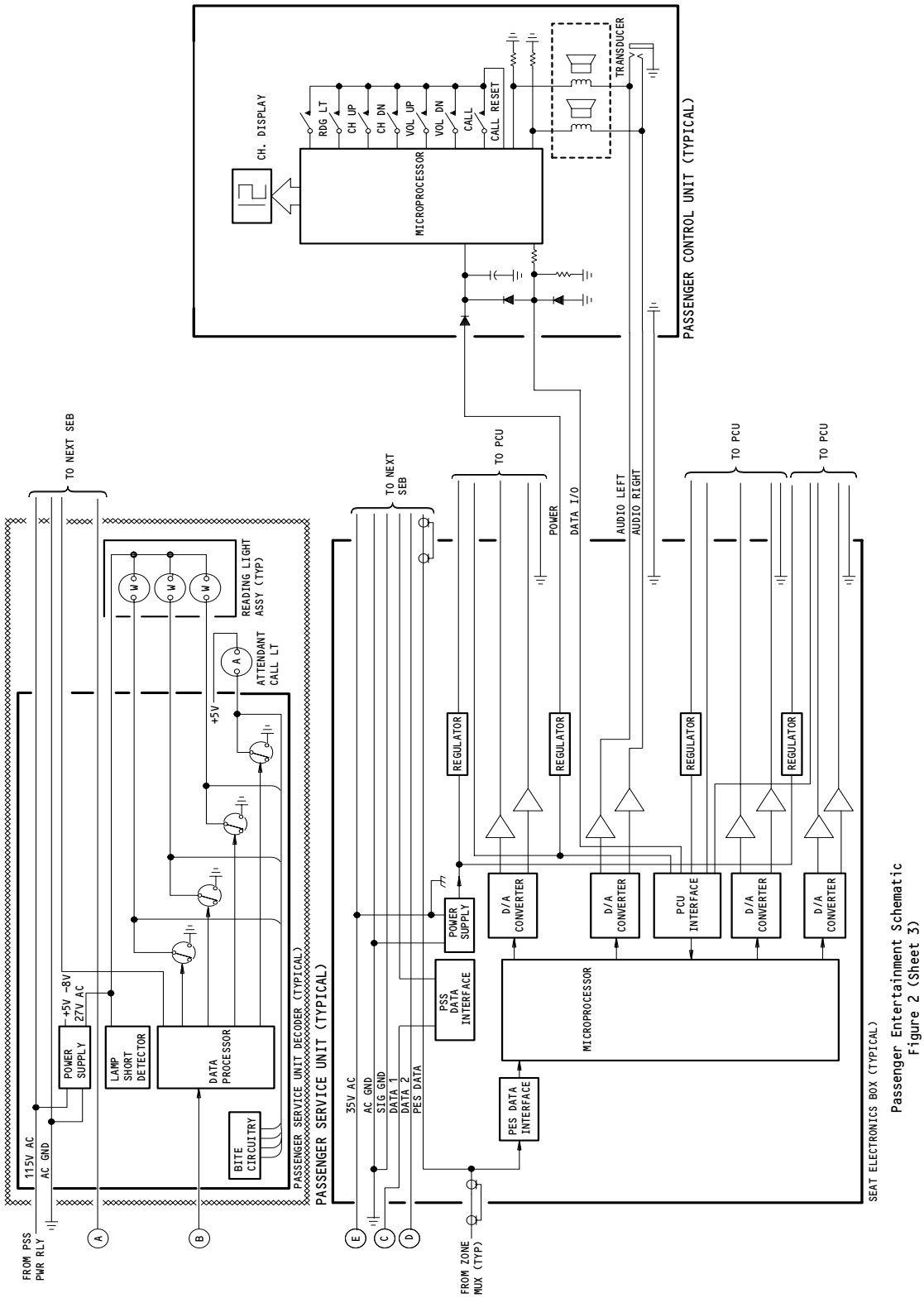
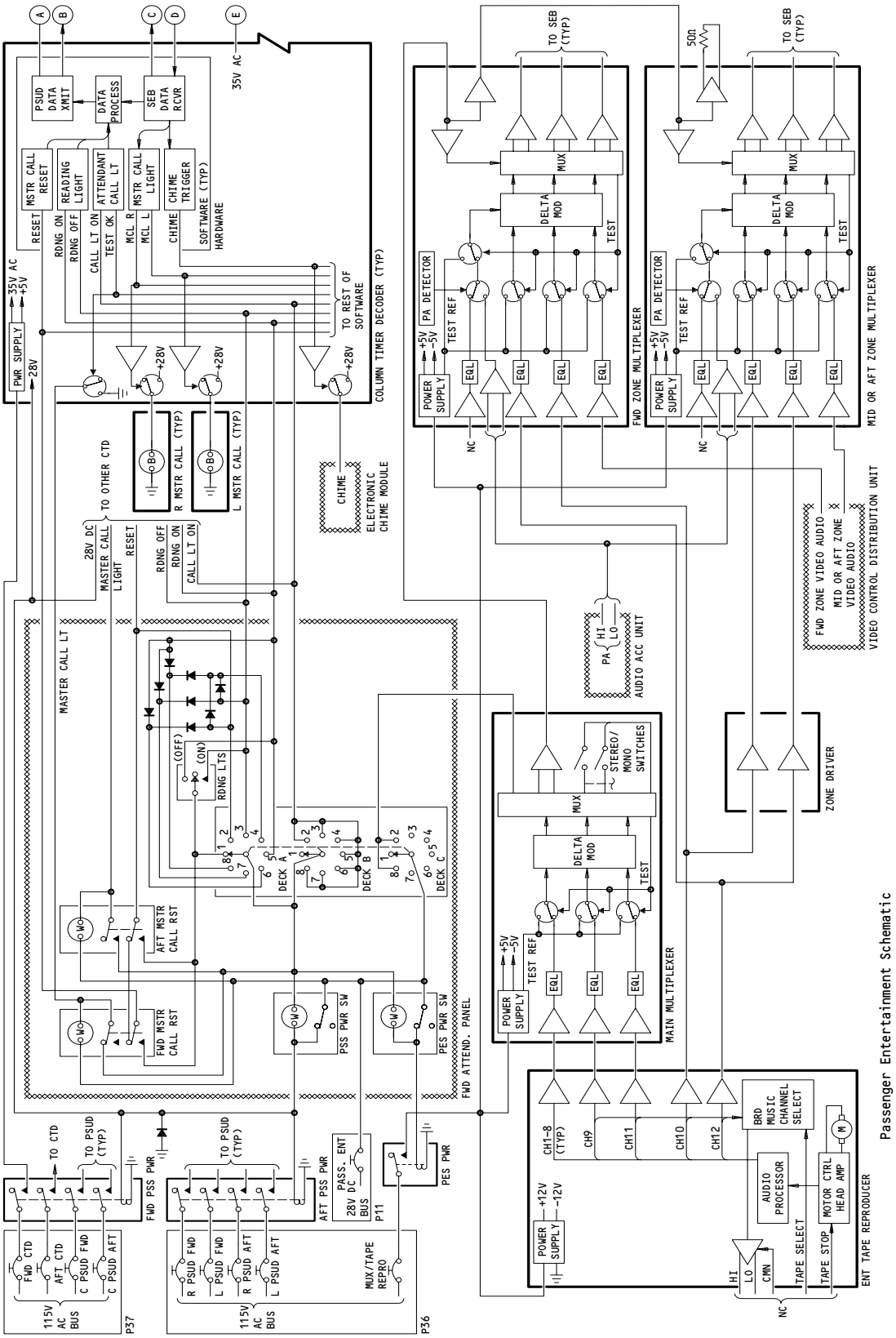


Passenger Entertainment Schematic
Figure 2 (Sheet 2)

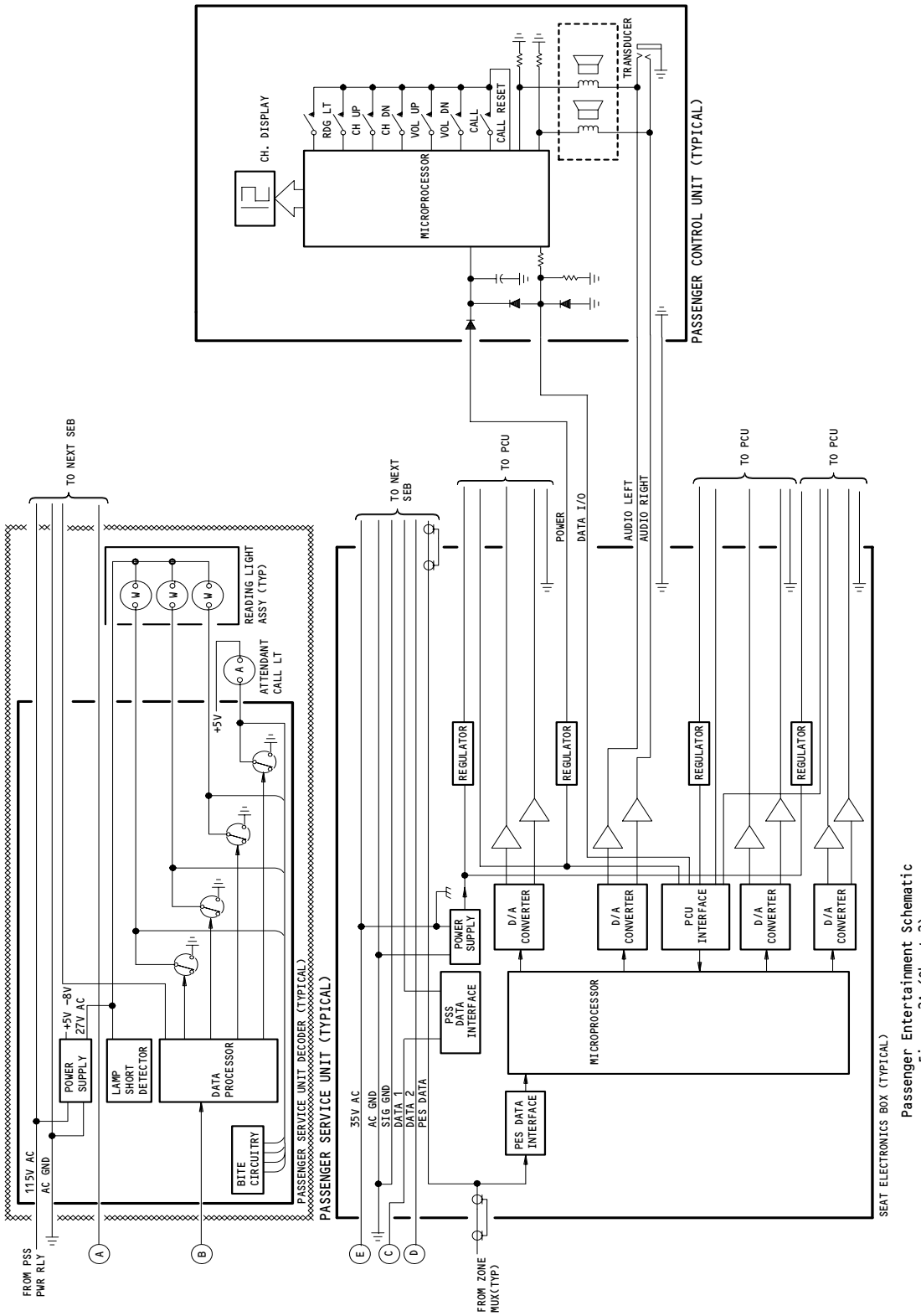


Passenger Entertainment Schematic
Figure 2 (Sheet 3)

587049



Passenger Entertainment Schematic
Figure 2A (Sheet 1)



Passenger Entertainment Schematic
Figure 2A (Sheet 2)

667814

(a) The PES/PSS is controlled from left forward attendant panel P21. The PASS ENT SYST PWR and the PASS SERV SYST PWR switchlights come on when that portion of the system is powered. The PASS ENT SYST PWR switch controls the PES relay, applying power to the main multiplexer, zone multiplexers, zone drivers and entertainment tape reproducer. The PASS SERV SYST PWR switch controls the fwd and aft PSS relays which apply 115v ac power to the CTDs and PSUDs. Circuit breakers on the P36 and P37 panels supply 115v ac to the PES and PSS power relays. The SEBs are powered by 35v ac from the CTDs, therefore PES operation requires that both the PASS ENT SYST PWR and PASS SERV SYST PWR switches be on.

(b) The READING light switch operates after the PSS power is turned on. In the ON position, all reading lights in the passenger cabin are on. In the OFF position the reading lights are off. The NORMAL position on the READING light switch provides individual control of the reading lights from the passenger control units.

(c) SAS 162-167, 276-278, 280 POST-SB 24-0152;
The UTILITY BUS - R switch can remove power from the IFE system. When selected off, the switch will remove power from the IFE video and audio circuit breakers.

(2) PES Audio

(a) The passenger entertainment system provides audio signals from the tape reproducer, the video projection system, and the PA system. These audio signals travel from their sources, through the main multiplexer and/or zone multiplexer to the seat electronic boxes, then to the passenger headsets.

(b) The entertainment tape reproducer delivers 10 analog audio channels to the main multiplexer. These signals are multiplexed and serialized to the zone multiplexers on a coaxial cable. Passenger address (PA) audio, video audio, and two tape audio inputs are supplied directly to the zone multiplexers where they are multiplexed. In the seat electronic boxes a PA message will override the selected entertainment program causing the tape reproducer to stop during the PA announcement. This ensures that all passengers hear the PA messages. The combined signals form 14 entertainment channels and one PA channel.

(c) The track audio from the tape reproducer is recorded in a combination of mono and stereo channels. The configuration of stereo channels provided to the SEBs is determined by the settings of the stereo/mono tag switches inside the main mux.

(d) Analog inputs to the zone muxes come from the entertainment tape reproducer, video tape reproducers, and PA amplifier. These analog inputs are converted to multiplexed serial digital audio and output to the three columns of SEBs.

(3) PES/PSS Passenger Control

(a) The serialized multiplexed audio from the zone mux passes thru the first SEB then on to the next SEB and so on. Within the SEB the digital audio is demultiplexed for each passenger as selected on the channel selector of the passenger control unit (PCU). Each SEB has the capability to provide audio for four passengers.

(b) The passenger can listen to entertainment audio by inserting a headset into the headset jacks in the seat armrest. The passenger can change channels or adjust volume level with controls on the PCU.

(4) PSS Lights and Calls

(a) The passenger service system (PSS) controls the operation of the reading lights and attendant call functions. The column timer decoders (CTDs) deliver timing and sync pulses to three columns of seat electronic boxes (SEBs), and passenger service unit decoders (PSUDs). The CTDs provide individual timing pulses to all units simultaneously. This allows for correct synchronization and control.

(b) At the same time in every frame, switches close in the SEB, CTD, and PSUD. When a passenger selects their reading light on, a logic 0 is generated in the PCU. In the SEB, it is converted into a data pulse. The data pulse is sent to the CTDs and PSUDs to turn the reading light on. At the same time in each successive frame, the system checks whether the reading light switch is on or off, and controls the light as necessary.

(c) ALL SAS AIRPLANES;
When an attendant call is made, a data pulse is generated. This causes the PSUD to turn on the row call light. The data pulse will also cause the CTD to turn on the blue attendant call light and sound a Hi chime through the electronic chime modules.

(d) ALL MTH AIRPLANES;
When an attendant CALL has been made, a DATA pulse is generated. This causes the PSUD to turn on the row CALL light, and the CTD to turn on the blue attendant CALL light and sound the HI-LO chime.

(e) The multiplexing function of the PSS is applied to three columns of seats. One CTD can control PSS functions for three columns of up to 31 seat groups per column. The CTD has three microprocessor circuits. One circuit controls the outboard right column of seats, another the center column of seats, and the other set controls the left column of seats. Each CTD has timing and control signal lines to control SEBs and PSUDs. The CTD provides a clock/data 1 (C/D 1) and a C/D 2 line to one column of SEBs and PSUDs. AC power is supplied to each SEB column for PSS and PES functions by the CTD. The PSUDs in each column receive 115 volt AC power through the PSS power relays.

(f) Clock/Data (C/D) pulses from the CTD are transmitted along a column of seats. The SEB and PSUD at each seat group is synchronously controlled by the CTD. Interrogation of the first SEB occurs when the first four bits of data are received from the C/D 1 line. This data is processed by the logic and timing detectors in the SEB. Any command input is transmitted back along C/D 1 within the defined time.

(g) After four bits are sampled, the input switch is set, and C/D 1 is connected to the next SEB and PSUD. The CTD generates a SYNC pulse after one frame (31 pulses). This SYNC pulse resets the four bit switches in all SEBs and PSUDs of the column. During the next frame, clock/data pulses are transmitted along the C/D 2 line. The first four bits are applied to the last seat group in the column. The seat groups are interrogated and controlled from last to first until the SYNC pulse reverses the process again. The clock/data line to the SEBs from the CTD is bi-directional in alternate frames. If a break in one of the clock/data lines occurs, the system will continue to operate.

(h) The PSUD responds to SEB commands determined by passenger control unit switches. Master call reset data is received from the FWD MSTR CALL RESET and AFT MSTR CALL RESET switches on the forward attendant panel. This data is sent from the CTD microprocessor, to the SEB and PSUD. The row call light is turned off, and SEB call circuits are reset. The time it takes to monitor one column of SEBs is called a frame. Each frame is terminated with a sync pulse. Each seat group receives general signals applicable to all seats, and particular signals related to one seat. Timing is the same for 2 or 3 seat groups.

(i) ALL SAS AIRPLANES;
Each column of SEBs has a termination plug at the last seat group. Each column of PSUDs has a termination plug at the last PSU. The forward CTD operates the fwd left master call light for attendant calls from its left column of SEBs and from the number 1 and 2 PCU inputs of the center SEB column. The forward CTD operates the fwd right master call light for calls from the right column of SEBs and the number 3 PCU inputs of the center SEB column. The aft CTD operates the mid and aft master call lights in the same fashion over the left and right aisleways. All attendant calls from the CTDs are provided to PA amplifier (767-200 AIRPLANES) or electronic chime modules (767-300 AIRPLANES) which produce the single high chime signals (AMM 23-42-00).

(j) ALL MTH AIRPLANES;
Each column of SEBs has a termination plug at the last seat group. Each column of PSUDs has a termination plug at the last PSU. The forward CTD operates the fwd left master call light for attendant calls from its left column of SEBs and from the number 1 and 2 PCU inputs of the center SEB column. The forward CTD operates the fwd right master call light for calls from the right column of SEBs and the number 3 PCU inputs of the center SEB column. The aft CTD operates the mid and aft master call lights in the same fashion over the left and right aisleways. All attendant calls from both CTDs are provided to the PA amplifier which produces the single HI-LO chime signals (AMM 23-31-00).

B. BITE

(1) System tests of the PES/PSS are performed using the PASS ENT AND SERVICE SYST switch on fwd attendant panel P21. The CTDs perform test routines in all test switch positions other than NORMAL. Each of the switch positions tests a different portion or function of the PES/PSS so that component isolation is possible. The FWD MSTR CALL RESET and AFT MSTR CALL RESET lights on P21 are used as status indicators for the fwd and aft portions of the PES/PSS being tested. A single hi chime will sound as the tests are successfully completed in the first two switch positions.

(2) Before using the PASS ENT AND SERVICE SYST test switch, the PASS ENT SYST PWR and PASS SERV SYST PWR switches should be on (switchlights on). The READING switch should be in the NORMAL position.

(3) Lights used as BITE indicators are:

LIGHT	LOCATION	FUNCTION
FWD and AFT MSTR CALL RESET	White switchlights on forward attendant panel.	GO-NO/GO indicators for test positons 1, and 3 thru 6.
Passenger call lights	White light in passenger service unit above each seat group.	Used to indicate location of unit or cable faults.
Master call lights	Blue lights in ceiling.	Used to distinguish unit faults from cable faults. On indicates unit failure. Off indicates cable failure

Reading lights	Incandesent lights in passenger service unit above each seat.	Used in ENT test position to locate seat electronics box, passenger control unit or cable faults.

(a) MASTER TEST - The CTDs check all the PSS units, PSS data lines, and PES signal transmissions for normal operation. A chime sounds to indicate the test is complete. Successful completion is indicated by the FWD and AFT MSTR CALL RESET lights coming on. If a fault is indicated, the test should be continued to isolate the faulty unit.

(b) LAMP TEST - The CTDs operate all the seat reading lights, passenger call lights, master call lights, the FWD MSTR CALL RESET light and the AFT MSTR CALL RESET light. The chime sounds to indicate test complete. Individual lights out indicate faulty lamps (bulbs) or PSUD. Entire columns of lights out indicate a faulty CTD.

(c) DATA DIR CALL LTS FWD ON OVHD - The CTDs check the PSUD data lines and units in the forward direction. Each PSUD makes a reading light driver check. All passenger call lights come on sequentially. A successful test is indicated by the FWD and the AFT MSTR CALL RESET lights coming on. A fault is indicated if either the FWD or AFT MSTR CALL RESET light remains off. If a master call light is on, the fault is the passenger service unit decoder (PSUD) at the first seat group with the passenger call light off. If all master call lights are off, the fault is the PSUD to PSUD cable between the passenger service unit with the passenger call light on and the passenger service unit with the passenger call light off.

(d) DATA DIR CALL LTS AFT OFF OVHD - The CTDs check the PSUD data lines and units in the reverse direction. All passenger call lights come on at the same time, then go out sequentially. A successful test is indicated by the FWD and AFT MSTR CALL RESET lights coming on. A fault is indicated if either the FWD or AFT MSTR CALL RESET light remains off. If a master call light is on, the fault is the passenger service unit decoder (PSUD) at the first seat group with the passenger call light on. If all master call lights are off, the fault is the PSUD to PSUD cable between the passenger service unit with the passenger call light on and the passenger service unit with the passenger call light off.

(e) DATA DIR CALL LTS FWD ON SEATS - The CTDs check the SEB data lines and units in the forward direction. All passenger call lights come on sequentially. A successful test is indicated by the FWD and AFT MSTR CALL RESET lights coming on. A fault is indicated if either the FWD or AFT MSTR CALL RESET light remains off. If a master call light is on, the fault is the seat electronics box (SEB) at the first seat group with the passenger call light off. If all master call lights are off, the fault is the SEB to SEB cable between the seat group with the passenger call light on and the seat group with the passenger call light off.

(f) DATA DIR CALL LTS AFT OFF SEATS - The CTDs check the SEB data lines and units in the reverse direction. All passenger call lights come on at the same time, then go out sequentially. A successful test is indicated by the FWD and AFT MSTR CALL RESET lights coming on. A fault is indicated if either the FWD or AFT MSTR CALL RESET light remains off. If a master call light is on, the fault is the seat electronics box (SEB) at the first seat group with the passenger call light on. If all master call lights are off, the fault is the SEB to SEB cable between the seat group with the passenger call light on and the seat group with the passenger call light off.

(g) ENT TEST - The CTDs check the PES. A successful test is indicated by all passenger call lights coming on and all reading lights remaining off. All the reading lights on at one seat group indicates a seat electronics box (SEB) failure. Only one reading light on, indicates a faulty transducer in the corresponding passenger control unit (PCU). All passenger call lights out in one column indicate a faulty zone mux. All passenger call lights out indicates a faulty main mux.

(h) The digital PCU BITE test is initiated when the PES/PSS test switch is in the ENT TEST position. The channel display and attendant call switch/light are used as status indicators. Normal PCU operation is indicated when the attendant call switchlight is illuminated and the center horizontal bar of the right digit is displayed. A transducer fault is indicated when the right digit displays E. A display showing anything other than E or the horizontal bar indicates a microprocessor fault. A blank display indicates loss of input power from the SEB or a fault in the PCU circuit.

(4) The PASS ENT AND SERVICE SYST switch should be set to NORMAL upon the completion of system tests. The FWD MSTR CALL RESET and AFT MASTER CALL RESET switches should be pressed to reset all the master call lights and passenger call lights.

C. Control

(1) Turn-On Procedure

(a) Supply electrical power (AMM 24-22-00).

(b) SAS 162-167, 276-278, 280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

(c) Check that the following overhead panel P11 circuit breaker is closed:
1) 11T8, PASS ENTMT/SERVICE CONT

(d) 767-300 AIRPLANES;
Check that the following forward misc electrical equipment panel P33 circuit breakers are closed:
1) 33A3, AFT C PSUD
2) 33A4, FWD C PSUD

(e) Check that the following left misc electrical equipment panel P36 circuit breakers are closed:
1) 36J1, R PSUD FWD
2) 36J2, R PSUD AFT
3) 36J3, L PSUD FWD
4) 36J4, L PSUD AFT
5) 36J5, MUX/TAPE REPRO

(f) Check that the following right misc electrical equipment panel P37 circuit breakers are closed:
1) 37K1, FWD CTD
2) 37K2, AFT CTD

(g) 767-200 AIRPLANES;
Check that the following P37 panel circuit breakers are closed:
1) 37K3, FWD C PSUD
2) 37K4, AFT C PSUD

(h) On fwd attendant panel P21:
1) Press PASS ENT SYST PWR switch to on (switchlight on).
2) Press PASS SERV SYST PWR switch to on (switchlight on).
3) Set READING switch to NORMAL.
4) Check that the PASS ENT AND SERVICE SYST switch is set to NORMAL.
5) Press the FWD MSTR CALL RESET switch.

6) Press the AFT MSTR CALL RESET switch.
7) ALL MTH AIRPLANES;
Press CHIME SHUTOFF switch to normal (not lighted).

(2) Boarding Music (AMM 23-31-00)
(3) PSS
(a) Reading light
1) Press reading light switch on PCU.
(b) Passenger-To-Attendant Call
1) Press attendant call switch on PCU.
(4) PES
(a) Connect headset to jack in seat armrest.
(b) Select desired audio channel on PCU.
(c) Adjust volume to desired level with volume control on PCU.

PASSENGER ENTERTAINMENT/PASSENGER SERVICE SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
AMPLIFIER - (23-31-00/101)				
PASSENGER ADDRESS, M177				
BOX - SEAT ELECTRONIC (SEB), M915	2	*	PASS. CABIN	23-34-04
BOX - SEAT ELECTRONIC (SEB), CREW REST, M1756 4	--	1	PASS. CABIN, CREW REST AREA	23-34-04
CARDS - (23-31-00/101)				
PA SWITCHING, M1634,M1635 1				
PA VOLUME LEVEL INDICATOR, M1633 1				
CHIMES - (23-42-00/101)				
AFT L ATTENDANT'S, B148 7				
AFT R ATTENDANT'S, B147 7				
FWD CTR ATTENDANT'S, B139 7				
FWD L ATTENDANT'S, B144 7				
MID L ATTENDANT'S, B146 7				
MID R ATTENDANT'S, B145 7				
CIRCUIT BREAKER -	2		FLT COMPT, P11	
PASS ENTMT/SERVICE CONT, C547		1	11T8	*
CIRCUIT BREAKERS -	1		119AL, MAIN EQUIP CTR, P33	
AFT C PSUD, C536		1	33A3	*
FWD C PSUD, C531		1	33A4	*
MID C PSUD, C507 6		1	33A5	*
CIRCUIT BREAKERS -	1		119AL, MAIN EQUIP CTR, P36	
L AFT PSUD, C535		1	36J4	*
L FWD PSUD, C530		1	36J3	*
MUX/TAPE REPRO, C546		1	36J5	*
R AFT PSUD, C541		1	36J2	*
R FWD PSUD, C533		1	36J1	*
CIRCUIT BREAKERS -	1		119AL, MAIN EQUIP CTR, P37	
AFT CTD, C543		1	37K2	*
FWD CTD, C542		1	37K1	*
DECODER - AFT COLUMN TIMER, M1306	1	1	821, MID EQUIP CTR, E5	23-34-07
DECODER - FWD COLUMN TIMER, M1319	1	1	119AL, MAIN EQUIP CTR	23-34-07
DECODER - MID COLUMN TIMER, M1320	1	1	119AL, MAIN EQUIP CTR	23-34-07
DECODERS - PASSENGER SERVICE UNIT (PSUD), M914,M1056	2	*	PASS. CABIN	23-34-08
DECODER - PASSENGER SERVICE UNIT (PSUD), CREW REST, M1755 4	--	1	PASS. CABIN, CREW REST AREA	23-34-08
DIODES - (23-42-00/101)				
CHIME ISLN R86,R87,R88,R89,R285,R286,R287 7				
DIODE - (31-01-33/101)				
K458 RELAY, R23				
DIODES - MASTER CALL ISLN, R312,R313 2	--	2	119AL, MAIN EQUIP CTR, E2-5, TB139	*
DRIVERS - ZONE, M1308; 1 M1710	1	2	119AL, MAIN EQUIP CTR, E3	23-34-10

* SEE THE WDM EQUIPMENT LIST

1 ALL SAS AIRPLANES
2 SAS 050-149
3 SAS 150-999
4 SAS 050-149,162-999
5 ALL MTH AIRPLANES
6 MTH 279-999
7 ALL EXCEPT SAS 050-149
8 ALL EXCEPT SAS 150-999

Passenger Entertainment/Passenger Service System - Component Index
Figure 101 (Sheet 1)

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
LIGHT - AFT B/C L MASTER CALL, L581 [3]	3	1	PASS. CABIN	*
LIGHT - AFT B/C R MASTER CALL, L582 [3]	3	1	PASS. CABIN	*
LIGHT - AFT CTR MASTER CALL, L637 [2]	3	1	PASS. CABIN	*
LIGHT - AFT L MASTER CALL, L583	3	1	PASS. CABIN	*
LIGHT - AFT R MASTER CALL, L584	3	1	PASS. CABIN	*
LIGHT - CTR T/C L MASTER CALL, L409 [3]	3	1	PASS. CABIN	*
LIGHT - CTR T/C R MASTER CALL, L410 [3]	--	1	PASS. CABIN	*
LIGHT - CREW REST LOWER BUNK READING, L1184 [4]	--	1	PASS. CABIN, CREW REST AREA	23-34-09
LIGHT - CREW REST UPPER BUNK READING, L1183 [4]	3	1	PASS. CABIN, CREW REST AREA	23-34-09
LIGHT - FWD B/C L MASTER CALL, L731 [3]	3	1	PASS. CABIN	*
LIGHT - FWD B/C R MASTER CALL, L732 [3]	3	1	PASS. CABIN	*
LIGHT - FWD MASTER CALL, L864 [2]	3	1	PASS. CABIN	*
LIGHT - FWD L MASTER CALL, L579	3	1	PASS. CABIN	*
LIGHTS - FWD R MASTER CALL, L580; L864 [3]	3	2	PASS. CABIN	*
LIGHTS - MID AFT L MASTER CALL, L1133 [2]; L687 [5]	3	2	PASS. CABIN	*
LIGHTS - MID AFT R MASTER CALL, L1134 [2]; L688 [5]	3	2	PASS. CABIN	*
LIGHT - MID CTR L MASTER CALL, L409 [8]	3	1	PASS. CABIN	*
LIGHT - MID CTR R MASTER CALL, L410 [8]	3	1	PASS. CABIN	*
LIGHTS - MID FWD L MASTER CALL, L731 [2]; L685 [5]	3	2	PASS. CABIN	*
LIGHTS - MID FWD R MASTER CALL, L732 [2]; L686 [5]	3	2	PASS. CABIN	*
LIGHT - MID L MASTER CALL, L581 [2]	3	1	PASS. CABIN	*
LIGHT - MID R MASTER CALL, L582 [2]	3	1	PASS. CABIN	*
LIGHT - MID T/C L MASTER CALL, L1133 [3]	3	1	PASS. CABIN	*
LIGHT - MID T/C R MASTER CALL, L1134 [3]	3	1	PASS. CABIN	*
LIGHT - PASSENGER SERVICE UNIT READING	2	*	PASS. CABIN	23-34-09
MULTIPLEXER - AFT ZONE, M1307	1	1	821, MID EQUIP CTR, E5	23-34-02
MULTIPLEXER - FWD ZONE, M642	1	1	119AL, MAIN EQUIP CTR	23-34-02
MULTIPLEXER - MAIN, M171	1	1	119AL, MAIN EQUIP CTR, E2-5	23-34-01
MULTIPLEXER - MID ZONE, M1321	1	1	119AL, MAIN EQUIP CTR	23-34-02

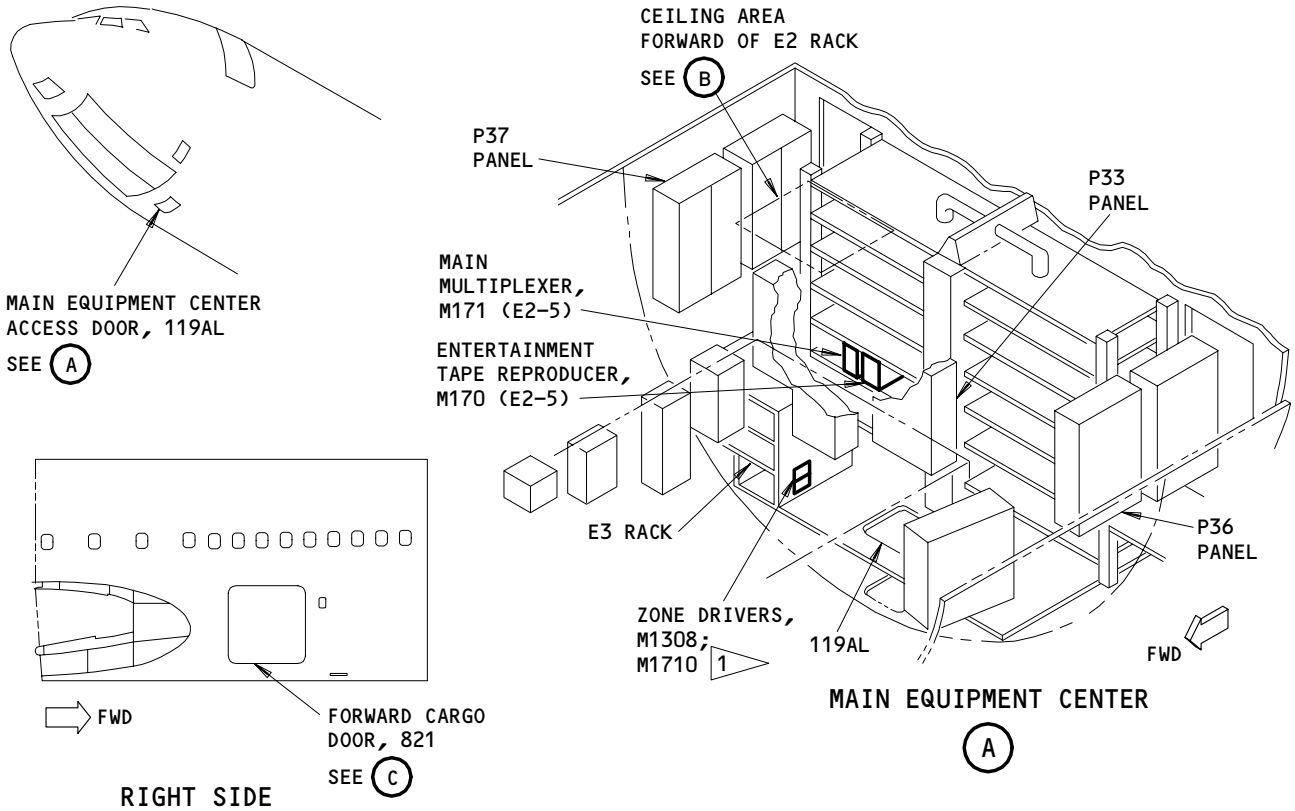
* SEE THE WDM EQUIPMENT LIST

Passenger Entertainment/Passenger Service System - Component Index
Figure 101 (Sheet 2)

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
PANEL - (33-22-00/101)				
FWD ATTENDANT'S, P21				
PLUG - 50 OHM TERMINATION, M1307T	--	1	821, MID EQUIP CTR	*
PLUG - PSUD TERMINATION, M914T	--	*	PASS. CABIN	*
PLUG - PSUD TERMINATION, M1755T 4	--	1	PASS. CABIN, CREW REST AREA	*
PLUG - SEB TERMINATION, M915T	--	*	PASS. CABIN	*
RELAYS - (31-01-33/101)				
AFT PSS PWR, K459				
FWD PSS PWR, K458				
MID PSS PWR, K1305 6				
PES PWR, K460				
PES/PSS TEST, K928				
RELAY - CALL LIGHT, K1262 2	--	1	119AL, MAIN EQUIP CTR, E2-5	*
RELAYS - CHIME OFF, K1258,K1259 5	--	2	119AL, MAIN EQUIP CTR, E2-5	*
REPRODUCER - (23-31-00/101)				
BOARDING MUSIC TAPE, M1708 1				
REPRODUCER - ENTERTAINMENT TAPE, M170	1	1	119AL, MAIN EQUIP CTR, E2-5	23-34-03
RESISTOR, R658 4	--	1	PASS. CABIN, CREW REST AREA	*
SWITCH - PES/PSS TEST, YBHS31	2	1	PASS. CABIN, FWD ATTENDANT'S PANEL, P21	*
SWITCH - READING LIGHTS, YBHS6	2	1	PASS. CABIN, FWD ATTENDANT'S PANEL, P21	*
SWITCH/LIGHT - AFT MASTER CALL RESET, YBHS19	2	1	PASS. CABIN, FWD ATTENDANT'S PANEL, P21	*
SWITCH/LIGHT - CHIME SHUT-OFF, YBHS20 5	2	1	PASS. CABIN, FWD ATTENDANT'S PANEL, P21	*
SWITCH/LIGHT - FWD MASTER CALL RESET, YBHS14	2	1	PASS. CABIN, FWD ATTENDANT'S PANEL, P21	*
SWITCH/LIGHT - PES PWR, YBHS16	2	1	PASS. CABIN, FWD ATTENDANT'S PANEL, P21	*
SWITCH/LIGHT - PSS PWR, YBHS15	2	1	PASS. CABIN, FWD ATTENDANT'S PANEL, P21	*
UNIT - (23-32-00/101)				
VIDEO CONTROL DISTRIBUTION, M815				
UNIT - (23-42-00/101)				
AUDIO ACCESSORY, M108				
UNIT - PASSENGER CONTROL (PCU)	2	*	PASS. CABIN SEAT ARMRESTS	23-34-05
UNIT - PASSENGER CONTROL (PCU), CREW REST LOWER BUNK, M1757 4	--	1	PASS. CABIN, CREW REST AREA	23-34-05
UNIT - PASSENGER CONTROL (PCU), CREW REST UPPER BUNK, M1758 4	--	1	PASS. CABIN, CREW REST AREA	23-34-05

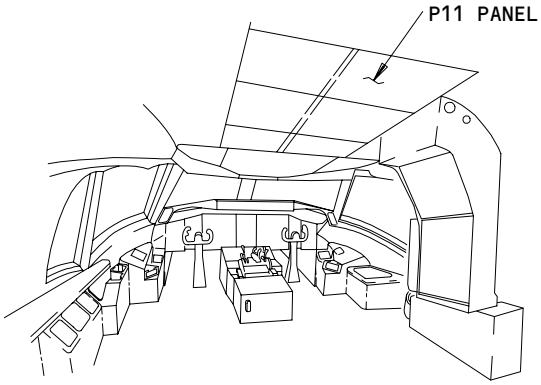
* SEE THE WDM EQUIPMENT LIST

Passenger Entertainment/Passenger Service System - Component Index
Figure 101 (Sheet 3)

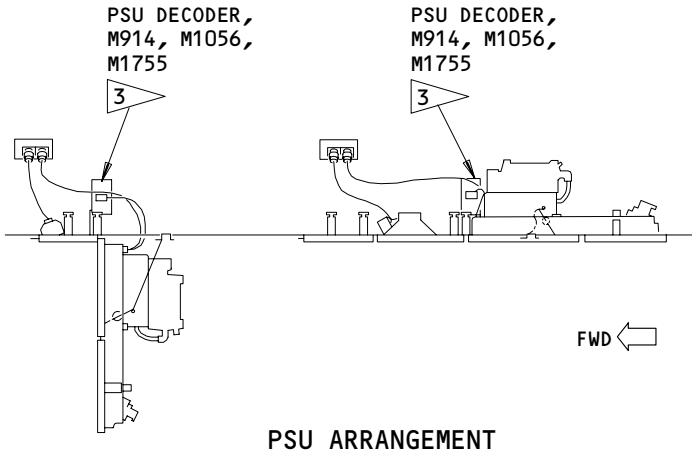


1 ALL SAS AIRPLANES

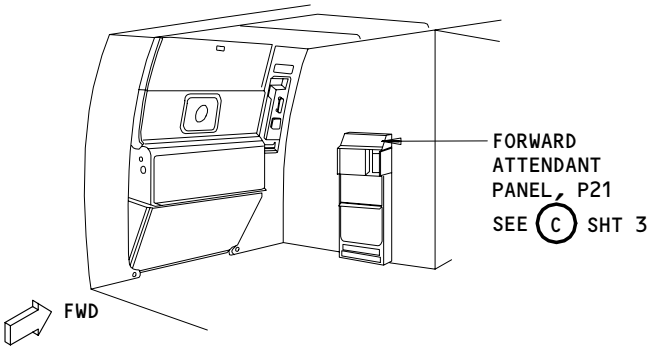
Passenger Entertainment/Passenger Service System - Component Location
Figure 102 (Sheet 1)



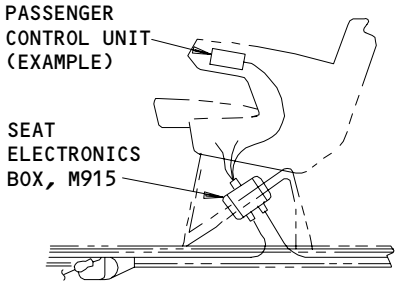
FIGHT COMPARTMENT



PSU ARRANGEMENT
(EXAMPLE)

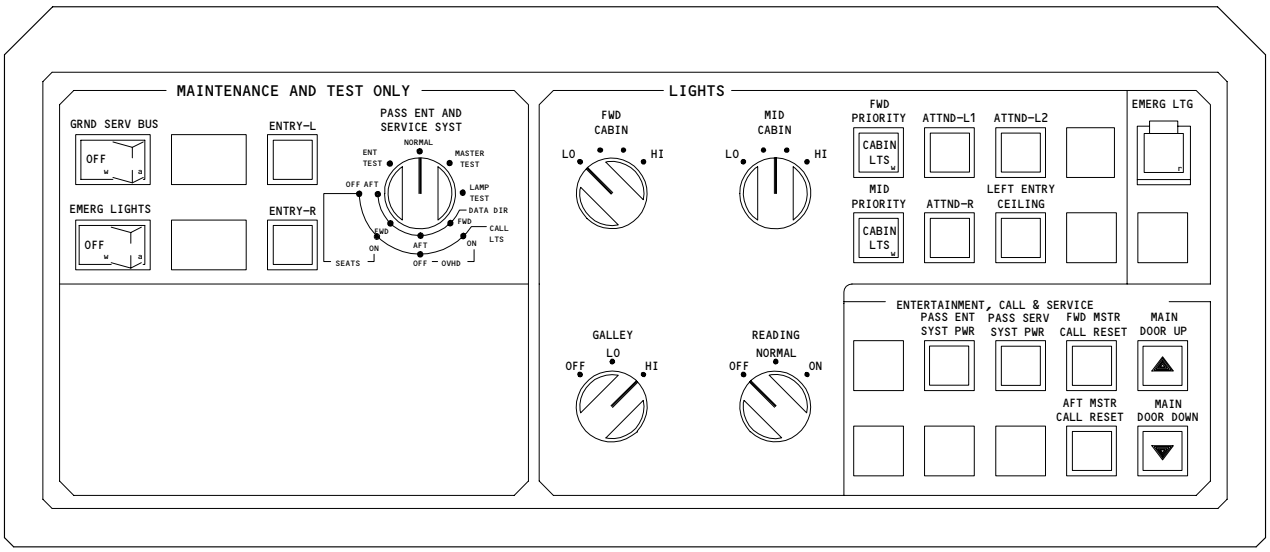


FORWARD ENTRY DOOR AREA



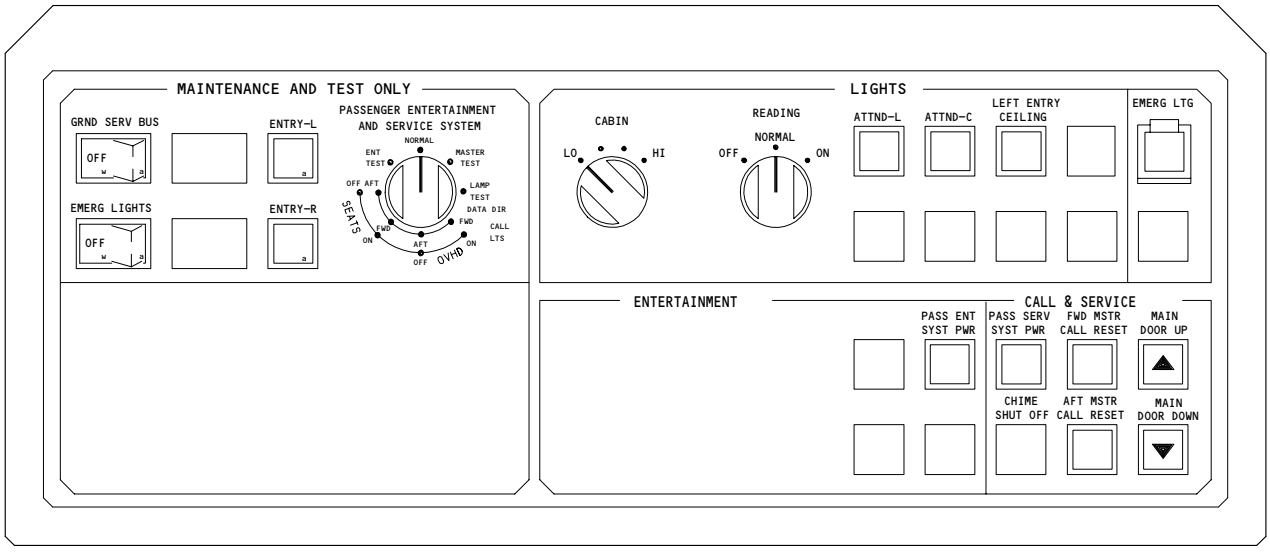
SEAT ARRANGEMENT
(EXAMPLE)

Passenger Entertainment System – Component Location
Figure 102 (Sheet 2)



FORWARD ATTENDANT PANEL, P21

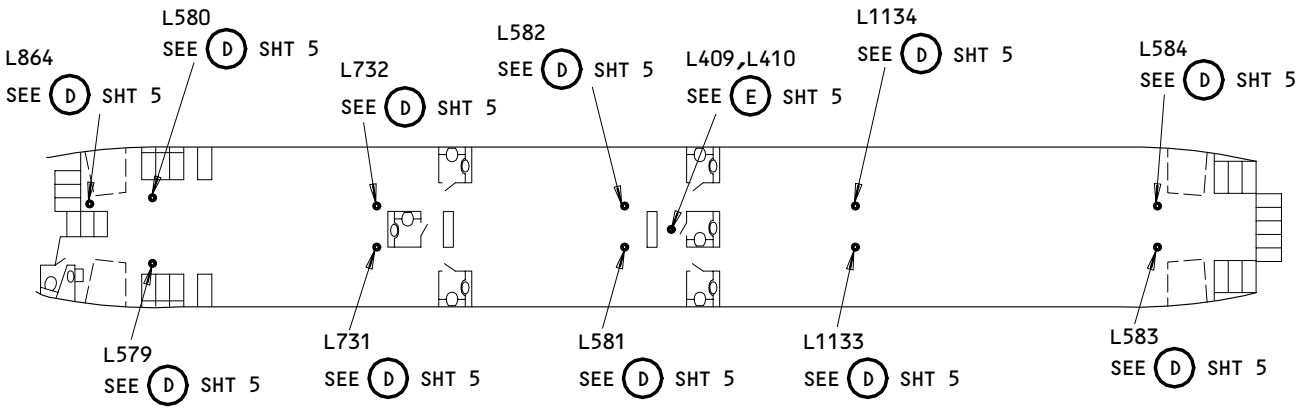
C 1



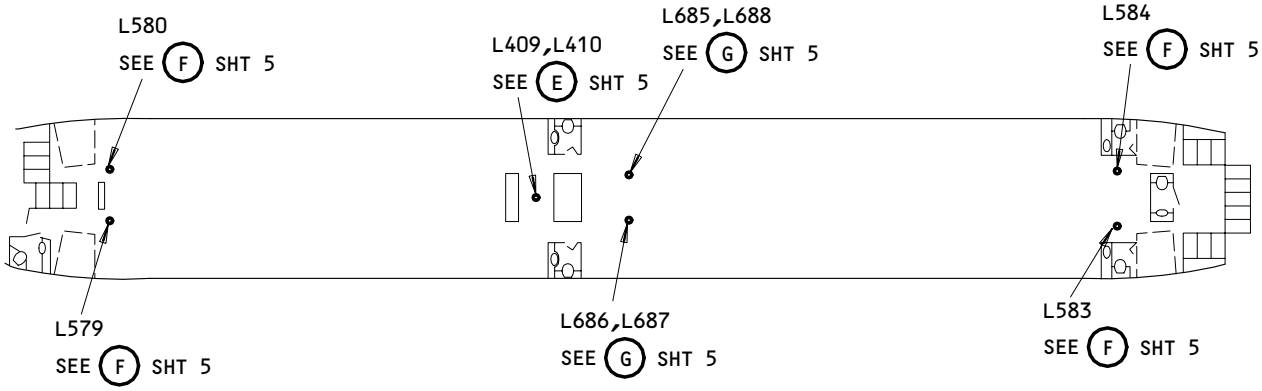
FORWARD ATTENDANT PANEL, P21

C 2

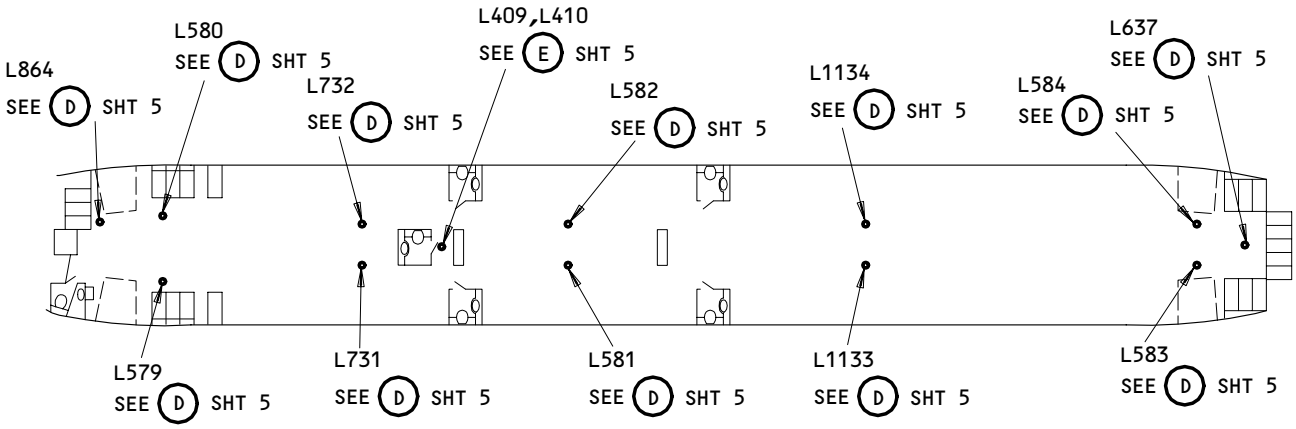
Passenger Entertainment System – Component Location (Detail from Sht 2)
Figure 102 (Sheet 3)



ALL SAS 767-300 AIRPLANES

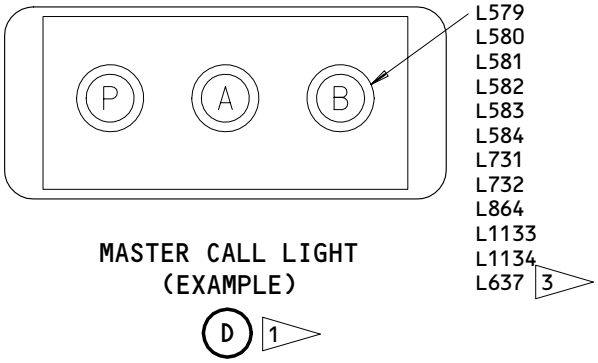


ALL MTH AIRPLANES



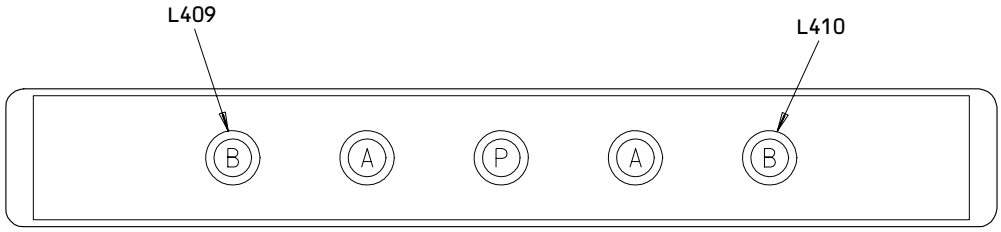
ALL SAS 767-200 AIRPLANES

Passenger Entertainment System - Component Location
Figure 102 (Sheet 4)



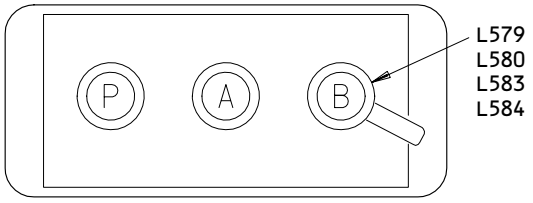
MASTER CALL LIGHT
(EXAMPLE)

D 1



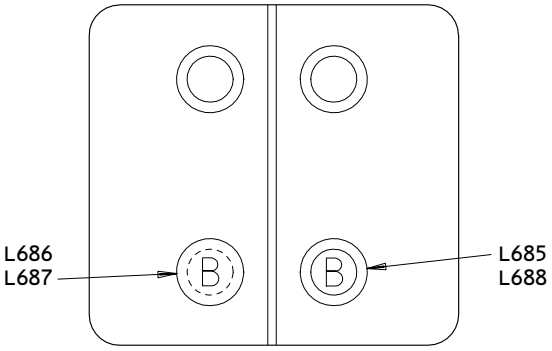
MASTER CALL LIGHT
(EXAMPLE)

E



MASTER CALL LIGHT
(EXAMPLE)

F 2



MASTER CALL LIGHT
(EXAMPLE)

G 2

Passenger Entertainment System – Component Location (Details from Sht 4)
Figure 102 (Sheet 5)

PASSENGER ENTERTAINMENT/PASSENGER SERVICE SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains two tasks. The first task is the operational test of the Passenger Entertainment/Passenger Service system. The second task is the system test of the PES/PSS. The operational test is a fast check of the PES/PSS. The system test is a full check of the PES/PSS.

TASK 23-34-00-715-001

2. Operational Test - PES/PSS
   A. General
      (1) This test gives a BITE test and an operational check of the passenger entertainment/passenger service system.
   B. References
      (1) 24-22-00/201, Electrical Power - Control
   C. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

   D. Prepare for the Operational Test

      S 865-002
      (1) Supply electrical power (Ref 24-22-00).

      S 865-003
      (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
          (a) 11C22, PASS ADRS
          (b) 11C23, INTERPHONE CABIN SERVICE
          (c) 11T8, PASS ENTMT/SERVICE CONT

      S 865-004
      (3) 767-300 AIRPLANES;
          Make sure these circuit breakers on the forward misc electrical equipment panel, P33, are closed:
          (a) 33A3, AFT C PSUD
          (b) 33A4, FWD C PSUD

      S 865-006
      (4) Make sure these circuit breakers on the left misc electrical equipment panel, P36, are closed:
          (a) 36J1, R FWD PSUD
          (b) 36J2, R AFT PSUD
          (c) 36J3, L FWD PSUD
          (d) 36J4, L AFT PSUD
          (e) 36J5, MUX/TAPE REPRO

S 865-007
(5) Make sure these circuit breakers on the right misc electrical equipment panel, P37, are closed:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 865-008
(6) 767-200 AIRPLANES;
Make sure these circuit breakers on the P37 panel are closed:
(a) 37K3, FWD C PSUD
(b) 37K4, AFT C PSUD

S 865-010
(7) At the Fwd Attendant Panel P21:
(a) Push the PASS ENT SYST PWR switch to on (switchlight on).
(b) Push the PASS SERV SYST PWR switch to on (switchlight on).
(c) Make sure the READING LIGHTS switch is in the NORMAL position.
(d) Set the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM switch to NORMAL.
(e) ALL MTH AIRPLANES;
Push the CHIME SHUTOFF switch to the usual position (not lighted).

S 865-549
(8) SAS 162-167, 276-278, 280 POST-SB 24-0152;
At the electric system control panel P5:
(a) Make sure the UTILITY BUS - R switch is in the ON position.

E. Do the PES/PSS BITE Test

S 715-231
(1) At the forward attendant's panel, P21:
(a) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the MASTER TEST position.

NOTE: This step may have to be done three times before all of the indications that follow occur.

(b) Make sure these indications occur:
1) FWD MSTR CALL RESET light comes on.
2) AFT MSTR CALL RESET light comes on.
3) HI chime sound operates.
(c) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the LAMP TEST position.
(d) Make sure these indications occur:
1) FWD MSTR CALL RESET light comes on.
2) AFT MSTR CALL RESET light comes on.
3) All passenger reading lights come on.
4) All PSU mounted attendant call lights (white) come on.
5) All ceiling mounted master call lights (blue) come on.
6) HI chime sound operates.

(e) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the DATA DIR FWD OVHD position.
(f) Make sure these indications occur:
1) All PSU mounted attendant call lights come on in sequence from fwd to aft.
2) All ceiling mounted master call lights are off.
3) FWD MSTR CALL RESET light is on.
4) AFT MSTR CALL RESET light is on.
(g) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the DATA DIR AFT OVHD position.
(h) Make sure these indications occur:
1) All the PSU mounted attendant call lights come on at the same time.
2) The PSU mounted attendant call lights go off in sequence from aft to forward.
3) The FWD MSTR CALL RESET light is on.
4) The AFT MSTR CALL RESET light is on.
5) The ceiling mounted master call lights are off.
(i) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the DATA DIR FWD SEATS position.
(j) Make sure these indications occur:
1) All PSU mounted attendant call lights come on in sequence from forward to aft.
2) The FWD MSTR CALL RESET light is on.
3) The AFT MSTR CALL RESET light is on.
4) The master call lights on the ceiling are off.
(k) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the DATA DIR AFT SEATS position.
(l) Make sure these indications occur:
1) All the call lights on the PSUs come on at the same time.
2) The attendant call lights on the PSUs go out in sequence from aft to forward.
3) The FWD MSTR CALL RESET light is on.
4) The AFT MSTR CALL RESET light is on.
5) The master call lights on the ceiling are out.
(m) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the ENT TEST position.
(n) Make sure these indications occur:
1) All the attendant call lights on the PSUs are ON.
2) The master call lights installed on the ceiling are out.
3) The FWD MSTR CALL RESET light is on.
4) The AFT MSTR CALL RESET light is on.
(o) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch clockwise to the NORMAL position.

F. Reading Light Controls Test

S 715-232
(1) Do these steps at the forward attendant's panel, P21:
(a) Turn the READING LIGHTS switch to the ON position.
1) Make sure all the passenger reading lights come on.

(b) Turn the READING LIGHTS switch to the OFF position.
1) Make sure all the passenger reading lights go off.
(c) Release the READING LIGHTS switch.
1) Make sure the READING LIGHTS switch goes to the NORMAL position.

S 865-013
(2) Turn on five reading lights in each zone of the passenger compartment. Push the reading light switch on each passenger control unit (PCU).

S 715-234
(3) Turn the READING LIGHTS switch to the OFF position.
(a) Make sure all the passenger reading lights go off.

S 715-351
(4) Release the READING LIGHTS switch.
(a) Make sure the READING LIGHTS switch goes to the NORMAL position.

G. Reading and Call Lights, Seat Operation

S 715-236
(1) At the last seat group in the left column of seats in the fwd zone:
(a) On a passenger control unit:
1) Push the reading light switch to on and make sure the applicable reading light comes on.
2) Push the reading light switch to off and make sure the reading light goes off.
3) Push the attendant call switch to on and make sure the applicable PSU attendant call light (white) comes on.
4) Make sure the applicable ceiling master call light(s) come on.
5) Make sure you hear a single HI chime in the passenger compartment.
6) Set the attendant call switch.
7) Make sure the PSU attendant call light goes off.
8) Make sure the ceiling master call light(s) goes off.

H. Do the Reading and Call Lights, Seat Operation paragraph again from the locations that follow:

S 715-246
(1) The last seat group in the center column of seats in the forward zone.

S 715-247
(2) The last seat group in the right column of seats in the forward zone.

S 715-248
(3) The last seat group in the left column of seats in the mid zone.

S 715-249
(4) The last seat group in the center column of seats in the mid zone.

S 715-250
(5) The last seat group in the right column of seats in the mid zone.

S 715-252
(6) The last seat group in the left column of seats in the aft zone.

S 715-253
(7) The last seat group in the center column of seats in the aft zone.

S 715-254
(8) The last seat group in the right column of seats in the aft zone.

I. Audio Entertainment Test

S 715-264
(1) At a seat in the forward zone:
  (a) Connect a headphone to the jack in the seat armrest.
  (b) ALL SAS AIRPLANES;
  Make sure there is clear audio on PCU channels 3 thru 12.
  (c) ALL MTH AIRPLANES;
  Make sure there is clear audio on PCU channels 5 thru 10.
  (d) Make sure the volume switch on the PCU adjusts the applicable volume.
  (e) Make a PA announcement from an attendant handset and make sure the announcement stops the entertainment audio in headphones.
  (f) Make sure the entertainment audio starts after the PA announcement is completed.

S 715-265
(2) Do the Audio Entertainment Test paragraph again at a seat in the mid zone.

S 715-267
(3) Do the Audio Entertainment Test paragraph again at a seat in the aft zone.

J. Put the Airplane Back to Its Initial Condition

S 865-090
(1) At the forward attendant's panel, P21:
  (a) Push the PASS ENT SYST PWR switch to off (switchlight off).
  (b) Push the PASS SERV SYST PWR switch to off (switchlight off).

S 865-091
(2) Remove electrical power if it is not necessary (Ref 24-22-00).

TASK 23-34-00-735-092

3. System Test - PES/PSS

A. General

(1) This test is a full check of the passenger entertainment and passenger service system. All system adjustment specifications necessary are included to make sure of the best performance.

B. References

(1) 23-31-00/501, Passenger Address System

(2) 24-22-00/201, Electrical Power - Control

C. Equipment

(1) Passenger's headset - commercially available

(2) The Matsushita equipment that follows,
Matsushita, One Panasonic Way, Secaucus, NJ
07094

(a) Entertainment Test Tape - RD-AM9504

(b) Entertainment Test Tape - RD-AM9505

(c) Entertainment Test Tape - RD-AM9506

D. Prepare for System Test

S 865-093

(1) Supply electrical power (Ref 24-22-00).

S 865-094

(2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:

(a) 11C22, PASS ADRS

(b) 11C23, INTERPHONE CABIN SERVICE

(c) 11T8, PASS ENTMT/SERVICE CONT

(d) 11T34, VIDEO PROJ

S 865-096

(3) 767-300 AIRPLANES;
Make sure these circuit breakers on the forward misc electrical equipment panel, P33, are closed:

(a) 33A3, AFT C PSUD

(b) 33A4, FWD C PSUD

S 865-097

(4) Make sure these circuit breakers on the left misc electrical equipment panel, P36, are closed:

(a) 36J1, R FWD PSUD

(b) 36J2, R AFT PSUD

(c) 36J3, L FWD PSUD

(d) 36J4, L AFT PSUD

(e) 36J5, MUX/TAPE REPRO

(f) 36J7, PRE RECD ANNCT

S 865-098
(5) Make sure these circuit breakers on the right misc electrical equipment panel, P37, are closed:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD
(c) ALL SAS AIRPLANES;
Circuit Breakers:
1) 37K5, FWD VIDEO PROJECTOR
2) 37K6, MID VIDEO PROJECTOR
3) 37K7, AFT VIDEO PROJECTOR
(d) ALL MTH AIRPLANES;
Circuit Breakers:
1) 37L1, VIDEO AC 1
2) 37L2, VIDEO AC 2
3) 37L3, VIDEO AC 3
4) 37L4, VIDEO AC 4
5) 37L6, VIDEO AC CONT CTR

S 865-099
(6) 767-200 AIRPLANES;
Make sure these circuit breakers on the P37 panel are closed:
(a) 37K3, FWD C PSUD
(b) 37K4, AFT C PSUD

S 865-101
(7) At the forward attendant's panel, P21:
(a) Push the PASS ENT SYST PWR switch to on (switchlight on).
(b) Push the PASS SERV SYST PWR switch to on (switchlight on).
(c) Make sure the READING LIGHTS switch is in the NORMAL position.
(d) Set the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM switch to NORMAL.

E. Reading Light Controls Test

S 735-277
(1) Do these steps at the forward attendant's panel, P21:
(a) Turn the READING LIGHTS switch to the ON position.
1) Make sure all the passenger reading lights come on.
(b) Turn the READING LIGHTS switch to the OFF position.
1) Make sure all the passenger reading lights go off.
(c) Release the READING LIGHTS switch.
1) Make sure the READING LIGHTS switch goes to the NORMAL position.

S 865-355
(2) Turn on five reading lights in each zone of the passenger compartment. Push the reading light switch on each passenger control unit (PCU).

S 735-278
(3) Turn the READING LIGHTS switch to the OFF position.
(a) Make sure all the passenger reading lights go off.

S 735-354
(4) Release the READING LIGHTS switch.
(a) Make sure the READING LIGHTS switch goes to the NORMAL position.

F. Reading and Call Lights, Seat Operation

S 735-293
(1) At the last seat group in the left column of seats in the fwd zone:
(a) At a seat passenger control unit:
1) Push the reading light switch to on and make sure the applicable reading light comes on.
2) Push the reading light switch to off and make sure the applicable reading light goes off.
3) Push the attendant call switch to on and make sure the conditions that follow occur:
a) The PSU attendant call light (white) above the seat group comes on.
b) The fwd left ceiling master call lights (blue) come on.
c) You hear one HI chime sound.
4) Push the attendant call switch to off and make sure the attendant call and master call lights go off.

G. Do the Reading and Call Lights, Seat Operation paragraph again from the locations that follow:

S 735-294
(1) The left seat in the last seat group in the center column of seats in the forward zone.

S 735-295
(2) The right seat in the last seat group in the center column of seats in the forward zone.

NOTE: Attendant calls from this seat will operate the fwd right master call lights.

S 735-296
(3) The last seat group in the right column of seats in the fwd zone.

NOTE: Attendant calls from this seat will operate the fwd right master call lights.

S 735-297
(4) The last seat group in the left column of seats in the mid zone.

NOTE: Attendant calls from this seat will operate the mid left master call lights.

S 735-298
(5) The left seat in the last seat group in the center column of seats in the mid zone.

