2 Taking an APBX handset off-hook results in the same decisions as specified for the WH–10 handset. However, the SDU to APBX off–hook actions are specified in Table 3-4, where the DTMF tone sequence <DTMF–C>, <DTMF–n> (n is 0, 1, 2, or 4) sent to the APBX handset indicates the SATCOM channel status:

- An outgoing call cannot be supported (n = 1, 2, or 4) or
- An outgoing call can be attempted (n = 0).

3 If the channel status indicates a call can be attempted, the SDU accepts any command determined to be valid from an APBX interface, including the on-hook DTMF tone. If the channel status indicates a call can not be attempted, the APBX handset is expected to send the on-hook DTMF tone. Otherwise, the SDU still accepts any command determined to be valid from an APBX interface; though the checked B-party address transfer command is guaranteed to produce a call setup failure. Subsequent to call setup commands sent to the SDU, call setup progress, failure, and termination DTMF tone sequences are sent to the APBX handset.

4 The SDU considers an off-hook channel to be in the on-hook state if no call has been in progress on that channel and no DTMF signals have been received for at least 120 seconds. A channel in the on-hook state must issue another DTMF off-hook signal to enable the reentry into the off-hook state.

(b) Checked Credit Card Data Transfer Command

1 The *2284*c*ddd# command, if valid, loads the transferred three-digit value into the SDU calling terminal ID buffer. This data is used in place of the default 000 in the calling terminal field of the call information service address initial signal unit (ISU) (S5) for any outgoing call setups on this channel until the next APBX on-hook is received. The command is accepted only if the modulo 10 sum of all the decimal digits in the command, including 2284, the three-digit calling terminal ID, and the check digit c is zero.

(c) Checked B-Party Address Transfer Command

1 The *2262*cdddd....# command, if valid, initiates a call setup request to the GES using the transferred digits dddd... as the B-party address and any track 2 credit card data stored since the previous on-hook transition on this channel. The command is only accepted if the modulo 10 sum of all decimal digits in the command, including 2262 and the check digit c is zero. A valid command causes the SDU to send the DTMF sequence <DTMF–C>, <DTMF–8> to the APBX handset. An invalid command causes the SDU to send the DTMF sequence <DTMF–C>, <DTMF–9> to the APBX handset.

Table 3-3. Assignment of DTMF Digits in the APBX Interface

DTMF Digit	Low (Hz)	High (Hz)	Meaning	To/From SDU
1	697	1209	1	Both
2	697	1336	2	Both
3	697	1477	3	Both
4	770	1209	4	Both
5	770	1336	5	Both
6	770	1477	6	Both
7	852	1209	7	Both
8	852	1336	8	Both
9	852	1477	9	Both
0	941	1336	0	Both
*	941	1209	*/STX	To
#	941	1477	#/ETX	To
A	697	1633	FS/Answer	Both
B	770	1633	Off–Hook	To
C	852	1633	Status	From
D	941	1633	On–Hook	To

NOTE: STX (start sentinel), ETX (end sentinel), and FS (frame separator) are used in the transfer of ISO 7813 track 2 data from the APBX to the SDU.

Table 3-4. SDU to APBX Off-Hook Actions

Action	Description
1	Play <DTMF–C>, <DTMF–2> followed by silence (idle).
2	Play <DTMF–C>, <DTMF–1> followed by silence (failure).
3	Play <DTMF–C>, <DTMF–4> followed by silence (accessing).
4	Play <DTMF–C>, <DTMF–2> followed by silence (idle).
5	Play <DTMF–C>, <DTMF–4> followed by silence (accessing).
6	Play <DTMF–C>, <DTMF–0> followed by silence (available).

2. Cockpit Communications

A. General

(1) The SDU codecs support headset interfaces for cockpit use only. These interfaces incorporate 600-ohm, 4-wire, off-hook/on-hook signaling and dialing through the combination of a control and display unit (either SCDU or MCDU), and (at the user's option) PTT, mic-on, or place/end call switches. If used, when the PTT button is pushed, the microphone audio signal is sent to the selected voice channel; activation of one of the discretes is signalled to the SDU. Also, an off-hook signal can be sent to the SDU through the SCDU. An audible chime and call lamps announce a ground-to-air call.

(2) The cockpit headsets interface with the codecs in the SDU through an audio management unit (AMU), which is also connected to other aircraft radios. The ACP associated with the AMU can be capable of selecting either a single or dual voice channels for the MCS system. When single-channel AMUs are installed, voice channel 1 is wired to AMU No. 1 and voice channel 2 is wired to AMU No. 2. This permits operation of two independent channels. When dual-channel AMUs are installed, voice channels No. 1 and No. 2 are wired in parallel to each AMU, enabling two voice channels to be shared by the cockpit users.

(3) Two functionally identical voice codec modules (VCM) are installed in the SDU and designated Codec A and Codec B.

(4) Associated with the SATCOM channels are SCDU pages, call lamps, channel selection switches, a chime, and a chime reset. The SDU hookswitch signaling can be supplied:

- When the ACP SATCOM channel select switch is activated
- When a PTT switch is activated
- When signaling through the SCDU, where the SDU hookswitch signaling discrete is inactive.

(5) Once off-hook, microphone audio is supplied to the selected SATCOM voice channel and the appropriate signaling is exchanged for call lamp and chime reset. Conversely, once on-hook, microphone audio is removed from the selected SATCOM voice channel and the call lamp is turned off.

B. Headset Off-Hook Signaling

(1) The headset is capable of going off-hook (to connect the call and to acknowledge the call signaling) if the cockpit voice call light output has transitioned for either the flashing or steady light activation, at which time:

- If the latched ACP hookswitch signaling is strapped, the headset is considered off-hook whenever the cockpit voice mic-on input is activated (connected to ground).
- If the switched PTT hookswitch signaling is strapped, the headset is considered off-hook whenever the cockpit voice mic-on input is activated for the first time after the call light activation for an incoming call, or when the place/end call input is activated to initiate an outgoing call.

(2) If ORT item xliii is enabled, the headset is capable of going off-hook when ANSWER CALL is selected on the SATCOM main menu page (TESTING/FAULT ISOLATION) after the call light activation and irrespective of hookswitch signaling.

C. Headset On-Hook Signaling

(1) If latched ACP hookswitch signaling is strapped, the headset is placed on-hook when an open is present on the cockpit voice mic-on input. Regardless of the hookswitch signaling, the cockpit voice place/end call 1 and 2 discrete inputs place the headset interface on-hook for cockpit audio channels 1 and 2, respectively, when a call clear event occurs. If ORT item xliii is enabled, the selection of END CALL or REJECT on the SATCOM main menu page (TESTING/FAULT ISOLATION) places the headset interface on-hook. Placing the headset on-hook results in normal call termination.

D. Voice Codec Module Audio Switching

(1) Headsets and analog connected phones interface to the SDU through the VCMs. Using a switch internal to the modules, each VCM can be connected to one of the cabin audio interfaces, or to one of the cockpit audio interfaces (or to both). Each VCM can be switched between either of its audio interfaces as follows:

- Codec A can be used in conjunction with either cabin audio No. 1 (WH–10 or APBX) or cockpit audio No. 1
- Codec B can be used in conjunction with either cabin audio No. 2 (WH–10 or APBX) or cockpit audio No. 2.

E. Voice Codec Module Sidetone

(1) Sidetone is supplied by each VCM. The sidetone level is adjustable for the cockpit audio, and is set to off for cabin audio. The adjustment range for cockpit sidetone is from 0 dB below the receive audio to off, with the default value set to 14.1 dB below the receive audio level. This setting is stored in nonvolatile memory within the SDU.

F. Voice Interface Module Stored Audio Messages

(1) The VIMs are capable of playing standard telephony supervisory lone signals, DTMF tones, and voice messages to the headset and analog phone users. These pacifiers are only sent to the analog interfaces:

- Headset
- WH–10 handsets
- APBX handsets.

(2) Stored audio messages are summarized in Table 3-5.

Table 3-5. Stored Audio Messages

Message No.	Message
1	Sorry, equipment failure, please refer to the user guide.
2	Sorry, attempting satellite access, please try later.
3	Sorry, log-on disabled, please refer to the user guide.
4	Sorry, no channel available, please try later.
5	Phone number memory <one> is empty.
6	Sorry, your call can no longer be sustained, please try later.
7	Sorry, your call has been preempted, please try later.
8	Sorry, connection failure, please try later.
9	Sorry, dialed calls have been disallowed, please refer to the user guide.
10	Sorry, outgoing calls have been disallowed, please refer to the user guide.
11	Sorry, number unobtainable.
12	Sorry, number busy, please try later.
13	Sorry, network congestion, please try later.
14	Sorry, credit card not honored at the ground station.
15	Sorry, access unauthorized.
16	Please wait, connecting your call.
17	Command accepted.
18	Command rejected.
19	The phone number stored in memory <one> is <oh> <oh> <one>...
20	The SATCOM is in <standby> |<auto log-on| <constrained log-on> mode.
21	Logged on to GES ID <one> <oh> <three>.
22	The preference level of GES ID <three> <oh> <two> on satellite <oh> <oh> <three> is <six>.
23	Equipment failure, equipment failure.
24	No channel available, no channel available.
25	Your call can no longer be sustained.
26	Your call has been preempted.
27	Connection failure, connection failure.
28	Number unobtainable, number unobtainable.
29	Number busy, number busy.
30	Network congestion, network congestion.
31	Channel <one> terminal ID is not assigned.
32	Channel <two> terminal ID is <oh> <one> <three> <nonexclusive>.

Table 3-5. Stored Audio Messages (cont)

Message No.	Message
33	Ground-to-air public calls destination set to <disallowed>.
34	Ground-to-air circuit mode data calls are <allowed>.

G. Voice Interface Module Dedication

(1) Each VIM has the property of dedication, which is different from the codec wiring. This property is of value on aircraft that have both headset and cabin (analog and digital) interface wiring, where contention for codec use can arise. Each VIM dedication is set to cabin, headset, or automatic through ORT item vi.

(2) A VIM with its dedication set to automatic can be allocated to a headset call or a cabin call, and is allocated on a first-come, first-served basis. A VIM can be reallocated to a headset call of priority 1, 2, or 3 through the preemption mechanism. A VIM with its dedication set to cabin is dedicated to its cabin (WH–10 or APBX) interface.

(3) A VIM with its dedication set to headset is unusable by the cabin interface. A VIM can be reallocated to a different headset call of priority 1, 2, or 3 through the preemption mechanism. ORT item vii (Appendix C) specifies whether a modem and HPA power should be reserved for a VIM dedicated to headset. This lets the pilot reserve one channel for cockpit use only.

Blank Page

SECTION 4
MECHANICAL INSTALLATION

1. Overview

A. General

(1) This section contains information on how and where to mount each component of the MCS system. For new installations, plan the installation in two stages. First, determine the location of the LRUs in the aircraft. Next, determine the length of RF and electrical interconnections for selected locations.

2. Equipment and Materials

A. General

(1) Refer to SYSTEM DESCRIPTION for mounting tray and mating connector information. For all other components, refer to the applicable Outline and Installation Diagram in this section.

(2) No additional special equipment or materials, other than those commonly used in the shop, are required to install the units in existing trays and clamps, and to adjust the system. Do not over tighten mounting screws. Where torque values are not given, it is acceptable to finger tighten the mounting screws.

3. Mechanical Installation Design

A. LRU Mechanical Installation

(1) The SDU and HPA are installed in mounting racks (ARINC 600) typically in the equipment bay of the aircraft. For a SATCOM installation, the primary installation dependent parameter is the RF coax cable loss requirements identified in Table 4-1. To make sure these requirements are met, some installations require the HPA(s) be installed in close proximity to the antenna subsystem components. Refer to the aircraft installation drawings for the location of the SATCOM equipment. For new installations, refer to Table 4-1 to determine the location of the SATCOM equipment to make sure the cable loss requirements are met.

(2) Mechanical installation data for the SDU, HPA, HSDU, and RFUIA are shown in Figure 4-2 thru Figure 4–5.

CAUTION: BEFORE AN LRU IS INSTALLED, PULL THE CIRCUIT BREAKERS THAT SUPPLY POWER TO THE LRU TO REMOVE POWER.

CAUTION: MOISTURE AND DIRT CAUSE DAMAGE TO LRUS.

CAUTION: LRU FAILURE RATES INCREASE WITH A RISE IN TEMPERATURE. INSTALL THE LRUS WITH CLEARANCE. LET THE AIR FLOW ON TOP AND BOTTOM OF LRUS TO PREVENT OVERHEATING.

CAUTION: MAKE SURE THAT THE LATEST ORT DATABASE SOFTWARE IS INSTALLED IN THE SDU BEFORE PERFORMING SYSTEM OPERATIONS.

NOTE: Honeywell/Thales recommends the MCS LRUs be installed so their installation is level (zero degrees) to the horizontal plane of the aircraft. Compliance with RTCA/DO–160D has been demonstrated with this orientation.

NOTE: Ambient temperature at the LRU location must be less than 104 °F (40 °C) during operation for best reliability.

B. Installation Dependent Considerations

(1) Refer to the SYSTEM DESCRIPTION section for the installation dependent considerations for the SDU.

C. Owner Requirements Table (ORT) Uploading

(1) When the SDU is changed, the ORT needs to be uploaded before normal operation can begin. Refer to the SYSTEM OPERATION section for the ORT upload procedures.

D. Cable Loss Requirements

(1) The attenuation and voltage standing wave ratio (VSWR) of coaxial cable used in the MCS system must meet the requirements specified in Table 4-1 to make sure the system operates correctly. Figure 4-1 shows the specific cable attenuations for the SATCOM equipment. All specified cable attenuations include connector losses, which are assumed to be 0.1 dB each. Honeywell recommends each cable assembly be sweep tested for loss and VSWR.

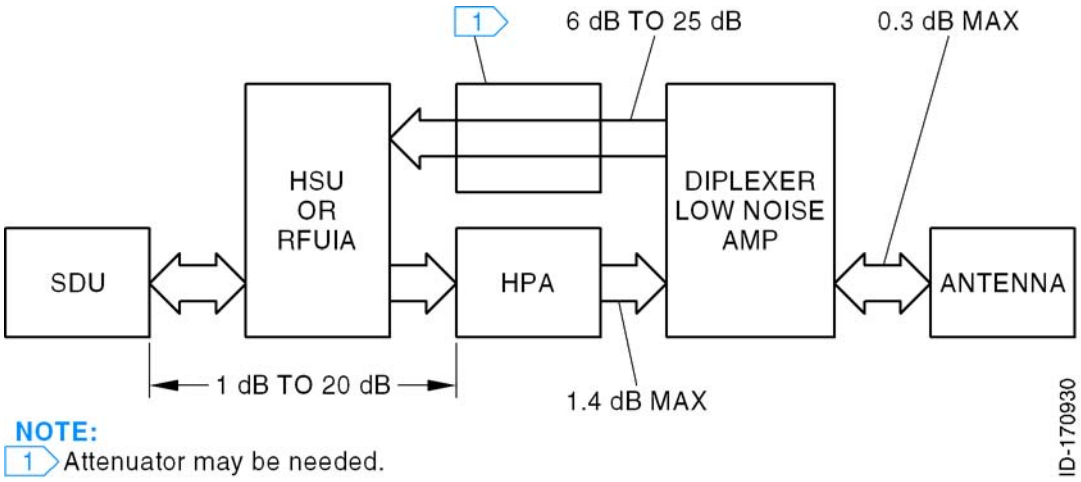


Figure 4-1. Cable Attenuations

Table 4-1. Cable Loss Requirements

Cable Assembly	Location	Minimum Loss	Maximum Loss	Maximum VSWR
TX Cable	Between SDU, HSU and HPA	1 dB	20 dB	2.0
RX Cable	Between Diplexer/LNA and SDU	6 dB	25 dB	2.0
TX Cable	Between HPA and Diplexer/LNA	N/A	1.4 dB (See Note)	1.3
RF Cable	Between Diplexer/LNA and Antenna	N/A	0.3 dB	1.3
NOTE: In installations that use a high power relay (HPR), the HPR loss must be included. The maximum Tx cable loss between the HGA and the antenna must not exceed 2.5 dB.				

E. Cooling Requirements

(1) The cooling requirements for the MCS avionics are specified in Table 4-2 as follows:

- Power dissipation is in Watts.
- Mass airflow is in pounds per hour.
- CF/M is cubic feet per minute at sea level and 104 °F (40 °C).
- Pressure drop is in inches of water.

(2) In most cases, a cooling system that meets the sea level requirements also meets the cooling requirements at –67 °F (–55 °C) and 70,000 feet.

Table 4-2. Cooling Requirements

LRU	Power Dissipation		Mass Airflow		CF/M		Pressure Drop	
	Max.	Nom.	Max.	Min.	Max.	Min.	Max.	Min.
SDU	150	105	96 (44 kg/hr)	73 (33 kg/hr)	23	18	0.25 (6.35 mm)	0.15 (3.81 mm)
HPA (60W)	425	250	176 (80 kg/hr)	121 (55 kg/hr)	42	29	0.25 (6.35 mm)	0.2 (5.0 mm)
HSU	100	55	63 (29 kg/hr)	49 (22 kg/hr)	15	11	0.25 (6.35 mm)	0.15 (3.81 mm)
NOTE: The SDU draws an additional 20 W during the first 10 minutes (maximum) of operation at 25 °C because of the oven controlled crystal oscillator (OCXO). The OCXO continuously dissipates this additional 20 W at –55 °C.								

F. Vendor Supplied Equipment

(1) Installation equipment like mounting trays, connectors, and cables can be obtained from various vendors. Refer to Appendix A for additional information about vendor manufactured equipment. For vendor supplied avionics, refer to the vendor documentation.

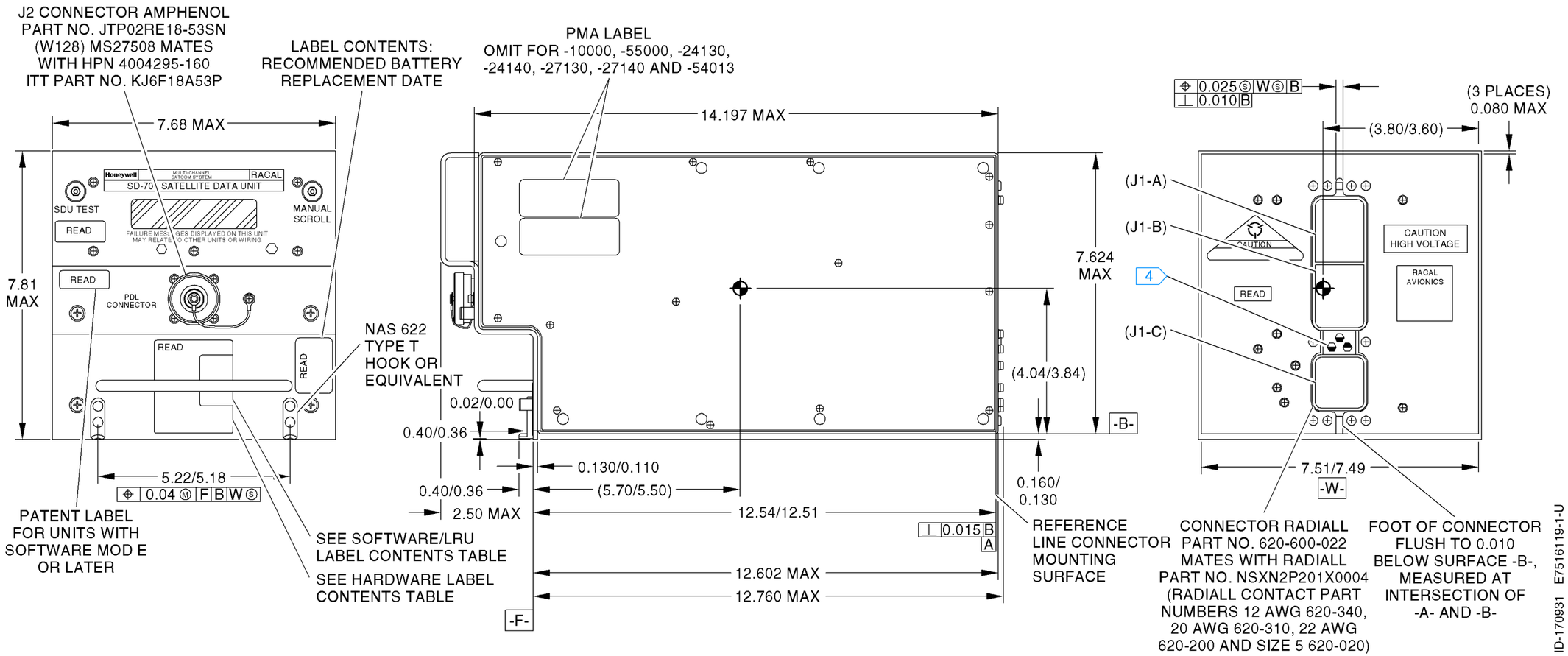


Figure 4-2. SD-700 and SD-720 (7516119) Outline and Installation Diagram

NOTES:

1. 

This assembly includes components which are subject to damage by electrostatic charges: Therefore all components shall be handled in accordance with guidelines for electrostatic discharge control.

2. Unit Weight:
Nominal: 28.0 pounds (12.70 kilograms).
Maximum: 32.0 pounds (14.50 kilograms).

3. Denotes approximate center of gravity.

4. Darkened portion indicates raised part of polarizing keyway.

5. This installation is in accordance with ARINC 600-12 Number 8 MCU.

6. Dimensions are in inches. See the Metric Conversion Table for corresponding dimensions in millimeters.

7. Cooling airflow requirements:
Minimum: 0.25 ± 0.05 inches of water (6.35 ± 1.27 millimeters of water) at a flow rate of 176.4 ± 2.0 pounds per hour (80.00 ± 0.91 kilograms per hour).

8. Unit finish: gold chemical film.

9. This unit defines 7520000-XXYYY.
XX = Hardware dash number 1 thru 99
YYY = Software Part No. 001 through 999.

10. 0.10 maximum rear panel thickness is required in connector mounting area defined as zone A. No other projections except connector mounting hardware are permitted in area defined as zone A.

11. Applies 0.750 from datum B.

12. Electrostatic dust covers shown partially removed for clarity.

13. ARINC 600 connector, receptacle, size 2
Unit Part No.: Radiall NSXFR221Y0908. Tray mating plug Part No. Radiall NSX2P221X0008.
ARINC 600 connector contact Radiall Part Nos.:
Size 22: Unit Part No. 620-361, tray mating Part No. 620-200.
Size 20: Unit Part No. 620-210, tray mating Part No. 620-310.
Size 12: Unit Part No. 620-240, tray mating Part No. 620-340.
Size 1 coax: Unit Part No. 620-044, see SDIM for tray mating contact Part No.
Size 5 coax: Unit Part No. 620-134, see SDIM for tray mating contact Part No.

14. ARINC 615 connector (PDL):
Unit connector Honeywell Part No. 4008114-160 or MS27508E18B53S, mating connectors Honeywell Part No. 4004295-160 or ITT Part No. KJ6F18A53P.

METRIC CONVERSION TABLE	
INCHES	MILLIMETERS
.010	0.254
.015	0.381
.020	0.508
.025	0.635
.030	0.762
.040	1.016
.060	1.524
.080	2.032
.100	2.240
.120	3.048
.145	3.683
.160	4.064
.184	4.674
.188	4.775
.200	5.080
.380	9.652
.750	19.050
1.400	35.560
1.810	45.974
1.970	50.038
2.500	63.500
3.590	91.186
4.500	114.300
5.310	134.874
5.750	146.050
6.890	175.006
7.640	194.056
7.800	198.120
10.070	255.778
10.110	256.794
10.790	274.066
11.300	287.020
12.520	318.008

Figure 4-3 (Sheet 1). HP-720 (7520006) Outline and Installation Diagram

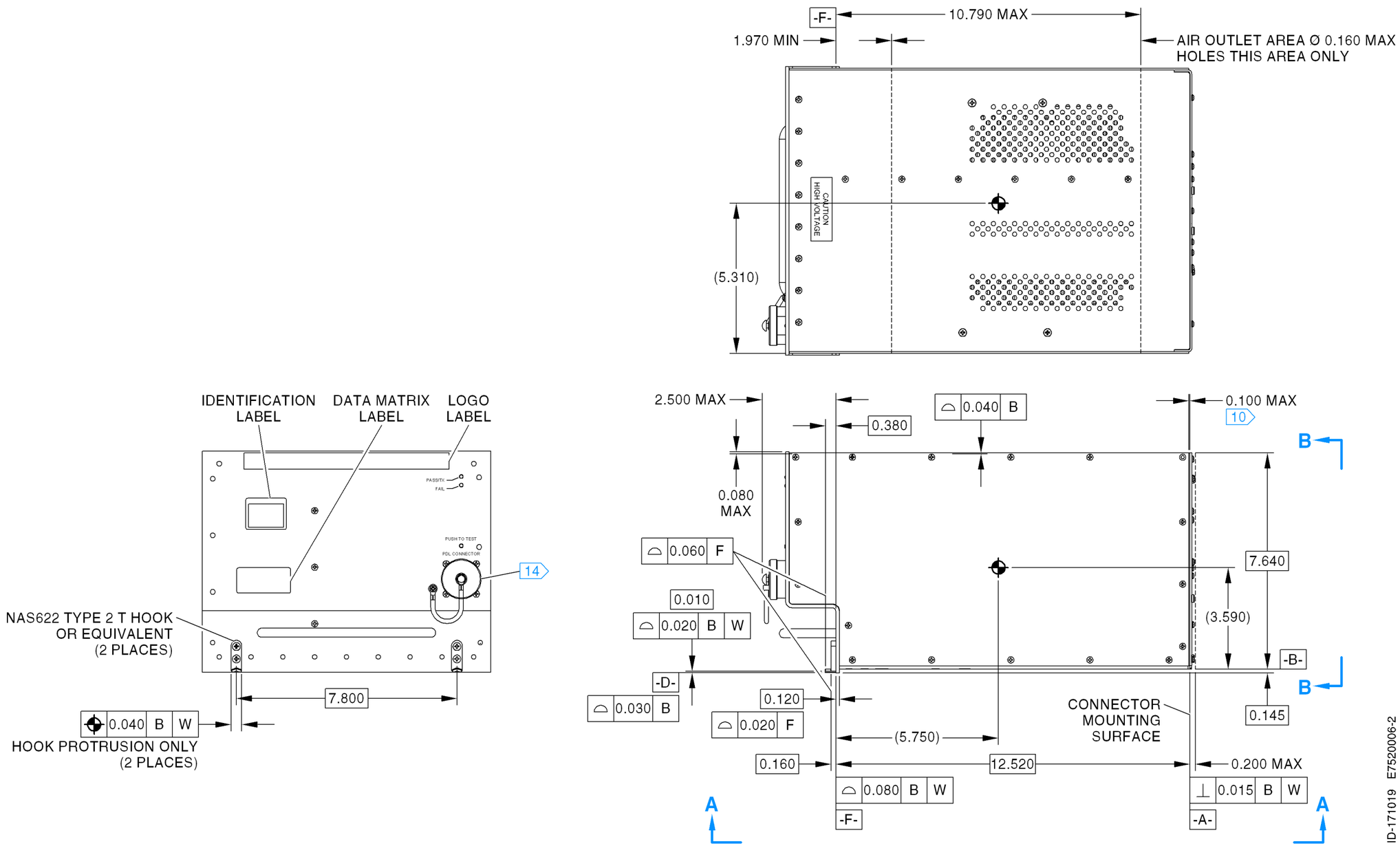


Figure 4-3 (Sheet 2). HP-720 (7520006) Outline and Installation Diagram

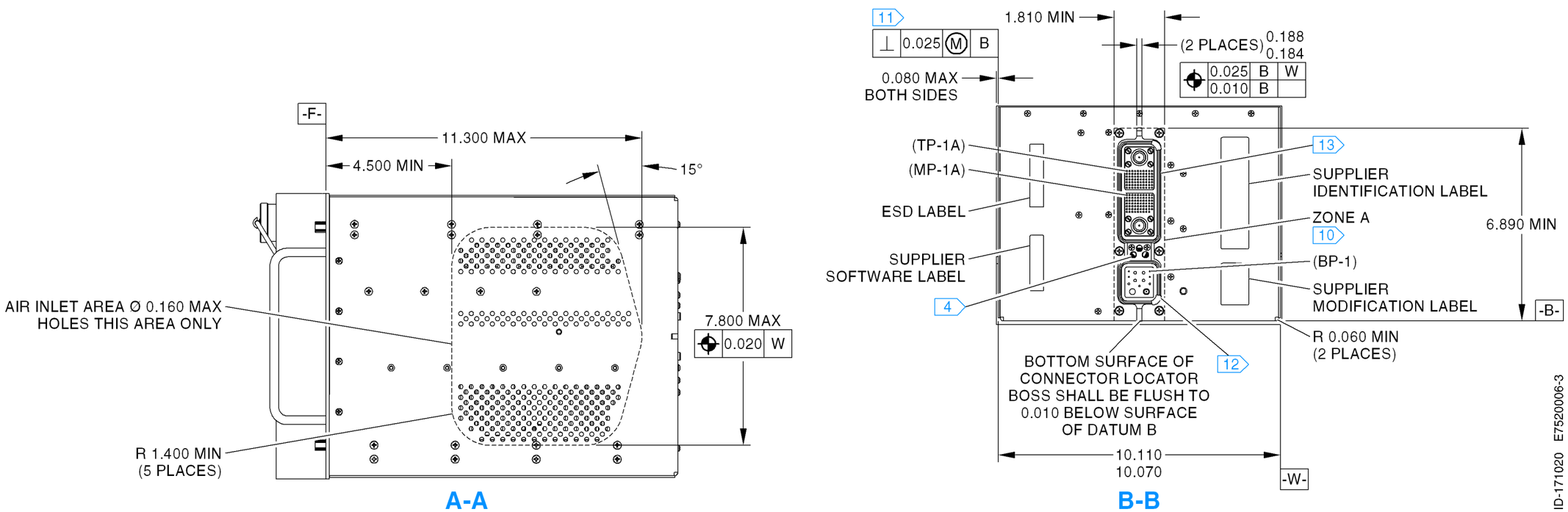


Figure 4-3 (Sheet 3). HP-720 (7520006) Outline and Installation Diagram

ID LABEL CONTENTS (FOR UNITS SUPPLIED TO BOEING ONLY)	
MODEL NO.	RFUia
UNIT NAME	RADIO FREQUENCY UNIT INTERFACE ASSEMBLY
WEIGHT	ACTUAL UNIT WEIGHT
UNIT PART NO.	7516222-901
ENVIRONMENTAL CATEGORY	DO160D ENV CAT (XXX1XXB[SCLMY] XXXXXXZXXXX[XXX]X[XXXX]XXX

5

METRIC CONVERSION TABLE			
INCHES	MILLIMETERS	INCHES	MILLIMETERS
0.010	0.254	0.750	19.050
0.015	0.381	1.810	45.974
0.020	0.508	2.440	61.980
0.025	0.635	2.500	63.500
0.030	0.762	2.600	66.090
0.040	1.016	3.300	83.820
0.060	1.524	4.860	123.444
0.080	2.032	4.900	124.460
0.100	2.540	6.580	167.130
0.120	3.048	6.890	175.006
0.145	3.683	7.640	194.056
0.184	4.674	12.520	318.008
0.188	4.775	12.760	324.104
0.380	9.652		

NOTES:
Unless otherwise specified

1. Unit Weight: Normal 3.49 lb/maximum 3.69 lb (1.58/1.67 kg).
2. ⌖ Denotes approximate center of gravity.

3 Darkened portion indicates solid part of polarizing keyway.
4. RFUia is in accordance with Arinc 600 number 4 MCU.

5 Dimensions are in inches. See Metric Conversion Table for corresponding dimensions in millimeters.
6. Unit finish: Gold chemical film per Honeywell specification M690278-2.

7 0.100 maximum rear panel thickness is required in connector mounting area defined as Zone A. No other projections except connector mounting hardware are permitted in area defined as Zone A.
8. Cooling is not required. Unit is free of cooling air holes.

9 Applies 0.750 from Datum B.
10. Read is for orientation only.

ID-170933

Figure 4-4 (Sheet 1). RFUIA Outline and Installation Diagram

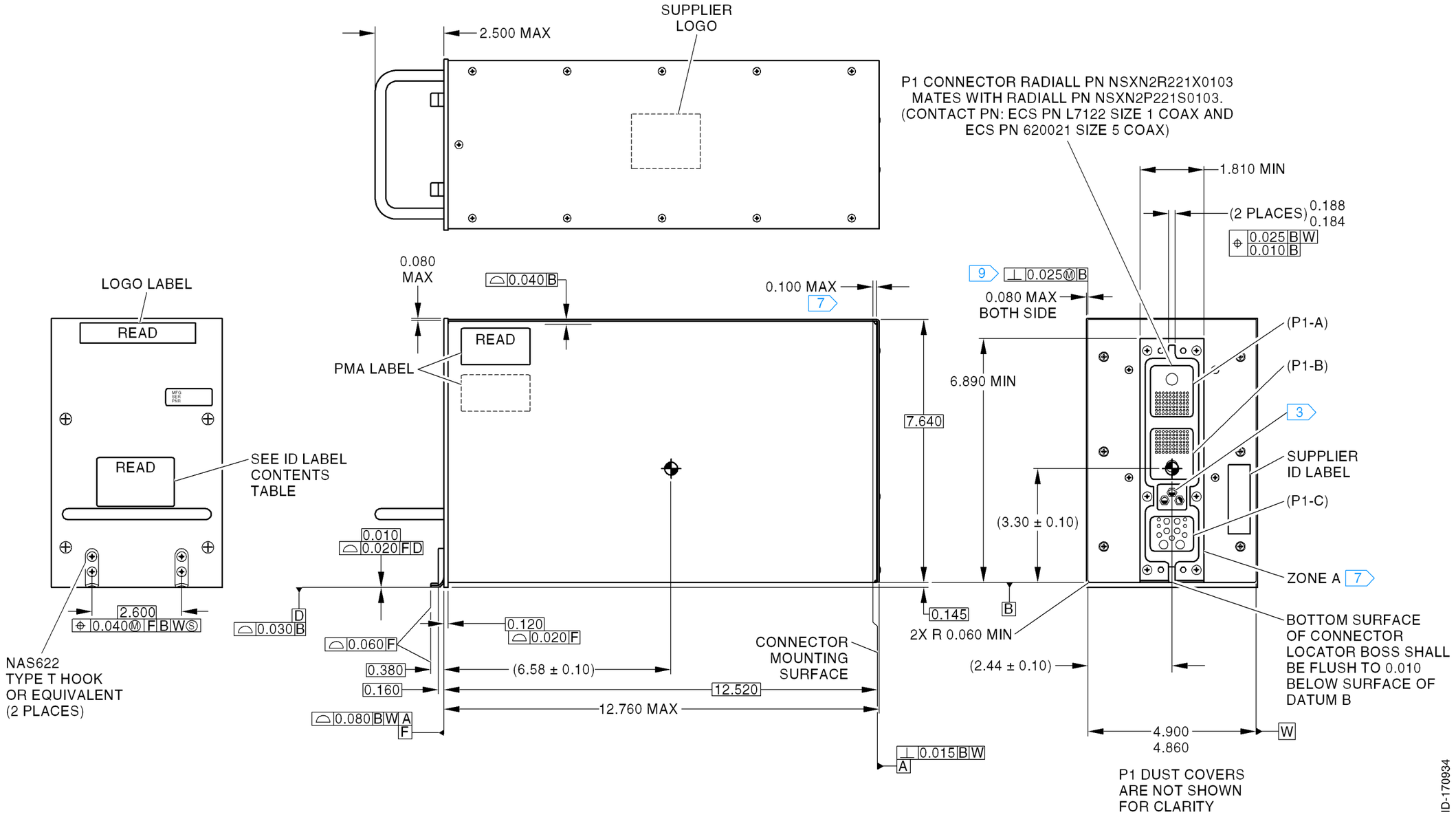


Figure 4-4 (Sheet 2). RFUIA Outline and Installation Diagram

NOTES:

1. 

This assembly includes components which are subject to damage by electrostatic charges: Therefore all components shall be handled in accordance with guidelines for electrostatic discharge control.

2. Unit Weight:
Nominal: 15.4 pounds (6.98 kilograms).
Maximum: 16.0 pounds (7.26 kilograms).

3. Denotes approximate center of gravity.

4. Darkened portion indicates raised part of polarizing keyway.

5. This installation is in accordance with ARINC 600-12 Number 4 MCU.

6. Dimensions are in inches. See the Metric Conversion Table for corresponding dimensions in millimeters.

7. Cooling airflow requirements:
Minimum: 0.15 ± 0.05 inches of water (13.81 ± 1.27 millimeters of water) at a flow rate of 49.5 ± 2.0 pounds per hour (22.00 ± 0.91 kilograms per hour). For added reliability the following may be used: 0.25 ± 0.05 inches of water (6.35 ± 1.27 millimeters of water) at a flow rate of 63.1 ± 2.0 pounds per hour (28.62 ± 0.91 kilograms per hour).

8. Unit finish: gold chemical film.

9. This unit defines 7520061-XXYYY.
XX = Hardware dash number 1 thru 99
YYY = Software Part No. 001 through 999.

10. 0.10 maximum rear panel thickness is required in connector mounting area defined as zone A. No other projections except connector mounting hardware are permitted in area defined as zone A.

11. Applies 0.750 from datum B.

12. Electrostatic dust covers shown partially removed for clarity.

13. ARINC 600 connector, receptacle, size 2
Unit Part No.: Radiall NSXFR221Y0903. Tray mating plug Part No. Radiall NSX2P221X0003.
ARINC 600 connector contact Radiall Part Nos.:
Size 22: Unit Part No. 620-361, tray mating Part No. 620-200.
Size 20: Unit Part No. 620-210, tray mating Part No. 620-310.
Size 12: Unit Part No. 620-240, tray mating Part No. 620-340.
Size 1 coax: Unit Part No. 620-044, see SDIM for tray mating contact Part No.
Size 5 coax: Unit Part No. 620-134, see SDIM for tray mating contact Part No.

14. ARINC 615 connector (PDL):
Unit connector Honeywell Part No. 4008114-160 or MS27508E188535, mating connectors Honeywell Part No. 4004295-160 or ITT Part No. KJ6F18A53P.

METRIC CONVERSION TABLE 6

INCHES	MILLIMETERS
.010	0.254
.015	0.381
.020	0.508
.025	0.635
.030	0.762
.040	1.016
.060	1.524
.080	2.032
.100	2.240
.120	3.048
.145	3.683
.160	4.064
.184	4.674
.188	4.775
.200	5.080
.380	9.652
.750	19.050
1.810	45.974
1.970	50.038
2.500	63.500
2.600	66.040
4.000	101.600
4.500	114.300
4.860	123.444
4.900	124.460
5.390	136.906
6.890	175.006
7.640	194.056
10.790	274.066
11.300	287.020
12.520	318.008

Figure 4-5 (Sheet 1). HS-720 (7520063) Outline and Installation Diagram

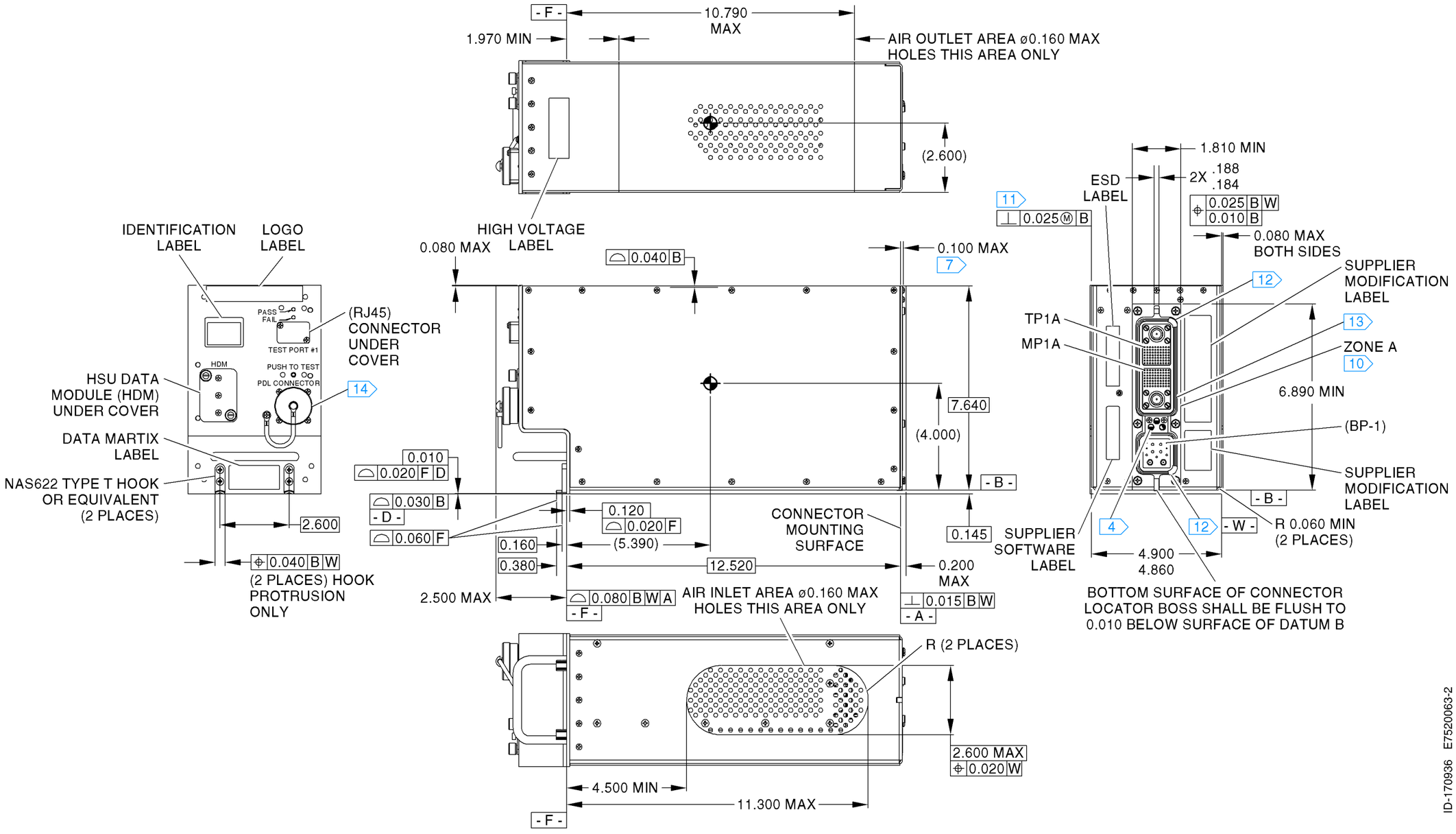


Figure 4-5 (Sheet 2). HS-720 (7520063) Outline and Installation Diagram

SECTION 5
ELECTRICAL INSTALLATION

1. Overview

A. General

(1) This section supplies electrical installation procedures, power distribution, and interconnect diagrams for each component of the MCS system.

2. Equipment and Materials

A. General

(1) None.

3. Electrical Installation Procedure

A. Connector Layout and Contact Arrangement

(1) Each front panel connector of the SDU, HSU, and HPA complies with ARINC characteristic 615, and is used to interface the LRU with an ARINC 615 portable data loader for software uploads. Pin callouts are specified in Table 5-1. See the MECHANICAL INSTALLATION section for specifics regarding connector part numbers for the ARINC 615 connector for each LRU and the corresponding mating connector.

(2) Table 5-2 lists the pin arrangements for the RJ–45 jack for the Ethernet Port 1. When a user terminal is connected to this jack, the rear connectors are disconnected so only the Ethernet Port 1 communications are available from this interface.

(3) The rear connectors of the SDU, HPA, RFUIA, and HSU comply with ARINC characteristic 600 as specified in Table 5-3. The ARINC 600 connector layouts and contact arrangement for the various connector plugs for each LRU of the MCS system are shown in Figure 5-1 thru Figure 5-11.

(4) Table 5-4 and Table 5-5 list the contact arrangements for the top and middle inserts for the SDU ARINC 600 connector. Table 5-6 lists the ICAO Block Strapping.

Table 5-1. ARINC 615 Connector Pin Callouts

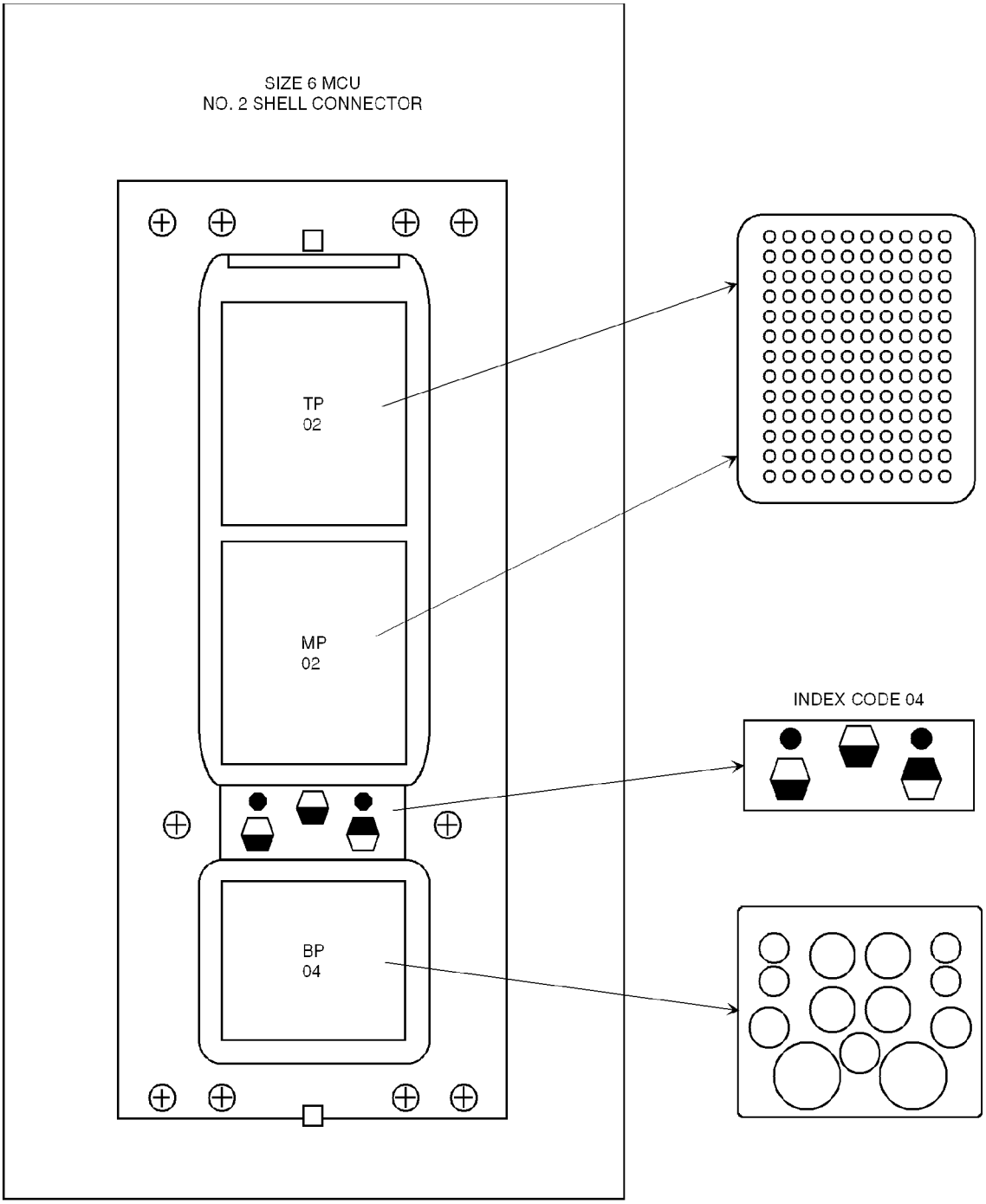
Pin	SDU Signal Name	HSU Signal Name	HPA Signal Name
1	PDL 429 A IN	PDL 429 A IN	PDL TO HPA 429 A
2	PDL 429 B IN	PDL 429 B IN	PDL TO HPA 429 B
5	SHIELD GND	SHIELD GND	SHIELD GND
8	PDL 429 A OUT	PDL 429 A OUT	HPA TO PDL 429 A
9	PDL 429 B OUT	PDL 429 B OUT	HPA TO PDL 429 B
16	SHIELD GND	SHIELD GND	SHIELD GND
18	PDL LINK A	PDL LINK A	PDL LINK A
19	GND (PDL LINK B)	GND (PDL LINK B)	GND (PDL LINK B)
20	115 VAC HOT	115 VAC HOT	115 VAC HOT
21	CHASSIS GND	CHASSIS GND	CHASSIS GND
22	115 VAC GND	115 VAC GND	115 VAC GND
37	––	28 V DC OUTPUT	28 V DC OUTPUT
38	––	28 V DC RETURN	28 V DC RETURN
40	RS232 A RX–DLT	––	– –
41	RS232 A TX–DLT	––	– –
42	RS232 B RX–CMT	RS232 TO HSU	RS232 TO HPA
43	RS232 B TX–CMT	RS232 TO DEBUG	RS232 TO DEBUG
48	LOGIC COMMON GND	LOGIC COMMON GND	LOGIC COMMON GND
49	LOGIC COMMON GND	LOGIC COMMON GND	LOGIC COMMON GND

Table 5-2. HSU Front Panel RJ–45 Pin Arrangements

RJ–45 Connector Pin	Pin Name	Signal Name
1	TX +	RJ–45 from User (+)
2	TX –	RJ–45 from User (–)
3	RX +	RJ–45 to User (+)
6	RX –	RJ–45 to User (–)

Table 5-3. ARINC 600 Connector Requirements

LRU	Connector Description	LRU Rear Connector Part No.	Rack Mounting Connector Part No.	Outline Diagram
SDU	ARINC 600 – Size 6 MCU No. 2 Shell • Type 02 Top Insert • Type 02 Middle Insert • Type 04 Bottom Insert • Index Pin Code 04	620–600–022 (Radiall)	NSXN2P201X0004 (Radiall)	Figure 4-2, Figure 5-1, Figure 5-2, Table 5-4, and Table 5-5
HPA (60 W)	ARINC 600 – Size 8 MCU No. 2 Shell • Type 08 Top Insert • Type 05 Middle Insert • Type 04 Bottom Insert • Index Pin Code 08	620–600–076 (Radiall)	NSXN2P221X0008 (Radiall)	Figure 4-3 Figure 5-3 thru Figure 5-6
RFUIA	ARINC 600 – Size 4 MCU No. 2 Shell • Type 08 Top Insert • Type 05 Middle Insert • Type 04 Bottom Insert • Index Pin Code 03	NSXNR221X0103 (Radiall)	NSXNP221S0103 (Radiall)	Figure 4–4 Figure 5-11
HSU	ARINC 600– Size 4 MCU No. 2 shell • Type 08 Top Insert • Type 05 Middle Insert • Type 04 Bottom Insert • Index Pin Code 03	620–600–075 (Radiall)	NSXN2P221X0003 (Radiall)	Figure 4–5 Figure 5–7 thru Figure 5–10



NOTE:

TP = TOP PLUG
MP = MIDDLE PLUG
BP = BOTTOM PLUG

AD-170937

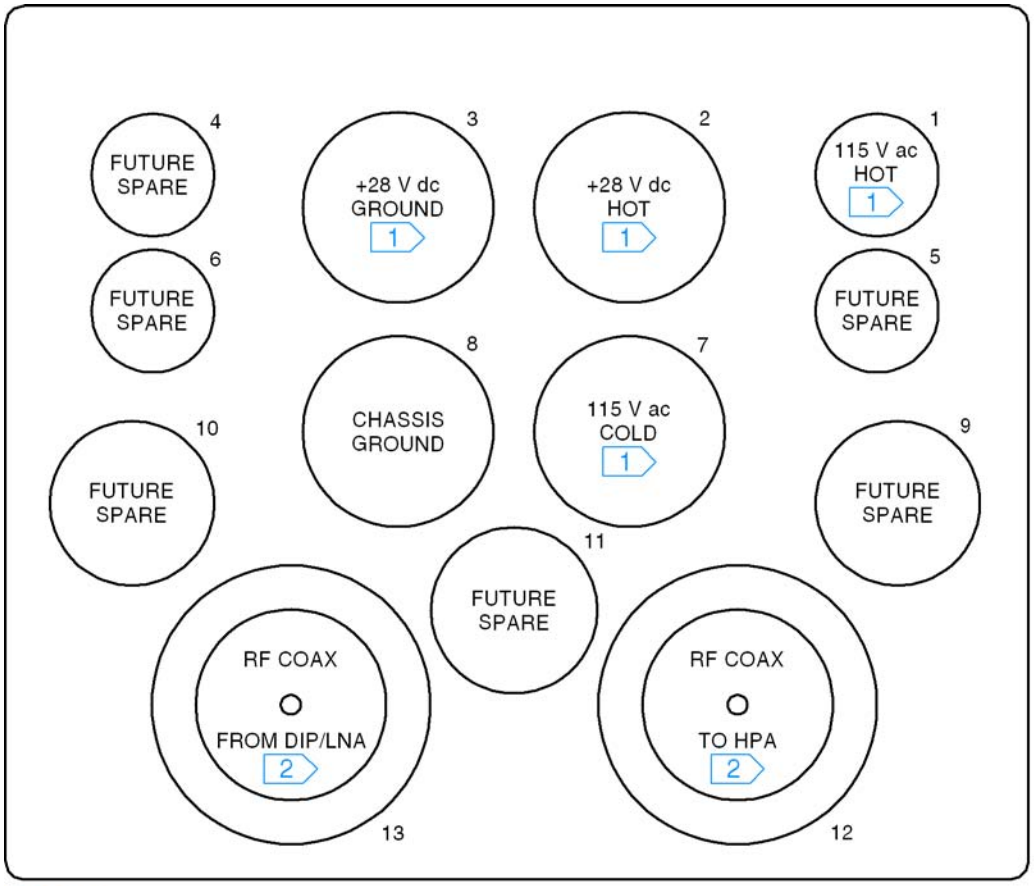
Figure 5-1. SDU ARINC 600 Connector Layout

Table 5-4. Contact Arrangements for Top Insert, SDU ARINC 600 Connector

	A	B	C	D	E	F	G	H	J	K
1	WH–10 CABIN VOICE CHANNEL 1 HOOK–SWITCH	WH–10 CABIN VOICE CHANNEL 2 HOOK–SWITCH	WH10–1 STATUS A (RINGER)	WH10–1 STATUS B (RINGER)	WH10–2 STATUS A (RINGER)	WH10–2 STATUS B (RINGER)	AVIONICS SUB–SYSTEM SATCOM FAIL WARNING (NON MCS FAIL)	WH–10 CABIN VOICE CHANNEL 1 IN–USE	SATELLITE LINK NOT READY	WH–10 CABIN VOICE CHANNEL 2 IN–USE
2	ANALOG PBX CHANNEL 1 INPUT HI	ANALOG PBX CHANNEL 1 INPUT LO	ANALOG PBX CHANNEL 1 OUTPUT HI	ANALOG PBX CHANNEL 1 OUTPUT LO	ANALOG PBX CHANNEL 2 INPUT HI	ANALOG PBX CHANNEL 2 INPUT LO	ANALOG PBX CHANNEL 2 OUTPUT HI	ANALOG PBX CHANNEL 2 OUTPUT LO	O	O
3	COCKPIT VOICE UN–AVAILABLE	CABIN VOICE UN–AVAILABLE	PACKET DATA UN–AVAILABLE	PACKET DATA LOW SPEED ONLY AVAILABLE (CD2–2)	SATCOM IN–OPERABLE (MCS FAIL)	CEPT–E1 0V SHIELD (GND)	CEPT–E1 to BRIDGED CTU (CM–250) 1A	CEPT–E1 to BRIDGED CTU (CM–250) 1B	CEPT–E1 to BRIDGED CTU (CM–250) 2A	CEPT–E1 to BRIDGED CTU (CM–250) 2B
4	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	CEPT–E1 0V
5	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
6	RESERVED	RESERVED	SPARE 429 OUTPUT A	SPARE 429 OUTPUT B	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	SPARE
7	RESERVED	RESERVED	SPARE	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
8	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	SPARE	SPARE
9	SPARE DISCRETE INPUT CONFIG STRAP TYPE	SPARE DISCRETE INPUT CONFIG STRAP TYPE	SPARE	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	SPARE
10	AVAIL OF 429 SSR MODE S ADDRESS	RESERVED FOR FMC CONFIG	RESERVED FOR FMC CONFIG	CMU BUS SPEED	CPDF CONFIG	AES ID BUS SPEED	HSU #1 PRESENCE	SDU CONTROLLER TYPE	RESERVED FOR STRAP OPTION	CALL LIGHT ACTIVATOR CONFIGU–RATION
11	STRAP PARITY (ODD)	CCS PRESENCE	IRS CONFIG	IRS CONFIG	HPR/HPA/ BSU/LGA CONFIG	HPR/HPA/ BSU/LGA CONFIG	HPR/HPA/ BSU/LGA CONFIG	HPR/HPA/ BSU/LGA CONFIG	HPR/HPA/ BSU/LGA CONFIG	HPR/HPA/ BSU/LGA CONFIG
12	CFDS/CMC TYPE	CFDS/CMC TYPE	CFDS/CMC TYPE	RESERVED CONFIG	SDU CONFIG	SDU NUMBER	CMU NO. 1 CONFIG	CMU NO. 2 CONFIG	WSC/ MCDU/ NO. 1 CONFIG	WSC/ MCDU/ NO. 2 CONFIG
13	PRIORITY 4 CALLS	MCDU/ BUS SPEED	LIGHT/ CHIME CODE	LIGHT/ CHIME CODE	WSC/ MCDU/ NO. 3 CONFIG	SDU CODEC 1 WIRING	SDU CODEC 1 WIRING	SDU CODEC 2 WIRING	SDU CODEC 2 WIRING	COCKPIT SIGNALING METHOD
14	5 V POS_MON	9 V POS_MON	RESERVED ATE	RESET–MON_N	PEIT_SEL_N	RESERVED ATE	RS–232 INPUT FROM HSU	RS–232 OUTPUT TO HSU	CEPT–E1 FROM BRIDGED CTU (CM–250)1A	CEPT–E1 FROM BRIDGED CTU (CM–250)1B
15	15 V POS_MON	15 V NEG_MON	GND (ATE COMMON)	CEPT–E1 FROM BRIDGED CTU (CM–250) 2A	CEPT–E1 FROM BRIDGED CTU (CM–250) 2B	DLT_RX (RS232 RX–SDU)	DLT_TX (RS232 TX–SDU)	CMT_RX (RS232 RX–SDU)	CMT_TX (RS232 TX–SDU)	CMT_DLT_ RTN

Table 5-5. Contact Arrangements for Middle Insert, SDU ARINC 600 Connector

	A	B	C	D	E	F	G	H	J	K
1	WH10 CABIN NO. 1 AUDIO IN HI	WH10 CABIN No. 1 AUDIO IN LO	WH10 CABIN No. 1 AUDIO OUT HI	WH10 CABIN No. 1 AUDIO OUT LO	DATA BUS FROM CABIN PACKET DATA A	DATA BUS FROM CABIN PACKET DATA B	FROM CMU NO. 1 429 A	FROM CMU NO. 1 429 B	TO CMU NO. 1 AND NO. 2 429 A	TO CMU NO. 1 AND NO. 2 429 B
2	COCKPIT AUDIO CH 1 INPUT HI	COCKPIT AUDIO CH 1 INPUT LO	COCKPIT AUDIO CH 1 OUTPUT HI	COCKPIT AUDIO CH 1 OUTPUT LO	COCKPIT AUDIO CH 2 INPUT HI	COCKPIT AUDIO CH 2 INPUT LO	COCKPIT AUDIO CH 2 OUTPUT HI	COCKPIT AUDIO CH 2 OUTPUT LO	CEPT–E1 FROM CTU INPUT A	CEPT–E1 FROM CTU INPUT B
3	CEPT–E1 TO CTU OUTPUT A	CEPT–E1 TO CTU OUTPUT B	DATA FROM MCDU/WSC NO. 1 A	DATA FROM MCDU/WSC NO. 1 B	DATA FROM MCDU/WSC NO. 2 A	DATA FROM MCDU/WSC NO. 2 B	DATA FROM CMU NO. 2 A	DATA FROM CMU NO. 2 B	DATA TO SCDU/WSC NO. 1, NO. 2, AND NO. 3 A	DATA TO SCDU/WSC NO. 1, NO. 2, AND NO. 3 B
4	AES ID INPUT A	AES ID INPUT B	FROM CFDS A	FROM CFDS B	TO CFDS A	TO CFDS B	MULTI–CONTROL OUTPUT A	MULTI–CONTROL OUTPUT B	WH10 CABIN NO. 2 AUDIO IN HI	WH10 CABIN NO. 2 AUDIO IN LO
5	LGA LNA ON/OFF CONTROL	WEIGHT–ON–WHEELS INPUT NO. 1	WEIGHT–ON–WHEELS INPUT NO. 2	WEIGHT–ON–WHEELS PROGRAM SELECT	WH10 CABIN NO. 2 AUDIO OUT HI	WH10 CABIN NO. 2 AUDIO OUT LO	BITE INPUT FROM LGA LNA	CHIME/ LIGHT INHIBIT	DUAL SYSTEM SELECT DISCRETE I/O	DUAL SYSTEM SELECT DISCRETE INHIBIT
6	DATA FROM PRIMARY IRS A	DATA FROM PRIMARY IRS B	DATA FROM SECONDARY IRS A	DATA FROM SECONDARY IRS B	BITE INPUT FROM HGA/HPA A	BITE INPUT FROM HGA/HPA B	SPARE 429 INPUT A	SPARE 429 INPUT B	BITE INPUT FROM LGA/HPA A	BITE INPUT FROM LGA/HPA B
7	DATA BUS FROM AIRBORNE LOADER A	DATA BUS FROM AIRBORNE LOADER B	DATA BUS TO AIRBORNE LOADER A	DATA BUS TO AIRBORNE LOADER B	RESERVED	RESERVED	BITE INPUT FROM ACU OR TOP–PORT BSU A	BITE INPUT FROM ACU OR TOP–PORT BSU B	BITE INPUT FROM STBD BSU A	BITE INPUT FROM STBD BSU B
8	DATA LOADER LINK A	DATA LOADER LINK B	RESERVED FOR DATA BUS FROM RMP A	RESERVED FOR DATA BUS FROM RMP B	CP VOICE CALL LGT OUTPUT NO. 1 (CD1–1)	CP VOICE MIC ON INPUT NO. 1	CP VOICE CALL LGT OUTPUT NO. 2 (CD2–2)	CP VOICE MIC ON INPUT NO. 2	DATA FROM MCDU/WSC NO. 3 A	DATA FROM MCDU/WSC NO. 3 B
9	DATA BUS TO SNU OR CPDF A	DATA BUS TO SNU OR CPDF B	RESERVED FOR DATA TO RMP A	RESERVED FOR DATA TO RMP B	FROM HSU #1 429A	FROM HSU #1 429B	TO HSU #1 429A	TO HSU 429B	CEPT–E1 FROM 0BE1 A	CEPT–E1 FROM 0BE1 B
10	CEPT–E1 TO 0BE1 A	CEPT–E1 TO 0BE1 B	RESERVED	RESERVED	RESERVED (GND)	RESERVED (GND)	RESERVED (GND)	RESERVED (GND)	SPARE	SPARE
11	FROM MOTION SENSOR NO. 1	MOTION SENSOR NO. 1 PROGRAM SELECT	CALL PLACE/END DISCRETE INPUT NO. 1	CALL PLACE/END DISCRETE INPUT NO. 2	CGU CONNECTION CONFIG	COCKPIT CALL DISCRETE SIGNALLING MODE	RESERVED UNSPEC PROGRAM	RESERVED UNSPEC PROGRAM	RESERVED UNSPEC PROGRAM	STRAP PARITY EVEN
12	CROSSTALK FROM OTHERSDU A	CROSSTALK FROM OTHERSDU B	CROSSTALK TO OTHERSDU A	CROSSTALK TO OTHERSDU B	SPARE O	SPARE O	RESERVED FOR DATA FROM FMC 1 A	RESERVED FOR DATA FROM FMC 1 B	RESERVED FOR DATA FROM FMC 2 A	RESERVED FOR DATA FROM FMC 2 B
13	HSU #1 DISABLE DISCRETE OUT	SPARE O	ICAO ADDRESS BIT NO. 1 (MSB)	ICAO ADDRESS BIT NO. 2	ICAO ADDRESS BIT NO. 3	ICAO ADDRESS BIT NO. 4	ICAO ADDRESS BIT NO. 5	ICAO ADDRESS BIT NO. 6	ICAO ADDRESS BIT NO. 7	ICAO ADDRESS BIT NO. 8
14	CP VOICE GO–AHEAD CHIME RESET	CP VOICE CHIME CONTACT 1 (CD2–8)	CP VOICE CONTACT 2	ICAO ADDRESS BIT NO. 9	ICAO ADDRESS BIT NO. 10	ICAO ADDRESS BIT NO. 11	ICAO ADDRESS BIT NO. 12	ICAO ADDRESS BIT NO. 13	ICAO ADDRESS BIT NO. 14	ICAO ADDRESS BIT NO. 15
15	ICAO ADDRESS BIT NO. 16	ICAO ADDRESS BIT NO. 17	ICAO ADDRESS BIT NO. 18	ICAO ADDRESS BIT NO. 19	ICAO ADDRESS BIT NO. 20	ICAO ADDRESS BIT NO. 21	ICAO ADDRESS BIT NO. 22	ICAO ADDRESS BIT NO. 23	ICAO ADDRESS BIT NO. 24 (LSB)	ICAO ADDRESS COMMON



NOTES:

1. The SDU primary power is supplied to either +28 V dc (pins 2 and 3) or 115 V ac (pins 1 and 7).
2. From/To HSU or RFUia if installed.