NOTE: Attendant calls from this seat will operate the mid left master call lights.

S 735-299
(6) The right seat in the last seat group in the center column of seats in the mid zone.

NOTE: Attendant calls from this seat will operate the mid right master call lights.

S 735-300
(7) The last seat group in the right column of seats in the mid zone.

NOTE: Attendant calls from this seat will operate the mid right master call lights.

S 735-302
(8) The last seat group in the left column of seats in the aft zone.

NOTE: Attendant calls from this seat will operate the aft left master call lights.

S 735-303
(9) The left seat in the last seat group in the center column of seats in the aft zone.

NOTE: Attendant calls from this seat will operate the aft left master call lights.

S 735-304
(10) The right seat in the last seat group in the center column of seats in the aft zone.

NOTE: Attendant calls from this seat will operate the aft right master call lights.

S 735-305
(11) The last seat group in the right column of seats in the aft zone.

NOTE: Attendant calls from this seat will operate the aft right master call lights.

H. ALL SAS AIRPLANES;
Audio Entertainment Test

S 865-149
(1) Push the PASS ENT SYST PWR switch (P21) to off (switchlight off) and attach DO-NOT-OPERATE tag.
(a) Put the test tapes into the boarding music and entertainment tape reproducers as shown below:

Boarding Music Tape Repro		RD-AM9504
Entertainment Tape Repro	Slot 1A	RD-AM9504
	2A	RD-AM9505
	3A	RD-AM9506
	1B	RD-AM9504
	2B	RD-AM9505
	3B	RD-AM9506

S 865-150
(2) Remove DO-NOT-CLOSE tag and push the PASS ENT SYST PWR switch to on.

S 865-151

(3) Push the START switch on the boarding music tape reproducer at the purser station.

PCU Channel Assignments
Table 501

PCU CHANNEL	AUDIO	TAPE TRACK IDENTITY
1	Mono	1 (Boarding music tape repro)
2	Mono	3 (Boarding music tape repro)
3	Mono	9
4	Mono	11
5	Stereo	1 and 3
6	Stereo	2 and 4
7	Stereo	5 and 7
8	Stereo	6 and 8
9	Mono	10
10	Mono	12
11	Mono (Spare)	Blank
12	Mono (Spare)	Blank

S 735-319

(4) At a seat in the fwd zone, put a headset into the armrest jack and do the steps that follow:
   (a) Adjust the volume control to a correct level.
   (b) Make sure the PCU channels have the correct audio as shown in Table 501.

S 735-320

(5) At a seat in the mid zone, put a headset into the armrest jack and do the steps that follow:
   (a) Adjust the volume control to a correct level.
   (b) Make sure the PCU channels have the correct audio as shown in Table 501.

S 735-322

(6) At a seat in the aft zone, put a headset into the armrest jack and do the steps that follow:
   (a) Adjust the volume control to a correct level.

(b) Make sure the PCU channels have the correct audio as shown in Table 501.

S 865-169

(7) Do the steps that follow at the video control center at the purser station:

(a) At the control distribution unit:

1) Push the SYSTEM POWER switch to on (switchlight on).
2) Push the zone 1, 2, and 3 PROJ PWR ON switches. Make sure the switchlights come on.
3) Push the zone 1, 2 and 3 SOURCE SEL switches until the display shows VTR 1.

(b) At the video tape reproducer 1 (VTR-1):

1) Push the EJECT control to make sure the VTR does not contain a cassette tape.
2) Put a cassette tape into VTR-1.
3) Push the REW control to make sure the cassette tape is rewound.
4) After the rewind is complete, push the PLAY control.

I. ALL MTH AIRPLANES;
Audio Entertainment Test

S 865-170

(1) Push the PASS ENT SYST PWR switch (P21) to off (switchlight off) and attach DO-NOT-OPERATE tag.

S 865-171

(2) Put the test tapes into the entertainment tape reproducer as shown below:

Entertainment Tape Repro	Slot 1A	RD-AM9504
	2A	RD-AM9505
	3A	RD-AM9506
	1B	RD-AM9504
	2B	RD-AM9505
	3B	RD-AM9506

S 865-172

(3) Remove DO-NOT-CLOSE tag and push the PASS ENT SYST PWR switch to on.

Table 501 PCU Channel Assignments		
PCU CHANNEL	AUDIO	TAPE TRACK IDENTITY
1	Mono	Video Audio
2	Mono	Video Audio
3	Mono	Blank
4	Mono	Blank
5	Stereo	1 and 3
6	Stereo	2 and 4
7	Stereo	5 and 7
8	Stereo	6 and 8
9	Mono	9 or 10
10	Mono	11 or 12

S 865-173

(4) Do the steps that follow at the video control center at the forward closet:

(a) At the system control unit:

1) Push the MASTER POWER switch to on (switchlight on).

2) Push the CLASS switch and make sure the display that follows is shown on the SCU monitor:

NOTE: Characters whithin -- brackets flash on and off. The -- brackets are used to identifiy the characters that flash and will not show on the SCU monitor.

CLASS	[F]	[C]	[M]
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

3) Push the CLASS switch again until the display that follows is shown on the SCU monitor:

CLASS	[F]	C	M
VIDEO	VCP1 OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

4) Push the VIDEO INPUT switch until the display that follows is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	[VCP1] OFF	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

5) Push the ON/OFF switch and make sure the display that follows is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 [ON]	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

6) Push the CLASS switch until the display that follows is shown on the SCU monitor:

CLASS	F	[C]	M
VIDEO	VCP1 ON	VCP1 OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

7) Push the VIDEO INPUT switch until the display that follows is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 ON	[VCP1] OFF	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

8) Push the ON/OFF switch and make sure the display that follows is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 ON	VCP1 [ON]	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

9) Push the CLASS switch until the display is shown on the SCU monitor:

CLASS	F	C	[M]
VIDEO	VCP1 ON	VCP1 ON	VCP1 OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

10) Push the VIDEO INPUT switch until the display that follows is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 ON	VCP1 ON	[VCP1] OFF
PA	CH1 OFF	CH1 OFF	CH1 OFF

11) Push the ON/OFF switch and make sure the display that follows is shown on the SCU monitor:

CLASS	F	C	M
VIDEO	VCP1 ON	VCP1 ON	VCP1 [ON]
PA	CH1 OFF	CH1 OFF	CH1 OFF

(b) At the video tape reproducer 1 (VTR-1):
1) Put the video cassette tape in.
2) Push the PLAY switch.

S 735-323
(5) At a seat in the fwd zone, put a headset into the armrest jack and do the steps that follow:
(a) Adjust the volume control to a correct level.
(b) Make sure the PCU channels have the correct audio as shown in Table 501.

S 735-324
(6) At a seat in the mid zone, put a headset into the armrest jack and do the steps that follow:
(a) Adjust the volume control to a correct level.
(b) Make sure the PCU channels have the correct audio as shown in Table 501.

S 735-325
(7) At a seat in the aft zone, put a headset into the armrest jack and do the steps that follow:
(a) Adjust the volume control to a correct level.
(b) Make sure the PCU channels have the correct audio as shown in Table 501.

J. Passenger Address Override Test

S 865-179
(1) The entertainment tape and video tape reproducers should operate.

S 735-343
(2) Put a headset into an armrest jack in the fwd zone and make sure the of the condition that follows:
(a) Entertainment audio is clear in the passenger headset.

S 865-202
(3) Remove an attendant handset from cradle and push the PA switch. Push and hold the PASSENGER ADDRESS PUSH-TO-TALK switch.

S 735-344
(4) Make sure the entertainment audio stops in the passenger headset.

S 735-345
(5) Speak into the handset and make sure you hear the announcement through the passenger headset.

S 735-346
(6) Put the attendant handset in the cradle and make sure you hear the entertainment audio in the passenger headset.

S 735-347
(7) Do the Passenger Address (PA) Override Test paragraph again at a seat in the mid zone.

S 735-349
(8) Do the Passenger Address (PA) Override Test paragraph again at a seat in the aft zone.

K. Put the Airplane Back to Its Initial Condition

S 865-219
(1) Push the STOP switch on the VTR-1.

S 865-220
(2) Push the EJECT switch on VTR-1 and remove the tape.

S 865-222
(3) Push the SYSTEM POWER switch to off (switchlight off) at the CDU.

S 865-226
(4) Push the PASS ENT SYST PWR and PASS SERV SYST PWR switches (P21) to off (switchlights off).

S 865-227
(5) Remove the entertainment test tapes from the entertainment and boarding music tape reproducers and put the usual entertainment tapes in.

S 865-230
(6) Remove electrical power if it is not necessary (Ref 24-22-00).

MAIN MULTIPLEXER - REMOVAL/INSTALLATION

1. General
   A. The main multiplexer, M171, is installed on shelf 5 of the E2 rack (E2-5) in the main equipment center.

TASK 23-34-01-004-001

2. Remove the Main Multiplexer
   A. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack Mounted Components
      (3) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center

      (2) Access Panel
          119AL Main Equipment Center

   C. Remove the Main Multiplexer

      S 014-021
      (1) Open the access door, 119AL, for the left miscellaneous electrical equipment panel, P36 (AMM 06-41-00/201).

      S 864-003
      (2) Open this circuit breaker on the P36 panel, and attach a DO-NOT-CLOSE tag:
          (a) 36J5, MUX/TAPE REPRO

      S 914-022

      CAUTION: DO NOT TOUCH THE MAIN MULTIPLEXER BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE MAIN MULTIPLEXER.

      (3) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

      S 024-004
      (4) Remove the main multiplexer (AMM 20-10-01/401).

TASK 23-34-01-404-008

3. Install the Main Multiplexer

A. References

(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels

(2) AMM 20-10-01/401, E/E Rack Mounted Components

(3) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices

(4) AMM 24-22-00/201, Electrical Power - Control

B. Access

(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment
221/222	Passenger Compartment

(2) Access Panel

119AL	Main Equipment Center

C. Install the Main Multiplexer

S 914-023

CAUTION: DO NOT TOUCH THE MAIN MULTIPLEXER BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE MAIN MULTIPLEXER.

(1) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 034-092

(2) Remove the dust cover from the main multiplexer.

S 864-009
(3) Make sure the stereo tag switches found on the PC board are set as follows:

SWITCH NO.	POSITION
1	ON
2	ON
3	ON
4	ON
5	OFF
6	OFF
7	OFF

S 434-094
(4) Install the dust cover on the main multiplexer.

S 424-017
(5) Install the main multiplexer (AMM 20-10-01/401).

D. Do a Test of the Main Multiplexer Installation

S 864-039
(1) Supply electrical power (AMM 24-22-00/201).

S 864-040
(2) Remove the DO-NOT-CLOSE tag, and close this circuit breaker on the P36 panel:
(a) 36J5, MUX/TAPE REPRO

S 864-060
(3) MTH 281-999;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37J6, AFT CTD
(b) 37J7, FWD CTD

S 864-081
(4) ALL SAS; AND MTH 275-280;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD

(b) 37K2, AFT CTD

S 864-085
(5) Make sure this circuit breaker is closed on the overhead circuit breaker panel, P11:
(a) 11T8, PASS ENTMT/SERVICE CONT

S 864-095
(6) Do these steps at the forward attendant's panel, P21:
(a) Push the PASS ENT SYST PWR switch-light to the on position.
(b) Push the PASS SERV SYST PWR switch-light to the on position.
(c) Make sure the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM test switch is in the NORMAL position.

S 864-137
(7) SAS 162-167, 276-278, 280 POST-SB 24-0152;
At the electric system control panel P5:
(a) Make sure the UTILITY BUS - R switch is in the ON position.

S 714-088
(8) At a seat passenger control unit (PCU), do the step that follows:
(a) Make sure you hear the audio sound on three or more channels.

E. Put the Airplane Back to Its Initial Condition

S 864-096
(1) Do these steps at the forward attendant's panel, P21:
(a) Push the PASS ENT SYST PWR switch-light to the off position.
(b) Push the PASS SERV SYST PWR switch-light to the off position.

S 414-029
(2) Close the access door, 119AL (AMM 06-41-00/201).

S 864-019
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

ZONE MULTIPLEXER - REMOVAL/INSTALLATION

1. General
   A. The forward and mid zone multiplexers, M642 and M1321, are installed on the ceiling of the main equipment center. They are positioned forward of the E2 rack.
   B. The aft zone multiplexer, M1307, is installed in the mid equipment center, below the E5 rack.
   C. This procedure contains two tasks. The first task removes the zone multiplexer. The second task installs the zone multiplexer and does a test of the installation.
   D. The removal and installation tasks are the same for each zone multiplexer.

TASK 23-34-02-004-001

2. Remove the Zone Multiplexer (Fig. 401)
   A. Access
      (1) Location Zone
          119/120 Main Equipment Center

      (2) Access Panel
          119AL Main Equipment Center

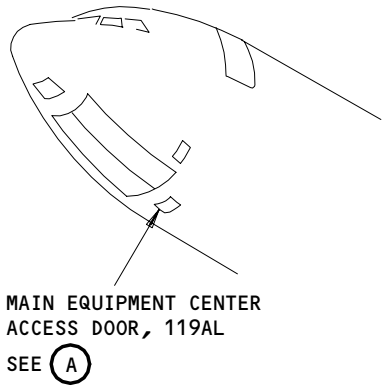
   B. Remove the Zone Multiplexer

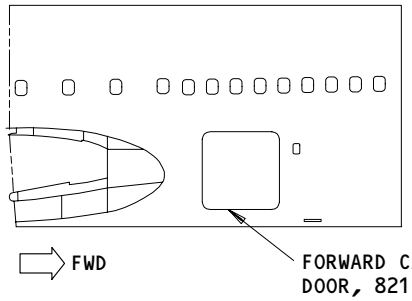
      S 864-019
      (1) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
          (a) 36J5, MUX/TAPE REPRO

      S 864-034
      (2) Mark the location of each electrical connector on the zone multiplexer.

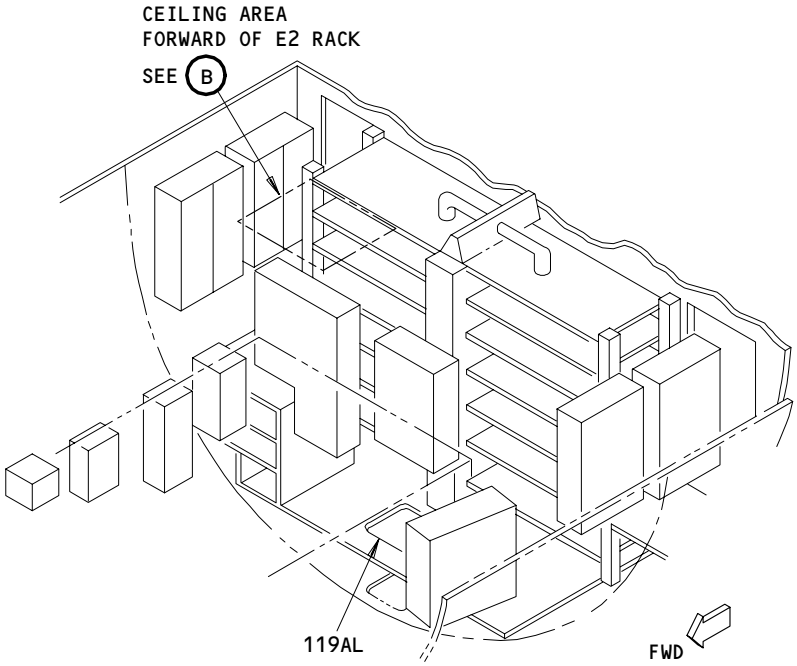
          NOTE: Some electrical connectors are not interchangeable.

      S 034-020
      (3) Disconnect the electrical connectors.



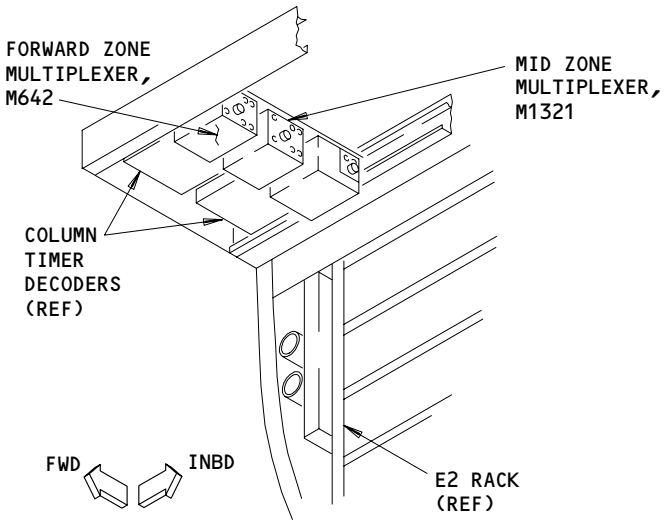


RIGHT SIDE



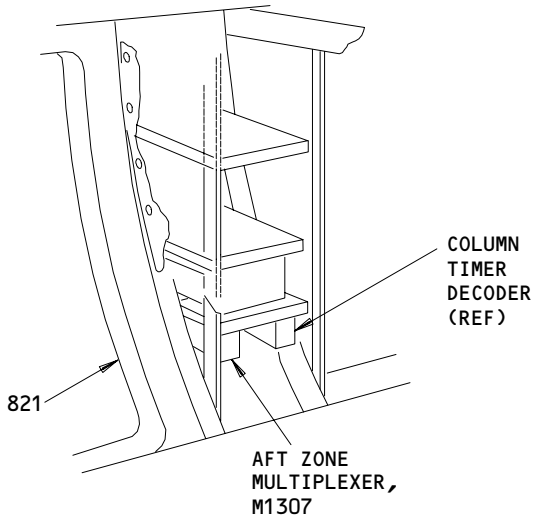
MAIN EQUIPMENT CENTER

A



CEILING AREA FORWARD OF E2 RACK

B



MID EQUIPMENT CENTER, E5

C

Zone Multiplexer - Installation
Figure 401

S 024-022
(4) Remove the four screws to remove the zone multiplexer.

TASK 23-34-02-404-002

3. Install the Zone Multiplexer (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control

B. Access
(1) Location Zone
119/120 Main Equipment Center

(2) Access Panel
119AL Main Equipment Center

C. Install the Zone Multiplexer

S 424-023
(1) Install the zone multiplexer with the four screws.

S 434-024
(2) Connect the electrical connectors.

D. Zone Multiplexer Installation Test

S 864-026
(1) Supply electrical power (AMM 24-22-00/201).

S 864-143
(2) SAS 162-167, 276-278, 280 POST-SB 24-0152;
At the electric system control panel P5:
(a) Make sure the UTILITY BUS - R switch is in the ON position.

S 864-004
(3) Remove the DO-NOT-CLOSE tag, and close this circuit breaker on the P36 panel:
(a) 36J5, MUX/TAPE REPRO

S 864-104
(4) MTH 281-999;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:

(a) 37J6, AFT CTD
(b) 37J7, FWD CTD

S 864-113
(5) ALL SAS; AND MTH 275-280;
Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 864-003
(6) Make sure this circuit breaker is closed on the overhead circuit breaker panel, P11:
(a) 11T8, PASS ENTMT/SERVICE CONT

S 864-008
(7) Push the PASS ENT SYST PWR and PASS SERV SYST PWR switch-lights to on (switch-lights on), on the forward attendant's panel, P21.

S 864-011
(8) Set the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM switch to NORMAL on the P21 panel.

S 714-035
(9) Do the steps that follow to do a test of the forward zone multiplexer installation:
(a) Do the step that follows in the forward zone of the passenger compartment:
1) Make sure you hear the audio at a seat in the left, center, and right column of seats.
(b) Make sure you hear the audio at a seat in the mid zone of the passenger compartment.

S 714-036
(10) Do the steps that follow to do a test of the mid zone multiplexer installation:
(a) Do the step that follows in the mid zone of the passenger compartment:
1) Make sure you hear the audio at a seat in the left, center, and right column of seats.
(b) Make sure you hear the audio at a seat in the aft zone of the passenger compartment.

S 714-051
(11) Do the steps that follow to do a test of the aft zone multiplexer installation:
(a) Do the step that follows in the aft zone of the passenger compartment:
1) Make sure you hear the audio at a seat in the left, center, and right column of seats.

S 864-029

(12) Push the PASS ENT SYST PWR and PASS SERV SYST PWR switch-lights to off (switch-lights off) on the P21 panel.

S 864-030

(13) Remove electrical power if it is not necessary (AMM 24-22-00/201).

ENTERTAINMENT TAPE REPRODUCER - MAINTENANCE PRACTICES

1. General
   A. The entertainment tape reproducer, M170, is installed on shelf 5 of the E2 rack (E2-5) in the main equipment center.
   B. The tape reproducer contains three pairs (six) of philips-type cassette tape magazines. There are a total of 12 monaural and/or stereo tracks from the tape reproducer.
   C. This procedure contains the tasks that follow:
      (1) Tape Reproducer Removal/Installation
      (2) Tape Magazine Removal/Installation
      (3) Tape Reproducer Head Cleaning

TASK 23-34-03-902-085

2. Tape Reproducer Removal/Installation
   A. References
      (1) AMM 20-10-01/401, E/E Rack Mounted Components
      (2) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones

119/120	Main Equipment Center
200	Passenger Compartment
211/212	Flight Compartment

      (2) Access Panel

119AL	Main Equipment Center

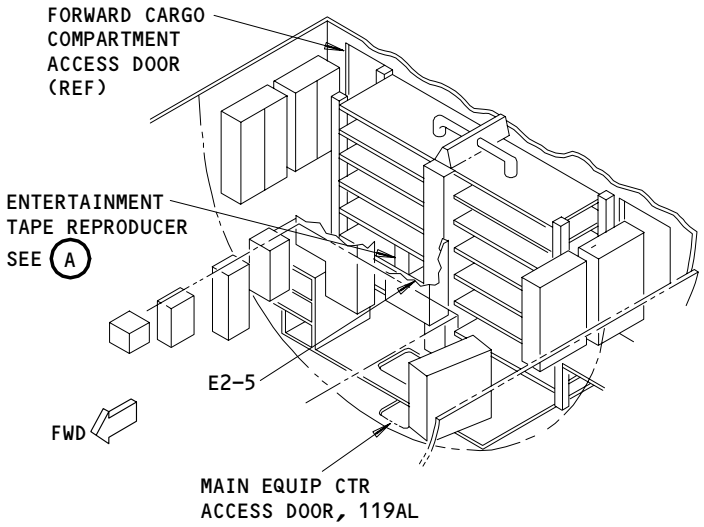
   C. Remove the Entertainment Tape Reproducer

      S 862-002
      (1) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE identifier:
         (a) 36J5, MUX/TAPE REPRO

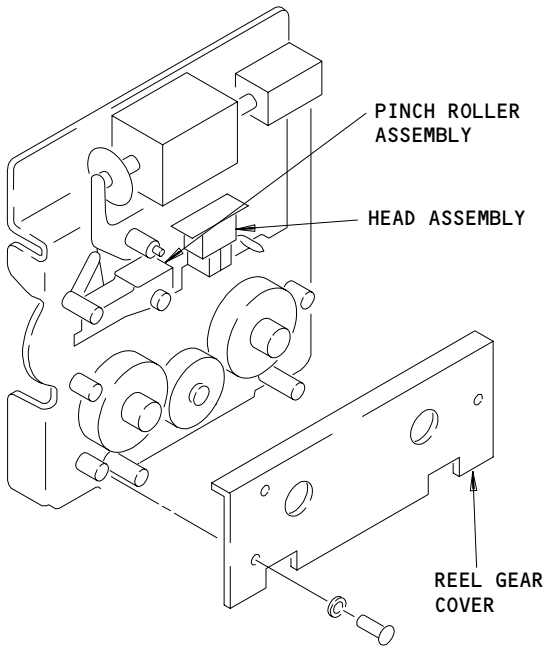
      S 022-003
      (2) Remove the tape reproducer (AMM 20-10-01/401).
   D. Install the Entertainment Tape Reproducer

      S 422-004
      (1) Install the tape reproducer (AMM 20-10-01/401).

      S 722-086
      (2) Do a test of the tape reproducer installation as follows:
         (a) Supply electrical power (AMM 24-22-00/201).

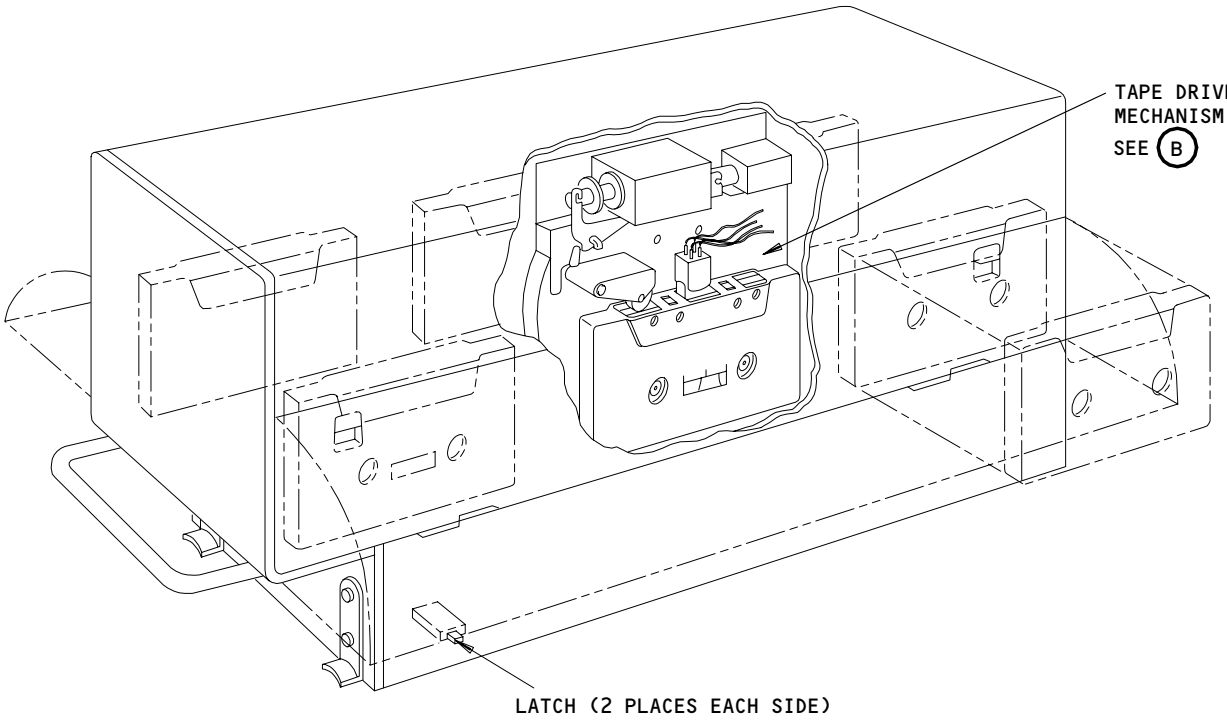


MAIN EQUIP CTR



TAPE DRIVE MECHANISM

B



ENTERTAINMENT TAPE REPRODUCER

A

Entertainment Tape Reproducer Access
Figure 201

(b) SAS 162-167, 276-278, 280 POST-SB 24-0152;
At the electric system control panel P5:
1) Make sure the UTILITY BUS - R switch is in the ON position.
(c) Remove the DO-NOT-CLOSE tag and close this P36 panel circuit breaker:
1) 36J5, MUX/TAPE REPRO
(d) Make sure these circuit breakers on the miscellaneous electrical equipment panel P37 are closed:
1) 37K1, FWD CTD
2) 37K2, AFT CTD
(e) Make sure this circuit breaker on the P11 panel is closed:
1) 11T8, PASS ENTMT/SERVICE CONT
(f) At the forward attendant panel:
1) Push the PASS ENT SYST PWR and PASS SERV SYST PWR switches to on (switch-lights come on).
2) MTH ALL;
Do as follows:
a) Set the BRD MUSIC VOLUME switch to the mid-point.
b) Turn the CHANNEL SELECT switch to positions 1, 2, 3 and 4. Make sure the boarding music from the passenger address speakers at each position is undistorted.
(g) At any seat in the passenger cabin, connect a passenger headset to the seat armrest jack. Make sure the entertainment audio is clear and audible on PCU channels 3 and 4.
(h) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-34-03-902-006

3. Tape Magazine Removal/Installation (Fig. 201)
A. References
(1) AMM 24-22-00/201, Electrical Power - Control
B. Access
(1) Location Zones
119/120 Main Equipment Center
(2) Access Panel
119AL Main Equipment Center
C. Remove Tape Magazine

S 862-008
(1) Open this circuit breaker on the left miscellaneous electrical equipment panel P36 and attach DO-NOT-CLOSE tag:
(a) 36J5, MUX/TAPE REPRO

S 012-010
(2) Remove entertainment tape reproducer (AMM 20-10-01/401).

S 032-011
(3) Release two fasteners on tape reproducer sides. Open access door.
(a) Find out which tape magazine(s) is (are) to remove.

S 022-022
(4) Pull the tape magazine out from the tape reproducer.

D. Install Tape Magazine

S 862-032
(1) Find out which side of tape cassette magazine is to be installed out.

NOTE: If installed incorrectly the tape magazine will not give an audio output.

S 422-033
(2) Install tape cassette magazine(s).

S 412-037
(3) Install the entertainment tape reproducer. Refer to the procedure in the Tape Reproducer Removal/Installation paragraph.

TASK 23-34-03-102-059

4. Tape Reproducer Head Cleaning (Fig. 201)

A. Access

(1) Location Zones
119/120 Main Equipment Center

(2) Access Panel
119AL Main Equipment Center

B. Consumable Materials

(1) B00130 Solvent Spec. TT-I-735 Isopropyl Alcohol
(2) G01659 Applicators - GG-A-616, Cotton

C. Prepare for Cleaning

S 862-123
(1) Open this circuit breaker on the left miscellaneous electrical equipment panel P36 and attach DO-NOT-CLOSE tag.
(a) 36J5, MUX/TAPE REPRO

S 012-062
(2) Remove tape reproducer (AMM 20-10-01/401).

S 012-067
(3) Remove tape magazines. Refer to the procedure in the Tape Magazine Removal/Installation paragraph.

S 212-068
(4) Examine each tape magazine for broken, locked, pie crusted or other signs of deterioration.

D. Clean Head Assemblies

S 012-111
(1) Find the tape deck drive assemblies to be cleaned (6 places).
(a) To remove reel gear cover of each assembly, remove screws (3 places).

S 212-075
(2) Examine tape heads, guides, capstan and sensors for contamination.

S 862-110

CAUTION: DO NOT USE HARSH DETERGENTS OR SOLVENTS TO CLEAN HEADS. HANDLE WITH EXTREME CARE OR DAMAGE MAY RESULT.

(3) Make cotton tip applicator moist with isopropyl alcohol.

S 112-077
(4) Carefully clean unwanted material on and around heads.

S 112-078
(5) Let head surfaces dry fully.

S 412-079
(6) Install reel gear covers (6 places). Install three screws on each.

S 412-082
(7) Install tape magazines. Refer to the procedure in the Tape Magazine Removal/Installation paragraph.

S 412-084
(8) Install tape reproducer. Refer to the procedure in the Tape Reproducer Removal/Installation paragraph.

SEAT ELECTRONIC BOX - REMOVAL/INSTALLATION

1. General
   A. One seat electronic box (SEB), M915, is installed under each seat group in the passenger compartment.
   B. The SEBs in each column of seat groups in a zone are connected in series. Each SEB has three electrical connectors. One connector is for the passenger control units (PCUs) in the seat group. The other two connectors are for the seat-to-seat cables. These two connectors go to the next seat group forward and the next seat group aft.
   C. The forward SEB in each column of a zone connects to the column timer decoder (CTD) for that zone. The aft SEB in each column of a zone connects to a SEB termination plug.

TASK 23-34-04-004-001

2. Remove the Seat Electronic Box (Fig. 401)

   A. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

   B. Remove the SEB

      S 864-031
      (1) Push these switch-lights to the off position on the forward attendant's panel, P21, and attach DO-NOT-OPERATE tags:
          (a) PASS ENT SYST PWR
          (b) PASS SERV SYST PWR

      S 214-015
      (2) Find the SEB under the seat group.

      S 034-016
      (3) Loosen the fasteners on the SEB cover.

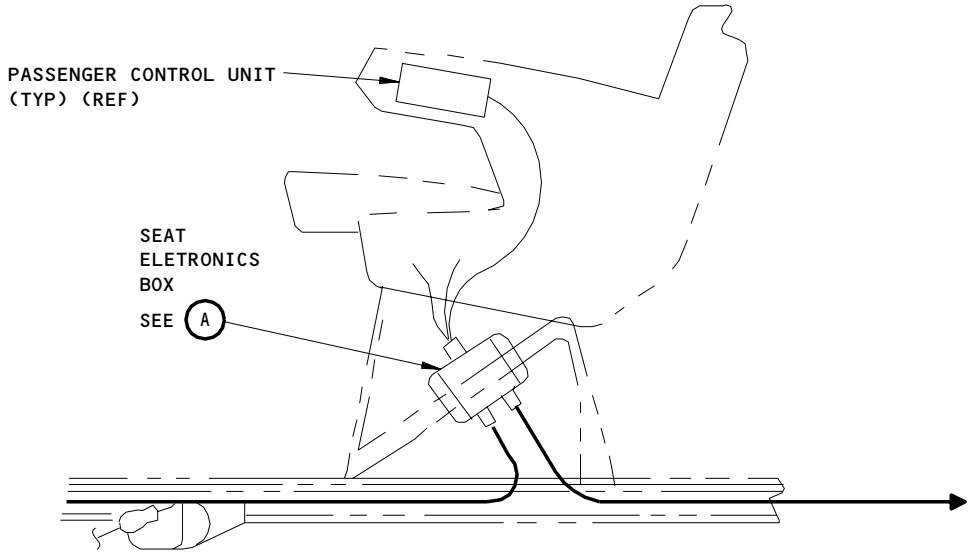
      S 014-017
      (4) Remove the SEB cover.

      S 034-018
      (5) Disconnect the electrical connectors (3 locations).

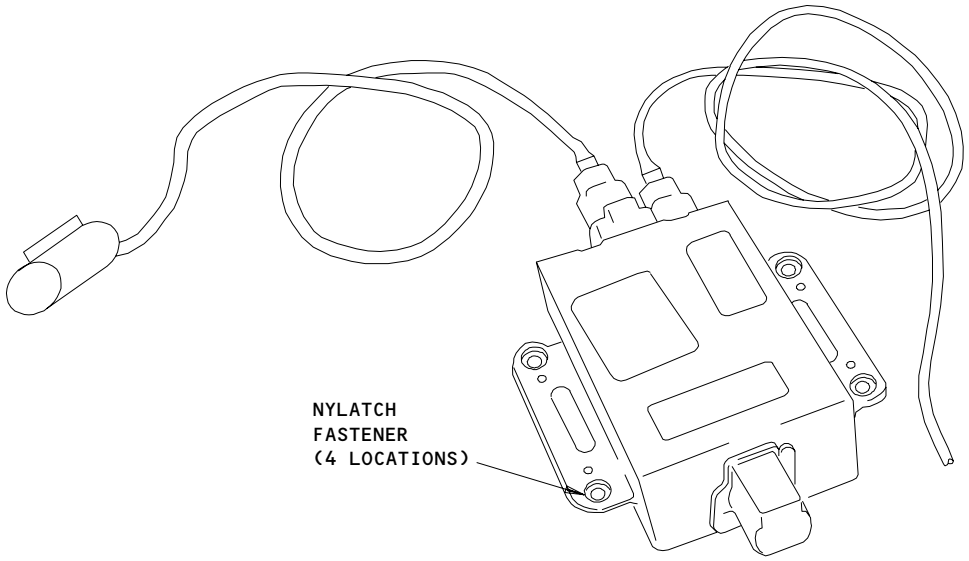
          NOTE: On the last SEB in a column, make sure you keep the termination plug for the SEB to be installed.

      S 034-022
      (6) Disengage the Nylatch fasteners (4 locations).

      S 024-023
      (7) Remove the SEB.



SEAT GROUP



SEAT ELECTRONICS BOX

A

Seat Electronics Box Installation
Figure 401

TASK 23-34-04-404-002

3. Install the Seat Electronic Box (Fig. 401)

A. References

(1) AMM 24-22-00/201, Electrical Power - Control

B. Access

(1) Location Zone

200 Upper Half of the Fuselage

C. Install the SEB

S 424-024

(1) Set the SEB in position.

S 434-025

CAUTION: INSTALL THE SEAT ELECTRONIC BOX NYLATCH FASTENERS TIGHTLY. INCORRECT FASTENER INSTALLATION CAN CAUSE SYSTEM FAILURES.

(2) Engage the Nylatch fasteners (4 locations).

S 434-030

(3) Connect the electrical connectors (3 locations).

NOTE: Make sure you connect a termination plug to the last SEB in a column.

S 414-033

(4) Install the SEB cover.

S 434-034

(5) Tighten the fasteners on the SEB cover.

D. Do a Test of the SEB Installation

S 864-028

(1) Supply electrical power (AMM 24-22-00/201).

S 864-003

(2) Make sure this circuit breaker is closed on the overhead circuit breaker panel, P11:

(a) 11T8, PASS ENTMT/SERVICE CONT

S 864-004
(3) Make sure these circuit breakers are closed on the forward miscellaneous electrical equipment panel, P33:
(a) 33A3, AFT C PSUD
(b) 33A4, FWD C PSUD
(c) MTH 279-999;
33A5, MID C PSUD

S 864-006
(4) Make sure these circuit breakers are closed on the left miscellaneous electrical equipment panel, P36:
(a) 36J1, R FWD PSUD
(b) 36J2, R AFT PSUD
(c) 36J3, L FWD PSUD
(d) 36J4, L AFT PSUD
(e) 36J5, MUX/TAPE REPRO

S 864-005
(5) Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 864-053
(6) Remove the DO-NOT-OPERATE tags, and push these switch-lights to the on position on the forward attendant's panel, P21:
(a) PASS ENT SYST PWR
(b) PASS SERV SYST PWR

S 864-009
(7) Make sure the READING LIGHTS switch is set to NORMAL on the P21 panel.

S 864-113
(8) SAS 162-167, 276-278, 280 POST-SB 24-0152;

At the electric system control panel P5:
(a) Make sure the UTILITY BUS - R switch is in the ON position.

S 714-054
(9) Do this step at a seat in the seat group where the SEB was replaced:
(a) Make sure the reading light switch on the passenger control unit turns the reading light on and off.

S 714-055
(10) Repeat the last step for a seat in the next aft seat group.

NOTE: This is not necessary if you replaced the last SEB in a zone column (with a termination plug installed).

S 864-012
(11) Push these switch-lights to the off position on the P21 panel:
(a) PASS ENT SYST PWR
(b) PASS SERV SYST PWR

S 864-013
(12) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PASSENGER CONTROL UNIT - REMOVAL/INSTALLATION

1. General
   A. The passenger control unit (PCU) does the operations that follow:

      - permits the passenger to control the seat lighting
      - call cabin attendants
      - set audio programs
      - control audio program volume

   B. A PCU is installed in the armrest of each passenger seat. The removal and installation procedures are the same for all PCUs.

TASK 23-34-05-004-001

2. Remove the Passenger Control Unit (Fig. 401)
   A. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

   B. Remove the PCU

      S 864-002
      (1) Push these switch-lights to the off position on the forward attendant's panel, P21, and attach DO-NOT-OPERATE tags:
          (a) PASS ENT SYST PWR
          (b) PASS SERV SYST PWR

      S 014-003
      (2) Get access to the PCU to be removed.

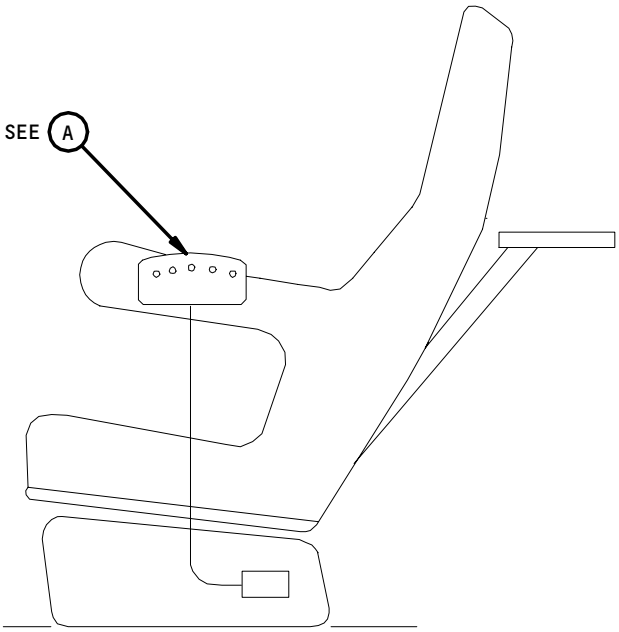
      S 034-004
      (3) Remove the mounting fasteners from the PCU.

      S 024-005
      (4) Remove the PCU.

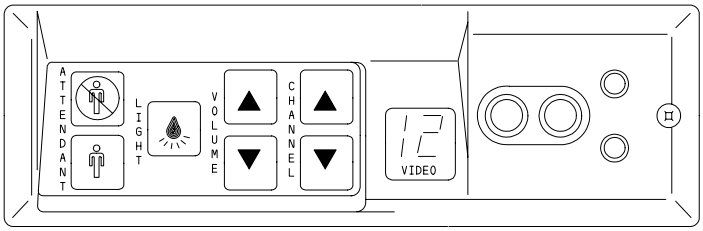
      S 034-006
      (5) Disconnect the electrical connector from the PCU.

TASK 23-34-05-404-007

3. Install the Passenger Control Unit (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control

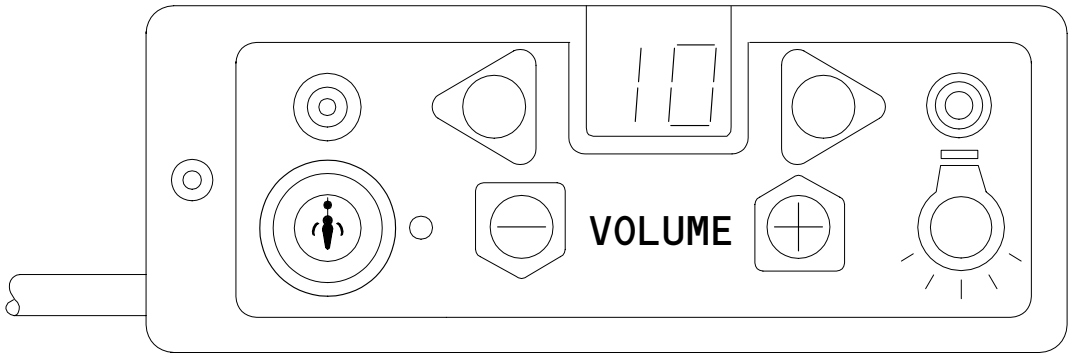


PASSENGER SEAT



PASSENGER CONTROL UNIT (TYPICAL)

A 2



PASSENGER CONTROL UNIT (TYPICAL)

A 1

1 ALL SAS AIRPLANES
2 ALL MTH AIRPLANES

Passenger Control Unit Installation
Figure 401

B. Access
(1) Location Zone
200 Upper Half of the Fuselage

C. Install the PCU

S 434-008
(1) Connect the electrical connector to the PCU.

S 424-018
(2) Install the PCU in the seat armrest.

S 434-010
(3) Install the mounting fasteners.

D. Do a Test of the PCU Installation

S 864-027
(1) Supply electrical power (AMM 24-22-00/201).

S 864-028
(2) Make sure this circuit breaker is closed on the overhead circuit breaker panel, P11:
(a) 11T8, PASS ENTMT/SERVICE CONT

S 864-032
(3) Make sure these circuit breakers are closed on the forward miscellaneous electrical equipment panel, P33:
(a) 33A3, AFT C PSUD
(b) 33A4, FWD C PSUD
(c) MTH 279-999;
33A5, MID C PSUD

S 864-029
(4) Make sure these circuit breakers are closed on the left miscellaneous electrical equipment panel, P36:
(a) 36J1, R FWD PSUD

(b) 36J2, R AFT PSUD
(c) 36J3, L FWD PSUD
(d) 36J4, L AFT PSUD
(e) 36J5, MUX/TAPE REPRO

S 864-030
(5) Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 864-050
(6) Remove the DO-NOT-OPERATE tags, and push these switch-lights to the on position on the forward attendant's panel P21:
(a) PASS ENT SYST PWR
(b) PASS SERV SYST PWR

S 864-129
(7) SAS 162-167, 276-278, 280 POST-SB 24-0152;
At the electric system control panel P5:
(a) Make sure the UTILITY BUS - R switch is in the ON position.

S 864-051
(8) Make sure the READING LIGHTS switch is set to NORMAL on the P21 panel.

S 714-052
(9) Make sure the reading light switch on the PCU turns the reading light on and off.

S 864-053
(10) Push these switch-lights to the off position on the P21 panel:
(a) PASS ENT SYST PWR
(b) PASS SERV SYST PWR

S 864-012
(11) Remove electrical power if it is not necessary (AMM 24-22-00/201).

COLUMN TIMER DECODER - REMOVAL/INSTALLATION

1. General
   A. The forward and mid column timer decoders (CTDs), M1319 and M1320, are installed on the ceiling of the main equipment center. They are positioned forward of the E2 rack.
   B. The aft column timer decoder (CTD), M1306, is installed in the mid equipment center, below the E5 rack.
   C. This procedure contains two tasks. The first task removes the column timer decoder. The second task installs the column timer decoder and does a test of the installation.
   D. The removal and installation tasks are the same for each column timer decoder.

TASK 23-34-07-004-001

2. Remove the Column Timer Decoder (Fig. 401)
   A. Access
      (1) Location Zones
          119/120 Main Equipment Center
          121/122 Forward Cargo Compartment
   B. Remove the CTD

      S 864-008
      (1) Open these circuit breakers on the right misc electrical equipment panel, P37, and attach DO-NOT-CLOSE tags:
          (a) 37K1, FWD CTD
          (b) 37K2, AFT CTD

      S 804-002
      (2) Make a Note of which electrical connectors are connected to which jacks for reference when installing column timer decoder.

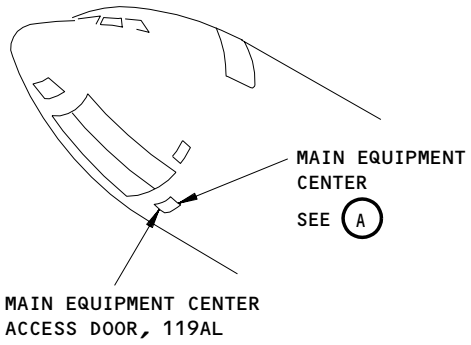
          NOTE: The column timer decoder has jacks that are not functionally interchangeable.

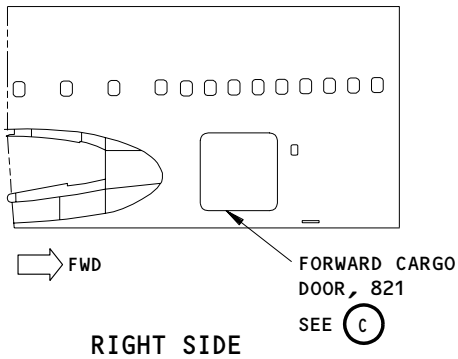
      S 034-003
      (3) Remove the electrical connectors.

      S 024-004
      (4) Loosen the four mounting screws and remove the column timer decoder, (Ref 20-41-01).

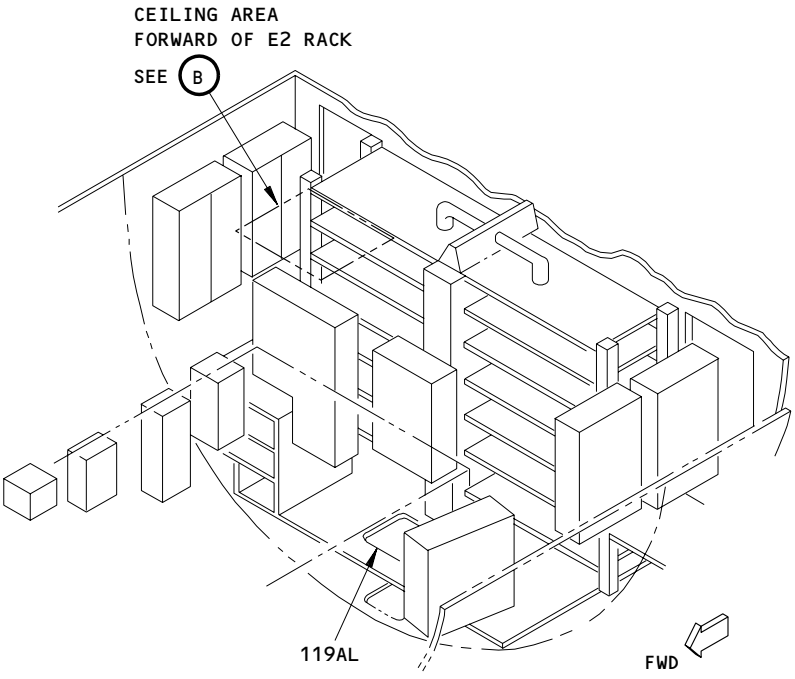
TASK 23-34-07-404-024

3. Install the Column Timer Decoder (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control



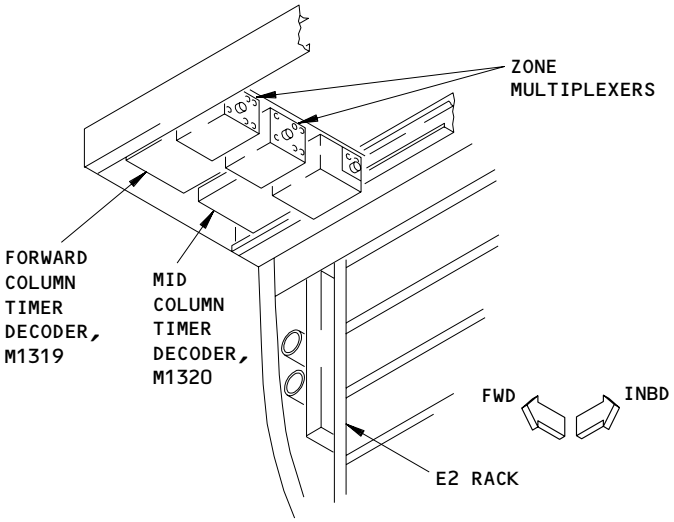


RIGHT SIDE



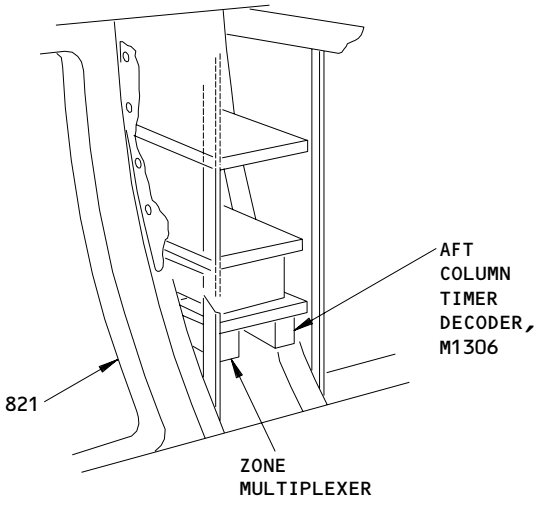
MAIN EQUIPMENT CENTER

A



CEILING AREA FORWARD OF E2 RACK

B



MID EQUIPMENT CENTER, E5

C

Column Timer Decoder - Installation
Figure 401

B. Access
(1) Location Zones
119/120 Main Equipment Center
121/122 Forward Cargo Compartment

C. Install the CTD

S 424-009
(1) Install the column timer decoder (Ref 20-41-01).

S 434-010
(2) Install the electrical connectors as they were before.

S 704-013
(3) Column Timer Decoder Installation Test
(a) Supply electrical power (AMM 24-22-00/201).
(b) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P37 panel:
1) 37K1, FWD CTD
2) 37K2, AFT CTD
(c) 767-300 AIRPLANES;
Make sure these circuit breakers on the forward misc electrical equipment panel, P33, are closed:
1) 33A3, AFT C PSUD
2) 33A4, FWD C PSUD
(d) Make sure these circuit breakers on the left miscellaneous electrical equipment panel, P36, are closed:
1) 36J1, R FWD PSUD
2) 36J2, R AFT PSUD
3) 36J3, L FWD PSUD
4) 36J4, L AFT PSUD
(e) 767-200 AIRPLANES;
Make sure these circuit breakers on the P37 panel are closed:
1) 37K3, FWD C PSUD
2) 37K4, AFT C PSUD
(f) Make sure this circuit breaker on the overhead circuit breaker panel, P11, is closed:
1) 11T8, PASS ENTMT/SERVICE CONT
(g) Push the forward attendant panel PASS ENT SYST PWR and PASS SERV SYST PWR switches on (switch light on).

(h) SAS 162-167, 276-278, 280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

(i) Make sure the forward attendant panel READING LIGHTS switch is set to NORMAL.

(j) To do a test of the forward column timer decoder installation, do the step that follows:

1) At one seat in the left, right and center seat groups in the first row, do the step that follows:

a) Make sure the reading light switch operates the reading light.

(k) To do a test of the mid column timer decoder installation, do the step that follows:

1) At one seat in the left, right and center seat groups in the mid zone, do the step that follows:

a) Make sure the reading light switch operates the reading light.

(l) To do a test of the aft column timer decoder installation, do the step that follows:

1) At one seat in the left, right and center seat groups in the last row, do the step that follows:

a) Make sure the reading light switch operates the reading light.

(m) Push the PASS ENT SYST PWR and PASS SERV SYST PWR switches to the off position.

S 864-014

(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PASSENGER SERVICE UNIT DECODER - REMOVAL/INSTALLATION

1. General
   A. One passenger service unit decoder (referred to as the PSUD) is above each passenger service unit (referred to as the PSU). Removal and installation of the outboard and center PSUDs is the same.

TASK 23-34-08-004-037

2. Remove the Passenger Service Unit Decoder (Fig. 401)

   A. Equipment
      (1) Latch Opening Tool (Rod) - 0.10 inch diameter maximum x 3.0 inches - Commercial Source
   B. Access
      (1) Location Zone
          200 Upper Half of the Fuselage

   C. Remove the PSUD

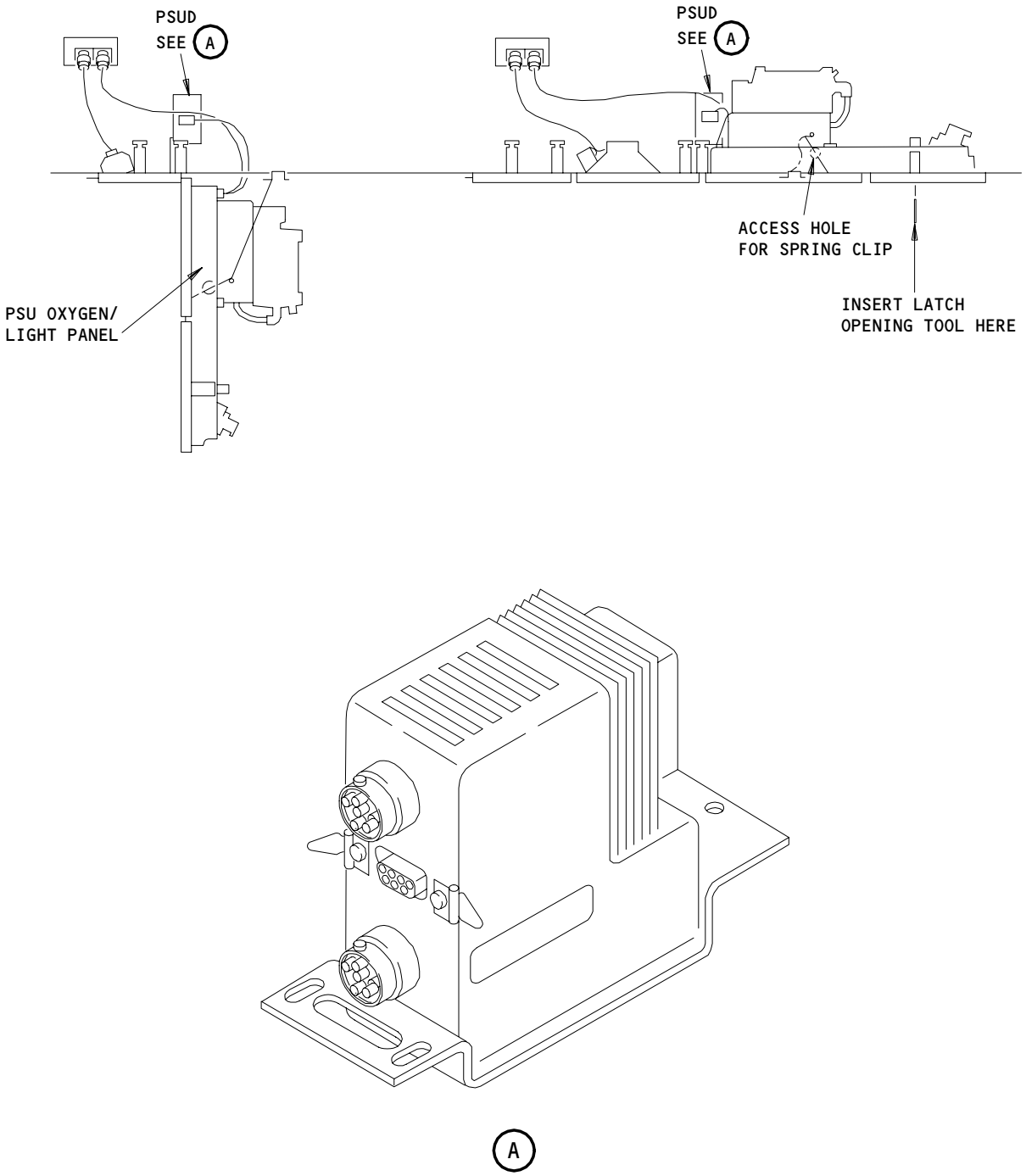
      S 864-002
      (1) Push these switch-lights to off (switch-lights off) on the forward attendant's panel, P21, and attach DO-NOT-OPERATE tags:
          (a) PASS ENT SYST PWR
          (b) PASS SERV SYST PWR

      S 014-038
      (2) For PSUD access, do the steps that follow:
          (a) Put the latch opening tool into one of the two holes forward of the reading lights.
          (b) Hold the PSU oxygen-light panel with your hand. Push the spring clip through the hole in the frame.
          (c) Put the latch opening tool into the other hole. Push the spring clip through the hole in the frame.
          (d) Permit the PSU to move open until held by the lanyard.

      S 204-039
      (3) Find the PSUD adjacent to the oxygen-light panel opening. The PSUD is at the forward end near the hinge.

      S 034-040
      (4) Remove the three electrical connectors from the PSUD. If a termination plug is removed, keep it for installation on the new PSUD.

      S 034-041
      (5) Remove the three PSUD fasteners that hold the PSUD.



Passenger Service Unit Decoder Installation
Figure 401

S 034-099
(6) Remove the grounding strap from the PSU rail screw.

S 024-042
(7) Remove the PSUD.

TASK 23-34-08-404-045

3. Install the Passenger Service Unit Decoder (Fig. 401)

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 25-23-01/401, Passenger Service Units

B. Access
(1) Location Zone
200 Upper Half of the Fuselage

C. Install the PSUD

S 434-046
(1) Install the PSUD termination plug if it was removed.

S 424-047
(2) Position the PSUD for installation and install the three mounting fasteners.

S 424-100
(3) Connect the ground strap from the PSUD to the PSU rail screw.

S 434-015
(4) Connect the three electrical connectors to the PSUD.

S 414-049
(5) Set the latches on the PSU oxygen-light panel (AMM 25-23-01/401).

S 414-050
(6) Lift the PSU oxygen-light panel and make sure the latches close.

D. Do a Test of the PSUD Installation

S 864-023
(1) Supply electrical power (AMM 24-22-00/201).

S 864-052
(2) Make sure this circuit breaker is closed on the overhead circuit breaker panel, P11:
(a) 11T8, PASS ENTMT/SERVICE CONT

S 864-053
(3) Make sure these circuit breakers are closed on the forward miscellaneous electrical equipment panel, P33:
(a) 33A3, AFT C PSUD
(b) 33A4, FWD C PSUD
(c) MTH 279-999;
33A5, MID C PSUD

S 864-063
(4) Make sure these circuit breakers are closed on the left miscellaneous electrical equipment panel, P36:
(a) 36J1, R FWD PSUD
(b) 36J2, R AFT PSUD
(c) 36J3, L FWD PSUD
(d) 36J4, L AFT PSUD
(e) 36J5, MUX/TAPE REPRO

S 864-064
(5) Make sure these circuit breakers are closed on the right miscellaneous electrical equipment panel, P37:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 864-030
(6) Remove the DO-NOT-OPERATE tags, and push these switch-lights to on (switch-lights on) on the P21 panel:
(a) PASS ENT SYST PWR
(b) PASS SERV SYST PWR

S 864-121
(7) SAS 162-167, 276-278, 280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-031
(8) Make sure the READING LIGHTS switch is set to NORMAL on the P21 panel.

S 714-074
(9) Do this step at a seat in the seat group where the PSUD was replaced:
(a) Make sure the reading light switch on the passenger control unit turns the reading light on and off.

S 714-075
(10) Repeat the last step for a seat in the next forward seat group.

S 714-076
(11) Repeat the step for a seat in the next aft seat group.

S 864-077
(12) Push these switch-lights to off (switch-lights off) on the P21 panel:
(a) PASS ENT SYST PWR
(b) PASS SERV SYST PWR

S 864-035
(13) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PASSENGER SERVICE UNIT READING LIGHTS - MAINTENANCE PRACTICES

1. General (Fig. 201)
   A. Individual passenger reading lights are in the oxygen-light panel part of the passenger service unit (PSU) (AMM 25-23-00) above each seat group. Each reading light is an incandescent lamp mounted in a movable reflector assembly which gives directional light.
   B. The reading light is controlled by and wired to a passenger service unit decoder (PSUD) (AMM 23-34-08) found adjacent to the PSU.
   C. The outboard PSU's each contain two reading lights. The center column PSU's each contain three reading lights.

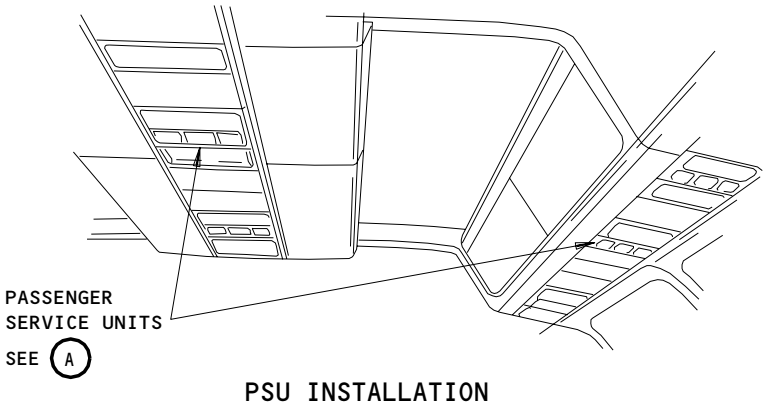
TASK 23-34-09-902-001

2. Relamp the PSU Reading Light (Fig. 201)
   A. Equipment
      (1) Latch Opening Tool (rod) - 0.10 inch maximum diameter x 3.0 inches length - commercial source
   B. References
      (1) AMM 25-23-01/401, Passenger Service Units
   C. Access
      (1) Location Zone
          200 Upper Half of the Fuselage
   D. Procedure

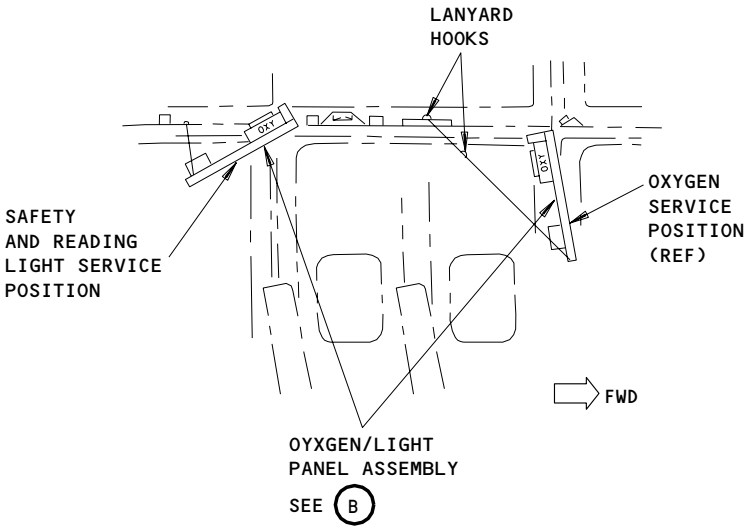
      S 862-002
      (1) Turn the READING LIGHTS switch to the OFF position at the fwd attendant panel P21.

      S 802-004
      (2) Find the PSU at which the reading light is to be relamped.
          (a) Put the latch opening tool in one of the two holes forward of the reading lights on the PSU panel.
          (b) Hold the PSU oxygen-light panel. Push the spring clip through the hole in the frame.
          (c) Put the latch opening tool in the other hole. Push the spring clip through the hole in the frame.
          (d) Let the PSU open until held by the lanyard.

      S 802-005
      (3) Find which reading light is to be relamped on the rear of the PSU.
          (a) Release the two slide clips on the rear of the reading light reflector module.
          (b) Remove the lamp socket from the reflector.
          (c) Push and turn the bayonet-type lamp and remove it from the lamp socket.
          (d) Put the new lamp in the lamp socket. Push and turn the lamp until locked in the socket.
          (e) Put the lamp socket in the reflector. Attach the two slide clips on the rear of the reading light module.