ID-170938

Figure 5-2. Contact Arrangements for Bottom Insert, SDU ARINC 600 Connector

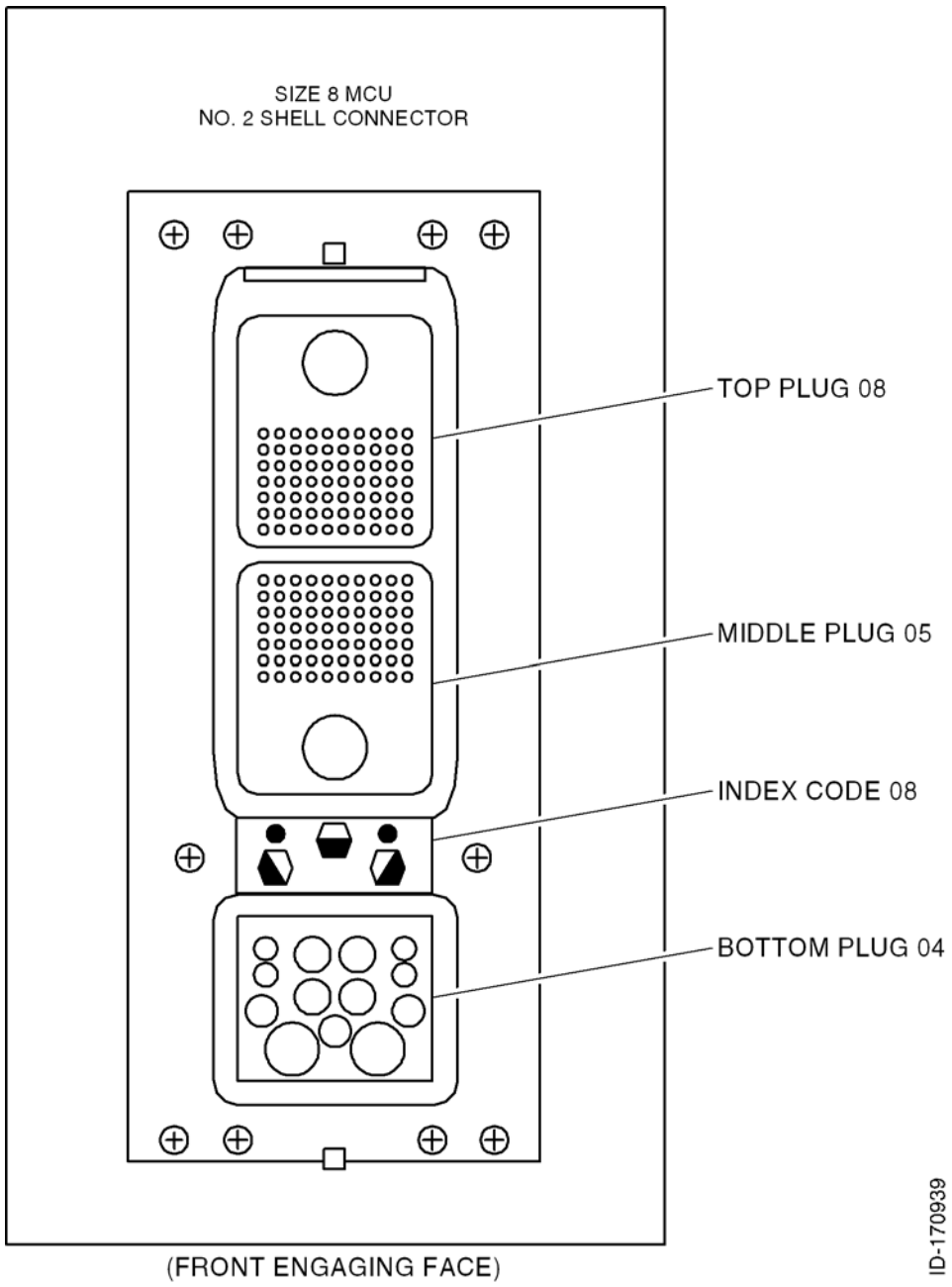


Figure 5-3. HPA ARINC 600 Connector Layout

TOP PLUG

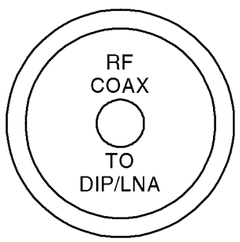
	A	B	C	D	E	F	G	H	J	K
					RF COAX FROM SDU (OR HSU) TPC 1					
1	INPUT MULTI-CTL A	INPUT MULTI-CTL B	OUTPUT HPA BITE A	OUTPUT HPA BITE B	FROM AIRBORNE DATA LDR A	FROM AIRBORNE DATA LDR B	TO AIRBORNE DATA LDR A	TO AIRBORNE DATA LDR B	DATA LOADER LINK A	DATA LOADER LINK B
2					SPARE DISCRETE INPUT			SPARE DISCRETE OUTPUT		
3	TOP/PORT HPA (1) A	TOP/PORT HPA (1) B	STRB HPA (2) A	STRB HBA (2) B						
4										
5	SDI NO. 1	SDI NO. 2		SDI COMMON						
6										
7										

ID-170940

Figure 5-4. Contact Arrangements for the Top Insert 60 Watt HPA ARINC 600 Connector

MIDDLE PLUG

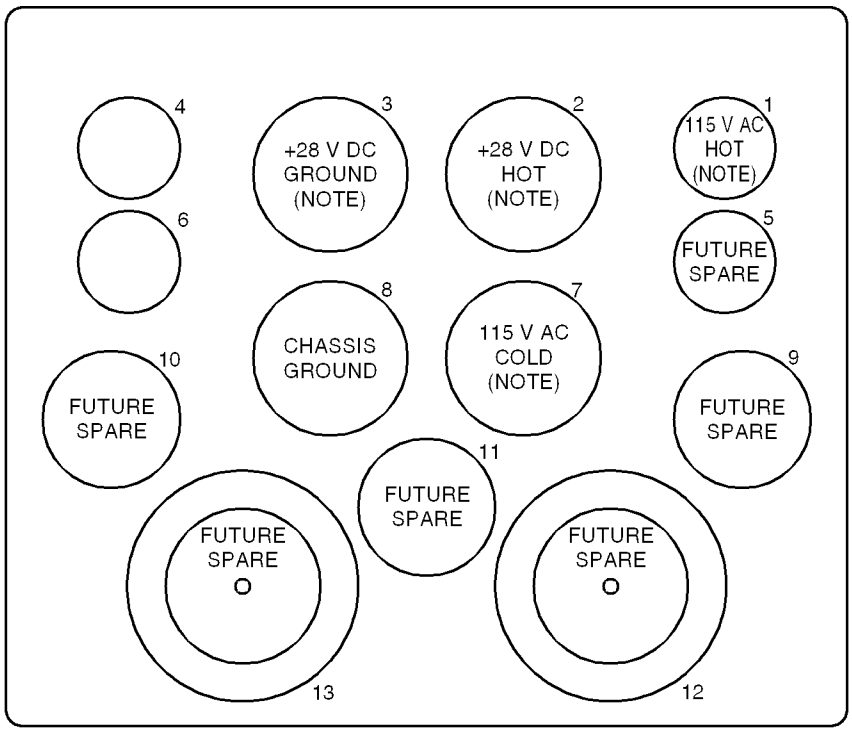
	A	B	C	D	E	F	G	H	J	K
1	LED 1 (GREEN) DISC	LED 2 (RED) DISC				LED DISC COMMON	MAINT PORT TO USER (RS232)	MAINT PORT FROM USER (RS232)	MAINT PORT SIGNAL GND (RS232)	
2										
3										
4										
5										
6										
7										



MPC 1

ID-170941

Figure 5-5. Contact Arrangements for Middle Insert, HPA (60 Watt) ARINC 600



NOTE: THE HPA PRIMARY POWER IS SUPPLIED TO EITHER +28 V DC (PINS 2 AND 3) OR 115 V AC (PINS 1 AND 7).

AD-170942

Figure 5-6. Contact Arrangements for Bottom Insert, HPA (60 Watt) ARINC 600 Connector

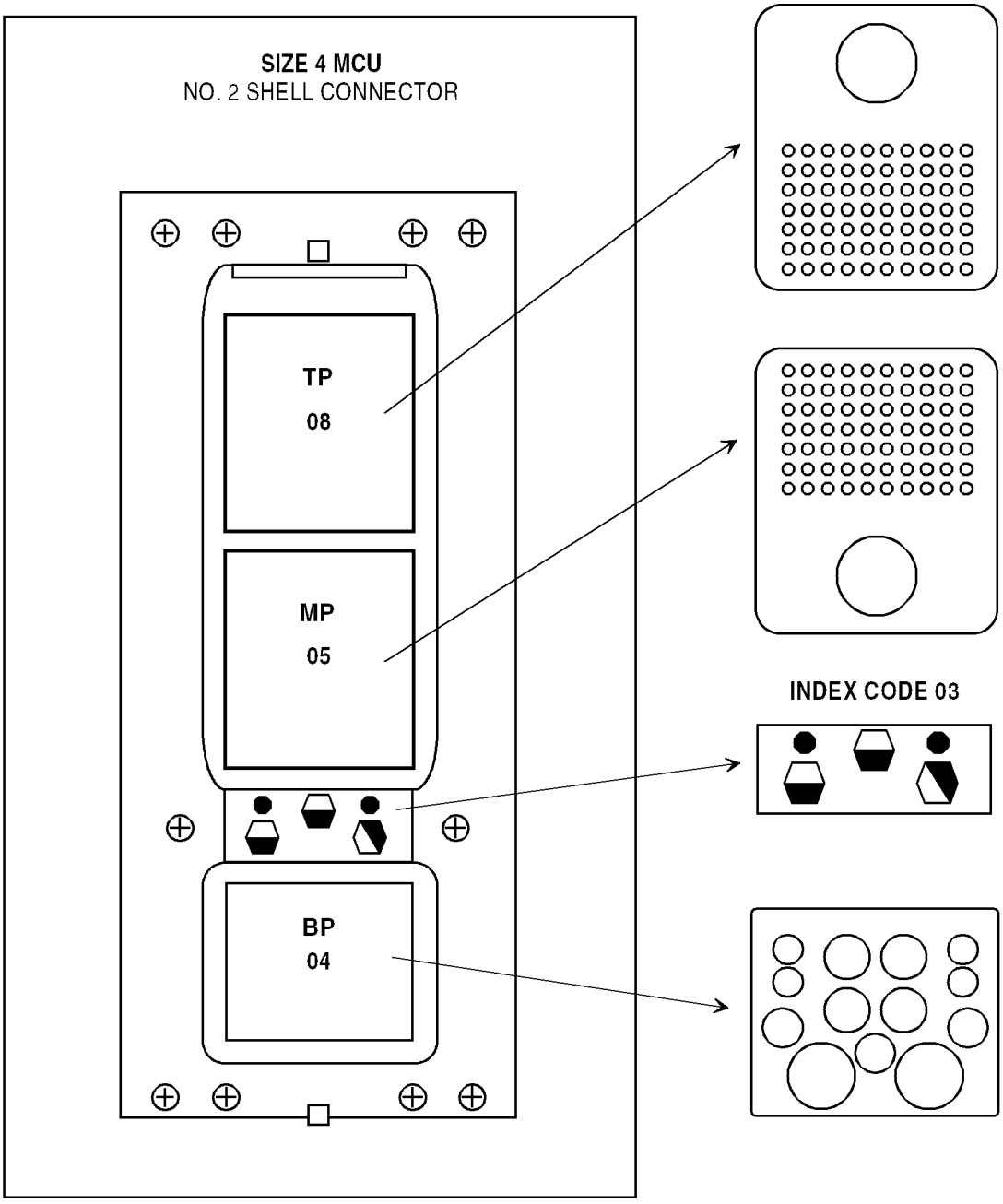
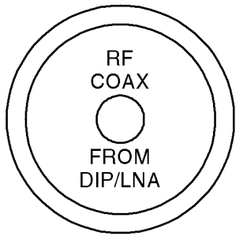


Figure 5-7. HS-720 ARINC 600 Connector Layout

HS-720 REAR CONNECTOR PINOUT (PRELIMINARY)



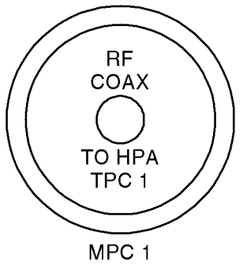
TPC 1

	A	B	C	D	E	F	G	H	J	K
1	DATA OUTPUT TO SDU A	DATA OUTPUT TO SDU B	DATA INPUT FROM SDU A	DATA INPUT FROM SDU B	CEPT-E1 TO SDU/USER A	CEPT-E1 TO SDU/USER B	CEPT-E1 FROM SDU/USER A	CEPT-E1 FROM SDU/USER B	UNSPEC RFU FUNCTION 3 A	UNSPEC RFU FUNCTION 3 B
2	SPARE A429 INPUT A	SPARE A429 INPUT B	SPARE A429 OUTPUT A	SPARE A429 OUTPUT B	SPARE DISCRETE INPUT NO. 1	SPARE DISCRETE INPUT NO. 2	SPARE DISCRETE INPUT NO. 3	SPARE DISCRETE OUTPUT NO. 1	SPARE DISCRETE OUTPUT NO. 2	SPARE DISCRETE OUTPUT NO. 3
3	UNSPEC RFU FUNCTION 4 A	UNSPEC RFU FUNCTION 4 B	UNSPEC RFU FUNCTION 5 A	UNSPEC RFU FUNCTION 5 B	UNSPEC RFU FUNCTION 6 A	UNSPEC RFU FUNCTION 6 B	SLIC NO. 1 TIP	SLIC NO. 1 RING	SLIC NO. 2 TIP	SLIC NO. 2 RING
4	FROM ARIBORNE DATA LOADER A	FROM AIRBORNE DTA LOADER B	TO ARIBORNE DATA LOADER A	TO AIRBORNE DATA LOADER B	DATA LOADER LINK A	DATA LOADER LINK B	SLIP NO. 3 TIP	SLIC NO. 3 RING	SLIC NO. 4 TIP	SLIC NO. 4 RING
5	RS-232 RxD TO USER	RS-232 TxD FROM USER	RS-232 RTS FROM USER	RS-232 CTS TO USER	HSU DISABLE DISCRETE INPUT	RS-232 DTS FROM USER	RS-232 DSR TO USER	RS-232 CD TO USER	RS-232 RI TO USER	RS-232 SIGNAL GROUND
6	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE
7	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE	RESERVED ATE

ID-170944

Figure 5-8. Contact Arrangements for Top Insert, HSU ARINC 600 Connector

	A	B	C	D	E	F	G	H	J	K
1	STRAP ETHERNET PORTS/HSD CHANNELS ALLOCATION	STRAP BGAN ENABLE	STRAP SPARE A429 O/P SPEED SELECT	STRAP SPARE A429 I/P SPEED SELECT	STRAP ISDN1 PRESENCE	STRAP ISDN2 PRESENCE	RS-232 MAINT PORT TO USER	HSD1 AVAILABLE DISCRETE O/P	10BASE-T NO. 1 TO USER +	10BASE-T NO. 1 FROM USER +
2	STRAP ETHERNET 1 PRESENCE	STRAP ETHERNET 2 PRESENCE	RESERVED STRAP OPTION NO. 10	RESERVED STRAP OPTION NO. 11	RESERVED STRAP OPTION NO. 12		RS-232 MAINT PORT FROM USER	HSD2 AVAILABLE DISCRETE O/P	10BASE-T NO. 1 FROM USER -	10BASE-T NO. 1 TO USER -
3	RESERVED STRAP OPTION NO. 13	RESERVED STRAP OPTION NO. 14	RESERVED STRAP OPTION NO. 15	STRAP CEPT E1 OPERATION	STRAP PARITY	DISCRETE/ STRAP COMMON	RS-232 MAINT PORT SIGNAL GROUND	HSD3 AVAILABLE DISCRETE O/P		
4	FWD ID BIT NO. 24	FWD ID BIT NO. 23	FWD ID BIT NO. 22	FWD ID BIT NO. 21	FWD ID BIT NO. 20	FWD ID BIT NO. 19	HSU FAILURE DISCRETE O/P	HSD4 AVAILABLE DISCRETE O/P		
5	FWD ID BIT NO. 18	FWD ID BIT NO. 17	FWD ID BIT NO. 16	FWD ID BIT NO. 15	FWD ID BIT NO. 14	FWD ID BIT NO. 13	FWD ID BIT NO. 12	FWD ID BIT NO. 11	FWD ID BIT NO. 10	FWD ID BIT NO. 9
6	ISDN S/T NO. 2 TO USER +	ISDN S/T NO. 2 FROM USER +	FWD ID BIT NO. 8	FWD ID BIT NO. 7	ISDN S/T NO. 1 TO USER +	ISDN S/T NO. 1 FROM USER +	FWD ID BIT NO. 6	FWD ID BIT NO. 5	10BASE-T NO. 2 TO USER +	10BASE-T NO. 2 FROM USER +
7	ISDN S/T NO. 2 FROM USER -	ISDN S/T NO. 2 TO USER -	FWD ID BIT NO. 4	FWD ID BIT NO. 3	ISDN S/T NO. 1 FROM USER -	ISDN S/T NO. 1 TO USER -	FWD ID BIT NO. 2	FWD ID BIT NO. 1	10BASE-T NO. 2 FROM USER -	10BASE-T NO. 2 TO USER -



ID-170945

Figure 5-9. Contact Arrangements for the Middle Insert, HSU ARINC 600 Connector

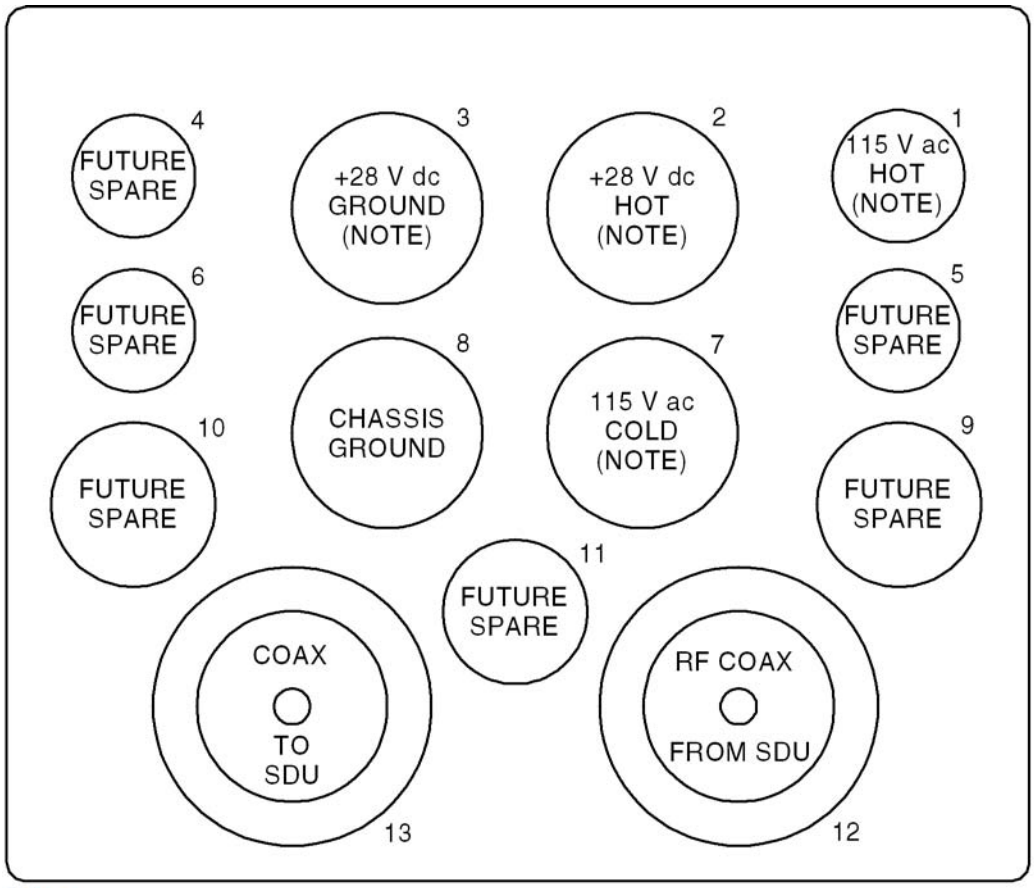


Figure 5-10. Contact Arrangements for the Bottom Insert, HSU ARINC 600 Connector

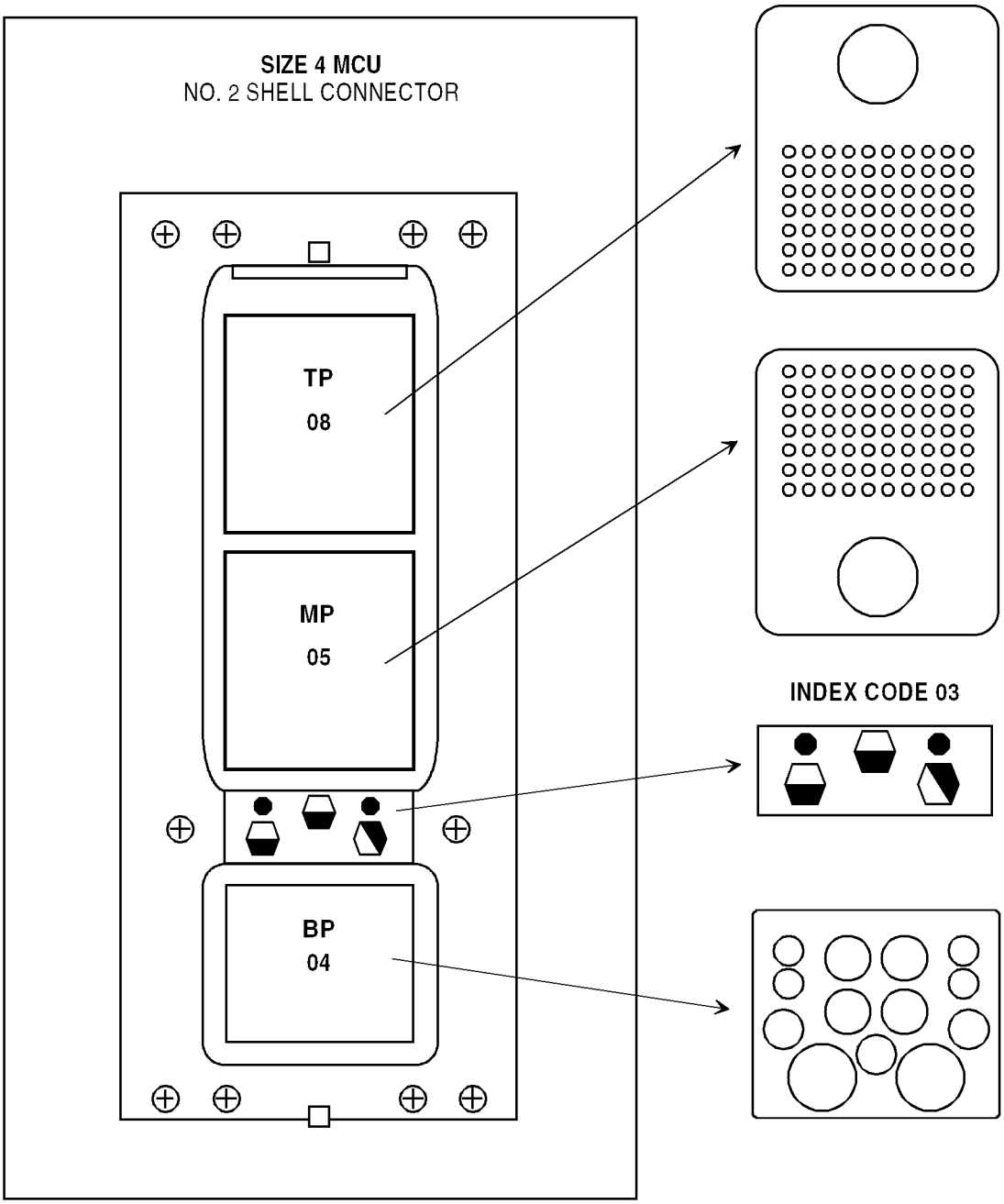


Figure 5-11. RFUIA ARINC 600 Connector Layout

B. Electrical Installation

(1) The information necessary to supply the electrical interconnects is shown in Figure 5-12 thru Figure 5-26. Interconnect diagrams are as follows:

- Figure 5-12. Satellite Data Unit & HSU Interface Diagram
- Figure 5-13. CMC Top–mounted High Gain Antenna Interface Diagram
- Figure 5-14. WH–10 Handset Interface Diagram
- Figure 5-15. HF–SAT Transfer Panel Interface Diagram
- Figure 5-16. Signal Conditioning Unit Interface Diagram
- Figure 5-17. Maintenance Panel Assembly Interface Diagram
- Figure 5-18. HS–720 Interface Diagram
- Figure 5-19. HS–720 Forward ID and Configuration Pins
- Figure 5-20. Tecom Top–Mounted High Gain Antenna Interface Diagram
- Figure 5-21. Mechanically Steered High Gain Antenna Interface Diagram
- Figure 5-22. AMT–50 Mechanically Steered High Gain Antenna Interface Diagram
- Figure 5-23. Dassault Conformal High Gain Antenna Interface Diagram
- Figure 5-24. Ball Conformal High Gain Antenna Interface Diagram
- Figure 5-25. Low Gain Antenna Interface Diagram
- Figure 5-26. Toyocom Top–Mounted High Gain Antenna Interface Diagram.

(2) The applicable configuration pins in the aircraft wiring must be connected to make the MCS system functional. The SDU receives and sends 30 system configuration discrete inputs through the configuration pins to properly match the avionics equipment installed on the aircraft (see Figure 5-12 and Paragraph 4. to identify the configuration pins).

(3) The SDU receives a 24-bit ICAO address that identifies the aircraft in which the SDU is installed (Figure 5-12). Continuity is defined as a resistance of 10 ohms or less between a configuration pin or address pin and the common. Continuity is broken when the resistance between a configuration pin or address pin and common measures 100k ohms or greater.

(4) Table 5-6 lists ICAO Block Strapping.

Blank Page

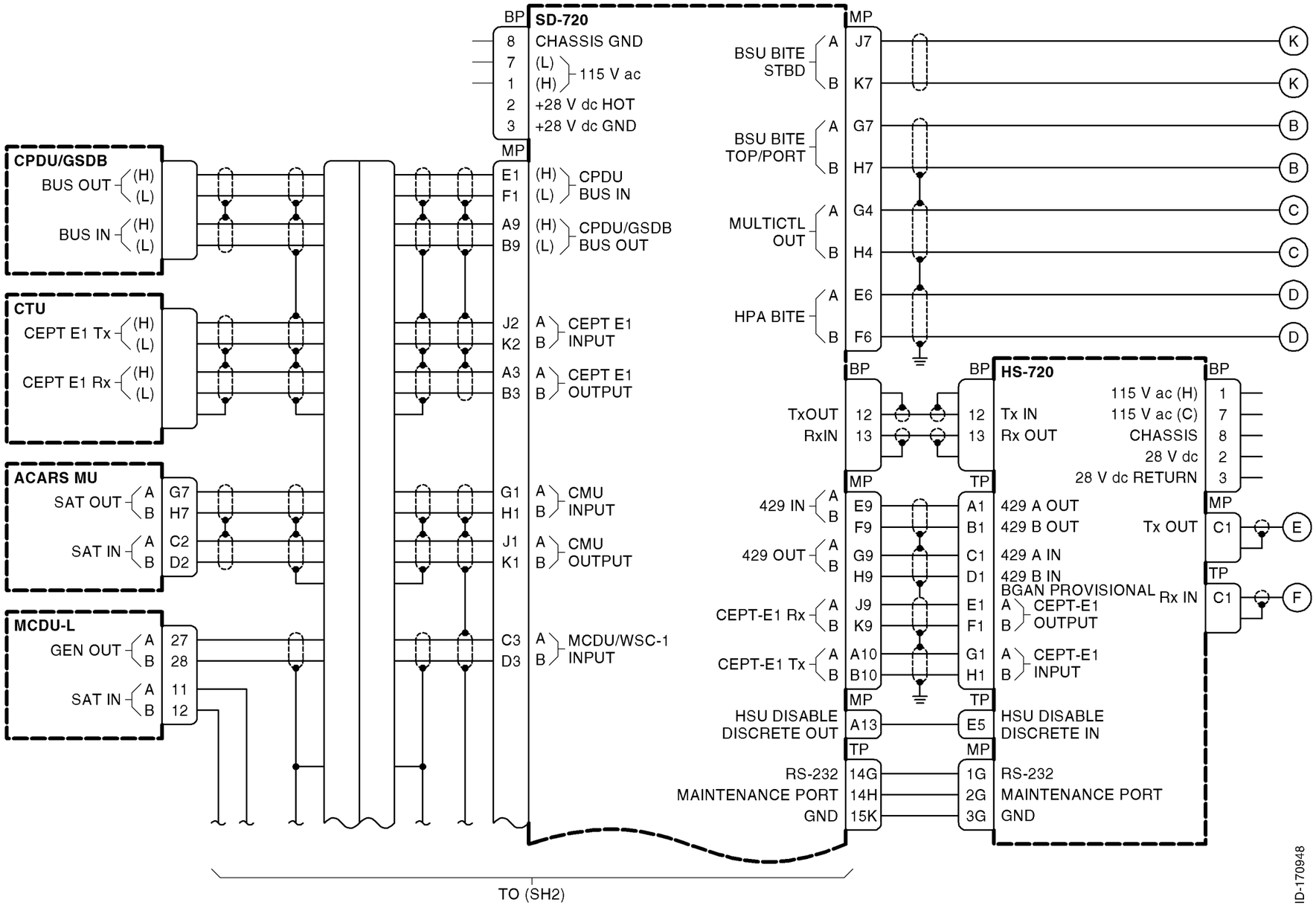


Figure 5-12 (Sheet 1). Satellite Data Unit & HSU Interface Diagram

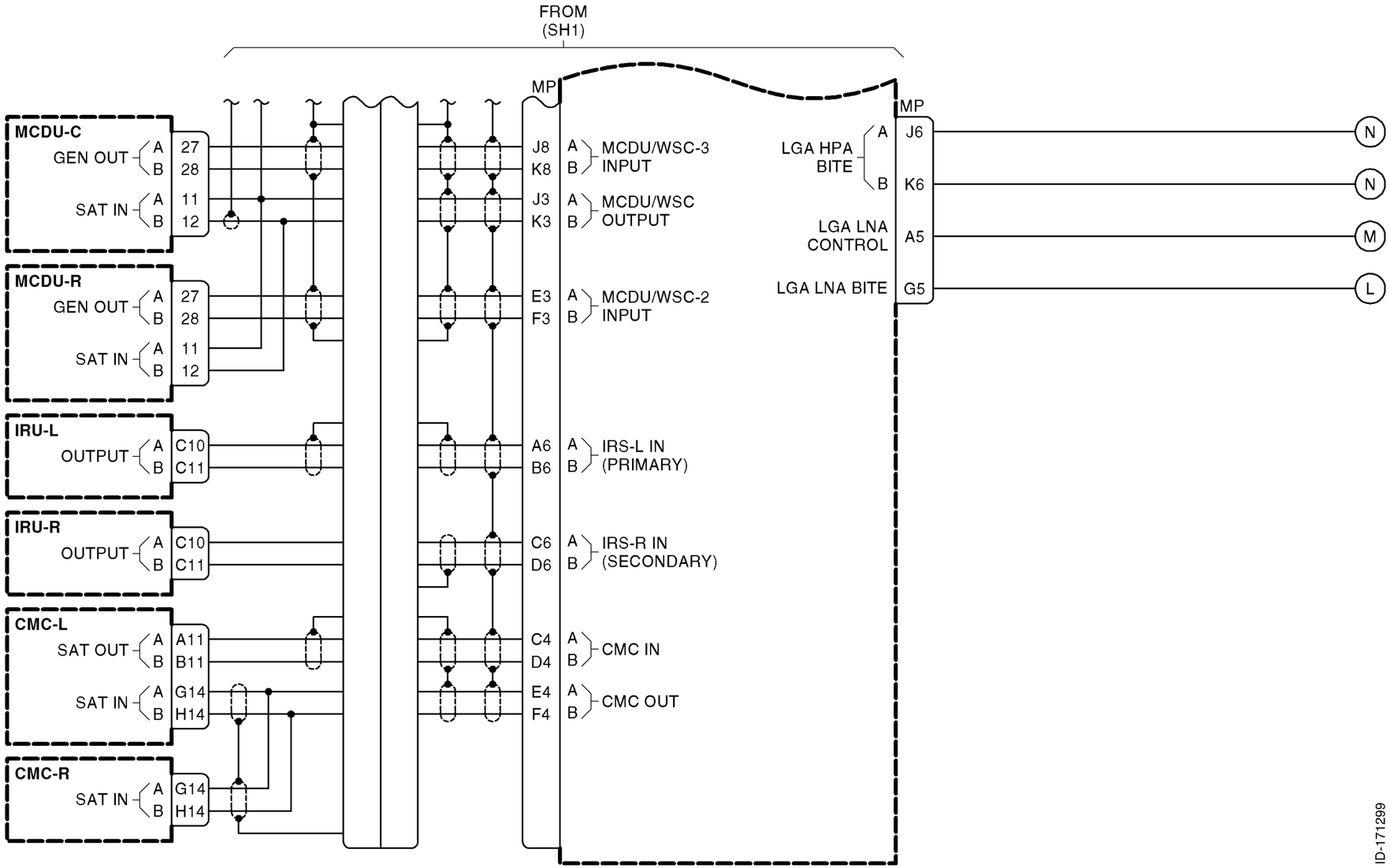


Figure 5-12 (Sheet 2). Satellite Data Unit & HSU Interface Diagram

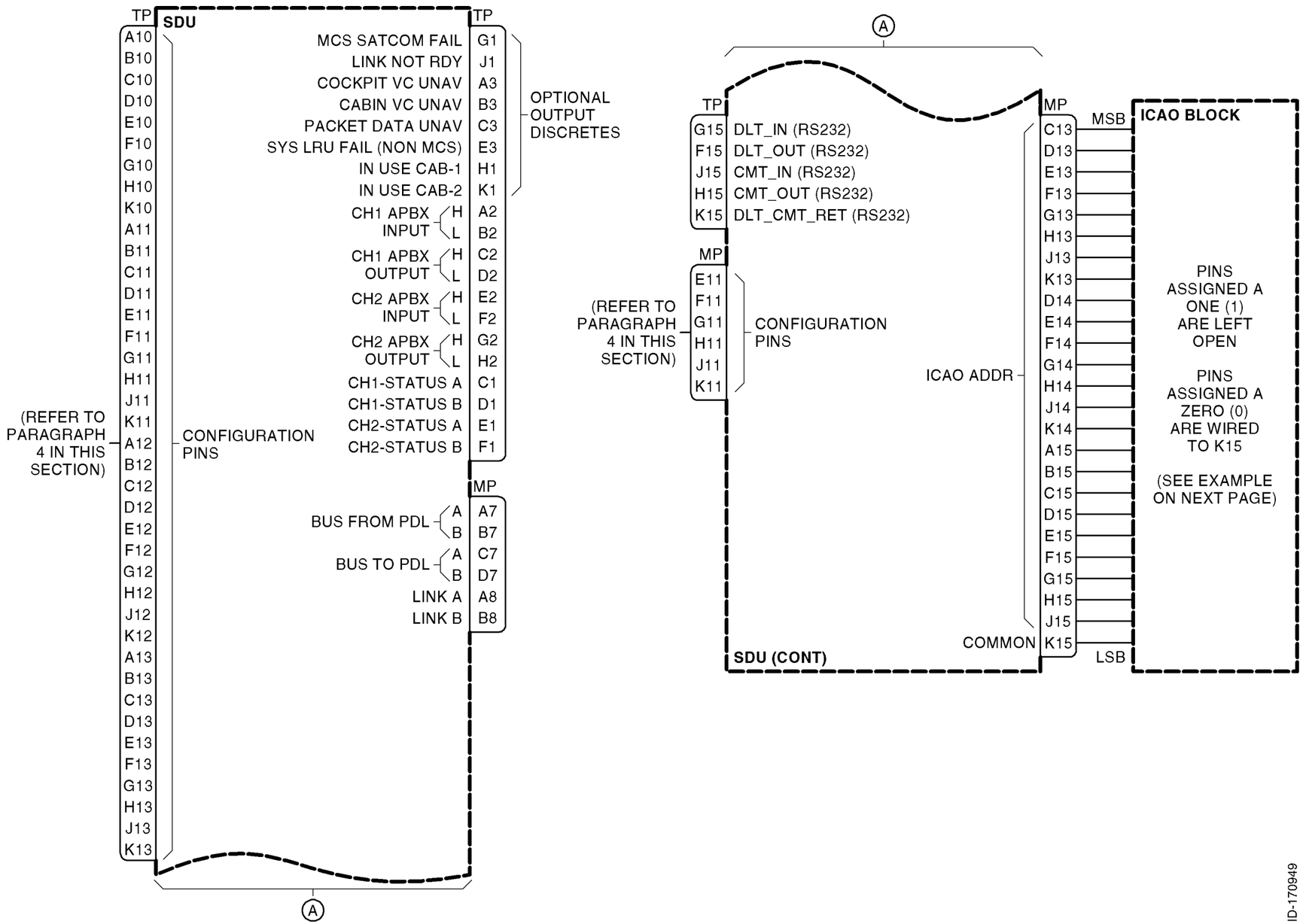


Figure 5-12 (Sheet 3). Satellite Data Unit & HSU Interface Diagram

Table 5-6. ICAO Block Strapping

Example: AES ID 53375006 (Octal)		
Octal	**Binary**	**SDU Connector Pin (MP)**
5	1	C13
	0	D13
	1	E13
3	0	F13
	1	G13
	1	H13
3	0	J13
	1	K13
	1	D14
7	1	E14
	1	F14
	1	G14
5	1	H14
	0	J14
	1	K14
0	0	A15
	0	B15
	0	C15
0	0	D15
	0	E15
	0	F15
6	1	G15
	1	H15
	0	J15
Common		K15

NOTES:

1. 53375006 (Octal) = 101011011111101000000110 (Binary).
2. Binary 1 = Open; Binary 0 = Ground.
3. Pins assigned a zero (0) are wired to SDU connector pin MP–K15 (common).