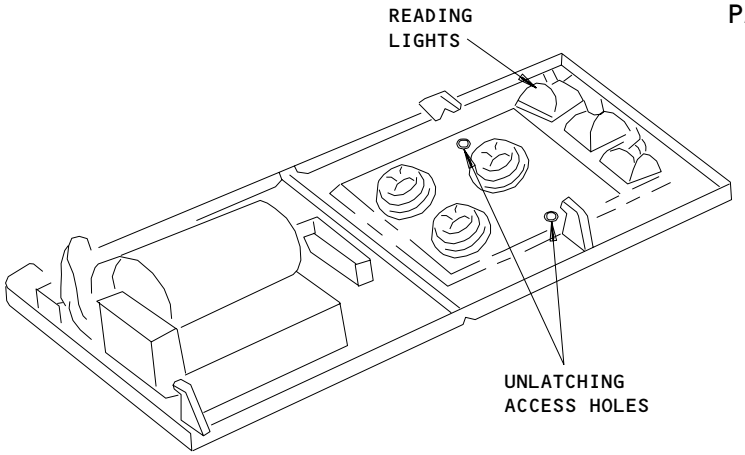


PSU INSTALLATION



PASSENGER SERVICE UNITS

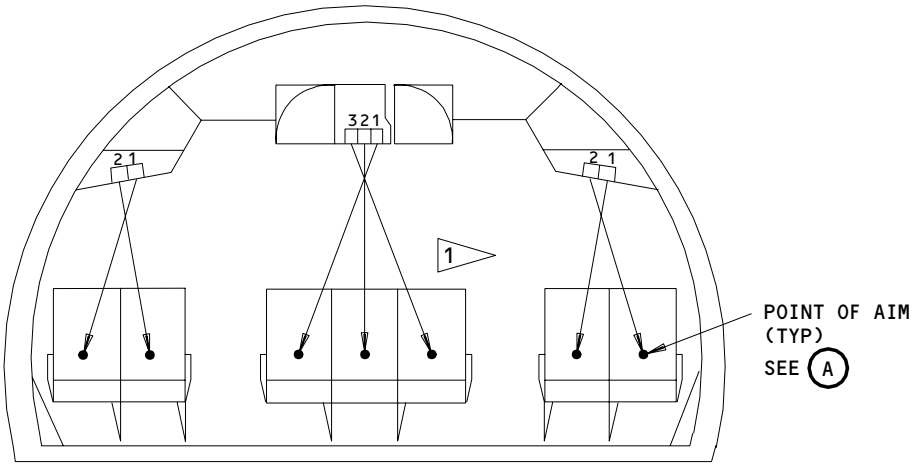
A



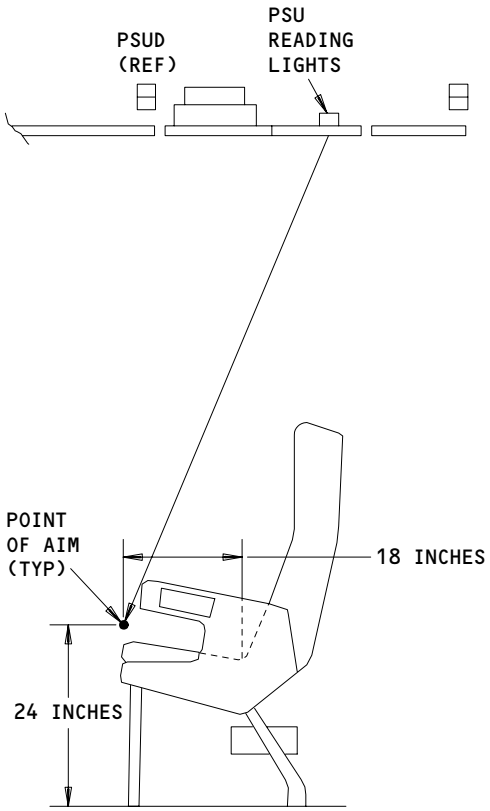
OXYGEN/LIGHT PANEL ASSEMBLY

B

Passenger Service Unit Reading Light Assembly
Figure 201



(LOOKING FORWARD)



(SIDE VIEW)

A

1 CENTER PSU READING LIGHT NO. 3 INOPERATIVE WITH DOUBLE SEAT IN CENTER

PSU Reading Lights Aiming Requirements
Figure 202

S 862-006
(4) Lift PSU oxygen/light panel and swing upward until secured into place.

S 862-007
(5) Turn the READING LIGHTS switch to the NORMAL position at the fwd attendant panel P21.

TASK 23-34-09-702-016

3. PSU Reading Lights Test

A. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 25-23-01/401, Passenger Service Units

B. Access
(1) Location Zone
200 Upper Half of the Fuselage

C. Procedure

S 862-017
(1) Supply electrical power (AMM 24-22-00/201).

S 862-040
(2) Make sure this circuit breaker on the overhead circuit breaker panel, P11, is closed:
(a) 11T8, PASS ENTMT/SERVICE CONT

S 862-054
(3) 767-300 AIRPLANES;
Make sure these circuit breakers on the forward miscellaneous electrical equipment panel, P33, are closed:
(a) 33A3, AFT C PSUD
(b) 33A4, FWD C PSUD

S 862-045
(4) Make sure these circuit breakers on the left miscellaneous electrical equipment panel, P36, are closed:
(a) 36J1, R FWD PSUD
(b) 36J2, R AFT PSUD
(c) 36J3, L FWD PSUD
(d) 36J4, L AFT PSUD

S 862-046
(5) Make sure these circuit breakers on the right miscellaneous electrical equipment panel, P37, are closed:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 862-018
(6) 767-200 AIRPLANES;
Make sure these circuit breakers on the P37 panel are closed:
(a) 37K3, FWD C PSUD
(b) 37K4, AFT C PSUD

S 862-100
(7) SAS 162-167, 276-278, 280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 862-020
(8) Turn the READING LIGHTS switch to the ON position at the fwd attendant panel P21.
(a) Make sure the PSU reading lights come on at all passenger seats.
(b) Turn the READING LIGHTS switch to the NORMAL position.

S 802-021
(9) Find the passenger seat where the reading light was relamped.
(a) Push the reading light switch on the passenger control unit and make sure the reading light comes on.
(b) Push the reading light switch again and make sure the reading light goes out.

S 862-023
(10) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-34-09-822-024

4. Directional Adjustment of the PSU Reading Lights (Fig. 202)

A. General
(1) Adjustments of the PSU reading lights are to be made by maintenance personnel. Each PSU reading light gives reading light for only one passenger. Angular adjustment is made by frictional gimbles at the front and rear of the reading light. Be careful when you adjust the lights because of the warm temperature of a light when on.

B. Equipment
(1) Latch Opening Tool (rod) - 0.10 inch maximum diameter x 3.0 inches length - commercial source

C. References
(1) AMM 24-22-00/201, Electrical Power - Control
(2) AMM 25-23-01/401, Passenger Service Units

D. Access
(1) Location Zone
200 Upper Half of the Fuselage

E. Aiming Adjustments

S 862-025
(1) Supply electrical power (AMM 24-22-00/201).

S 862-026
(2) Make sure all applicable circuit breakers in the PSU Reading Lights Test paragraph are closed.

S 862-027
(3) Make sure the READING LIGHTS switch is in the NORMAL position at the fwd attendant panel P21.

S 982-051
(4) Push the reading light switch on the passenger control unit and make sure the reading light comes on.
(a) To adjust a large number of reading lights, turn the READING LIGHTS switch to ON.

S 802-029
(5) Find the "Point of Aim" as shown in Fig. 202 with a piece of cardboard or an equivalent surface. The "Point of Aim" is in the center, 18 inches in front of the seat break, 24 inches above the floor.

NOTE: SEATS OF DIFFERENT SIZES, TYPES, GROUPS AND LOCATIONS MAY HAVE DIFFERENT BEAM AIMING POINTS. ADJUST THE LIGHT FOR BEST LIGHTING IN THE READING AREA OF THE SEAT.

S 822-030
(6) Apply pressure around the reading light and move it until the light points to the "Point of Aim". Use gloves or cloth on your fingers if the light becomes too hot. If the light cannot be on the "Point of Aim" do steps (6) thru (9).

S 802-031
(7) Find which direction the light should be adjusted to put it on the "Point of Aim".

S 012-032
(8) To lower the PSU, insert a small tool in the unlatching holes on the sides of the PSU.

S 822-034
(9) Hold the rear of the reading light and adjust as necessary.

S 412-052
(10) Lift the PSU to the latched position and make sure the aim is correct. Lower the PSU and adjust aim if necessary.

S 862-036
(11) Remove the cardboard.

S 862-038

(12) Push the reading light switch on the passenger control unit and make sure the reading light goes out.

S 862-053

(13) Make sure the READING LIGHTS switch is in the NORMAL position at P21.

S 862-039

(14) Remove electrical power if it is not necessary (AMM 24-22-00/201).

ZONE DRIVER - REMOVAL/INSTALLATION

1. General
   A. Zone drivers M1308 and M1710 are on the inboard side of the E3 equipment rack in the main equipment center. The removal and installation procedures are the same for the two units.

TASK 23-34-10-004-001-001

2. Remove the Zone Driver (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center

   C. Procedure

      S 864-002-001
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11T8, PASS ENTMT/SERVICE CONT
          (b) 11T34, VIDEO PROJ

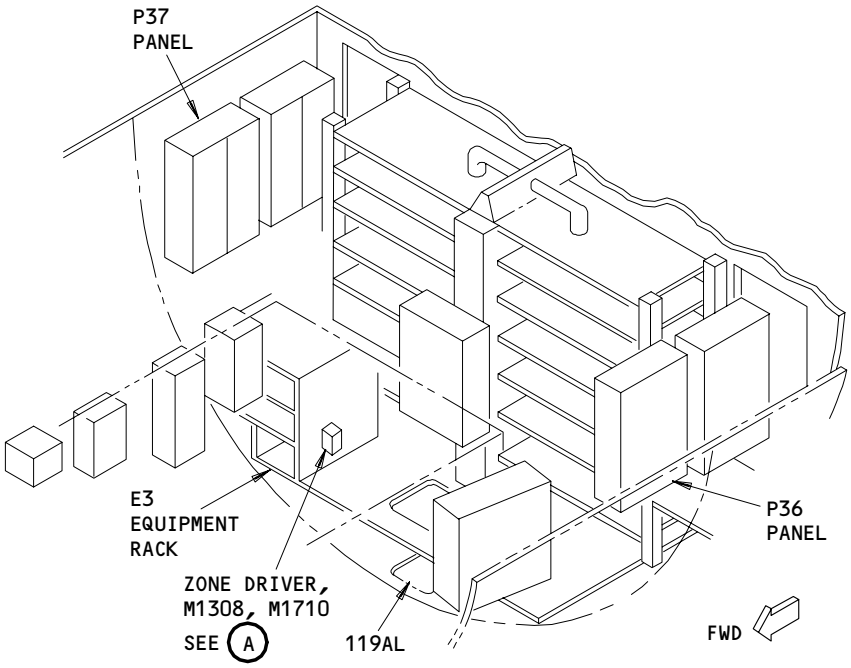
      S 034-003-001
      (2) Disconnect the electrical connector.

      S 014-004-001
      (3) Remove the four fasteners.

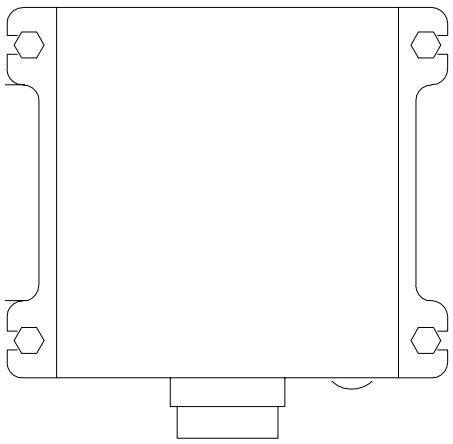
      S 024-005-001
      (4) Remove the zone driver.

TASK 23-34-10-404-006-001

3. Install the Zone Driver (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control



MAIN EQUIP CTR



ZONE DRIVER (EXAMPLE)

A

Zone Driver Installation
Figure 401

B. Access
(1) Location Zones
119/120 Main Equipment Center

C. Procedure

S 864-007-001
(1) Put the zone driver in position on the brackets.

S 434-008-001
(2) Attach the zone driver to the bracket with the four fasteners.

S 434-009-001
(3) Connect the electrical connector.

S 864-015-001
(4) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11T8, PASS ENTMT/SERVICE CONT
(b) 11T34, VIDEO PROJ

D. Zone Driver Installation Test

S 864-010-001
(1) Supply electrical power (AMM 24-22-00/201).

S 864-017-001
(2) SAS 162-167 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-011-001
(3) Make sure these circuit breakers on the left misc electrical equipment circuit breaker panel, P36, are closed:
(a) 36J5, MUX/TAPE REPRO
(b) 36J7, PRE RECD ANNCT

S 864-012-001
(4) Make sure these circuit breakers on the right misc electrical equipment circuit breaker panel, P37, are closed:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 704-013-001
(5) Do a test of the zone driver, as follows:
(a) Make sure the PASSENGER ENTERTAINMENT AND SERVICE SYSTEM switch on the forward attendant panel, P21, is set to NORMAL.

(b) Push the PASS SERV SYS PWR and PASS ENT SYS PWR switches on the forward attendant panel, P21, on (switch-light on).
(c) Make sure the SYSTEM POWER switch is in the off position at the control distribution unit in the video control center. The video control center is at the purser station.
(d) Push the START switch on the boarding music tape-reproducer at the purser station.
(e) To do a test of the zone driver M1308 installation, do the step that follows:
1) Make sure you hear boarding music audio on PCU channels 1 and 2 at any seat in the aft zone.
(f) To do a test of the zone driver M1710 installation, do the step that follows:
1) Make sure you hear boarding music audio on PCU channels 1 and 2 at any seat in the mid zone.
(g) Push the PASS SERV SYST PWR and PASS ENT SYS PWR switches off (switch-light off).

S 864-014-001
(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

ZONE DRIVER - REMOVAL/INSTALLATION

1. General
   A. Zone driver M1308 is on the inboard side of the E3 equipment rack in the main equipment center.

TASK 23-34-10-004-001-002

2. Remove the Zone Driver (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          119/120 Main Equipment Center

   C. Procedure

      S 864-002-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11T8, PASS ENTMT/SERVICE CONT

      S 864-003-002
      (2) Open this circuit breaker on the left misc electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
          (a) 36J5, MUX/TAPE REPRO

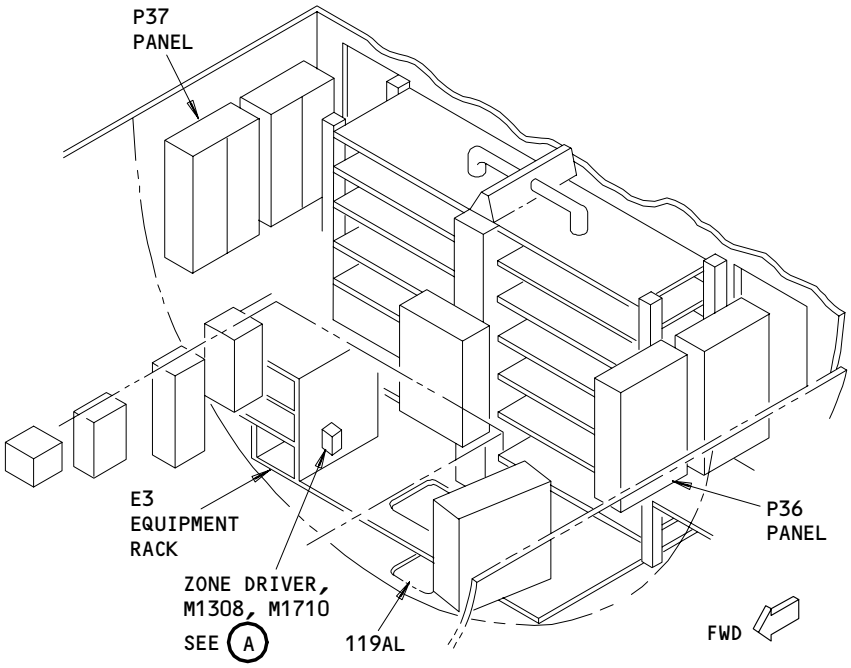
      S 034-004-002
      (3) Disconnect the electrical connector.

      S 034-005-002
      (4) Remove the four fasteners.

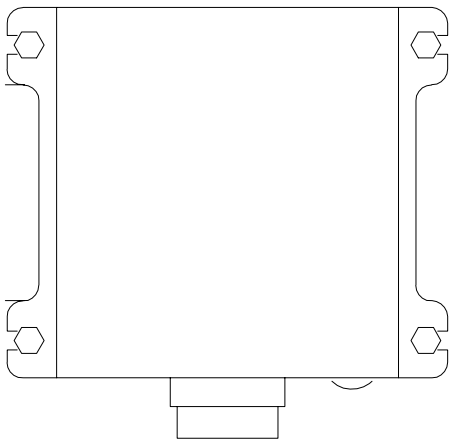
      S 024-006-002
      (5) Remove the zone driver.

TASK 23-34-10-404-007-002

3. Install Zone Driver (Fig. 401)
   A. References
      (1) AMM 24-22-00/201, Electrical Power - Control



MAIN EQUIP CTR



ZONE DRIVER (EXAMPLE)

A

Zone Driver Installation
Figure 401

B. Access
(1) Location Zones
119/120 Main Equipment Center

C. Procedure

S 824-008-002
(1) Put the zone driver in position on the brackets.

S 424-009-002
(2) Attach the zone driver to the bracket with the four fasteners.

S 434-010-002
(3) Connect the electrical connector.

S 864-011-002
(4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11T8, PASS ENTMT/SERVICE CONT

S 864-012-002
(5) Remove DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36J5, MUX/TAPE REPRO

D. Zone Driver Installation Test

S 864-013-002
(1) Supply electrical power (AMM 24-22-00/201).

S 864-020-002
(2) SAS 276-278, 280 POST-SB 24-0152;
Make sure the UTILITY BUS - R switch is in the ON position at the electrical system control panel P5.

S 864-014-002
(3) Make sure these circuit breakers on the forward misc electrical equipment panel, P33, are closed:
(a) 33A3, AFT C PSUD
(b) 33A4, FWD C PSUD

S 864-015-002
(4) Make sure these circuit breakers on the left misc electrical equipment circuit breaker panel, P36, are closed:
(a) 36J1, R FWD PSUD

(b) 36J2, R AFT PSUD
(c) 36J3, L FWD PSUD
(d) 36J4, L AFT PSUD

S 864-016-002
(5) Make sure these circuit breakers on the right misc electrical equipment panel P37 are closed:
(a) 37K1, FWD CTD
(b) 37K2, AFT CTD

S 704-017-002
(6) Do a test of the zone driver, as follows:
(a) Make sure the PASSENGER ENTERTAINMENT AND SERVICE SYS switch on the forward attendant panel, P21, is set to NORMAL.
(b) Make sure the READING LIGHT switch on the forward attendant panel, P21, is set to NORMAL.
(c) Push the PASS SERV SYS PWR and PASS ENT SYS PWR switches on the P21 panel to the on position.
(d) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYS switch to the MASTER TEST position.
1) Make sure the FWD and AFT MSTR CALL RESET switch-lights on the P21 panel come on.
2) Make sure the Hi chime is heard in the passenger cabin.
(e) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYS switch to the NORMAL position.
1) Make sure the FWD and AFT MSTR CALL RESET switch-lights go off.
(f) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYS switch to the ENT TEST position and make sure of the conditions that follow:
- Make sure all PSU call lights come on.
- Make sure the master call lights are off.
- Make sure the FWD and AFT MSTR CALL switch-lights come on.

(g) Turn the PASSENGER ENTERTAINMENT AND SERVICE SYS switch to NORMAL and do the steps that follow:
1) Make sure the FWD and AFT MSTR CALL RESET switch-lights go off.

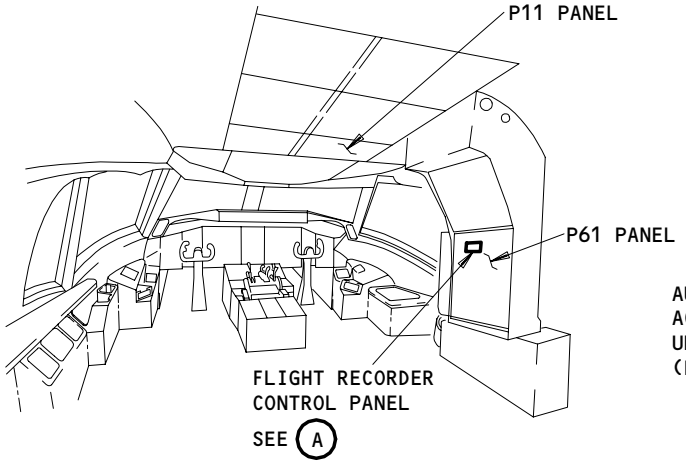
2) Push the PASS SERV SYST PWR and PASS ENT SYS PWR switches to the off position.

S 864-018-002

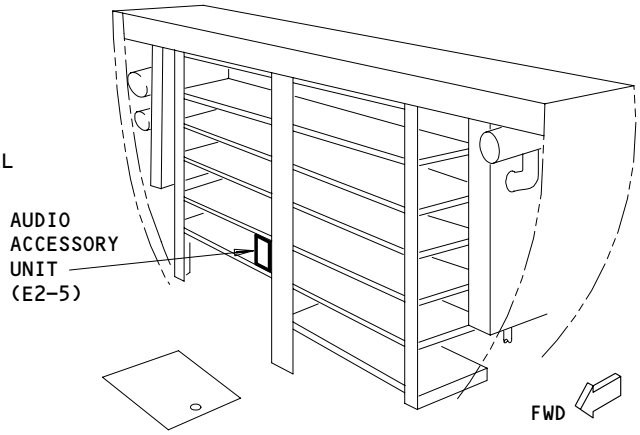
(7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

SERVICE INTERPHONE SYSTEM - DESCRIPTION AND OPERATION

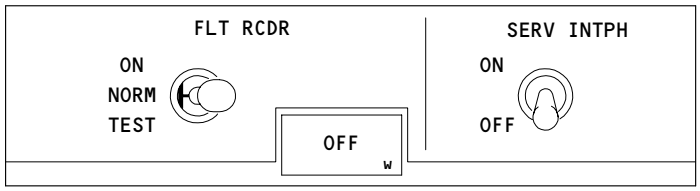
1. General
   A. The service interphone system provides facilities for interphone communication between servicing stations during ground operations. In addition, communication extends to the flight compartment and to the attendant stations.
   B. The service interphone system includes phone jacks at convenient service locations around the airplane. The system also includes amplifiers and mixing circuits housed inside the audio accessory unit. It is located on shelf E4 of the main equipment center. The SERV INTPH switch activates the system and is located on the right sidewall panel, P61.
   C. The system gets power from the 28v dc battery bus, through a circuit breaker on overhead panel P11.
2. Component Details (Fig. 1)



FLIGHT COMPARTMENT



MAIN EQUIPMENT CENTER



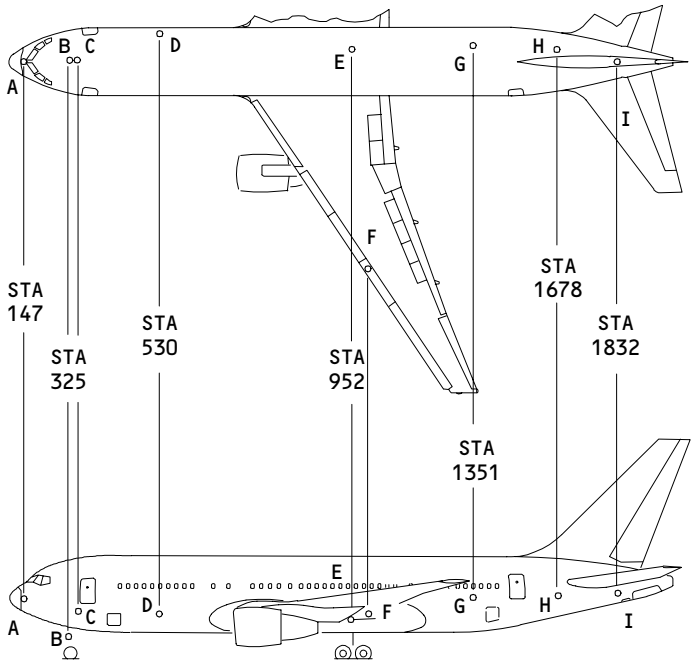
FLIGHT RECORDER CONTROL PANEL

A

SERVICE INTERPHONE JACK LOCATIONS

A WEATHER RADAR MOUNT
B P40 CONTROL PANEL 1
C MAIN EQUIPMENT CENTER
D FORWARD CARGO HANDLING PANEL, P35
E SERVICE PANEL, P56 (RIGHT WHEEL WELL) 1
F FUELING PANEL, P28 (LEFT WING) 1
G AFT CARGO HANDLING PANEL, P39
H JACK SCREW AREA 1
I APU AREA 1

1 SWITCHED JACKS



SERVICE INTERPHONE JACK LOCATIONS

Service Interphone System Component Location
Figure 1

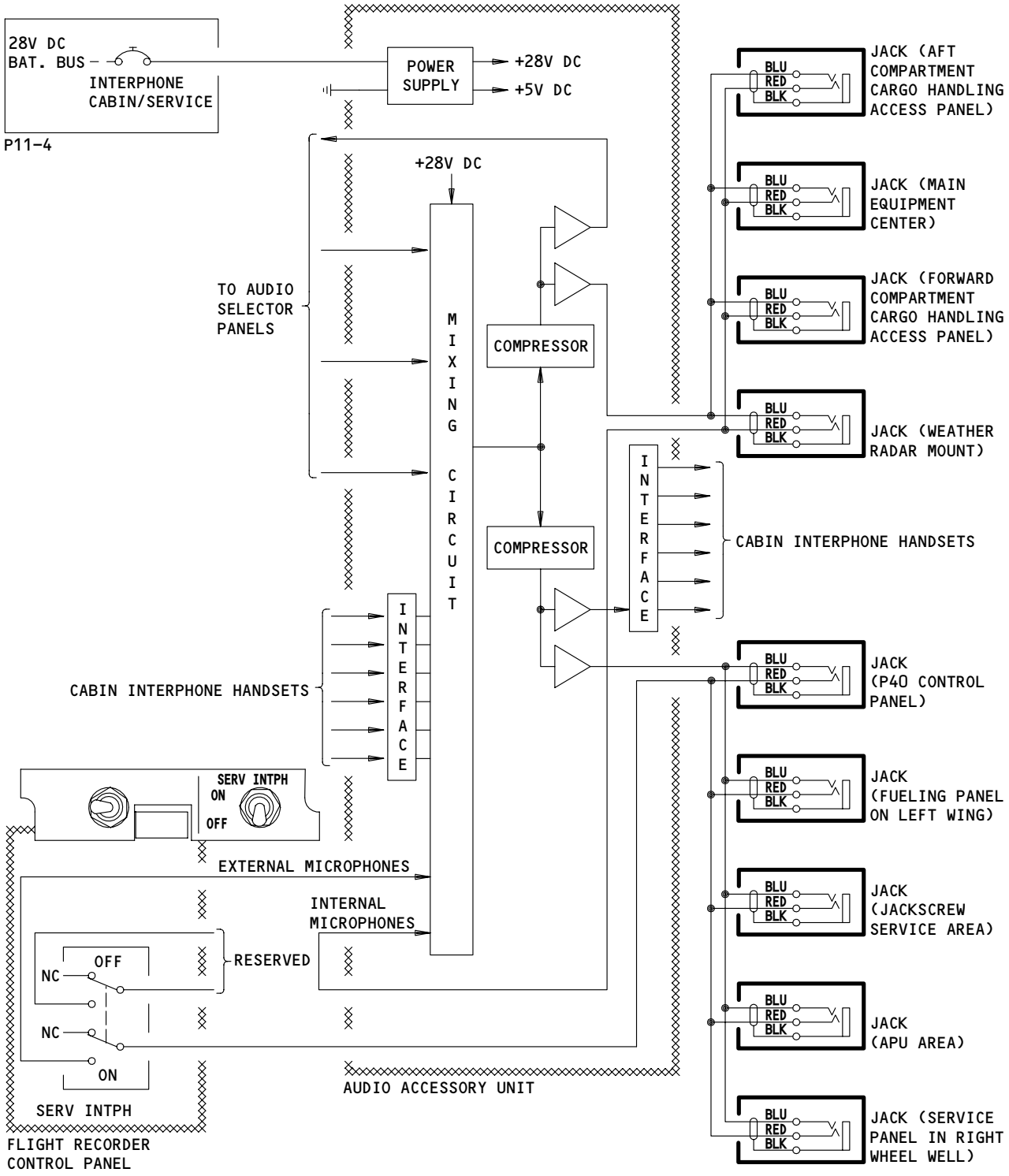
A. Audio Amplifier

(1) Two identical audio amplifiers with parallel inputs are located in the audio accessory unit on shelf E2-5 in the main equipment center. The amplifiers are used by both the service interphone and the cabin interphone systems. A placard on the audio accessory unit identifies and locates the two amplifiers. There are two outputs from each amplifier. One output goes to the cabin interphone audio on the audio selector panels. The other output goes to the cabin interphone handsets and the service interphone jacks. The amplifiers have internal adjustments preset for compression, squelch, and volume.

B. Service Interphone Switch

(1) The SERV INTPH switch is located on the right sidewall panel P61. In the ON position, the switch connects the microphone lines from the external service interphone jacks to the input of the interphone amplifiers. The OFF position disconnects the microphone lines to isolate the external service interphone jacks during flight.

3. Operation (Fig. 2)



Service Interphone System Schematic Diagram
Figure 2

A. Functional Description

(1) The INTERPHONE CABIN/SERVICE circuit breaker on overhead panel P11 controls power to the system.

(2) The SERV INTPH switch on panel P61 connects the microphone lines from the external phone jacks to the input of the interphone amplifiers. This switch activates the service interphone system. Then the interphone amplifiers distribute the amplified audio to the audio selector panels in the flight compartment, as well as to the cabin handsets, and to the audio line of the service interphone jacks located at the usual service locations. All microphone input from the handsets and from the audio selector panels mixes with that of the service interphone jacks onto a single-party system.

(3) The flight crew talks with the service interphone stations by pushing the MIC SELECTOR labeled INTER on the audio selector panel and also the FLT INT switch on the pilots' call panel (P5). These switches, along with the SERV INTPH switch on panel P61, connect a flight crew headset to the service interphone system. On each panel, both the INTER and the FLT INT switches are push-on/push-off type and are lighted when on. The related sliding volume control sets the sound level for that particular station.

(4) Personnel at the cabin attendant stations use the service interphone system by picking up the handsets and speaking.

(5) Personnel at the service locations use the service interphone system by plugging a headset into the phone jack and speaking. First, the SERV INTPH switch must be set to ON.

B. Control

(1) To place the system in operation, supply electrical power (Ref 24-22-00/201).

(2) On overhead panel P11, make sure the INTERPHONE CABIN/SERVICE circuit breaker is closed.

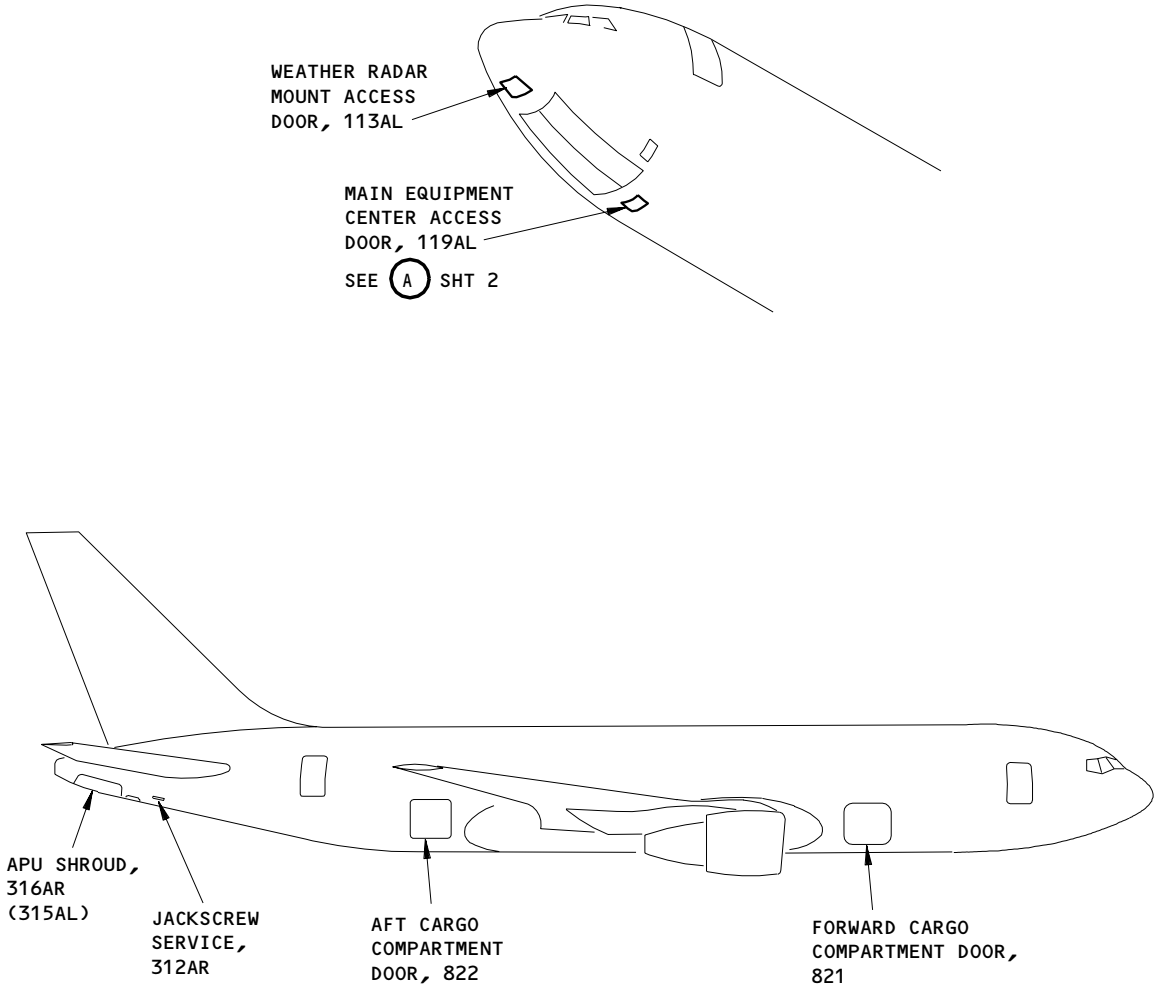
(3) On right sidewall panel P61, make sure the SERV INTPH switch is set to the ON position.

SERVICE INTERPHONE SYSTEM

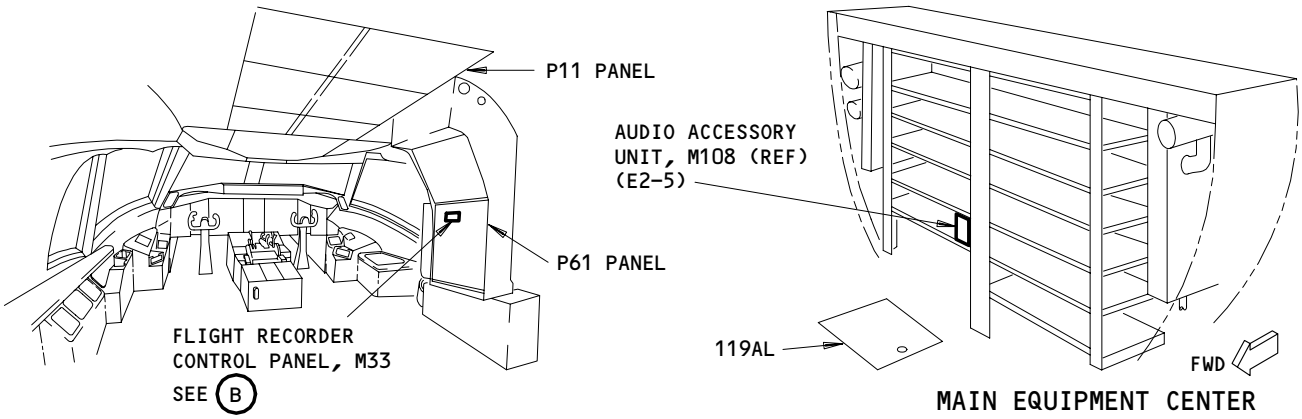
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER –	2		FLT COMPT, P11	
INTERPHONE CABIN/SERVICE, C551		1	11C23	*
JACK – SERVICE INTPH, D8503	2	1	312AR, JACKSCREW SERVICE	*
JACK – SERVICE INTPH, D8505	2	1	316AR (315AL), APU SHROUD	*
JACK – SERVICE INTPH, D8539	2	1	119AL, MAIN EQUIP CTR	*
JACK – SERVICE INTPH, D8541	2	1	113AL, WEATHER RADAR MOUNT	*
JACK – SERVICE INTPH, D8543	2	1	NOSE WHL GEAR, APU SHUTDOWN PNL, P40	*
JACK – SERVICE INTPH, D8547	2	1	821, FWD COMPT CARGO HDLG ACCESS PNL, P35	*
JACK – SERVICE INTPH, D8549	2	1	L WING FUELING PNL, P28	*
JACK – SERVICE INTPH, D8553	2	1	R W/W SERVICE PNL, P56	*
JACK – SERVICE INTPH, D8555	2	1	822, AFT COMPT CARGO HDLG ACCESS PNL, P39	*
PANEL – (FIM 31-31-00/101)				
FLIGHT RECORDER CONTROL, M33				
SWITCH – SERVICE INTPH, YDSS2	2	1	FLT COMPT, P61, FT RCDR CONT PNL, M33	*
UNIT – (FIM 23-42-00/101)				
AUDIO ACCESSORY, M108				

* SEE THE WDM EQUIPMENT LIST

Service Interphone System – Component Index
Figure 101



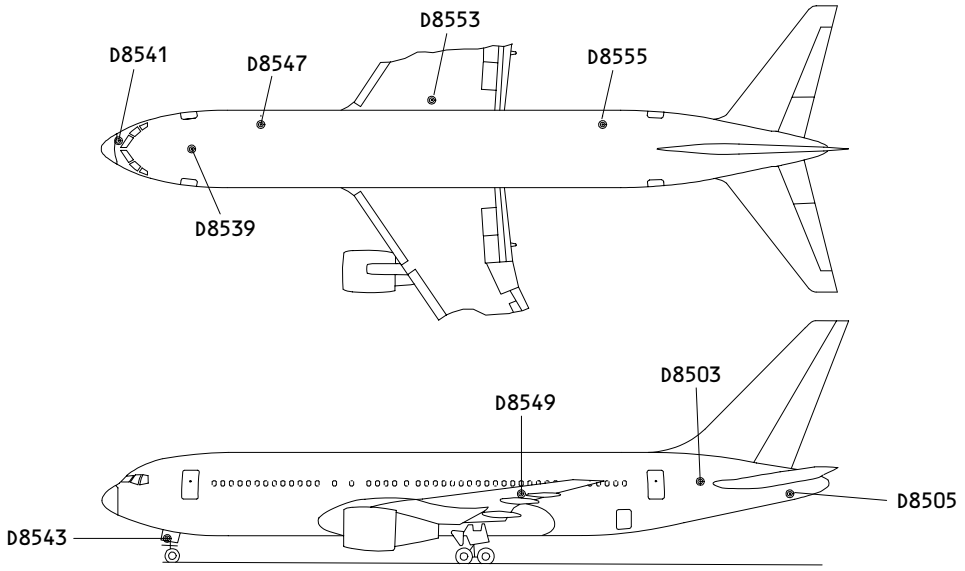
Service Interphone System - Component Location
Figure 102 (Sheet 1)



FLIGHT RECORDER CONTROL PANEL, M33 (REF)

B

JACK	LOCATION
D8503	JACKSCREW SERVICE
D8505	APU SHROUD
D8539	MAIN EQUIPMENT CENTER
D8541	WEATHER RADAR MOUNT
D8543	P40 CONTROL PANEL
D8547	FORWARD COMPARTMENT CARGO HANDLING ACCESS PANEL, P35
D8549	LEFT WING FUELING PANEL, P28
D8553	RIGHT WHEEL WELL SERVICE PANEL, P56
D8555	AFT COMPARTMENT CARGO HANDLING ACCESS PANEL, P39



SERVICE INTERPHONE JACK LOCATIONS

Service Interphone System - Component Location
Figure 102 (Sheet 2)

SERVICE INTERPHONE SYSTEM - ADJUSTMENT/TEST

TASK 23-41-00-715-001

1. Operational Test - Service Interphone System

A. General

(1) This procedure contains a task that gives the operational test for the service interphone system.

B. References

(1) AMM 24-22-00/201, Electrical Power - Control

C. Equipment

(1) Boom Mic Headset

D. Access

(1) Location Zones

119/120	Main Equipment Center
121/122	Forward Cargo Compartment
144	Main Landing Gear Wheel Well
153/154	Aft Cargo Compartment
211/212	Control Cabin - Section 41
315/316	APU Compartment
331	Horizontal Stabilizer, Center Section
711	Nose Landing Gear (NLG)

(2) Access Panels

113AL	Fwd Equip Ctr
119AL	Main Equip Ctr
312AR	Stabilizer Jackscrew
315AL/316AR	Auxiliary Power Unit
541RT/641RT	Overwing Fueling
742	Main Gear and Wheel Well Components
821	Forward Cargo Compartment
822	Aft Cargo Compartment

E. Prepare for Test

S 865-003

(1) Supply electrical power (AMM 24-22-00/201).

S 865-004

(2) Make sure this circuit breaker on the overhead panel, P11, is closed:

(a) 11C23, INTERPHONE CABIN/SERVICE

F. Service Interphone System Test

S 985-005

(1) Set the SERV INTPH switch on the flight recorder control module, M33 to ON. The M33 module is installed on the right sidewall panel, P61.

S 985-002

(2) Use the headsets to do a check for a clear voice communication between D8543 service interphone jack and each of these jacks. (D8543 is found on the APU shutdown panel P40).
   (a) D8553 Right wheel well service panel P56
   (b) D8541 Weather/radar mount (forward 41 section)
   (c) D8547 Forward compartment cargo handling access panel P35
   (d) D8539 (INTPH JACK) Main Equipment Center (near P34)
   (e) D8555 Aft compartment cargo handling access panel P39

S 985-011

(3) Use the headsets to do a check for a clear voice communication between D8555 (D8555 is found on the P39 panel) service interphone jack and each of these jacks.
   (a) D8539 Main electrical/electronics bay
   (b) D8549 Left wing fueling panel P28
   (c) D8503 Jackscrew service (lower right side in jackscrew area)
   (d) D8505 APU shroud (on forward wall in APU compartment)
   (e) D8553 Right wheel well service panel P56

S 985-012

(4) Set the SERV INTPH switch on the P61 panel to OFF.

S 985-013

(5) Use the headsets to make sure that the communication between D8553 and D8555 service interphone jacks is not possible.

S 985-014

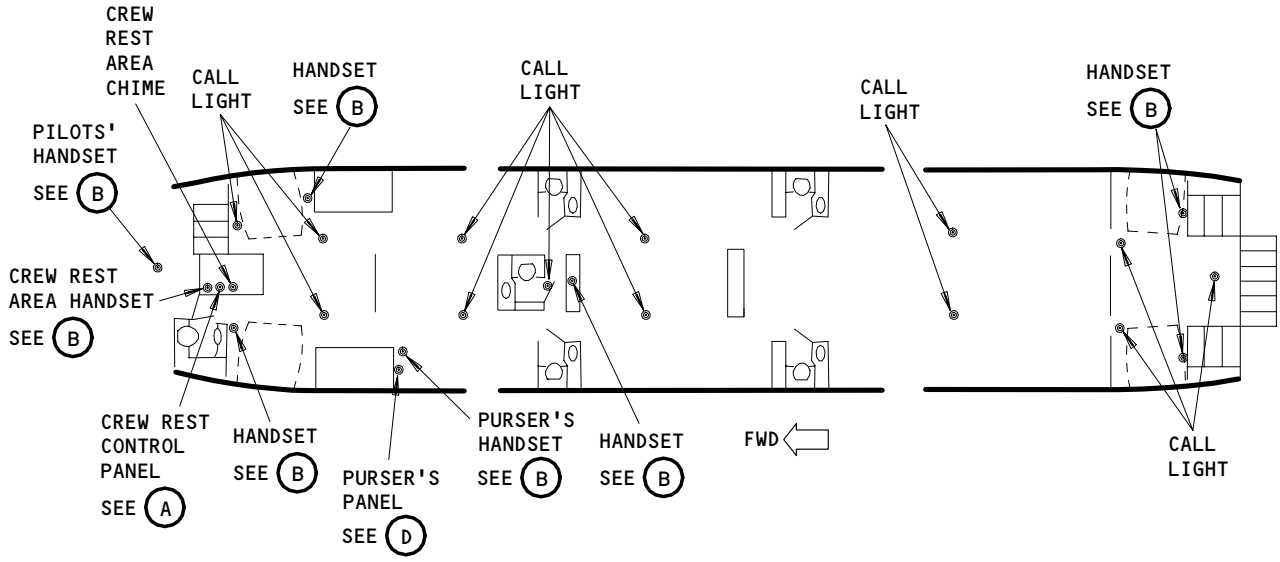
(6) Use the headsets to make sure that the communication between D8553 and D8543 service interphone jacks is not possible.

S 865-016

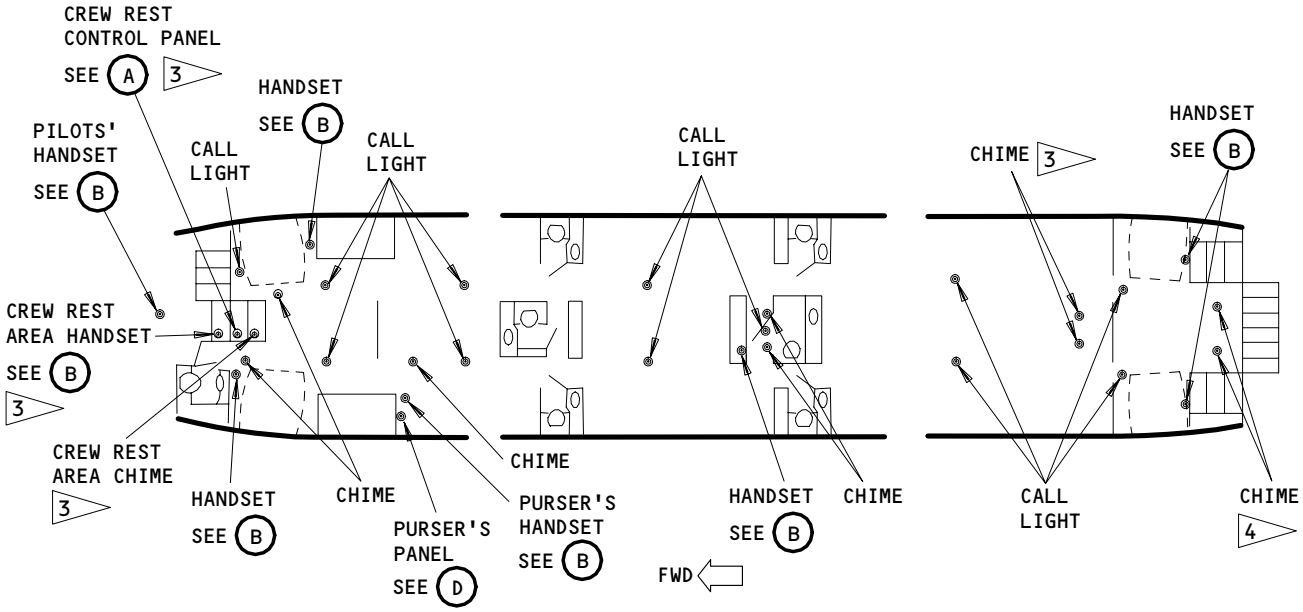
(7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

CABIN INTERPHONE SYSTEM - DESCRIPTION AND OPERATION

1. General
   A. The cabin interphone system provides facilities for interphone communication among cabin attendants, and between the flight compartment crewmembers and attendants. The cabin interphone system microphone circuits can be switched to the input of the passenger address (PA) system to permit announcements.
   B. The cabin interphone system includes: cabin attendant handsets, purser handset, a pilots' handset, attendant and purser call lights, the pilots' call panel, and associated amplifiers and mixing circuits located in the audio accessory unit.
   C. The cabin interphone system receives power from the 28v dc battery bus through a circuit breaker on overhead panel P11.
2. Component Details (Fig. 1)



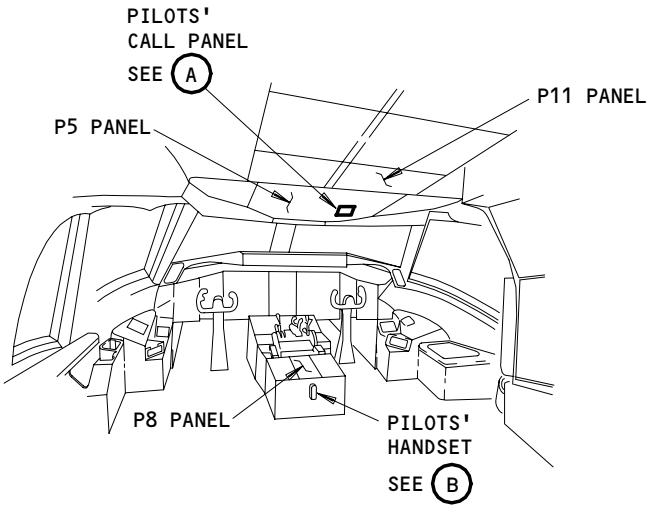
HANDSET, CALL LIGHT AND CHIME LOCATIONS 1



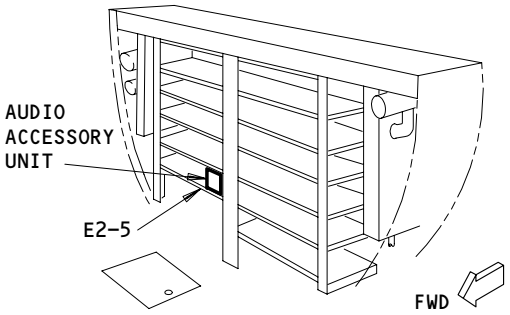
HANDSET, CALL LIGHT AND CHIME LOCATIONS 2

1 SAS 050-149
2 SAS 150-999
3 SAS 162-999
4 SAS 150-161

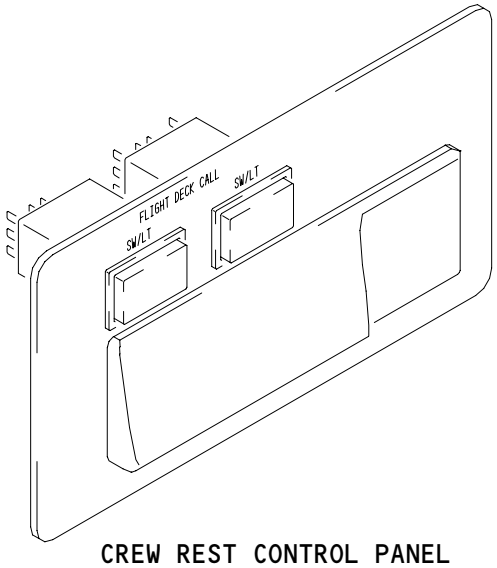
Cabin Interphone System Component Location
Figure 1 (Sheet 1)



FLIGHT COMPARTMENT

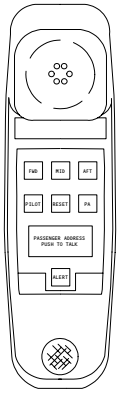


MAIN EQUIPMENT CENTER



CREW REST CONTROL PANEL

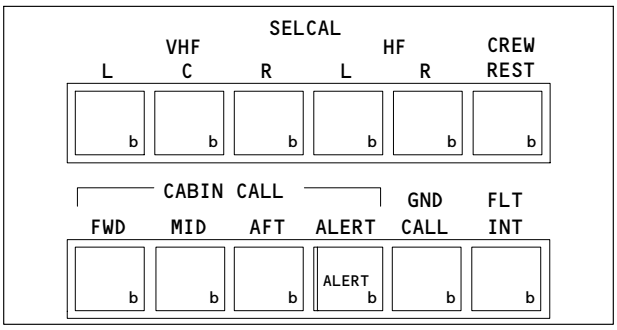
A



HANDSET
(EXAMPLE)

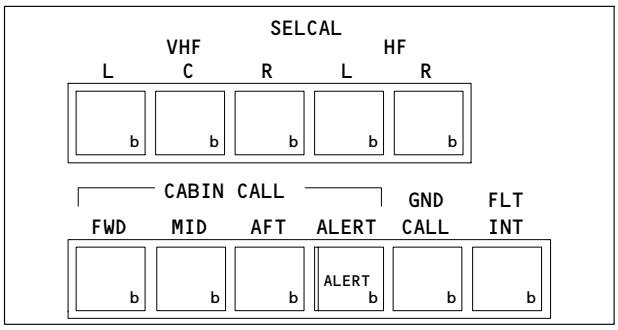
B

Cabin Interphone System Component Location
Figure 1 (Sheet 2)



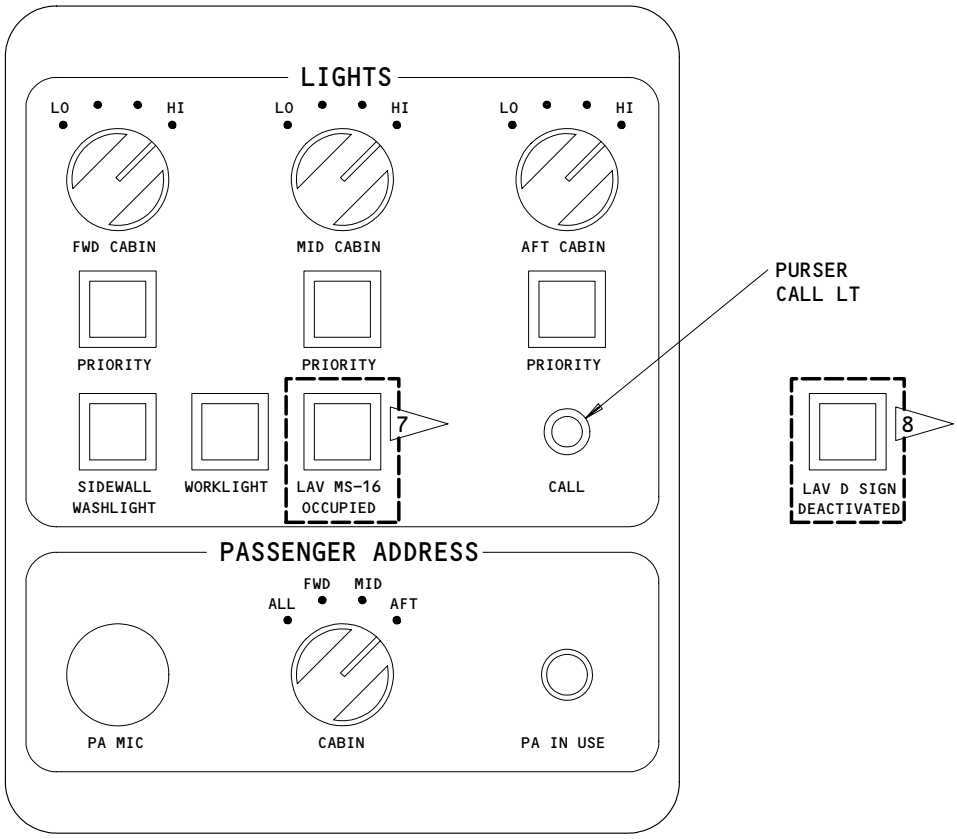
PILOTS' CALL PANEL

C 5



PILOTS' CALL PANEL

C 6



PURSER'S PANEL

D

5 SAS 050-149, 162-999

6 SAS 150-161

7 SAS 050-051, 150-155, 162-165

8 SAS 052-149, 156-161, 166-999

Cabin Interphone System Component Location
Figure 1 (Sheet 3)

A. Audio Accessory Unit

(1) Two identical audio amplifiers with paralleled inputs are located in the audio accessory unit (E2-5, main equipment center). The amplifiers are used by both the service and cabin interphone systems. A placard on the audio accessory unit identifies and locates the two amplifiers. There are two outputs from each amplifier. One output is to the cabin interphone audio on the audio selector panels, the other output is to the cabin interphone handsets and service interphone jacks. The amplifiers have preset internal adjustments for compression, squelch, and volume.

(2) The audio accessory unit contains the interphone power supply card, main logic input/output card, call interface card, and three dual handset interface cards. A potentiometer for adjusting the audio level to the handsets is located on the PA control card. All interphone controlling functions are performed in the audio accessory unit automatically upon receipt of command signals from the dialing circuits in the handsets or pilots' call panel.

B. Cabin Interphone Handsets

(1) ON SAS 050-149, 162-999;
attendant handsets are located at each attendant station. A crew rest handset is located at the crew rest area. A purser handset is located at the purser's station. The pilots' handset is located on the P8 control stand. Each handset contains the following components; a noise cancelling microphone to minimize airplane noise; four call switches for station-to-station dialing (FWD, MID, AFT and PILOT), an ALERT call switch and a PA switch; a RESET switch to permit consecutive calls without placing the handset in the cradle after each call; a PA push-to-talk (PTT) switch; a magnetically actuated switch to disconnect the handset from the system when it is placed in its cradle.

(2) ON SAS 150-161;
attendant handsets are located at each attendant station. A purser handset is located at the purser's station. The pilots' handset is located on the P8 control stand. Each handset contains the following components; a noise cancelling microphone to minimize airplane noise; four call switches for station-to-station dialing (FWD, MID, AFT and PILOT), an ALERT call switch and a PA switch; a RESET switch to permit consecutive calls without placing the handset in the cradle after each call; a PA push-to-talk (PTT) switch; a magnetically actuated switch to disconnect the handset from the system when it is placed in its cradle.

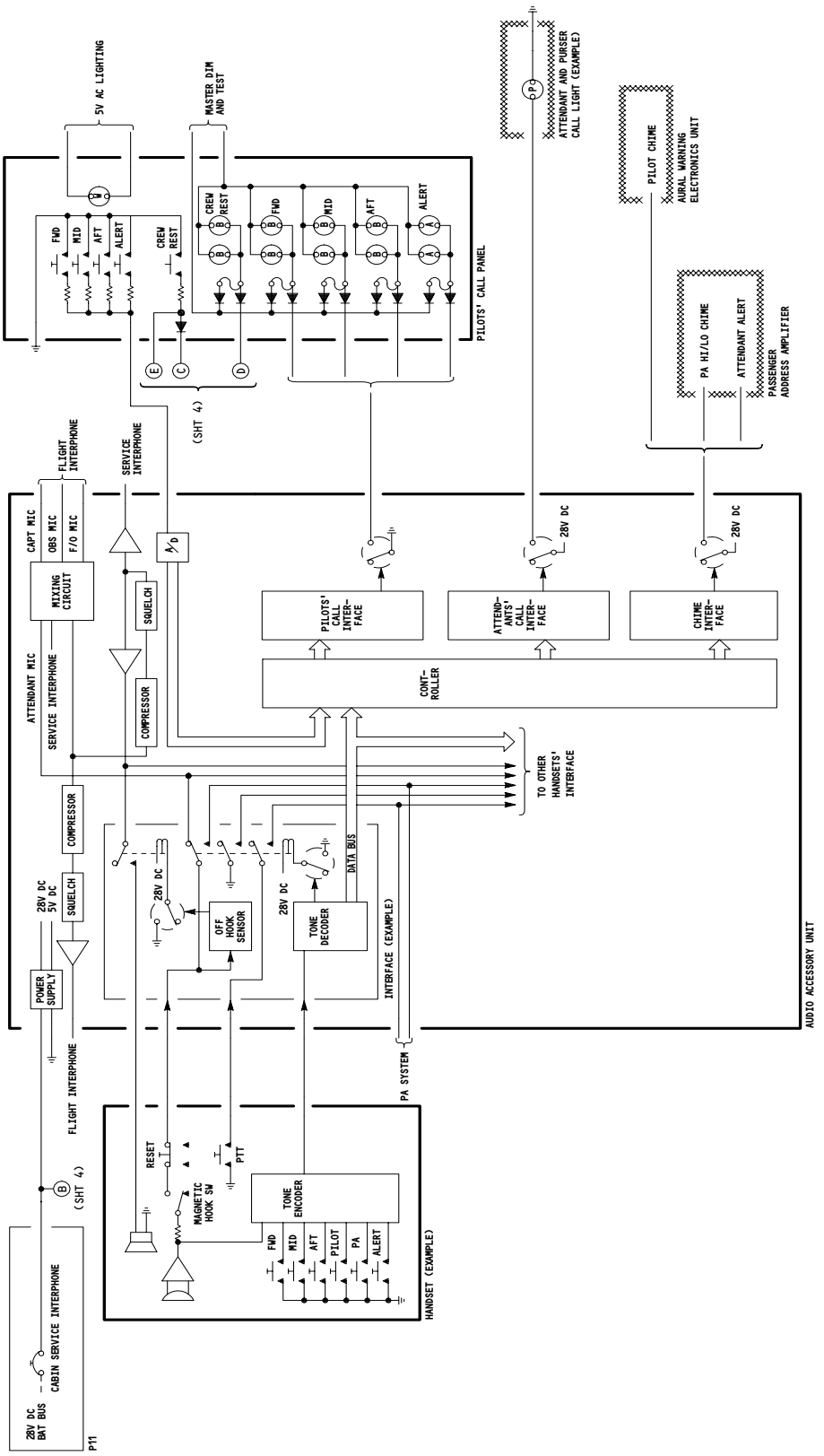
C. Pilots' Call Panel

(1) The pilots' call panel is located on the P5 pilots' overhead panel. The cabin interphone system interfaces with the pilots' call panel through three momentary blue lighted switches which indicate an attendant or purser call (FWD, MID, AFT) and one momentary blue lighted switch which indicates an alert call (ALERT).

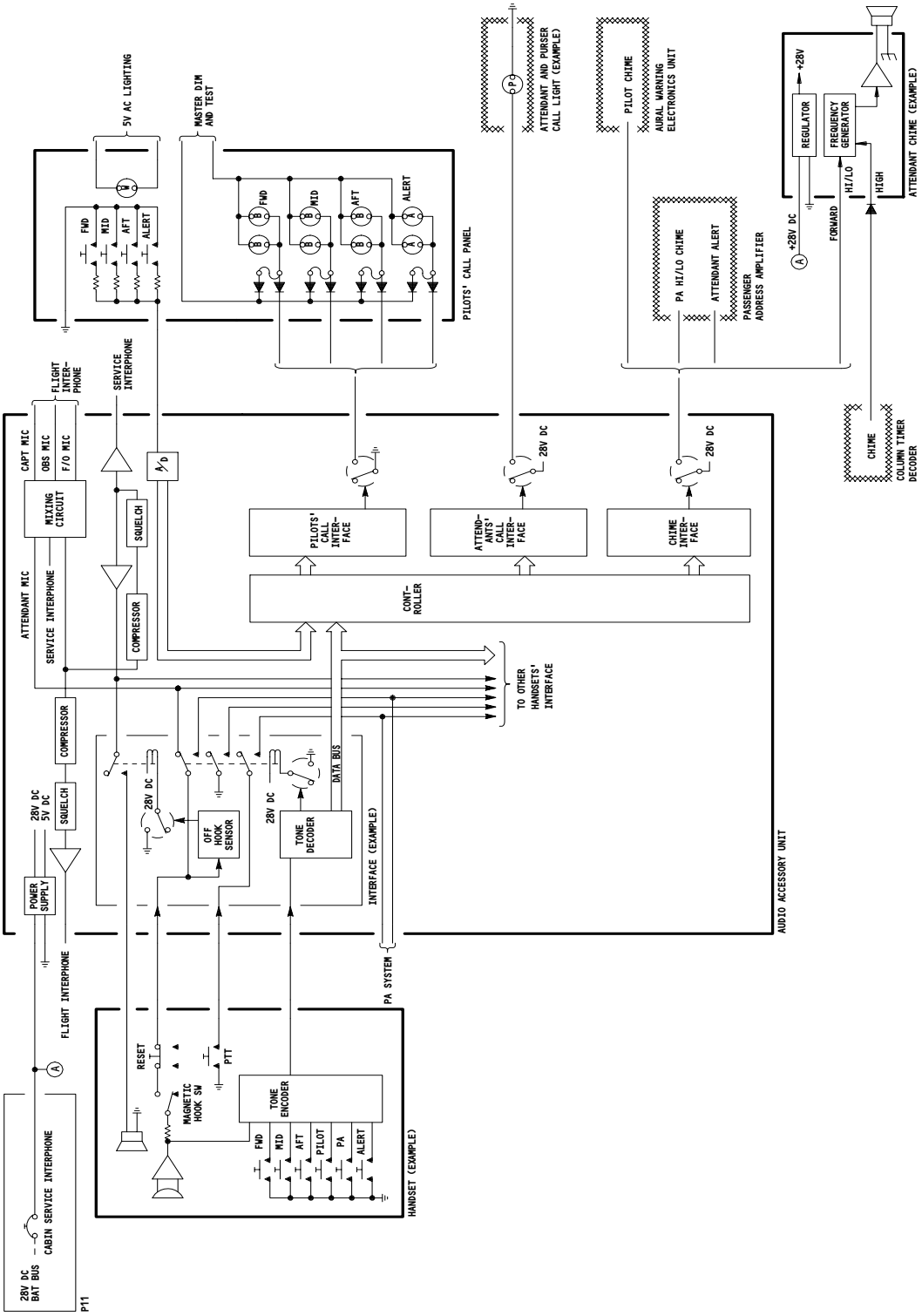
(2) ON SAS 050-149, 162-999;
the crew rest area call system interfaces with the pilots' call panel through a momentary blue lighted switch which indicates a call from the crew rest area.

(3) The FWD, MID, and AFT lighted switches are pressed to dial the indicated station. The ALERT lighted switch is pressed to initiate an alert call.
(4) The GND CALL switch provides a signaling capability between the flight compartment and nose landing gear area (AMM 23-43-00).
(5) The FLT INT switch on the pilots' call panel connects the cabin and flight interphone amplifiers in parallel giving the flight crew access to the cabin interphone system through the audio selector panels.

3. Operation (Fig. 2)

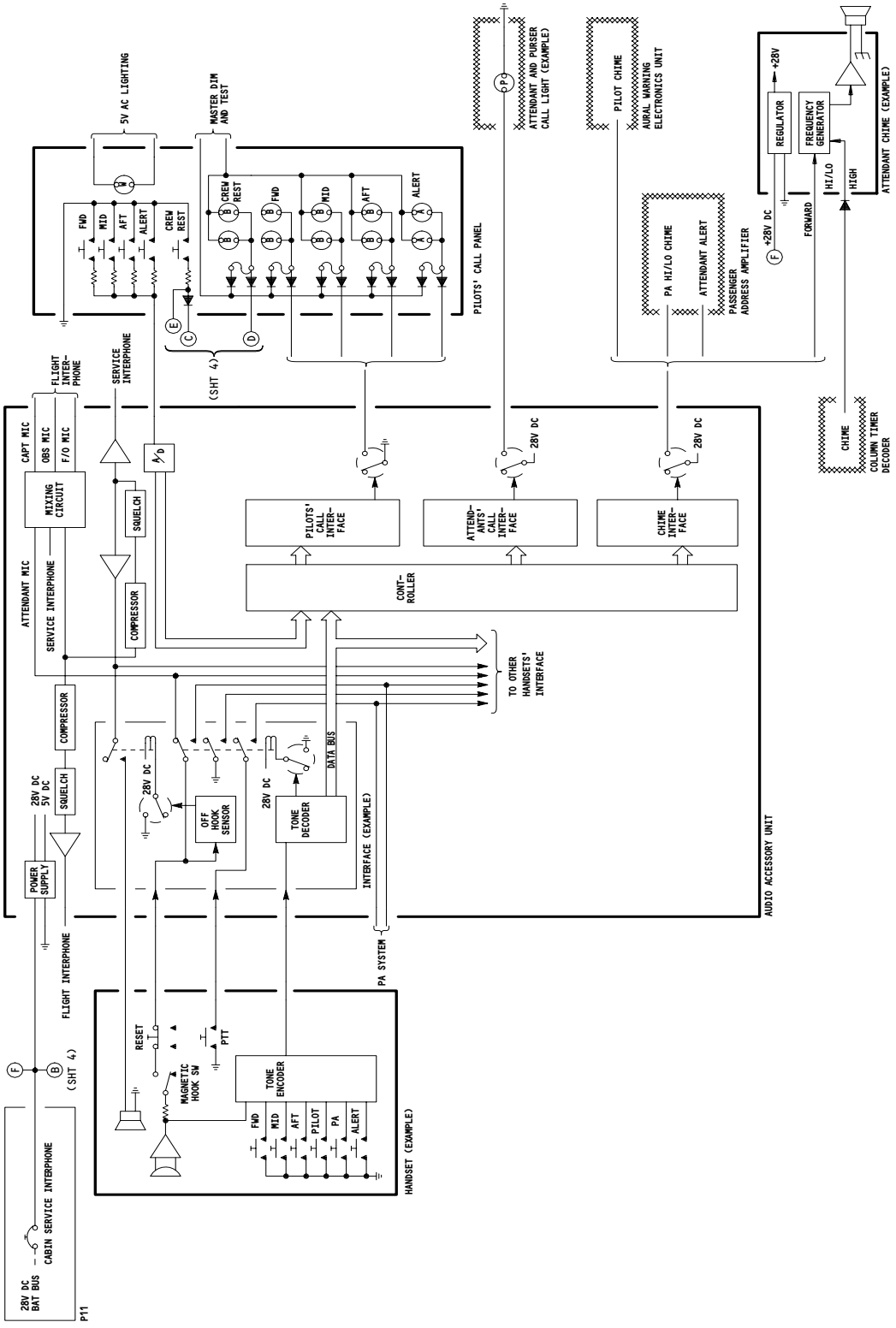


Cabin Interphone System Schematic
Figure 2 (Sheet 1)

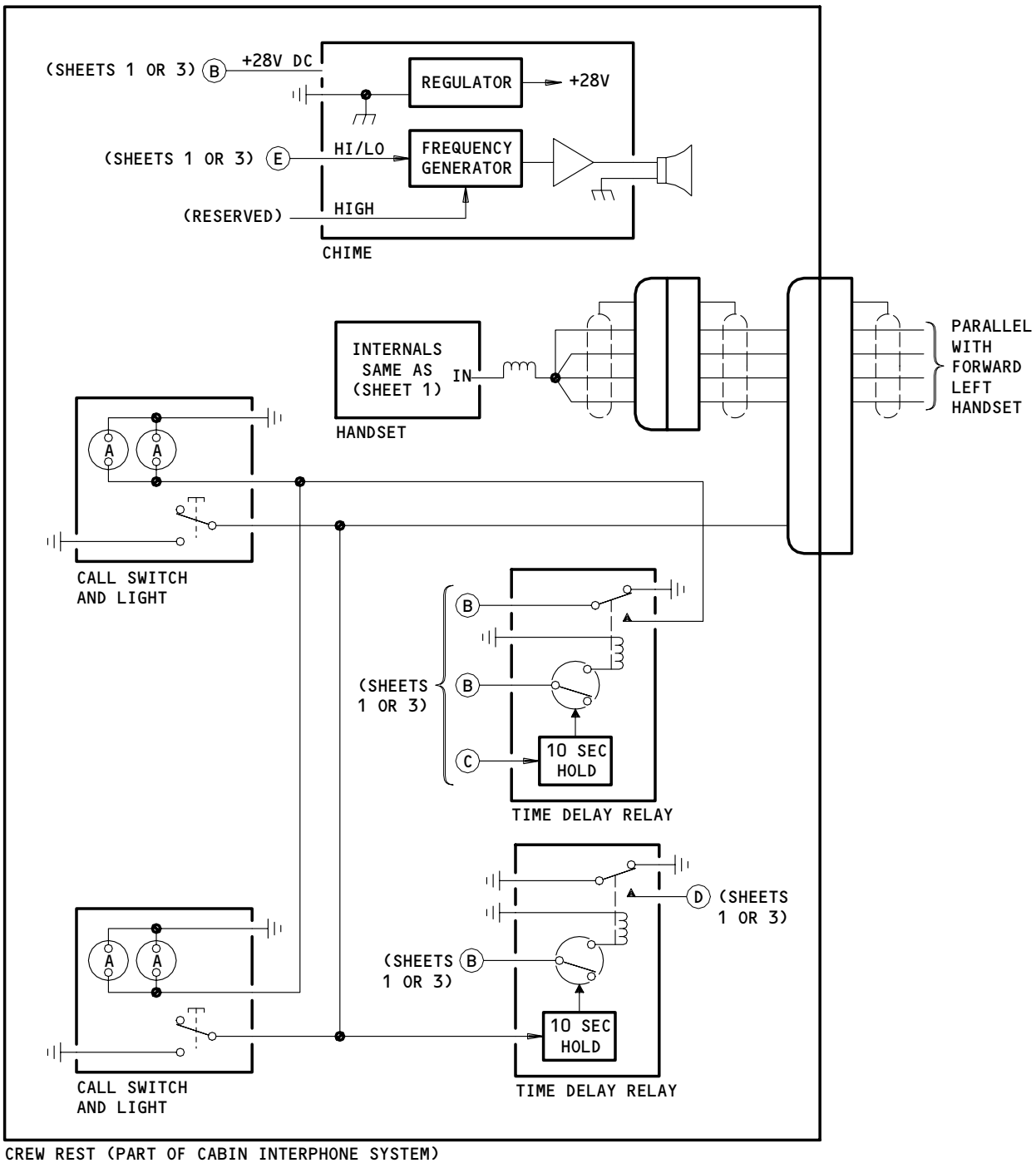


Cabin Interphone System Schematic
Figure 2 (Sheet 2)

586911



Cabin Interphone System Schematic
Figure 2 (Sheet 3)



Cabin Interphone System Schematic
Figure 2 (Sheet 4)

A. Functional Description

(1) Cabin interphone calling from one station to another is done by single digit dialing. Pressing a call switch on a handset activates the system causing two tones to be sent to the audio accessory unit. The tones are processed in the accessory unit and a signal is provided to the called station to turn on the call light, and activate the chime. A signal is also sent to the aural warning system to generate a hi chime in the flight compartment for calls to the pilot.

(2) Passenger compartment cabin interphone stations with multiple positions have their handsets, call lights, and chimes connected in parallel:

(a) The FWD station consists of the left and right forward attendants positions and the purser position.

(b) The MID station consists of the single mid attendants position.

(c) The AFT station consists of the left and right aft attendants positions.

(3) A pilot can place a call by pressing a call switch on the pilots' handset or by pressing a call switch on the pilots' call panel. The lights in the call panel switches came on for incoming calls and go off when the pilots' handset is taken off hook. The call lights on the pilots' call panel can also be reset by pressing the call light.

(4) ON SAS 050-149, 162-999;
a pilot can place a call to the crew rest area by pressing the crew rest call switch on the pilots' call panel. The call light switches in the crew rest area come on and the chime sounds once for incoming calls from the flight compartment. The time delay relays reset the call light switches.

(5) Communication is possible between attendant or purser handset positions and stations having audio selector panels. The FLT INT switch on the pilots' call panel connects the flight and cabin interphone systems in parallel. The INTER MIC SELECTOR switch on the audio selector panel connects flight compartment microphone lines to the interphone system.

(6) The controller in the audio accessory unit monitors busy stations and prevents incoming calls when a called station is busy. The controller also activates the hi/lo chime output and causes the lamp driver to turn on the attendant call light. Station-to-station calling can be accomplished except under the following conditions:

(a) A station can not be called when any handset connected to the station is off hook.

(b) No station can call another station that has been called but not answered; however, the station that placed the initial call can repeat it.

(c) Only one call can be made from a handset without first performing a reset.

(7) Any position with a handset can call the pilot. Multiple calls by stations to the pilot are permitted. The calling handset can be reset by placing the handset in its cradle or by pressing the RESET switch on the handset. When the called station removes the handset from the cradle, a magnetic switch in the handset closes, connecting the microphone lines to the cabin interphone system.

(8) All handsets can be used to place an alert call. An alert call is placed by pressing the guarded ALERT switch. An alert call is recognized at all stations by a flashing pink call light, and three automatic hi/lo chimes. An alert call is recognized in the flight compartment by the blue ALERT light on the pilots' call panel coming on and by the sounding of a single hi chime. The stations are reset as they respond to the alert call by going off-hook with the handsets or by pressing the reset switch on the handsets. The alert call is also reset when the initiating handset is placed on-hook.

(9) When the pilot, attendant, or purser calls a station, the pink call light at the called station goes on. A hi/lo chime is also activated. When the called station responds by lifting the handset off-hook, the pink call light goes off and two-way communication can take place.

(10) When a station calls the pilot, the blue attendant's call light on the pilots' call panel comes on and a single hi chime is sounded in the flight compartment.

(11) The pilot can call any station by using a handset or the pilots' call panel. The station switches (FWD, MID, AFT) on the pilots' call panel are pressed to begin communication when a handset is not used. A hand mic or boom mic/headset is used to transmit audio to the called station. Multiple calls by the pilot to stations are permitted. The station switches on the pilots' call panel do not light when a call is placed. A pink light at the called station and hi/lo chime signals a pilot-to-station call. Calls are repeatable by re-pressing the station switch. The pilots' call panel does not have call reset capabilities. Pilot-to-attendant or pilot-to-purser calls via the pilots' handset work the same as an attendant-to-attendant or attendant-to-purser calls via the attendants' or pursers' handset. When the pilot handset is off hook, no calls can be placed to the pilot. When the handset is on hook, the pilot can receive calls from any station handset.

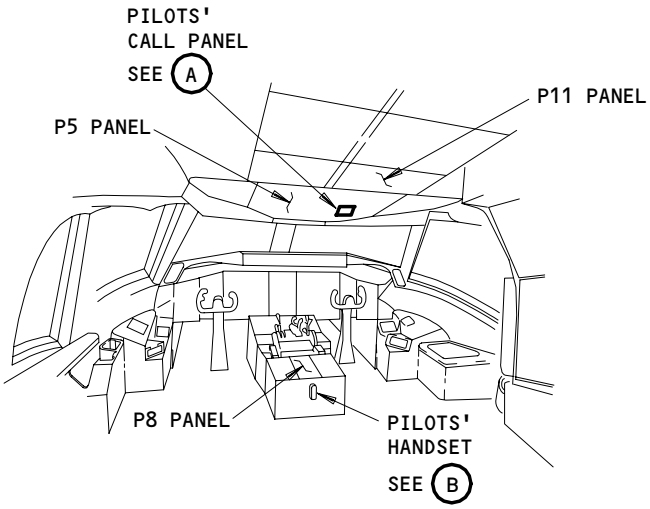
B. Control

(1) To place the system in operation, supply electrical power (Ref 24-22-00/201).

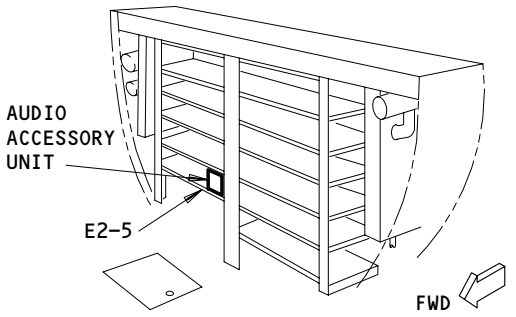
(2) Check that INTERPHONE CABIN/SERVICE circuit breaker on overhead panel P11 is closed.

CABIN INTERPHONE SYSTEM - DESCRIPTION AND OPERATION

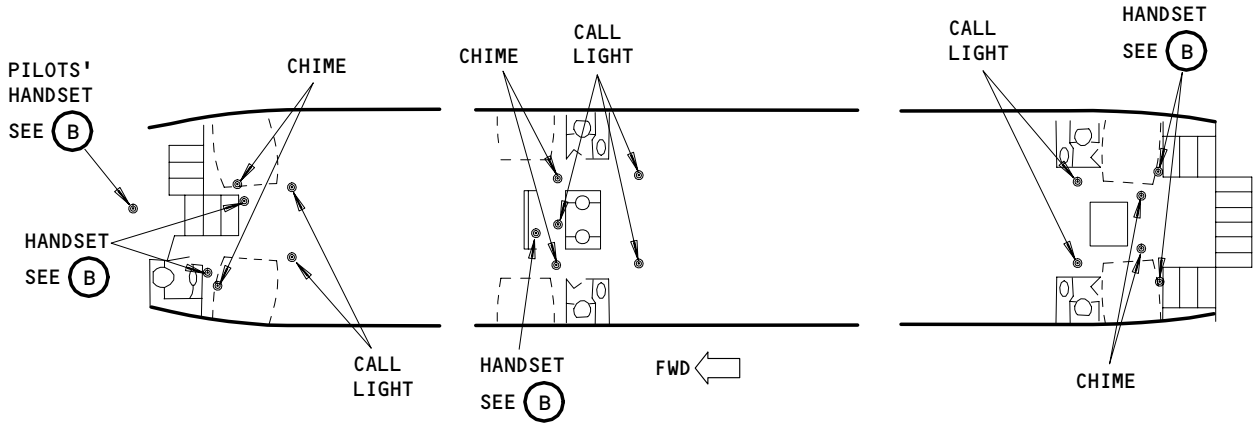
1. General
   A. The cabin interphone system provides facilities for interphone communication among cabin attendants, and between the flight compartment crewmembers and attendants. The cabin interphone system microphone circuits can be switched to the input of the passenger address (PA) system to permit announcements.
   B. The cabin interphone system includes: cabin attendant handsets, a pilots' handset, attendant call lights, the pilots' call panel, and associated amplifiers and mixing circuits located in the audio accessory unit.
   C. The cabin interphone system receives power from the 28v dc battery bus through a circuit breaker on overhead panel P11.
2. Component Details (Fig. 1)



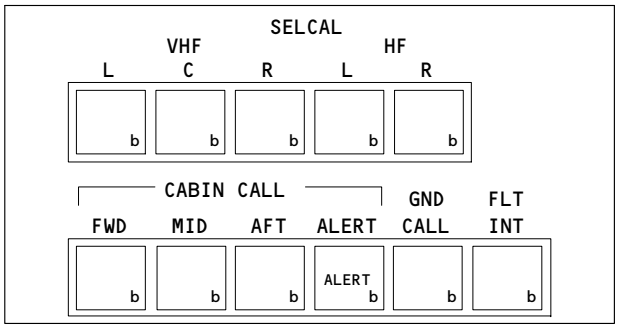
FLIGHT COMPARTMENT



MAIN EQUIPMENT CENTER

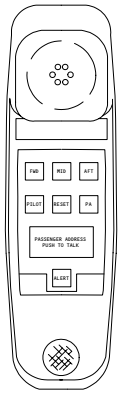


HANDSET AND CALL LIGHT LOCATIONS



PILOTS' CALL PANEL

A



SOFT-TOUCH
KEYBOARD

HANDSET (EXAMPLE)

B

Cabin Interphone System Component Location
Figure 1

A. Audio Accessory Unit

(1) Two identical audio amplifiers with paralleled inputs are located in the audio accessory unit (E2-5, main equipment center). The amplifiers are used by both the service and cabin interphone systems. A placard on the audio accessory unit identifies and locates the two amplifiers. There are two outputs from each amplifier. One output is to the cabin interphone audio on the audio selector panels, the other output is to the cabin interphone handsets and service interphone jacks. The amplifiers have preset internal adjustments for compression, squelch, and volume.

(2) The audio accessory unit contains the interphone power supply card, main logic input/output card, call interface card, and three dual handset interface cards. A potentiometer for adjusting the audio level to the handsets is located on the PA control card. All interphone controlling functions are performed in the audio accessory unit automatically upon receipt of command signals from the dialing circuits in the handsets or pilots' call panel.

B. Cabin Interphone Handsets

(1) Attendant handsets are located at each attendant station. The pilots' handset is located on the P8 pilots' aft control stand. Each handset has the following components: a noise cancelling dynamic microphone to minimize aircraft noise; six push buttons for dialing; a reset button to permit consecutive calls without replacing the handset in the cradle; a push-to-talk (PTT) switch; a magnetically actuated hook switch to electrically disconnect a handset from the system when the handset is placed in its cradle.

C. Pilots' Call Panel

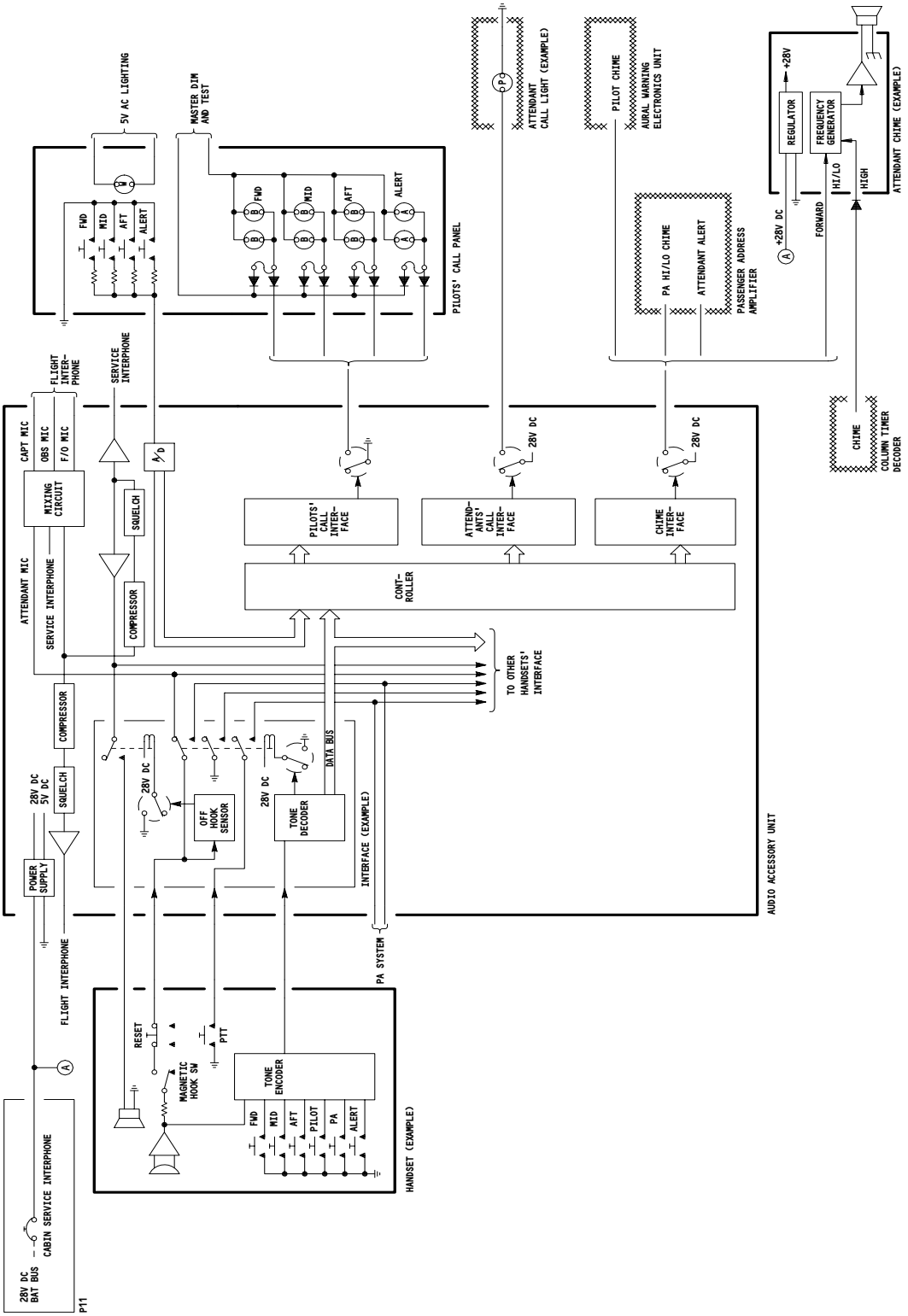
(1) The pilots' call panel is located on the P5 pilots' overhead panel. The cabin interphone system interfaces with the pilots' call panel through three momentary blue lighted switches which indicate an attendant call (FWD, MID, AFT) and one momentary blue lighted switch which indicates an alert call (ALERT).

(2) The FWD, MID, and AFT lighted switches are pressed to dial the indicated attendant's station. The ALERT lighted switch is pressed to initiate an alert call.

(3) The GND CALL switch provides a signaling capability between the flight compartment and nose landing gear area (AMM 23-43-00).

(4) The FLT INT switch on the pilots call panel connects the cabin and flight interphone amplifiers in parallel.

3. Operation (Fig. 2)



Cabin Interphone System Schematic
Figure 2

992999

A. Functional Description

(1) Cabin interphone calling from one station to another is done by single digit dialing. Pressing a call switch on a handset activates the system causing two tones to be sent to the audio accessory unit. The tones are processed in the accessory unit and a signal is provided to the called station to turn on the call light, and activate the attendant chime. A signal is also sent to the aural warning system to generate a hi chime in the flight compartment for calls to the pilot.

(2) A pilot can place a call by pressing a call switch on the pilots' handset or by pressing a call switch on the pilots' call panel. The lights in the call panel switches came on for incoming calls and go off when the pilots' handset is taken off hook. The call lights on the pilots' call panel can also be reset by pressing the call light.

(3) Communication is possible between attendant handset stations and stations having audio selector panels. The FLT INT switch on the pilots' call panel connects the flight and cabin interphone systems in parallel. The INTER MIC SELECTOR switch on the audio selector panel connects flight compartment microphone lines to the interphone system.

(4) The controller in the audio accessory unit monitors busy stations and prevents incoming calls when a called station is busy. The controller also activates the hi/lo chime output and causes the lamp driver to turn on the attendant call light. Station-to-station calling can be accomplished except under the following conditions:

(a) A station can not be called when any handset connected to the station is off hook.

(b) No station can call another station that has been called but not answered; however, the station that placed the initial call can repeat it.

(c) Only one call can be made from a handset without first performing a reset.

(5) Any attendant can call the pilot. Multiple calls by attendants to the pilot are permitted. The calling handset can be reset by hanging up the handset or by pressing the reset switch on the handset. When the called station removes the handset from the cradle, a magnetic hook switch closes, connecting the microphone to the system.

(6) All handsets can be used to place an alert call. An alert call is placed by pressing the guarded ALERT switch. An alert call is recognized at the attendant stations by a flashing pink call light, and three automatic hi/lo chimes. An alert call is recognized in the flight compartment by the blue ALERT light on the pilots' call panel coming on and by the sounding of a single hi chime. The stations are reset as they respond to the alert call by going off-hook with the handsets or by pressing the reset switch on the handsets. The alert call is also reset when the initiating handset is placed on-hook.

(7) When the pilot or attendant call an attendant, the pink call light at the attendant's station goes on. A hi/lo chime is also activated. When the called station responds by lifting the handset off-hook, the pink call light goes off and two-way communication can take place.

(8) When an attendant calls the pilot, the blue attendant's call light on the pilots' call panel comes on and a single hi chime is sounded in the flight compartment.

(9) The pilot can call any attendant station by using a handset or the pilots' call panel. The attendant switches (FWD, MID, AFT) on the pilots' call panel are pressed to begin communication when a handset is not used. A hand mic or boom mic/headset is used to transmit audio to the attendant stations. Multiple calls by the pilot to attendants are permitted. The attendant switches on the pilots' call panel do not light when a call is placed. A pink light at the attendant station and hi/lo chime signals a pilot-to-attendant call. Calls are repeatable by re-pressing the attendant switch. The pilots' call panel does not have call reset capabilities. Pilot-to-attendant calls via the pilots' handset work the same as an attendant-to-attendant call. When the pilot handset is off hook, no calls can be placed to the pilot. When the handset is on hook, the pilot can receive calls from any attendant handset.

B. Control

(1) To place the system in operation, supply electrical power (Ref 24-22-00/201).

(2) Check that INTERPHONE CABIN/SERVICE circuit breaker on overhead panel P11 is closed.

CABIN INTERPHONE SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
AMPLIFIER - (FIM 23-31-00/101)				
PASSENGER ADDRESS, M177				
CHIME - AFT L ATTENDANT, B148 1	5	1	PASS. CABIN	23-42-04
CHIME - AFT R ATTENDANT, B147 1	5	1	PASS. CABIN	23-42-04
CHIME - CREW REST AREA, B420 2	5	1	PASS. CABIN, CREW REST AREA	*
CHIME - FWD C ATTENDANT, B139 1	5	1	PASS. CABIN	23-42-04
CHIME - FWD L ATTENDANT, B144 1	5	1	PASS. CABIN	23-42-04
CHIME - MID L ATTENDANT, B146 1	5	1	PASS. CABIN	23-42-04
CHIME - MID R ATTENDANT, B145 1	5	1	PASS. CABIN	23-42-04
CHIME - PURSER'S, B376 1	5	1	PASS. CABIN, PURSER'S STATION	23-42-04
CIRCUIT BREAKER -	2		FLT COMPT, P11	
INTERPHONE CABIN/SERVICE, C551		1	11C23	*
HANDSET - ATTENDANT, B61	2	5	PASS. CABIN	*
HANDSET - CREW REST AREA, B61 2	2	1	PASS. CABIN, CREW REST AREA	*
HANDSET - PILOTS', B61	2	1	FLT COMPT, P8	*
HANDSET - PURSER'S, B61	2	1	PASS. CABIN, PURSER'S STATION	*
LIGHT - ATTENDANT CALL	5	3	PASS. CABIN	*
MODULE - (FIM 31-51-00/101)				
BELL CHIME AURAL WARNING, M1000				
PANEL - (FIM 33-21-00/101)				
PURSER'S, P78				
PANEL - CREW REST CONTROL 2	3,4	1	PASS. CABIN, CREW REST AREA	*
PANEL - PILOTS' CALL, M51	2	1	FLT COMPT, P5	23-42-02
RELAY - TIME DELAY, B418,B419 2	3,4	2	PASS. CABIN, CREW REST AREA	*
SWITCH-LIGHT, CALL, B416,B417 2	4	2	PASS. CABIN, CREW REST AREA, CREW REST CONTROL PANEL	*
UNIT - AUDIO ACCESSORY, M108	1	1	119AL, MAIN EQUIP CTR, E2-5	23-42-01

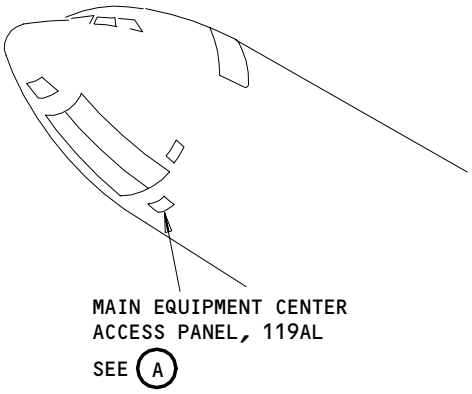
* SEE THE WDM EQUIPMENT LIST

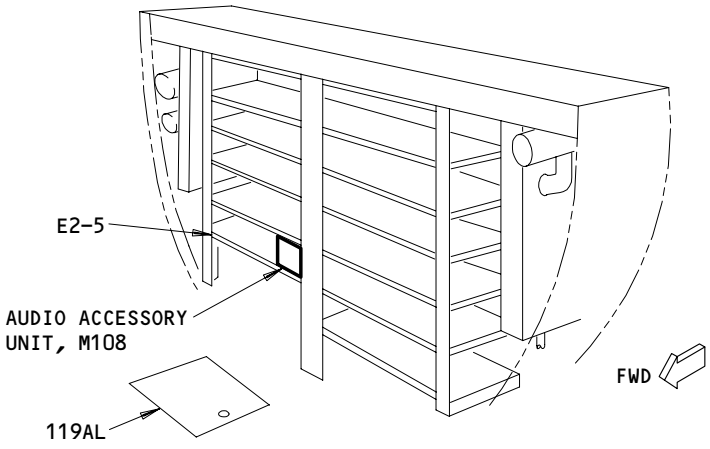
1 SAS 150-999

2 SAS 050-149,162-999

3 FOR THE QUANTITY, LOCATION, AND EQUIPMENT NUMBERS, REFER TO THE WDM 23-42-11.

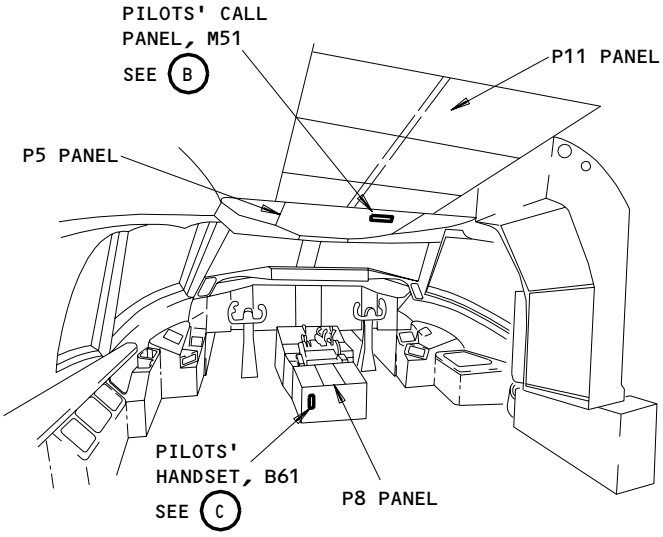
Cabin Interphone System - Component Index
Figure 101



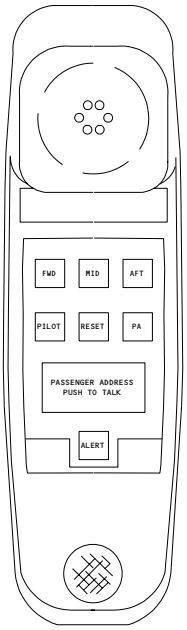


MAIN EQUIPMENT CENTER
A

Cabin Interphone System - Component Location
Figure 102 (Sheet 1)

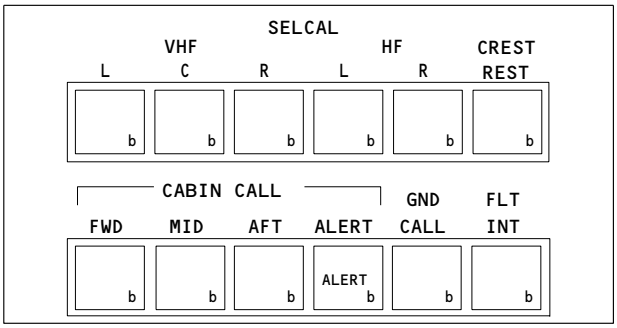


FLIGHT COMPARTMENT



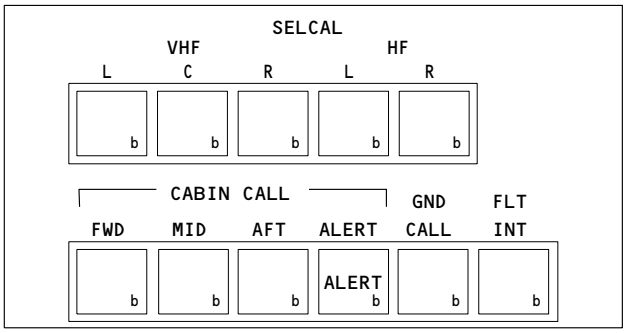
HANDSET, B61
(EXAMPLE)

C



PILOTS' CALL PANEL, M51

B 1



PILOTS' CALL PANEL, M51

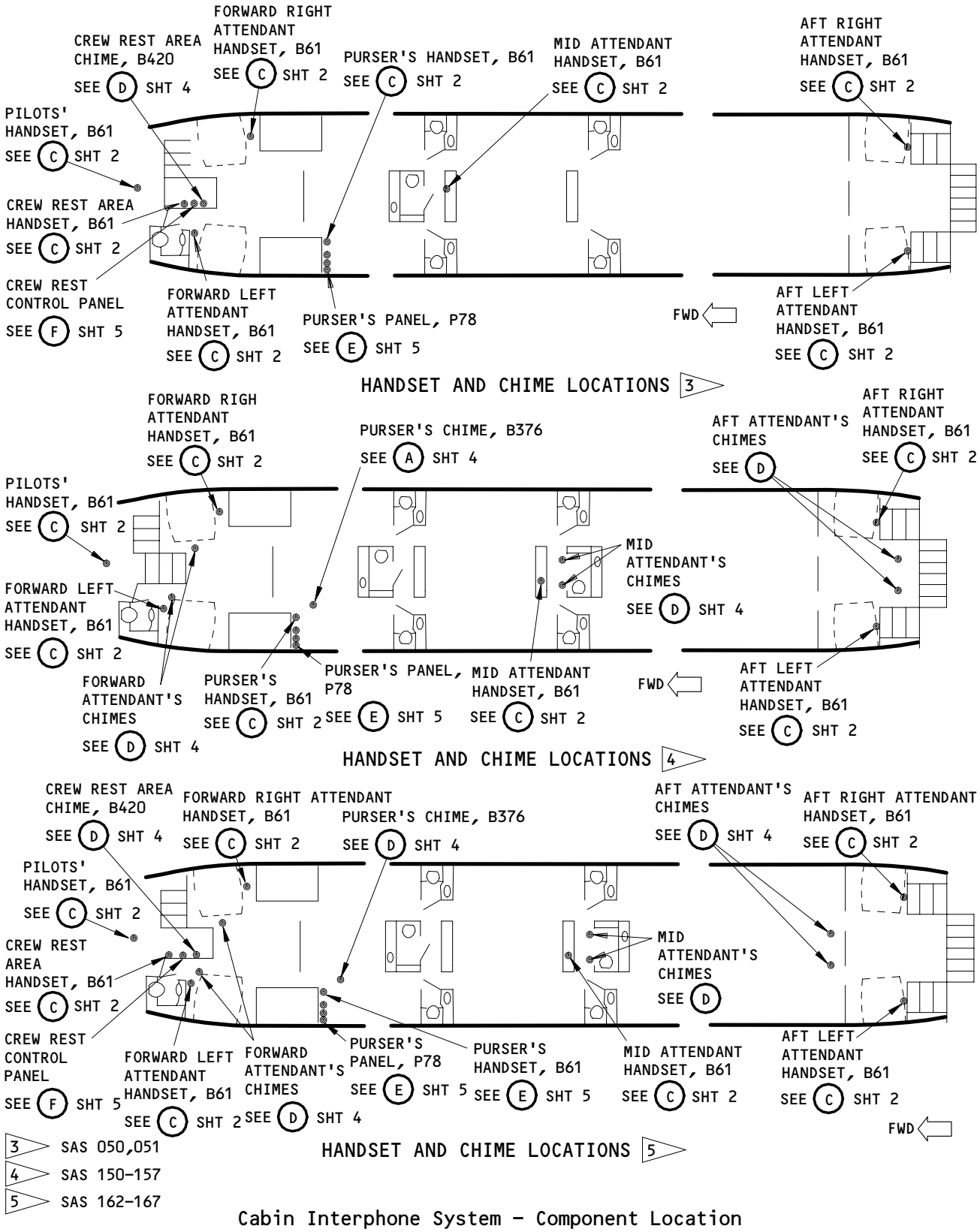
B 2

1 SAS 050-149,162-999

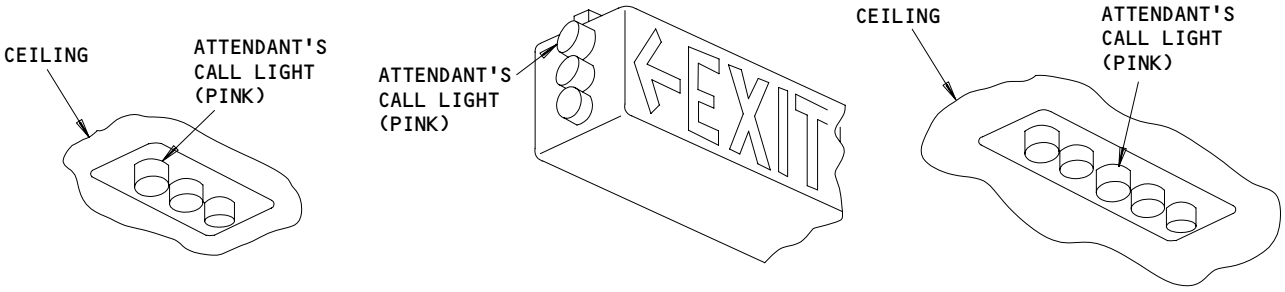
2 SAS 150-161

Cabin Interphone System - Component Location
Figure 102 (Sheet 2)

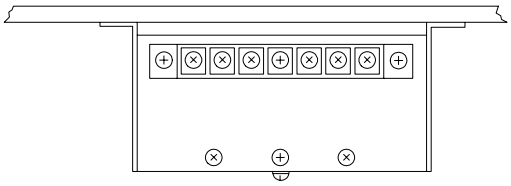
586684



Cabin Interphone System - Component Location
Figure 102 (Sheet 3)



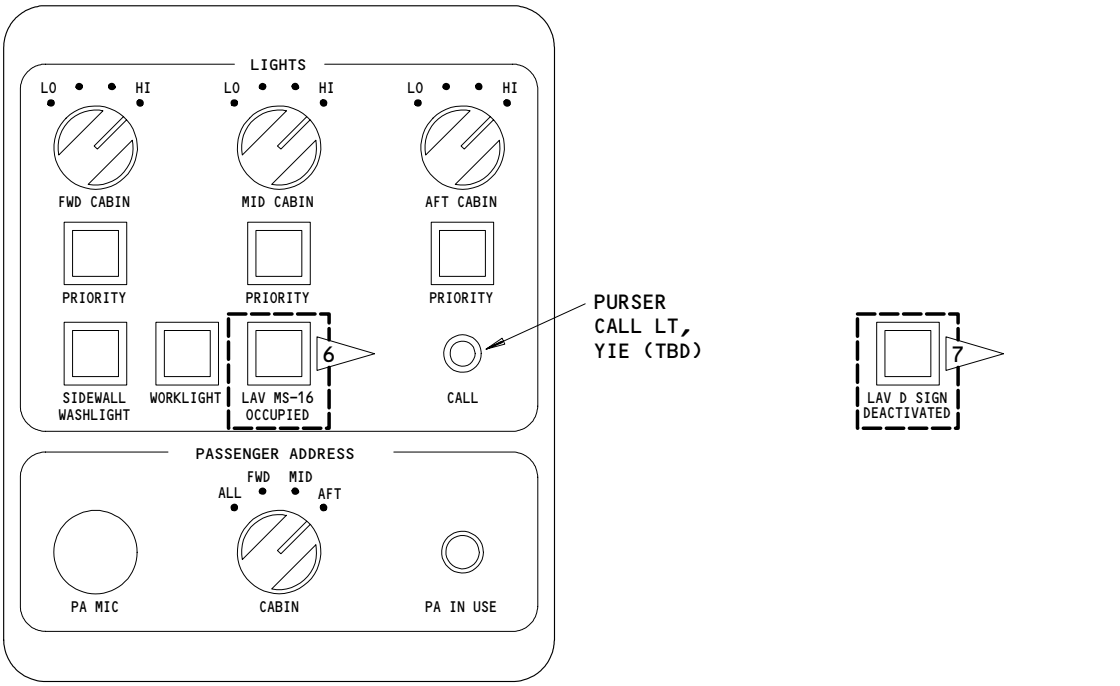
ATTENDANT'S CALL LIGHT
(EXAMPLE)



ELECTRONIC CHIME
(EXAMPLE)

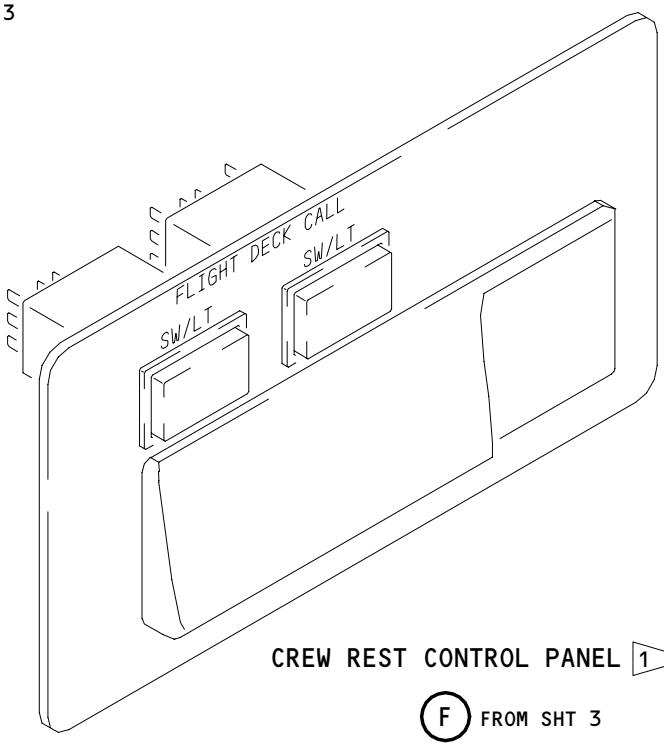
D FROM SHT 3

Cabin Interphone System - Component Location
Figure 102 (Sheet 4)



PURSER'S PANEL, P78 (REF)

(E) FROM SHT 3



CREW REST CONTROL PANEL 1

(F) FROM SHT 3

6 SAS 050-051, 150-155, 162-165

7 SAS 052-149, 156-161, 166-999

Cabin Interphone System - Component Location
Figure 102 (Sheet 5)

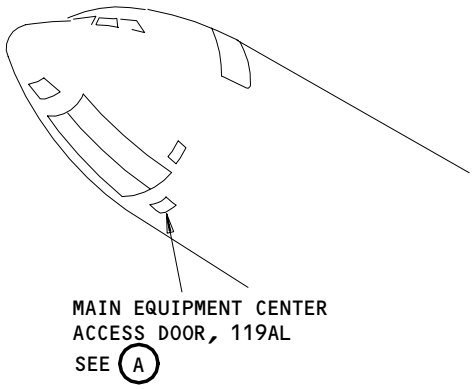
CABIN INTERPHONE SYSTEM

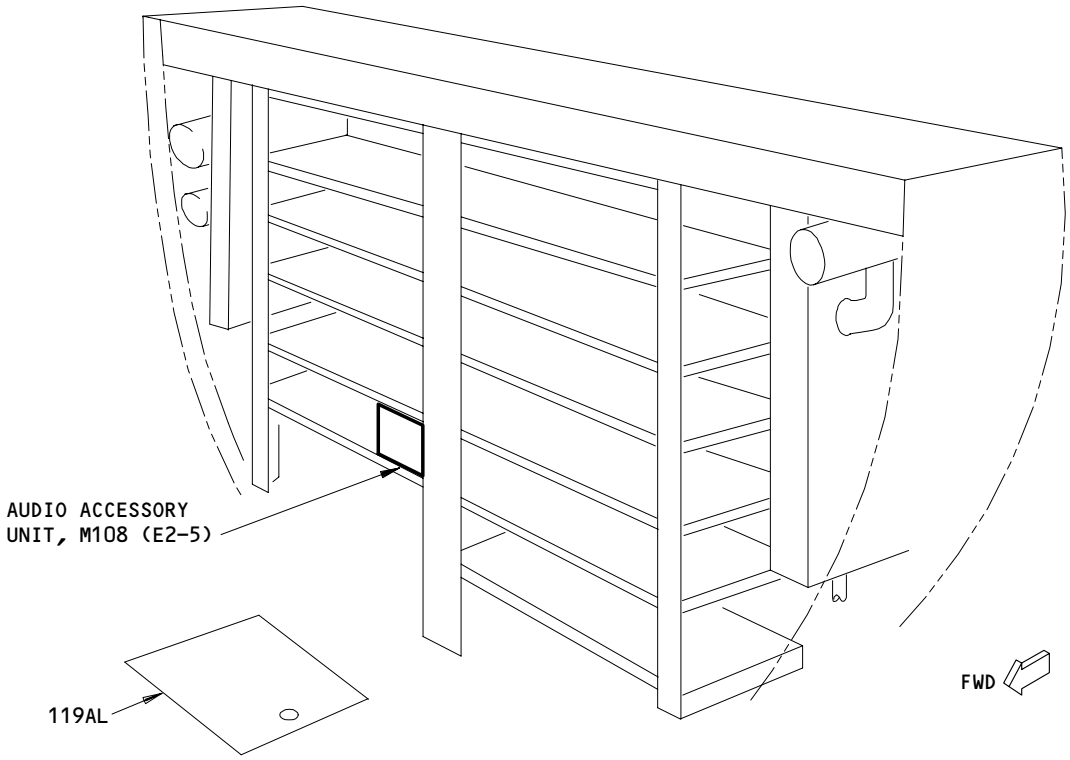
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
AMPLIFIER - (FIM 23-31-00/101)				
PASSENGER ADDRESS, M177				
CHIME - AFT L ATTENDANT, B148	3	1	PASS. CABIN	23-42-04
CHIME - AFT R ATTENDANT, B147	3	1	PASS. CABIN	23-42-04
CHIME - FWD L ATTENDANT, B144	3	1	PASS. CABIN	23-42-04
CHIME - FWD R ATTENDANT, B139	3	1	PASS. CABIN	23-42-04
CHIME - MID L ATTENDANT, B146	3	1	PASS. CABIN	23-42-04
CHIME - MID R ATTENDANT, B145	3	1	PASS. CABIN	23-42-04
CIRCUIT BREAKER -	2		FLT COMPT, P11	
INTERPHONE CABIN/SERVICE, C551		1	11C23	*
HANDSET - ATTENDANT, B61	3	5	PASS. CABIN	*
HANDSET - PILOTS', B61	2	1	FLT COMPT, P8	*
LIGHT -ATTENDANT CALL	3	1	PASS. CABIN	*
MODULE - (FIM 31-51-00/101)				
BELL CHIME AURAL WARNING, M1000				
PANEL - PILOTS' CALL, M51	2	1	FLT COMPT, P5	23-42-02
UNIT - AUDIO ACCESSORY, M108	1	1	119AL, MAIN EQUIP CTR, E2-5	23-42-01

* SEE THE WDM EQUIPMENT LIST

1 FOR THE QUANTITY LOCATION, AND EQUIPMENT NUMBERS, REFER TO THE WDM 23-42-11.

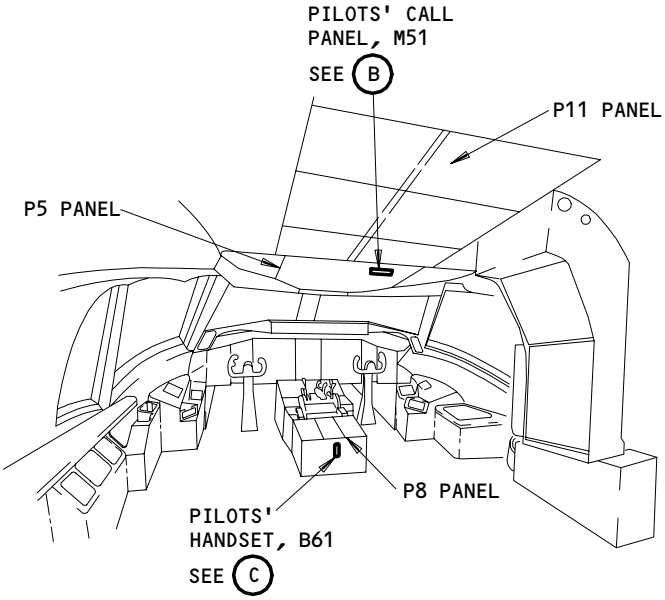
Cabin Interphone System - Component Index
Figure 101



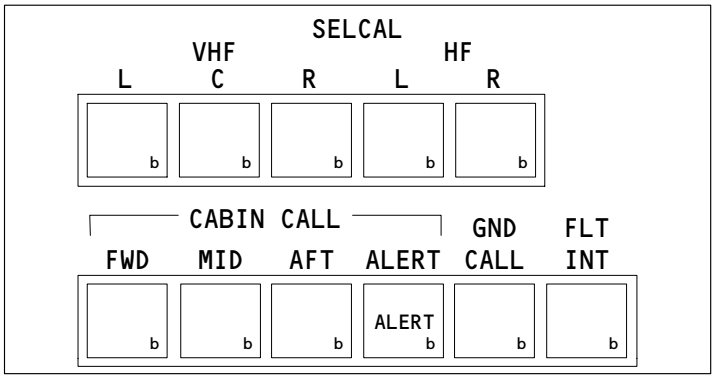


MAIN EQUIPMENT CENTER
(A)

Cabin Interphone System - Component Location
Figure 102 (Sheet 1)

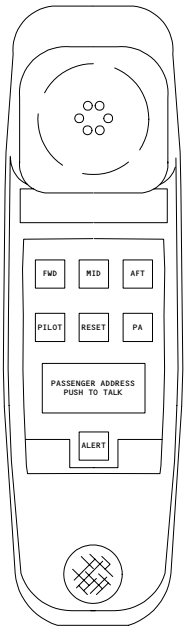


FLIGHT COMPARTMENT



PILOTS' CALL PANEL, M51

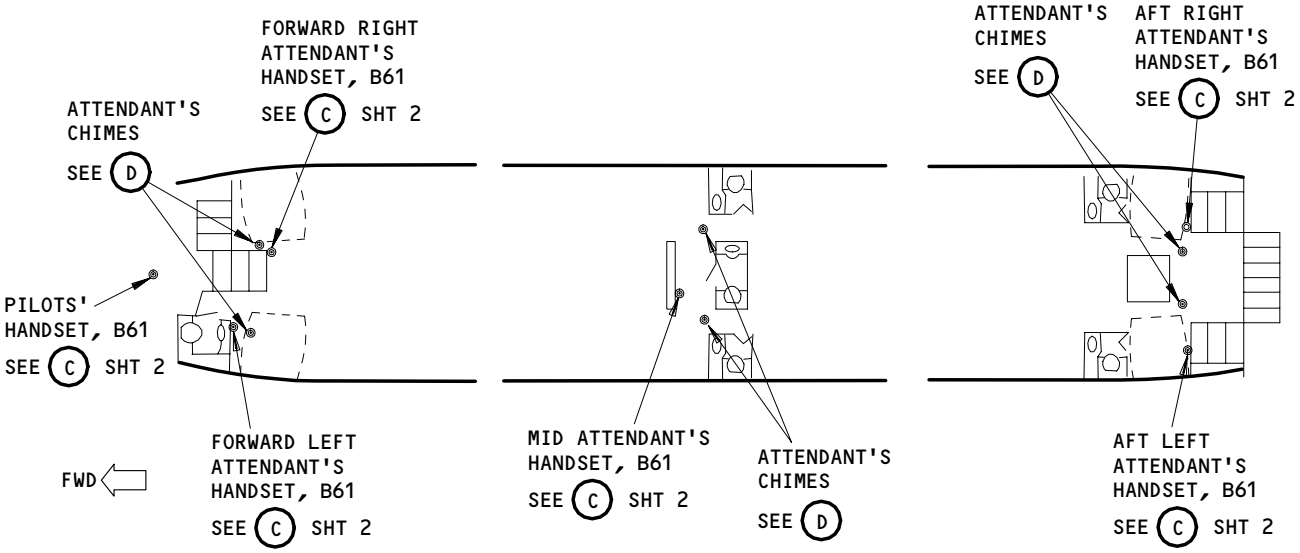
B



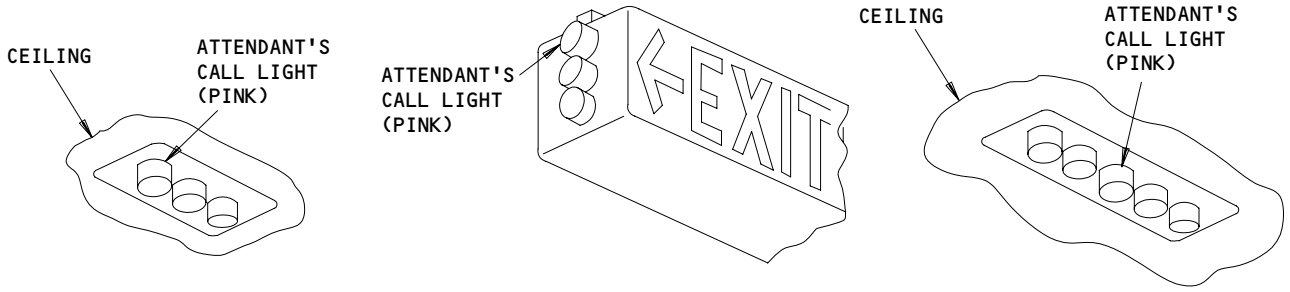
HANDSET, B61 (EXAMPLE)

C

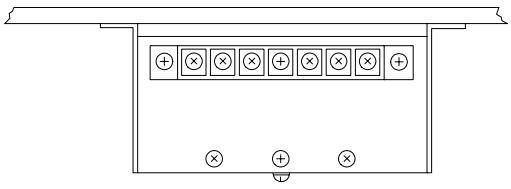
Cabin Interphone System - Component Location
Figure 102 (Sheet 2)



HANDSET AND CHIME LOCATIONS



ATTENDANT'S CALL LIGHT (EXAMPLE)



ELECTRONIC CHIME B139, B144-148

D

Cabin Interphone System - Component Location
Figure 102 (Sheet 3)

CABIN INTERPHONE - ADJUSTMENT/TEST

TASK 23-42-00-735-001

1. System Test - Cabin Interphone System

A. General

(1) This procedure contains a task that gives the system test of the cabin interphone system.

(2) 767-200 AIRPLANES;
The hi-lo attendant's call chime is supplied by the electronic chime modules installed adjacent to the attendant's stations.

B. References

(1) AMM 24-22-00/201, Electrical Power - Control

C. Access

(1) Location Zones
200 Upper Half of Fuselage (except section 48)

D. Prepare for System Operational Test

S 865-003

(1) Supply electrical power (AMM 24-22-00/201).
Make sure the Engine Indication and Crew Alerting System (AMM 31-41-00/501) is operable.

S 865-004

(2) Make sure that these circuit breakers on the overhead panel, P11, are closed:
(a) 11B16, AURAL WARN SPKR L
(b) 11B18, WARN ELEX B
(c) 11C22, PASS ADRS
(d) 11C23, INTERPHONE CABIN/SERVICE
(e) 11H35, AURAL WARN SPKR R
(f) 11J34, WARN ELEX A

S 865-124

(3) Make sure all handsets are on the hook.

E. Cabin Interphone System Operational Test.

S 715-006

(1) Pilots' Call Panel Test
(a) On the pilots' call panel M51, push the FWD call switch.

(b) Make sure you hear the chime in the forward attendant area.
(c) ALL SAS AIRPLANES;
Make sure that both forward attendant and purser call lights come on.
(d) ALL MTH AIRPLANES;
Make sure that both forward attendant call lights come on.
(e) ALL SAS AIRPLANES;
Do the steps that follow:
1) Lift the forward left attendant handset off hook.
2) Make sure that both forward attendant and purser call lights go off.
3) Put the handset back on hook.
(f) ALL MTH AIRPLANES;
Do the steps that follow:
1) Lift the forward left attendant handset off hook.
2) Make sure that both attendant call lights go off.
3) Put the handset back on hook.
(g) ALL SAS AIRPLANES;
Do the steps that follow:
1) Push the FWD call switch on pilots' call panel(M51).
2) Make sure that both the forward attendant and purser call chimes are heard and both the forward attendant and purser call lights come on.
(h) ALL MTH AIRPLANES;
Do the steps that follow:
1) Push the FWD call switch on the pilots' call panel(M51).
2) Make sure that the attendant call chime is heard and the forward attendant call lights come on.
(i) SAS 150-999;
Do the steps that follow:
1) Lift the forward right attendant handset off hook.
2) Make sure that both forward attendant and purser call lights go off.
3) Put the handset back on hook.
(j) MTH 275-999;
Do the steps that follow:
1) Lift the forward right attendant handset off hook.
2) Make sure that all the forward attendant call lights go off.
3) Put the handset back on hook.
(k) SAS 150-999;
Do the steps that follow:
1) Push the FWD call switch on the pilots' call panel(M51).
2) Make sure that both the forward attendants and purser call chimes are heard and both the forward attendants and purser call lights come on.
(l) SAS 150-999;
Do the steps that follow:
1) Lift the pursers' handset off hook.
2) Make sure that both attendants and purser call lights go off.

3) Put the handset back on hook.

(m) Push the MID call switch on the pilots' call panel.

(n) Make sure you hear the chime at each mid attendant station.

(o) ALL SAS AIRPLANES;
Make sure that both mid attendant call lights are on.

(p) ALL MTH AIRPLANES;
Make sure that call lights at mid attendant's station are on.

(q) ALL SAS AIRPLANES;
Do the steps that follow:
1) Lift the mid attendant handset off hook.
2) Make sure that both mid attendant call lights go off.
3) Put the handset back on hook.

(r) ALL MTH AIRPLANES;
Do the steps that follow:
1) Lift the mid attendant handset off hook.
2) Make sure that the attendant's call lights go off.
3) Put the handset back on hook.

(s) Push the AFT call switch on the pilots' call panel.

(t) Make sure you hear a Hi-Lo chime at each aft attendant station.

(u) Make sure that the call lights at the aft attendant stations are on.

(v) Lift the aft left attendant handset off the hook.

(w) Make sure that the attendant call lights go off.

(x) Put the handset back on the hook.

(y) Push the AFT call switch on the pilots' call panel.

(z) Make sure you hear the chime and see the call light come on at each attendant station.

(aa) Lift the aft right attendant handset off the hook.

(ab) Make sure that the attendant call lights go off.

(ac) Put the handset back on the hook.

(ad) Push the ALERT call switch on the pilots' call panel.

(ae) Make sure you hear the chime three times in the mid attendant area.

(af) ALL SAS AIRPLANES;
Make sure that the forward, mid, and aft attendant's and purser's call lights at each station come on and go off continuosly.

(ag) ALL MTH AIRPLANES;
Make sure that the forward, mid, and aft attendant's call lights at each attendant station come on and go off continuously.

(ah) Lift the pilots' handset off the hook.

(ai) Put the pilots' handset back on the hook.

(aj) Make sure the call light at each station goes off.

S 715-007

(2) Pilots' Handset Test

(a) ALL SAS AIRPLANES;
Do the steps that follow:
1) Lift the pilots' handset off hook.

2) Push the FWD button on the handset
3) Make sure you hear a Hi-Lo chime at both forward attendant and purser stations.

(b) ALL MTH AIRPLANES;
Do the steps that follow:
1) Lift the pilots' handset off hook.
2) Push the FWD button on the handset.

(c) ALL SAS AIRPLANES;
Make sure that the call lights at both forward attendant and purser positions are on.

(d) ALL MTH AIRPLANES;
Make sure that the call lights at the forward attendant stations are on.

(e) ALL SAS AIRPLANES;
Do the steps that follow:
1) Push the RESET button on the pilots' handset.
2) Make that both forward attendant and purser call lights go off.

(f) ALL MTH AIRPLANES;
Do the steps that follow:
1) Push the RESET button on the pilots' handset.
2) Make sure that the forward attendant call lights go off.

(g) Push the MID button on the pilots' handset.
(h) Make sure you hear a Hi-Lo chime at the mid attendant stations.
(i) Make sure the call light comes on at each of the mid attendant stations.
(j) Push the RESET button on the pilots' handset.
(k) Make sure the light goes off at each mid attendant station.
(l) Push the AFT button on the pilots' handset.
(m) Make sure you hear the chime in the aft attendant area.
(n) Make sure that the call light comes on at each aft attendant station.
(o) Push the RESET button on the pilots' handset.
(p) Make sure the call light at each attendant station goes off.
(q) Push the PA button on pilots' handset.
(r) Push and hold down the PTT placard.
(s) Speak into the pilots' handset.
(t) Make sure you hear clear voice through the PA speakers.
(u) Release the PTT placard, and push the RESET button.
(v) ALL SAS AIRPLANES;
Do the steps that follow:
1) Push the ALERT button on the pilots' handset.

2) Make sure that all the forward, mid, aft attendant and purser call lights come on and go off continuously.

(w) ALL MTH AIRPLANES;
Do the steps that follow:
1) Push the ALERT button on the pilots' handset.
2) Make sure that all the forward, mid, and aft attendant call lights come on and go off continuously.

(x) ALL SAS AIRPLANES;
Do the steps that follow:
1) Put the pilots' handset back on hook.
2) Make sure that all attendant and purser call lights go off.

(y) ALL MTH AIRPLANES;
Do the steps that follow:
1) Put the pilots' handset back on hook.
2) Make sure that all attendant call lights go off.

S 715-008

(3) Attendant Handset Test
(a) At the forward attendants' station, push the MID button on the attendant handset.
(b) Make sure you hear a Hi-Lo chime at the mid attendant station.
(c) Make sure the call light comes on at the mid attendant station.
(d) Make a voice communication between the forward and the mid attendant stations.
(e) Make sure you hear a clear voice through both handsets.
(f) Push the RESET button on the forward attendant handset.
(g) Push the AFT button on the forward attendant handset.
(h) Make sure you hear a Hi-Lo chime at the aft attendant stations.
(i) Make sure the call light comes on at each aft station.
(j) Make a voice communication between the forward and the aft attendant stations.
(k) Make sure you hear a clear voice through both handsets.
(l) Push the RESET button on the forward attendant handset.
(m) Push the FWD button on the forward attendant handset.
(n) Make sure that the system does not operate.
(o) Do the steps above again to test the mid and the aft attendant's handsets.
(p) At either forward attendant's station, lift handset off hook.
(q) Push the PA button on the forward attendant handset.
(r) Push and hold down the PTT placard and speak into the handset.
(s) Make sure you hear a clear audio through the PA speakers.
(t) Put the forward handset back to its' holder.
(u) At the mid attendant station, take the handset off the hook.
(v) Push the PA button on the mid attendant handset.

(w) Push and hold down the PTT placard, and speak into the mid attendant handset.
(x) Make sure you hear a clear voice through the PA speakers.
(y) Put the handset back on the hook.
(z) At an aft attendant station, take the handset off the hook.
(aa) Push the PA button on the aft attendant handset.
(ab) Push and hold down the PTT placard on the aft attendant handset.
(ac) Speak into the handset.
(ad) Make sure you hear a clear audio through the PA speakers.
(ae) Put the handset back on the hook.

S 715-009

(4) Attendant Handset and Pilots' Call Panel Interface Test
(a) At the forward attendant station, push the PILOT button on the attendant handset.
(b) Make sure you hear a Hi chime in the flight compartment.
(c) Make sure that the FWD call light on the pilots' call panel comes on.

(d) Push the RESET button on the forward attendant handset.
(e) Make sure that the FWD call light on the pilots' call panel goes off.
(f) At the forward attendant station, push the ALERT button on the attendant handset.
(g) Make sure you hear three chimes at the attendant stations.

(h) Make sure that all attendant call lights come on and go off continuously (except for the station that makes the call).

NOTE: All forward attendant call lights will stay off for ALERT calls made from one of the forward handsets.

(i) Make sure that the ALERT light on the pilots' call panel is on.
(j) Put the forward attendant handset on hook.
(k) Make sure that the pilot ALERT light is off.
(l) Make sure that the attendant call lights go off.
(m) At the mid attendant station, push the PILOT button on the attendant handset.
(n) Make sure you hear a hi chime in the flight compartment.
(o) Make sure that the MID call light on the pilots' call panel comes on.
(p) Push the RESET button on the mid handset.
(q) Make sure that the MID call light on the pilots' call panel goes off.

(r) At the mid attendant station, push the ALERT button on the attendant handset.
(s) Make sure you hear three chimes in the attendant areas.

(t) Make sure that all attendant call lights come on and go off continuously (except for station that makes the call).
(u) Make sure the ALERT light on the pilots' call panel comes on.
(v) Put the mid attendant handset back on the hook.
(w) Make sure that the pilots' ALERT light is off.
(x) Make sure that the attendant call lights go off.
(y) At the aft attendant's station, push the PILOT button on the attendant handset.
(z) Make sure you hear a Hi chime in the flight compartment.
(aa) Make sure that the AFT call light on the pilots' call panel comes on.

(ab) Push the RESET button on the aft handset.
(ac) Make sure that the AFT call light on the pilots' call panel goes off.
(ad) At the aft attendant station, push the ALERT button on the attendant handset.
(ae) Make sure you hear three chimes in the attendant areas.

(af) Make sure that all attendant call lights come on and go off continuously (except for the station that makes the call).

NOTE: All aft attendant call lights will stay off for an ALERT call made from one of the aft attendant handsets.

(ag) Make sure the ALERT light on the pilots' call panel comes on.

(ah) Put the aft handset back on the hook.
(ai) Make sure that the pilots' ALERT light goes off.
(aj) Make sure that the attendant call lights go off.

S 715-010

(5) Pilots' Call Panel Call Lamp Reset Test
(a) At the forward attendant station, push the PILOT button on the attendant handset.
(b) With the handset off the hook, make sure the FWD call light on the pilots' call panel goes off when pushed.

(c) At the forward attendants station, push the ALERT button on the attendant handset.
(d) With the handset off the hook, make sure the ALERT light on the pilots' call panel goes off when pushed.
(e) Put the handset back on the hook.
(f) At the mid attendant station, push the PILOT button on the attendant handset.
(g) With the handset off the hook, make sure the MID call light on the pilots' call panel goes off when pushed.
(h) Put the handset back on the hook.
(i) At the aft attendant station, push the PILOT button on the attendant handset.
(j) With the handset off the hook, make sure the AFT call light on the pilots' call panel goes off when pushed.
(k) Put the handset back on the hook.

S 715-011

(6) Voice Quality Test
(a) Push the FLT INT switch on the pilots' call panel.
(b) At each audio selector panel, push the INT MIC SELECTOR switch.
(c) Set the volume control to the usual level.
(d) From each attendant station, push the PILOT call switch to speak with the pilots' station.
(e) In the flight compartment, use a boom headset, and the PTT switch on each audio selector panel, to speak with the attendant station.
(f) Make sure you hear a clear voice between each audio selector panel and each attendant handset.

S 865-012

(7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

AUDIO ACCESSORY UNIT - REMOVAL/INSTALLATION

1. General
   A. The audio accessory unit M108 is installed on shelf 5 of the main equipment center rack E2 (E2-5).
   B. This procedure contains two tasks. The first task removes the audio accessory unit from the main equipment center. The second task installs the audio accessory unit in the main equipment center.

TASK 23-42-01-004-001

2. Remove the Audio Accessory Unit
   A. General
      (1) This task removes the audio accessory unit from shelf 5 of the E2 rack in the main equipment center.
   B. References
      (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
      (2) AMM 20-10-01/401, E/E Rack-Mounted Components

   C. Access
      (1) Location Zones
          119/120 Main Equipment Center
          211/212 Flight Compartment

      (2) Access Panel
          119AL Main Equipment Center

   D. Remove the Audio Accessory Unit

      S 864-003
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11C22, PASS ADRS
          (b) 11C23, INTERPHONE CABIN/SERVICE
          (c) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
          (d) 11C26, INTERPHONE DUAL PWR F/O
          (e) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
          (f) 11G30, INTERPHONE DUAL PWR F/O

S 014-021
(2) Open the access panel, 119AL, for the audio accessory unit (Ref 06-41-00/201).