Blank Page

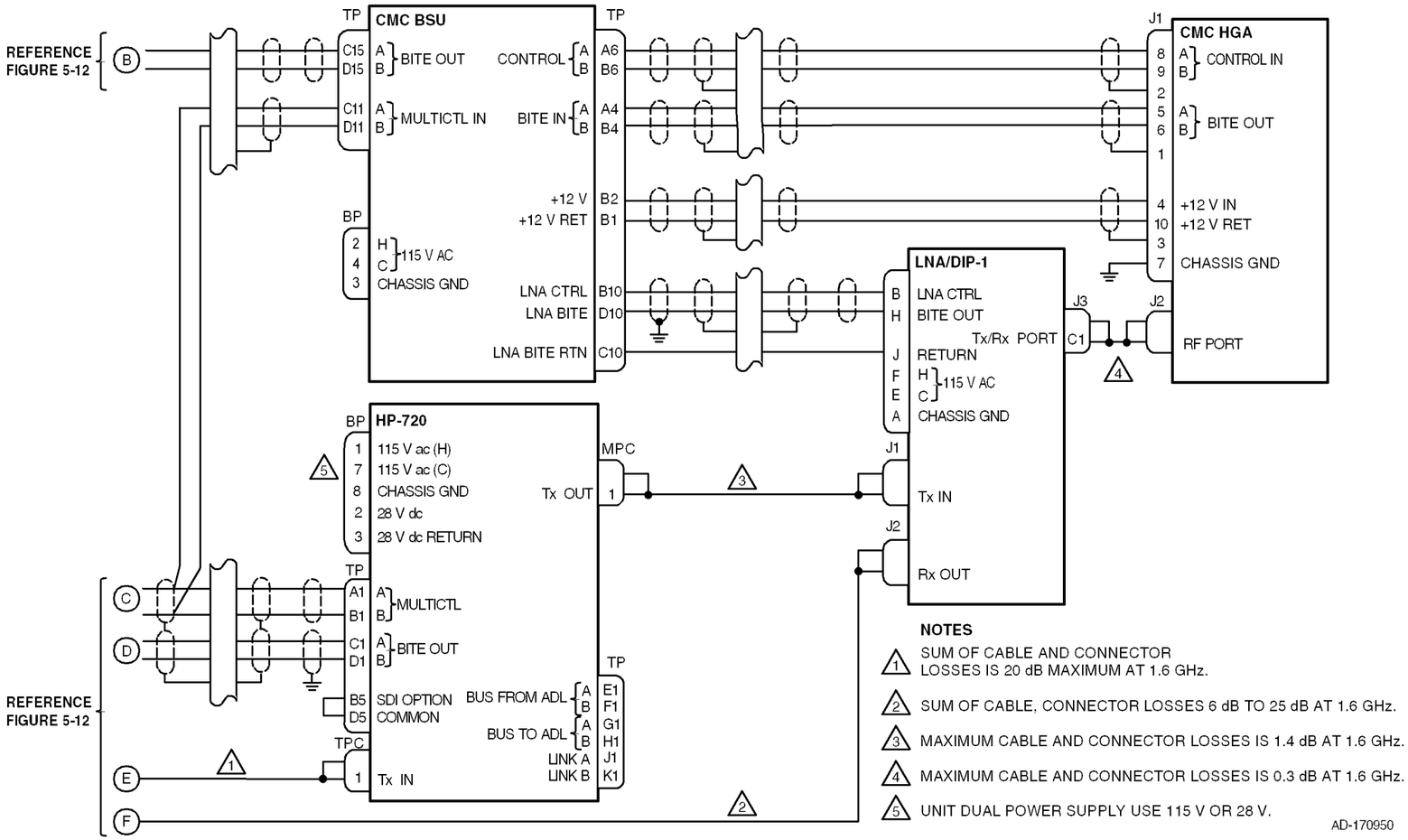


Figure 5-13. CMC Top-mounted High Gain Antenna (HGA) Interface Diagram

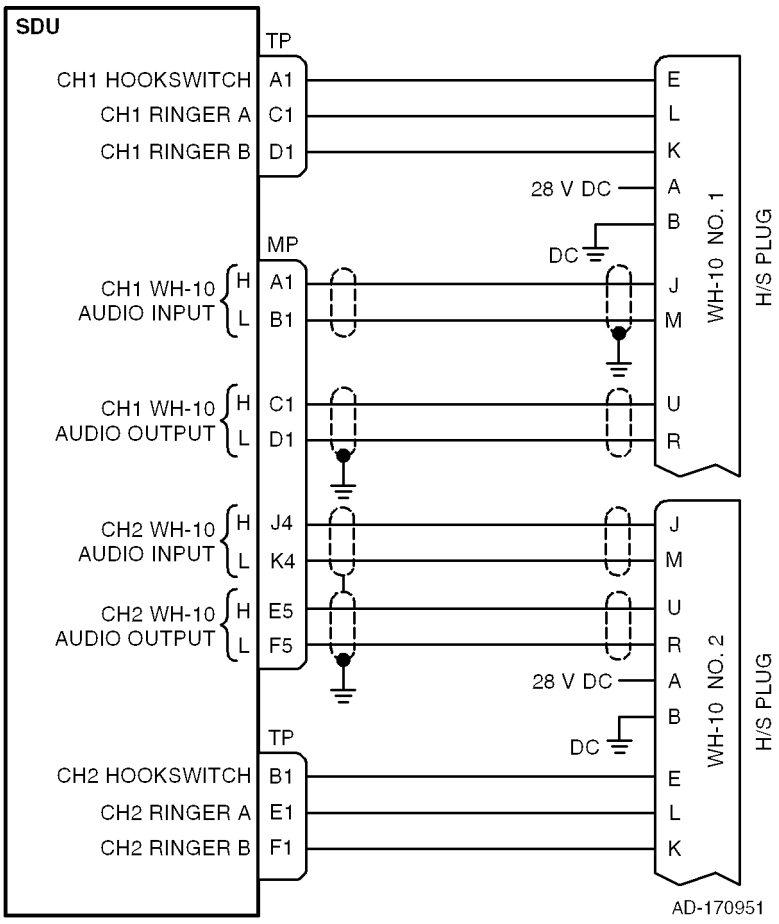
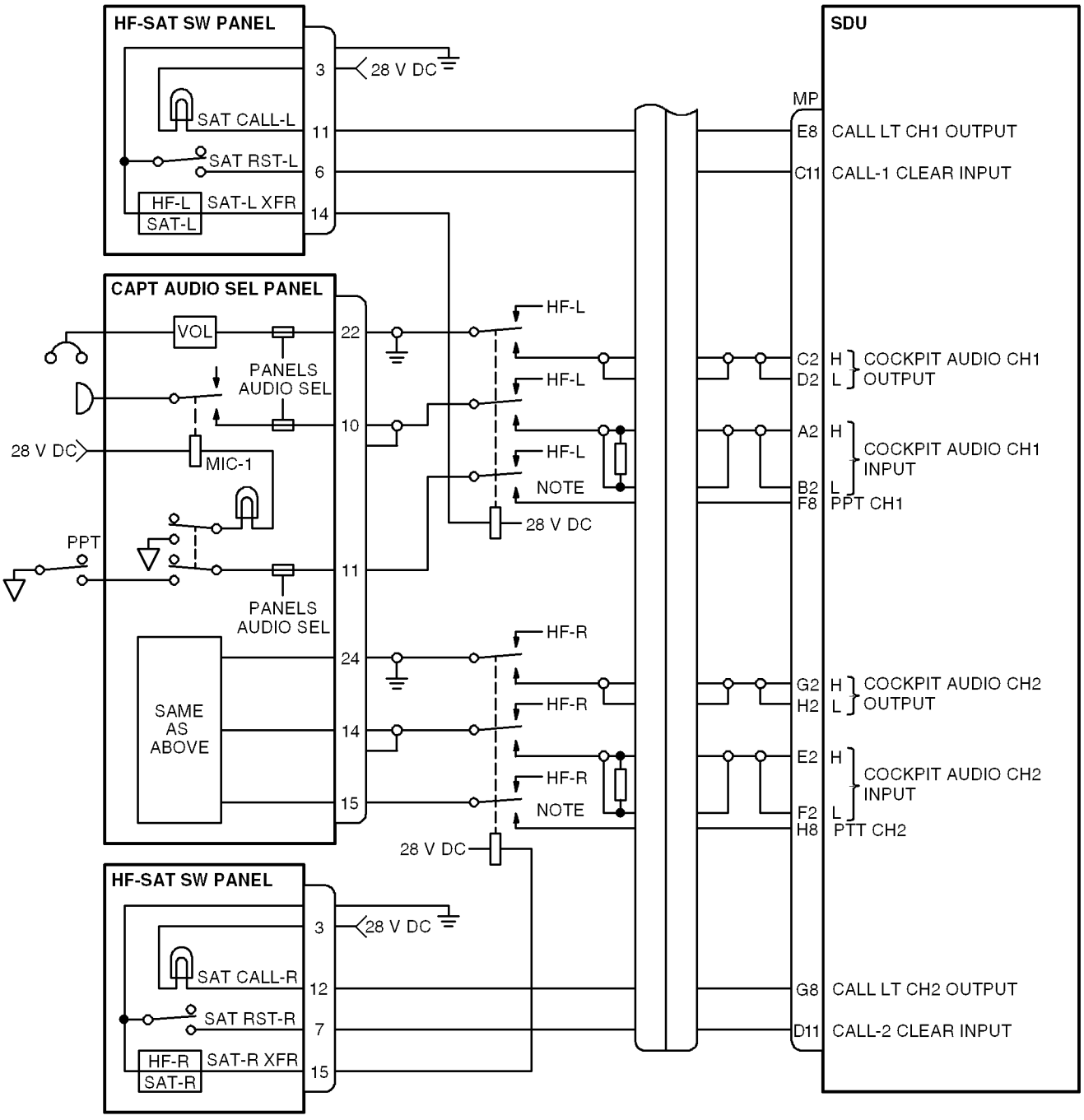


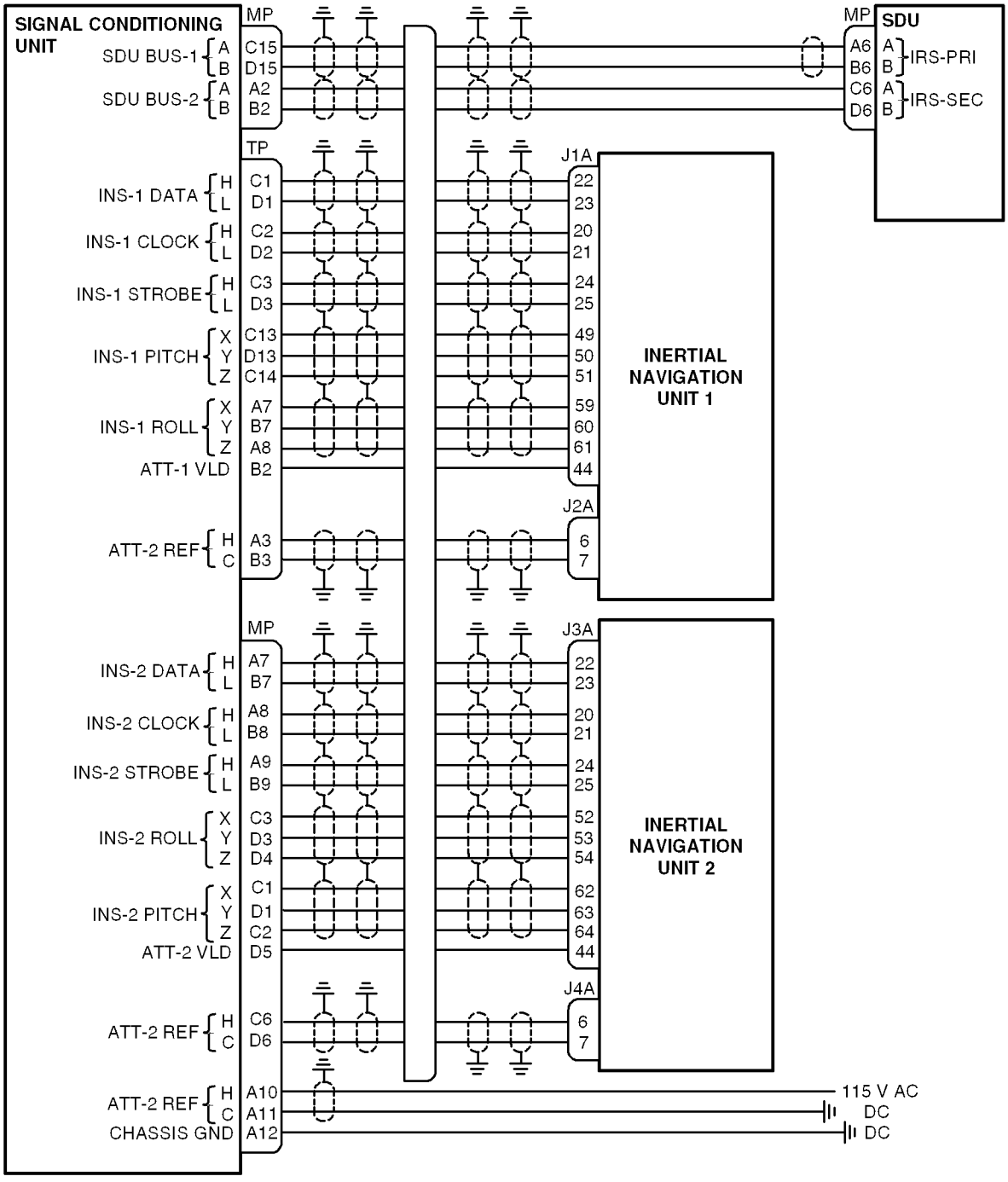
Figure 5-14. WH-10 Handset Interface Diagram



NOTE: TWO 330 OHM RESISTORS MAY BE REQUIRED TO BE INSTALLED IN PARALLEL BETWEEN THE MIC INPUT (H) AND MIC INPUT (L) FOR EACH SAT VOICE CHANNEL TO REDUCE AIRPLANE NOISE (400 Hz) SUSCEPTABILITY FOR GROUND PARTY TELEPHONE RECEPTION.

AD-170952

Figure 5-15. HF-SAT Transfer Panel Interface Diagram



NOTE: THIS INTERFACE DIAGRAM REPRESENTS ONE OF MANY SCU CONFIGURATIONS

AD-170953

Figure 5-16. Signal Conditioning Unit Interface Diagram

Blank Page

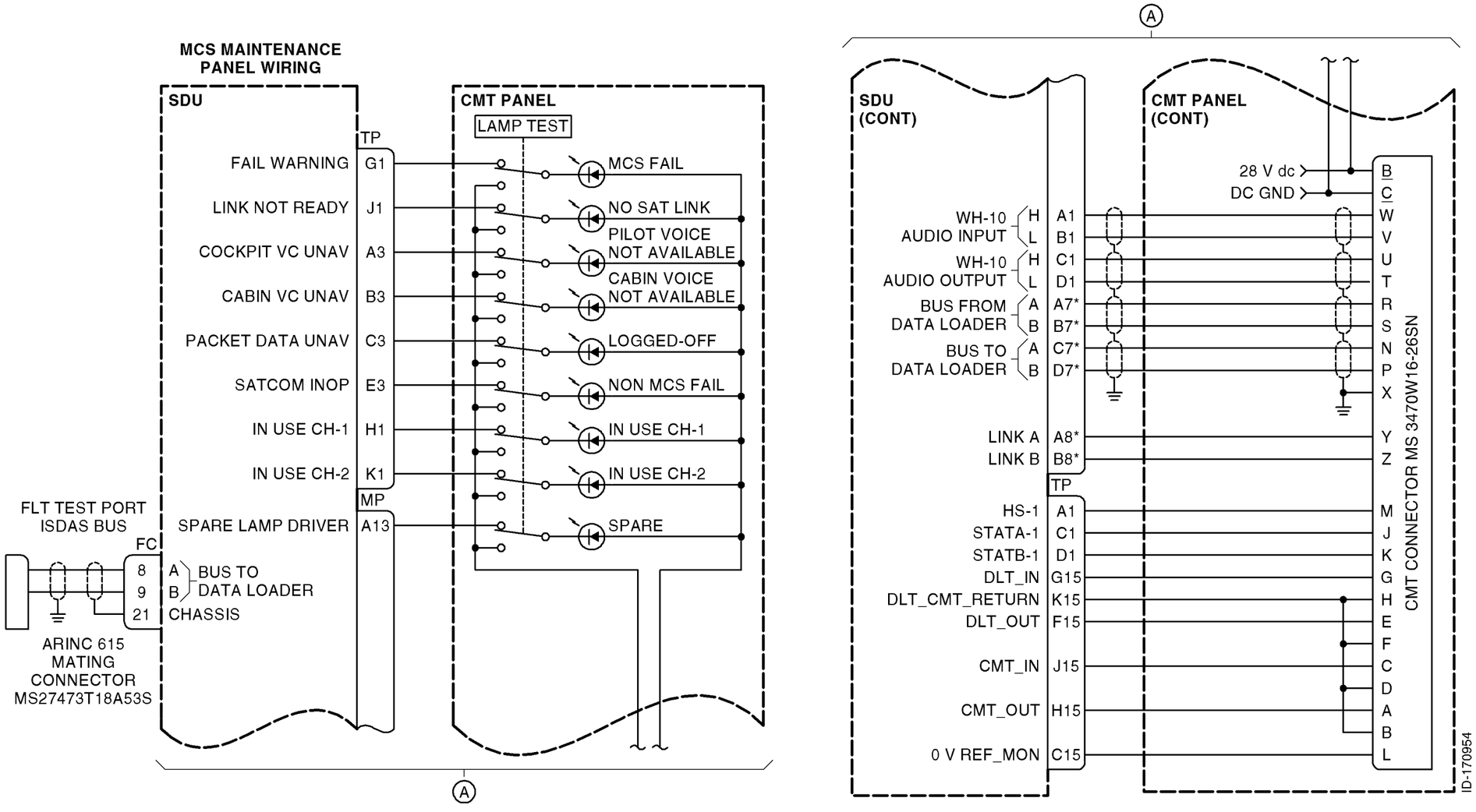


Figure 5-17. Maintenance Panel Assembly Interface Diagram

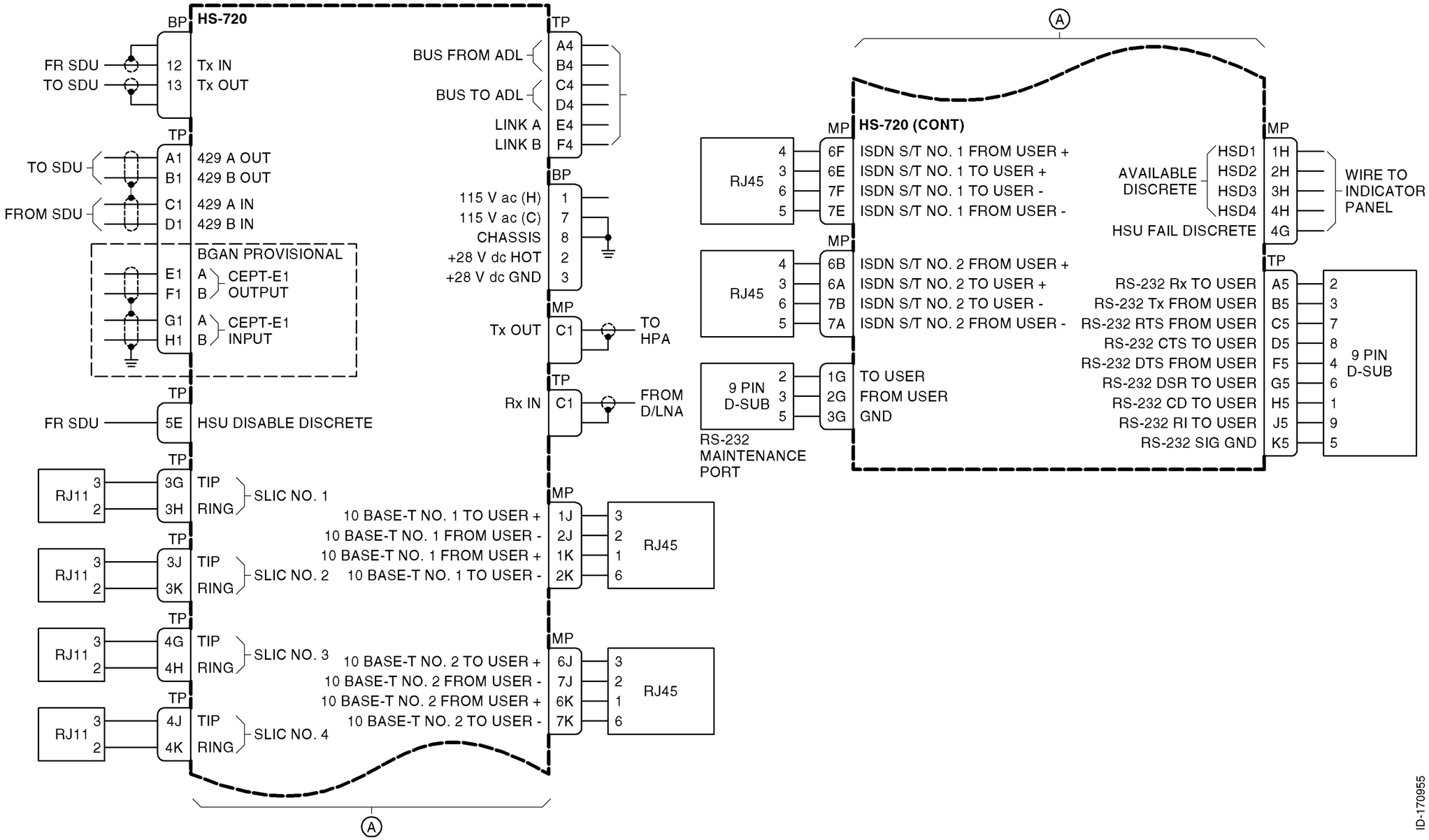
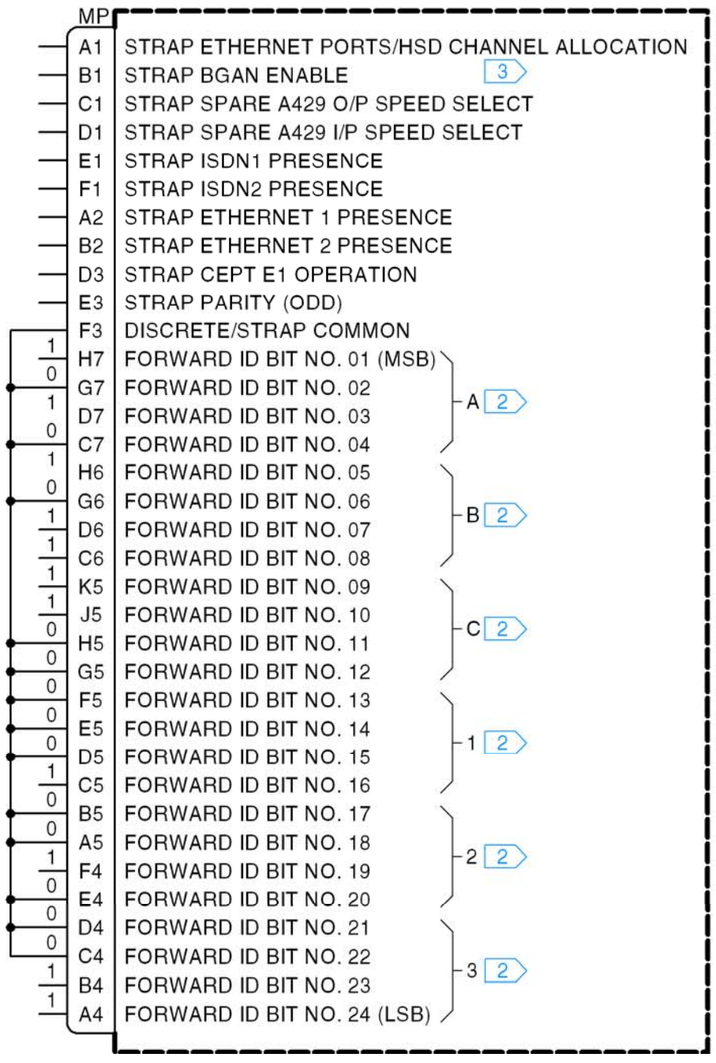


Figure 5-18. HS-720 Interface Diagram

TEMPORARY REVISION NO. 23-1

INSERT PAGE 40 OF 53 FACING PAGE 5-41/5-42.

Reason: To add Note 3 to incorporate SBB operation data to Figure 5-19.
Replace Figure 5-19 with the new illustration as follows:

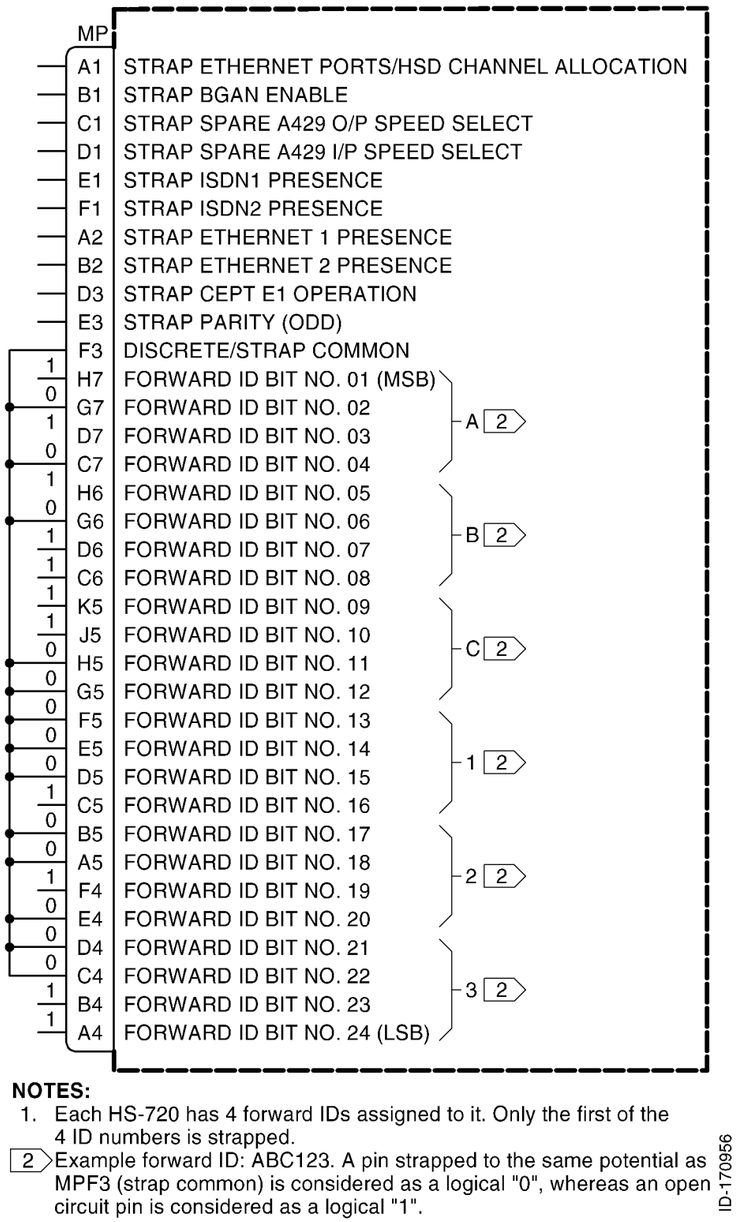


NOTES:

1. Each HS-720 has 4 forward IDs assigned to it. Only the first of the 4 ID numbers is strapped.
2. Example forward ID: ABC123. A pin strapped to the same potential as MPF3 (strap common) is considered as a logical "0", whereas an open circuit pin is considered as a logical "1".
3. Pin MPB1 Interpretation
   0 SBB operation enabled
   1 SBB operation inhibited

ID-274976

Figure 5-19. HS-720 Forward ID & Configuration Pins



NOTES:

1. Each HS-720 has 4 forward IDs assigned to it. Only the first of the 4 ID numbers is strapped.

2 Example forward ID: ABC123. A pin strapped to the same potential as MPF3 (strap common) is considered as a logical "0", whereas an open circuit pin is considered as a logical "1".