S 024-008
(3) Remove the audio accessory unit (Ref 20-10-01/401).

TASK 23-42-01-404-009

3. Install the Audio Accessory Unit

A. General

(1) This task installs the audio accessory unit on shelf 5 of the E2 rack in the main equipment center.

B. References

(1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
(2) AMM 20-10-01/401, E/E Rack-Mounted Components
(3) AMM 24-22-00/201, Electrical Power - Control

C. Access

(1) Location Zones

119/120	Main Equipment Center
211/212	Flight Compartment

(2) Access Panel

119AL	Main Equipment Center

D. Install the Audio Accessory Unit

S 424-010
(1) Install the audio accessory unit (AMM 20-10-01/401).

S 864-030
(2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11C22, PASS ADRS
(b) 11C23, INTERPHONE CABIN/SERVICE
(c) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
(d) 11C26, INTERPHONE DUAL PWR F/O
(e) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
(f) 11G30, INTERPHONE DUAL PWR F/O

E. Do a Test of the Audio Accessory Unit

S 864-018
(1) Supply electrical power (AMM 24-22-00/201).

S 714-020
(2) Do a test of the audio accessory unit as follows:
(a) Momentarily push the PILOT switch on the handset installed at the forward left attendant station.
(b) Make sure that the FWD switch-light on the pilots' call panel comes on.

(c) Push the FWD switch-light.
(d) Make sure that the light in the switch goes off.

F. Put the Airplane Back to Its Initial Condition

S 414-022
(1) Close the access panel, 119AL (AMM 06-41-00/201).

S 864-019
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

PILOTS' CALL PANEL - REMOVAL/INSTALLATION

1. General
   A. The pilots' call panel (M51) is installed on the pilots' overhead panel (P5).
   B. This procedure contains two tasks. The first task removes the pilots' call panel from the overhead panel. The second task installs the pilots' call panel to the overhead panel.

TASK 23-42-02-004-001

2. Remove the Pilots' Call Panel
   A. General
      (1) This task removes the pilots' call panel from the overhead panel in the flight compartment.
   B. Access
      (1) Location Zone
          211/212 Flight Compartment

   C. Remove the Pilots' Call Panel

      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11C23, INTERPHONE CABIN/SERVICE
          (b) 11H32, GND CALL
          (c) 11R3, LEFT IND LIGHTS 3

      S 024-003
      (2) Remove the pilots' call panel (PCP).
          (a) Remove the four screws on the front of the PCP.
          (b) Remove the PCP from the control stand..
          (c) Disconnect the connector from the PCP.

TASK 23-42-02-404-004

3. Install the Pilots' Call Panel
   A. General
      (1) This task installs the pilots' call panel to the overhead panel in the flight compartment.
   B. References
      (1) 24-22-00/201, Electrical Power - Control

C. Access
(1) Location Zone
211/212 Flight Compartment

D. Install the Pilots' Call Panel

S 424-005
(1) Install the pilots' call panel (PCP).
(a) Connect the connector to the PCP.
(b) Put the PCP in the correct position on the control stand.
(c) Install the four screws which attach the PCP to the control stand.

S 864-008
(2) Supply electrical power (Ref 24-22-00/201).

S 864-006
(3) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11C23, INTERPHONE CABIN/SERVICE
(b) 11H32, GND CALL
(c) 11R3, LEFT IND LIGHTS 3

S 714-007
(4) Do a test of the pilots' call panel as follows:
(a) Momentarily push the PILOT switch on the handset installed at the forward left attendant station.
1) Make sure that the FWD switch-light on the pilots' call panel comes on.
(b) Push the FWD switch.
1) Make sure that the light in the switch goes off.

S 864-009
(5) Remove electrical power if it is not necessary (Ref 24-22-00/201).

CABIN INTERPHONE HANDSET ON-HOOK MAGNET - APPROVED REPAIRS

1. General
   A. A magnet on the rear side of the attendant handset cradle does the handset on-hook function. If the magnet disengages from the cradle, the repair procedure that follows must be completed.

TASK 23-42-03-308-001

2. Repair the Handset On-Hook Magnet (Fig. 801)
   A. Consumable Materials
      (1) A00138 Compound - Sealing BMS 5-19 Class B-1/2
      (2) B00130 Solvent Spec. TT-I-735 Isopropyl Alcohol
      (3) G02167 Fine-grade sand paper
      (4) G00507 Clean cloth
   B. Reference
      (1) 24-22-00/201, Electrical Power - Control
   C. Access
      (1) Location Zones
          200 Passenger Cabin
          211/212 Flight Compartment

   D. Repair the Handset On-Hook Magnet

      S 868-003
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
          (a) 11C23, INTERPHONE CABIN/SERVICE

      S 308-002
      (2) Do these steps to repair the magnet:
          (a) Get access to the rear of the handset cradle.
          (b) Make sure that the magnet is loose or that it fell from the recess on the rear of the cradle.
          (c) Remove the used selant from the magnet and from the recess at the rear of the cradle.
          (d) Lightly sand the two surfaces.
          (e) Clean the two surfaces with a clean cloth made moist with isopropyl alcohol.

              NOTE: Do not touch the two surfaces with your bare hands. You must prepare the surfaces correctly for a good bond.

          (f) Make sure that there is a red dot on the north-seeking end of the magnet.
          (g) Make sure that the magnet will install correctly in the center of the recess.
          (h) Apply a thin layer of the selant on the two surfaces.
          (i) Install the magnet in the recess with the red dot at the correct end.

(j) Apply more selant around the magnet.
(k) Put pressure on the magnet during the cure for a continuous line of the selant on the surfaces.

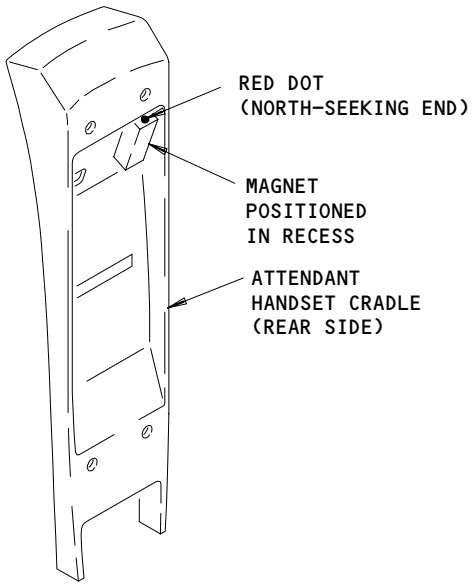
NOTE: Assemble immediately after the selant is applied to the surfaces. Selants shown as BMS 5-19 Class B-1/2 have a work-life of less than two hours. The selant will set sufficiently in four hours if heat is used to put the bond line temperature at approximately 120 degrees F (but not to exceed 140 degrees F).

E. Do a Test of the Handset On-Hook Magnet

S 868-004
(1) Supply electrical power (Ref 24-22-00/201).

S 868-005
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11C23, INTERPHONE CABIN/SERVICE

S 868-006
(3) Make sure that these circuit breakers on the P11 panel are closed:
(a) 11B16, AURAL WARN SPKR L
(b) 11B18, WARN ELEX B



Cabin Interphone Handset On-Hook Magnet - Location
Figure 801

(c) 11C22, PASS ADRS
(d) 11H35, AURAL WARN SPKR R
(e) 11J34, WARN ELEX A

S 868-007
(4) Make sure that the handset is in the cradle.

S 718-008
(5) Do the test that follows:
(a) Make a call to the attendant station from a different handset.
(b) Make sure that the call light and the chime come on.
(c) Remove the handset from the cradle.
(d) Make sure that the call light goes off.
(e) Put the handset in the cradle.

S 868-009
(6) Remove electrical power if it is not necessary (Ref 24-22-00/201).

ELECTRONIC CHIME - REMOVAL/INSTALLATION

1. General
   A. Electronic chimes for the attendant areas are installed in the cabin ceiling and non-acoustical panels.
   B. This procedure contains two tasks. The first task removes the electronic chimes from the passenger cabin ceiling. The second task installs the electronic chimes to the cabin ceiling.

TASK 23-42-04-004-001

2. Electronic Chime Removal

   A. General
      (1) This task gives the instructions to remove the electronic chime.
   B. References
      (1) AMM 24-22-00/201, Electrical Power - Control
      (2) AMM 25-22-02/401, Lowered Ceiling Panels
   C. Access
      (1) Location Zones

221/222	Passenger Cabin - Sect 41
231/232	Passenger Cabin - Sect 43
241/242	Passenger Cabin - Sect 45
251/252	Passenger Cabin - Sect 46

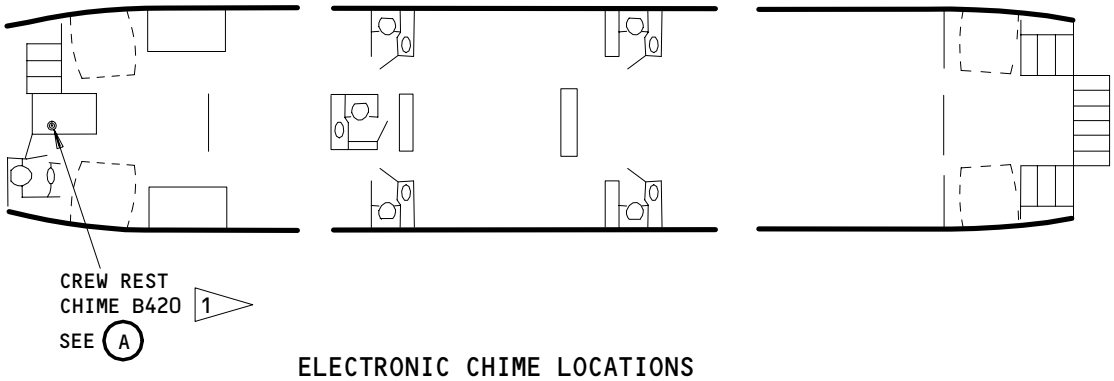
   D. Remove Electronic Chime

      S 864-002
      (1) Open this circuit breaker on the overhead panel, P11, and attach DO-NOT-CLOSE tag:
         (a) 11C23, INTERPHONE CABIN/SERVICE

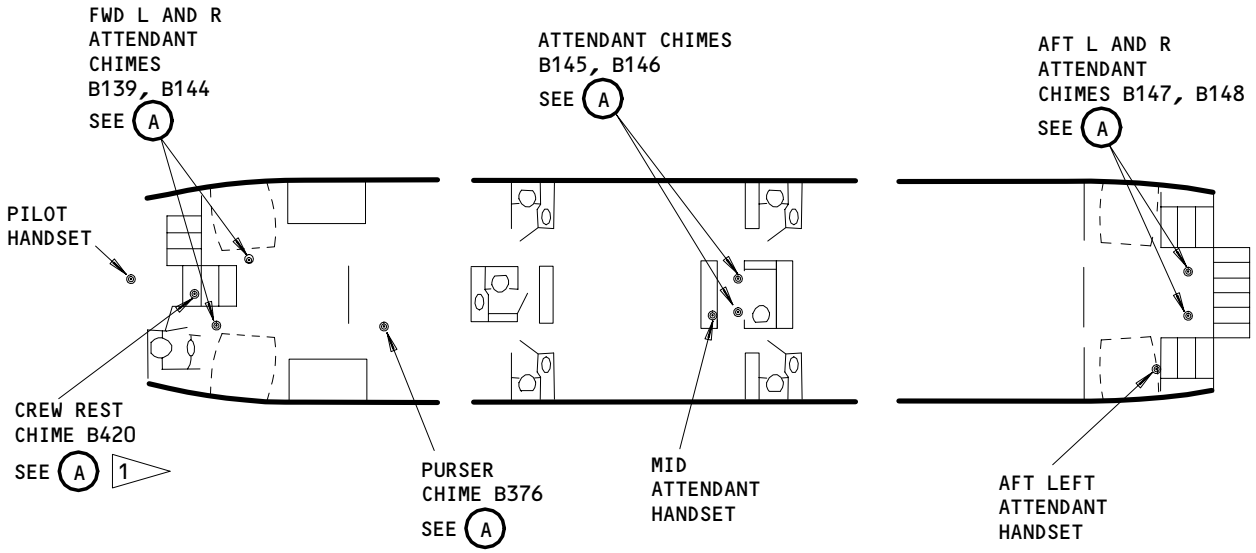
      S 944-003
      (2) Find the electronic chime to be removed and lower the ceiling panel (AMM 25-22-02/401).

      S 944-004
      (3) Disconnect four wires from the terminals on the electronic chime.
         (a) Make a note of the location and color of the wires for polarity during installation.

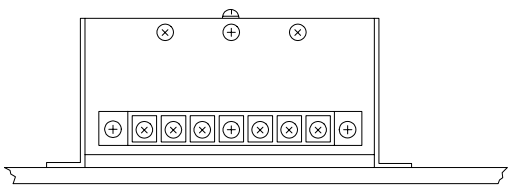
      S 024-010
      (4) Remove four screws and washers to remove the electronic chime.



ELECTRONIC CHIME LOCATIONS
767-200 AIRPLANES



ELECTRONIC CHIME LOCATIONS
767-300 AIRPLANES

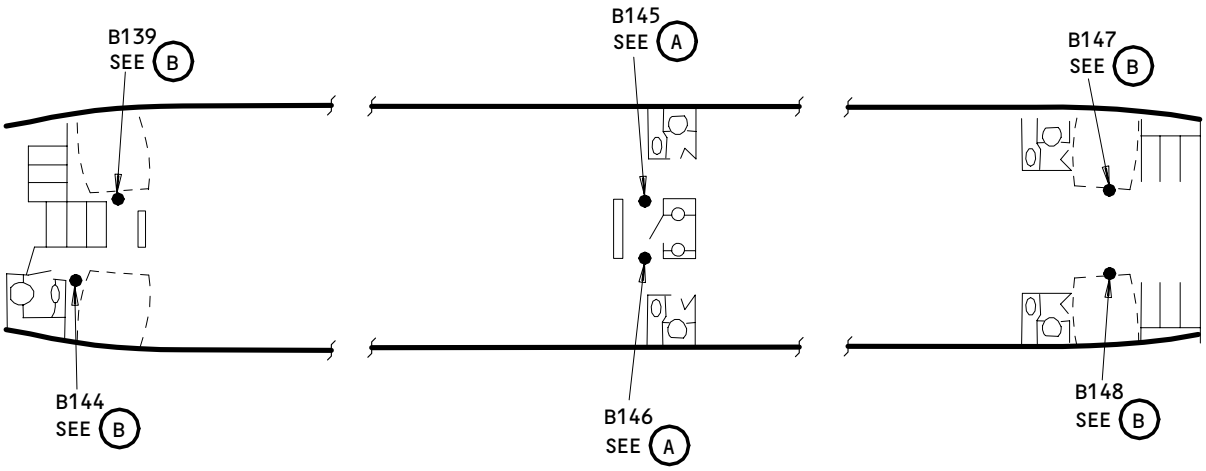


ELECTRONIC CHIME (EXAMPLE)

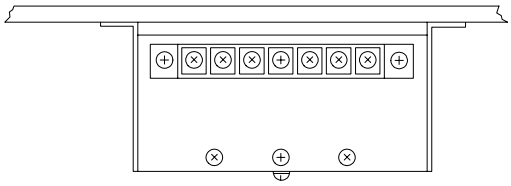
A

1 SAS 050,051,162-999

Electronic Chime Installation
Figure 401 (Sheet 1)



ELECTRONIC CHIME LOCATIONS



ELECTRONIC CHIME (EXAMPLE)

B

Electronic Chime Installation
Figure 401 (Sheet 2)

666283

TASK 23-42-04-404-011

3. Electronic Chime Installation

A. General

(1) This task gives the instructions to install the electronic chime.

B. References

(1) AMM 24-22-00/201, Electrical Power Control

(2) AMM 25-22-02/401, Lowered Ceiling Panels

C. Access

(1) Location Zones

221/222	Passenger Cabin - Sect 41
231/232	Passenger Cabin - Sect 43
241/242	Passenger Cabin - Sect 45
251/252	Passenger Cabin - Sect 46

D. Install Electronic Chime

S 424-012

(1) Install the electronic chime with four screws and washers to the ceiling panel assembly.

S 944-013

(2) Connect the wires to the electronic chime terminals.

(a) Make sure of the polarity as in the removal procedure.

S 944-014

(3) Install the ceiling panel (AMM 25-22-02/401).

S 864-006

(4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

(a) 11C23, INTERPHONE CABIN/SERVICE

S 864-008

(5) Supply electrical power (AMM 24-22-00/201).

S 714-015

(6) Do a test of the Electronic Chime.

(a) At any attendant station except for the station where the electronic chime was replaced, lift the attendant handset.

(b) Push the station (FWD, MID, AFT) where the electronic chime was replaced.

(c) Make sure that a Hi/Lo chime by the electronic chime is heard.

(d) Put the handset back on the hook.

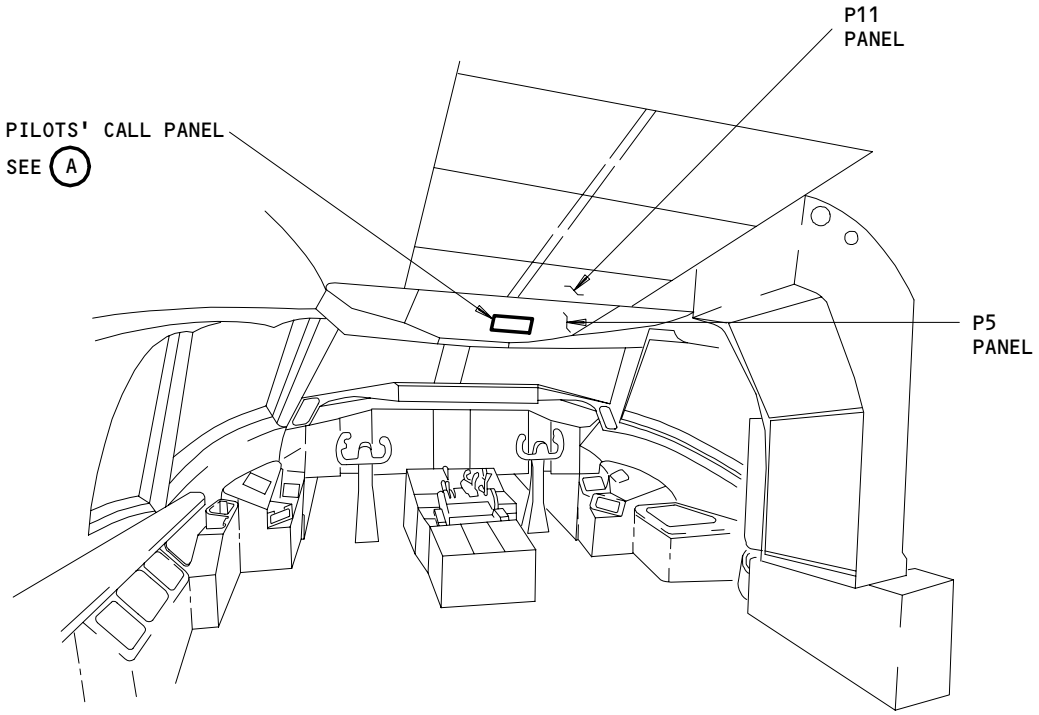
S 864-009

(7) Remove electrical power if it is not necessary (AMM 24-22-00/201).

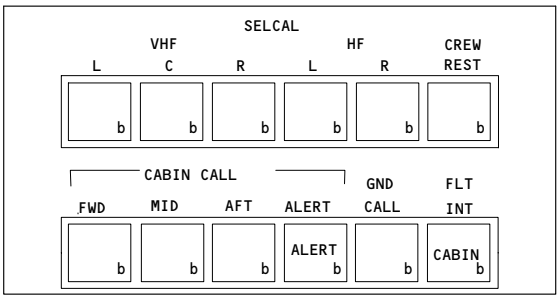
GROUND CREW CALL SYSTEM - DESCRIPTION AND OPERATION

1. General
   A. The ground crew call system allows personnel in the flight compartment and ground servicing personnel to gain each others' attention so they may communicate using one of the interphone systems. The system uses 28v dc battery bus power obtained from a circuit breaker on the P11 panel.
   B. The ground crew call system provides a signaling capability between the flight compartment and nose landing gear area.
   C. The attention of personnel outside the airplane is gained by pressing the GND CALL pushbutton on the pilots' call panel. The ground crew call horn will sound when this is done.
   D. From the nose landing gear, the attention of personnel in the flight compartment is gained by pressing the FLIGHT DECK CALL button on the P40 CONTROL PANEL. The GND CALL light on the pilots' call panel comes on, and a single high chime sounds in the flight compartment.

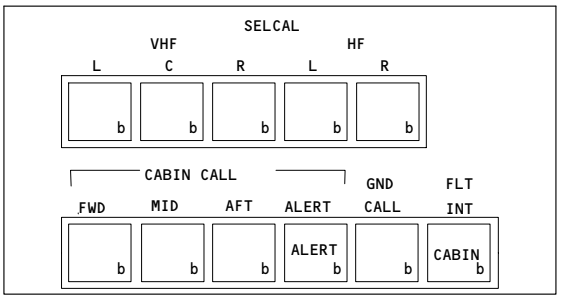
   E. The ground crew call horn will also sound when the equipment cooling system fails, or when power fails while an inertial reference unit (IRU) is left to operate on dc battery power.
2. Component Details (Fig. 1)



FLIGHT COMPARTMENT



PILOTS' CALL PANEL
A 1

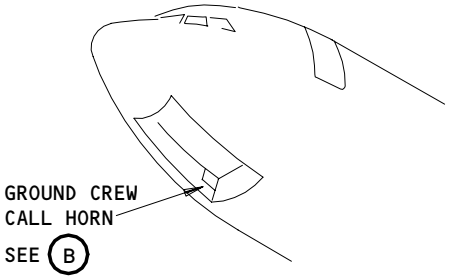


PILOTS' CALL PANEL
A 2

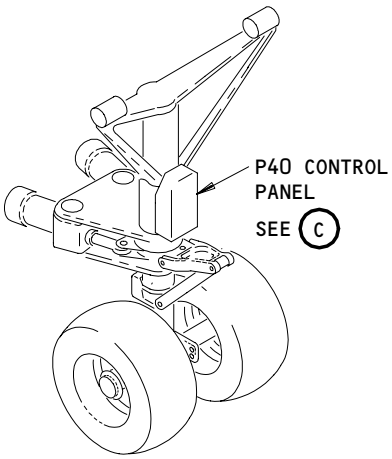
1 ALL SAS 767-200 AIRPLANES

2 ALL SAS 767-300 AIRPLANES
ALL MTH AIRPLANES

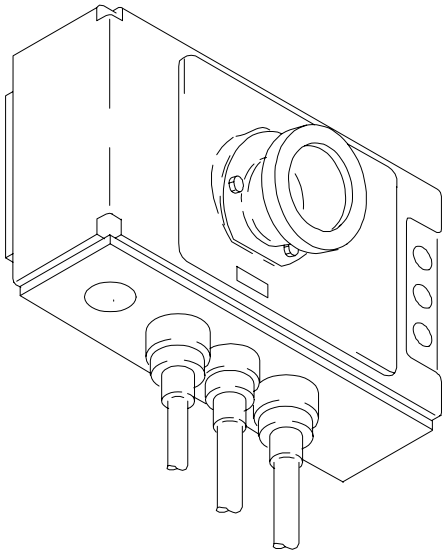
Ground Crew Call System Component Locations
Figure 1 (Sheet 1)



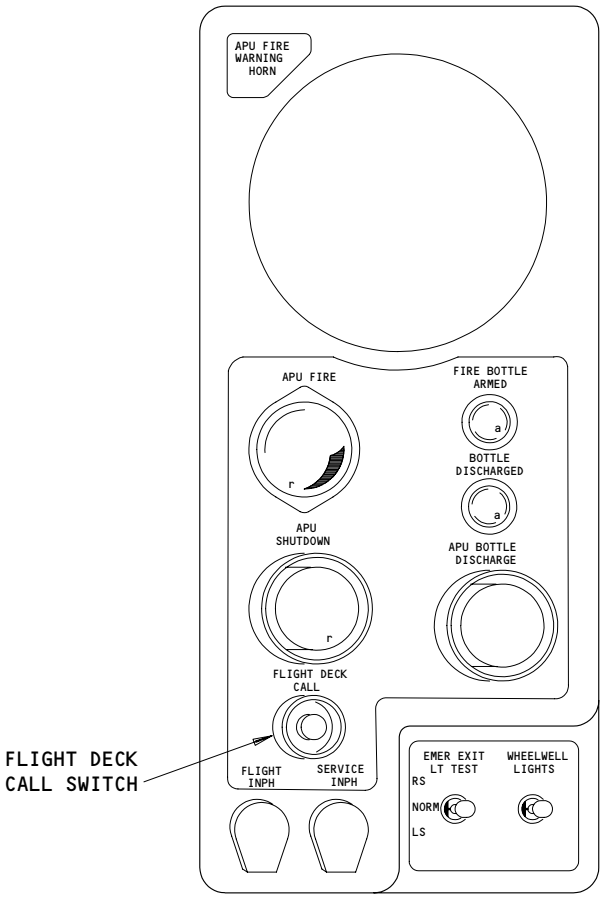
NOSE WHEEL WELL



NOSE LANDING GEAR



GROUND CREW CALL HORN
B



P40 CONTROL PANEL
C

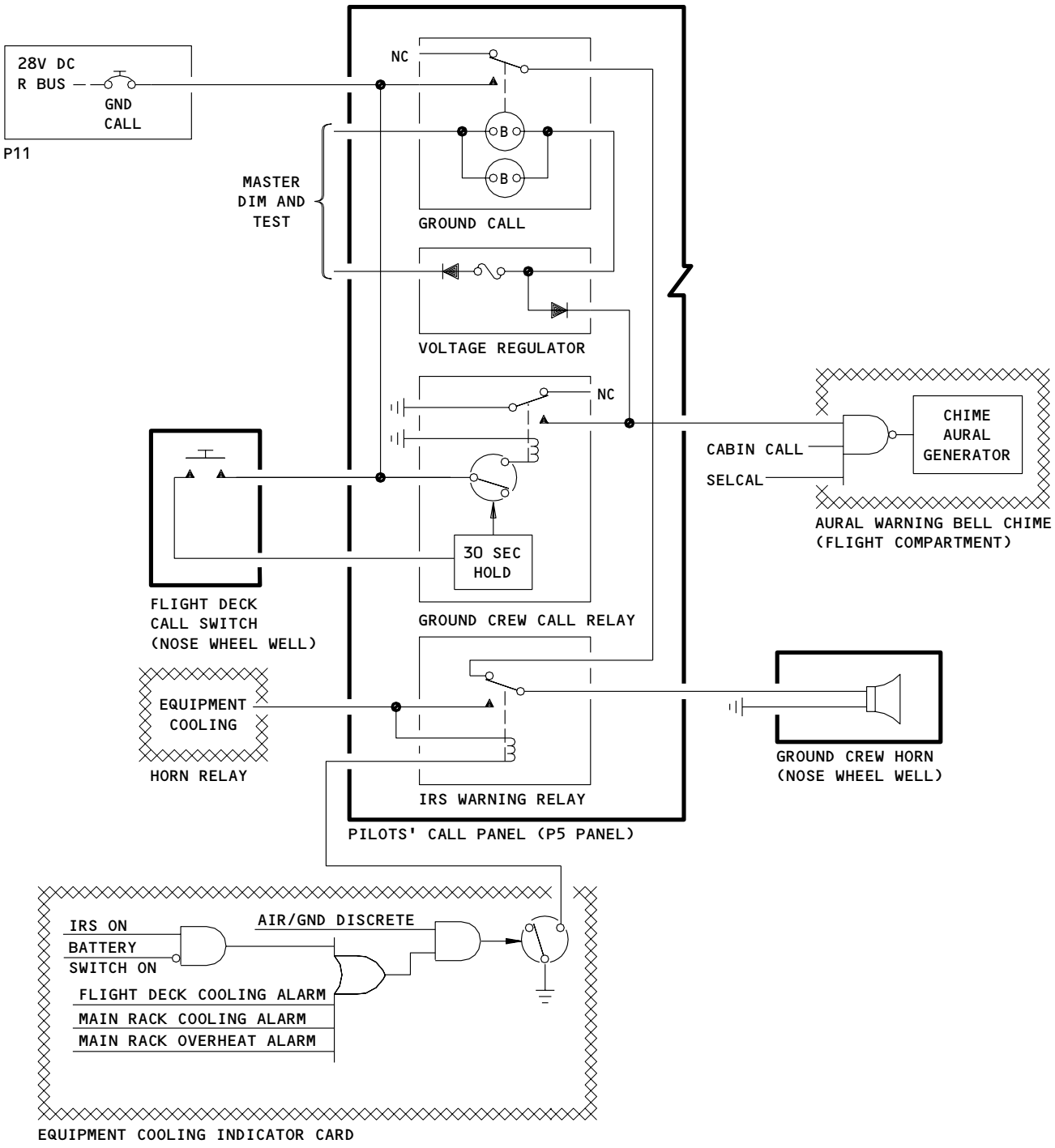
Ground Crew Call System – Component Location
Figure 1 (Sheet 2)

A. Ground Call Switch
   (1) The GND CALL switch is on the pilots' call panel, which is on the pilots' overhead panel P5. The call horn operates as long as the pilot pushes the switch. Inside the GND CALL switch, a lamp comes on when ground crew pushes the FLIGHT DECK CALL switch at the nose wheel.

B. Flight Deck Call Switch
   (1) The FLIGHT DECK CALL switch is on the P40 CONTROL PANEL. To call the flight compartment from the nose wheel, ground crew personnel push the button. This step makes the GND CALL light come on at the pilots' call panel and sounds the chime in the flight compartment. A related circuit keeps the light on for 30 seconds.
   (2) The chime sound comes from the bell chime module, M1000. It is in the warning electronics unit P51, which is located in the main equipment center. The bell chime module has a chime generator and amplifiers to energize the aural warning loudspeakers.

C. Ground Crew Call Horn
   (1) The attention of personnel outside the airplane is gained by pressing the GND CALL switch. The ground crew call horn (located in the nose wheel well) will sound in these situations:
      (a) The pilot presses the GND CALL switch.
      (b) The equipment cooling system is in OVRD mode for more than 55 seconds.
      (c) An IRU is on and there is no power to the over-temperature protection circuits (ac and HMG dc power has failed, or the pilot has selected equipment cooling OVRD).
      (d) When ac and HMG dc power are lost and an IRU is on (powered from the main battery).
      (e) There is an overheat condition for at least 30 seconds from the flight deck, the main rack, or the supply air sensors.

3. Operation (Fig. 2)



Ground Crew Call System Schematic
Figure 2

A. Functional Description

(1) The GND CALL circuit breaker on overhead panel P11 controls power to the system. Power from the circuit breaker is routed to the ground crew call relay in the pilots' call panel and to the FLIGHT DECK CALL and GND CALL switches.

(2) Flight compartment calls from the P40 CONTROL PANEL are controlled by the FLIGHT DECK CALL switch and ground crew call relay. When the FLIGHT DECK CALL switch is pressed, a hold-in circuit keeps the ground crew call relay energized for 30 seconds. When energized, the ground crew call relay lights the GND CALL lignt on the pilots' call panel, and generates a single chime through the aural warning loaudspeakers.

(3) When the GND CALL switch is pressed, power is applied to the ground crew call horn through the de-energized contacts of the IRS warning relay. The horn will sound for as long as the GND CALL switch is pressed.

(4) The IRS warning relay can be energized by a control signal from the equipment cooling system (Ref 21-58-00/001). The ground crew call horn will sound to indicate IRS power failures and equipment cooling failures.

B. Control

(1) To place the system in operation, provide electrical power (Ref 24-22-00/201).

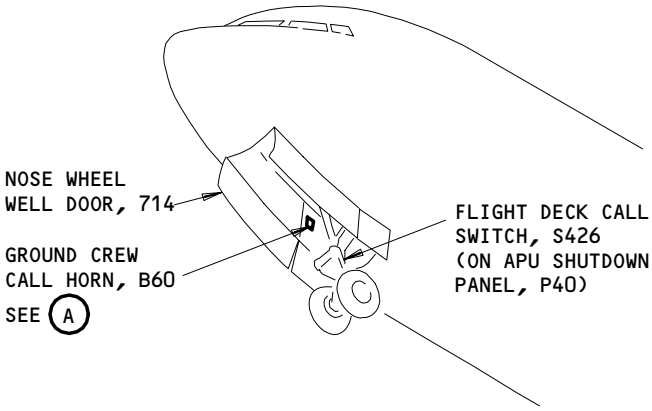
(2) On overhead panel P11, make sure the GND CALL circuit breaker is closed.

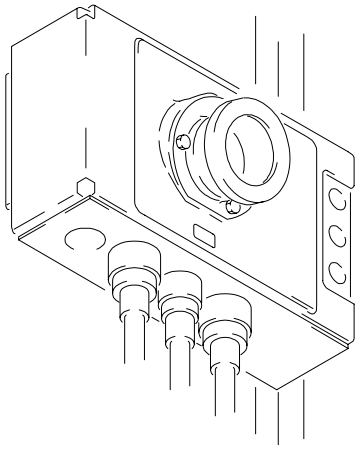
GROUND CREW CALL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CARD - (FIM 21-58-00/101)				
EQUIP COOLING IND, M867				
CIRCUIT BREAKER -			FLT COMPT, P6	
EQUIP COOL GND WARN, C711	--	1	6D6	*
CIRCUIT BREAKER -			FLT COMPT, P11	
GND CALL, C560	--	1	11H32	*
DIODE - SUPPRESSOR, R252	--	1	119AL, MAIN EQUIP CTR, E2-5	*
HORN - GROUND CREW CALL, B60	--	1	714, NOSE WHEEL WELL	23-43-01
MODULE - (FIM 31-51-00/101)				
BELL CHIME AURAL WARNING, M1000				
PANEL - (FIM 23-42-00/101)				
PILOTS' CALL, M51				
PANEL - (FIM 26-15-00/101)				
APU SHUTDOWN (REMOTE CONTROL), P40				
SWITCH - FLT DECK CALL, S426	--	1	NOSE LANDING GEAR, APU SHUTDOWN PANEL, P40	*
SWITCH-LIGHT - GND CALL, YDCS10	--	1	FLT COMPT, P5, PILOTS' CALL PANEL, M51	*

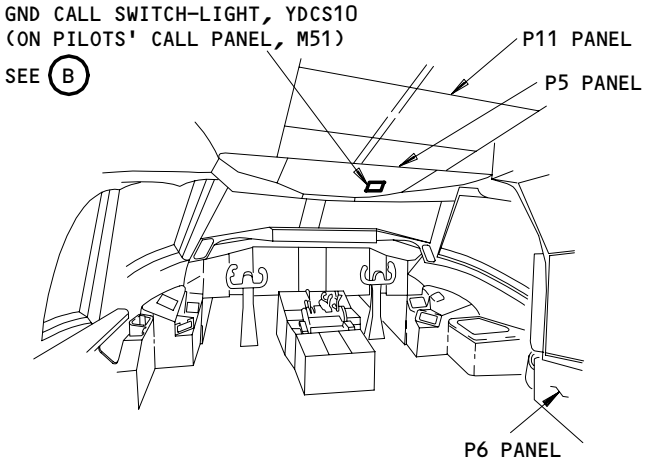
* SEE THE WDM EQUIPMENT LIST

Ground Crew Call System - Component Index
Figure 101

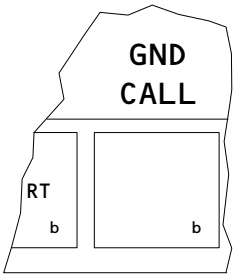




GROUND CREW CALL HORN, B60
A



FLIGHT COMPARTMENT



GND CALL SWITCH-LIGHT, YDCS10
B

Ground Crew Call System - Component Location
Figure 102

GROUND CREW CALL SYSTEM - ADJUSTMENT/TEST

TASK 23-43-00-715-001

1. Operational Test - Ground Crew Call System

A. General

(1) This procedure has a task which gives the operational test for the ground crew call system. For a satisfactory result, make sure the call signals between the nose gear wheel well and the flight compartment operate.

B. References

(1) 24-22-00/201, Electrical Power - Control

C. Access

(1) Location Zones

211/212	Flight Compartment
711	Nose Landing Gear

D. Prepare for Operational Test

S 865-002

(1) Supply electrical power (Ref 24-22-00/201).

S 865-003

(2) Make sure this circuit breaker on the overhead circuit breaker panel, P11, is closed:

(a) 11H32, GND CALL

E. Do the Operational Test

S 985-004

(1) Momentarily push the FLIGHT DECK CALL switch on the APU shutdown panel (P40).

(a) Make sure you hear a single chime in the flight compartment.

(b) Make sure the blue GND CALL switch-light on the pilots' call panel (M51) comes on. M51 is installed on the pilots' overhead panel (P5).

(c) Make sure the blue GND CALL switch-light stays on for 30 ±5 seconds, then goes off.

S 985-005

(2) Momentarily push the GND CALL switch on the pilots' call panel.

(a) Make sure you hear the horn in the nose gear wheel well while the switch is pushed.

S 865-006

(3) Remove electrical power if it is not necessary (Ref 24-22-00/201).

GROUND CREW CALL HORN - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks. The first task removes the ground crew call horn from the right side of the nose gear wheel well. The second task installs the ground crew call horn to the right side of the nose gear wheel well.

TASK 23-43-01-004-001

2. Remove the Ground Crew Call Horn (Fig. 401)
   A. General
      (1) This task gives the instructions to remove the ground crew call horn from the nose gear wheel well.
   B. References
      (1) 24-22-00/201, Electrical Power - Control
      (2) 32-00-20/201, Landing Gear Downlocks
   C. Access
      (1) Location Zones

211/212	Flight Compartment
710	Nose Landing Gear and Doors

   D. Prepare for Removal

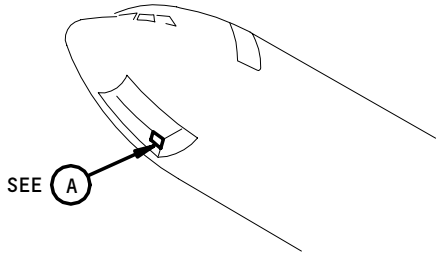
      S 864-002
      (1) Make sure that the landing gear downlocks are installed (Ref 32-00-20/201).

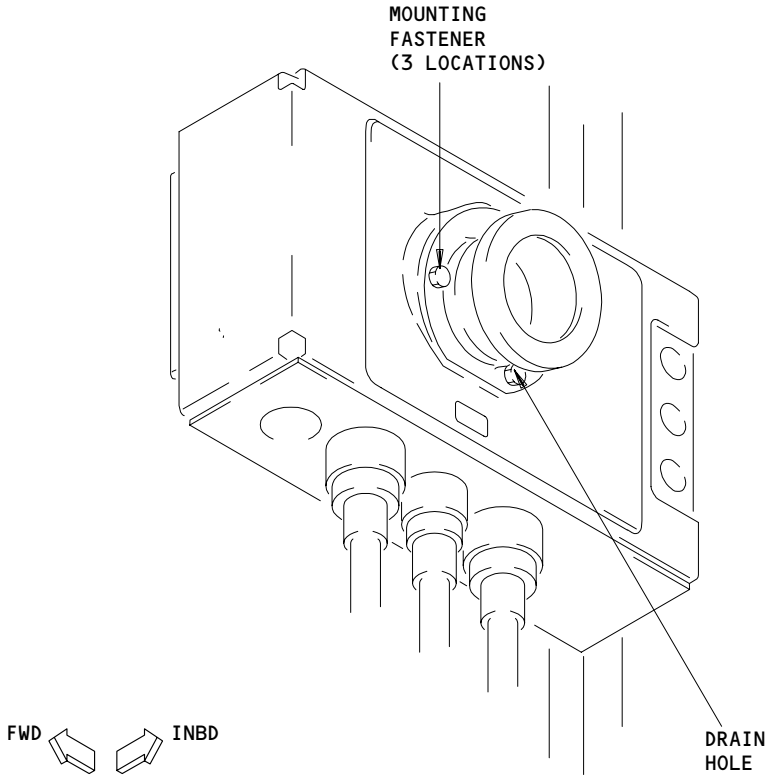
      S 864-003
      (2) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
         (a) 11H32, GND CALL
   E. Remove the Ground Crew Call Horn

      S 034-004
      (1) Remove the three screws that hold the horn.

      S 214-016
      (2) Identify the locations and colors of the electrical leads for installation.

      S 034-005
      (3) Remove the electrical leads from the horn terminals.





GROUND CREW CALL HORN

A

Ground Crew Call Horn Installation
Figure 401

S 024-006
(4) Remove the ground crew call horn.

TASK 23-43-01-404-007

3. Install the Ground Crew Call Horn (Fig. 401)

A. General
(1) This task gives the instructions to install the ground crew call horn to the nose gear wheel well.

B. Consumable Materials
(1) B00316 Solvent - Aliphatic Naphtha, TT-N-95
(2) B00748 Potting Compound - BAC 5550 Grade C

C. References
(1) 24-22-00/201, Electrical Power - Control
(2) 32-00-20/201, Landing Gear Downlocks

D. Access
(1) Location Zones

211/212	Flight Compartment
710	Nose Landing Gear and Doors

E. Install the Ground Crew Call Horn

S 114-008
(1) Clean the horn terminals and the electrical leads with solvent.

S 434-009
(2) Connect the electrical leads to the horn terminals.

S 394-010
(3) Apply layers of potting compound to the electrical leads and the horn terminals.

S 424-011
(4) Use the three screws to install the ground crew call horn with the drain hole to the bottom.

F. Do a Test of the Ground Crew Call Horn

S 864-017
(1) Supply electrical power (Ref 24-22-00/201).

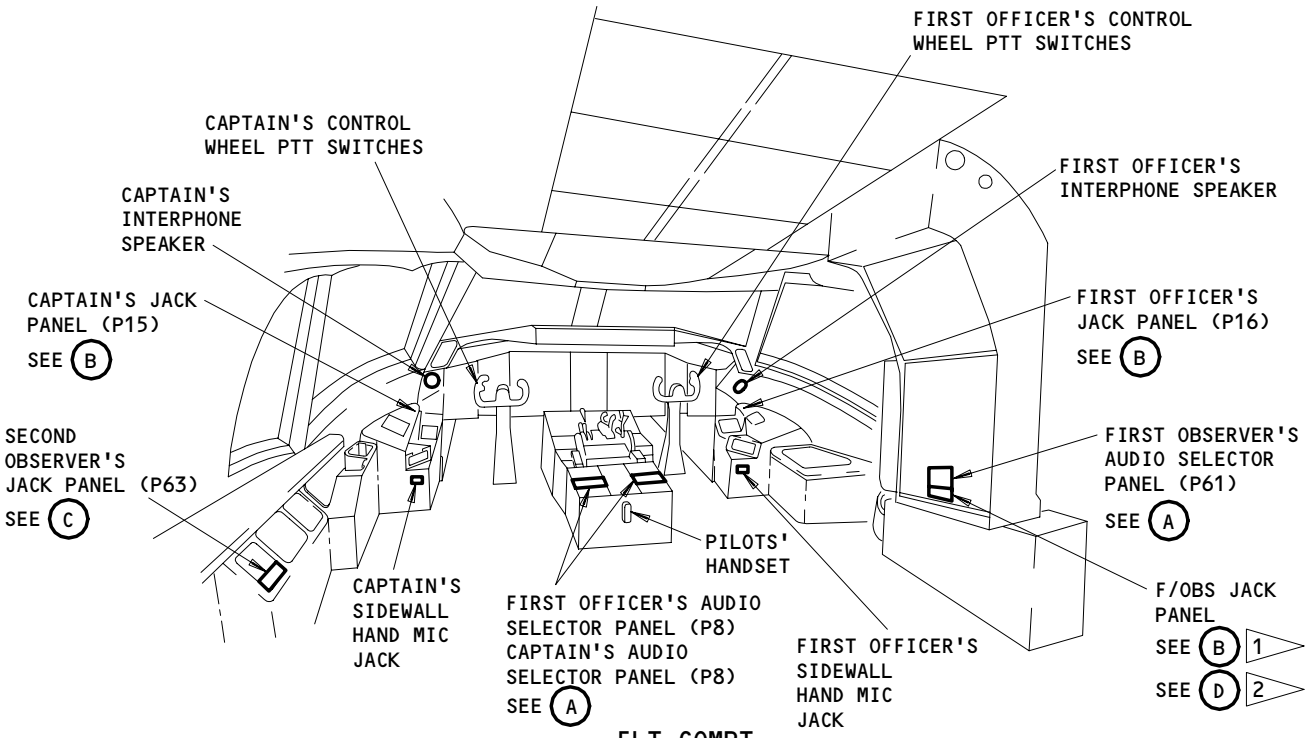
S 864-012
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11H32, GND CALL

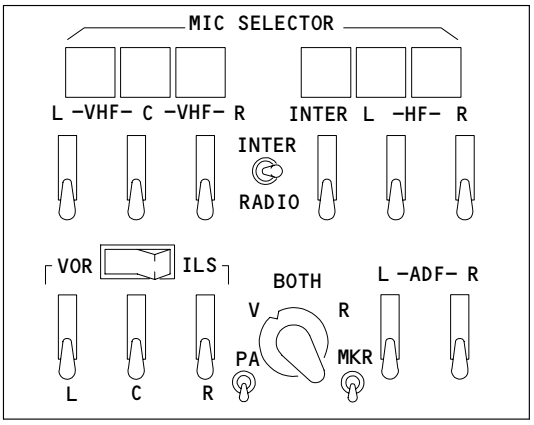
S 714-013
(3) Do a test of the horn as follows:
(a) Push the GND CALL switch on the pilots' call panel (M51).
(b) Make sure you hear the horn.

S 864-015
(4) Remove electrical power if it is not necessary (Ref 24-22-00/201).

FLIGHT INTERPHONE SYSTEM - DESCRIPTION AND OPERATION

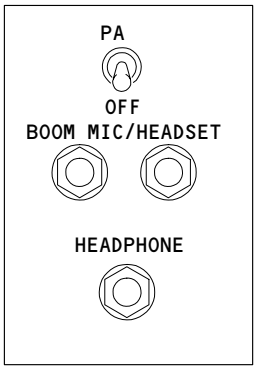
1. General
   A. The flight interphone system provides facilities for interphone communication among flight compartment crewmembers and provides the means for them to key, transmit, and receive on airplane radio systems and receive on airplane navigation systems.
   B. The flight interphone system extends communication to ground personnel at the nose gear interphone station and allows flight compartment crewmembers to make passenger address announcements and communicate with cabin and service interphone stations.
   C. The flight interphone system includes amplifiers and mixing circuits in the audio accessory unit, audio selector panels, interphone speakers, microphone/headphone jacks and push-to-talk (PTT) switches.
   D. The captain's and first officer's flight interphone components include the following: audio selector panel; headset, headphone, and hand mic jacks; control wheel push-to-talk (PTT) switches; and interphone speakers.
   E. The first observer's flight interphone components include the following: audio selector panel; headset, headphone and hand mic jacks. The second observer's flight interphone components located on second observer's console panel P63 consist of a pair of headphone jacks that monitor the first officer's or first observer's audio selector panel.
   F. The flight interphone system receives power from two sources, the 28v dc battery bus and the 28v dc right bus. Circuit breakers on overhead panel P11 control power to the system.
2. Component Details (Fig. 1)
   A. Audio Accessory Unit
      (1) The flight interphone amplifier is located in the audio accessory unit (E2 rack in the main equipment center). The amplifier is a printed circuit card which receives microphone inputs and provides audio to all flight interphone stations. The amplifier has preset internal adjustments for compression, squelch and volume. Adjustments to the unit are not externally accessible.
   B. Audio Selector Panel
      (1) Audio selector panels are located in the flight compartment. Two audio selector panels are on the P8 control stand, and one is on the first observer's P61 right side panel. Each panel contains microphone selector switches which connect microphone circuits to the interphone systems, or to the radio communication systems. The RADIO/INTER switch on the panel keys the selected flight compartment microphone. Volume control is provided by switches on the panel.





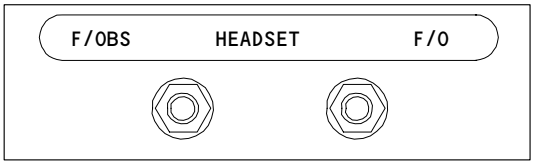
AUDIO SELECTOR PANEL

A



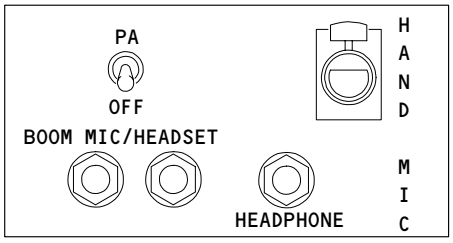
CAPT, F/O, 1 F/OBS JACK PANEL

B



SECOND OBSERVER'S JACK PANEL

C



FIRST OBSERVER'S JACK PANEL

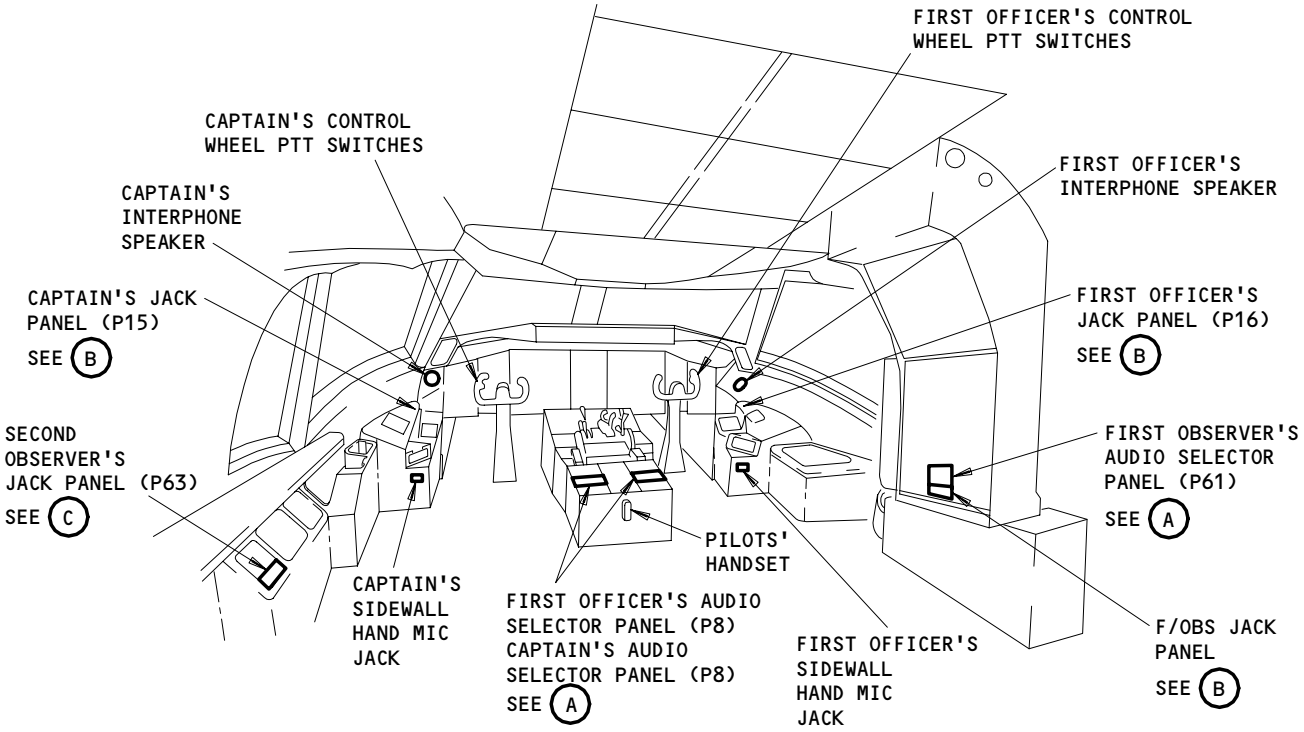
D 2

1 767-200 AIRPLANES

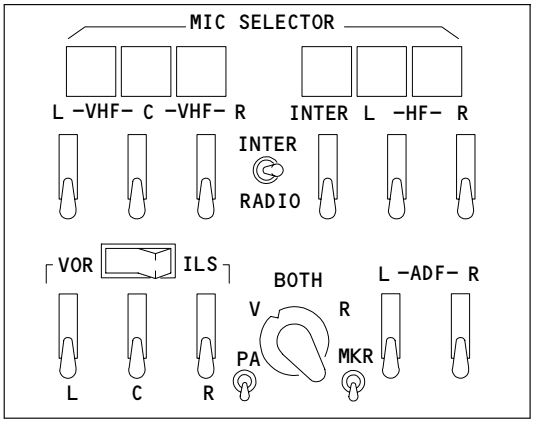
2 767-300 AIRPLANES

Flight Interphone System Component Location
Figure 1 (Sheet 1)

612131

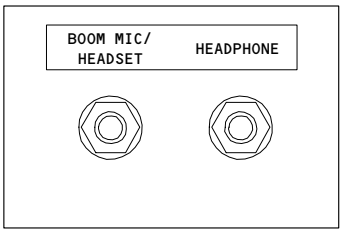


FLT COMPT



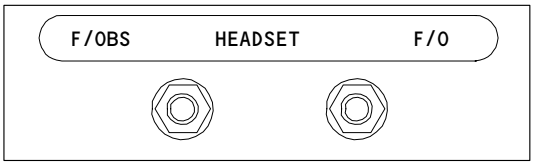
AUDIO SELECTOR PANEL

A



CAPT, F/O, F/OBS JACK PANEL

B



SECOND OBSERVER'S JACK PANEL

C

Flight Interphone System Component Location
Figure 1 (Sheet 2)

666353

C. Interphone Speakers

(1) ALL MTH AIRPLANES;
two interphone speakers are located in the flight compartment. The captain's speaker is on the P13 panel and the first officer's speaker is on the P14 sidewall panel. Each speaker unit contains a loudspeaker, amplifier, muting circuits, and a volume control. The speakers receive all audio inputs provided to the audio selector panels. Whenever a PTT switch is pressed at the captain's or first officer's station, the respective speaker will be muted. Volume is adjusted by a knob in the center of the speaker.

(2) ALL SAS 767-300 AIRPLANES;
two interphone speakers are located in the flight compartment. The captain's speaker is on the P13 sidewall panel and the first officer's speaker is on the P14 sidewall panel. The unit contains a loudspeaker, amplifier, muting circuits, and a volume control. The speakers receive all audio signals provided to the audio selector panels. The speakers are muted whenever a PTT switch is pressed at the captain's or first officer's station. Volume is adjusted by a knob in the center of the speaker.

(3) ALL SAS 767-200 AIRPLANES;
two interphone speakers are located in the flight compartment. The captain's speaker is on the P13 sidewall panel and the first officer's speaker is on the P14 sidewall panel. The unit contains a loudspeaker, amplifier, muting circuits, and a volume control. The speakers receive all audio signals provided to the audio selector panels. The speakers are muted whenever a PTT switch is pressed at the respective speaker station. Volume is adjusted by a knob in the center of the speaker.

D. Flight Interphone Jack Panels

(1) The captain, first officer, and first observer each have a jack panel for a boom mic/headset and headphone. Each station also has separate jacks for a hand mic and oxygen mask microphone. The second observer has a jack panel for monitoring the first officer's or first observer's audio selector panel.

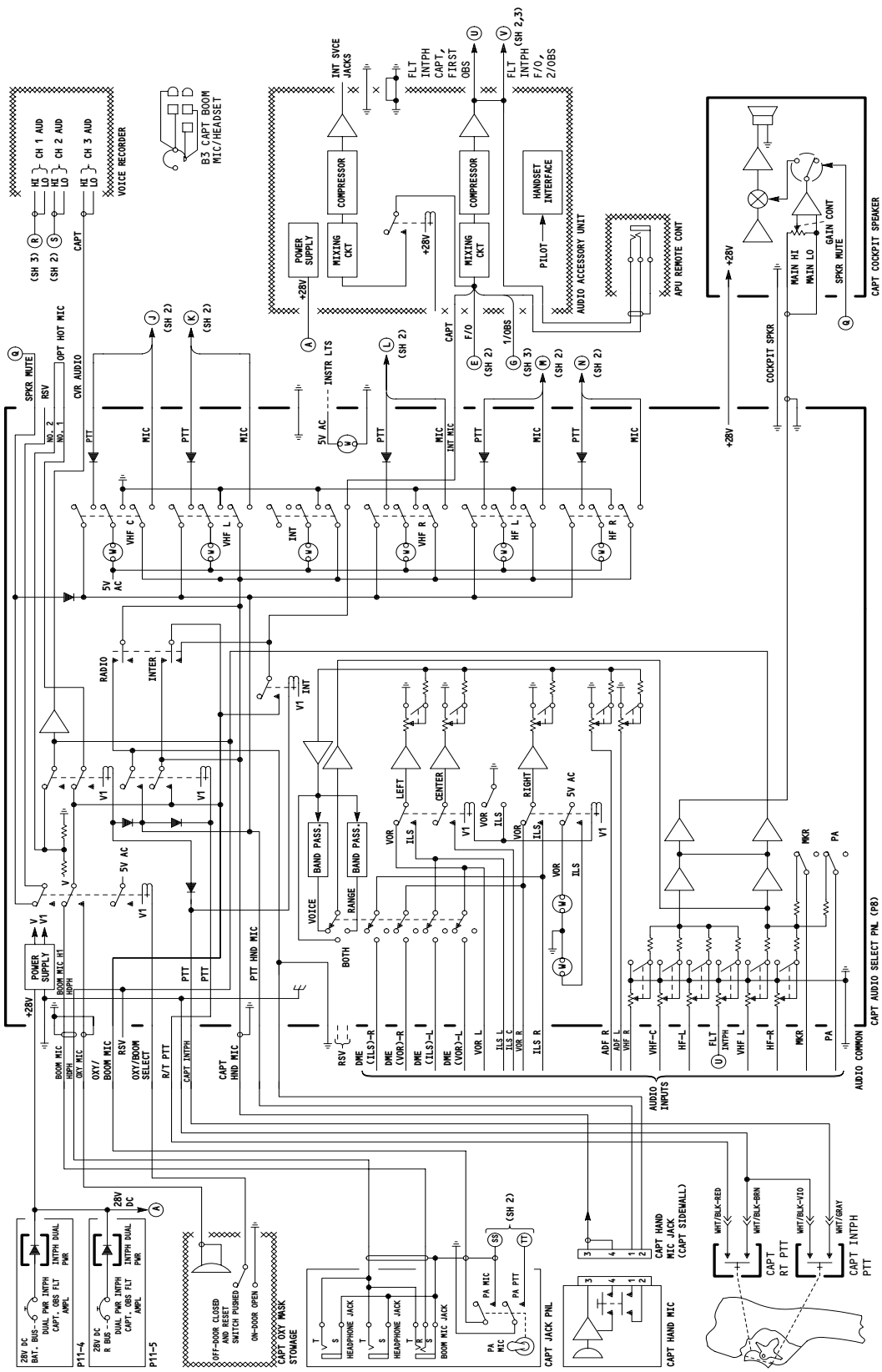
E. Push-To-Talk (PTT) Switch

(1) Push-to-talk (PTT) switches are located at the captain, first officer and first observer stations. The hand mic and control wheel both have PTT switches. The switch must be pressed before messages are begun or no transmission can take place. Audio and control circuits to the audio selector panel are completed when the PTT switch is pressed.

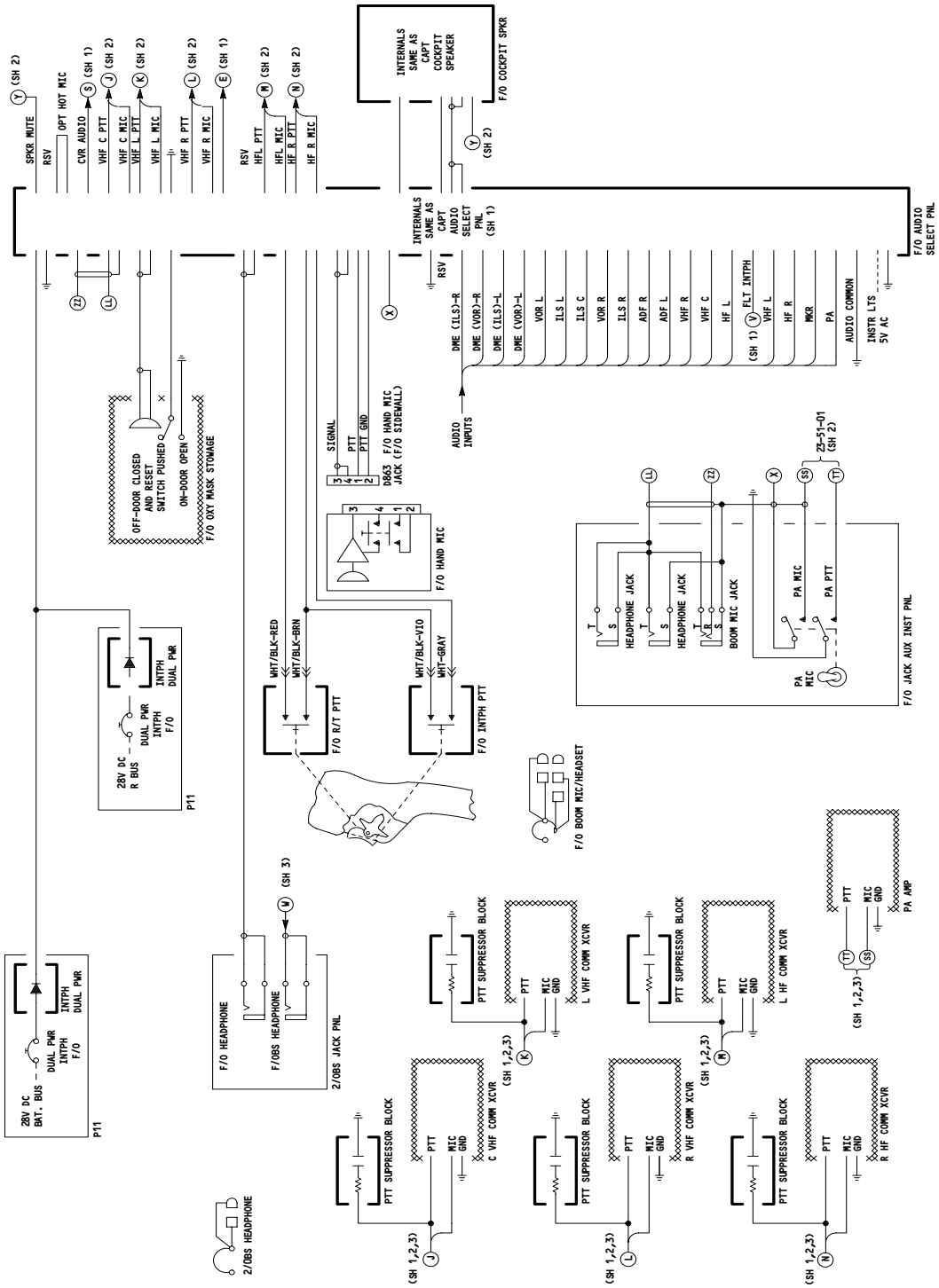
F. INTER/RT SWITCH

(1) The INTER/RADIO switch is often referred to as a PTT switch. The INTER/RADIO switches are located on the audio selector panel and on the control wheels of the captain and first officer.

3. Operation (Fig. 2)

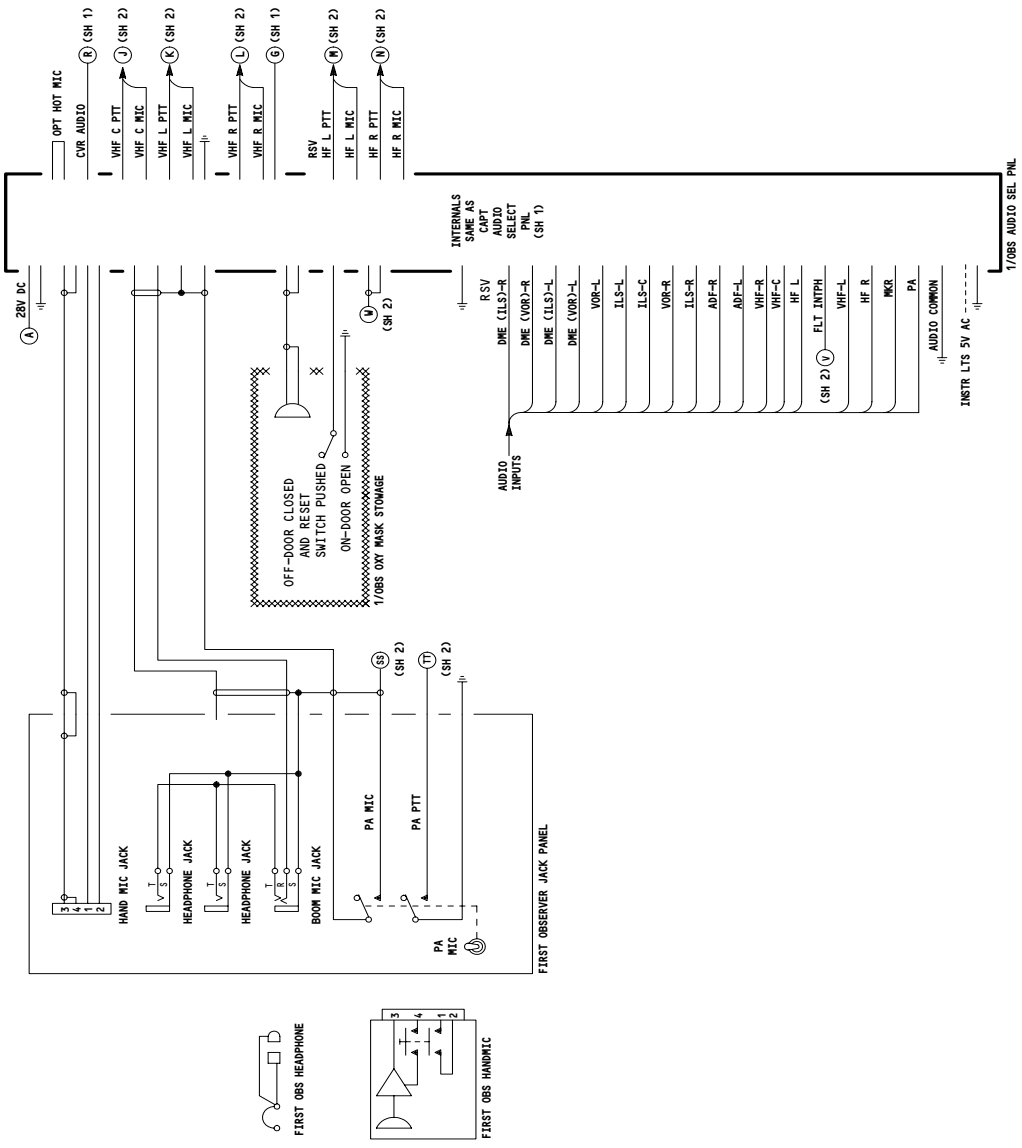


Flight Interphone System Schematic
Figure 2 (Sheet 1)

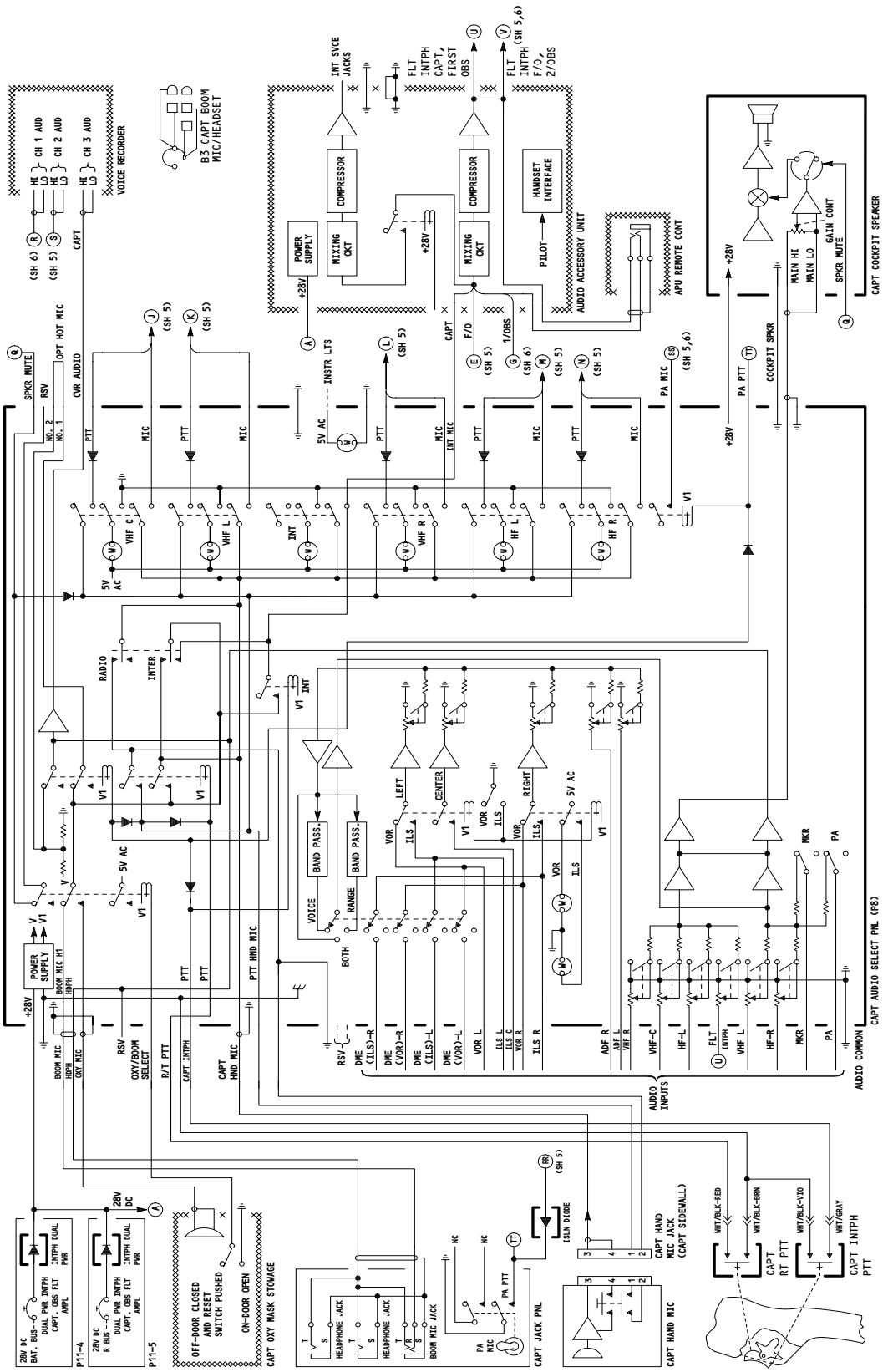


Flight Interphone System Schematic
Figure 2 (Sheet 2)

63660T

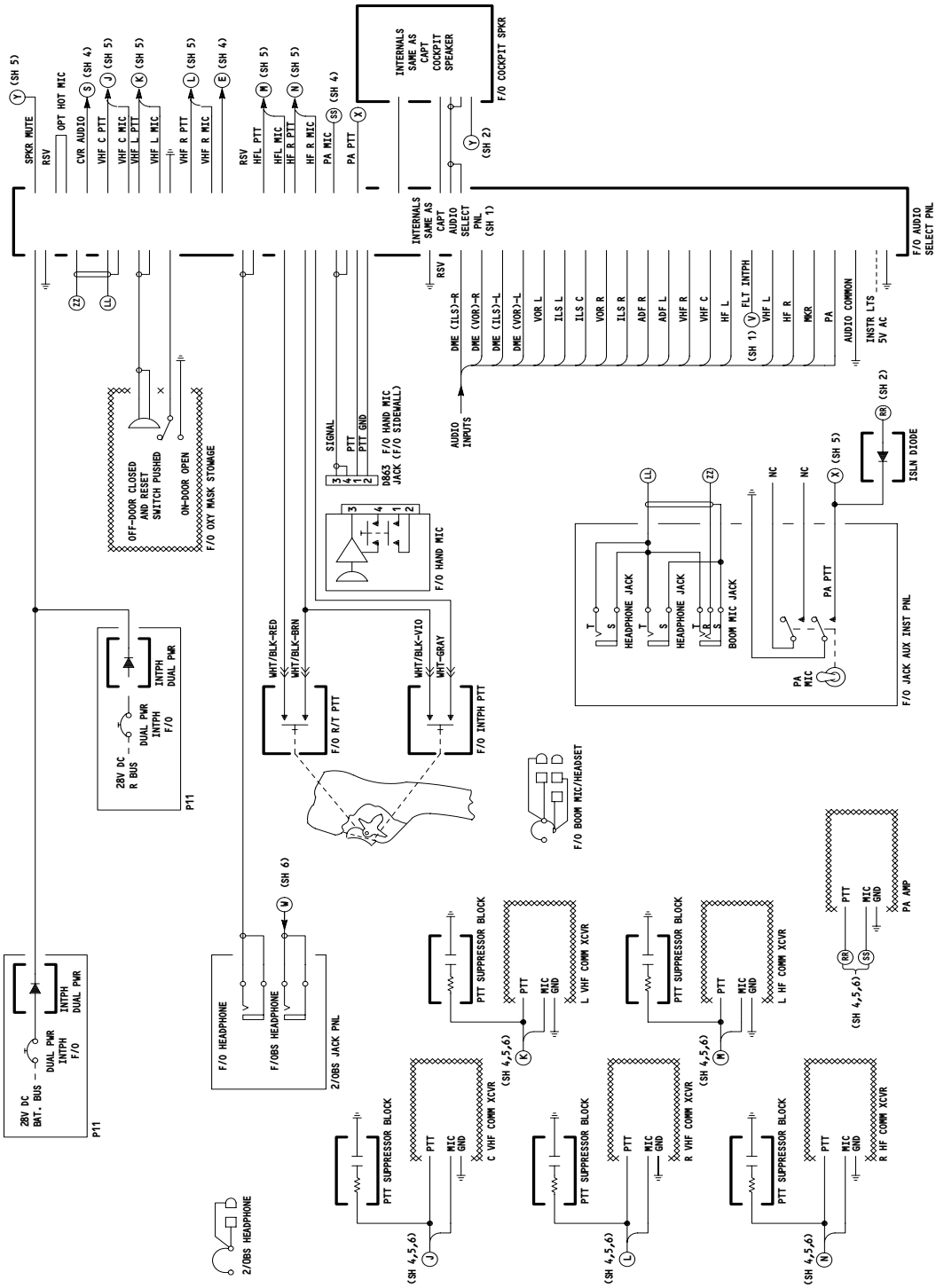


Flight Interphone System Schematic
Figure 2 (Sheet 3)

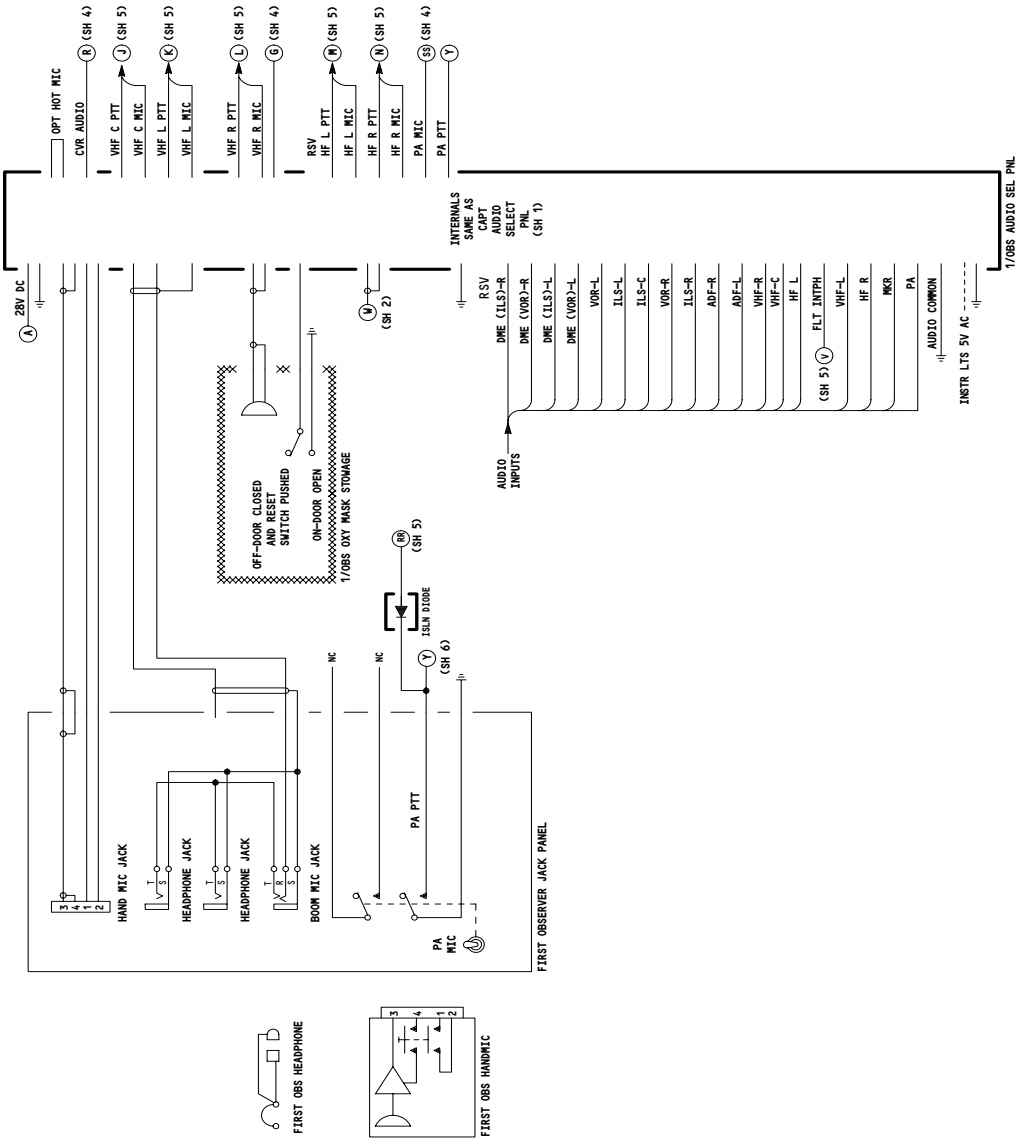


Flight Interphone System Schematic
Figure 2 (Sheet 4)

753209



Flight Interphone System Schematic
Figure 2 (Sheet 5)



Flight Interphone System Schematic
Figure 2 (Sheet 6)

A. Functional Description

(1) The flight interphone system is the communication link between flight compartment crewmembers. The system provides common microphone circuits for the communication systems and common headphone and speaker circuits for the communication and navigation systems.

(2) The captain's and first officer's flight interphone components and operation are the same.

(3) The first observer's flight interphone components and operation are the same as the captain's except for the absence of a control wheel push-to-talk switch and interphone speaker. The second observer can monitor the first officer's or first observer's audio selector panel through headphone jacks.

(4) The flight interphone components, which include microphones and audio amplifiers, provide the connecting link between airplane communication systems, navigation receivers, and flight compartment crewmembers. Audio selector panels enable crewmembers to transmit and receive over the radio systems or receive over the navigation systems. Microphone select switches on the audio selector panels enable flight compartment crewmembers to send messages using the various microphones (boom, hand, and oxygen mask) and push-to-talk switches. These messages are transmitted over the flight and cabin/service interphone systems, radio systems, and passenger address system. The interphone, radio communication, and navigation systems audio outputs are provided to the interphone speakers, headsets and voice recorder.

(5) The INTER/RADIO push-to-talk switch on the audio selector panels and control wheels are used with the microphone select switches on the audio selector panels to transmit over any radio system or the interphone system. When INTER/RADIO is held to the RADIO position, it energizes the microphone circuit selected by the microphone select switches and audio transmission can take place over the system selected. When the INTER/RADIO switch is held to the INTER position, it overrides all microphone selection and allows audio transmission over the flight interphone system.

(6) Amplifiers, summing networks, and filters in the audio selector panel provide audio signals from the interphone and radio communication systems to the headphones and speakers. Audio signals from the navigation receivers are also monitored through the headphones and speakers. Reception of all audio signals is controlled by the volume switches. The captain's INT microphone switch is lighted when on. The switch is interlocked with the other microphone switches so that only one at a time can be pressed.

(7) The navigation systems (ADF, VOR, ILS, MKR) audio is controlled by switches on the audio selector panel. The left, center, or right (L, C, R) switches control selection and volume of the desired receiver. The VOICE-BOTH-RANGE switch is a filter control that separates voice signals and range signals. The filter switch can also combine both voice and range signals. All radio communication, interphone, and navigation outputs are received and recorded by the voice recorder.

(8) To apply microphone audio to the radio communication, interphone, or passenger address system:
  (a) Press the microphone select switch on the audio selector panel to select desired communication system.
  (b) If a handheld microphone is used, press the PTT switch on the microphone and talk.
  (c) If the boom microphone or the oxygen mask microphone is to be used:
  (d) Open the oxygen mask stowage door to enable the oxygen mask microphone and disable the boom microphone. Press push-to-talk switch and talk.
  (e) The boom microphone is enabled when the oxygen mask stowage door is closed and you push the reset test switch.

(9) To listen to navigation and communication systems audio, complete the following:
  (a) For communications systems, adjust the volume control switch on the audio selector panel and listen to headset.
  (b) For navigation systems audio, select desired L-C-R (left-center-right) and filter (VOICE-BOTH-RANGE) positions on audio selector panel, adjust volume control switch and listen to headset.
  (c) The captain's and first officer's interphone speakers can be used to listen to navigation and communication system audio. A knob in the center of the interphone speaker adjusts speaker volume as desired.
  (d) The P40 APU shutdown panel has an interphone jack for monitoring flight interphone communication.

B. Control

(1) To place the system in operation, supply electrical power (Ref 24-22-00/201).

(2) Make sure that the INTERPHONE DUAL PWR CAPT/OBS FLT AMPL (2 places) and the DUAL PWR F/O (2 places) circuit breakers on the overhead panel P11 are closed.

FLIGHT INTERPHONE SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
AMPLIFIER - (REF 23-31-00, FIG. 101)				
PASSENGER ADDRESS, M177				
CIRCUIT BREAKER -	1		FLT COMPT, P11	
INTERPHONE - DUAL PWR CAPT/OBS FLT AMPL, C644,C645		2	11C25,11G29	*
INTERPHONE - DUAL PWR F/O, C646,C647		2	11C26,11G30	*
DIODE - R58,R59,R60,R61	1	4	FLT COMPT, BEHIND P11	*
DIODE - ISOLATION, R472,R473,R474 1		3	MAIN EQUIP CENTER, E2-5	*
INTERROGATOR - (REF 34-55-00, FIG. 101)				
LEFT DME, M123				
RIGHT DME, M124				
JACK - CAPT HAND MIC, D861	1	1	FLT COMPT, P13	*
JACK - F/O HAND MIC, D863	1	1	FLT COMPT, P14	*
JACK - FLT INTPH, D8545	2	1	APU GROUND CONT PNL, P40	*
MIC - CAPT OXY MASK, M933	1	1	FLT COMPT	*
MIC - F/O OXY MASK, M934	1	1	FLT COMPT	*
MIC - F/OBS OXY MASK, M936	1	1	FLT COMPT	*
PANEL - (REF 34-51-00, FIG. 101)				
LEFT VOR CONT, M91				
RIGHT VOR CONT, M92				
PANEL - CAPT AUDIO SELECTOR, M70	1	1	FLT COMPT, P8	23-51-01
PANEL - CAPT JACK, M889	1	1	FLT COMPT, P15	*
PANEL - F/O AUDIO SELECTOR, M71	1	1	FLT COMPT, P8	23-51-01
PANEL - F/O JACK, M890	1	1	FLT COMPT, P16	*
PANEL - F/OBS AUDIO SELECTOR, M98	1	1	FLT COMPT, P61	23-51-01
PANEL - F/OBS JACK, M133	1	1	FLT COMPT, P61	*
PANEL - SEC/OBS JACK, M892	1	1	FLT COMPT, P63	*
RECEIVER - (REF 34-31-00, FIG. 101)				
CENTER ILS, M157				
LEFT ILS, M156				
RIGHT ILS, M158				
RECEIVER - (REF 34-51-00, FIG. 101)				
LEFT VOR/MKR, M186				
RIGHT VOR/MKR, M187				
RECEIVER - (REF 34-57-00, FIG. 101)				
LEFT ADF, M215				
RIGHT ADF, M216				
RECORDER - (REF 23-71-00, FIG. 101)				
VOICE, M201				
SPEAKER - CAPT COCKPIT, B1	1	1	FLT COMPT	23-51-02
SPEAKER - F/O COCKPIT, B2	1	1	FLT COMPT	23-51-02

* SEE THE WDM EQUIPMENT LIST

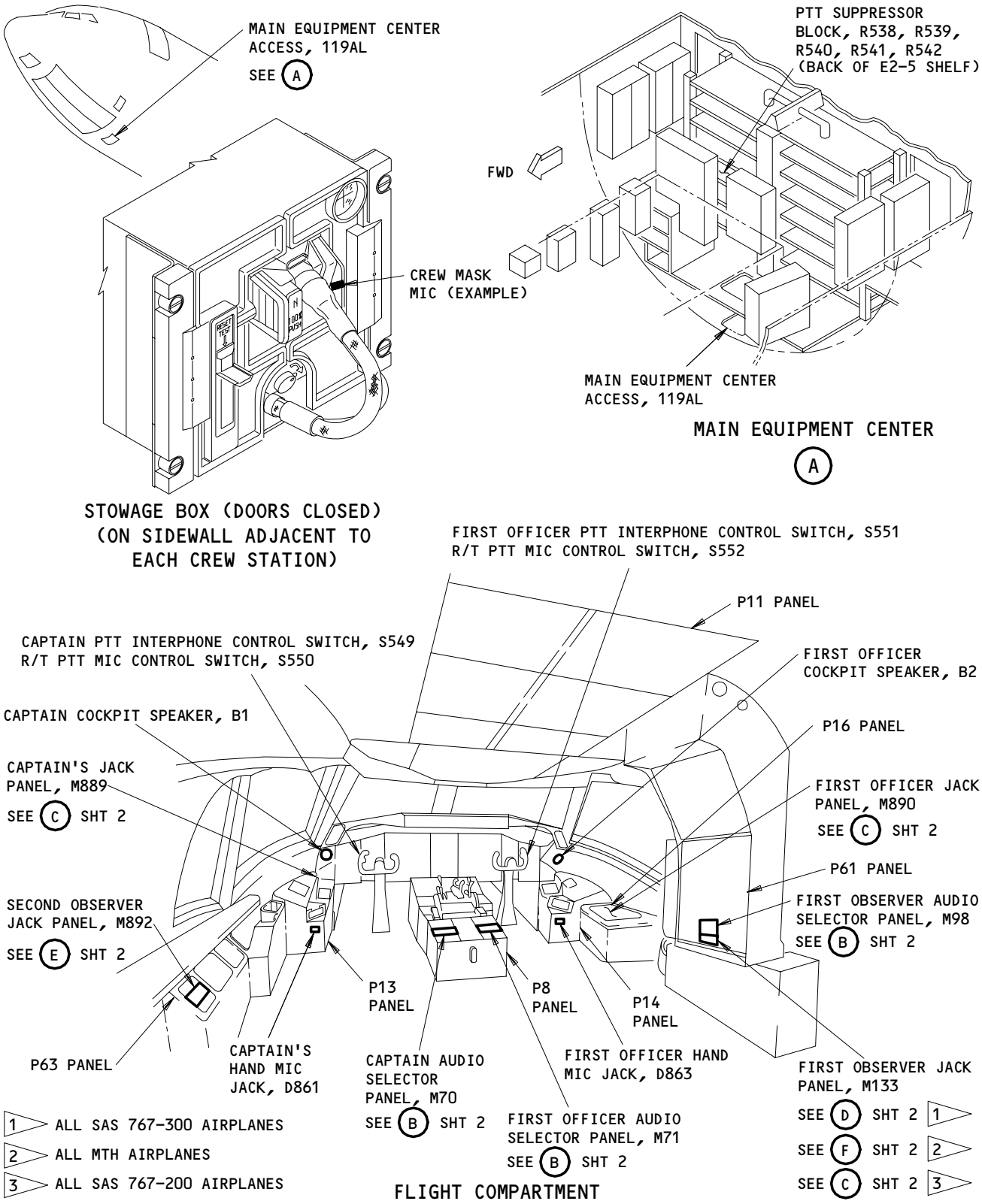
1 SAS 150-152 WITH SB 23-32, SAS 050-149,153-999 AND ALL MTH AIRPLANES.

Flight Interphone System - Component Index
Figure 101 (Sheet 1)

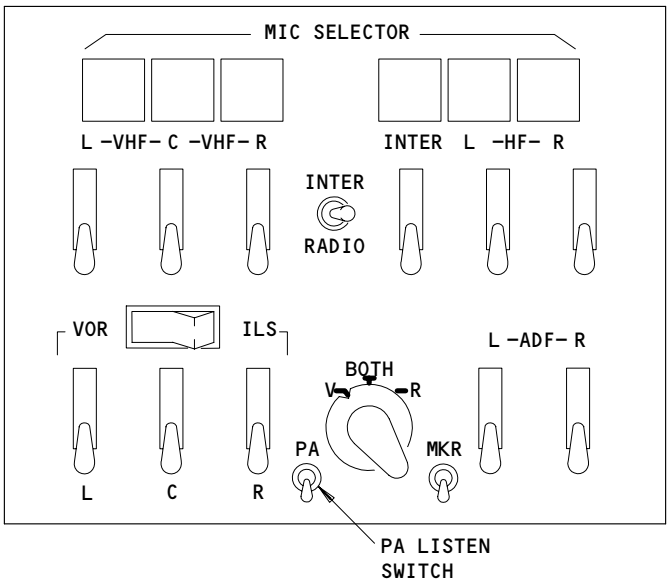
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
STOWAGE - CAPT OXY MASK, M933	1	1	FLT COMPT	*
STOWAGE - F/O OXY MASK, M934	1	1	FLT COMPT	*
STOWAGE - F/OBS OXY MASK, M936	1	1	FLT COMPT	*
SUPPRESSOR BLOCK - PTT, R538-R542	1	5	119AL, MAIN EQUIP CTR, E2-5	*
SWITCH - CAPT PTT INTPH, S549	1	1	FLT COMPT, CAPT CONT WHEEL	23-51-03
SWITCH - CAPT R/T PTT, S550	1	1	FLT COMPT, CAPT CONT WHEEL	23-51-03
SWITCH - F/O PTT INTPH, S551	1	1	FLT COMPT, F/O CONT WHEEL	23-51-03
SWITCH - F/O R/T PTT, S552	1	1	FLT COMPT, F/O CONT WHEEL	23-51-03
UNIT - (REF 23-42-00, FIG. 101)				
AUDIO ACCESSORY, M108				
XCVER - (REF 23-11-00, FIG. 101)				
LEFT HF COMM, M152				
RIGHT HF COMM, M153				
XCVER - (REF 23-12-00, FIG. 101)				
CENTER VHF COMM, M190				
LEFT VHF COMM, M188				
RIGHT VHF COMM, M189				

* SEE THE WDM EQUIPMENT LIST

Flight Interphone System - Component Index
Figure 101 (Sheet 2)

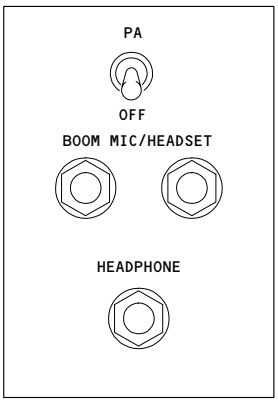


Flight Interphone System - Component Location
Figure 102 (Sheet 1)



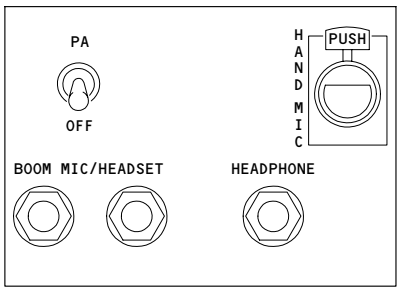
CAPTAIN, FIRST OFFICER OR FIRST OBSERVER
AUDIO SELECTOR PANEL, M70, M71, OR M98

(B) FROM SHT 1



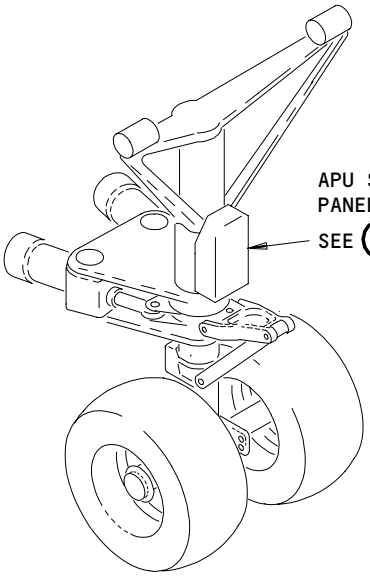
CAPTAIN 1, FIRST OFFICER 1, OR
FIRST OBSERVER 3 JACK PANEL
M889 1, M890 1, OR M133 3

(C) FROM SHT 1

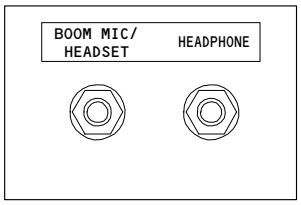


FIRST OBSERVER JACK PANEL, M133

(D) 1 FROM SHT 1

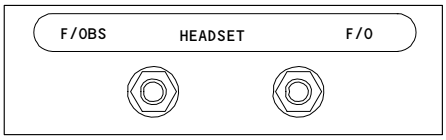


NOSE LANDING GEAR



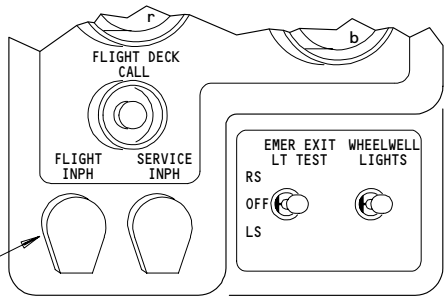
CAPTAIN, FIRST OFFICER OR
FIRST OBSERVER JACK PANEL
M889, M890, M133

(F) FROM SHT 1
2



SECOND OBSERVER JACK PANEL, M892

(E) FROM SHT 1



FLIGHT
INTERPHONE
JACK, D8545

APU SHUTDOWN PANEL, P40

(G)

1 ALL SAS 767-300 AIRPLANES
2 ALL MTH AIRPLANES
3 ALL SAS 767-200 AIRPLANES

Flight Interphone System - Component Location
Figure 102 (Sheet 2)

FLIGHT INTERPHONE SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains one task. This task gives the system test and adjustments of the flight interphone system.

TASK 23-51-00-735-009

2. System Test - Flight Interphone System
   A. General
      (1) The flight interphone system test makes sure that the system operates correctly and is ready for use.
   B. References
      (1) 24-22-00/201, Electrical Power - Control
   C. Access
      (1) Location Zones
         (a) 211/212 Flight Compartment
   D. Prepare for Test

      S 865-001
      (1) Supply electrical power (Ref 24-22-00/201).

      S 865-002
      (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
         (a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
         (b) 11C26, INTERPHONE DUAL PWR F/O
         (c) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
         (d) 11G30, INTERPHONE DUAL PWR F/O

      S 985-008
      (3) Turn the volume control knob on the captain's and the first officer's interphone speakers counterclockwise to off.

      S 825-012
      (4) On the captain's, first officer's and first observer's audio selector panels, adjust all volume controls to OFF except INT which should be on with volume at mid-point.
   E. Audio Selector Panel and Jack Panel Test

      S 715-021
      (1) Do the operational test as follows:
         (a) At each audio selector panel, push the INT mic select switch.
            1) Make sure the light in the switch comes on.
         (b) Use hand mics and headphones to make a voice communication between the captain and the first officer stations.
            1) Make sure you hear clear audio.

2) Make sure the INT volume control on both the audio selector panels changes the volume level smoothly.

(c) Use hand mics and headphones to make a voice communication between the captain and first observer stations.
1) Make sure you hear clear audio.
2) Make sure the INT volume control on the first observer's audio selector panel changes the volume level smoothly.

(d) Make a flight interphone voice transmission from the captain's station and use a headset to monitor the transmission at the second observer's jack panel (P63).
1) Make sure you hear clear audio through each headphone jack.

(e) Use the boom mic/headsets with the audio selector panel INTER-RADIO switches held to the RADIO position to make a voice communication between the captain and first officer stations.
1) Make sure you hear clear audio.

(f) Use the boom mic/headsets with the control wheel INT-R/T switches held to the R/T position to make a voice communication between the captain and first officer stations.
1) Make sure you hear clear audio.

(g) Use the boom mic/headsets with the audio selector panel INTER-RADIO switches held to the RADIO position to make a voice communication between the captain and first observer stations.
1) Make sure you hear clear audio.

(h) At the captain's, first officer's, and first observer's audio selector panels, set any system except INT with MIC SELECTOR switches.

(i) Use the boom mic/headsets with the audio selector panel INTER-RADIO switches held to the INTER position to make a voice communication between the captain and first officer stations.
1) Make sure you hear clear audio.

(j) Use the boom mic/headsets with the control wheel INT-R/T switches held to the INT position to make a voice communication between the captain and first officer stations.
1) Make sure you hear clear audio.

(k) Use the boom mic/headsets with the audio selector panel INTER-RADIO switches held to the INTER position to make a voice communication between the captain and first observer stations.
1) Make sure you hear clear audio.

F. Interphone Speaker Test

S 715-022

(1) Do the operational test as follows:
(a) Set the volume knob on the first officer's interphone speaker to off.
1) Make sure the interphone speaker is off.
(b) Set the volume knob on the captain's interphone speaker to mid-point.

(c) Make a flight interphone voice transmission from the first observer's station.
1) Make sure you hear clear audio through the captain's interphone speaker.

(d) ALL MTH AIRPLANES;
during a voice transmission from the first observer's station, make sure the audio selector panel INTER-RADIO switch at the captain's station mutes the captain's speaker when the switch is held to the INTER position.

(e) ALL SAS 767-200 AIRPLANES;
during a voice transmission from the first observer's station, make sure the audio selector panel INTER-RADIO switch at either the captain's or first officer's station mutes the respective speaker when the switch is held to the INTER position.

(f) ALL SAS 767-300 AIRPLANES;
during a voice transmission from the first observer's station, make sure the audio selector panel INTER-RADIO switch at either the captain's or first officer's station mutes both the captain's and first officer's speakers when the switch is held to the INTER position.

(g) ALL MTH AIRPLANES;
during a voice transmission from the first observer's station, make sure the control wheel INT-R/T switch at the captain's station mutes the captain's speaker when the switch is held to the INT position.

(h) ALL SAS 767-300 AIRPLANES;
during a voice transmission from the first observer's station, make sure the control wheel INT-R/T switch at either the captain's or first officer's station mutes both the captain's and first officer's speakers when the switch is held to the INT position.

(i) ALL SAS 767-200 AIRPLANES;
during a voice transmission from the first observer's station, make sure the control wheel INT-R/T switch at either the captain's or first officer's station mutes the respective speaker when the switch is held to the INT position.

(j) Set the volume knob on the captain's interphone speaker to off.
1) Make sure the speaker is off.

(k) Set the volume knob on the first officer's interphone speaker to mid-point.

(l) Make a flight interphone voice transmission from the first observer's station.
1) Make sure you hear clear audio through the first officer's interphone speaker.

(m) ALL SAS 767-300 AIRPLANES;
during a voice transmission from the first observer's station, make sure the audio selector panel INTER-RADIO switch at either the captain's or first officer's station mutes both the first officer's and the captain's speaker when the switch is held to the RADIO position.

(n) ALL SAS 767-200 AIRPLANES;
during a voice transmission from the first observer's station, make sure the audio selector panel INTER-RADIO switch at either the captain's or first officer's station mutes the respective speaker when the switch is held to the RADIO position.

(o) Set the volume knob on the first officer's interphone speaker to off.
1) Make sure the speaker is off.

(p) Set the volume knob on the captain's interphone speaker to mid-point.

(q) At the captain's, first officer's, and first observer's audio selector panels, push the INT MIC SELECTOR switches.
1) Make sure the light in the switch comes on.

(r) ALL MTH AIRPLANES;
1) Make sure you hear clear audio through the first officer's interphone speaker.

(s) ALL MTH AIRPLANES;
during a voice transmission from the first observer's station, make sure the audio selector panel INTER-RADIO switch at the captain's station mutes the captain's speaker when the switch is held to the RADIO position.

(t) ALL SAS 767-300 AIRPLANES;
during a voice transmission from the first observer's station, make sure the control wheel INT-R/T switch at either the captain's or the first officer's station mutes both the captain's and the first officer's speaker when the switch is held to either R/T position.

(u) ALL SAS 767-200 AIRPLANES;
during a voice transmission from the first observer's station, make sure the control wheel INT-R/T switch at either the captain's or the first officer's station mutes the respective speaker when the switch is held to either R/T position.

(v) ALL MTH AIRPLANES;
during a voice transmission from the first observer's station, make sure the control wheel INT-R/T switch at the captain's station mutes the captain's speaker when the switch is held to the R/T position.

(w) ALL MTH AIPRLANES;
do the steps that follow:
1) Set the volume knob on the captain's interphone speaker to off.
   a) Make sure the speaker is off.
2) Set the volume knob on the first officer's interphone speaker to mid-point.
3) Make a flight interphone voice transmission from the first observer's station.
   a) Make sure you hear clear audio through the first officer's interphone speaker.

4) During a voice transmission from the first observer's station, make sure the audio selector panel INTER-RADIO switch at the first officer's station mutes the first officer's speaker when the switch is held to the RADIO position.
5) During a voice transmission from the first observer's station, make sure the control wheel INT-R/T switch at the first officer's station mutes the first officer's speaker when the switch is held to the R/T position.

(x) Set the volume knobs on the captain's and first officer's interphone speakers to mid-point.
(y) Make a flight interphone voice transmission from the first observer's station.
(z) During a transmission from the first observer's station, make sure the captain's hand mic PTT switch will mute the captain's interphone speaker.
(aa) During a transmission from the first observer's station, make sure the first officer's hand mic PTT switch will mute the first officer's speaker.

G. Oxygen Mask Microphone Test

S 715-023
(1) Do the operational test as follows:
(a) Open the oxygen mask stowage door at the captain, first officer, and the first observer stations to get access to the oxygen mask and the oxygen mask microphone.
(b) Use the captain's and the first officer's oxygen mask microphones and headsets to make a voice communication between their stations.
1) Make sure you hear clear audio through the headsets.
(c) Use the captain's and first observer's oxygen mask microphones and headsets to make a voice communication between their stations.
1) Make sure you hear clear audio through the headsets.
(d) At each station, put the oxygen mask away in the stowage compartment and close the oxygen mask stowage door.
1) Push the RESET/TEST switch on the stowage door to put back to boom microphone.

(e) Make sure interphone communication is possible when you use the boom microphones between the captain, first officer, and first observer station.
(f) Make a voice communication between the captain's station and the flight interphone jack on the P40 panel.
1) Make sure you hear clear audio.

H. Interphone Dual Power Source Test

S 865-024
(1) Open this circuit breaker on the P11 panel:
(a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

S 715-026
(2) Make a voice communication between the captain's station and the first officer's station.
(a) Make sure you hear clear audio.

S 865-027
(3) Close this circuit breaker on the P11 panel:
(a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

S 865-028
(4) Open this circuit breaker on the P11 panel:
(a) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

S 715-029
(5) Make a voice communication between the captain's station and the first officer's station.
(a) Make sure you hear clear audio.

S 865-030
(6) Close this circuit breaker on the P11 panel:
(a) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

S 865-031
(7) Open this circuit breaker on the P11 panel:
(a) 11C26, INTERPHONE DUAL PWR F/O

S 715-032
(8) Make a voice communication between the captain's station and the first officer's station.
(a) Make sure you hear clear audio.

S 865-033
(9) Close this circuit breaker on the P11 panel:
(a) 11C26, INTERPHONE DUAL PWR F/O

S 865-034
(10) Open this circuit breaker on the P11 panel:
(a) 11G30, INTERPHONE DUAL PWR F/O

S 715-035

(11) Make a voice communication between the captain's station and the first officer's station.
(a) Make sure you hear clear audio.

S 865-036

(12) Close this circuit breaker on the P11 panel:
(a) 11G30, INTERPHONE DUAL PWR F/O

S 865-037

(13) Remove electrical power if it is not necessary (Ref 24-22-00/201).

AUDIO SELECTOR PANEL - REMOVAL/INSTALLATION

1. General
   A. The audio selector panels are installed in the flight compartment (Fig. 401). The removal/installation procedure is the same for all panels.
   B. This procedure contains two tasks. The first task removes the audio selector panel from the flight compartment. The second task installs the audio selector panel in the flight compartment.

TASK 23-51-01-004-001

2. Remove the Audio Selector Panel
   A. General
      (1) This task gives the instructions to remove the audio selector panel from the flight compartment.
   B. References
      (1) AMM 20-41-01/201, Electrostatic Sensitive Devices
   C. Access
      (1) Location Zones
          211/212 Flight Compartment

   D. Remove the Audio Selector Panel

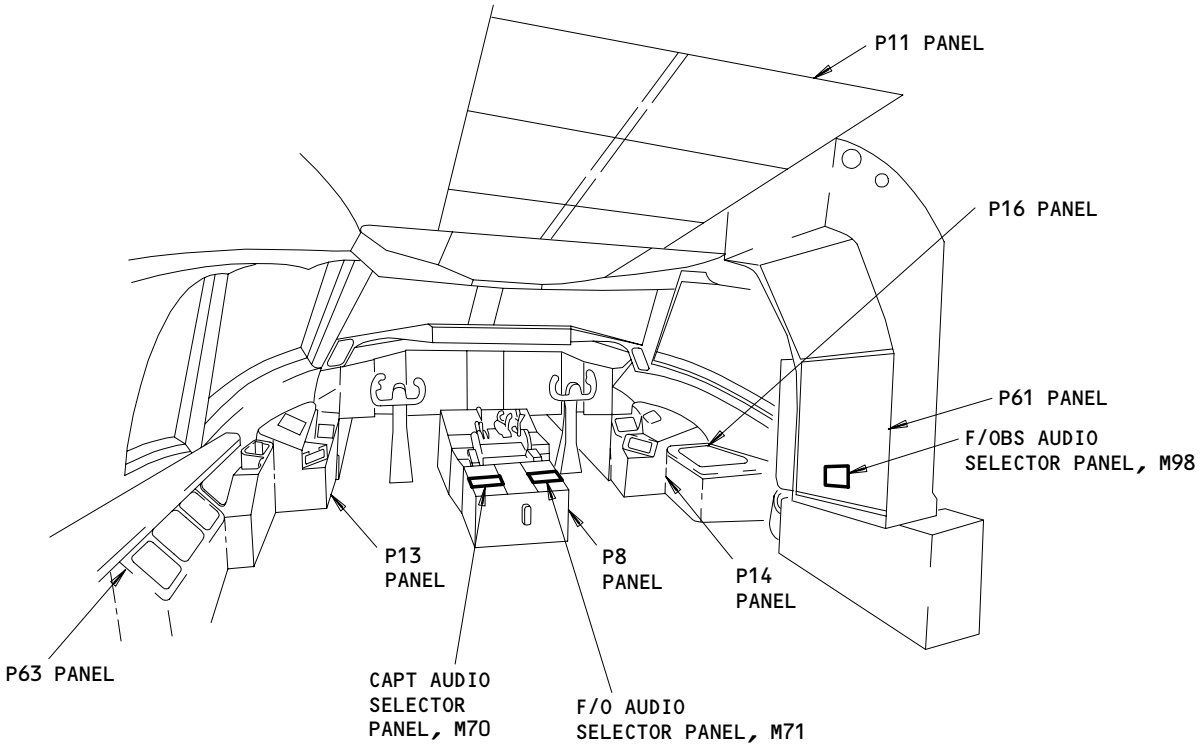
      S 864-002
      (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
          (b) 11C26, INTERPHONE DUAL PWR F/O
          (c) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
          (d) 11G30, INTERPHONE DUAL PWR F/O

      S 864-019

      CAUTION: DO NOT TOUCH THE AUDIO SELECTOR PANEL BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE AUDIO SELECTOR PANEL.

      (2) Do the procedure for devices that are sensitive to electrostatic discharge (Ref 20-41-01/201).

      S 024-021
      (3) Remove the audio selector panel.



FLT COMPT

Audio Selector Panel Installation
Figure 401

TASK 23-51-01-404-020

3. Install Audio Selector Panel

A. General

(1) This task gives the instructions to install the audio selector panel in the flight compartment.

B. References

(1) 24-22-00/201, Electrical Power - Control

(2) 20-41-01/201, Electrostatic Sensitive Devices

C. Access

(1) Location Zones

211/212 Flight Compartment

D. Install the Audio Selector Panel

S 424-022

CAUTION: DO NOT TOUCH THE AUDIO SELECTOR PANEL BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE AUDIO SELECTOR PANEL.

(1) Do the procedure for devices that are sensitive to electrostatic discharge (Ref 20-41-01/201).

S 424-023

(2) Install the audio selector panel.

S 864-032

(3) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

(a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

(b) 11C26, INTERPHONE DUAL PWR F/O

(c) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

(d) 11G30, INTERPHONE DUAL PWR F/O

E. Audio Selector Panel Installation Test

S 714-038

(1) Do the operational test as follows:

S 864-039

(2) Supply electrical power (Ref 24-22-00/201).

(a) Make sure this circuit breaker on the overhead circuit breaker panel, P11, is closed:

1) 11C22, PASS ADRS

(b) Push the PA MIC SELECTOR switch on the audio selector panel.

1) Make sure the light in the switch comes on.

(c) Make a PA announcement.

1) Make sure you hear clear audio through the passenger address speakers.

S 864-040

(3) Remove electrical power if it is not necessary (Ref 24-22-00/201).

INTERPHONE SPEAKER - REMOVAL/INSTALLATION

1. General
   A. Two interphone speakers are installed in the flight compartment. The captain's speaker is installed on the captain's forward console. The first officer's speaker is installed on the first officer's forward console. The removal and installation procedure is the same for both speakers.
   B. This procedure contains two tasks. The first task removes the flight interphone speakers from the forward consoles. The second task installs the flight interphone speakers in the forward consoles.

TASK 23-51-02-004-001

2. Interphone Speaker Removal (Fig. 401)
   A. General
      (1) This task gives the instructions to remove either of the interphone speakers from the forward console.
   B. Access
      (1) Location Zone
          211/212 Flight Compartment

   C. Prepare To Remove Interphone Speaker

      S 864-002
      (1) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
          (b) 11C26, INTERPHONE DUAL PWR F/O
          (c) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
          (d) 11G30, INTERPHONE DUAL PWR F/O

      S 864-008

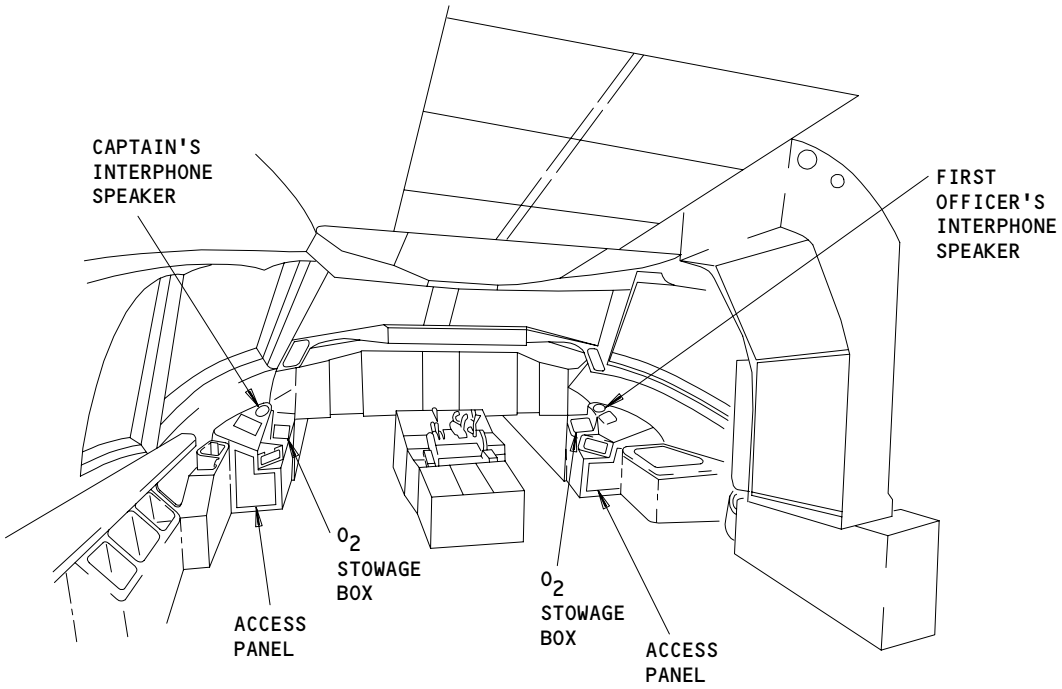
      WARNING: DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

      (2) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
          (a) 6H15, CAPT SEAT
          (b) 6J21, F/O SEAT

      S 014-009
      (3) Remove access panel (Fig. 401).

      S 014-010
      (4) Remove oxygen stowage box for more access.

      S 034-011
      (5) Remove connector from rear of speaker.



Interphone Speaker Installation
Figure 401

S 024-012
(6) Remove the interphone speaker.
(a) Lift the interphone speaker through the access opening.

TASK 23-51-02-404-013

3. Interphone Speaker Installation (Fig. 401)

A. General
(1) This task gives the instructions to install the flight interphone speaker into the forward console.

B. Reference
(1) AMM 24-22-00/201, Electrical Power - Control

C. Access
(1) Location Zone
212/212 Flight Compartment

D. Procedure

S 424-014
(1) Install the interphone speaker.

S 434-015
(2) Install the connector.

S 414-016
(3) Install the oxygen stowage box.

S 414-017
(4) Install the access panel.

S 864-018
(5) Remove DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
(a) 6H15, CAPT SEAT
(b) 6J21, F/O SEAT

S 864-035
(6) Remove DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
(a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
(b) 11C26, INTERPHONE DUAL PWR F/O
(c) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

(d) 11G30, INTERPHONE DUAL PWR F/O

S 714-024

(7) Interphone Speaker Installation Test

S 864-025

(8) Supply electrical power (AMM 24-22-00/201).
   (a) Turn the volume knob on the interphone speaker and set to the middle position.
   (b) Make a flight interphone voice transmission from the first observer's station.
   (c) Make sure you hear clear audio through the interphone speaker.

S 864-026

(9) Remove electrical power if it is not necessary (AMM 24-22-00/201).

CONTROL WHEEL PUSH-TO-TALK SWITCH - REMOVAL/INSTALLATION

1. General
   A. A microphone PTT switch is installed in each pilot's control wheel. The switch permits the pilot to do the communication system PTT functions with both hands on the control wheel.
   B. This procedure contains two tasks. The first task removes the PTT switch from the pilot's control wheel. The second task installs the PTT switch in the control wheel.

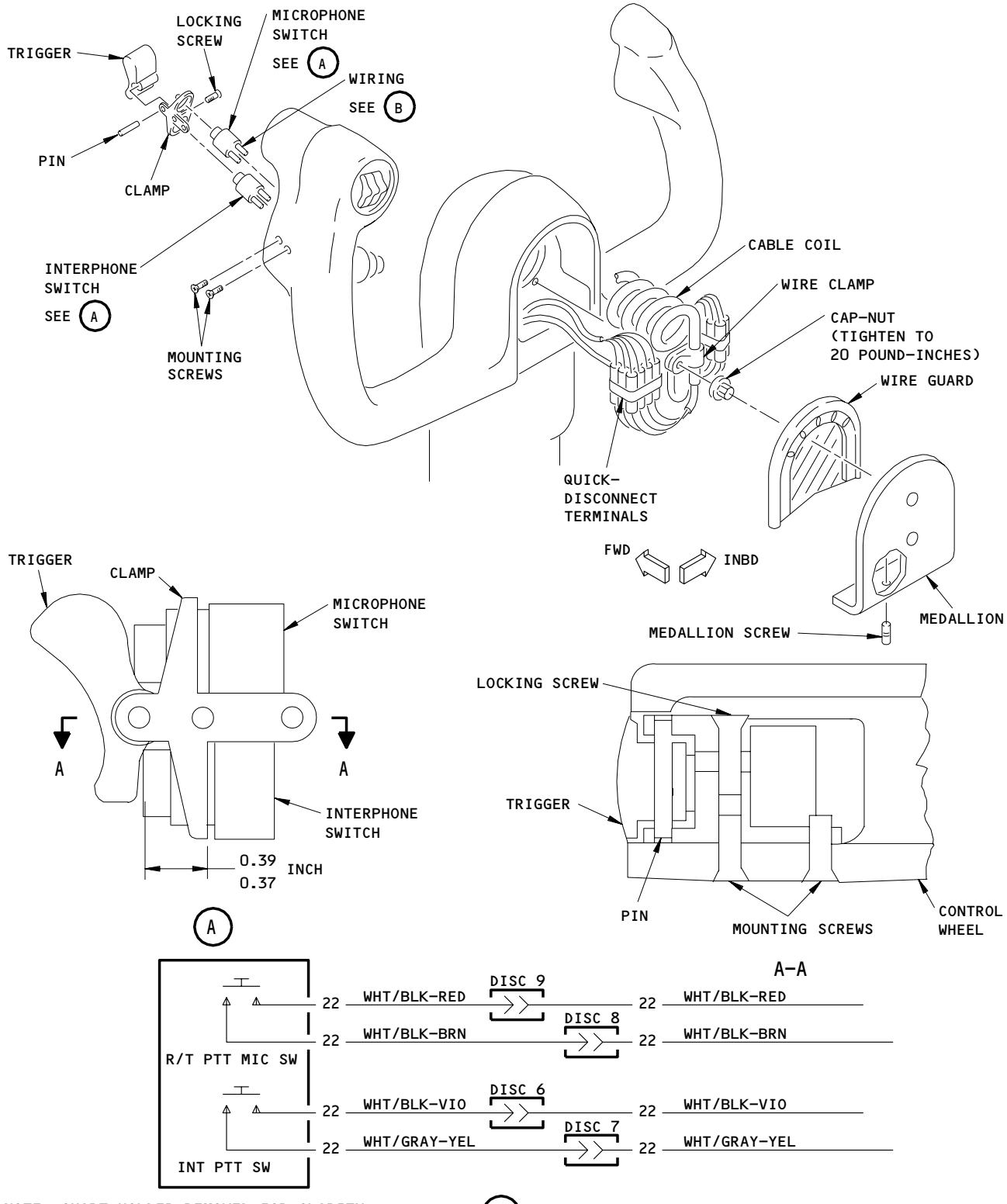
TASK 23-51-03-004-001

2. Remove PTT Switch (Fig. 401)
   A. General
      (1) This task gives the instructions to remove the PTT switch from the pilot's control wheel.
   B. Equipment
      (1) Insertion and Extraction tool (Duetch No. M15570-20)
   C. Consumable Material
      (1) G01568 30-inch length of copper wire (No. 18 to 22 gauge), preferably uninsulated (used for switch wire threading through PTT switch hole)
   D. Access
      (1) Location Zones
          211/212 Flight Compartment

   E. Remove the PTT Switch

      S 864-002
      (1) For the captain's PTT switch, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
          (b) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

      S 864-008
      (2) For the first officer's PTT switch, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
          (a) 11C26, INTERPHONE DUAL PWR F/O
          (b) 11G30, INTERPHONE DUAL PWR F/O



NOTE: CHART HOLDER REMOVED FOR CLARITY.

Control Wheel PTT Switch Installation
Figure 401

S 864-013

WARNING: REMOVE ELECTRICAL POWER FROM THE FLIGHT COMPARTMENT SEAT. ACCIDENTAL ELECTRICAL OPERATION OF THE FLIGHT COMPARTMENT SEAT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Open these circuit breakers on the main power distribution panel, P6 and attach DO-NOT-CLOSE tags:
(a) 6H15, CAPT SEAT
(b) 6J21, F/O SEAT

S 014-014
(4) Remove the medallion screw and the medallion with chart holder.

S 014-015
(5) Remove the cap-nut and pull out the wire bundle to get access to the disconnects.

S 034-016
(6) Use the extraction tool to disconnect the wires mentioned below from the quick-disconnect terminals.
(a) To remove the R/T control PTT switch, disconnect the WHITE/BLACK/BROWN and WHITE/BLACK/RED wires from the terminals.
(b) To remove the interphone control PTT switch, disconnect the WHITE/BLACK/VIOLET and WHITE/GREY/YELLOW wires from the terminals.

S 864-017
(7) Connect one end of the 30-inch copper wire around the two wires that are connected to the switch.

S 014-019
(8) Remove the two mounting screws.

S 014-018
(9) Remove the switch assembly and wire through the PTT switch hole.

NOTE: Permit approximately 3 or 4 inches of copper wire to come out from the PTT switch hole.

S 034-020
(10) Disconnect the copper wire from the switch wires.

S 034-021
(11) Remove the locking screw.

S 024-022
(12) Remove the switch from the clamp.

S 034-023
(13) Disconnect the switch wiring from the switch at the soldered connection.

NOTE: Do not discard switch wires, save and use for reinstallation.

TASK 23-51-03-404-024

3. Install PTT Switch (Fig. 401)
   A. General
      (1) This task gives the instructions to install the PTT switch on the pilot's control wheel.
   B. Equipment
      (1) Insertion and Extraction tool (Duetch No. M15570-20)
   C. Consumable Material
      (1) G01568 30-inch length of copper wire (No. 18 to 22 gauge), preferably uninsulated (used for switch wire threading through PTT switch hole)
   D. Reference
      (1) 24-22-00/201, Electrical Power - Control
   E. Access
      (1) Location Zones
          211/212 Flight Compartment

   F. Install the PTT Switch

S 434-026
(1) Solder the color coded wires to the switch per detail B.

NOTE: If the wires saved from the switch removal are not reusable, use 6 mil nominal (5 mil minimum) insulated tin-coated copper wire 22 AWG, color coded per detail B.

S 434-028
(2) Install the interphone switch into the clamp per detail A.
(a) Make sure the switch does not turn in the clamp.

S 434-035
(3) Install the microphone switch into the clamp until the switch touches the trigger.

S 824-036

(4) Adjust the switch with an additional 1/4 ± 1/8 turn to give a load to the switch button.

S 434-037

(5) Install the locking screw in the clamp.

S 984-038

(6) Connect the copper wire (end that is out from the PTT switch hole) around the switch wire bundle and pull the bundle down through the PTT switch hole with the other end of the copper wire.

S 034-039

(7) Disconnect the copper wire from the switch wire bundle.

S 434-041

(8) Use the insertion tool per detail B to connect the switch wires to the quick-disconnect terminals.

S 434-043

CAUTION: MAKE SURE THE WIRE CLAMP AND THE CENTER CABLE COIL IN THE HUB OF THE CONTROL WHEEL ARE INSTALLED AT THE POSITION SHOWN ON FIG. 401. FAILURE TO INSTALL THE COIL IN THE CENTER WILL RESULT IN TOO MUCH FRICTION AND CAN CAUSE DAMAGE TO EQUIPMENT.

(9) Install the quick-disconnect terminal bundle into the control wheel with the cap-nut.

NOTE: During installation, set the wire clamp to the center position of the cable coil in the control wheel.

S 434-077

(10) Tighten the cap-nut to 20 pound-inches.

S 434-097

CAUTION: ENSURE THAT WIRE GAURD ASSEMBLY SLIDES SMOOTHLY IN GROOVE OF WHEEL ASSEMBLY DURING INSTALLATION. KEEP ALL WIRES AND CONNECTORS CLEAR OF PLANE OF GROOVE TO PREVENT POSSIBLE WIRE INSULATION DAMAGE DURING ASSEMBLY.

(11) Install wire guard assembly. Insert lower end of wire guard assembly inside base of wheel. Firmly press upper edge of seal until guard is below medallion groove.

S 964-044

(12) Replace the medallion in the center of the control wheel.

S 424-045

(13) Install the switch assembly into the mounting recess with the two mounting screws.

S 864-046

(14) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
(a) 6H15, CAPT SEAT
(b) 6J21, F/O SEAT

S 864-047

(15) For the captain's PTT switch, remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11C25, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL
(b) 11G29, INTERPHONE DUAL PWR CAPT/OBS FLT AMPL

S 864-053

(16) For the first officer's PTT switch, remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11C26, INTERPHONE DUAL PWR F/O
(b) 11G30, INTERPHONE DUAL PWR F/O

G. PTT Switch Installation Test

S 714-058

(1) Do the operational test as follows:

S 864-059

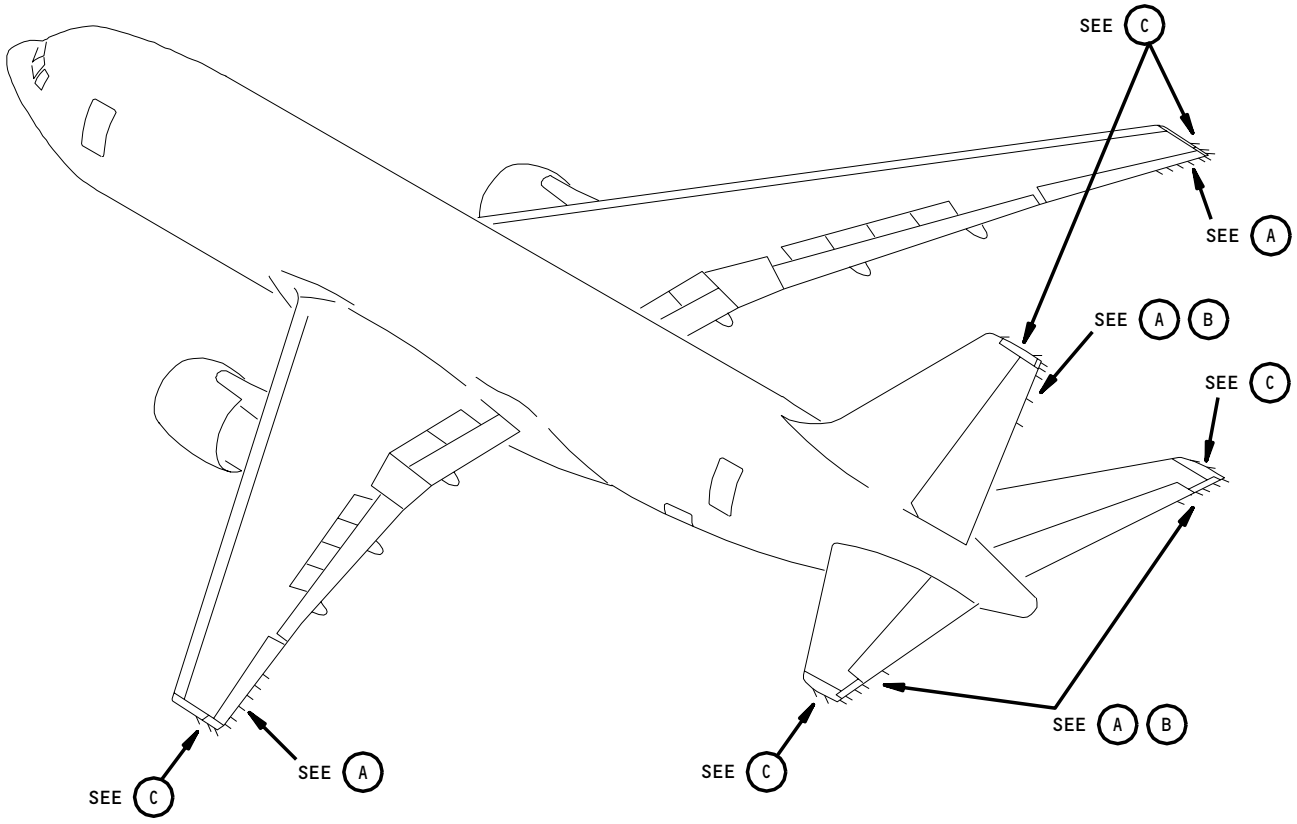
(2) Supply electrical power (Ref 24-22-00/201).
(a) At the pilot's audio selector panel, set the flight interphone audio and any microphone except the flight interphone.
(b) Make sure interphone communication is possible when the push-to-talk switch is set to the INTER position.
(c) Make sure the switch goes back to the off position when released.
(d) At the pilot's audio selector panel, set the flight interphone microphone.

(e) Make sure interphone communication is possible when the push-to-talk switch is held to the RADIO position.
(f) Make sure the switch goes back to the off position when released.

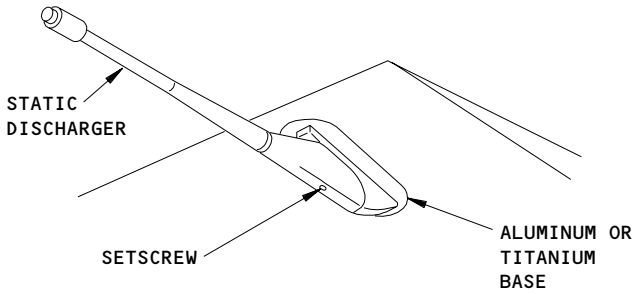
S 864-060
(3) Remove electrical power if it is not necessary (Ref 24-22-00/201).

STATIC DISCHARGES - DESCRIPTION AND OPERATION

1. General
   A. Static dischargers are installed along the outboard trailing edges and tips of the wings, and horizontal and vertical stabilizers.
   B. Static dischargers reduce radio transceiver interference. This interference is caused by corona discharge from airplane surfaces due to precipitation static and engine charging. The static dischargers prevent coupling of any static into radio transceiver antennas by releasing static at points that are a critical length from airplane extremities. At these points, there is little coupling of static into radio transceiver antennas.
2. Component Details (Fig. 1)
   A. The static dischargers installed along the trailing edges of the wing and tail surfaces are 9-5/16 inches long. Each includes a resistive discharger rod with a carbon-based molded tip. A setscrew in the discharger holds it to the discharger base. Wingtip and stabilizer tip discharger rods are similarly constructed, but are only five inches long.
   B. Aluminum discharger bases are used on sheet metal or aluminum flame-sprayed surfaces. Titanium discharger bases are used on graphite composite surfaces. Composite trailing edge surfaces within 18 inches of tip areas are flame-sprayed with aluminum. Composite areas flame-sprayed with aluminum use aluminum discharger bases.
   C. A mounting plate is installed between the discharger base and the composite trailing edge where it is too thin to be adequately riveted. The discharger base is riveted to the mounting plate. For graphite composite surfaces the mounting plate is bonded to the composite surface with silver epoxy. On the forward part of the mounting plate the surface is thicker, so fasteners secure the mounting plate to the surface.
   D. Tip-type discharger bases have curved mounting surfaces, and are made of aluminum. The setscrew is in the discharger base. Composite tip areas within 18 inches of the edges are aluminum flame-sprayed.