Figure 5-19. HS-720 Forward ID & Configuration Pins

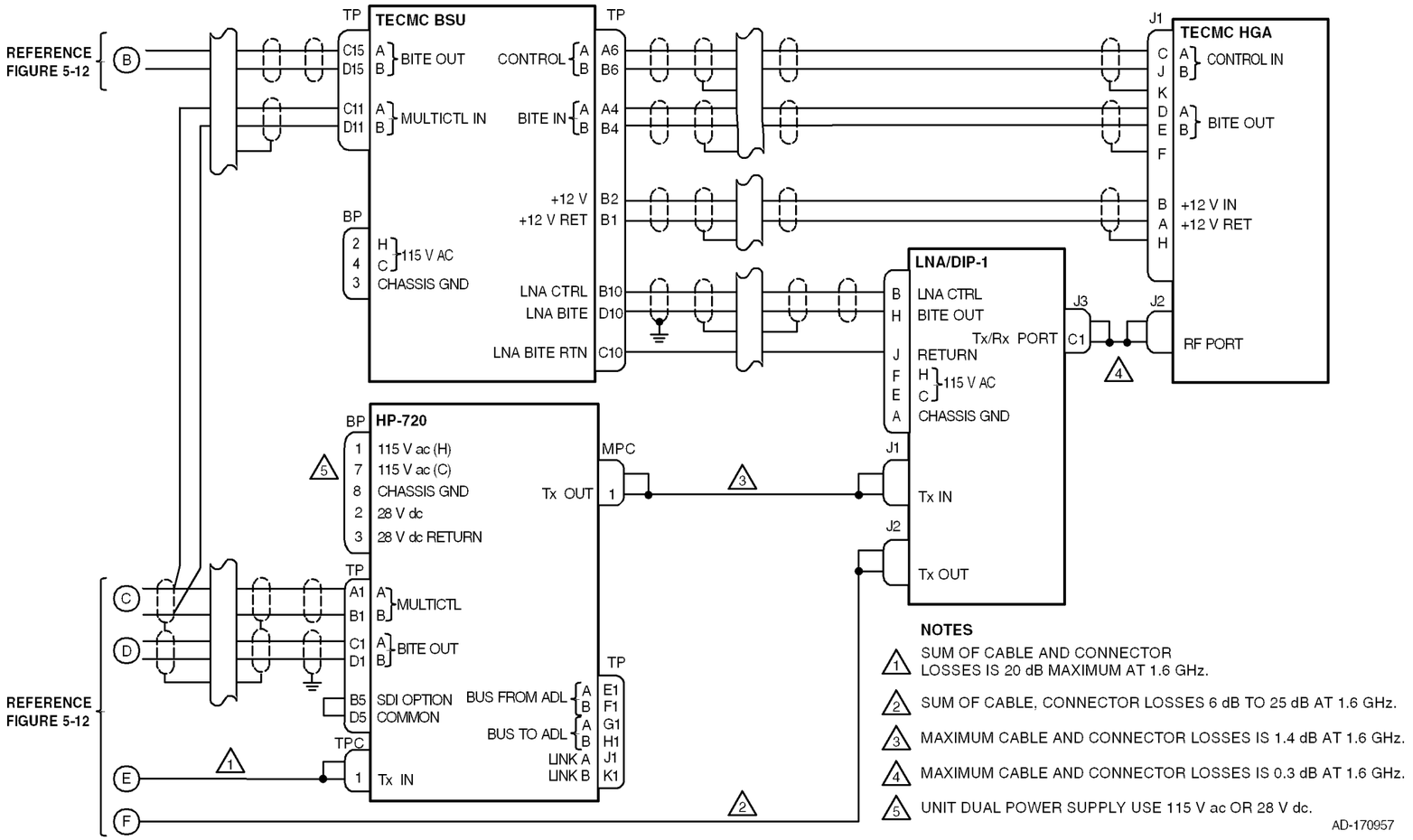


Figure 5-20. Tecom Top–Mount High Gain Antenna Interface Diagram

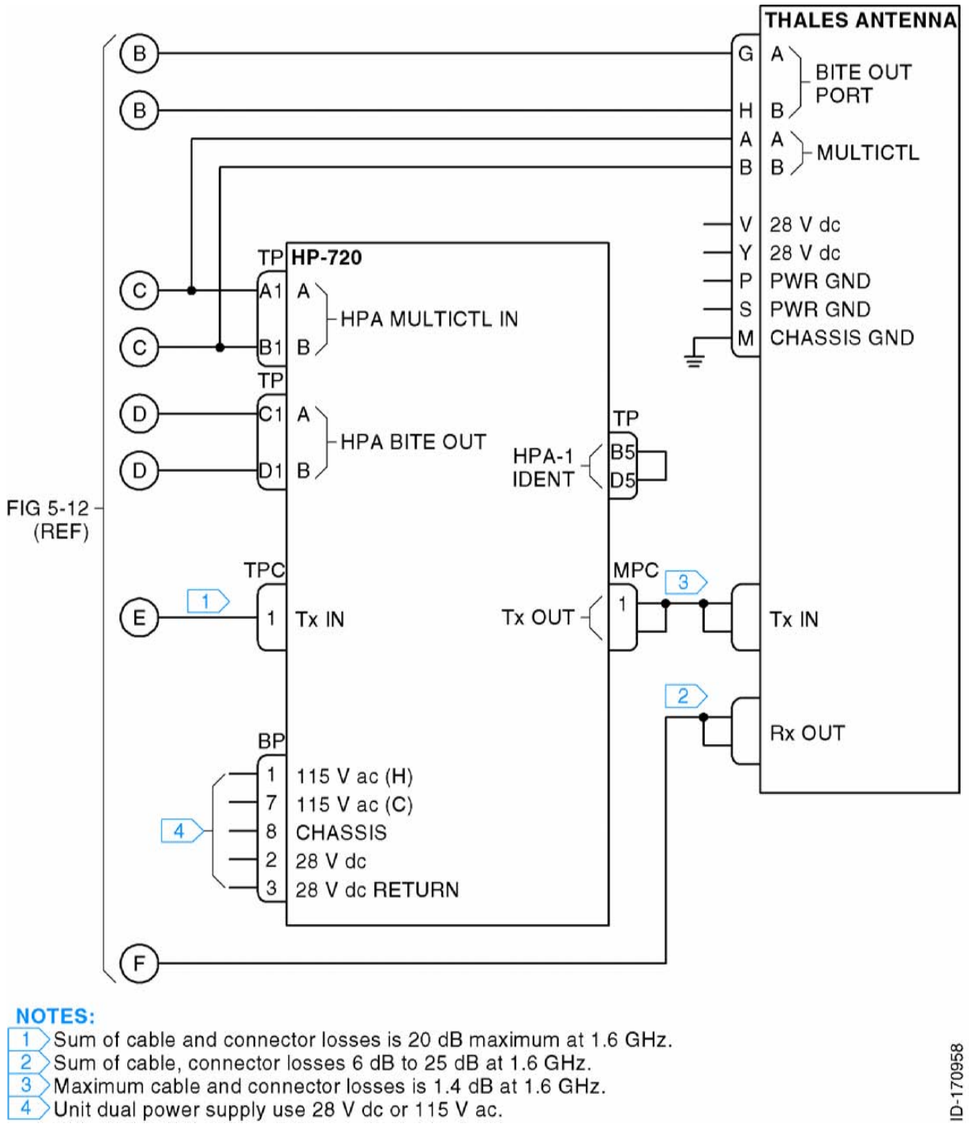
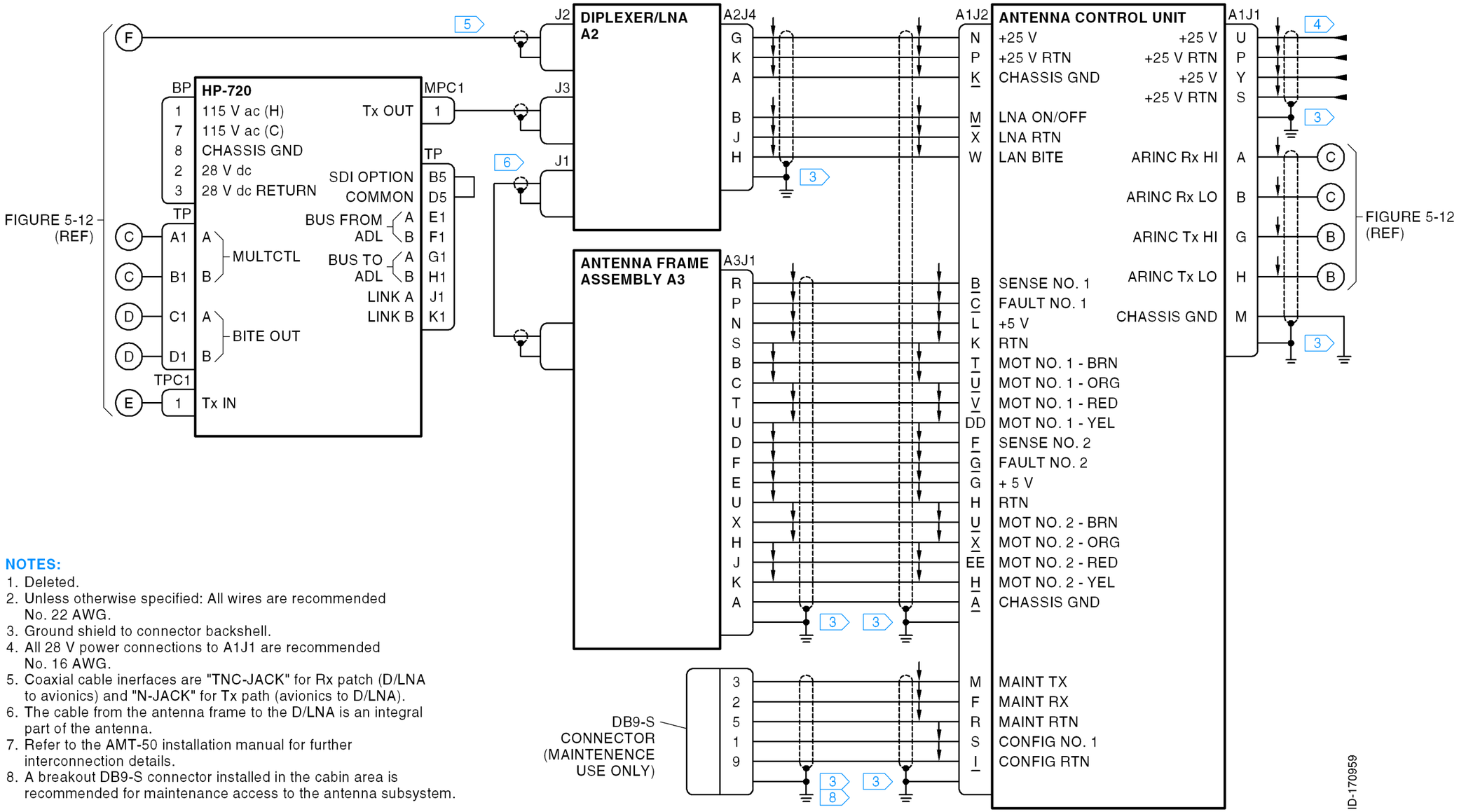


Figure 5-21. Thales Mechanically Steered High Gain Antenna Interface Diagram



NOTES:

1. Deleted.
2. Unless otherwise specified: All wires are recommended No. 22 AWG.
3. Ground shield to connector backshell.
4. All 28 V power connections to A1J1 are recommended No. 16 AWG.
5. Coaxial cable inerfaces are "TNC-JACK" for Rx patch (D/LNA to avionics) and "N-JACK" for Tx path (avionics to D/LNA).
6. The cable from the antenna frame to the D/LNA is an integral part of the antenna.
7. Refer to the AMT-50 installation manual for further interconnection details.
8. A breakout DB9-S connector installed in the cabin area is recommended for maintenance access to the antenna subsystem.

Figure 5-22. EMS AMT-50 Mechanically Steered High Gain Antenna Interface Diagram

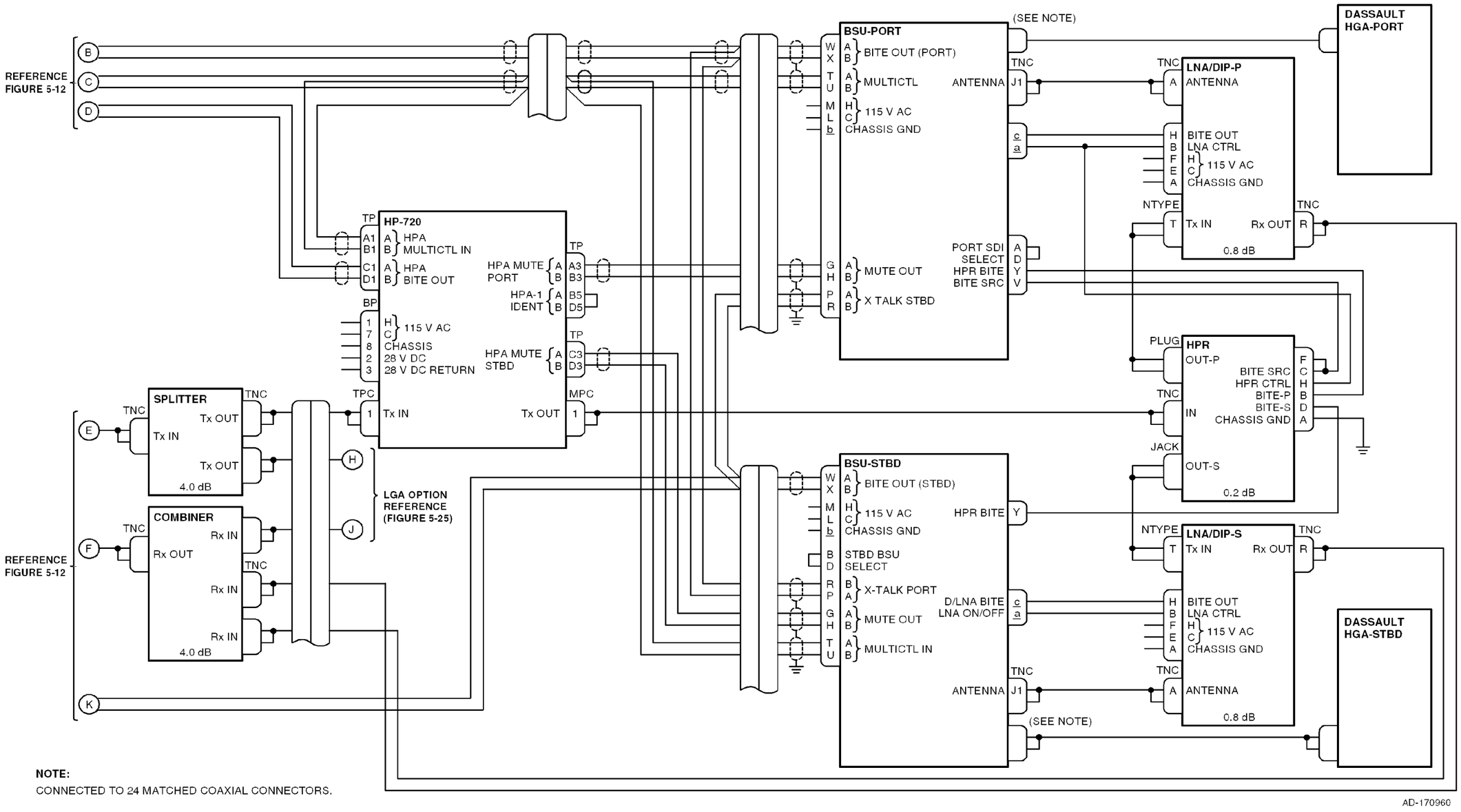


Figure 5-23. Dassault Conformal High Gain Antenna Interface Diagram

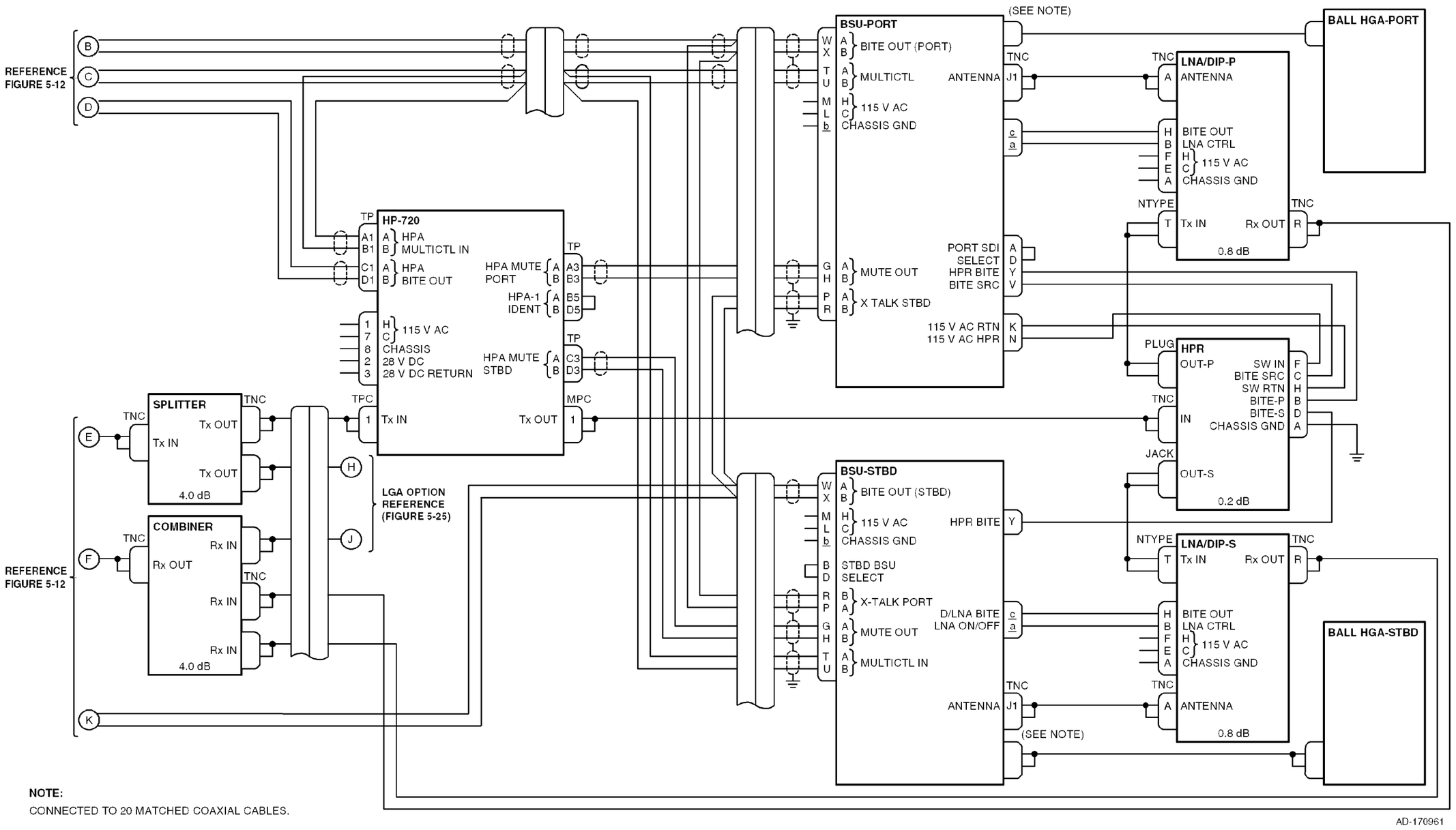


Figure 5-24. Ball Conformal High Gain Antenna Interface Diagram

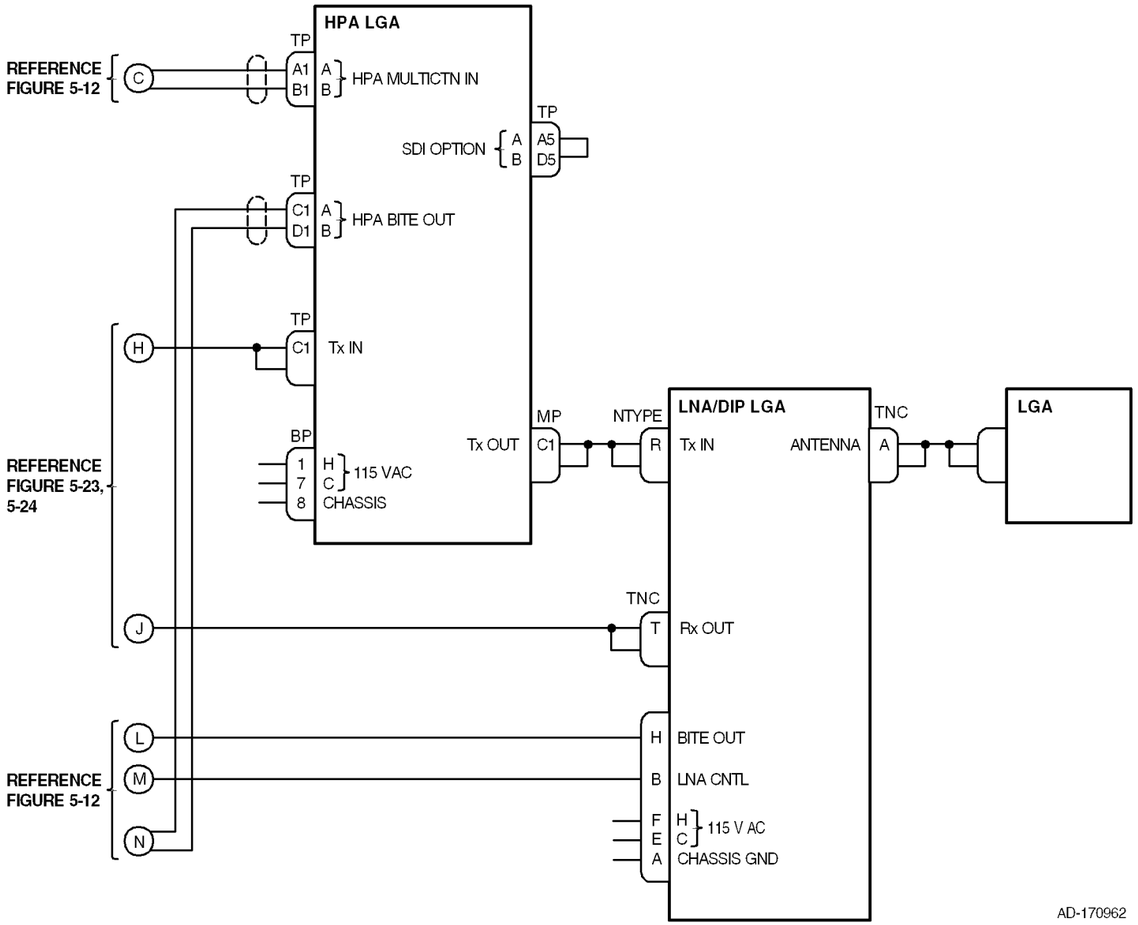


Figure 5-25. Low Gain Antenna Interface Diagram

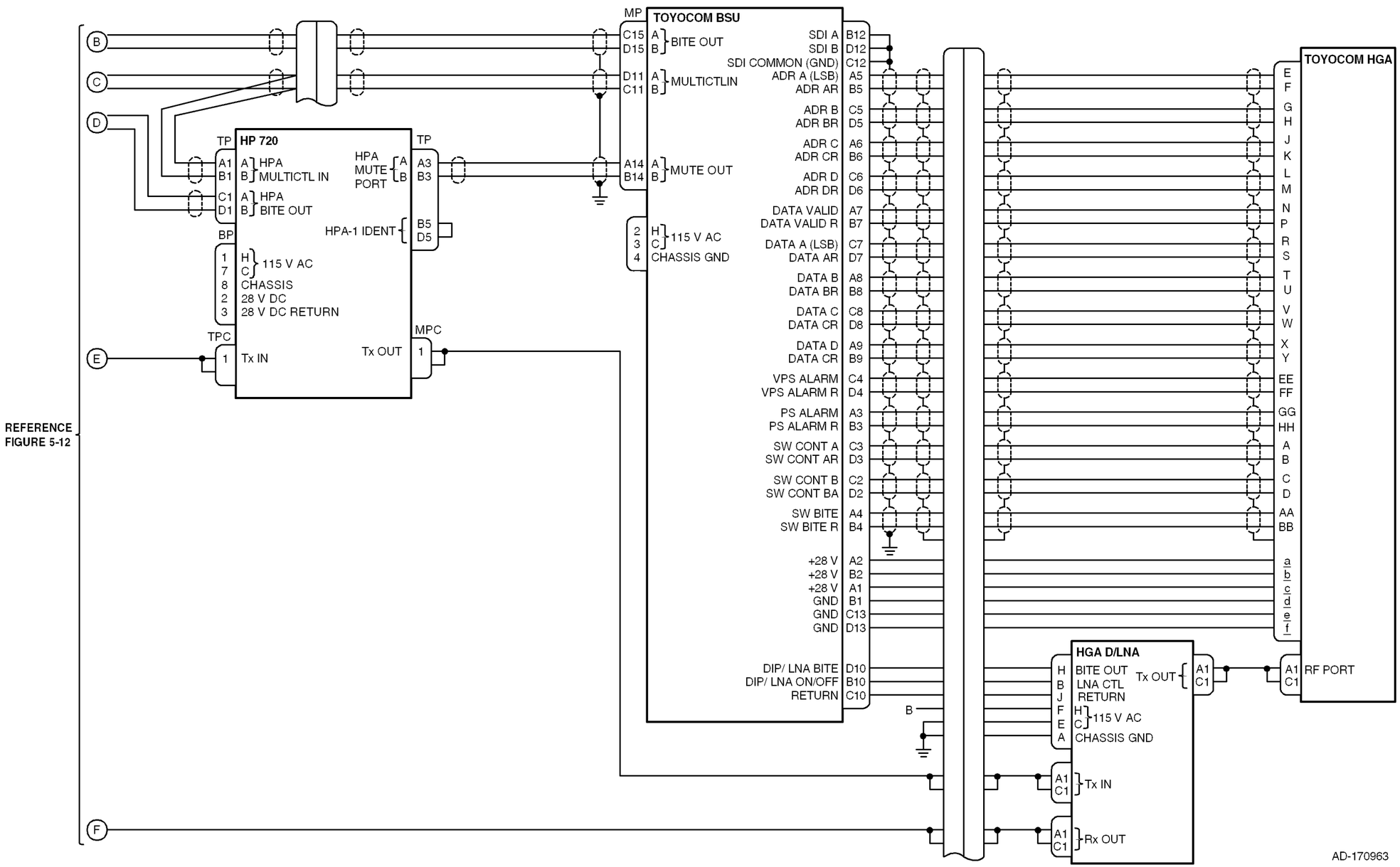


Figure 5-26. Toyocom Top-mounted High Gain Antenna Interface Diagram

TEMPORARY REVISION NO. 23-1

INSERT PAGE 41 OF 53 FACING PAGE 5-57.

Reason: To change Table 5-7 to incorporate the GNSS frequency check algorithm data for pins TP11E thru TP11K.

Replace Table 5-7 as follows:

Table 5-7. Configuration Pins

Pin	Definition
TP11E	HPA ANTENNA SUBSYSTEM CONFIGURATION AND GNSS FREQUENCY CHECK ALGORITHM
TP11F	HPA ANTENNA SUBSYSTEM CONFIGURATION AND GNSS FREQUENCY CHECK ALGORITHM
TP11G	HPA ANTENNA SUBSYSTEM CONFIGURATION AND GNSS FREQUENCY CHECK ALGORITHM
TP11H	HPA ANTENNA SUBSYSTEM CONFIGURATION AND GNSS FREQUENCY CHECK ALGORITHM
TP11J	HPA ANTENNA SUBSYSTEM CONFIGURATION AND GNSS FREQUENCY CHECK ALGORITHM
TP11K	HPA ANTENNA SUBSYSTEM CONFIGURATION AND GNSS FREQUENCY CHECK ALGORITHM

4. Configuration Pins

A. General

(1) The following paragraphs supply system configuration pin definitions and interpretation information. Pins assigned to take on the binary **one** state in a given code should be left as an open circuit. Pins assigned to take on the binary **zero** state in the code should be wired to SDU connector pin MP15K (address common) on the airframe side of the connection. The configuration pins are listed in Table 5-7.

Table 5-7. Configuration Pins

Pin	Definition
TP10A	AVAILABILITY OF ARINC 429 ICAO 24–BIT AIRCRAFT ADDRESS (AES ID) FROM 429 PORTS
TP10B	FMC CONNECTION TO SDU
TP10C	FMC CONNECTION TO SDU
TP10D	ARINC 429 BUS SPEED TO/FROM CMU NO. 1 AND CMU NO. 2
TP10E	CPDF CONFIGURATION
TP10F	429 BUS SPEED OF AES ID INPUT
TP10G	HSU INSTALLED
TP10H	SCDU CONTROLLER TYPE
TP10J	RESERVED FOR STRAP OPTION
TP10K	CALL LIGHT ACTIVATION
TP11A	STRAP PARITY (ODD: COVERING THE OTHER 39 STRAP PINS)
TP11B	CCS PRESENCE
TP11C	IRS CONFIGURATION
TP11D	IRS CONFIGURATION
TP11E	HPR/HPA/BSU/LGA CONFIGURATION
TP11F	HPR/HPA/BSU/LGA CONFIGURATION
TP11G	HPR/HPA/BSU/LGA CONFIGURATION
TP11H	HPR/HPA/BSU/LGA CONFIGURATION
TP11J	HPR/HPA/BSU/LGA CONFIGURATION
TP11K	HPR/HPA/BSU/LGA CONFIGURATION
TP12A	CFDS TYPE
TP12B	CFDS TYPE
TP12C	CFDS TYPE

Table 5-7. Configuration Pins (cont)

Pin	Definition
TP12D	PAD FOR CFDS/SDU CONFIGURATION
TP12E	SDU CONFIGURATION
TP12F	SDU NUMBER
TP12G	CMU NO. 1 CONFIGURATION
TP12H	CMU NO. 2 CONFIGURATION
TP12J	MCDU/WSC NO. 1 CONFIGURATION
TP12K	MCDU/WSC NO. 2 CONFIGURATION
TP13A	PRIORITY 4 CALLS TO/FROM COCKPIT
TP13B	ARINC 429 BUS SPEED TO MCDU NO. 1, NO. 2, AND NO. 3
TP13C	COCKPIT VOICE CALL LIGHT/CHIME OPTIONS
TP13D	COCKPIT VOICE CALL LIGHT/CHIME OPTIONS
TP13E	MCDU/WSC NO. 3 CONFIGURATION
TP13F	SDU CODEC 1 WIRING
TP13G	SDU CODEC 1 WIRING
TP13H	SDU CODEC 2 WIRING
TP13J	SDU CODEC 2 WIRING
TP13K	COCKPIT HOOKSWITCH SIGNALING METHOD
MP11E	CM–250 CGU CONNECTION CONFIGURATION
MP11F	COCKPIT CALL DISCRETE SIGNALING MODE
MP11G	SPARE
MP11H	SPARE
MP11J	SPARE
MP11K	PARITY

B. Availability of ARINC 429 ICAO ADDRESS (AES ID) from 429 Ports

(1) The interpretation of this configuration pin is given in Table 5-8.

Table 5-8. Availability of ARINC 429 ICAO ADDRESS (AES ID) from 429 Ports

TP10 Pin A	Interpretation
1	ICAO ADDRESS (AES ID) NOT AVAILABLE FROM CMU NO. 1 OR CMU NO. 2 OR AES ID INPUT
0	ICAO ADDRESS (AES ID) IS AVAILABLE FROM CMU NO. 1 OR CMU NO. 2 OR AES ID INPUT

(2) When wired to the zero state, the TP10A configuration pin indicates the ICAO 24–bit aircraft address (AES ID) is available in the ARINC 429 label 275/276 format from one or both of the SDU CMU input ports or ARINC 429 label 214/216 format from the AES ID input port, and that one of those ARINC 429 sources of the address is used with no specific preference for CMU 1, CMU 2, or the AES ID input. In this state, the discrete inputs on SDU pins MP13C thru MP13K and MP14D thru MP14J are not assumed to be wired and the SDU does not use the discretes, even if the ARINC 429 sources fail or remain inactive.

(3) In the zero state, the SDU monitors the CMU 1, CMU 2, and AES ID input buses until a valid ICAO address is received. Bits 1 thru 16 of the AES ID are obtained from the label 214/275 word and bits 17 thru 24 are obtained from the label 216/276 word. The SDU only constructs a full 24-bit address from labels 214/275 and 216/276 words received from the same input port (e.g., label 214/275 from CMU 1 can not be combined with label 216/276 from CMU 2 or label 216 from the AES ID input). The address is only considered valid if it does not consist of all zeros or ones, and has been received in ARINC 429 words with their sign–status matrix (SSM) indicating normal operation.

(4) If address words containing either all zeros or ones are received, followed by address words with a valid address (i.e., not all zeros or ones), the SDU verifies the receipt of both labels 214/275 and 216/276 at least twice with the same address bits content in each respective word before declaring the address valid. This is to preclude the SDU from inadvertently and prematurely assuming the address is valid after only one of the two labels has yielded a valid segment of the overall address, but the most previously received copy of the other label has not yet been updated to its intended code. The root problem is that the 24 correlated address bits are transmitted in two separate asynchronous words that are not inherently correlated/paired. This requirement is intended to effectively pair the label 214/275 and 216/276 transmissions.

(5) Once a valid ICAO address is received on any bus, the SDU ignores further data received on any of the buses until the next POST/PAST. This requirement relieves the SDU of having to deal with the possibility that the ICAO technical address might change while the SDU is logged-on. The AES ID (ICAO address) is determined at startup and cannot change until the next POST/PAST. The SDU does not log-on until it has a valid AES ID. The SDU waits indefinitely to receive a valid address from an available ARINC 429 source rather than giving up at the end of POST/PAST, since it cannot proceed as an AES without the address. If the configuration pin indicates the ARINC 429 source is available, the discretes are not wired. The SDU will not revert to the discretes at the end of POST/PAST as the CMU may not yet be operational.

(6) If configuration pin TP10A is wired to the one state, then neither CMU input port nor the AES ID input port is capable of supplying the AES ID in the ARINC 429 format and the SDU reads the AES ID from the discrete inputs.

(7) With either the ARINC 429 or discrete inputs source, an AES ID of all zeros or all ones (binary) is invalid (typically indicative of an unprogrammed address) which constitutes a failure. The SDU does not attempt to log-on to a GES with an invalid AES ID.

C. FMC Connection to SDU

(1) The interpretation of this configuration pin is given in Table 5-9.

Table 5-9. FMC Connection to SDU

TP10 Pins		Interpretation
B	C	
0	0	FMC NO. 1 CONNECTED, FMC NO. 2 CONNECTED
0	1	FMC NO. 1 CONNECTED, FMC NO. 2 NOT CONNECTED
1	0	FMC NO. 1 NOT CONNECTED, FMC NO. 2 CONNECTED
1	1	NEITHER FMC CONNECTED
NOTE: SATCOM does not support the FMC interface.		

D. ARINC 429 Speed to/from CMU No. 1 and CMU No. 2

(1) The interpretation of this configuration pin is given in Table 5-10.

Table 5-10. ARINC 429 Speed to/from CMU No. 1 and CMU No. 2

TP10 Pin D	Interpretation
1	LOW SPEED ARINC 429 DATA BUS
0	HIGH SPEED ARINC 429 DATA BUS

(2) When this configuration pin is wired to the zero state, the SDU operates its input and output ARINC 429 buses for the CMUs No. 1 and No. 2 at high speed. When wired to the one state, the SDU operates these buses at the low speed.

E. Cabin Packet Data Function (CPDF)

(1) The interpretation of this configuration pin is given in Table 5-11.