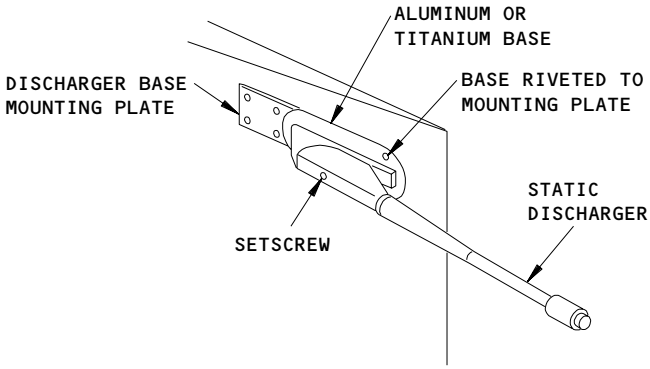


Static Discharger Locations
Figure 1 (Sheet 1)



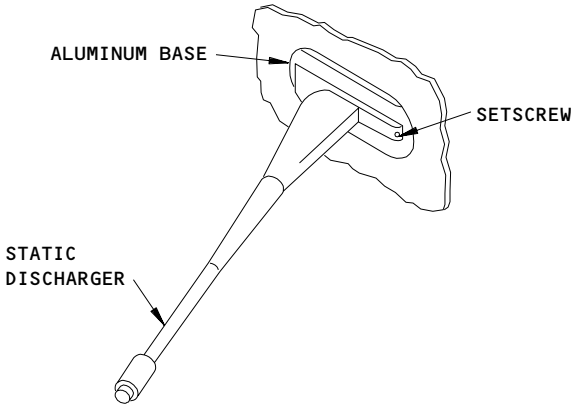
TRAILING EDGE
SURFACE INSTALLATION
(EXAMPLE)

A



TRAILING EDGE SURFACE
INSTALLATION WITH MOUNTING PLATE
(EXAMPLE)

B



STABILIZER TIP, WING TIP
AND FIN CAP INSTALLATION
(EXAMPLE)

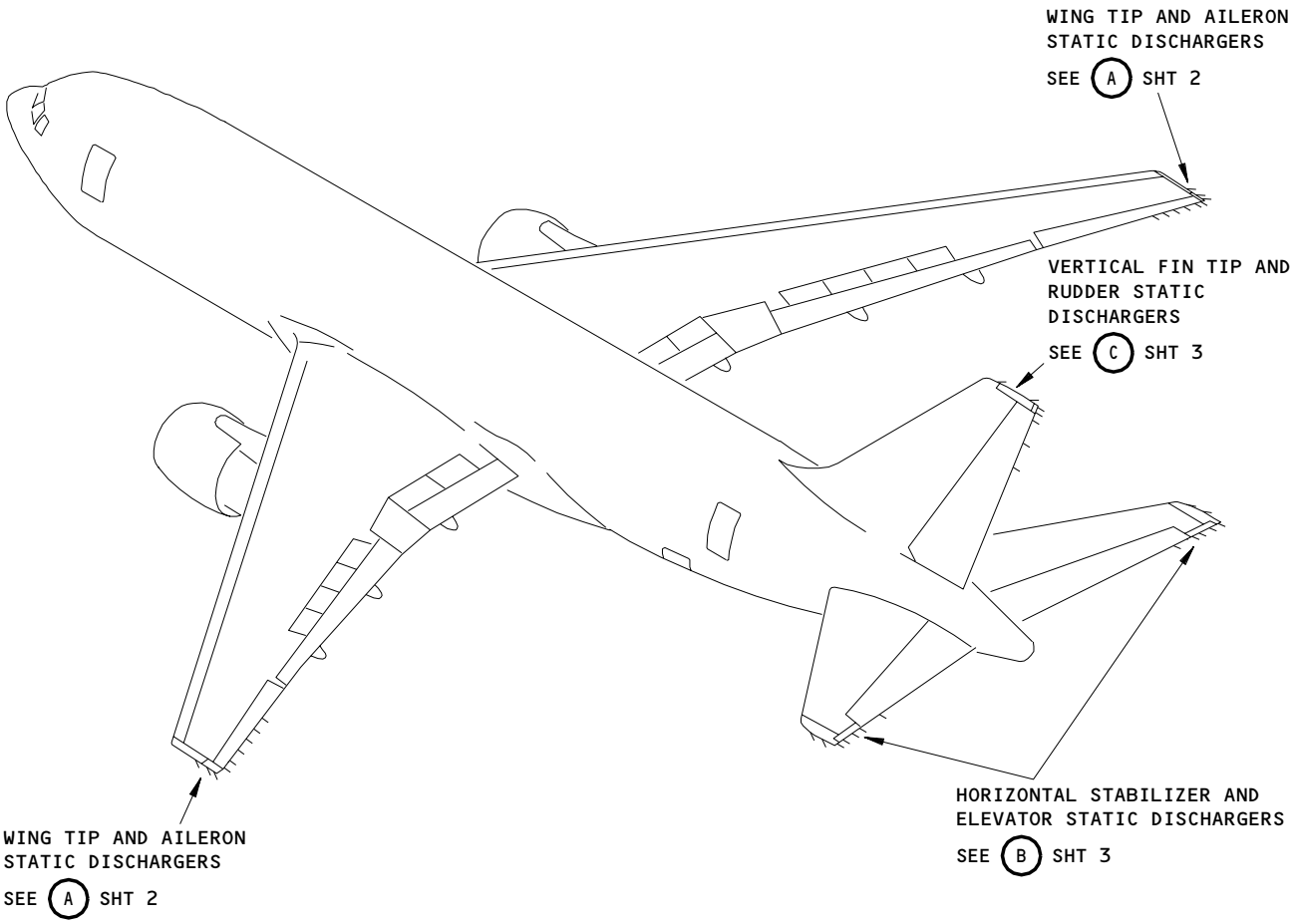
C

Static Discharger Locations
Figure 1 (Sheet 2)

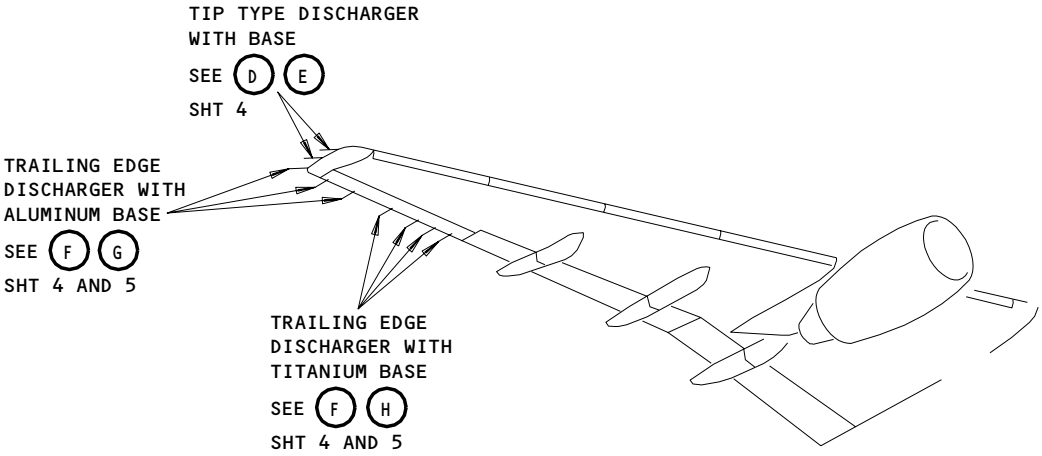
STATIC DISCHARGERS

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
BASE – ALUMINUM STATIC DISCHARGER, TRAILING EDGE TYPE	3	6	HORIZ STABILIZER OUTBOARD TRAILING EDGES	23-61-01
	3	2	HORIZ STABILIZER TIPS	23-61-01
	2	4	OUTBOARD AILERONS	23-61-01
	3	3	RUDDER	23-61-01
	2	2	WINGTIPS	23-61-01
BASE – STATIC DISCHARGER, TIP TYPE	3	4	HORIZ STABILIZER TIPS	23-61-01
	3	2	VERTICAL STABILIZER TIP	23-61-01
	2	4	WINGTIPS	23-61-01
BASE – TITANIUM STATIC DISCHARGER, TRAILING EDGE TYPE	2	8	OUTBOARD AILERONS	23-61-01
	3	2	OUTBOARD ELEVATORS	23-61-01
	3	2	RUDDER	23-61-01
DISCHARGER – TIP TYPE STATIC	3	4	HORIZ STABILIZER TIPS	23-61-01
	3	2	VERTICAL STABILIZER TIP	23-61-01
	2	4	WINGTIPS	23-61-01
DISCHARGER – TRAILING EDGE TYPE STATIC	3	6	HORIZ STABILIZER OUTBOARD TRAILING EDGES	23-61-01
	3	2	HORIZ STABILIZER TIPS	23-61-01
	2	12	OUTBOARD AILERONS	23-61-01
	3	2	OUTBOARD ELEVATORS	23-61-01
	3	5	RUDDER	23-61-01
	2	2	WINGTIPS	23-61-01
MOUNTING PLATE – ALUMINUM STATIC DISCHARGER BASE	3	6	HORIZ STABILIZER OUTBOARD TRAILING EDGES	23-61-01
	3	1	RUDDER	23-61-01
MOUNTING PLATE – TITANIUM STATIC DISCHARGER BASE	3	2	OUTBOARD ELEVATORS	23-61-01
	3	2	RUDDER	23-61-01
	2	8	OUTBOARD AILERONS	23-61-01

Static Dischargers – Component Index
Figure 101

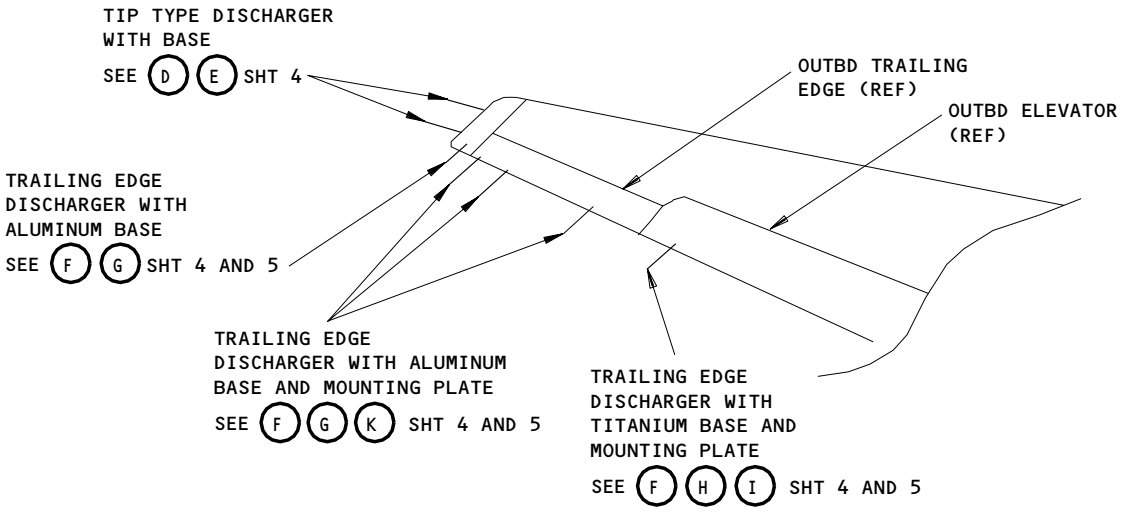


Static Dischargers - Component Location
Figure 102 (Sheet 1)



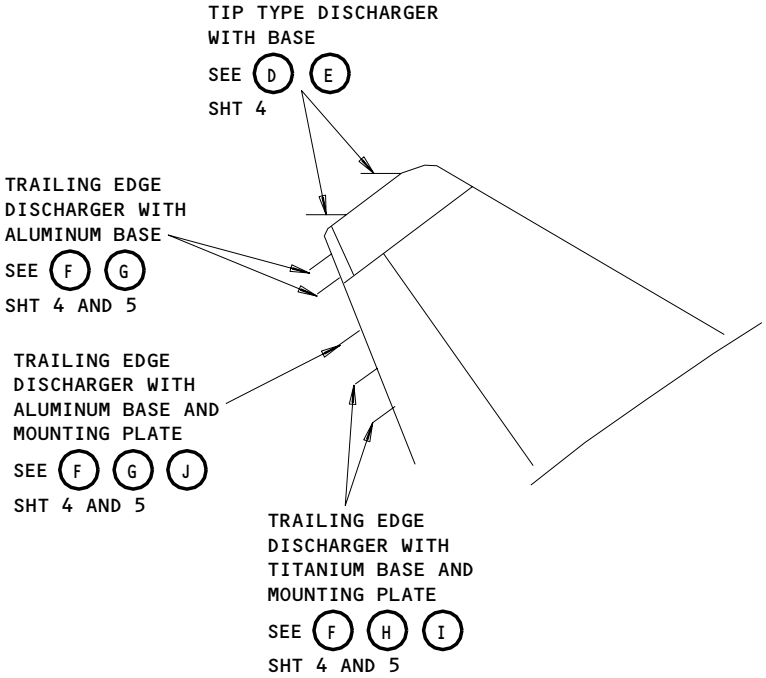
WING TIP AND AILERON STATIC DISCHARGERS (EXAMPLE)
A

Static Dischargers - Component Location (Detail from Sht 1)
Figure 102 (Sheet 2)



HORIZONTAL STABILIZER AND ELEVATOR STATIC DISCHARGERS (EXAMPLE)

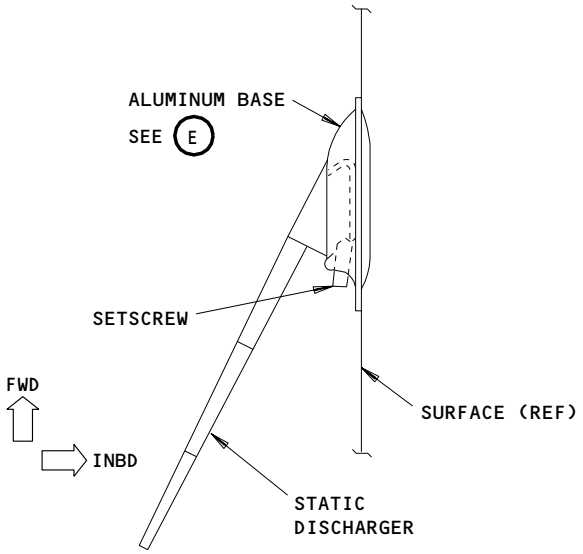
B



VERTICAL FIN TIP AND RUDDER STATIC DISCHARGERS

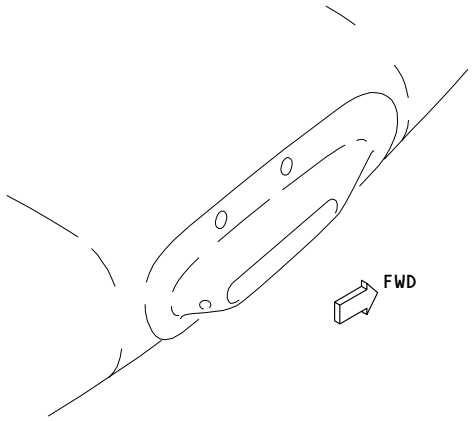
C

Static Dischargers - Component Location (Details from Sht 1)
Figure 102 (Sheet 3)



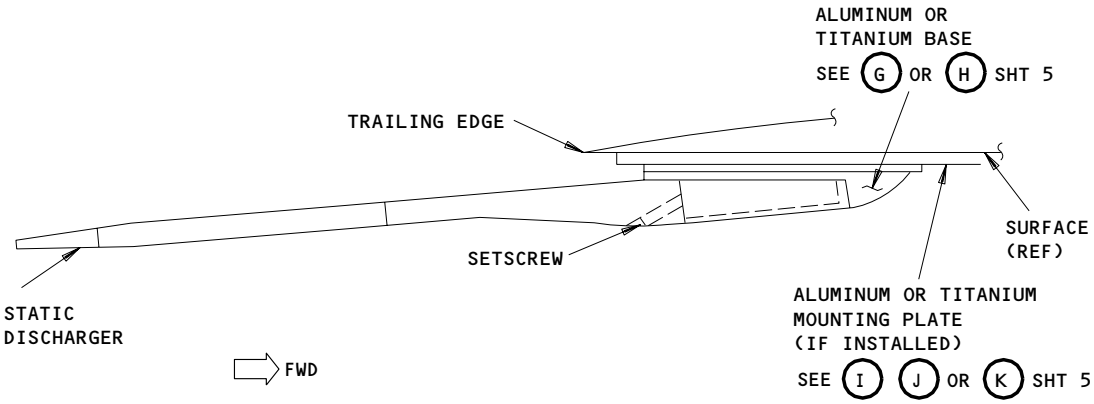
TIP TYPE STATIC DISCHARGER

D



TIP TYPE STATIC DISCHARGER BASE
(ALUMINUM – FLAT OR CURVED SURFACE)

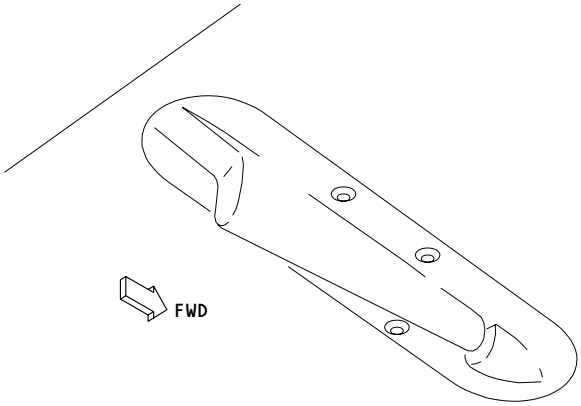
E



TRAILING EDGE TYPE STATIC DISCHARGER

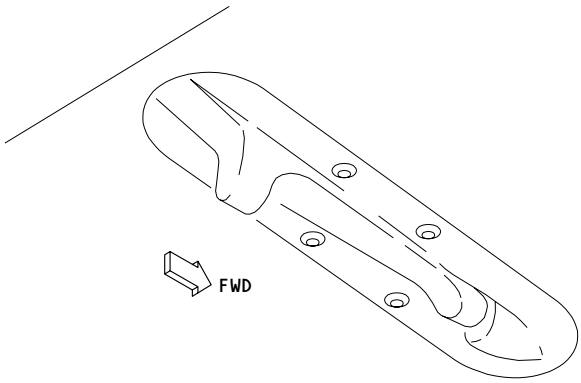
F

Static Dischargers – Component Location (Details from Sht 2 and 3)
Figure 102 (Sheet 4)



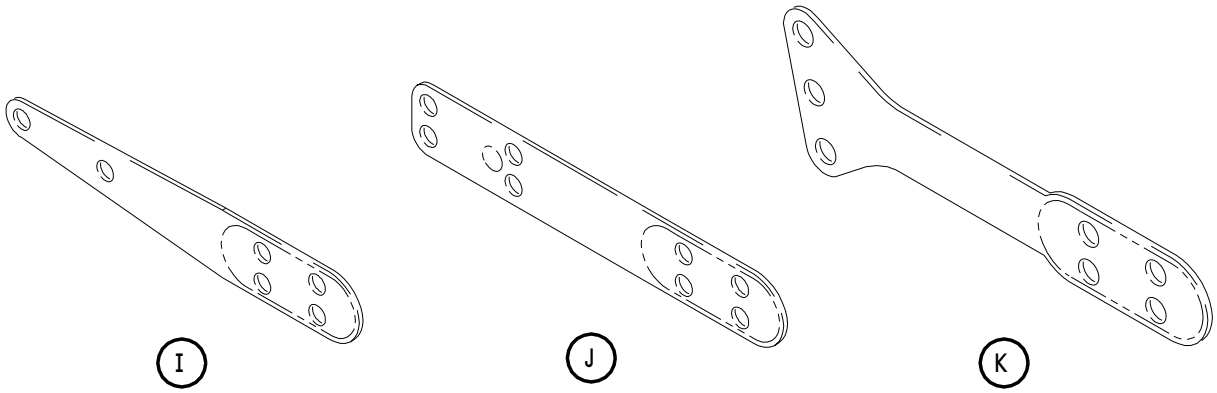
TRAILING EDGE TYPE STATIC
DISCHARGER BASE
(ALUMINUM)

G



TRAILING EDGE TYPE STATIC
DISCHARGER BASE
(TITANIUM)

H



STATIC DISCHARGER BASE MOUNTING PLATE
(ALUMINUM OR TITANIUM)

Static Discharger - Component Location (Details from Sht 2, 3 and 4)
Figure 102 (Sheet 5)

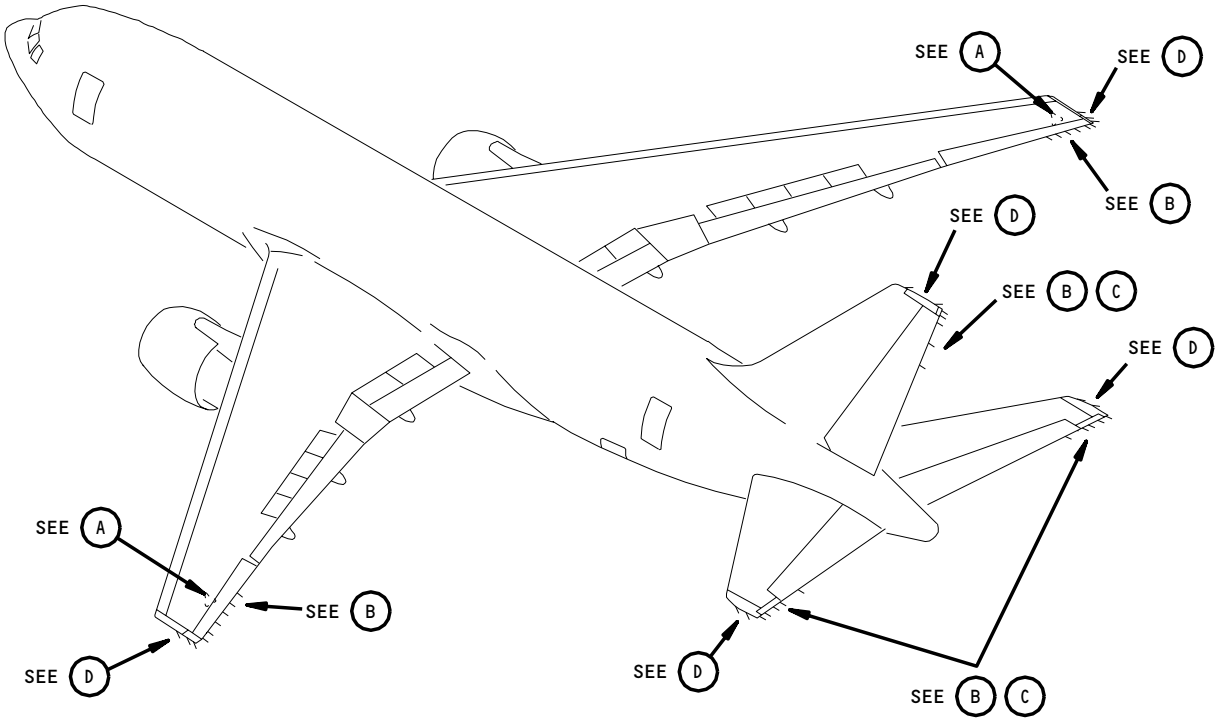
K38418

STATIC DISCHARGERS - MAINTENANCE PRACTICES

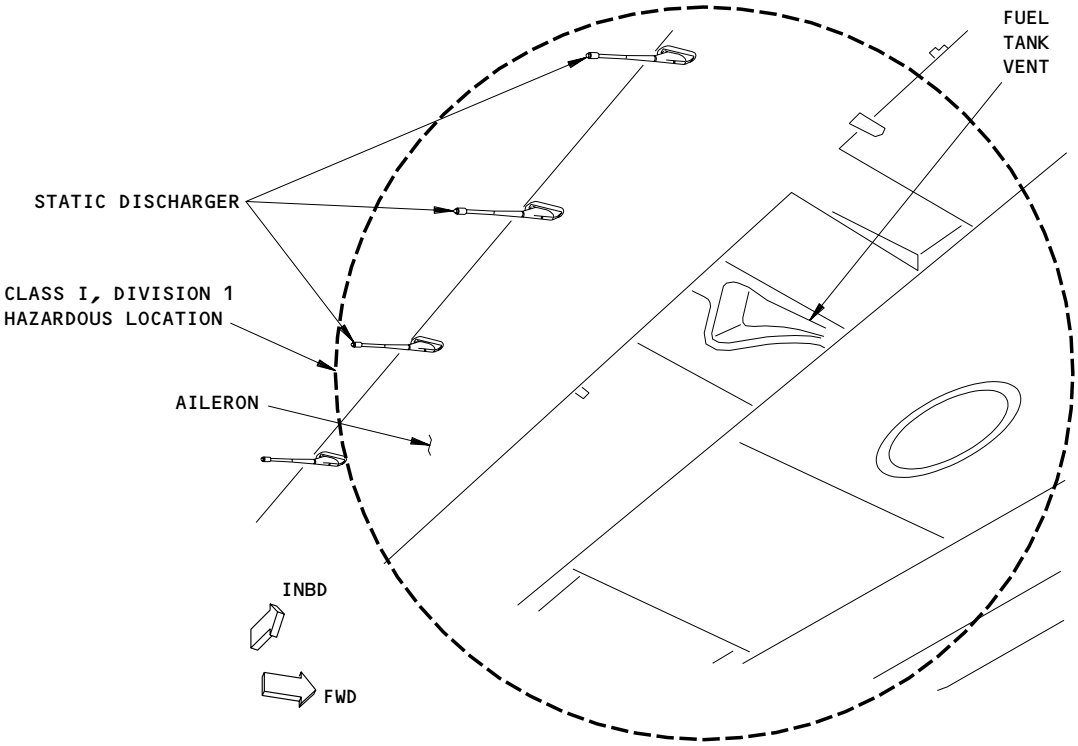
1. General
   A. The static dischargers are along the trailing edges and tips of the wings and tail surfaces. Each discharger is held in place by a setscrew on its base, which attaches to the airplane surface.
   B. This procedure contains inspection/check procedures for the static dischargers. Do the check procedure to decrease the radio reception interference. The check also discharges the electrical energy collected in flight.
   C. This procedure contains removal/installation procedures for the static dischargers. The tip type dischargers are smaller than the trailing edge dischargers. The removal/installation procedures for all dischargers are almost the same.
   D. This procedure contains removal/installation procedures for the static discharger bases. Tip discharger bases are aluminum with rounded mounting surfaces. Trailing edge discharger bases are aluminum or titanium. Resistance tests are included to do a test of the discharger base installation.

TASK 23-61-01-202-001

2. Static Discharger Inspection/Check (Fig. 201)
   A. References
      (1) AMM 24-22-00/201, Manual Control
      (2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
   B. Access
      (1) Location Zones
         320 Vertical Stabilizer and Rudder
         330 Left Horizontal Stabilizer and Elevator
         340 Right Horizontal Stabilizer and Elevator
         560 Left Wing Trailing Edge - Aft of Rear Spar and outboard of inboard Aileron
         660 Right Wing Trailing Edge - Aft of Rear Spar and outboard of inboard Aileron
   C. Deactivate the Flight Control Surface Movement

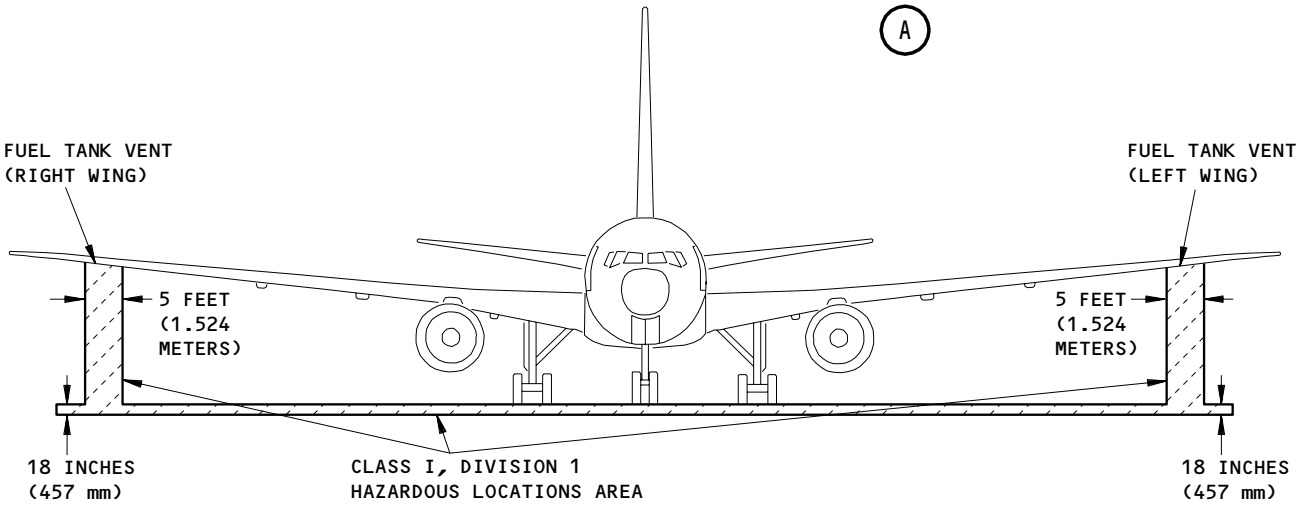


Static Discharger Locations
Figure 201 (Sheet 1)



LEFT WING
(RIGHT WING IS OPPOSITE)

A



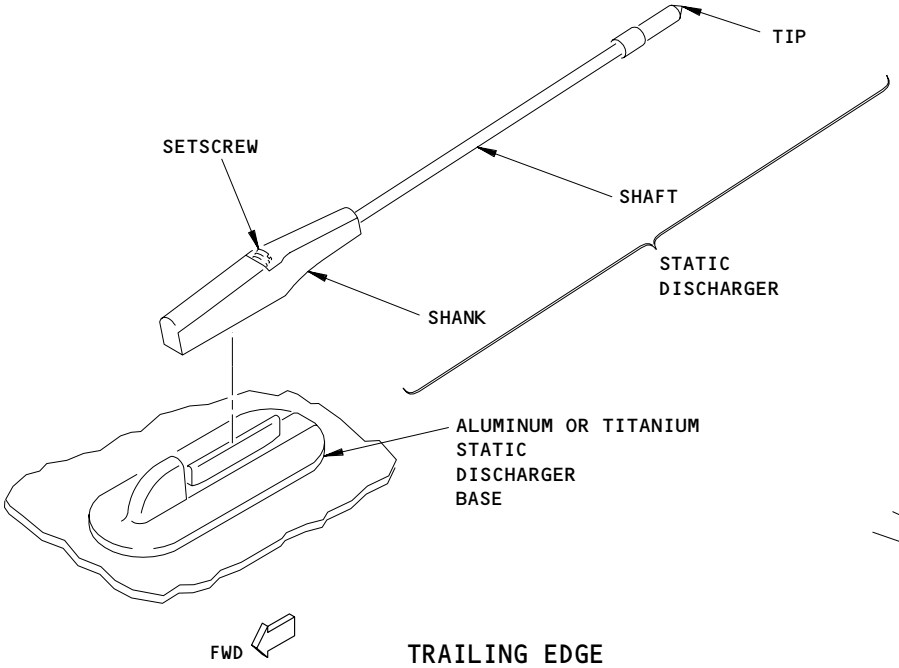
CLASS I, DIVISION 1 HAZARDOUS LOCATIONS
(CLOSED FUEL TANK) 1

WARNING: DO NOT USE A MEGOHMMETER TO MEASURE STATIC DISCHARGER RESISTANCE IN A CLASS I, DIVISION 1 HAZARDOUS LOCATION. AN EXPLOSION OR FIRE IS POSSIBLE.

1 REFER TO AMM 28-11-00/201 FOR DEFINITIONS OF HAZARDOUS LOCATIONS

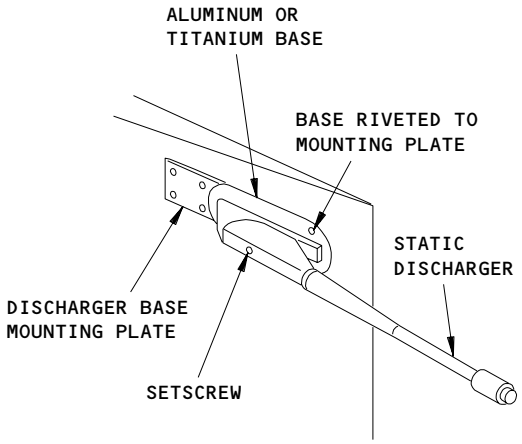
Static Dischargers Location
Figure 201 (Sheet 2)

L95879



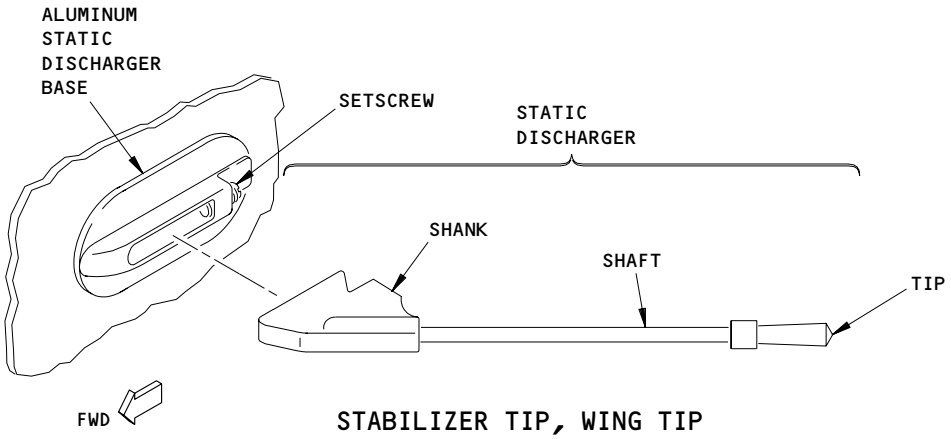
TRAILING EDGE
SURFACE INSTALLATION
(EXAMPLE)

B



TRAILING EDGE SURFACE
INSTALLATION WITH MOUNTING PLATE
(EXAMPLE)

C



STABILIZER TIP, WING TIP
AND FIN CAP INSTALLATION
(EXAMPLE)

D

Static Discharger Locations
Figure 201 (Sheet 3)

K38617

S 862-162

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-163

(2) Remove the power from the electrical system (AMM 24-22-00/201).

D. Procedure

S 212-002

(1) Visually make sure all dischargers are not broken and are tight on their bases.
   (a) Examine dischargers for lightning damage (burned or pitted discharger base). Replace discharger if necessary.

S 212-003

(2) Examine dischargers for broken, bent, or missing tips. If repair is not possible replace the discharger.

S 762-154

(3) Do this task to measure the resistance of all dischargers between the discharger tip and the discharger base: Static Discharger Test (AMM 23-61-01/201).

S 762-153

(4) Do this task to measure the resistance of all dischargers between the discharger base and the airplane surface: Static Discharger Base Inspection/Check (AMM 23-61-01/201).

E. Put the Airplane Back to Its Usual Condition

S 862-184

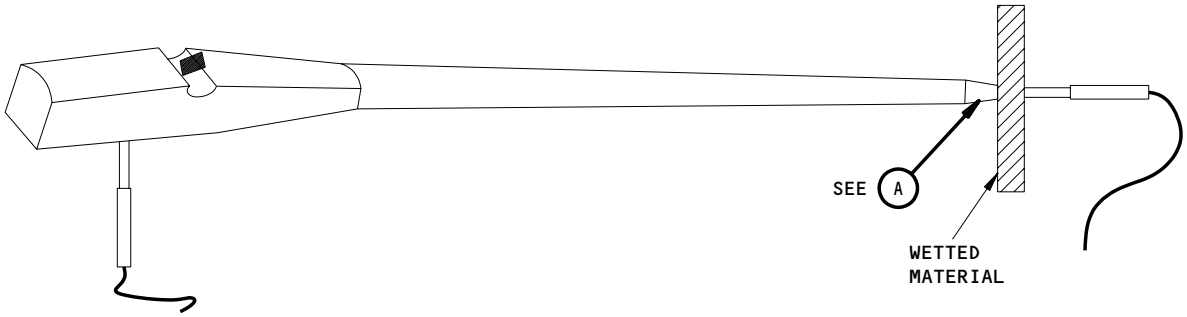
(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-732-155

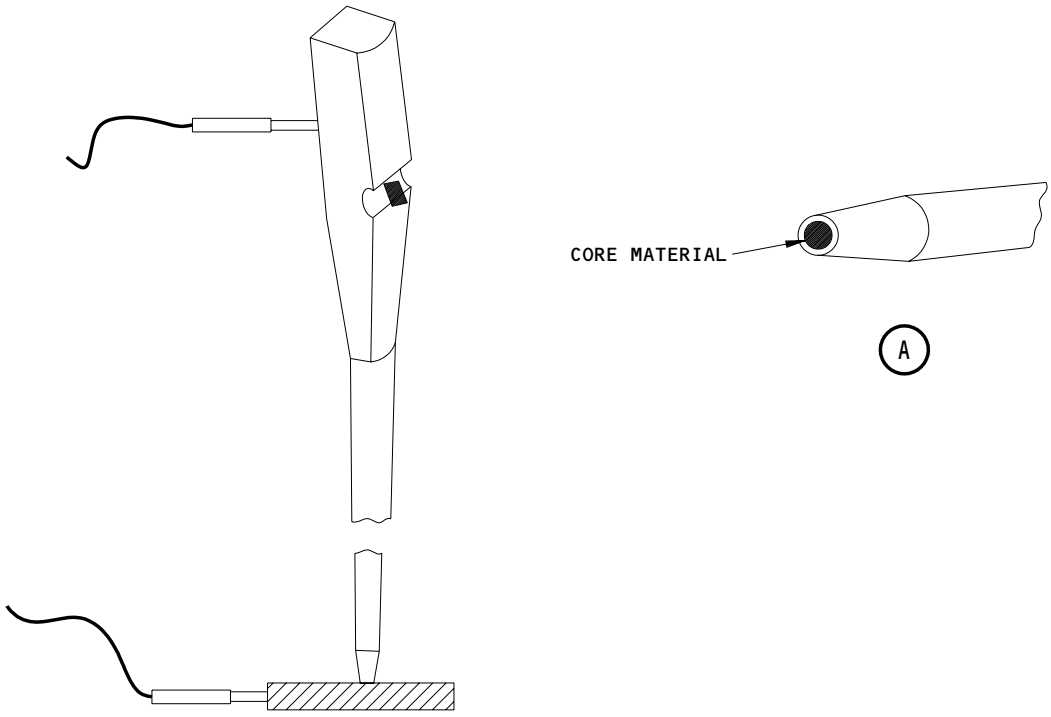
3. Static Discharger Test

A. References
   (1) AMM 24-22-00/201, Manual Control
   (2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems

B. Equipment
   (1) 1863 Megohmmeter (or equivalent)
   Quadtech Inc. (Vendor Code 0PK96)
   100 Nickerson Ave., Marlborough, MA 01752
   (2) Bonding Meter (SWPM 20-20-00)



ON WING DISCHARGER RESISTANCE TEST



ALTERNATE (OFF WING) DISCHARGER RESISTANCE TEST

NOTE: TEST PROCEDURES FOR THE TRAILING EDGE AND WING TIP DISCHARGERS ARE THE SAME.

Static Discharger Resistance Test
Figure 201A

C. Consumable Materials
(1) G00034 Cloth cotton, lint free
D. Access
(1) Location Zones
320 Vertical Stabilizer and Rudder
330 Left Horizontal Stabilizer and Elevator
340 Right Horizontal Stabilizer and Elevator
560 Left Wing Trailing Edge - Aft of Rear Spar and outboard of inboard Aileron
660 Right Wing Trailing Edge - Aft of Rear Spar and outboard of inboard Aileron
E. Deactivate the Flight Control Surface Movement

S 862-164

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-165
(2) Remove the power from the electrical system (AMM 24-22-00/201).
F. Procedure

S 732-156

WARNING: DO NOT USE A MEGOHMMETER NEAR A FUEL TANK VENT. IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) If you must do a resistance check for a static discharger that is in a five foot diameter area around a fuel tank vent, then do these tasks:
(a) Static Discharger Removal
(b) Static Discharger Installation.

S 732-157
(2) Discharger Resistance Test

WARNING: USE THE PRECAUTIONS THAT FOLLOW WHEN YOU USE A MEGOHMMETER. IF YOU DO NOT USE PRECAUTIONS, THEN IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(a) Use these precautions for possible fuel vapors when you use a megohmmeter:
1) Use the Quadtech 1863 megohmmeter or equivalent meter with a 500 VDC test voltage and a maximum 5 milliampere short circuit current.

2) Do not use a megohmmeter at these locations:
   a) Area adjacent to or below a wing fuel tank vent, five foot (1.524 meters) diameter column, from vent to ground.
   b) Zero to 18 inches (457 mm) above the ground in the area around the airplane.
3) Make sure that:
   a) Area is well ventilated.
   b) Metal workstands are grounded.
   c) Megohmmeter is plugged into a grounded receptacle.
   d) Megohmmeter is insulated from metal work stands.

(b) To measure the resistance between the discharger tip and base, do the steps that follow:
1) AIRPLANES WITH DAYTON-GRANGER AND OTHER STATIC DISCHARGERS NOT SUPPLIED BY CHELTON;
Put the wet material on the END of the discharger tip.
2) AIRPLANES WITH CHELTON SUPPLIED STATIC DISCHARGERS;
Put the wet material on the END of the discharger tip.

NOTE: DO NOT wrap the wetted material around the tip of the discharger. Wrapping the wetted material around tip of the discharger can cause erroneous resistance readings resulting in the unnecessary removal of a serviceable static discharger. Place the wetted material between the tip of the discharger and the megger probe. If resistance is not within limits, remove wetted material and place megger probe directly onto tip onto discharger core material and repeat test. Refer to Figure 201, ON WING DISCHARGER RESISTANCE TEST. If you are using the alternate discharger test method, connect the megger probe to the edge of the wetted material as shown in Figure 201, ALTERNATE (OFF WING) DISCHARGER RESISTANCE TEST.

3) Position the megohmmeter leads on the base and on the wet cloth.
4) Make sure the resistance value is between 6-100 megohms.

S 962-158
(3) Replace the dischargers that do not meet the resistance values.

G. Put the Airplane Back to Its Usual Condition

S 862-185
(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-732-141

4. Static Discharger Base Inspection/Check

A. Equipment
(1) Bonding meter (SWPM 20-20-00)

B. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
(3) AMM 51-21-10/701, Decorative Exterior Finishes

C. Access
(1) Location Zones
320 Vertical Stabilizer and Rudder
330 Left Horizontal Stabilizer and Elevator
340 Right Horizontal Stabilizer and Elevator
560 Left Wing Trailing Edge - Aft of Rear Spar and outboard of inboard Aileron
660 Right Wing Trailing Edge - Aft of Rear Spar and outboard of inboard Aileron

D. Deactivate the Flight Control Surface Movement

S 862-166

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-167
(2) Remove the power from the electrical system (AMM 24-22-00/201).

E. Procedure

S 762-150

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) Use a bonding meter (SWPM 20-20-00) to do a check of the static discharger bond between the discharger bases and airplane surface.

S 762-148

(2) Use method 1 or method 2 to measure the bond resistance.

(a) Method 1 - Use a bonding meter (SWPM 20-20-00) to measure the dc resistance between the static discharger base and the bonded airplane surface:

NOTE: This resistance measurement is for in-service bonds and static discharger bases. There is a different measurement value for newly installed static discharger bases and bonds.

Make sure both meter leads touch bare metal. If a surface is coated with paint, you can scrape off a small amount of paint or use a sharp probe to penetrate the paint.

1) Do the test as follows:
   a) Put one meter lead on the discharger base.
   b) Put one meter lead on the airplane surface.
2) ALUMINUM DISCHARGER BASE ON ALUMINUM OR ALUMINUM FLAME-SPRAYED SURFACE;
   Make sure the resistance is not more than 0.5 ohms.

CAUTION: BE CAREFUL WHEN YOU CLEAN THE ALUMINUM SURFACE. DAMAGE TO ALUMINUM COATING CAN OCCUR.

   a) If it is necessary, clean the flame-sprayed surface with Scotch Brite.
3) TITANIUM DISCHARGER BASE ON A CARBON COMPOSITE SURFACE;
   Make sure the resistance value is not more than 5.0 ohms.
4) If it is necessary, paint the area where the paint was removed for the test (AMM 51-21-10/701).

(b) Method 2 - Use a bonding meter (SWPM 20-20-00) to do a check of the bond resistance between two adjacent discharger bases.

NOTE: This resistance measurement is for in-service bonds and static discharger bases. There is a different measurement value for newly installed static discharger bases and bonds.

Make sure both leads touch bare metal. If a surface is coated with paint, you can scrape off a small amount of paint or use a sharp probe to penetrate the paint.

1) Do the test as follows:
   a) Put one meter lead on the discharger base.
   b) Put one meter lead on the adjacent discharger base.
2) ALUMINUM DISCHARGER BASE TO ALUMINUM DISCHARGER BASE ON ALUMINUM OR ALUMINUM FLAME-SPRAYED SURFACE;
   Make sure the resistance is not more than 0.5 ohm.

3) TITANIUM DISCHARGER BASE TO TITANIUM DISCHARGER BASE ON A CARBON COMPOSITE SURFACE;
Make sure the resistance is not more than 5.0 ohms.
4) If the resistance shows more than the resistance values in Method 2, then do the procedure in Method 1 to find the defective static discharger base.

(c) For discharger bases that do not meet resistance requirements, do the steps that follow:
1) Remove the base.
2) Clean the bonding surfaces.
3) Install or replace the discharger base (refer to the Static Discharger Base Removal/Installation).

F. Put the Airplane Back to Its Usual Condition

S 862-186

(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-022-008

5. Static Discharger Removal (Fig. 201)

NOTE: See FIM 23-61-00/101, Fig. 101 and FIM 23-61-00/101, Fig. 102, for detail location information.

A. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems

B. Access
(1) Location Zones
320 Vertical Stabilizer and Rudder
330 Left Horizontal Stabilizer and Elevator
340 Right Horizontal Stabilizer and Elevator
560 Left Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron.
660 Right Wing Trailing Edge - Aft of rear spar and outboard of inboard Aileron.

C. Deactivate the Flight Control Surface Movement

S 862-168

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-169
(2) Remove the power from the electrical system (AMM 24-22-00/201).

D. Removal of Trailing Edge Type Static Discharger

S 022-076
(1) Loosen the setscrew four or five turns on the discharger.

S 862-010
(2) Put a thin-bladed tool between the discharger casting and the discharger base.
(a) Pry on the discharger and pull out on the sides of the discharger casting to remove the discharger from base.

E. Removal of Tip Type Static Discharger

S 022-011
(1) Loosen the setscrew three or four turns on the rear of the discharger base.

S 862-012
(2) Put a small blade between the end of the discharger casting and the base.
(a) Pry on the discharger and pull on the rod as near as possible to the base.

F. Put the Airplane Back to Its Usual Condition

S 862-187
(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-402-013

6. Static Discharger Installation

A. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems

B. Equipment
(1) 1863 Megohmmeter (or equivalent)
Quadtech Inc. (Vendor Code 0PK96)
100 Nickerson Ave., Marlborough, MA 01752
(2) Bonding Meter (SWPM 20-20-00)

C. Access
(1) Location Zones
320 Vertical Stabilizer and Rudder
330 Left Horizontal Stabilizer and Elevator
340 Right Horizontal Stabilizer and Elevator
560 Left Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron
660 Right Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron

D. Consumables
   (1) A00313 Loctite 242
   (2) G00034 Cloth cotton, lint free
E. Deactivate the Flight Control Surface Movement

S 862-182

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-183
(2) Remove the power from the electrical system (AMM 24-22-00/201).
F. Static Discharger Inspection Test

S 732-140
(1) Use the megohmmeter to measure the resistance between static discharger tip and static discharger shank before you install the static discharger.

WARNING: USE THE PRECAUTIONS THAT FOLLOW WHEN YOU USE A MEGOHMMETER. IF YOU DO NOT USE PRECAUTIONS, THEN IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(a) Use these precautions for possible fuel vapors when you use a megohmmeter:
   1) Use the Quadtech 1863 megohmmeter or equivalent meter with a 500 VDC test voltage and a maximum 5 milliampere short circuit current.
   2) Do not use a megohmmeter at these locations:
      a) Area adjacent to or below a wing fuel tank vent, five foot (1.524 meters) diameter column, from vent to ground.
      b) Zero to 18 inches (457 mm) above the ground in the area around the airplane.
   3) Make sure that:
      a) Area is well ventilated.
      b) Metal workstands are grounded.
      c) Megohmmeter is plugged into a grounded receptacle.
      d) Megohmmeter is insulated from metal work stands.

(b) To measure the resistance between the discharger tip and shank, do the steps that follow:
1) AIRPLANES WITH DAYTON-GRANGER AND OTHER STATIC DISCHARGERS NOT SUPPLIED BY CHELTON;
Put the wet material on the END of the discharger tip.
2) AIRPLANES WITH CHELTON SUPPLIED STATIC DISCHARGERS;
Put the wet material on the END of the discharger tip.

NOTE: DO NOT wrap the wetted material around the tip of the discharger. Wrapping the wetted material around tip of the discharger can cause erroneous resistance readings resulting in the unnecessary removal of a serviceable static discharger. Place the wetted material between the tip of the discharger and the megger probe. If resistance is not within limits, remove wetted material and place megger probe directly onto tip of discharger core material and repeat test. If you are using the alternate discharger test method, connect the megger probe to the edge of the wetted material.

3) Position the megohmmeter leads on the static discharger shank and on the wet cloth.
4) Make sure the resistance value is between 6-100 megohms.

S 762-200
(2) Alternative Discharger Resistance Test.

NOTE: This test is for a static discharger that is near a fuel tank vent, but can alos be used for static dischargers at other locations as well.
(a) Static Discharger Removal.
(b) Move the discharger to a safe location to use the megohmmeter.
(c) Use the megohmmeter to measure the resistance between the discharger tip and the discharger shank (S732-140).
(d) Static Discharger Installation.

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(e) FOR METALLIC SHANK STATIC DISCHARGERS ONLY;
Use a bonding meter (SWPM 20-20-00) to measure the resistance between the discharger shank and the discharger base.
1) Make sure that the resistance is not more than 1 ohm.

(f) FOR PLASTIC SHANK STATIC DISCHARGERS ONLY;
Use a bonding meter (SWPM 20-20-00) to measure the resistance between the set screw in the discharger shank and the discharger base.
1) Make sure that the resistance is not more than 1 ohm.

G. Installation of Trailing Edge Type Static Discharger

S 102-160
(1) Make sure that the mating surfaces of the static discharger and the discharger base are clean.

S 022-071
(2) Remove the setscrew from the static discharger.

S 392-197

CAUTION: DO NOT USE LOCKTITE WITH PLASTIC-BASED MATERIAL STATIC DISCHARGER OR WITH NY-LOC INSERTS IN THE SET SCREW. LOCKTITE REACTS TO PLASTIC MATERIALS THAT WILL CAUSE EVENTUAL FAILURE OF THE BOND AND RESULT IN SEPARATION OF THE STATIC DISCHARGER FROM THE AIRPLANE.

(3) For static dischargers without a Ny-loc insert in the mounting hole and static dischargers that are not plastic-based material, do this step:
(a) Apply a thin layer of loctite (thread sealer 242) to the setscrew threads.

S 422-014
(4) Install the setscrew on the static discharger.

S 822-012
(5) Adjust the setscrew until it makes a continuous surface with the static discharger casting.

S 422-015
(6) Install the discharger over the discharger base with an even pressure on the discharger casting until correctly in position.
(a) Tighten the static discharger setscrew:
1) AIRPLANES WITH 2-14SC1, 2-16SC1, 740007, 80-1746-2, 80-1828-2 STATIC DISCHARGERS;
Tighten it to 7.5 ±1.5 inch-pounds.
2) AIRPLANES WITH 10-900-21, 10-900-25 STATIC DISCHARGERS;
Tighten it to 2.5 inch-pounds.

3) AIRPLANES WITH 16785, 740001, 16305 STATIC DISCHARGERS;
Tighten it to 5 inch-pounds.

(b) Make sure there is no movement between the static discharger and the discharger base.

H. Installation of Tip Type Static Discharger

S 102-161

(1) Make sure that the mating surfaces of the static discharger and the discharger base are clean.

S 022-015

(2) Remove the setscrew from the static discharger base.

S 392-198

CAUTION: DO NOT USE LOCTITE WITH PLASTIC-BASED MATERIAL STATIC DISCHARGER OR WITH NY-LOC INSERTS IN THE SET SCREW. LOCTITE REACTS TO PLASTIC MATERIALS THAT WILL CAUSE EVENTUAL FAILURE OF THE BOND AND RESULT IN SEPARATION OF THE STATIC DISCHARGER FROM THE AIRPLANE.

(3) For static dischargers without a Ny-Loc insert in the mounting hole and for static dischargers that are not plastic-based material, do this step:

(a) Apply a thin layer of loctite (thread sealer 242) to the setscrew threads.

S 422-016

(4) Install the setscrew in the discharger base.

S 822-018

(5) Adjust the setscrew until it makes a continuous surface with the discharger base.

S 422-017

(6) Put the discharger casting into the cavity of the discharger base.

(a) Tighten the static discharger setscrew:

1) AIRPLANES WITH 2-14SC1, 2-16SC1, 740007, 80-1746-2, 80-1828-2 STATIC DISCHARGERS;
Tighten it to 7.5 ±1.5 inch-pounds.

2) AIRPLANES WITH 10-900-21, 10-900-25 STATIC DISCHARGERS;
Tighten it to 2.5 inch-pounds.

3) AIRPLANES WITH 16785, 740001, 16305 STATIC DISCHARGERS; Tighten it to 5 inch-pounds.

(b) Make sure there is no movement between the static discharger and the discharger base.

I. Static Discharger Installation Test

S 762-151

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) ALL STATIC DISCHARGERS EXCEPT P/N 10-900-21 AND 10-900-25; Use a bonding meter (SWPM 20-20-00) to measure the resistance between the shank of the discharger and the static discharger base.
(a) Maximum resistance value is 1 ohm.

S 762-159

(2) STATIC DISCHARGERS P/N 10-900-21 AND 10-900-25; If the static discharger is not in a 5-foot diameter area around a fuel tank vent, then do this step:
(a) Do this paragraph again: Static Discharger Inspection Test, but do the test between the discharger tip and the discharger base.

J. Put the Airplane Back to Its Usual Condition

S 862-188

(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

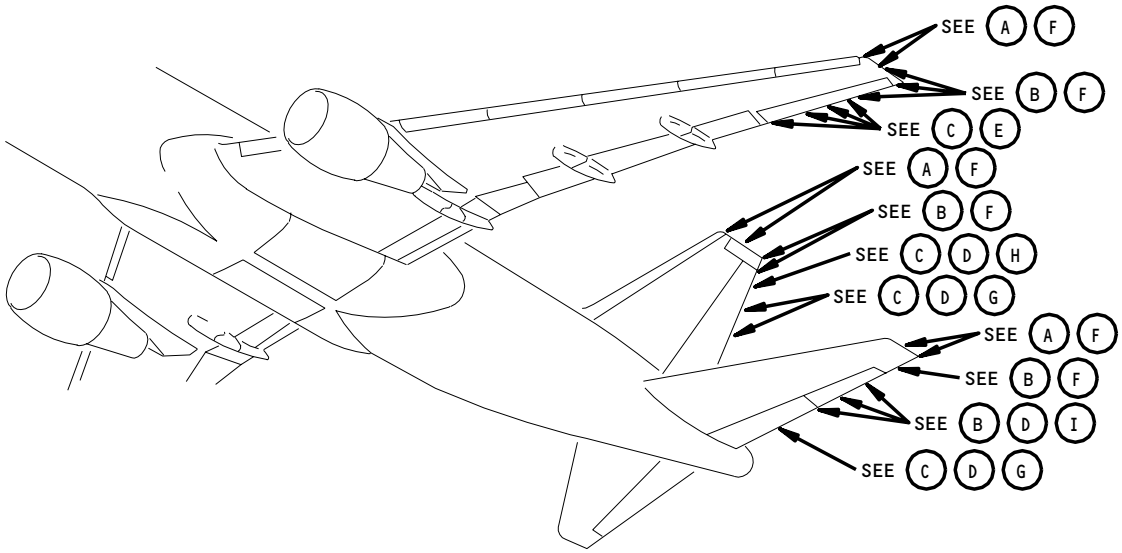
TASK 23-61-01-022-018

7. Static Discharger Base Removal (Fig. 202)

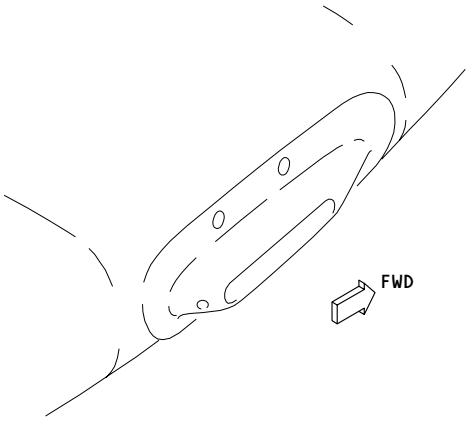
NOTE: See FIM 23-61-00/101, Fig. 101 and FIM 23-61-00/101, Fig. 102, for detail location information.

A. General
(1) Three types of discharger bases are on the wings and stabilizers. Installation on the left and right wings and horizontal stabilizers are almost the same. Bases on the rudder are on the left and right sides for aerodynamic balance.
(2) Tip type static discharger bases are aluminum with a rounded surface fastened to the sheet metal. Curvature of the surface gives the part number.
(3) Trailing edge type static discharger bases are aluminum or titanium. Aluminum bases are fastened to aluminum sheet metal, or are mounted to aluminum flame-sprayed surfaces with an aluminum mounting plate.
(4) Titanium bases are used on graphite composite surfaces. Titanium bases are attached to the ailerons, or are riveted to a titanium mounting plate on the graphite composite surfaces.

B. References
(1) AMM 24-22-00/201, Manual Control

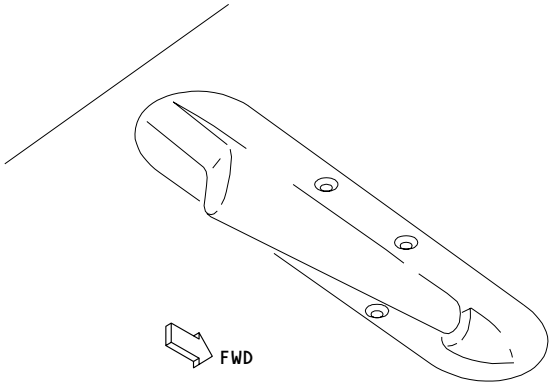


Static Discharger Base Installations
Figure 202 (Sheet 1)



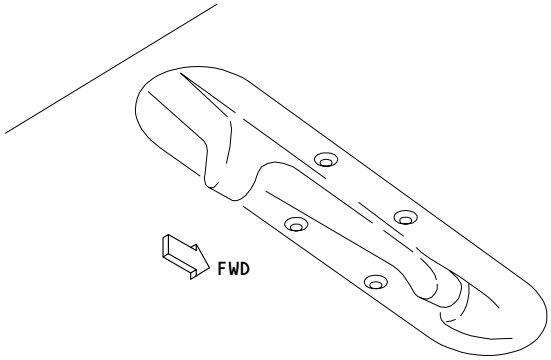
TIP TYPE STATIC DISCHARGER BASE
(ALUMINUM)

A



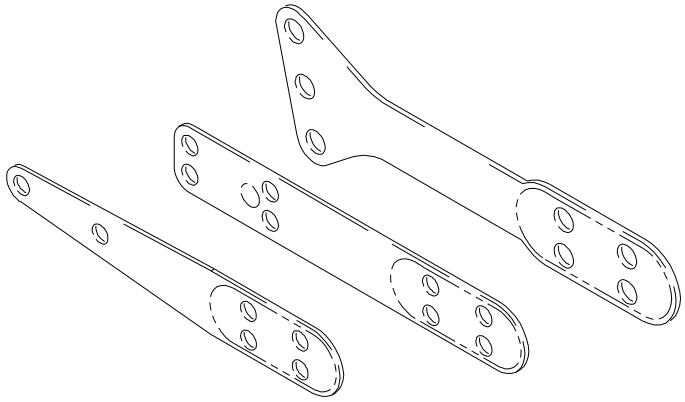
TRAILING EDGE TYPE STATIC DISCHARGER BASE
(ALUMINUM)

B



TRAILING EDGE TYPE STATIC DISCHARGER BASE
(TITANIUM)

C

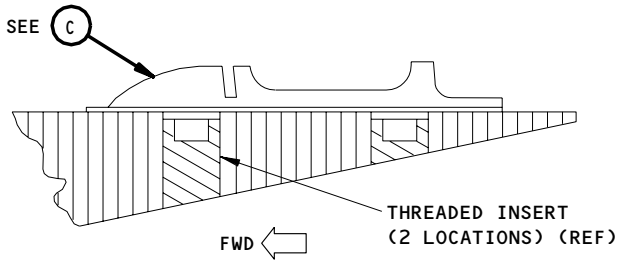


STATIC DISCHARGER BASE MOUNTING PLATE
(ALUMINUM OR TITANIUM)

D

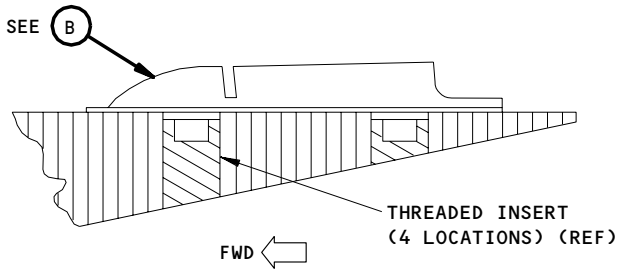
Static Discharger Base Installations
Figure 202 (Sheet 2)

K38531



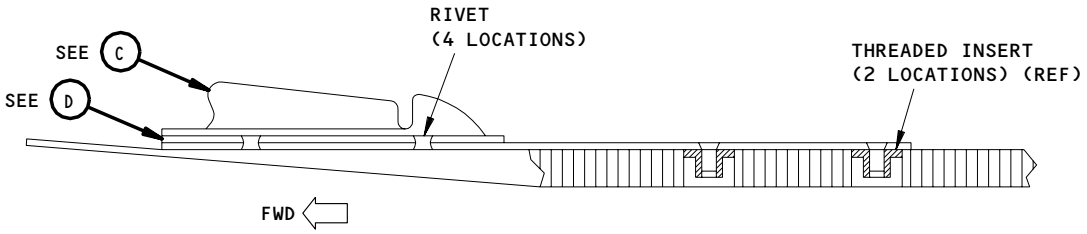
TITANIUM STATIC DISCHARGER BASE INSTALLATION

E



ALUMINUM STATIC DISCHARGER BASE INSTALLATION

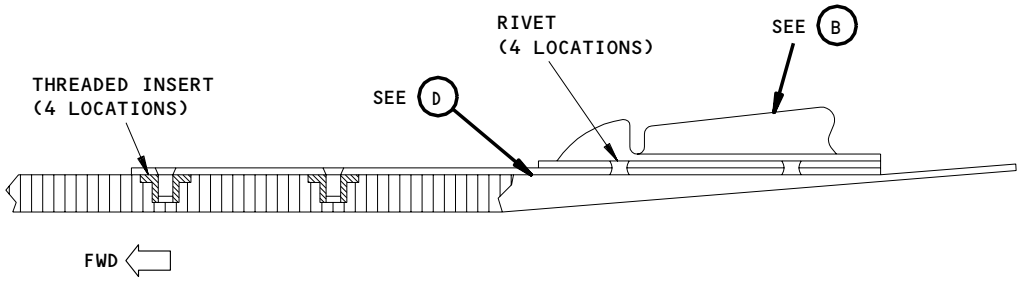
F



TITANIUM DISCHARGER BASE WITH MOUNTING PLATE INSTALLED

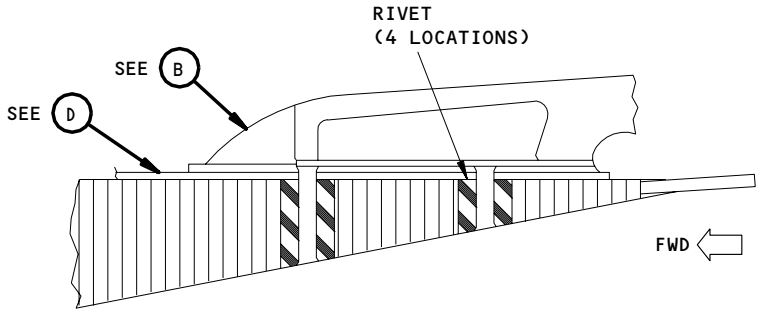
G

Static Discharger Base Installations
Figure 202 (Sheet 3)



ALUMINUM DISCHARGER BASE WITH MOUNTING PLATE
INSTALLATION ON THE RUDDER

H



ALUMINUM DISCHARGER BASE WITH MOUNTING PLATE
INSTALLATION ON THE HORIZONTAL STABILIZER

I

Static Discharger Base Installations
Figure 202 (Sheet 4)

(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
(3) AMM 51-31-01/201, Seals and Sealing

C. Equipment

(1) Spatula - commercially available

D. Access

(1) Location Zones

320	Vertical Stabilizer and Rudder
330	Left Horizontal Stabilizer and Elevator
340	Right Horizontal Stabilizer and Elevator
560	Left Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron
660	Right Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron

E. Deactivate the Flight Control Surface Movement

S 862-180

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-181

(2) Remove the power from the electrical system (AMM 24-22-00/201).

F. Prepare to Remove Discharger Base

S 802-019

(1) Find the discharger base to be removed.

S 022-020

CAUTION: BE CAREFUL WHEN YOU REMOVE AND INSTALL THE DISCHARGER. YOU CAN DAMAGE THE THREADS AND THE RECESSED HEAD OF THE SETSCREW EASILY.

(2) Loosen the discharger setscrew and remove the discharger from base.

G. Remove Aluminum or Titanium Static Discharger Base which not mounted on mounting plate

S 022-022

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(1) Remove the weather-aerodynamic fillet seal around the edge of the base (AMM 51-31-01/201).

S 022-023

(2) Remove the four screws from the base, refer to the Structural Repair Manual.

S 022-024

(3) Put a sharp broad-based tool under the edge of the base and remove the base from the airplane skin.

H. Remove Aluminum Static Discharger Base with mounting plate on the Horizontal Stabilizer

S 022-121

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(1) Remove the weather-aerodynamic fillet seal around the edge of the base (AMM 51-31-01/201).

S 022-026

(2) Remove four rivets from the static discharger base.

S 022-027

(3) Put a sharp broad-based tool under the edge of the base and remove the base from the mounting plate.

NOTE: In this case, it is not necessary to remove the mounting plate.

I. Remove the Aluminum Static Discharger Base with mounting plate on the Rudder

S 022-122

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(1) Remove the weather-aerodynamic fillet seal around the edge of the base and the mounting plate (AMM 51-31-01/201).

S 022-126
(2) Remove the screws from the mounting plate.

S 022-127
(3) Put a sharp broad-based tool under the edge of the mounting plate and remove the mounting plate assembly from the rudder surface.

S 022-128
(4) Remove the rivets from the discharger base.

S 022-129
(5) Put a sharp broad-based tool under the edge of the base and remove the base from the mounting plate.

J. Remove Titanium Static Discharger Base with mounting plate

S 022-028

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(1) Remove the weather-aerodynamic fillet seal around the edge of the base and the mounting plate (AMM 51-31-01/201).

S 022-124
(2) Remove the screws from the mounting plate.

S 022-123
(3) Put a sharp broad-based tool under the edge of the mounting plate and remove the mounting plate assembly from the airplane surface.

S 022-034
(4) Remove four rivets from the base. Refer to the Structural Repair Manual.

S 022-031
(5) Put a sharp broad-based tool under the edge of the base and remove the base from the mounting plate.

K. Put the Airplane Back to Its Usual Condition

S 862-189
(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-402-032

8. Installation for Aluminum Static Discharger Base without Mounting Plate

A. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems

(3) AMM 51-31-01/201, Seals and Sealing

B. Equipment

(1) Bonding meter (SWPM 20-20-00)
(2) Sealing gun - 6 inch length cartridge - commercially available.

C. Consumable Materials

(1) B01012 Solvent - Final Cleaning Prior to General Sealing (Series 92) (SOPM 20-30-92)
(2) A00247 Sealant - Chromate type BMS 5-95 Class B
(3) G00033 Cheesecloth - BMS 15-5 (AMM 20-30-07/201)
(4) B00107 Scotch Brite, Sheet, Pads, Finishing Type A

D. Access

(1) Location Zones

320	Vertical Stabilizer and Rudder
330	Left Horizontal Stabilizer and Elevator
340	Right Horizontal Stabilizer and Elevator
560	Left Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron
660	Right Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron

E. Deactivate the Flight Control Surface Movement

S 862-170

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-171

(2) Remove the power from the electrical system (AMM 24-22-00/201).

F. Prepare to Install Discharger Base

S 862-093

(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Remove sealant from the bonding surface (AMM 51-31-01/201).
(b) Make sure the discharger mounting surface is correct for the installation.

WARNING: KEEP SOLVENTS AWAY FROM OPEN FIRE. DO NOT GET THE SOLVENTS IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS CAN BE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Clean and remove grease from the bonding areas with a clean wiper soaked with clean solvent. Do this until no unwanted material remains.

G. Install the Discharger Base

S 422-092

(1) Do the steps that follow:

(a) Mix BMS 5-95 Class B chromate sealant, refer to the instructions on the container.

NOTE: Apply sealant only when the temperature of the structure is at 50-F or above.

(b) Put the base tightly on the surface. Make sure the base is aligned with the slip stream. Make sure the holes in the base are in alignment with the screw retainers in the surface.

(c) Apply sealant to the four mounting screws.

(d) Install the mounting screws wet.

(e) Fill holes with sealant.

(f) Make sure there are no cracks.

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE BONDING. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(g) Apply sealant around the edge of the base to make a weather-aerodynamic fillet seal (AMM 51-31-01/201).

(h) Permit curing time for sealant as applicable.

(i) Install static discharger, refer to the Static Discharger Installation section.

H. Static Discharger Base Installation Test

S 762-143

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) Use a bonding meter (SWPM 20-20-00) to do a check of the electrical bond between the static discharger base and the airplane surface.

NOTE: This resistance measurement is for a newly installed discharger base and a new bond. The resistance measurement is different for an in-service bond and discharger base.

(a) The maximum resistance value is 0.1 ohm.

CAUTION: BE CAREFUL WHEN YOU CLEAN THE ALUMINUM SURFACE. DAMAGE TO ALUMINUM COATING CAN OCCUR.

1) To measure to resistance, clean the aluminum surface of the airplane with Scotch Brite if necessary.

I. Put the Airplane Back to Its Usual Condition

S 862-190

(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-402-094

9. Installation for Titanium Static Discharger Base without Mounting Plate

A. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
(3) AMM 51-31-01/201, Seals and Sealing

B. Equipment

(1) Bonding meter (SWPM 20-20-00)
(2) Sealing gun - 6 inch length cartridge - commercially available.

C. Consumable Materials
(1) B00148 Solvent - Methyl Ethyl Ketone (MEK) - ASTM D740
(2) B00184 Solvent - Presealing, Cleaning Solvent - BMS11-7
(3) B00666 Solvent - Methyl Propyl Ketone (MEK) - BMS11-9
(4) B01026 Solvent - FCC-55
(5) B01054 Solvent - MEK:sec-Butyl alcohol (42:58 percent) - MEK-alcohol blend
(6) A00471 Sealant - BMS 5-35, Type 1, Grade A
(7) A00247 Sealant - Chromate type BMS 5-95 Class B
(8) G00033 Cheesecloth - BMS 15-5 (AMM 20-30-07/201)
(9) G01077 Emery paper - 250 grit

D. Access
(1) Location Zones
560 Left Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron
660 Right Wing Trailing Edge - Aft of rear Spar and outboard of inboard Aileron

E. Deactivate the Flight Control Surface Movement

S 862-172

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-173
(2) Remove the power from the electrical system (AMM 24-22-00/201).

F. Prepare to Install Discharger Base

S 862-095
(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Remove sealant from the bonding surface (AMM 51-31-01/201).
(b) Make sure the discharger mounting surface is correct for the installation.
(c) Lightly rub the surfaces of the graphite panel and the titanium base with 250 grit sand paper.
1) Rub the graphite surface until you can see the black dust.

WARNING: KEEP SOLVENTS AWAY FROM OPEN FIRE. DO NOT GET THE SOLVENTS IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS CAN BE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(d) Clean and remove grease from the bonding areas with a clean wiper soaked with clean solvent (BMS11-7, FCC-55, MEK-alcohol blend, ASTM D740 or BMS11-9). Do this until no unwanted material remains.

G. Install the Discharger Base

S 422-096

(1) Do the steps that follow:

(a) Prepare BMS 5-35 Grade A, Type 1 silver filled sealant and BMS 5-95 Class B chromate sealant , refer to the instructions on the container.

NOTE: Apply sealants only when the temperature of the structure is at 50-F or above.

(b) In less than five minutes after cleaning the surfaces, do the step that follows.

1) Apply a thin layer of BMS 5-35 sealant to the mounting surfaces of the base and the aileron. Make sure there are no holes.

(c) Put the base tightly on the aileron surface. Twist lightly with moderate pressure to move out unwanted sealant.

1) Make sure the base is aligned with the slip stream. Make sure the holes in the base are in alignment with the screw retainers in the aileron.

2) Clean away unwanted sealant.

(d) Apply BMS 5-95 chromate sealant to two mounting screws.

(e) Install the mounting screws wet.

(f) Fill holes with BMS 5-95 chromate sealant.

1) Make sure there are no cracks.

(g) Let BMS5-35 sealant cure as applicable prior to fillet sealing.

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(h) Apply BMS 5-95 chromate sealant around the edge of the base to make a weather-aerodynamic fillet seal (AMM 51-31-01/201).

(i) Permit curing time for the BMS5-95 sealants as applicable.

(j) Install the static discharger, refer to the Static Discharger Installation section.

H. Static Discharger Base Installation Test

S 762-142

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) Use a bonding meter (SWPM 20-20-00) to do a check of the electrical bond between the static discharger base and the airplane surface.

NOTE: This resistance measurement is for a newly installed discharger base and a new bond. The resistance measurement is different for an in-service bond and discharger base.

(a) The maximum resistance value is 1.0 ohm.

I. Put the Airplane Back to Its Usual Condition

S 862-191

(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-402-097

10. Installation for Aluminum Static Discharger Base with Mounting Plate on the Horizontal Stabilizer

A. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
(3) AMM 51-31-01/201, Seals and Sealing

B. Equipment

(1) Bonding meter (SWPM 20-20-00)
(2) Sealing gun - 6 inch length cartridge - commercially available.

C. Consumable Materials
(1) B01012 Solvent - Final Cleaning Prior to General Sealing (Series 92) (SOPM 20-30-92)
(2) A00247 Sealant - Chromate type BMS 5-95 Class B
(3) G00033 Cheesecloth - BMS 15-5 (AMM 20-30-07/201)
(4) B00107 Scotch Brite, Sheet, Pads, Finishing Type A

D. Access
(1) Location Zones
330 Left Horizontal Stabilizer and Elevator
340 Right Horizontal Stabilizer and Elevator

E. Deactivate the Flight Control Surface Movement

S 862-174

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-175

(2) Remove the power from the electrical system (AMM 24-22-00/201).

F. Prepare to Install Discharger Base

S 862-098

(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Remove sealant from the mounting plate surface (AMM 51-31-00/201).

(b) Make sure the discharger mounting surface is correct for the installation.

WARNING: KEEP SOLVENTS AWAY FROM OPEN FIRE. DO NOT GET THE SOLVENTS IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS CAN BE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Carefully clean and remove grease from the mounting plate with a clean wiper wetted with a small amount of clean solvent. Do this until no unwanted material remains.

G. Install the Discharger Base

S 422-099

(1) Do the steps that follow:

(a) Mix BMS 5-95 Class B chromate sealant refer to the instructions on the container.

NOTE: Apply sealant only when the temperature of the structure is at 50-F or above.

(b) Put the base tightly on the mounting plate.

1) Make sure the base is aligned correctly with the slip stream.

(c) Rivet the base to the airplane, refer to the Structural Repair Manual.
(d) Fill holes with BMS 5-95 chromate sealant.
1) Make sure there are no cracks.

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE BONDING. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(e) Apply BMS 5-95 chromate sealant around the edge of the base to make a weather-aerodynamic fillet seal (AMM 51-31-01/201).
1) Permit curing time for the sealant as applicable.
(f) Install the static discharger, refer to the Static Discharger Installation section.

H. Static Discharger Base Installation Test

S 762-144

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) Use a bonding meter (SWPM 20-20-00) to do a check of the electrical bond between the static discharger base and the airplane surface.

NOTE: This resistance measurement is for a newly installed discharger base and a new bond. The resistance measurement is different for an in-service bond and discharger base.

(a) The maximum resistance value is 0.1 ohm.

CAUTION: BE CAREFUL WHEN YOU CLEAN THE ALUMINUM SURFACE. DAMAGE TO ALUMINUM COATING CAN OCCUR.

1) To measure to resistance, clean the aluminum surface of the airplane with Scotch Brite if necessary.

I. Put the Airplane Back to Its Usual Condition

S 862-192
(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-402-100

11. Installation for Aluminum Static Discharger Base with Mounting Plate on the Rudder

A. References
(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
(3) AMM 51-31-01/201, Seals and Sealing

B. Equipment

(1) Bonding meter (SWPM 20-20-00)
(2) Sealing gun - 6 inch length cartridge - commercially available.

C. Consumable Materials
(1) B01012 Solvent - Final Cleaning Prior to General Sealing (Series 92) (SOPM 20-30-92)
(2) A00247 Sealant - Chromate type BMS 5-95 Class B
(3) G00033 Cheesecloth - BMS 15-5 (AMM 20-30-07/201)
(4) B00107 Scotch Brite, Sheet, Pads, Finishing Type A

D. Access
(1) Location Zones
320 Vertical Stabilizer and Rudder

E. Deactivate the Flight Control Surface Movement

S 862-176

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-177
(2) Remove the power from the electrical system (AMM 24-22-00/201).

F. Prepare to Install Discharger Base on the Mounting Plate

S 862-101
(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Remove sealant from the mounting plate (AMM 51-31-01/201).

WARNING: KEEP SOLVENTS AWAY FROM OPEN FIRE. DO NOT GET THE SOLVENTS IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS CAN BE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Clean and remove grease from the mounting plate with a clean wiper soaked with clean solvent. Do this until no unwanted material remains.

G. Install the Discharger Base on the Mounting Plate

S 422-102

(1) Do the steps that follow:

(a) Mix BMS 5-95 Class B chromate sealant, refer to the instructions on the container.

NOTE: Apply sealant only when the temperature of the structure is at 50-F or above.

(b) Install rivets to attach the base to the mounting plate.

(c) Apply sealant BMS5-95 to the rivets.

H. Prepare to Install the Mounting plate assembly on the Rudder

S 862-103

(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE BONDING. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Remove sealant from the bonding surface of the rudder (AMM 51-31-01/201).

(b) Make sure the assembly mounting surface is correct for the installation.

(c) Clean and remove grease from the bonding surface with a clean wiper soaked with clean solvent. Do this until no unwanted material remains.

I. Install the Mounting Plate Assembly on the Rudder

S 422-105

(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Apply sealant BMS5-95 on the aft 2.8 inches of the faying surface between the mounting plate and the rudder panel (AMM 51-31-01/201).

(b) Put the mounting plate assembly tightly on the surface. Make sure the assembly is aligned with the slip stream.

(c) Apply sealant BMS5-95 to the four mounting screws.

(d) Install the mounting plate assembly with the wet mounting screws.

(e) Fill holes with sealant.

(f) Make sure there are no cracks.

(g) Apply sealant BMS5-95 around the edge of the base and the mounting plate to make a weather-aerodynamic fillet seal.

(h) Permit curing time for sealant as applicable.

(i) Install static discharger, refer to the Static Discharger Installation section.

J. Static Discharger Base Installation Test

S 762-145

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) Use a bonding meter (SWPM 20-20-00) to do a check of the electrical bond between the static discharger base and the airplane surface.

NOTE: This resistance measurement is for a newly installed discharger base and a new bond. The resistance measurement is different for an in-service bond and discharger base.

(a) The maximum resistance value is 0.1 ohm.

CAUTION: BE CAREFUL WHEN YOU CLEAN THE ALUMINUM SURFACE. DAMAGE TO ALUMINUM COATING CAN OCCUR.

1) To measure to resistance, clean the aluminum surface of the airplane with Scotch Brite if necessary.

K. Put the Airplane Back to Its Usual Condition

S 862-193

(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

TASK 23-61-01-402-106

12. Installation for Titanium Static Discharger Base with Mounting Plate

A. References

(1) AMM 24-22-00/201, Manual Control
(2) AMM 29-11-00/201, Main (Left, Right, Center) Hydraulic Systems
(3) AMM 51-31-01/201, Seals and Sealing

B. Equipment

(1) Bonding meter (SWPM 20-20-00)
(2) Sealing gun - 6 inch length cartridge - commercially available.

C. Consumable Materials

(1) B00148 Solvent - Methyl Ethyl Ketone (MEK) - ASTM D740
(2) B00184 Solvent - Presealing, Cleaning Solvent - BMS11-7
(3) B00666 Solvent - Methyl Propyl Ketone (MEK) - BMS11-9
(4) B01026 Solvent - FCC-55
(5) B01054 Solvent - MEK:sec-Butyl alcohol (42:58 percent) - MEK-alcohol blend
(6) A00471 Sealant - BMS 5-35, Type 1, Grade A
(7) A00247 Sealant - Chromate type BMS 5-95 Class B
(8) G00033 Cheesecloth - BMS 15-5 (AMM 20-30-07/201)
(9) G01077 Emery paper - 250 grit

D. Access
(1) Location Zones
320 Vertical Stabilizer and Rudder
330 Left Horizontal Stabilizer and Elevator
340 Right Horizontal Stabilizer and Elevator

E. Deactivate the Flight Control Surface Movement

S 862-178

WARNING: MAKE SURE PRESSURE IS REMOVED FROM HYDRAULIC SYSTEM. MAKE SURE HYDRAULIC POWER AND ELECTRICAL POWER ARE NOT SUPPLIED. IF HYDRAULIC PRESSURE IS PRESENT OR HYDRAULIC/ELECTRICAL POWER IS SUPPLIED, THE FLIGHT CONTROL SURFACES CAN MOVE. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the pressure and power from the Main Hydraulic System (AMM 29-11-00/201).

S 862-179
(2) Remove the power from the electrical system (AMM 24-22-00/201).

F. Prepare to Install Discharger Base on the Mounting Plate

S 862-107
(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Remove sealant from the mounting plate (AMM 51-31-01/201).

WARNING: KEEP SOLVENTS AWAY FROM OPEN FIRE. DO NOT GET THE SOLVENTS IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS CAN BE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(b) Clean and remove grease from the mounting plate with a clean wiper soaked with clean solvent (BMS11-7, FCC-55, MEK-alcohol blend, ASTM D740 or BMS11-9) . Do this until no unwanted material remains.

G. Install the Discharger Base on the Mounting Plate

S 422-108
(1) Do the steps that follow:
(a) Put the base in the correct position on the mounting plate.
(b) Rivet the base to the mounting plate, refer to the Structural Repair Manual.

H. Prepare to Install the Mounting plate Assembly on the Airplane Surface

S 862-110

(1) Do the steps that follow:

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REMOVE THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(a) Remove sealant from the bonding surface of the airplane (AMM 51-31-01/201).
(b) Make sure the assembly mounting surface is correct for the installation.
(c) Lightly rub the surfaces of the graphite panel and the titanium assembly with 250 grit sand paper.
1) Rub the graphite surface until you can see the black dust.
(d) Clean and remove grease from the bonding surfaces with a clean wiper soaked with clean solvent (BMS11-7, FCC-55, MEK-alcohol blend, ASTM D740 or BMS 11-9) . Do this until no unwanted material remains.

I. Install the Mounting Plate Assembly on the Airplane Surface

S 422-120

(1) Do the steps that follow:
(a) Prepare BMS 5-35 Grade A, Type 1 silver filled sealant and BMS 5-95 chromate sealant , refer to the instructions on the container.

NOTE: Apply sealants only when the temperature of the structure is at 50-F or above.

(b) DISCHARGER BASE ASSEMBLY ON THE RUDDER;
In less than five minutes after cleaning the surfaces, apply the sealants as follows.

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE BONDING. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

1) Apply sealant BMS 5-35, Grade A, Type1 on the forward 2.4 inches of the faying surface between the mounting plate and the rudder panel (AMM 51-31-01/201).
2) Apply sealant BMS 5-95 on the aft 2.8 inches of the faying surface between the mounting plate and the rudder panel.
(c) DISCHARGER BASE ASSEMBLY ON THE OUTBOARD ELEVATORS;
In less than five minutes after cleaning the surfaces, apply the sealants as follows.

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE BONDING. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

1) Apply sealant BMS 5-35, Grade A, Type1 on the forward area (area not below the base) of the faying surface between the mounting plate and the outboard elevator panel (AMM 51-31-01/201).
2) Apply sealant BMS 5-95 on the aft area (area below the base) of the faying surface between the mounting plate and the outboard elevator panel.

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE BONDING. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

(d) Put the discharger base assembly on the bonding surface of the airplane. Twist lightly with moderate pressure to move out unwanted sealant (AMM 51-31-01/201).
1) Clean away unwanted sealant.
(e) Apply BMS 5-95 chromate sealant to two mounting screws.
(f) Install the mounting screws wet.
(g) Fill holes with BMS 5-95 chromate sealant.
(h) Make sure there are no cracks.
(i) Let BMS 5-35 sealant cure as applicable prior to fillet sealing.
(j) Apply BMS 5-95 chromate sealant around the edge of the base to make a weather-aerodynamic fillet seal.
(k) Permit curing time for BMS 5-95 sealant as applicable.
(l) Install the static discharger, refer to the Static Discharger Installation section.

J. Static Discharger Base Installation Test

S 762-146

WARNING: MAKE SURE THAT THE BONDING METER IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(1) Use a bonding meter (SWPM 20-20-00) to do a check of the electrical bond between the static discharger base and the airplane surface.

NOTE: This resistance measurement is for a newly installed discharger base and a new bond. The resistance measurement is different for an in-service bond and discharger base.

(a) The maximum resistance value is 1.0 ohm.

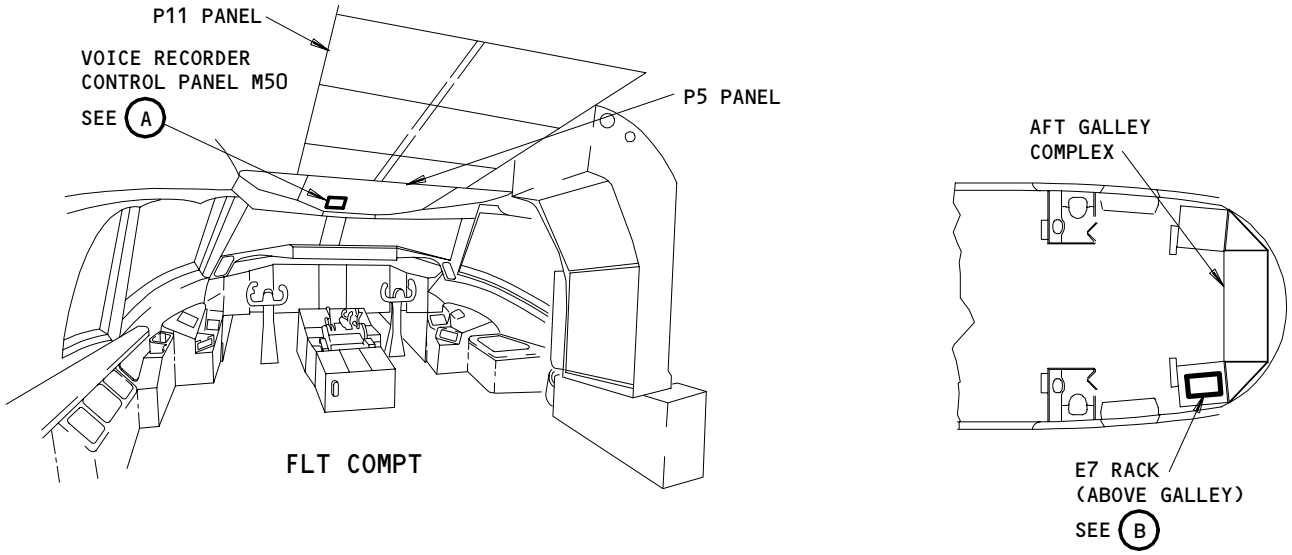
K. Put the Airplane Back to Its Usual Condition

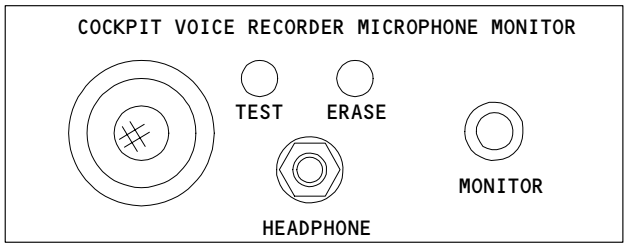
S 862-194

(1) If it is necessary, put the airplane to its usual condition (AMM 29-11-00/201).

VOICE RECORDER SYSTEM - DESCRIPTION AND OPERATION

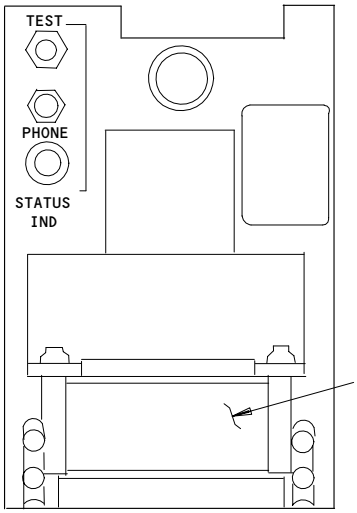
1. General
   A. The voice recorder system preserves a continuing record of the latest 30 minutes of flight crew communications and conversations. The four-channel voice recorder receives inputs from the audio selector panels for the captain, the first officer, and the first observer, and from an area microphone in the flight compartment.
   B. The voice recorder system consists of a recorder located in the aft passenger cabin ceiling and a control panel with an area microphone located on overhead panel P5.
   C. 115 VAC power is supplied to the system from the right AC bus. The VOICE RECORDER circuit breaker, located on overhead panel P11, controls power to the system.
2. Component Details (Fig. 1)
   A. Voice Recorder
      (1) The voice recorder is installed in the E7 equipment rack in the aft passenger cabin ceiling. The recorder is a thermally insulated, impact resistant, 4 MCU unit, and international orange in color.
      (2) The voice recorder unit contains a tape transport which includes the tape, tape drive, two four-track recording heads, two erase heads, two monitor heads, and a bulk erase coil.
         (a) The recording tape is a 1/4 inch wide polymide tape 230 feet long. The four-track tape runs at 2.75 IPS totaling 30 minutes of recording time in both the forward and reverse directions.
      (3) The voice recorder unit also contains four recording amplifiers, a monitor amplifier, 45-KHz bias generator, 400 Hz test circuits, motor controls, and power supply.
      (4) The front panel contains a TEST switch, headphone jack, STATUS IND light (green) and an underwater locator beacon (ULB).
         (a) Push the TEST switch to initiate a test of all tape tracks in both the record and monitor capabilities.
         (b) A headset inserted into the headphone jack will monitor all tape tracks slightly delayed after they are recorded.
         (c) The STATUS IND light comes on during tests, indicating that the pair of tape tracks being monitored are recorded at an adequate level.





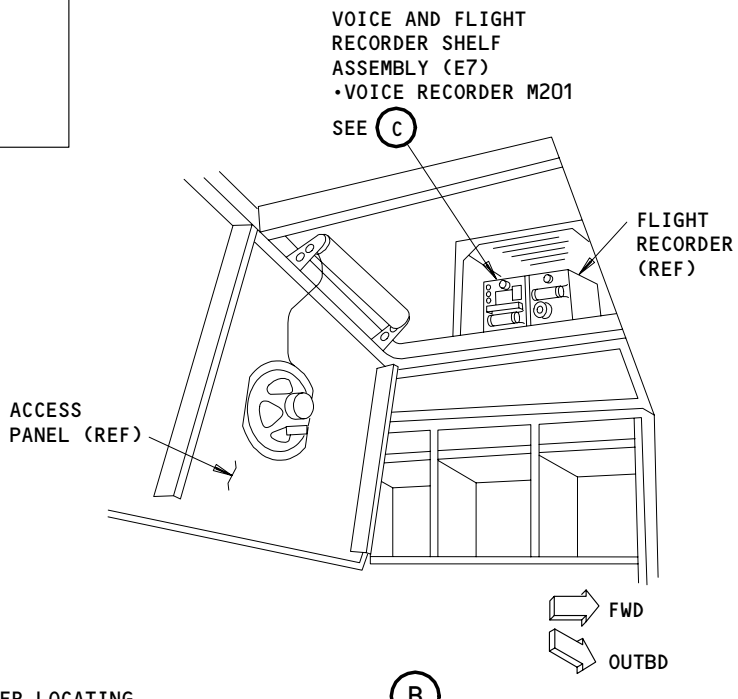
VOICE RECORDER CONTROL PANEL

A



VOICE RECORDER M201

C



B

Voice Recorder System Component Locations
Figure 1

(5) An ULB is attached to the voice recorder front panel and is a self-contained device. The ULB will emit a 37.5-KHz signal when the water activated switch is closed. The ULB contains a dated label to indicate when the battery requires periodic replacement.

B. Voice Recorder Control Panel

(1) The voice recorder control panel is located on overhead panel (P5). It contains an area microphone with preamplifier and filter circuits, a phone jack to monitor system recording through headsets, a test switch to initiate the functional self test, a monitor light to provide an indication of self test success or failure, and an erase switch.

(2) Pushing the TEST switch will activate test circuits within the voice recorder. A 400 Hz tone is applied to all four heads. If the test is sucessful, the MONITOR light comes on and you hear a modulated sound in the headset. The test is complete after 3.5 seconds.

(3) Push the ERASE switch will cause the voice recorder data to be completely erased. Bulk erasure is possible only when the airplane is on the ground with the parking brake set.

3. Operation (Fig. 2)

A. Functional Description

(1) The latest 30 minutes of flight compartment communications are recorded by the voice recorder. Channels 1 thru 3 record audio from the first observer's, the first officer's, and the captain's audio selector panels, respectively. Channel 4 records audio picked up by the area microphone on the voice recorder control panel (P5).

(2) The voice recorder is powered directly from the 115 VAC right bus. The power supply in the voice recorder supplies ±15 and ±24 VDC used within the recorder and ±18 VDC used in the voice recorder control panel.

(3) The 1/4 inch wide tape runs at 2.75 IPS in the forward direction for 15 minutes until it reaches the "end of tape". Then the motor controls reverse and the tape runs for 15 minutes until it reaches the "beginning of tape" and so on. As the tape comes off of the reel, it first passes the erase head where the 45 KHz erase signal is applied to all four tracks.

(4) The tape then passes the four-track record heads where recorded audio plus the 45 KHz bias signals are applied onto the tape. The 45 KHz bias shifts the audio band upwards to improve the linearity of the record amplifiers. Then the tape passes the monitor head from which the audio on all four tracks can be monitored. The tape continues onto the takeup reel until the appropriate "sensor" causes the tape to reverse and then the same sequence occurs utilizing the other heads.

(5) Recording is continuously monitored at the voice recorder control panel. Some time delay exists due to the record monitor head spacing. Audio outputs are available at phone jacks on the voice recorder and control panel. The monitor/erase head monitors one half of the tape in one direction and erases the other half in the other direction. The output of the monitor is routed to the level detector during self testing.

(6) Under certain conditions, pushing the ERASE switch on the control panel will cause the entire tape to be erased. Bulk erasure requires that the ERASE switch be pushed when the airplane is on the ground with the parking brake set. When the ERASE switch is pushed, a 115 VAC, 400 Hz is applied to the bulk erase coil through the bulk erase relay. The bulk erase relay also removes dc power from the record, playback, and test circuits. The ERASE switch must be pushed for at least 14 seconds for a complete erasure. This is the time required for one revolution of the tape reel. When the ERASE switch is released, the system returns to normal operation.

B. Test

(1) Self Test

(a) The self test mode is initiated by pushing the Test switch on the voice recorder or control panel. A 400 Hz test tone is inserted, recorded, monitored, and detected to functionally test the system. The MONITOR indicator on the control panel comes on and the STATUS IND light on the voice recorder comes on two times for a successful test. The modulated test sound can be monitored at the phone jack.

(b) Pushing the TEST switch causes the 200 msec pulse generator to energize the test relay which applies 400 Hz into each record amplifier for 200 msec. The 2 sec pulse generator also activates the MONITOR light during the self-test. Because the odd and even numbered record heads are spaced apart, one pair of tracks are monitored for 200 msec and then after 300 msec, the other tracks are monitored for 200 msec.

(c) The monitor head provides the two 200 msec inputs to the audio driver which inputs to the phone jacks. The audio driver also outputs to the level detector which operates the green STATUS IND on the voice recorder and the MONITOR indicator on the control panel displaying the two 200 msec tones. The test automatically terminates after 3.5 seconds.

(2) Operational Test

(a) The area microphone and audio selector panels (ASP) can be used to test the voice recorder system. With the area microphone covered, a voice input to each audio selector panel can be monitored at the headphone jack on the recorder control panel. With all audio inputs removed from the ASP, inputs to the area microphone on the control panel can be monitored in the same fashion.

C. Control

(1) Power-On Procedure

(a) Supply electrical power (AMM 24-22-00/201).

(b) Make sure that the VOICE RECORDER circuit breaker is closed on the overhead panel P11.

(2) Access for monitoring recorded audio and test tones.

(a) Connect a 600 ohm headset at the headset jack on the voice recorder control panel or at the front of the voice recorder.

D. For more details on the Voice Recorder System, refer to these wiring diagrams and functional schematics:

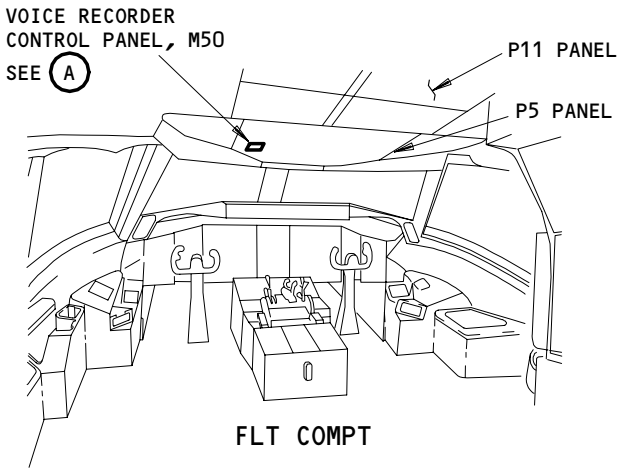
WDM 23-71-11: Voice Recorder System
WDM 23-71-12: Voice Recorder Power Relay Control
SSM 23-71-01: Voice Recorder
SSM 23-71-02: Voice Recorder Power Relay Control

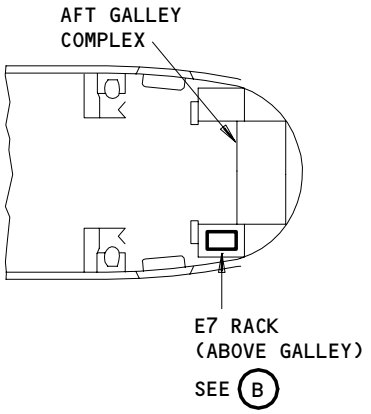
VOICE RECORDER SYSTEM

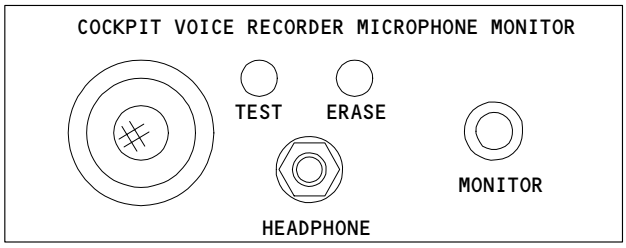
COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
BEACON – UNDERWATER LOCATOR	--	1	AFT PASSENGER CABIN CEILING, E7	23-71-03
CIRCUIT BREAKER			FLT COMPT, P11	
VOICE RECORDER, C532	--	1	11H34	*
PANEL – (FIM 23-51-00/101)				
CAPT AUDIO SELECTOR, M70				
F/O AUDIO SELECTOR, M71				
1ST OBS AUDIO SELECTOR, M98				
PANEL – VOICE RECORDER CONTROL, M50	--	1	FLT COMPT, P5	23-71-02
RECORDER – VOICE, M201	--	1	AFT PASSENGER CABIN CEILING, E7	23-71-01
RELAY – (FIM 31-01-36/101)				
SYS NO. 1 AIR/GROUND, K178				
PARK BRAKE CLOSE SENSE, K419				

* SEE THE WDM EQUIPMENT LIST

Voice Recorder System – Component Index
Figure 101

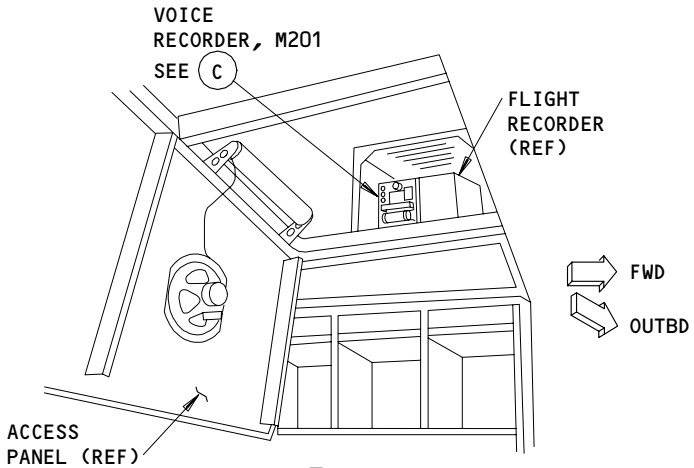






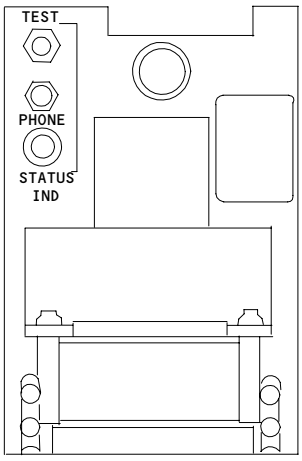
VOICE RECORDER CONTROL PANEL, M50

A



E7 RACK

B



VOICE RECORDER, M201

C

Component Location
Figure 102

VOICE RECORDER SYSTEM - ADJUSTMENT/TEST

1. General
   A. This procedure contains several tasks. The first task is the operational test. Tasks associated with this task include a Prepare to Test task and a Voice Recorder Control Panel task.
   B. The next task is a test of the Voice Recorder Front Panel.
   C. The last task is a system test task.

TASK 23-71-00-715-001

2. Operational Test - Voice Recorder System
   A. General
      (1) This adjustment test procedure is an operational test of the voice recorder system. The necessary equipment is on the airplane.
   B. Access
      (1) Location Zones

251	Passenger Cabin - section 46 (Left)
252	Passenger Cabin - section 46 (Right)
211/212	Control Cabin

   C. Procedure

      S 865-005
      (1) Do this task: Prepare for Operational Test.

      S 715-026
      (2) Do this task: Voice Recorder Control Panel Test.

      S 715-007
      (3) Do this task: "Voice Recorder Front Panel Test".

TASK 23-71-00-865-008

3. Prepare for Operational Test
   A. General
      (1) This task prepares the airplane for the operational test.

B. References
(1) 24-22-00/201, Electrical Power - Control
C. Access
(1) Location Zones
251 Passenger Cabin - section 46 (Left)
252 Passenger Cabin - section 46 (Right)
211/212 Control Cabin
D. Procedure

S 765-002
(1) Supply electrical power (AMM 24-22-00/201).

S 715-042
(2) Do this task: "Voice Recorder Control Panel Test".

TASK 23-71-00-715-026

4. Voice Recorder Control Panel Test
A. General
(1) This task does a test of the Voice Recorder Control Panel.
B. References
(1) 24-22-00/201, Electrical Power - Control
C. Access
(1) Location Zones
251 Passenger Cabin - section 46 (Left)
252 Passenger Cabin - section 46 (Right)
211/212 Control Cabin
D. Prepare for the test.

S 865-027
(1) Supply electrical power (AMM 24-22-00/201).

S 865-034
(2) Connect the 600 ohm headphone to the HEADSET jack on the voice recorder control panel (P5).

S 715-005
(3) Do the steps that follow for the operational test:
(a) Push the TEST switch on voice recorder control panel for approximately 1/2 second.

(b) Make sure that the MONITOR light comes on while you push the TEST switch.
(c) Make sure you hear four tones in the headphone while you push the TEST switch.

S 865-028
(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-71-00-715-029

5. Voice Recorder Front Panel Test

A. General
(1) This task does a test of the Voice Recorder Front Panel.

B. References
(1) 24-22-00/201, Electrical Power - Control

C. Access
(1) Location Zones

251	Passenger cabin - section 46 (Left)
252	Passenger cabin - section 46 (Right)
211/212	Control Cabin

D. Procedure

S 715-033
(1) Do the steps that follow for the operational test:

S 865-031
(2) Supply electrical power (AMM 24-22-00/201).
(a) Connect the 600 ohm headset into the PHONE jack on voice recorder on E7 rack.
(b) Push TEST switch on voice recorder front panel for approximately 1/2 second.
(c) Make sure that you hear four tones in the headphone while you push the TEST switch.
(d) Make sure the STATUS IND light on the voice recorder comes on two times while you push the TEST switch.
(e) Disconnect the headset from the voice recorder.

S 865-007
(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 23-71-00-735-008

6. System Test - Voice Recorder System

A. General
(1) This system test procedure does a four channel test of the system with flight crew microphones.

B. References
(1) 10-11-01/201, Normal Parking
(2) 23-51-00/501, Flight Interphone
(3) 24-22-00/201, Electrical Power - Control
(4) 27-61-00/201, Spoiler/Speedbrake Control System
(5) 32-09-02/201, Air/Ground Relays

C. Access
(1) Location Zones

251	Passenger Cabin - section 46 (Left)
252	Passenger Cabin - section 46 (Right)
211/212	Control Cabin

D. Prepare for Test

S 865-009
(1) Supply electrical power (AMM 24-22-00/201).

E. Four Channel Microphone Tests

S 735-009
(1) Do the steps that follow for the system test:
(a) Connect 600 ohm headset to HEADSET jack on voice recorder control panel on the P5 panel.
(b) Connect boom microphone to captain's jack panel on P15 panel (AMM 23-51-00/501).

(c) Put a cover on the area microphone on the voice recorder control panel. Speak into the boom microphone.

(d) Make sure you hear your voice through the headset at the voice recorder control panel.

NOTE: When you test the digital or solid state voice recorder you will hear your voice in the headset as you speak. When you test the analog or tape based voice recorder you will hear your voice in the headset after approximately a 0.5 second delay.

(e) Disconnect boom microphone from captain's jack panel and connect it to the first officer's jack on the P16 panel.

(f) Speak into the BOOM microphone.
(g) Make sure you hear your voice through the headset at the voice recorder control panel.

NOTE: When you test the digital or solid state voice recorder you will hear your voice in the headset as you speak. When you test the analog or tape based voice recorder you will hear your voice in the headset after approximately a 0.5 second delay.

(h) Disconnect boom microphone from first officer's jack.
(i) Connect boom microphone into first observer's jack panel (P17).

(j) Speak into boom microphone.
(k) Make sure you hear your voice through the headset at the voice recorder control panel.

NOTE: When you test the digital or solid state voice recorder you will hear your voice in the headset as you speak. When you test the analog or tape based voice recorder you will hear your voice in the headset after approximately a 0.5 second delay.

(l) Disconnect boom microphone from first observer's jack panel (P17).
(m) Remove the cover from the area microphone.
(n) Speak into the area microphone on the voice recorder control panel from a distance of three to four feet away.

(o) Make sure you hear your voice through the headset at the voice recorder control panel.

NOTE: When you test the digital or solid state voice recorder you will hear your voice in the headset as you speak. When you test the analog or tape based voice recorder you will hear your voice in the headset after approximately a 0.5 second delay.

(p) Set boom microphones to the usual position.
(q) Disconnect the headset from voice recorder control panel.

S 865-016
(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

F. Bulk Erasure Test

S 865-015
(1) Make sure the parking brake is set (AMM 10-11-01/201).

S 865-024
(2) Supply electrical power (AMM 24-22-00/201).

S 865-043
(3) Open this circuit breaker on the main power distribution panel (P6) and attach a DO-NOT-CLOSE tag:
(a) 6F4, LANDING GEAR PARKING BRAKE VLV

S 865-023
(4) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 735-004

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY AND DAMAGE CAN OCCUR.

(5) Do the steps that follow for the system test:
(a) Do the Flight Mode Simulation procedure for the No. 1 air/ground system (AMM 32-09-02/201).
(b) Push the ERASE switch on the voice recorder control panel.
(c) Make sure you do not hear a modulated sound in the headphone.
(d) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P6 panel:
1) 6F4, LANDING GEAR PARKING BRAKE VLV
(e) Push the ERASE switch on the voice recorder control panel.
(f) Make sure you do not hear a modulated sound in the headphone.

(g) Put the No. 1 air/ground system back to the ground mode (AMM 32-09-02/201).
(h) Activate spoilers (AMM 27-61-00/201) if deactivated.
(i) Push the ERASE switch on the voice recorder control panel and hold for 17 seconds.
(j) While the switch is pushed, make sure you hear a modulated sound in the headset.
(k) Disconnect headphone from the voice recorder control panel.

S 865-040
(6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VOICE RECORDER - REMOVAL/INSTALLATION

1. General
   A. Voice recorder M201 is in the aft equipment center rack E7 above the aft galley. Electrical connections are made through a connector at the rear of the unit.

TASK 23-71-01-024-001

2. Remove the Voice Recorder
   A. References
      (1) 20-10-01/401, E/E Rack Mounted Components
      (2) 25-22-02/401, Lowered Ceiling Panels
   B. Access
      (1) Location Zones
          251 Passenger cabin - section 46 (Left)
          252 Passenger cabin - section 46 (Right)
   C. Procedure

      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tag:
          (a) 11H34, VOICE RECORDER

      S 014-003
      (2) Do this task: "Remove the Lowered Ceiling Panels", (AMM 25-22-02/401), to remove the ceiling panel to get access to the voice recorder.

      S 024-004
      (3) Remove the voice recorder (AMM 20-10-01/401).

      S 034-005
      (4) Remove the underwater locator beacon (ULB) from the voice recorder if the replacement voice recorder does not have a ULB installed, do this task: Underwater Locator Beacon (ULB) Removal (AMM 23-71-03/201).

TASK 23-71-01-424-006

3. Install the Voice Recorder
   A. References
      (1) 20-10-01/401, E/E Rack Mounted Components

(2) 23-71-03/201, Underwater Locator Beacon
(3) 24-22-00/201, Electrical Power - Control
(4) 25-22-02/401, Lowered Ceiling Panels

B. Access

(1) Location Zones
251 Passenger cabin - section 46 (Left)
252 Passenger cabin - section 46 (Right)

C. Procedure

S 434-007

(1) Install an underwater locator beacon (ULB) if the voice recorder does not have a ULB installed, do this task: Underwater Locator Beacon (ULB) Installation (AMM 23-71-03/201).

S 424-008

(2) Install the voice recorder (AMM 20-10-01/401).

S 414-009

(3) Do this task: "Install the Lowered Ceiling Panels", (AMM 25-22-02/401), by the aft No. 1 galley.

S 864-010

(4) Remove DO-NOT-CLOSE tag and close this circuit breaker on the overhead circuit breaker panel, P11:
(a) 11H34, VOICE RECORDER

D. Voice Recorder Installation Test

S 864-011

(1) Supply electrical power (AMM 24-22-00/201).

S 864-109

(2) Connect the 600 ohm headset to the HEADSET jack at the voice recorder front panel (E7).

S 864-101

(3) Push and hold the TEST switch on the voice-recorder front panel for approximately 1/2 second.
(a) Make sure the green STATUS IND light comes on two times.
(b) Make sure you hear four tones in the headset while you push the TEST switch.

S 864-017

(4) Release the TEST switch.

S 864-026

(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

VOICE RECORDER CONTROL PANEL - REMOVAL/INSTALLATION

1. General
   A. The voice recorder control panel, M50, is on the pilots' overhead panel, P5.

TASK 23-71-02-024-001

2. Remove the Voice Recorder Control Panel
   A. Access
      (1) Location Zones
          211/212 Control Cabin
   B. Procedure

      S 864-002
      (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tag.
          (a) 11H34, VOICE RECORDER

      S 024-003
      (2) Remove the voice recorder control panel.

TASK 23-71-02-424-004

3. Install the Voice Recorder Control Panel
   A. References
      (1) 24-22-00/201, Electrical Power - Control
   B. Access
      (1) Location Zones
          211/212 Control Cabin
   C. Procedure

      S 424-005
      (1) Install the voice recorder control panel.

      S 864-006
      (2) Remove DO-NOT-CLOSE tag and close this circuit breaker on the overhead circuit breaker panel, P11:
          (a) 11H34, VOICE RECORDER
   D. Voice recorder control panel installation test:

      S 864-007
      (1) Supply electrical power (AMM 24-22-00/201).

S 864-032

(2) Connect the 600 ohm headset to the HEADSET jack at the voice recorder control panel (P5).

S 864-045

(3) Push and hold the TEST switch on the voice recorder control panel for approximately 1/2 second.
   (a) Make sure that the MONITOR light comes on while you push the TEST switch.
   (b) Make sure you hear four tones in the headset while you push the TEST switch.

S 864-013

(4) Release the TEST switch.

S 864-016

(5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

UNDERWATER LOCATOR BEACON - MAINTENANCE PRACTICES

1. General
   A. This procedure has these tasks:
      (1) A removal of the underwater locator beacon (ULB).
      (2) A replacement of the ULB battery.
      (3) An operational test of the ULB.
      (4) An installation of the ULB.
   B. The underwater locator beacon (ULB) is attached to the front of the voice recorder. The voice recorder is installed on the E7 rack in the aft overhead passenger compartment.

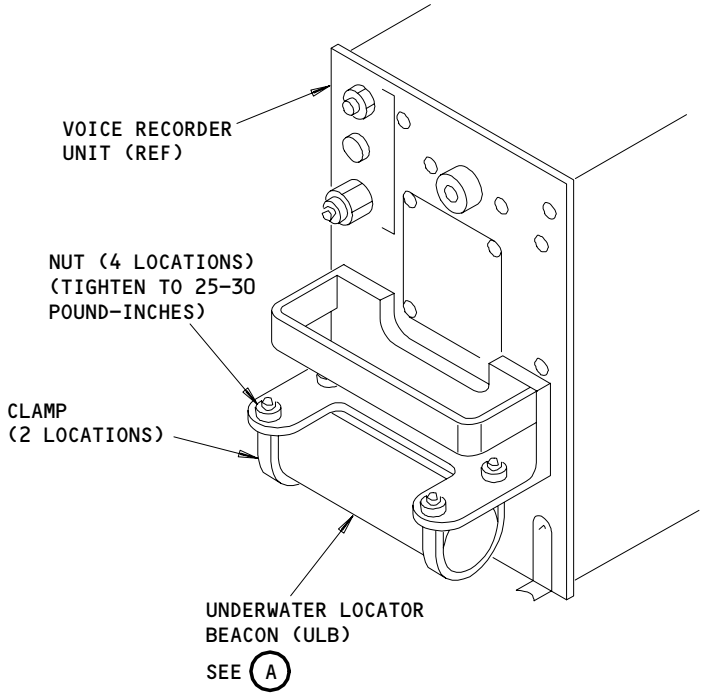
TASK 23-71-03-022-001

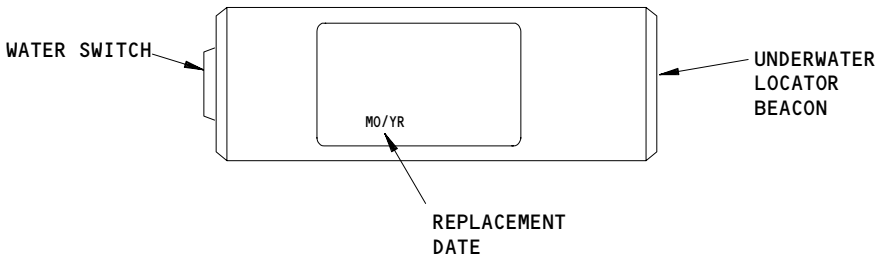
2. Underwater Locater Beacon Removal (Fig. 201)
   A. General
      (1) The ULB has a battery as the power source. The ULB has no external electrical connections.
   B. References
      (1) AMM 23-71-01/401, Voice Recorder
      (2) AMM 25-22-02/401, Lowered Ceiling Panels
   C. Access
      (1) Location Zones
          253 Area Above Passenger Compartment Ceiling, Left - Section 46
          254 Area Above Passenger Compartment Ceiling, Right - Section 46
   D. Removal Procedure

      S 012-081
      (1) Open the ceiling panel (AMM 25-22-02/401) to get access to the voice recorder in the aft passenger compartment.

      S 022-096
      (2) Do this task: Remove the Voice Recorder (AMM 23-71-01/401).

      S 022-063
      (3) Remove the underwater locator beacon from the voice recorder.
          (a) Loosen the four nuts that hold the ULB.
          (b) Remove the two nuts and the clamp from one end of the ULB.
          (c) Remove the ULB.
          (d) Keep the two nuts and the clamp.





UNDERWATER LOCATOR BEACON

A

Underwater Locator Beacon Installation
Figure 201

TASK 23-71-03-962-003

3. VOICE RECORDERS WITH DUKANE ULBs;
Underwater Locator Beacon Battery Replacement (Fig. 202)

A. General

(1) This procedure contains these tasks:
(2) A removal of the Dukane ULB Battery.
(3) An installation of the Dukane ULB Battery.

B. Equipment

(1) Spanner Wrench, 810-325
Dukane Corporation,
2900 Dukane Drive,
St. Charles, IL 60174
(2) Split Radiator Hose
1-1/4-inch diameter, 5 inches in length

C. Consumable Materials

(1) G02440 Battery, Dukane 810-2007/K

D. Removal Procedure

S 512-056

WARNING: DO NOT REMOVE THE BATTERY FROM THE DK100/DK130 ULB. DO NOT CAUSE DAMAGE TO THE DK100/DK130 ULB. DO NOT DISCARD THE DK100 /DK130 ULB. THE MANUFACTURER HAS A REPLACEMENT PROGRAM FOR EXPIRED ULBs. ON OR BEFORE THE EXPIRED DATE, SEND THE DK100 /DK130 ULB TO THE MANUFACTURER FOR SERVICING. THE BATTERY CONTAINS DANGEROUS CHEMICAL MATERIALS WHICH CAN CAUSE INJURIES TO PERSONNEL.

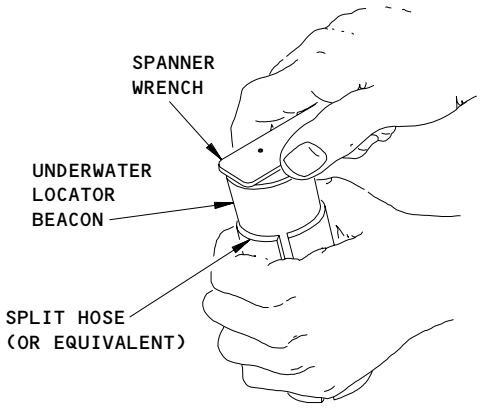
(1) If you have a DK100/DK130 ULB, send it to the manufacturer for servicing.

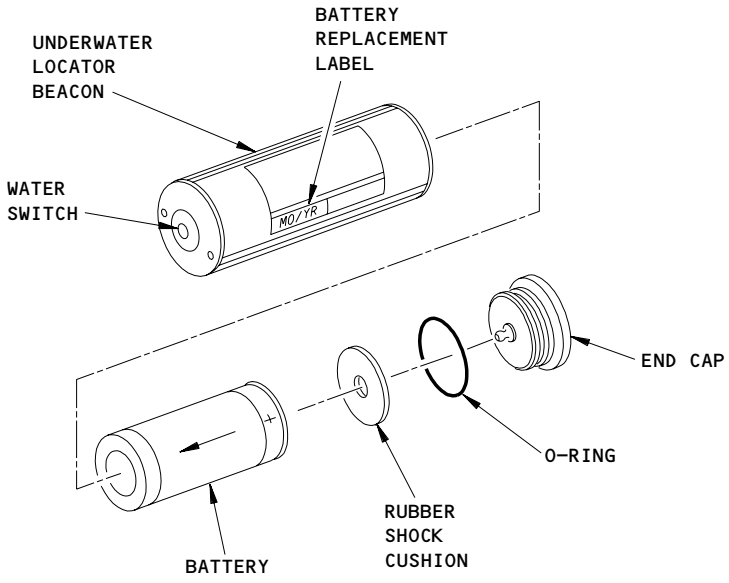
S 022-100

(2) If you do not have a DK100/DK130 ULB, remove the ULB battery:

CAUTION: DO NOT HOLD THE UNDERWATER LOCATOR BEACON WITH A VISE. THIS CAN CAUSE DAMAGE TO THE UNDERWATER LOCATOR BEACON.

(a) Hold the ULB body with a split radiator hose.
(b) Use a spanner wrench to remove the end cap that is identified BATTERY ACCESS.
(c) Remove the rubber shock cushion from the battery end if it is not removed with the cap.
(d) Hit the ULB body lightly to remove the battery.





BATTERY INSTALLATION

Underwater Locator Beacon Battery Replacement
Figure 202

E. Installation Procedure

S 422-050

(1) Install the ULB battery:

NOTE: The Dukane 810-2007/K battery is a 6 year lithium battery used in the Dukane model DK120/DK140 ULB.

(a) Put a new battery replacement label on the ULB body.
(b) On the date label, write the next scheduled replacement date for the new ULB battery that you installed.

NOTE: The date label is blank so you can write in a replacement date based on your maintenance schedule.

CAUTION: INSTALL THE ULB BATTERY CORRECTLY. INCORRECT POLARITY WILL CAUSE PERMANENT DAMAGE TO THE ULB.

(c) Put the new battery in the ULB with the end identified by INSERT THIS END in first.
(d) Remove and discard the used O-ring from the end cap.

CAUTION: DIRT OR OTHER UNWANTED MATERIAL CAN CAUSE DAMAGE TO THE THREADS AND THE O-RING SEAL. THIS CAN PERMIT WATER LEAKAGE.

(e) Clean the threads and the O-ring groove in ULB body.
(f) Apply a thin layer of lubricant to the O-ring, O-ring groove, and threads.
(g) Install a new O-ring on the end cap.
(h) Put the rubber shock cushion smoothly on the end cap.
(i) Put the end cap into the body.
(j) Tighten the end cap until the cap flange touches the ULB body.

NOTE: Only use hand force on the spanner wrench.

S 712-172

(2) Do this task: Underwater Locator Beacon - Operational Test.

TASK 23-71-03-962-051

4. VOICE RECORDERS WITH TELEDYNE BENTHOS ULBs;
Underwater Locator Beacon Battery Replacement (Fig. 202)

A. General

(1) This procedure contains these tasks:

(a) Prepare for the removal of the Teledyne Benthos ULB Battery.

(b) A removal of the Teledyne Benthos ULB Battery.

(c) An installation of the Teledyne Benthos ULB Battery.

B. Equipment

(1) B362-09111, Torque Adapter, Used on Underwater Locator Beacon
Teledyne Benthos, Inc.
49 Edgerton Drive
North Falmouth, MA 02556

(2) Split Radiator Hose
1-1/4-inch diameter, 5 inches in length

C. Consumable Materials

(1) B362-06192-2, Teledyne Benthos.

NOTE: B362-06192-2 contains a lithium battery P/N C362-04270-2, a 2-022 O-Ring, an O-Ring lubricant packet and replacement instruction.

D. Prepare for the Removal

S 862-206

(1) Measure the battery voltage of the ELP-362D ULB. Use a high-impedance digital voltmeter with a minimum input impedance of 10 Megohms.

(a) Put the negative meter lead on the water switch.

(b) Put the positive meter lead on the bare aluminum surface of the beacon housing.
(c) Read the voltmeter.

E. Removal Procedure

S 512-057
(1) If the measured voltage is less than 6.0 Volts, send the ELP-362D ULB to the manufacturer for servicing.

S 022-055
(2) If the measured voltage is 6.0 Volts or more, remove the battery from the ELP-362D ULB:

CAUTION: DO NOT HOLD THE UNDERWATER LOCATOR BEACON WITH A VISE. THIS CAN CAUSE DAMAGE TO THE UNDERWATER LOCATOR BEACON.

(a) Hold the ULB body with a split radiator hose.
(b) Use the torque adapter to remove the end cap that is identified as BATTERY ACCESS.
(c) Turn the housing up to remove the battery from the unit.
(d) Discard the battery.

NOTE: Refer to local instructions when you discard the battery.

F. Installation Procedure

S 422-053
(1) Install the new ULB battery:

NOTE: The Teledyne Benthos C362-04270-2 battery is a six year battery.

(a) Set the battery until the arrow points to the top end of the unit.

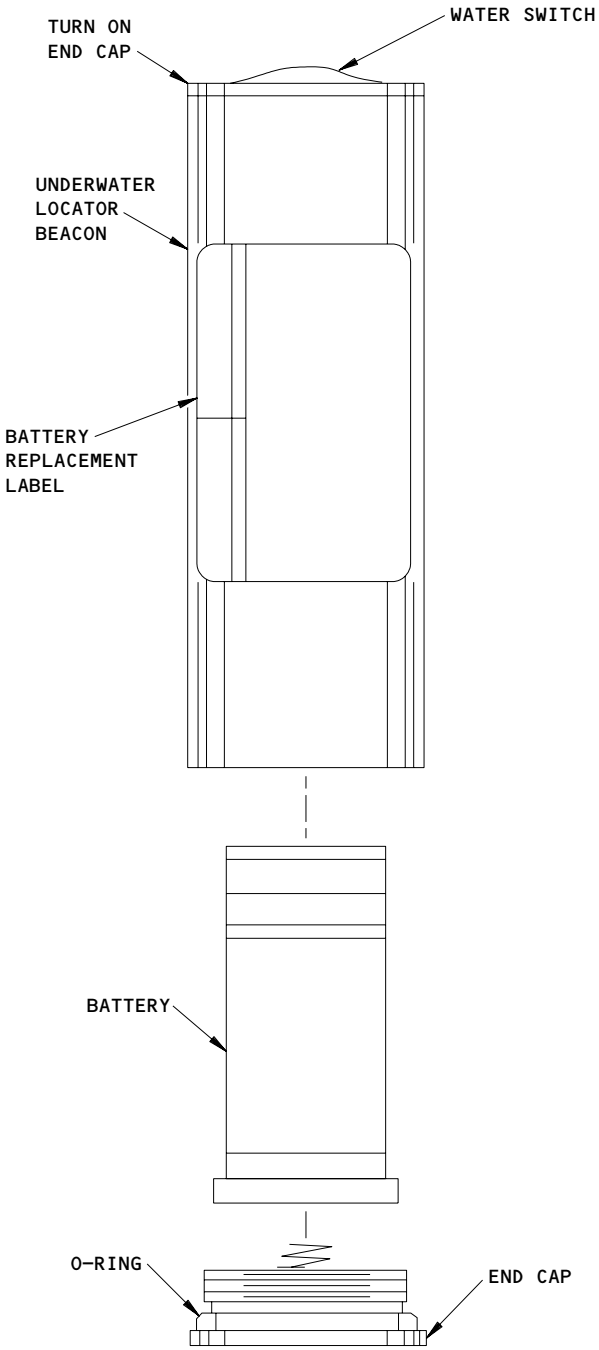
NOTE: The battery label has an arrow mark.

(b) On the date label, write the next scheduled replacement date for the new ULB battery that you installed.

NOTE: The date label is blank so you can write in a replacement date based on your maintenance schedule.

CAUTION: INSTALL THE ULB BATTERY CORRECTLY. INCORRECT POLARITY WILL CAUSE PERMANENT DAMAGE TO THE ULB.

(c) Put the new battery in the ULB with the end identified by INSERT THIS END in first.
(d) Remove the O-ring from its groove in the end cap.



BATTERY INSTALLATION

Underwater Locator Beacon Battery Replacement
Figure 203

CAUTION: DIRT OR OTHER UNWANTED MATERIAL CAN CAUSE DAMAGE TO THE THREADS AND THE O-RING SEAL. THIS CAN PERMIT WATER LEAKAGE.

(e) Clean O-ring groove of dirt, lint, and other unwanted materials.
(f) Apply the O-ring lubricant to the new O-ring.
(g) Put the lubricated O-ring in the end-cap groove.
(h) Attach the end cap to the housing.
(i) Use the torque adapter to install the end cap tightly.

NOTE: Only use hand force on the torque adapter.

(j) Torque the end cap to 25 to 30 inch pounds.

S 712-173
(2) Do this task: Underwater Locator Beacon - Operational Test.

TASK 23-71-03-712-058
5. Underwater Locator Beacon - Operational Test
A. References
(1) AMM 25-22-02/401, Lowered Ceiling Panels
B. Equipment
(1) Ultrasonic Test Set, 42A12 Series (alternative)
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174
(2) Ultrasonic Test Set, PL1 (alternative)
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174
(3) Ultrasonic Test Set, PL3 (alternative)
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174
(4) Acoustic Test Set, ATS-260 (alternative)
Datasonics INC.
1400 Route 28A
Cataumet, MA 02534
(5) TS100 Test Set - Seacom
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174-3395
(6) TS200 Test Set - Seacom
Dukane Corporation
2900 Dukane Drive
St. Charles, IL 60174-3395

C. Procedure

S 012-105

(1) Open the ceiling panel (AMM 25-22-02/401) to get access to the voice recorder in the aft passenger compartment ceiling.

S 712-059

(2) If you have a 42A12 Series test set, do this test of the ULB:

NOTE: 42A12 can do a test for all Dukane and Teledyne Benthos ULBs.

(a) Put the test set approximately 3 feet from ULB.
(b) Set the OFF-GAIN control switch on test set to middle position.
    1) Make sure that you hear sounds through the earphone on the test set.
(c) Set the TUNING CONTROL to 37 ±1 kHz.
(d) Set the INPUT SELECTOR switch to the INT position.
(e) Make sure the test set operates correctly.
    1) Rub your thumb and fingers together in front of the microphone to make sure it operates.

        NOTE: This will produce a rushing noise from the speaker.

        a) Make sure you hear sounds through the test set earphone.
(f) Use tape to attach a piece of wire or other conductive material to the ULB case and the center of the water switch.

    NOTE: This will make a short circuit from the center of the water switch to the outer part of the ULB.

    1) Make sure you hear a pulsed tone at 1-second intervals.
(g) Remove the piece of wire or other conductive material from the ULB case and center of the water switch.
    1) Make sure you do not hear a pulsed tone.
(h) Set the OFF-GAIN control switch to the OFF position.
(i) Make sure that the water switch on the ULB has no grease or dirt.
    1) If necessary, clean the switch with water and detergent.
    2) Dry the switch with a clean cloth.

S 712-060

(3) If you have a PL1 test set, do this test of the ULB:

NOTE: PL1 can only do a test for the DK100 ULB.

(a) Use tape to attach a piece of wire or other conductive material to the ULB case and the center of the water switch.

NOTE: This will make a short circuit from the center of the water switch to the outer part of the ULB.

(b) Put the end of the test set against the ULB, approximately one inch from the water switch.
(c) Push and hold operation switch on the test set.
1) Make sure the BEACON ACTIVE WHEN FLASHING light flashes.
2) Remove the piece of wire or other conductive material from the ULB case and center of the water switch.
3) Make sure the BEACON ACTIVE WHEN FLASHING light does not flash.
(d) Release the operation switch on the test set.
(e) Remove the test set.
(f) Make sure that the water switch on the ULB has no grease or dirt.
1) If necessary, clean the switch with water and detergent.
2) Dry the switch with a clean cloth.

S 712-102

(4) If you have a PL3 test set, do this test:

NOTE: PL3 can only do a test for the DK100 and DK120 ULBs.

(a) Push and hold the test set against the ULB water switch.
1) Make sure that you hear a pulse sound.
2) Make sure that you see the LED light comes on and off.
(b) Remove the test set from the ULB.
(c) Make sure that the water switch on the ULB has no grease or dirt.
1) If necessary, clean the switch with water and detergent.
2) Dry the switch with a clean cloth.

S 712-061

(5) If you have an ATS-260 test set, do this test of ULB:

NOTE: ATS-260 can only do a test for the ELP-362D ULB.

(a) Put the test set clip on the ULB.
(b) Push and hold the PUSH TO TEST button.
(c) Put the test set probe on the ULB water switch.
1) Make sure a green LED shows.
2) Make sure you can hear sounds from the test set.

3) Make sure the amber LED flashes.

(d) Release the PUSH TO TEST button.

(e) Remove the test set.

(f) Make sure that the water switch on the ULB has no grease or dirt.

1) If necessary, clean the switch with water and detergent.

2) Dry the switch with a clean cloth.

S 712-194

(6) If you have a TS100 Portable Test Set, do this test of the ULB:

NOTE: TS100 can only do a test for the DK100 and DK120 ULBs.

(a) Connect the probe head of the TS100 Test Set to the beacon in its mount.

(b) Slide the switch on the side of the Test Set housing to ON and make sure the LCD display on the TS100 Test set shows TESTING.

(c) Press the button in the center of the TS100 Test Set to do a retest and make sure the LCD display shows TESTING.

(d) Make sure that within a few seconds, the LCD display shows BEACON PASSED.

1) If the LCD display shows one of these messages, take the applicable corrective action:

a) BATTERY FAULT (Beacon is not operating correctly)

b) NO PULSE OUTPUT (Beacon is not operating correctly)

c) PULSE FAULT (Beacon is not operating correctly)

d) FREE-RUN FAULT (Beacon is not operating correctly)

e) TEST SET FAULT (Replace Test Set batteries)

f) NEED SERVICE (Beacon is not operating correctly)

g) OPEN PROBE/BATT (Probe is not correctly attached or beacon battery is dead).

(e) After approximately 10 seconds, the LCD display changes from the BEACON PASSED message to READY FOR TEST message.

(f) Remove the TS100 probe head from the beacon.

S 712-203

(7) If you have a TS200 test set, do this test of the ULB:

NOTE: TS200 can do a test for all Dukane ULBs.

(a) Attach the test probe clip of the test set to the beacon in its mount.

(b) Put the tip of the probe on the silver pad of the water switch at the end of the beacon.

1) The LCD display will show the battery voltage of the beacon.

(c) Refer to the applicable battery code for the minimum permitted range of the beacon battery voltage:

NOTE: Examine the battery replacement label to find the battery code.

1) Code A - 3.55 Volts
2) Code B - 2.97 Volts
3) Code C - 2.97 Volts
4) Code D - 2.97 Volts

(d) Push the red button on the test set.
1) The beacon starts and you hear a pinging noise from the test set.

(e) Remove the test probe clip of the test set from the ULB.

(f) Replace the ULB if necessary.

S 412-110

(8) Close the ceiling panel (AMM 25-22-02/401) in the aft passenger compartment.

TASK 23-71-03-422-022

6. Underwater Locator Beacon Installation (Fig. 201)

A. Consumable Materials
(1) B00541 Detergent, General Purpose

B. References
(1) AMM 23-71-01/401, Voice Recorder
(2) AMM 25-22-02/401, Lowered Ceiling Panels

C. Access
(1) Location Zones
253 Area Above Passenger Compartment Ceiling, Left - Section 46
254 Area Above Passenger Compartment Ceiling, Right - Section 46

D. Installation Procedure

S 422-073

(1) Install the underwater locator beacon on the voice recorder:
(a) Make sure that the water switch on the ULB has no grease or dirt.
1) Clean the water switch with a weak detergent.
(b) Put the ULB into the bracket.
(c) Install the clamp on the end of the ULB with the two nuts.
(d) Make sure you can read the replacement date on the ULB.
(e) Tighten the four nuts.

S 422-097

(2) Do this task: Install the Voice Recorder (AMM 23-71-01/401).

S 412-076

(3) Close the ceiling panel (AMM 25-22-02/401) in the aft passenger compartment.