Table 5-11. Cabin Packet Data Function (CPDF)

TP10 Pin E	Interpretation
0	CPDF CONNECTED
1	CPDF NOT CONNECTED

(2) When wired to the zero state, this configuration pin indicates the input designated for the CPDF (MP1E and MP1F) is connected to an ARINC 429 source of data–3 packet data and that the SDU output (pins MP9A and MP9B) is wired to the CPDF. The SDU only logs/reports/ indicates CPDF failures and bus inactivity on the CPDF input bus if this configuration pin indicates the bus is supposed to be connected to an ARINC source. The SDU can assume (for functional purposes) the presence of the CPDF connections from the state of this pin.

F. ARINC 429 BUS Speed of AES ID Input

(1) The interpretation of this configuration pin is given in Table 5-12.

Table 5-12. ARINC 429 Bus Speed of AES ID Input

TP10 Pin F	Interpretation
0	HIGH SPEED ARINC 429 BUS
1	LOW SPEED ARINC 429 BUS

G. HSU Presence

(1) The interpretation of this configuration pin is given in Table 5-13.

Table 5-13. HSU Presence

TP10 Pin G	Interpretation
0	HSU INSTALLED
1	HSU NOT INSTALLED

(2) When wired to the zero state, this configuration indicates that SDU pins MP9E/F and MP9G/H are connected to the high speed data unit (HSDU). The SDU only logs/reports/indicates inactivity on its HSU input bus when this strap is in the zero state. The SDU assumes, for functional purposes, the presence of the HSU from the state of this strap.

H. SDU Controller Type

(1) The interpretation of this configuration pin is given in Table 5-14.

Table 5-14. SDU Controller Type

TP10 Pin H	Interpretation
0	WSC SDU CONTROLLER TYPE
1	MCDU/SDU CONTROLLER TYPE

(2) When wired to the zero state, the SDU interfaces to the Williamsburg SDU controller (WSC) interface. When wired to the one state, the SDU interfaces to the Multi–Controller Display Unit (MCDU). The SDU chooses the appropriate interface protocols and BITE failures based on the state of TP10H.

(3) When the WSC SDU controller type is selected, TP13B (Table 5–29) must also be wired to the zero state since the WSC interface only operates at low speed.

I. Call Light On (Air/Ground Calls)

(1) The interpretation of this configuration pin is given in Table 5-15.

Table 5-15. Call Light On (Air/Ground Calls)

TP10 Pin K	Interpretation
0	CALL LIGHT ON AT CALL INITIATION (FOR AIR/GROUND CALLS)
1	CALL LIGHT ON AT CALL CONNECTION (FOR AIR/GROUND CALLS)

J. Strap Parity (ODD)

(1) The interpretation of this configuration pin is given in Table 5-16.

Table 5-16. Strap Parity (ODD)

TP11 Pin A	Interpretation
0	SUM OF ALL OTHER STRAPS SET TO 1 IS ODD
1	SUM OF ALL OTHER STRAPS SET TO 1 IS EVEN

(2) The coverage of the parity pin is SDU connector pins TP10A thru TP10K and TP11B thru TP13K (39 pins other than itself). The parity pin is programmed to a zero or one to yield an odd number of strap bits set to the one state, including the parity pin itself.

(3) The parity pin is wired to yield odd parity over all 40 configuration pins (i.e., the parity pin is programmed to the zero or one state to yield an odd number of configuration pins wired to the one state, including itself. The SDU verifies the state of the parity pin is correct when the configuration pins are read (typically once per power cycle just after power-up). An invalid state of the parity pin is logged/reported/indicated; the states of the other configuration pins are used as read despite the parity error.

K. Cabin Communications System (CCS)

(1) The interpretation of this configuration pin is given in Table 5-17.

Table 5-17. Cabin Communications System (CCS)

TP11 Pin B	Interpretation
0	CCS INSTALLED
1	CCS NOT INSTALLED

(2) When wired to the zero state, this configuration indicates that SDU pins MP2J/K and MP3A/B (CEPT–E1 input and output respectively) are connected to the CCS CTU.

(3) The SDU only logs, reports, and/or indicates inactivity on its CCS input bus when this strap is in the zero state. The SDU assumes, for functional purposes, the presence of the CCS from the state of this strap.

L. Inertial Reference System (IRS)

(1) The interpretation of these configuration pins is given in Table 5-18.

Table 5-18. Inertial Reference System (IRS)

TP11 Pins		Interpretation
C	D	
0	0	PRIMARY IRS INSTALLED, SECONDARY IRS INSTALLED
0	1	PRIMARY IRS INSTALLED, SECONDARY IRS NOT INSTALLED
1	0	PRIMARY IRS NOT INSTALLED, SECONDARY IRS INSTALLED
1	1	PRIMARY IRS NOT INSTALLED, SECONDARY IRS NOT INSTALLED

(2) When individually wired to the zero state, configuration pins TP11C and TP11D indicate, respectively, that the inputs designated for the primary and secondary IRSs (MP6A/MP6B and MP6C/MP6D, respectively) are connected to an ARINC 429 source of IRS label 310, 311, 312, 314, 324, 325, and 361 information (although label 361, Inertial Altitude, is not required for SATCOM). The actual IRS (i.e., IRS No. 1, IRS No. 2, or IRS No. 3) driving either SDU input is determined from the source destination identifier (SDI) bits of the received ARINC words. The SDU only logs/reports/indicates bus inactivity on either bus if the respective configuration pin indicates that the bus is supposed to be connected to an ARINC 429 source. The SDU can assume (for functional purposes) the presence of the IRS connections from the state of these pins.

M. HPA/Antenna Subsystem Configuration

(1) The interpretation of these configuration pins is given in Table 5-19.

Table 5-19. HPA/Antenna Subsystem Configuration

TP11 Pins						LGA+LNA/DIPLEXER	LGA HPA	TOP/PORT BSU+HGA	STARBOARD BSU+HGA	HGA HPA	HPR	RESERVED FOR FUTURE	RESERVED FOR MFR	
E	F	G	H	J	K									
1	1	1	1	1	1	*	*							
0	1	1	1	1	1			*		*				
1	0	1	1	1	1	*	*	*		*				
0	0	1	1	1	1	*	*	*	*	*	*			
1	1	0	1	1	1							*		
0	1	0	1	1	1							*		
1	0	0	1	1	1	*		*		*	*			Note 1
0	0	0	1	1	1	*	*	*	*		*			Note 1
1	1	1	0	1	1			*	*	*	*			
0 1	1 0	1 0	0 1	1 0	1 0	to						*		Note 2
1 0	1 0	1 0	0 0	0 0	0 0	to							*	Note 2

NOTES:
1. Not defined at this time.
2. Other configurations are possible and can be added at a later date.

TEMPORARY REVISION NO. 23-1

INSERT PAGE 42 OF 53 FACING PAGE 5-64.

Reason: To change Table 5-19 to incorporate the GNSS frequency check algorithm data.

Replace Table 5-19 as follows:

Table 5-19. (TP11E – K) HPA/Antenna Subsystem Configuration and GNSS Frequency Check Algorithm[1]

[10] Decimal Code	Pins TP11						LGA	LGA HPA	TOP/PORT BSU + HGA	STARBOARD BSU + HGA	HGA HPA	HPR	GNSS FREQ CHK REQD	GNSS FREQ CHK NOT REQD	ARINC 781 HGA	RESERVED FOR FUTURE	RESERVED FOR MFR	NOTES
	E	F	G	H	J	K												
63	1	1	1	1	1	1	*	*					*					
62	0	1	1	1	1	1			*		*		*					
61	1	0	1	1	1	1	*	*	*		*		*					
60	0	0	1	1	1	1	*	*	*	*	*	*	*					
59	1	1	0	1	1	1							*			*		
58	0	1	0	1	1	1							*			*		
57	1	0	0	1	1	1							*			*		
56	0	0	0	1	1	1							*			*		
55	1	1	1	0	1	1			*	*	*	*	*					
54	0	1	1	0	1	1					*		*		*			
48-53	1 0	0 0	1 0	0 0	1 1	1 1	to									*		
47	1	1	1	1	0	1	*	*						*				
46	0	1	1	1	0	1			*		*			*				
45	1	0	1	1	0	1	*	*	*		*			*				
44	0	0	1	1	0	1	*	*	*	*	*	*		*				
43	1	1	0	1	0	1								*		*		
42	0	1	0	1	0	1								*		*		
41	1	0	0	1	0	1								*		*		
40	0	0	0	1	0	1								*		*		
39	1	1	1	0	0	1			*	*	*	*		*				
38	0	1	1	0	0	1					*			*	*			
8-37	1 0	0 0	1 0	0 1	0 0	1 0	to									*		
0-7	1 0	1 0	1 0	0 0	0 0	0 0	to										*	

Note 1: Other configurations are possible and may be added at a later date. Note that ARINC Characteristic 761 Attachment 1-4B Table 1-3K (which is an extension of ARINC Characteristic 741 Table 1-4K) defines configurations which include intermediate-gain antennas (IGAs). Those IGA configurations may also apply to ARINC Characteristic 741-compatible equipment; therefore, the IGA codes defined in ARINC Characteristic 761 should be considered as reserved for those definitions in this table as well. Any changes to this table should be coordinated with ARINC Characteristic 761. Note that the configuration codes for “GNSS Frequency Check Required” and “GNSS Frequency Check Not Required” are identical except for TP11J. Refer to ARINC 741 Part 2 Section 3.5.4.1.1 regarding the frequency check for GNSS interference prevention.

(2) For functional purposes, the SDU assumes the HPA and antenna subsystem configuration of its particular installation from states of these configuration pins. However, configurations 100111 and 000111 are not supported. Both of the nonsupported configurations involve the sharing of a single HPA between an LGA and HGA, by using a high power relay (HPR). No control or BITE signal interfaces are specified for the HPR, the MCS system does not accommodate these configurations.

(3) The SDU commands the system, uses its resources, and logs/reports/indicates failures in the HPAs and antenna subsystem based on the determined HPA and antenna subsystem configuration. Inactivity on the SDU input buses from the HPA(s) and ACU/BSU(s) and failures against the diplexer/LNA and HPR are logged/reported/indicated if the respective LRU is specified to be connected according to these pins. If these configuration pins are set to a nonsupported, reserved for future, or reserved for **Mfr** state, the SDU logs/reports/indicates the appropriate strap failure(s) and does not attempt any satellite communication functions.

N. CFDS/CMC

(1) The interpretation of these configuration pins is given in Table 5-20.

Table 5-20. CFDS/CMC

TP12 Pins			Interpretation
A	B	C	
0	0	0	UNDEFINED
0	0	1	McDONNELL–DOUGLAS TYPE CFDS
0	1	0	AIRBUS TYPE CFDS
0	1	1	HONEYWELL CAIMS
1	0	0	BOEING TYPE CMC (ALL EPIC PLATFORMS)
1	0	1	UNDEFINED
1	1	0	UNDEFINED
1	1	1	CFDS NOT INSTALLED

(2) For functional purposes, the SDU can assume the type of central fault/maintenance system (if any) that is connected from the state of these configuration pins. The CMC/CFDS interface operates according to the determined type. The appropriate strap failure(s) is(are) logged/indicated if an undefined code is present. The SDU only logs/reports/indicates bus inactivity for the MP4C/MP4D CFDS interface input bus if the configuration pins indicate the CMC/CFDS is supposed to be installed.

O. SDU Configuration

(1) The interpretation of this configuration pin is given in Table 5-21.

Table 5-21. SDU Configuration

TP12 Pin E	Interpretation
0	SECOND SDU INSTALLED
1	SECOND SDU NOT INSTALLED

(2) When wired to the zero state, this configuration pin indicates a second SDU is present as part of the MCS system installation. The zero state also indicates pins MP12C/MP12D and MP12A/MP12B (cross talk to and from the other SDU, respectively) and MP5J/MP5K (dual system select and dual system disable discretes, respectively) are connected to the second SDU. When this pin is in the zero state, it also indicates these signals are used to determine dual SATCOM operation as specified in SYSTEM OPERATION. The SDU only logs/reports/indicates inactivity on its input cross–talk bus from the second SDU when this pin is in the zero state. The SDU can assume (for functional purposes) the presence of a second SDU from the state of this configuration pin. The SDU also uses the state of this pin (and for dual SATCOM installations, the state of SDU number pin TP12F) to determine the state of its output word SDI fields.

P. SDU Number

(1) The interpretation of this configuration pin is given in Table 5-22.

Table 5-22. SDU Number

TP12 Pin F	Interpretation
0	SDU NO. 2
1	SDU NO. 1
NOTE: The state of this strap is **Don't Care** for a single SDU configuration.	

(2) When wired to the zero state, this configuration pin indicates this SDU is No. 2 in a dual MCS system installation. The one state indicates this SDU is No. 1 in a dual installation. The SDU uses the state of this pin and the SDU configuration pin TP12E to determine the state of its output word SDI fields. In a single MCS system installation, the status of this configuration pin is ignored.

Q. CMU No. 1 and No. 2 Configuration

(1) The interpretation of these configuration pins is given in Table 5-23 and Table 5-24.

Table 5-23. CMU No. 1

TP12 Pin G	Interpretation
0	CMU NO. 1 INSTALLED
1	CMU NO. 1 NOT INSTALLED

Table 5-24. CMU No. 2

TP12 Pin H	Interpretation
0	CMU NO. 2 INSTALLED
1	CMU NO. 2 NOT INSTALLED

(2) When individually wired to the zero state, configuration pins TP12G and TP12H indicate, respectively, that the inputs designated for CMU No. 1 and CMU No. 2 (pins MP1G/MP1H and MP3G/MP3H, respectively) are connected to an ARINC 429 source of CMU information (e.g., CMU label 270 and SAL 304), and also the single SDU output (pins MP1J/MP1K) is wired to the appropriate CMU(s). The SDU only logs/reports/indicates bus inactivity on either CMU input bus if the respective configuration pin indicates the bus is supposed to be connected to an ARINC source. The SDU can assume (for functional purposes) the presence of the CMU connections from the state of these configuration pins.

R. MCDU/WSC No. 1 thru No. 3 Configuration

(1) The interpretation of these configuration pins is given in Table 5-25 thru Table 5-27.

Table 5-25. MCDU/WSC No. 1

TP12 Pin J	Interpretation
0	MCDU/WSC NO. 1 INSTALLED
1	MCDU/WSC NO. 1 NOT INSTALLED

Table 5-26. MCDU/WSC No. 2

TP12 Pin K	Interpretation
0	MCDU/WSC NO. 2 INSTALLED
1	MCDU/WSC NO. 2 NOT INSTALLED

Table 5-27. MCDU/WSC No. 3

TP13 Pin E	Interpretation
0	MCDU/WSC NO. 3 INSTALLED
1	MCDU/WSC NO. 3 NOT INSTALLED

(2) When individually wired to the zero state, configuration pins TP12J, TP12K, and TP13E indicate, respectively, that the inputs designated for MCDU/WSC No. 1, No. 2, and No. 3 (pins MP3C/MP3D, MP3E/MP3F, and MP8J/MP8K, respectively) are connected to an ARINC 429 source of line select/keypad control information, and also the single SDU output (MP3J/MP3K) is wired to all appropriate MCDU/WSC(s). The SDU only logs/reports/indicates bus inactivity on any of the three buses if the respective configuration pin indicates the bus is supposed to be connected to an ARINC source. The SDU can assume (for functional purposes) the presence of the MCDU/WSC connections from the state of these configuration pins.

S. Priority 4 Calls to/from Cockpit

(1) The interpretation of this configuration pin is given in Table 5-28.

Table 5-28. Priority 4 Calls to/from Cockpit

TP13 Pin A	Interpretation
0	DISALLOW PRIORITY 4 CALLS
1	ALLOWS PRIORITY 4 CALLS

(2) When this configuration pin is wired to the zero state, the SDU disallows priority 4 calls from being routed to or initiated from the cockpit. This state prevents ORT item xiii (Appendix C) from being set to allow routing of ground-to-air priority 4 calls to the cockpit headset. When this configuration is wired to the one state, the SDU lets priority 4 calls be initiated from the cockpit and lets ground-to-air calls be routed to the cockpit based upon ORT item xiii.

T. ARINC 429 BUS Speed to MCDU No. 1/MCDU No. 2/MCDU No. 3

(1) The interpretation of this configuration pin is given in Table 5-29.

Table 5-29. ARINC 429 Bus Speed to MCDU No. 1/MCDU No.2/MCDU No. 3

TP13 Pin B	Interpretation
0	LOW SPEED ARINC 429 BUS
1	HIGH SPEED ARINC 429 BUS

(2) When this configuration pin is wired to the zero state, the SDU operates its ARINC 429 output bus for MCDU No. 1, No. 2, and No. 3 at the low speed. When wired to the one state, the SDU operates this bus at the high speed.

U. Cockpit Voice Call Light/Chime Option

(1) The interpretation of these configuration pins is given in Table 5-30.

Table 5-30. Cockpit Voice Call Light/Chime Option

TP13 Pins		Interpretation
C	D	
0	0	SPARE
0	1	STEADY LIGHTS AND MULTISTROKE CHIME
1	0	FLASHING LIGHTS AND SINGLE STROKE CHIME
1	1	STEADY LIGHTS AND SINGLE STROKE CHIME

(2) The SDU determines the mode of cockpit call annunciation (flashing vs. steady voice call lamp, multistroke vs single stroke chime) from the states of these configuration pins. The functionality of the cockpit call annunciation interface (pins MP8E and MP8G for the call lights, and MP14B and MP14C for the chime) operate according to the configuration pin connections selected. The selected state of pins TP13C and TP13D applies to both air- and ground-initiated calls; it only applies to the call annunciation phase (i.e., following connection acknowledgement by receipt of the off-hook state as specified by the state of TP13K, a multistroke chime is silenced and the call lamp remains on steady). The appropriate strap failure(s) is logged/indicated if an undefined code is present. The SDU defaults to the steady lights and single stroke chime state if an undefined code is present.

(3) The steady versus flashing light option applies to the call annunciation phase only. The light remains on (steady) for the duration of the call after the acknowledgement of the annunciation for either the steady or flashing light option.

V. SDU CODEC 1 and CODEC 2 Wiring

(1) The interpretation of these configuration pins is given in Table 5-31 and Table 5-32.

Table 5-31. SDU Analog Interface No. 1 Wiring

TP13 Pins		Interpretation
F	G	
0	0	AMS WIRED, CABIN AUDIO WIRED
0	1	AMS WIRED, CABIN AUDIO NOT WIRED
1	0	AMS NOT WIRED, CABIN AUDIO WIRED
1	1	AMS NOT WIRED, CABIN AUDIO NOT WIRED

Table 5-32. SDU Analog Interface No. 2 Wiring

TP13 Pins		Interpretation
H	J	
0	0	AMS WIRED, CABIN AUDIO WIRED
0	1	AMS WIRED, CABIN AUDIO NOT WIRED
1	0	AMS NOT WIRED, CABIN AUDIO WIRED
1	1	AMS NOT WIRED, CABIN AUDIO NOT WIRED

(2) The SDU determines the extent and nature of the analog cockpit and cabin voice connections from the states of these configuration pins. The functionality of the analog cockpit and cabin voice interface (pins MP1A/MP1B, MP1C/MP1D, MP2A/MP2B, MP2C/MP2D, MP2E/MP2F, MP2G/MP2H, MP4J/MP4K, and MP5E/MP5F) operate according to the connections selected. ORT item vi for codec dedication (Appendix C) is related to the SDU codec configuration pins; dedication or automatic sharing of a codec to or with a particular interface is only possible if the SDU codec wiring straps indicate the codec is wired to that interface.

W. Cockpit Hookswitch Signaling Method

(1) General

(a) The interpretation of this configuration pin is given in Table 5-33.

Table 5-33. Cockpit Hookswitch Signaling Method

TP13 Pin K	Interpretation
1	SWITCHED PTT AND/OR SCDU LINE SWITCH(ES)
0	LATCHED AUDIO CONTROL PANEL SATCOM MICROPHONE SWITCH

(b) This configuration pin specifies the functionality of the SDU **Cockpit Voice Mic-On Input No. 1** (and No. 2) discrete inputs (referred to as the **mic-on inputs**). When TP13K is wired to the one state, the SDU utilizes the **switched PTT and/or MCDU/SCDU line switch(es)** (referred to as **switched PTT**) method for cockpit hookswitch signaling on the mic-on inputs. When TP13K is wired to the zero state, the SDU utilizes the **latched audio control panel SATCOM microphone switch** (referred to as the **latched ACP**) method. These two methods are described below.

(2) Switched PTT Method

(a) With the switched PTT method, the SDU assumes the mic-on inputs are wired to conventional microphone momentary push-to-talk switches (i.e., they are dynamically active [on/off] throughout the duration of the call). The SDU assumes the air- or ground-initiated call annunciation to have been acknowledged (i.e., the call to be in the off-hook state) when the appropriate mic-on input is activated (connected to ground) for the first time after the call annunciation for a particular channel. Successive activations of that mic-on input for the duration of that call have no effect on the status of that call until the call has been cleared.

(b) With the switched PTT method, the off-hook state is also entered following activation of the **Answer Call** line select switch on the MCDU/SCDU. The on-hook state is entered following activation of the **End Call** line select switch on the MCDU/SCDU that results in call clearing.

(c) This method also allows usage of the place/end call discrete input and associated switch to initiate calls to preselected numbers, as well as to terminate existing calls.

(3) Latched ACP Method

(a) With the latched ACP method, the SDU assumes the mic-on inputs are wired to SATCOM microphone select switches on the ACP that are latched on (connected to ground) for the entire duration of a call. The SDU considers the air- or ground-initiated call annunciation to have been acknowledged (i.e., the call to be in the off-hook state) when the appropriate mic-on input is active (connected to ground) for a particular channel. The call is cleared and the channel is considered to be in the on-hook state when the mic-on input is in the open-circuit state.

(b) With the latched ACP method, all hookswitch signaling for answering and terminating all air- and ground-initiated calls is handled by the mic-on inputs; the MCDU/SCDU **Answer Call** and **End Call** options are blanked (the MCDU/SCDU is only necessary for specifying the called-party number and initiating the call process for air-to-ground calls).

(c) This method also allows usage of the mic–on discrete input and switch to initiate calls to preselected numbers.

X. CM–250 CGU Connection Configuration

(1) The interpretation of this configuration pin is given in Table 5-34.

Table 5-34. CM–250 CGU Connection Configuration

MP11 Pin E	Interpretation
0	CM–250 LOOPED CONFIGURATION
1	CM–250 IN–LINE CONFIGURATION

(2) Looped configuration is not implemented. Assume In–Line configuration (MP11E set to the 1 state).

Y. Cockpit Call Discrete Signaling Mode

(1) The interpretation of this configuration pin is given in Table 5-35.

Table 5-35. Cockpit Call Discrete Signaling Mode

MP11 Pin F	Interpretation
0	EPIC COCKPIT CALL DISCRETE SIGNALING MODE
1	COCKPIT CALL LIGHT/CHIME SIGNALING MODE

(2) Table 5-36 gives the call signaling definitions and SDU output pins with MP11F in a logic 0 and logic 1 state.

Table 5-36. Call Signaling Definitions

SDU Output Pin	Legacy Call Signaling Definition (MP11F=1)	Enhanced Call Signaling Definition (MP11F=0)
MP8E	CHANNEL 1 CALL LIGHT	CHANNEL 1 CD 1 (CD1–1)
MP14B	CHIME	CHANNEL 1 CD 2 (CD2–1)
MP8G	CHANNEL 2 CALL LIGHT	CHANNEL 2 CD 1 (CD1–2)
TP3D	PACKET DATA LOW SPEED ONLY	CHANNEL 2 CD 2 (CD2–2)

(3) Selecting the EPIC cockpit call discrete signaling mode (MP11F=0) is only required when the SDU is connected to the Honeywell AV–900 audio control panel (ACP). This ACP is typically installed on EPIC equipped aircraft.

(4) When MP11F is wired to the zero state, the SDU output pins identified in Table 5-36 function as combinational logic to indicate one of the four states shown in Table 5-37.

Table 5-37. Per Channel State Definition (MP11F=0)

CD1	CD2	Channel State
High[1]	High	On Hook
Low[1]	High	Call Initiated/Connected[2]
High	Low	Call Answered
Low	Low	Incoming Call

NOTES:

1. "High" and "Low" (impedance –– open–collector–type output) are as defined in ARINC 741 Part 1 Attachment 1–4 Note 10.
2. Depending on the state of SDU system configuration pin TP10K, the state will transition on either call initiation or call connection.

Z. Strap Parity

(1) The interpretation of this configuration pin is given in Table 5-38.

Table 5-38. Strap Parity

MP11 Pin E	Interpretation
0	SUM OF ALL STRAPS IS SET TO EVEN
1	SUM OF ALL STRAPS IS SET TO ODD

(2) This pin is set to the zero or one state to yield an even number of strapped pins (MP11E to MP11K).

Blank Page

SECTION 6
TESTING/FAULT ISOLATION

1. Overview

A. General

(1) This section defines the built-in test equipment (BITE) requirements for the MCS system (i.e., SDU and HPA). Information supplied in this section describes how MCS system failures are detected, recorded, and reported. See Figure 6-1 for an overview of the BITE system communications.

(2) System BITE contributes to a number of maintenance functions:

- Detection of internal and external failures
- Storage of in-flight failure data
- Reporting failure status in the air and on the ground
- Ground test capability for isolating faulty LRUs, performance verification, and system level testing.

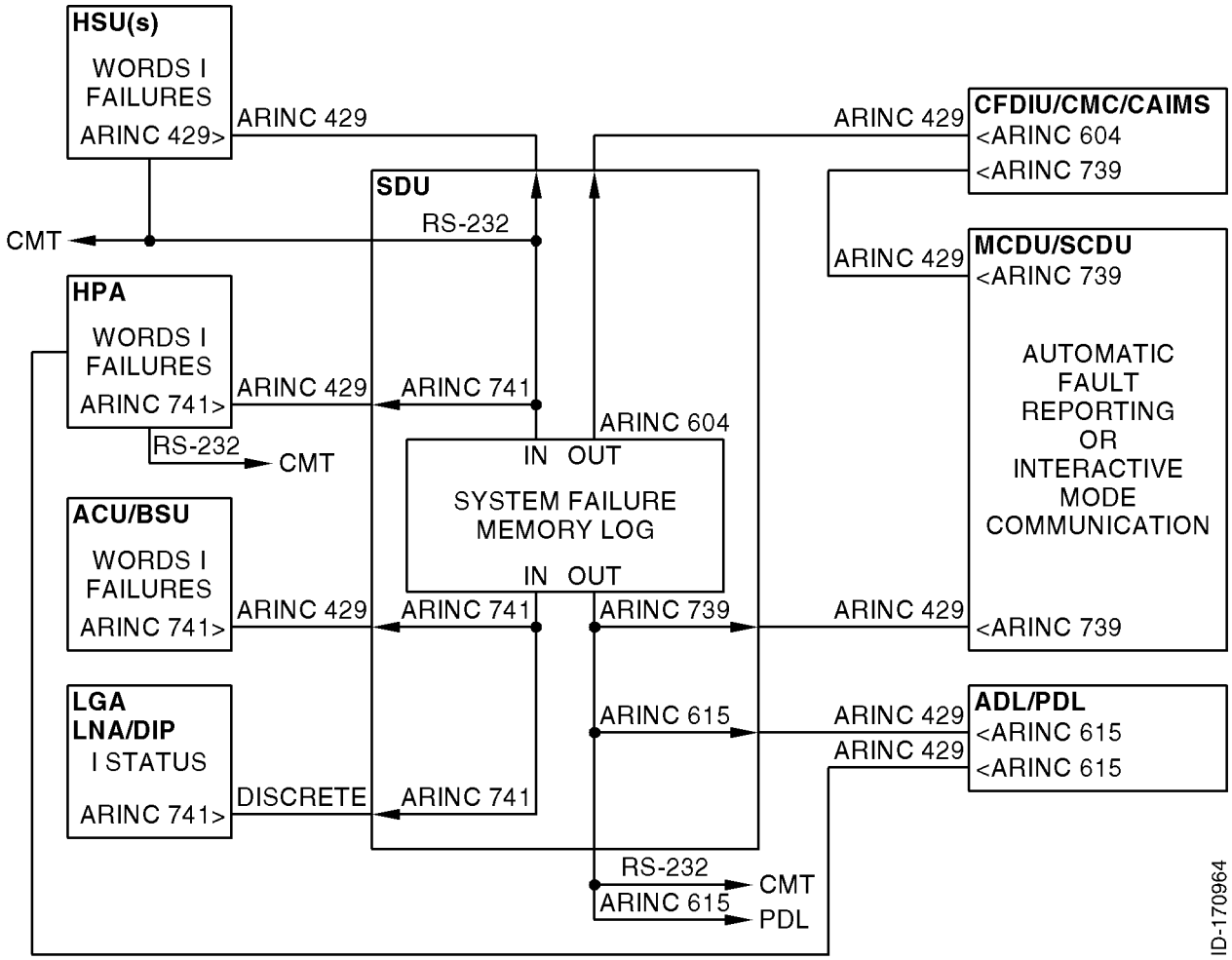


Figure 6-1. System BITE Communication

B. Definitions

(1) Degraded Operation

(a) Degraded operation is defined as the condition when the MCS system is operating with a failure that results in diminished capability (e.g., some, but not all channel units available, or less than nominal HPA power available).

(2) Failure

(a) A failure is defined as a fault that persists for a predetermined amount of time or for a predetermined number of samples. The tolerance on all failure timing criteria is ± 0.5 second.

(3) Intermittent Failure

(a) An intermittent failure is defined as a fault that had been declared a failure, recovered to its normal valid state, and then is declared to have failed again. A failure occurrence counter is maintained for each entry in the LRU and system failure logs to identify intermittent failures.

(4) Fault

(a) A fault is defined as the result of a measurement or comparison that does not satisfy the test or monitoring result requirements. The test or monitoring result requirements can require a time element.

(5) Reversion

(a) Reversion is defined as the system response to a failure condition that results in continued system operation in the presence of the failure, and can result in degraded system capability.

(6) MCS LRU

(a) The following are defined as the MCS LRUs (i.e., those manufactured by Honeywell/Thales):

- SDU
- HPA
- HSU.

C. Failure Detection and Reporting Levels

(1) Failures are detected in the MCS system by a wide variety of tests. The immediate result of failure detection is usually diagnosis of the failure to a specific component or functional circuit group, on a specific SRU, in a specific LRU. However, some detected failures may only be able to be diagnosed to a suspect SRU, or only to a suspect LRU, or only to a pair or group of LRUs and the physical or logical interface(s) between them. Three enumerated levels of failure diagnosis are defined in Table 6-1.

Table 6-1. Levels of Failure

Level	Description
Level I	Diagnosis to the LRU level or its equivalent (e.g., a specific inactive bus, error, or warning)
Level II	Diagnosis to the SRU (module or circuit card) level
Level III	Diagnosis to the component or functional circuit group level or equivalent (e.g., a very specific error condition)

(2) All MCS LRUs implement Level I and, where possible, Level II failure detection. Level I diagnosis primarily supports line maintenance. Front panel displays and automatic reports to central fault/maintenance systems are only performed to Level I resolution because they are primarily used to support line maintenance, which is typically limited to LRU replacement. Level II and Level III diagnosis primarily support shop and factory maintenance. Level II and Level III failure detection information is stored in the LRU and system failure logs, and can be displayed on the commissioning and maintenance terminal (CMT) pages.

D. LRU Coverage

(1) The LRU coverage is defined as the sum of all component failure rates covered by the BITE circuitry within an LRU, divided by the total of the component failure rates within that LRU. This coverage is greater than or equal to 0.95 as defined. The LRU probability of false detection is defined as the sum of all component failure rates of the BITE circuitry within an LRU divided by the total of the component failure rates within that LRU. This coverage is greater than 0.01 as defined. The LRU coverage includes the following:

- All SDU to avionic interfaces, where possible
- All MCS inter-LRU interfaces
- All power supply voltages
- All battery voltages
- All microprocessors/microcontrollers
- All memory devices (RAM, ROM, etc).

(2) All discrete drivers between the SDU and the avionics LRUs have over current protection and open-circuit detection.

E. Monitoring and Testing Functions

(1) General

(a) The declaration of an inactive input bus takes precedence over declaration of one or more data word failures against the LRU driving that bus (i.e., if the bus is inactive, additional logging and reporting of low-rate failures of individual data words on that bus are precluded). The failure and recovery criteria is set to make sure individual data word failures are not declared when the bus is inactive. This is typically done by setting inactive bus failure criteria (e.g., three seconds) to be faster than word update rate failure criteria (e.g., five seconds), and inactive bus recovery criteria (e.g., two seconds) to be longer than word update rate recovery criteria (e.g., one second).

(b) Unless an LRU providing ARINC 429 data declares itself to have failed, a fault is declared against that LRU when the ARINC 429 data is faulty. This is determined by checking (as appropriate for each word) for data inconsistencies, data out-of-range, uses of undefined or reserved values, and occurrences of the failure warning state in the sign/status matrix (SSM) field.

(c) Two basic types of failure detection testing performed are: functional tests and continuous monitoring (CM). The purpose of functional testing in the form of power-on self test and person-activated self test is to exercise the equipment in a manner as closely as possible to its normal operation. Failures detected during functional testing are declared to be current failures until a subsequent functional test shows the failure condition has recovered.

(d) The purpose of continuous monitoring is to test the equipment in a nondisruptive manner while it is performing its normal operations. Such testing usually includes monitoring the power supply voltages, temperature sensors, bias currents, input bus activity, buffer overflow, input data failures, etc. This testing can also include abnormal failures that cannot be tested as part of the functional testing, such as protocol failures, processor instruction traps, data loader problems, etc.

(2) Power-On Self-Test

(a) General

1 The power-on self-test (POST) is a series of functional tests for individual LRUs; each MCS LRU performs its own internal POST upon a cold start. A cold start is defined as the response of an LRU where no retention of any previously stored information in any volatile memory is assumed. The power supply provides signals to help an orderly power-down and power-up process for the LRU during power interrupts of any length. Primary power interrupts of less than 5 milliseconds duration have no effect on system operation. For primary power interrupts longer than 5 milliseconds and up to 200 milliseconds duration, the LRU maintains normal operation, except the RF transmit and receive processes do not need to be supported in any LRU during this interval. For primary power interrupts greater than 200 milliseconds duration that causes normal operation to cease, the LRU performs a cold start following restoration of primary power.

2 The POST sequence of tests does not terminate when an out-of-tolerance condition is encountered. Instead, the sequence continues to complete as many tests as possible to record all available information regarding existing failures. An individual LRU that successfully passes POST is declared to be fully functional. POST must take into account failures detected by continuous monitoring (i.e., if POST passes, but testing unique to continuous monitoring has detected and logged a current failure, then the POST result is logged as a failure).

3 After executing its own POST, the SDU commands a system-wide functional test of the HPA(s), HSU and ACU/BSU(s) (including the HGAs, HGA diplexer/LNA, and HPR) as applicable for the installed equipment in accordance with the system configuration pins (see MECHANICAL INSTALLATION). The SDU then processes the results of the functional tests from these LRUs. The SDU commands the functional test as follows through:

- BIT request in the HSU command word
- SSM field of the HPA command word(s) for the HPA
- SSM field(s) for the ACU/BSU control word(s) for the ACU/BSU(s).

4 The BITE status from the LGA diplexer/LNA is continuously sent to the SDU, with no functional test command necessary or possible. Test results from the HGA(s), HGA diplexer/LNA, and HPR are reported by the ACU/BSU(s).

5 The SDU allows up to 30 ± 1 seconds for other system LRUs, except the HSU, which is allowed 60 ± 1 seconds to report their POST results following initiation of a system-wide functional test. If an LRU fails to report its functional test results within this time period, but otherwise meets the ARINC 429 bus communication rate requirements, the SDU considers that LRU to have failed. If no ARINC 429 bus communication is received on a particular bus, the SDU considers that bus to be inactive.

(b) Test Initiation

1 The correct operation of much of the internal circuitry of the SDU depends on clocks derived from the high-stability frequency reference generated by the oven-controlled crystal oscillator (OCXO). Therefore, it is inappropriate to perform BITE tests until this clock frequency has achieved gross stability. If the SDU is powered on after having stabilized at a cold external temperature (e.g., –55° C), it can take several tens of seconds for the frequency drift rate to be low enough before the phase locked oscillators (PLO) that derive the dependent clocks can lock onto the OCXO frequency reference.

2 The SDU defers testing of sensitive equipment until a positive indication of settling is detected, or sufficient time passes so the lack of settling itself can be classified as a failure. Deferral of these sections of POST also result in normal operation being deferred, including access to the user interfaces (SCDU, CFDS, and CMT) and all automatic calibration processing. Consequently, the SDU suspends POST until the SDU detects the first of the following conditions:

- OCXO heater monitor indicates it has achieved operating temperature.
- Power supply unit (PSU) temperature sensor indicates a reading above 25 °C.
- Channel filter module transmit and receive PLO lock detectors both indicate that lock has been achieved.
- More than 4 minutes have elapsed since primary power was applied.

(c) LRU Front Panel LED and Alphanumeric Display Tests

1 A test of the HPA and HSU front panel LEDs is performed as a part of each POST. At a minimum, this is made up of flashing the LEDs on and off. The LED flashing continues until POST is completed or for 3 ± 0.5 seconds. During the test, the SDU tests its alphanumeric display by incorporating one or more occurrences of the word **TESTING** into its display sequence to make sure all display elements are tested.

(d) RF Loop Back Tests

1 As part of the system-wide POST, the SDU implements a RF loop back test. The RF loop back occurs in the radio frequency module (RFM) installed in the SDU.

2 The SDU delays initiating the RF loop back test until it receives an indication the RF loop back has been activated. If the SDU fails to receive a valid indication within 30 seconds following the RF loop back request, then the SDU completes its POST without executing the RF loop back test. The SDU cancels the RF loop back request when the loop back test is completed, or if the 30 second timer expires while waiting for verification of an active RF loop back.

(3) Person-Activated Self-Test

(a) The person-activated self-test (PAST) performs the same functions as POST. PAST is initiated in the HPA and the HSU by pushing the PUSH-TO-TEST (PTT) switch on the respective LRU front panel. PAST can also be initiated any time through:

- Respective CMT interface to the LRU
- SSM field of the HPA command word sent to the HPA from the SDU
- BIT request in HSU command word sent to the HSU from the SDU.

(b) A stuck switch on the CMT or LRU front panel does not cause PAST to remain active. Any switch activity is ignored while PAST (or POST) is executing.

(c) The HPA and HSU inhibit PAST while the aircraft is airborne, except when PAST is initiated through the CMT, which is permitted at any time. The HPA and HSU cannot properly function if not receiving valid command words from the SDU containing the air/ground status and command information. Under these conditions, the HPA and HSU are not usable by the SDU. PAST is only permitted while the aircraft is on the ground, or when the airborne/on-ground status is unknown. In lieu of the airborne/on-ground status information from the SDU, the HPA and HSU permit PAST as though the aircraft is on the ground.

(d) A system-wide PAST is initiated in the SDU when commanded by:

- Entry through the SATCOM control and display unit (SCDU)
- Entry through the central maintenance computer (CMC)
- Entry through the central fault display system (CFDS)
- Command from the CMT
- Activating the PTT switch (SDU TEST) on the front panel.

(e) A stuck switch on the SDU front panel does not cause PAST to remain active. Any switch activity is ignored while PAST (or POST) is executing.

(4) Continuous Monitoring

(a) Continuous monitoring (CM) of the BITE circuitry does not interfere with the normal operation of the system. Instead any failure condition is recorded and reported. Continuous monitoring operates as a background task at all times, even during functional testing. Functional test failure codes that are identical to the continuous monitoring codes (except for the MSB of the level 3 code) indicate cases where the functional test differs in some way from the companion CM test. Those CM failures detected during functional testing (e.g., maintenance and status word failures) are logged as CM failures, not functional failures.

F. Failure Recording

(1) The SDU records CFDS internal failures at all times. The SDU only records CFDS external failures while receiving a valid All Call DC1 Command if a Douglas or Airbus CFDS is installed. Internal failures are defined as those internal to the SATCOM subsystem. External failures are defined as those external to the SATCOM subsystem. If a Boeing CMC (or no CFDS) is installed or if valid DC commands are not available, then the air/ground status is used to generate pseudo DC states of DC0 (aircraft on-ground) and DC1 (aircraft airborne).

(2) The HPA records internal failures at all times. The HPA only records external failures while the aircraft is airborne, based on the status of the weight-on-wheels discrete (on-ground vs. airborne). Internal failures are defined as those that have the same Level I code as the LRU recording the failure (i.e., 01 for the SDU, 04 for the HGA HPA, and 07 for the LGA HPA). External failures are defined as those failures not having the same level 1 code as the LRU recording the failure.

(3) The HPA and HSU store their functional test and CM failure records in nonvolatile memory designated as the LRU failure memory log. Each LRU failure memory log is capable of being interrogated and cleared. The SDU contains a nonvolatile memory that serves as a system failure memory log. Functional test results supplied by the HSU, HPA(s), ACU/BSU(s), LGA diplexer/LNA, and the SDU itself are recorded in this system failure memory log. The system failure memory log is capable of being interrogated and cleared for each LRU individually. Each LRU failure memory log and the system failure memory log is capable of recording at least 1000 failures.

(4) The HPA, HSU and other system LRUs supply failure information to the SDU for storage in the system failure memory log. In the absence of any detected failures during a flight leg, the SDU records the flight leg counter, flight number, ICAO address, date, and Greenwich Mean Time (GMT) at the flight leg transition. The SDU also records the aircraft identification for display on the SCDU and CFDS maintenance pages.

(5) Class – The SDU declares and stores the classification (Airbus/Douglas CFDS) of failure (one, two, three) for each entry in this field.

- Class 1 failures are indicated in flight to the crew by the CFDS because they have operational consequences for the current or next flight(s).
- Class 2 failures are not automatically indicated in flight to the crew by the CFDS because they have no operational consequences for the current or next flight(s), but are indicated to the crew on the ground because they cannot be left uncorrected until the next routine scheduled maintenance check.
- Class 3 failures are not indicated to the flight crew because they can be left uncorrected until a routine scheduled maintenance check. An accumulation of Class 3 failures can lead to a Class 2 or Class 1 failure.
- Aircraft Identification – The aircraft identification (i.e., the tail number) is made up of nine alphanumeric characters. The SDU obtains the aircraft identification from the CMC or CFDS through ARINC labels 301, 302, and 303 (if available).

G. Failure Reporting

(1) General

(a) Active failures include those internal and external failures deemed to be currently failing while the aircraft is on the ground or airborne. Unlike failure recording that excludes recording external failures while on the ground, failure reporting has its own set of criteria as specified in the following paragraphs.

(2) HPA Failure Reporting

(a) General

1 The HPA reports its functional test/CM failure status by lighting its front panel LEDs, and through communication to the SDU.

(b) HPA Front Panel Indicators and Controls

1 The HPA indicators and controls are given in Table 6-2.

Table 6-2. HPA Indicators/Controls

Indicator/Control	Description
PASS LED	Shows green after a test, if no failures are detected in the HPA
FAIL LED	Shows red after a test, if failures are detected in the HPA
PUSH–TO–TEST (PTT)	Push this button to start a test of the HPA

(c) HPA Front Panel LEDs

1 Functional testing effectively controls the on/off state of the front panel LEDs during the period beginning with initiation of the functional testing (POST/PAST), through execution of the functional test sequences (including LED testing), and up to and including the indication of the test results on the LEDs. Continuous monitoring exclusively controls the LEDs at all other times.

2 The green LED (PASS) lights for 30 ± 5 seconds at the conclusion of the functional test sequences if both of the following are true:

- The HPA determines there are no currently active CM failures having its own Level I code (i.e., 04 or 07, as applicable)
- No functional test failures have been detected with its own Level I code.

3 There must be no known failures in order to light the green LED as the functional test indication.

4 The red LED (FAIL) lights continuously during the functional test indication phase and through the transition to the CM indication phase, if the HPA detects at least one currently active CM failure with its own Level I code. If the HPA detects only functional test failures (i.e., no CM failures are currently active), the red LED lights for 30 ± 5 seconds and is then turned off.

5 The red LED also lights as long as the failure persists, if the HPA detects any CM failure that has its own Level I code while continuous monitoring is controlling the LEDs. Otherwise, both LEDs are turned off. Continuous monitoring itself never causes the green LED to light. The presence or absence of functional test failures does not affect the CM indication.

(d) HPA-SDU Communication

1 The HPA communicates its functional testing/CM failure status to the SDU through the HPA maintenance and status words. The HPA only indicates a FW SSM state in its maintenance and status words, and active discrete failure bits in its maintenance word. Since no failures unique to functional testing activate the SSM FW state or the discrete failure bits in the maintenance word, no functional test failures need to be latched until the next functional testing sequence.

2 For certain failures detected during continuous monitoring, the appropriate discrete failure bits and the SSM FW state are set within the maintenance and status words as long as the failure persists.

(3) HSU Failure Reporting

(a) General

1 The HSU reports its functional test/CM failure status by lighting its front panel LEDs, and through communication to the SDU.

(b) HSU Front Panel Indicators and Controls

1 The HSU indicators and controls are given in Table 6-3.

Table 6-3. HSU Indicators/Controls

Indicator/Control	Description
PASS LED	Shows green after a test, if no failures are detected in the HSU
FAIL LED	Shows red after a test, if failures are detected in the HSU
PUSH–TO–TEST (PTT)	Push this button to start a test of the HSU

(c) HSU Front Panel LEDs

1 Functional testing effectively controls the on/off state of the front panel LEDs during the period beginning with initiation of the functional testing (POST/PAST), through execution of the functional test sequences (including LED testing), and up to and including the indication of the test results on the LEDs. Continuous monitoring exclusively controls the LEDs at all other times.

2 The green LED (PASS) lights for 30 ± 5 seconds at the conclusion of the functional test sequences if both of the following are true:

- The HSU determines there are no currently active CM failures having its own Level I code (i.e., 03)
- No functional test failures have been detected with its own Level I code.

3 There must be no known failures in order to light the green LED as the functional test indication.

4 The red LED (FAIL) lights continuously during the functional test indication phase and through the transition to the CM indication phase, if the HSU detects at least one currently active CM failure with its own Level I code. If the HSU detects only functional test failures (i.e., no CM failures are currently active), the red LED lights for 30 ± 5 seconds and is then turned off.

5 The red LED also lights as long as the failure persists, if the HSU detects any CM failure that has its own Level I code while continuous monitoring is controlling the LEDs. Otherwise, both LEDs are turned off. Continuous monitoring itself never causes the green LED to light. The presence or absence of functional test failures does not affect the CM indication.

(d) HSU-SDU Communication

1 The HSU communicates its functional testing/CM failure status to the SDU through the HSU status word. The HSU indicates a FW SSM state in its status word, when failures are present that prevent it from offering HSD service.

2 For certain failures detected during continuous monitoring, the appropriate discrete failure bits and the SSM FW state are set within the maintenance and status words as long as the failure persists.

(4) SDU Failure Reporting

(a) General

1 The SDU reports its functional testing/CM failure status and all other system LRUs by:

- Activating its alphanumeric display
- Communicating to the SCDU, CMC, CFDS, and CMT interfaces.

2 The alphanumeric display indicates all applicable failure conditions with no regard to:

- Any type of internal/external failure differentiation
- Any CFDS failure class distinctions
- Which LRU detected a failure (either the SDU itself or one of the reporting LRUs in the SATCOM subsystem).

3 The SDU delays reporting the results of the functional test sequence for a period of 5 seconds. This gives continuous monitoring the opportunity to perform its unique tests during the delay period, and include any current CM failures in the test report. The SDU takes a snapshot at the end of the functional test delay period to include all currently active CM failures in addition to all failures detected during functional testing. The functional test delay period applies to the SDU alphanumeric display, the SCDU maintenance pages, the CFDS pages, and the CAIMS and CMC fault summary words, but not to the CMT.

(b) SDU Front Panel Indicators and Controls

1 The SDU indicators and controls are given in Table 6-4.

Table 6-4. SDU Indicators/Controls

Indicator/Control	Description
SDU TEST	Push this button to initiate a system–wide SATCOM test
SYSTEM STATUS DISPLAY	Shows data defining the SATCOM system configuration and the identification of all SATCOM components that are not operating as required
MANUAL SCROLL	Push this button to scroll through the messages on the system status display

(c) Front Panel Alphanumeric Display and MANUAL SCROLL Button

1 General

a The alphanumeric display makes it easy for the maintenance personnel to identify which system LRU has failed. The alphanumeric display is blank unless specifically activated for temporary display of failure messages and other status information. The alphanumeric display is also kept blank under conditions of extreme temperatures. The display is not intended to be started when its temperature is less than –5 °C, or greater than +30 °C. The alphanumeric display is started during the LED test portion of the functional test sequence. After the functional test delay period, and any time during continuous monitoring, the alphanumeric display can be started by pushing the MANUAL SCROLL button.

b The operator can scroll the alphanumeric display through the entire applicable message sequence by repeatedly pushing the MANUAL SCROLL button within 30 ± 5 seconds after the display is started. One left-justified 20-character (or less) message is displayed each time the MANUAL SCROLL button is pushed. When the end of the display sequence is reached (i.e., END OF LIST), the next actuation of the MANUAL SCROLL button returns the alphanumeric display to the top of the display sequence, enabling the operator to scroll through the sequence again. Message scrolling is performed according to the following sequence:

- One of four possible system/SDU pass/fail messages
- All applicable Level I failure messages
- LRU part number messages (up to four lines)
- ORT identification message
- END OF LIST message.

c If the MANUAL SCROLL button is inactivate for 30 ± 5 seconds at any point during the display sequence, the alphanumeric display is blanked and any display sequence in progress is aborted. At the same time, one or both of the front panel LEDs (as appropriate) are turned off if they were exclusively indicating functional test failures with no current CM failures.

2 SYSTEM/SDU PASS/FAIL Message

a This one-line message, which summarizes the overall functional test or CM status, takes on one of four possible states:

- SDU PASS SYS PASS
- SDU PASS SYS FAIL
- SDU FAIL SYS PASS
- SDU FAIL SYS FAIL.

3 Level I Failure Messages

a This section lists all the applicable Level I failure messages that can be displayed on the alphanumeric display, along with the appropriate LRU or control bus input. These messages are listed in failure code order in Table 6-5. For the functional test display, the message list includes all the active failures in the snapshot and the list is static.

b For continuous monitoring, the message list includes all currently active CM failures. The presence or absence of functional test failures does not affect the CM message list. The failure message list for the CM display is potentially dynamic.

c During continuous monitoring, if a new CM failure becomes active during the scroll sequence, the respective message appears at its proper location in the sequence according to its Level I code. This occurs either during the current scroll sequence if that Level I code has not yet been reached, or during the next scroll sequence if the failure is still active. If a CM failure recovers during a scroll sequence, its message does not appear in any subsequent scroll sequence, even if it had appeared earlier. If a CM failure recovers while its particular message is currently being displayed, the message continues to be displayed until the MANUAL SCROLL button is activated or until the time-out period expires.

Table 6-5. Level 1 Failure Messages

Level 1 Code	Failure Message	Description
	AES LRU Failures:	
00	(not applicable)	Unknown Level I failure
01	SDU	SDU failed
02	OTHER SDU	Other SDU (of a dual system) failed
03	HSU	HSU failed
04	HPA–HI GAIN	High Gain Antenna HPA failed

Table 6-5. Level 1 Failure Messages (cont)

Level 1 Code	Failure Message	Description
07	HPA-LO GAIN	Low Gain Antenna HPA failed
0A	HI POWER RELAY	HPR (antenna system) failed
0D	DLNA-(TOP/L)	Top/Port Diplexer/Low Noise Amplifier failed
0F	DLNA-R	Starboard Diplexer/Low Noise Amplifier failed
10	DLNA-LO GAIN	LGA Diplexer/Low Noise Amplifier failed
13	BSU-(TOP/L)	Top/Port BSU or ACU failed
15	BSU-R	Starboard BSU failed
1A	HI GAIN ANT-(TOP/L)	Top/Port HGA failed
1C	HI GAIN ANTENNA-R	Starboard HGA failed
1F	LO GAIN ANTENNA	LGA failed
21	SCDU1 or WSC1	No. 1 SCDU or WSC failed
22	SCDU2 or WSC2	No. 2 SCDU or WSC failed
23	SCDU3 or WSC3	No. 3 SCDU or WSC failed
	Non-AES LRU Failures:	
33	(ACARS MU/CMU)1	No. 1 AFIS/ACARS unit failed
34	(ACARS MU/CMU)2	No. 2 AFIS/ACARS unit failed
35	IRS-PRI	Primary IRS failed
36	IRS-SEC	Secondary IRS failed
39	(CFDIU/CMC)	CFDS/CMC failed
3D	FMC1	No. 1 FMC failed
3E	FMC2	No. 2 FMC failed
40	ARINC 429 ICAO ADDR	429 ICAO address source failed
41	(not applicable)	Discrete cockpit indicators failed
42	CTU	Cabin telecommunications unit failed
43	(CFS/CPDF)	Cabin file server/cabin packet data function failed
	Inactive BITE Bus Input to SDU from other LRU:	
50	HSU/SDU	HSU bus
52	(CFS/CPDF)/SDU	Cabin file server/cabin packet data function bus
53	(ACARS MU/CMU)1/SDU	No. 1 AFIS/ACARS unit bus

Table 6-5. Level 1 Failure Messages (cont)

Level 1 Code	Failure Message	Description
54	CTU/SDU	CEPT-E1 bus from the CCS
55	SCDU1/SDU or WSC1/SDU	No. 1 SCDU or WSC bus
56	SCDU2/SDU or WSC2/SDU	No. 2 SCDU or WSC bus
57	(ACARS MU/CMU)2/SDU	No. 2 AFIS/ACARS unit bus
59	(CFDIU/CMC)/SDU	CFDS bus
5A	IRS-PRI/SDU	Primary IRS bus
5B	IRS-SEC/SDU	Secondary IRS bus
5C	HPA-HI GAIN/SDU	High Gain Antenna HPA bus
5F	HPA-LO GAIN/SDU	Low Gain Antenna HPA bus
62	BSU-(TOP/L)/SDU	Top/port BSU bus
64	BSU-R/SDU	Starboard BSU bus
65	(not applicable)	Radio Management Panel bus
66	SCDU3/SDU or WSC3/SDU	No. 3 SCDU or WSC bus
71	OTHER SDU/THIS SDU	Bus from other SDU in a dual system
73	FMC1/SDU	No. 1 FMC bus
74	FMC2/SDU	No. 2 FMC bus
	Inactive Bus Inputs to other LRU:	
90	SDU M-CTRL/HPA-HI	Multicontrol bus to HGA HPA from SDU
96	SDU M-CTRL/HPA-LO	Multicontrol bus to LGA HPA from SDU
98	SDU M-CTRL/BSU-(T/L)	Multicontrol bus to top/port BSU from SDU
9A	BSU-R XTALK/BSU-L	Crosstalk bus to port BSU from starboard BSU
9C	SDU M-CTRL/BSU-R	Multicontrol bus to starboard BSU from SDU
9D	BSU-L XTALK/BSU-R	Crosstalk bus to starboard BSU from port BSU
9E	SDU/HSU	Control bus to HSU from SDU
A1	SDU/WSC1	Bus to WSC1 from SDU
A2	SDU/WSC2	Bus to WSC2 from SDU
A3	SDU/WSC3	Bus to WSC3 from SDU

Table 6-5. Level 1 Failure Messages (cont)

Level 1 Code	Failure Message	Description
	Miscellaneous Failures:	
A6	HSU ETHERNET PORT 1	No activity on HSU Ethernet port 1
A7	HSU ETHERNET PORT 2	No activity on HSU Ethernet port 2
C0	WRG:STRAPS/SDU	System configuration pins error
C1	WOW1/WOW2/SDU	Weight on wheels discrete inputs disagree
C2	SDU DUAL SEL/DISABLE	Dual system discrete inputs disagree
C3	WRG:ICAO ADDR/SDU	ICAO address straps error
C4	TX PATH VSWR–HI GAIN	Excessive VSWR load at HGA HPA output
C5	WRG:STRAPS/SDU ORT	Configuration pins and ORT settings disagree
C6	TX PATH VSWR–LO GAIN	Excessive VSWR load at LGA HPA output
C7	HPA–HI GAIN OVERTEMP	Over temperature in HGA HPA
C8	BAD GROUND STATION	Invalid GES frequency command
C9	HPA–LO GAIN OVERTEMP	Over temperature in LGA HPA
CA	SDU/DLNA–LO GAIN	LGA LNA control driver SDU
CB	WRG:SDI/HPA–HI GAIN (see NOTE)	HGA HPA identification strapped incorrectly
CC	WRG:SDI/HPA–LO GAIN (see NOTE)	LGA HPA identification strapped incorrectly
CD	SDU (POC/TOTC)	SDU power-on counter or total-on-time counter has been reset
CF	HPA–HI (POC/TOTC)	HGA HPA power-on counter or total-on-time counter has been reset
D0	HPA–LO (POC/TOTC)	LGA HPA power-on counter or total-on-time counter has been reset
D1	WRG:SDI/HPA–HI GAIN (see NOTE)	HGA HPA identification strapped incorrectly
D2	WRG:SDI/HPA–LO GAIN (see NOTE)	LGA HPA identification strapped incorrectly
D3	WRG:SDI/BSU–(T/L)	Top/Port BSU identification strapped incorrectly
D4	WRG:SDI/BSU–R	Starboard BSU identification strapped incorrectly
D5	HPA–HI GAIN COAX	HGA HPA input coax cable
D6	HPA–LO GAIN COAX	LGA HPA input coax cable

Table 6-5. Level 1 Failure Messages (cont)

Level 1 Code	Failure Message	Description
D8	DLNA/(SDU)-(T/L)	Top/Port HGA LNA coax cable output to HSU or SDU
D9	DLNA/(SDU)-R	Starboard HGA LNA coax cable output to HSU or SDU
DA	DLNA/(SDU)-LO GN	LGA LNA coax cable output to HSU or SDU
DB	LO GAIN SUBSYSTEM	LGA log-on functional test failure or could not initiate test
DC	NO ACTIVE MU/CMU	At least one (C)MU is communicating, but none have declared themselves active
DD	SDU OWNER REQS-SECD	Error in the secured ORT partition
DE	SDU OWNER REQS-USER	Error in the user ORT partition
DF	HI GAIN SUBSYSTEM	Slave HGA log-on functional test failure or could not initiate test
E1	BAD HSU DISABLE DISC	HSU disable discrete from SDU not functioning
E4	BAD HSU/SDU I/F VER	Incompatible interface between HSU and SDU
E6	HSU/HPA TX RF PATH	HSU to HPA coax cable
E8	DLNA/HSU RX RF PATH	DLNA to HSU coax cable
EC	WRG:STRAPS/HSU	HSU configuration pins error
ED	WRG:STRAPS/HSU ORT	HSU configuration pins and SDU ORT settings disagree
EE	WRG:FWD ID/HSU	HSU forward ID straps error
	Undefined:	
Others	LEVEL 1 FAULT XX	XX is the Level 1 failure code (undefined)

NOTE: The front panel display messages associated with failure codes CBx and CCx (WRG:SDI/HPA HI-GAIN and WRG:SDI/HPA LO-GAIN, respectively) are identical to the messages raised for failure codes D1x and D2x, respectively. This use of a single front panel display message for multiple failure codes (where the CB/CCx codes reflect detection by the HGA/LGA HPA of an invalid HPA SDI strap condition, while the D1/D2x codes are generated by the SDU in response to a report from the HGA/LGA HPA of having detected an unexpected SDI code) is deliberate, and results from alignment of the front panel display messages with their CFDS/CMC counterparts. Because of this approach, it is possible (in this specific case) for an operator to receive two consecutive front panel display messages that are the same.

4 LRU Identification (Part Numbers) Electronically

a Following the display of all Level I failure messages, a list of the available LRU end-item part numbers is displayed. This list only includes part numbers for those LRUs present in the given installation as defined by the system configuration pins (see MECHANICAL INSTALLATION). For an installed LRU whose end-item part number is not available, dashes are displayed in place of the part number (e.g., **HPL** _ _ _ _ _ _ _ _ _ _ _ _ _ _). The list of part numbers are displayed in the order given in Table 6-6.

Table 6-6. List of Part Numbers

LRU	Part No.
SDU	SDU bbbbbbb–hhsss–nn
HGA HPA	HPH bbbbbbb–hhsss–nn
LGA HPA	HPL bbbbbbb–hhsss–nn
HSU	HSU bbbbbbb–hhsss–nn

NOTES:

1. bbbbbbb represents the seven-digit LRU end-item base part number.
2. hh represents the two-digit LRU end-item hardware configuration number.
3. sss represents the three-digit LRU end-item software configuration number.
4. nn represents the two-character LRU end-item software modification level (possibly including space, dash characters, and alpha characters).

b For the SDU, the two-digit LRU hardware configuration number must be entered manually through the CMT interface for valid data to be available for display. This data is stored during LRU end-item testing. All other numbers reside within the LRU software. All numbers are communicated to the SDU by Honeywell/Thales HSU and HPA(s) through the part number block transfer. For non-Honeywell/Thales interfacing HPAs, no such data is available to the SDU, therefore, dashes are displayed for the HPA end-item part number.

5 ICAO Aircraft Address

a Following the display of the LRU End Item part numbers, the ICAO aircraft address is displayed in octal and hexadecimal formats as shown below:

ICAO–XXXXXXXX YYYYYY

Where “XXXXXXXX” represents the octal format and “YYYYYY” represents the hexadecimal format. If the ICAO is provided from an ARINC 429 source, as determined by the state of configuration pin TP10A, and a valid ICAO has not been received, the octal and hexadecimal values are replaced with dashes.

6 HSD Channel ISN

a Following the display of the ICAO aircraft address, the Inmarsat Serial Number (ISN) for each installed HSD channel is displayed as shown below:

ISNX: YYYYYY ZZZZZZ

Where “X” is a decimal number from 1 to 4 used to distinguish multiple ISNs, and where “YYYYYY” represents the Type Approval ID and “ZZZZZZ” the Forward ID. The ISNs for each installed HSD channel are displayed on a separate line. If the ISN for an installed HSD channel is not available, dashes are displayed in place of the Type Approval ID and the Forward ID.

7 ORT Identification

a Following the display of the ISNs, if one or more HSD channels are installed, or after the ICAO, if no HSD channels are installed, the user ORT identification is displayed as specified:

- ORT ID–XXXXXXXXXXXXX (first line)
- XXXXXXXXXXX–MODIFIED (second line, after another activation of the MANUAL SCROLL button).

b Where XXXXXXXXXXXXXXXXXXXXXXXX represents the 24-character description contained in the user ORT description field. The user ORT description field is used to annotate a particular set of ORT items to identify one from another (e.g., NORTH PACIFIC ROUTE, SOUTH ATLANTIC ROUTE, 747–400 ASIAN ROUTE, 777 ASIAN ROUTE). Alternatively, this item could contain a software identification (e.g., a software part number for the user ORT as a released entity).

c The MODIFIED flag is only displayed if the state of the user ORT modified flag indicates any item in the user ORT has been modified since the user ORT was created. When any user ORT item is modified by the SDU software, either directly or indirectly, the user ORT modified flag is set to MODIFIED. If the state of the user ORT modified flag is unmodified, the MODIFIED flag is not displayed. The state of the user ORT modified flag is never set to unmodified by the SDU software.

d The next two pushes of the MANUAL SCROLL button present the same information for the Secured ORT partition.

8 SDU Temperature

a Following the display of the ORT Identification, the SDU temperature is displayed as shown below:

SDU TEMP (–)XXXC

Where “XXX” represents the numeric display of the actual SDU temperature in degrees Celsius, with a (–) sign or space as appropriate for negative and positive values. The “XXX” field will have leading zeros replaced by spaces.

9 End Of List Message

a The END OF LIST message is displayed at the end of the display list after the ORT identification.

H. Miscellaneous BITE Requirements

(1) The typical retention period for the BITE memory is at least five years at 25 °C. The worst case retention period is at least one year at 50 °C. If batteries are used to supply backup power for the BITE memory, the typical battery lifetime should be at least 10 years at 25 °C. The worst case lifetime is at least two years at 50 °C.

(2) Each system LRU has a total on-time clock (TOTC) to accumulate and record the amount of time the LRU has been powered up. The TOTC has a 10 minute resolution, and is capable of accumulating and recording a count of at least 200,000 hours.

(3) The TOTC value is capable of being examined, and of being reset to 0:00 through the CMT. Any manual TOTC reset, or any automatic TOTC reset (e.g., upon detection of corruption of its value), results in an automatic entry of the event into the LRU failure memory log and the SDU system failure memory log. The TOTC hours are capable of being automatically entered into the LRUs maintenance activity log.

I. Maintenance Activity Log

(1) A maintenance activity log is stored in each system LRU. The maintenance activity log is made up of the six most recent maintenance activity records (MAR). Each MAR can be entered through the CMT. Information is stored in the MAR as shown in Table 6-7 and in the order listed.

Table 6-7. MAR Information

Field	Size	Range
Document Number	16 ASCII Characters	a–z, A–Z, 0–9
Date (yymmdd)	6 ASCII Numerics	yy 00–99 mm 01–12 dd 01–31
Location	32 ASCII Characters	a–z, A–Z, 0–9
Phone Number	18 ASCII Numerics	0–9
Total On-Time Clock (Hours)	6 ASCII Numerics	0–200,000

(2) The fields are defined as follows:

- Document number – The document number has up to 16 alphanumeric characters. The intent of this field is to supply maintenance activity traceability.
- Date field – The date field is made up of six numeric characters in the format of yymmdd, where yy represents the year, mm represents the month, and dd represents the day. This field is entered automatically by the SDU as determined by its internal real-time clock (RTC); it is entered manually for the HPA. The intent of this field is to record the date the maintenance activity was performed.
- Location field – The location field has up to 32 alphanumeric characters. The intent of this field is to indicate the place where the LRU maintenance service was performed.
- Phone number field – The phone number field is made up of 18 numeric characters. The intent of this field is to supply a phone number of who performed the LRU maintenance. This phone number should include the combination of country code, area code, and local phone number.
- Total on-time clock field – The TOTC field is made up of six numeric characters representing hours. This field is entered automatically by the LRU as determined by the internal TOTC.

2. SATCOM Control and Display Unit

A. General

(1) The SATCOM Control and Display Unit (SCDU) menu formats obey the accepted industry standards for multifunction (multipurpose) control and display units (MCDU). The following paragraphs describe the SCDU display layout and terminology used to describe the display, font size conventions, scratchpad usage, format, keyboard usage, display symbols, and update rates.

B. SCDU Display Terminology and Basic Operation

(1) General

(a) The SCDU display is made up of 14 lines of 24 characters. The top line (line 1) is referred to as the title line and the bottom line (line 14) is referred to as the scratchpad. Lines 2 thru 13 are arranged into six pairs having a label line and data line. The SDU communicates to the SCDU for all data to be displayed in green. The color displayed on the MCDU depends on how the MCDU responds to this communication.

(b) There are six line select (LS) keys on each side of the SCDU display designated left (L) and right (R) and numbered 1 to 6 from top to bottom. The LS keys are associated with a pair of display lines where the upper line of a pair is the label line and the lower line is the data line. The LS key/line pair relations are given in Table 6-8.

(c) The SCDU can display a large and small font size. Different character fonts are not shown in the example SCDU page figures given in this section. The use of large font is indicated by the presence of uppercase letters in the SCDU page figures, while the use of small fonts are demonstrated by lowercase letters. In general, page names displayed in the title line are in large font. For pages where p/t is specified to be displayed in the title line, the p/t is in small font. Data entered into the scratchpad is displayed in large font. Data in the label lines is displayed in small font, while data in the data lines is displayed in large font. Numerical character font sizes cannot be shown in the figures, but their font sizes follow the same conventions.

Table 6-8. LS Key/Line Pair Relations

LS Keys	Display Lines
1L – 1R	2 and 3
2L – 2R	4 and 5
3L – 3R	6 and 7
4L – 4R	8 and 9
5L – 5R	10 and 11
6L – 6R	12 and 13

(d) Labels on the left side of the SCDU display are displayed beginning in column 2 of the label line. Data on the left side is left-justified in the data line. Labels and data on the right side of the SCDU display is right-justified. This is the case unless specified otherwise.

(2) Scratchpad

(a) General

1 The scratchpad is used for data entry and displaying SDU generated messages. Pushing an alphanumeric key on the keypad (0 through 9, A through Z, +/– [plus or minus], / [slash, space]) enters that character into the scratchpad. The scratchpad is not used for fixed format display purposes. The mechanism used for data entry is described below.

(b) Data Entry

1 When the user types the appropriate characters using the SCDU keypad, the characters are echoed on the scratchpad. After data entry, the user must push the appropriate LS key adjacent to the data field where the data is to be displayed. The SDU then checks the data for format and acceptability (out-of-range, entry not permitted into the field, etc). If the data is incorrect, the SDU leaves the previous data in the field and displays the appropriate error message in the scratchpad. If any LS key is pushed adjacent to a blank or nonselectable field, the scratchpad message 1 (i.e., NOT ALLOWED) is issued. If the entry was rejected because an incorrect LS key was pushed, the entry is accepted if the correct LS key is subsequently pushed.

(c) Scratchpad Message

1 If the SDU determines a data entry does not conform to format or acceptability requirements after an entry is attempted, the SDU issues a scratchpad message prompting the user for the correct data. The user can clear a scratchpad message by using the clear (CLR) key, or by entering data into the scratchpad over the message.

(d) CLR and DEL Keys

1 General

a The CLR and delete (DEL) keys are used to clear the scratchpad and alter the data fields. Generally, for MCDUs that have only a CLR key (e.g., Airbus and Douglas) the scratchpad is cleared and the data fields are altered by using this key. For MCDUs that have both CLR and DEL keys (e.g., Boeing), the scratchpad is cleared using the CLR key, while the data fields are altered using the DEL key.

2 CLR Key

a Pushing the CLR key clears the scratchpad message. When the scratchpad contains user-entered characters, momentary actuation of the CLR key clears the last entered character, while continual actuation of the CLR key clears the entire contents of the scratchpad.

b When the scratchpad is empty, pushing the CLR key causes CLR to be displayed in the scratchpad indented five spaces. If an LS key is pushed and the field adjacent to the LS key is specified to be either erasable (e.g., an unprotected number) or a default maintained value (e.g., protected number priorities), the field is cleared or reverts back to its default value, as applicable.

c For compatibility with the Boeing 777 AIMS/CDU, the SDU clears the entire scratchpad when the CLR command is received with the repeat bit set.

3 DEL Key

a The DEL key (if available) can be used to clear or revert the data fields. Pushing the DEL key causes no response when the scratchpad is not empty, except for either an SDU issued error message or pilot-entered characters.

b When the scratchpad is empty, pushing the DEL key causes DELETE to be displayed in the scratchpad.

NOTE: Pushing the DEL key again does not clear DELETE from the scratchpad. Instead, pushing the CLR key when DELETE is displayed in the scratchpad clears DELETE.

c If an LS key is pushed and the field adjacent to the LS key is specified to be either erasable (e.g., an unprotected number) or a default maintained value (e.g., protected number priorities), the field is cleared or reverts back to its default value, as applicable.

d When the scratchpad contains CLR indented five spaces as the result of the CLR key being pushed with an empty scratchpad and the DEL key is subsequently pushed, the SDU replaces CLR with DELETE in the scratchpad.

(e) NEXT PAGE and PREV PAGE Keys

1 General

a Pushing the NEXT PAGE and PREV PAGE (if available) function keys on the SCDU keypad causes the SDU to display the next page, or previous page of the display sequence where appropriate (i.e., when p/t is displayed in the title line).

2 NEXT PAGE Key

a Pushing this key causes the next page in the sequence to be displayed. If the last page in a multiple page sequence is displayed and the NEXT PAGE key is pushed, the first page is displayed. The SDU ignores this key if the key is pushed when p/t is not displayed, or if a p/t display is the value 1/1.

3 PREV PAGE Key

a Pushing this key causes the previous page in the sequence to be displayed. If the first page in a multiple page sequence is displayed and the PREV PAGE key is pushed, the last page is displayed. The SDU ignores this key if the key is pushed when p/t is not displayed, or if a p/t display is the value 1/1.

(f) Special Symbols

1 When displayed, special symbols are defined as given in Table 6-9.

Table 6-9. Special Symbols

Symbol	Description
* (Asterisk)	Pushing the LS key adjacent to this symbol (when it appears) causes an action of some kind to occur (e.g., making a phone call, sorting a phone list, or initiating log-off).
[ ] (Brackets)	Empty brackets prompt the user for data entry into the field. However, data entry is not mandatory. Brackets surrounding data indicate the data is unprotected and can be modified or deleted. Not all fields modifiable are surrounded by brackets. When brackets are used to enclose existing data, as opposed to prompting entry of data into an empty field, they are intended as an indication the data is unprotected (i.e., an unprotected phone number). Conversely, protected phone numbers do not have brackets, indicating the phone number cannot be modified or deleted.
< , > (Carets)	A caret adjacent to an LS key indicates if the key is pushed the display changes to a new page. The new page is either the one indicated next to the caret or, in case of RETURN>, the higher level page.
<SEL>	Indicates the data in the field is currently selected (e.g., the selected GES or antenna).

(g) Updates

1 Dynamically generated display fields, whose contents have changed, are updated by the SDU both periodically (at a rate of at least 1 Hz), and upon completion of an LS key action that could have caused the display or the display field to change. With multiple SCDU configurations, the SDU only maintains one version of each page for display. The SDU responds to LS key actuations from all SCDUs in a serial fashion and updates the display page(s). Each SCDU scratchpad and the channel selection fields are independent from all others, allowing each user to perform independent actions.

C. SCDU Page Hierarchy

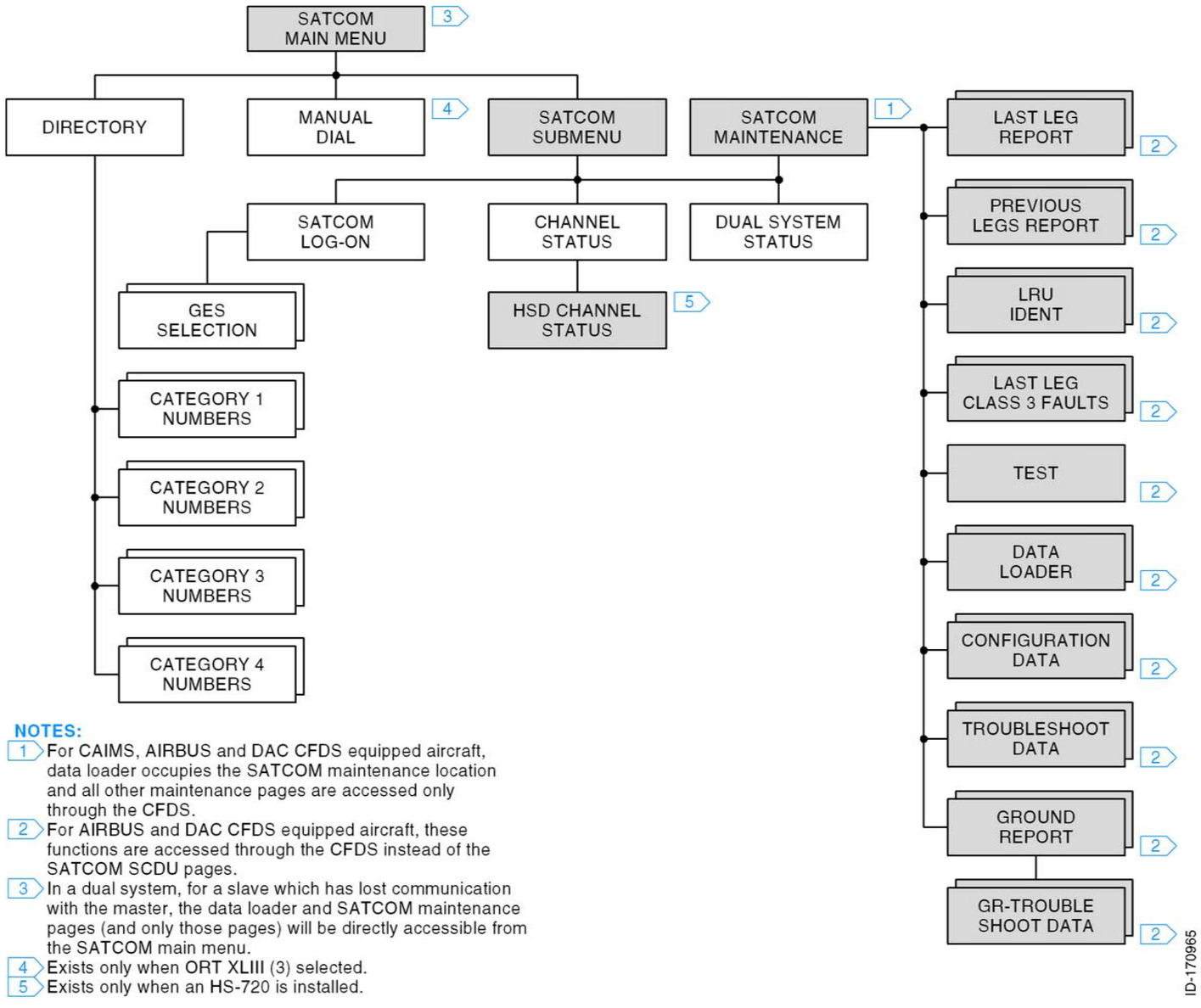
(1) The SCDU page hierarchy is shown in Figure 6-2. The SATCOM MAIN MENU page is accessed by pushing the LS key adjacent to <SAT for single SDU installations. Highlighted blocks in Figure 6-2 represent maintenance pages that are discussed in detail in paragraph D. Refer to the appropriate MCS SATCOM System Guide for additional non highlighted SATCOM displays.

D. SCDU Pages

(1) SATCOM MAIN MENU Page

(a) Access to this page is from the MCDU MAIN MENU page. The purpose of this page is to display call status information, to optionally make, answer, and terminate calls, and to supply access to lower level pages. See Figure 6-3 for example pages.

Blank Page



NOTES:

1. For CAIMS, AIRBUS and DAC CFDS equipped aircraft, data loader occupies the SATCOM maintenance location and all other maintenance pages are accessed only through the CFDS.
2. For AIRBUS and DAC CFDS equipped aircraft, these functions are accessed through the CFDS instead of the SATCOM SCDU pages.
3. In a dual system, for a slave which has lost communication with the master, the data loader and SATCOM maintenance pages (and only those pages) will be directly accessible from the SATCOM main menu.
4. Exists only when ORT XLIII (3) selected.
5. Exists only when an HS-720 is installed.

Figure 6-2. SATCOM SCDU Page Hierarchy

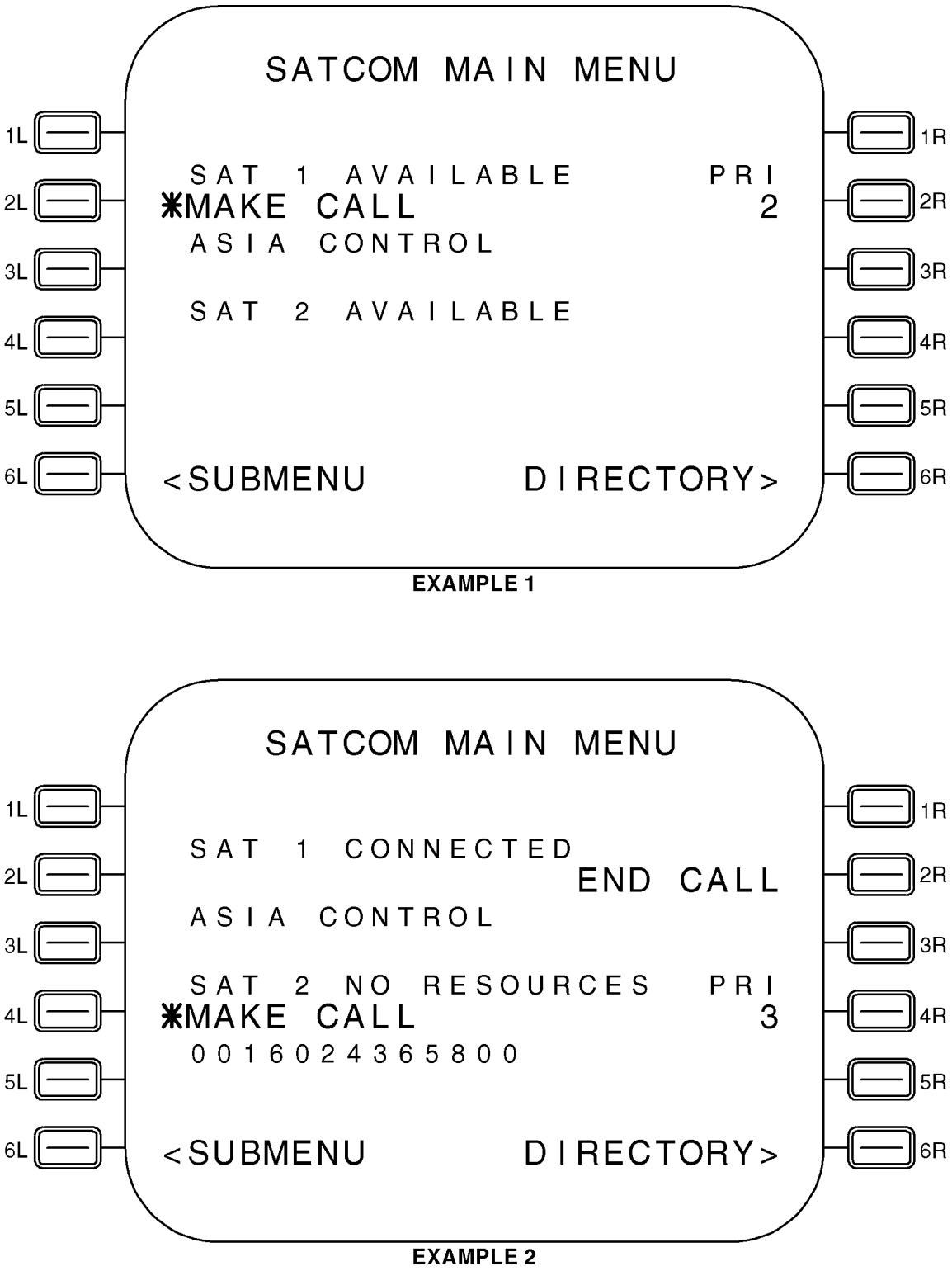
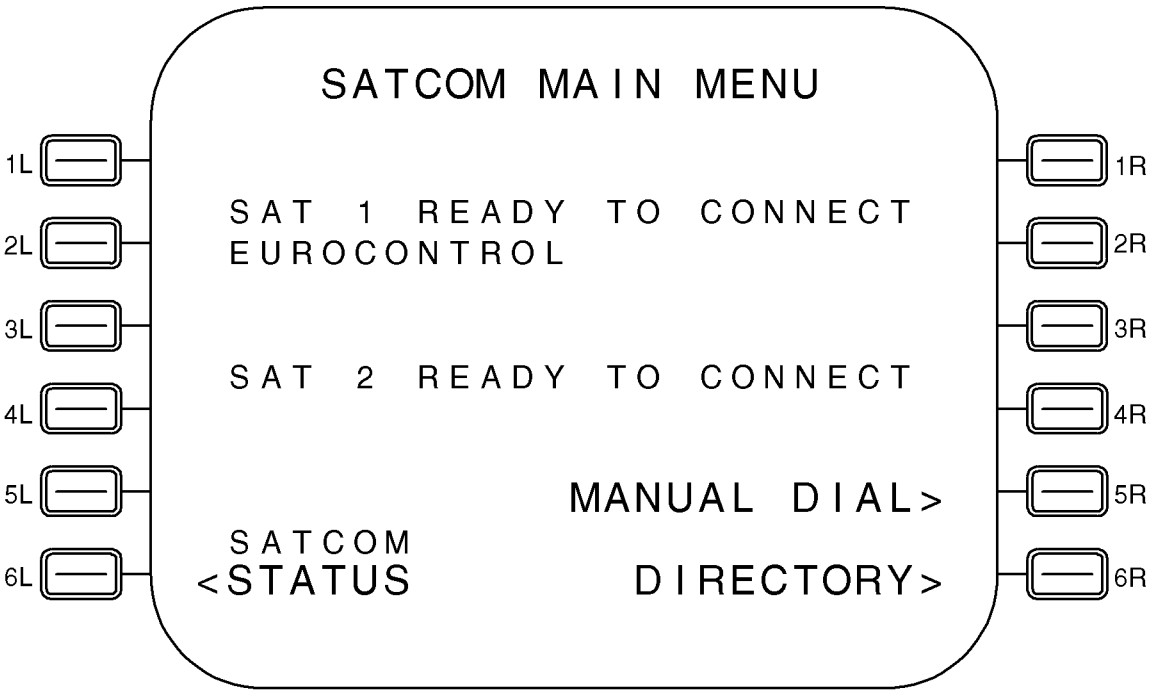
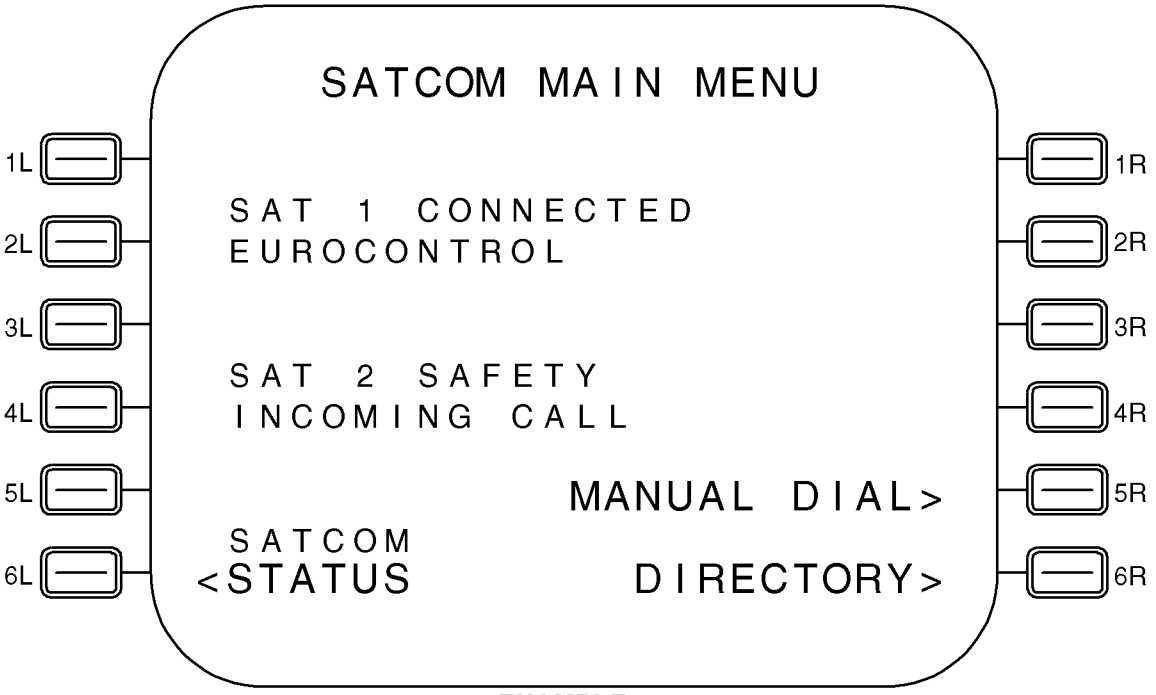


Figure 6-3 (Sheet 1, Boeing/Corporate). SATCOM SCDU Main Menu Page



EXAMPLE 3



EXAMPLE 4

Figure 6-3 (Sheet 2, Airbus). SATCOM SCDU Main Menu Page

(2) SUBMENU or SATCOM STATUS Page

(a) Access to this page is from the SATCOM MAIN MENU page. The purpose of this page is to display the current log-on state, to supply a way of entering and displaying flight identifier, and to supply access to the SATCOM LOG-ON, SATCOM CHANNEL STATUS, and SATCOM MAINTENANCE (or, if applicable, DATA LOADER MENU) pages. When in a dual system, access to the DUAL SYSTEM STATUS menu page is supplied. See Figure 6-4 for example pages.

(3) SATCOM MAINTENANCE Pages

(a) General

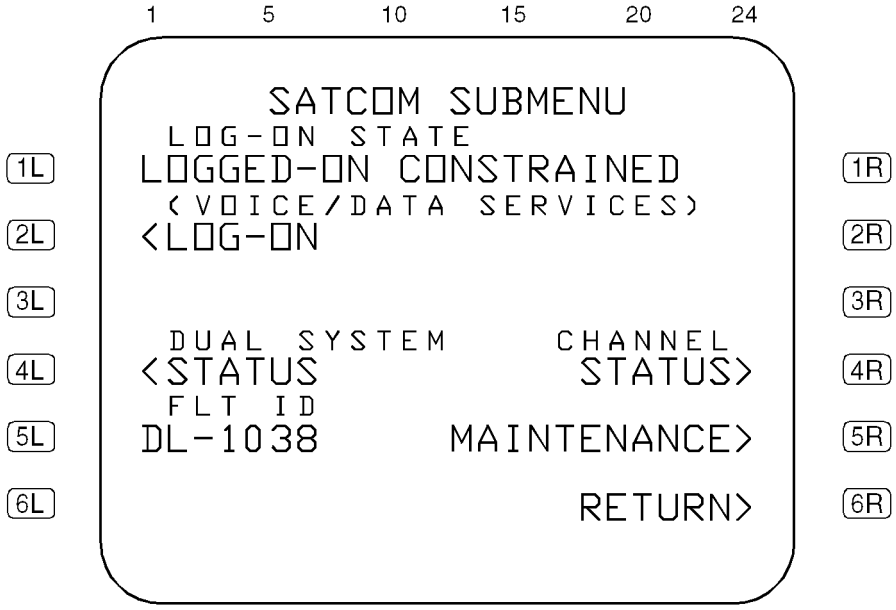
1 An example SATCOM MAINTENANCE page for non-Airbus/Douglas CFDS equipped aircraft is shown Figure 6-5.

2 The SATCOM MAINTENANCE pages menu selection, subject to ORT item iv (refer to SYSTEM OPERATION), is accessible from the SATCOM SUBMENU page only on non-Airbus/Douglas CFDS equipped aircraft. In Airbus and Douglas configurations, these pages are accessed through the CFDS.

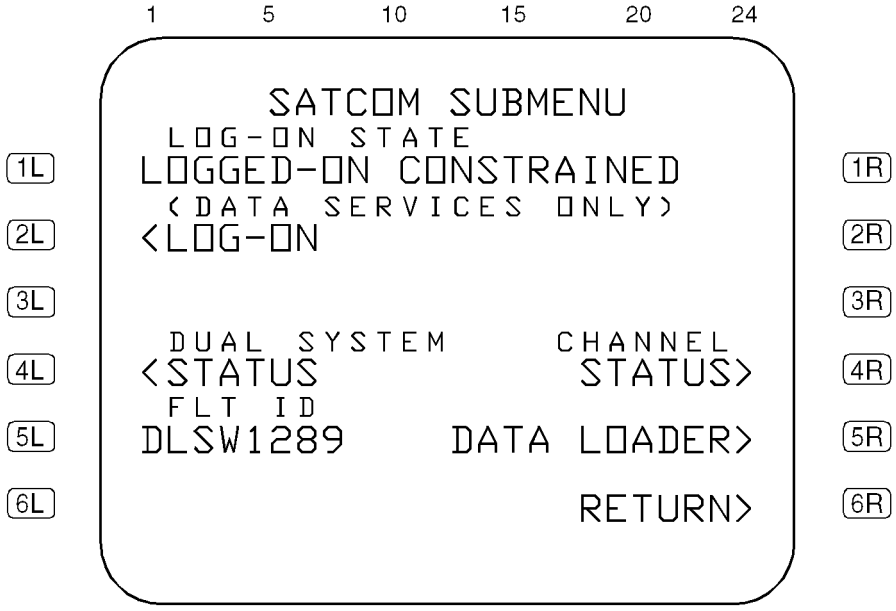
3 The purpose of these pages are to display SATCOM maintenance data. In a dual system, the maintenance data pertains to the system from which the display pages are being supplied (SAT 1 or SAT 2).

4 The display format and functionality for the SATCOM maintenance pages (i.e., for the SAT–N, LAST LEG REPORT, PREVIOUS LEGS REPORT, LRU IDENTIFICATION, LAST LEG CLASS 3 FAULTS, TEST, TROUBLESHOOT DATA, GROUND TROUBLESHOOT DATA, GROUND REPORT, and CONFIGURATION DATA pages) is the same as defined for the CFDS interactive mode maintenance pages with the exception of the following:

- The RETURN> prompt is displayed on the right adjacent to the 6R key, as opposed to the left.
- The SDU issues scratchpad message 1 (i.e., NOT ALLOWED) if any LS key is pushed adjacent to a blank or display-only field.



SCDU ACCESSED MAINTENANCE PAGE AVAILABLE



SCDU ACCESSED MAINTENANCE PAGES NOT AVAILABLE

AD-170967

Figure 6-4 (Sheet 1, Boeing/Corporate). SATCOM SUBMENU Page

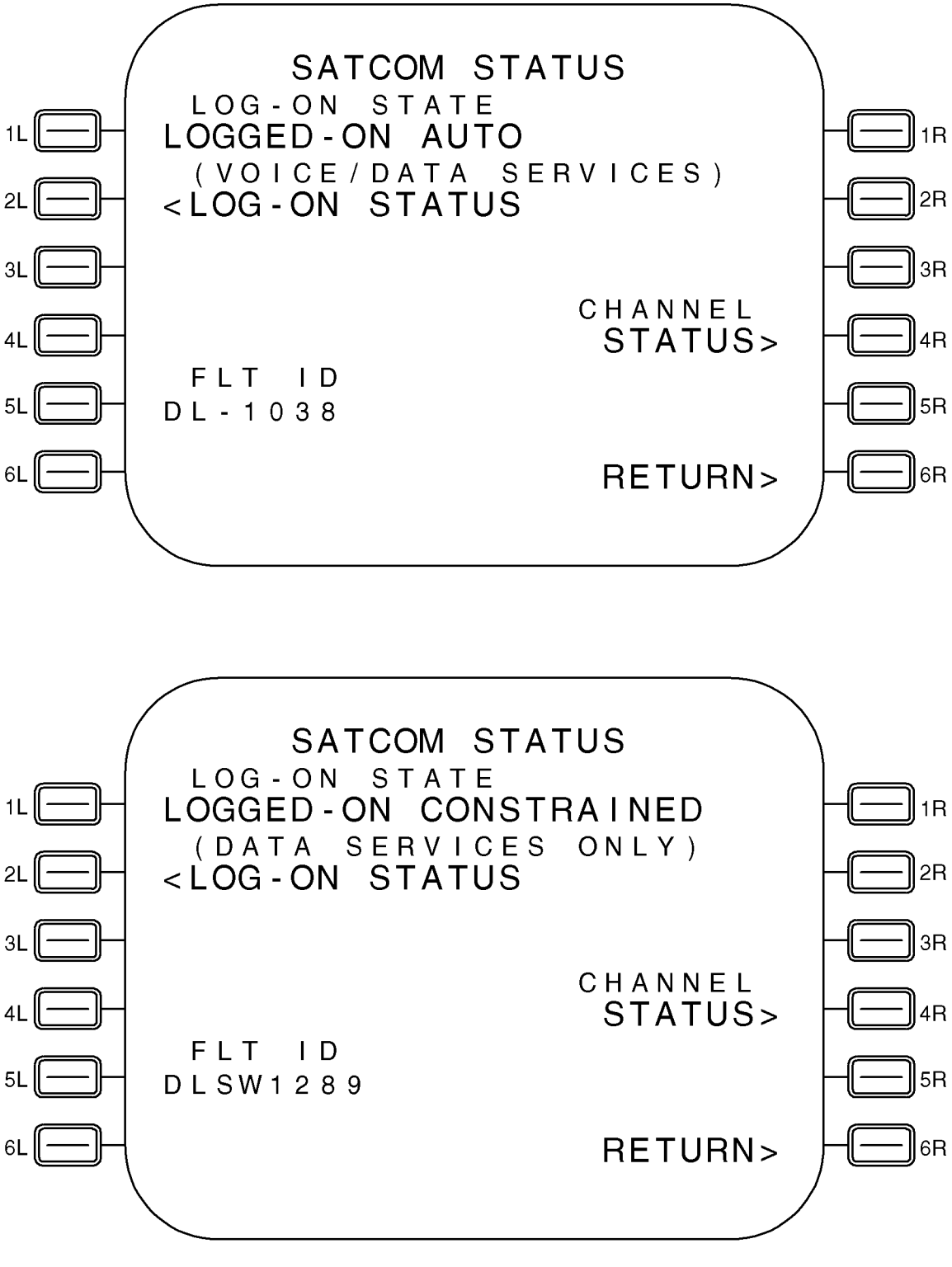


Figure 6-4 (Sheet 2, Airbus). SATCOM STATUS Page

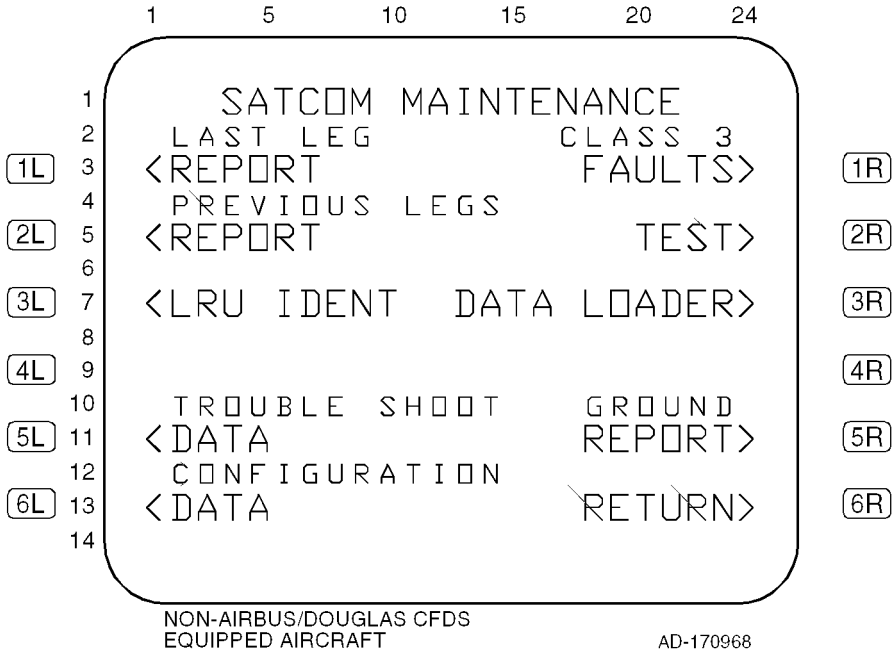


Figure 6-5. SATCOM MAINTENANCE Page

5 Access to SATCOM maintenance displays are as follows:

- Push LS key 1L to show the Last Leg Report page (see Figure 6-10)
- Push LS key 2L to show the Previous Leg Report page (see Figure 6-11)
- Push LS key 3Lto show the LRU Identification page (see Figure 6-12)
- Push LS key 5L to show the Trouble Shooting Data page (see Figure 6-13)
- Push LS key 6L to show the Configuration Data page (see Figure 6-8)
- Push LS key1R to show the Last Leg Class 3 Faults page (see Figure 6-14)
- Push LS key 2R to show the Test page (see Figure 6-6)
- Push LS key 3R to show the Data Loader Menu page (see Figure 6-9)
- Push LS key 5R to show the Ground Report page (see Figure 6-15).

(b) TEST page

1 If a system-wide functional test (i.e., PAST) is initiated from the SCDU interface (i.e., by pushing the 2R key on the SATCOM MAINTENANCE page), the first access of the SATCOM subsystem from an SCDU MAIN MENU page after the POST/PAST Results Delay period causes the TEST page to be shown with the status of the current failures. However, the TEST page shows the TEST IN PROGRESS 60S message if this first access occurs during the POST/PAST Results Delay period. If the SATCOM subsystem is not accessed within 5 minutes of the completion of an SCDU-initiated PAST, the page hierarchy is reset to its original structure as shown in Figure 6-2.

2 When the 2R key is pushed on the SATCOM MAINTENANCE (i.e., SAT–N) page, the SDU initiates a PAST and the page display temporarily goes to the TEST page where TEST IN PROGRESS 60S is displayed. However, the SCDU eventually times out the SATCOM subsystem and takes back control of the display. This is due to the fact that for SCDU-accessed maintenance pages, the SDU interfaces directly with the SCDU (as opposed to going through the CFDIU) and is unable to maintain proper bus activity (which the CFDIU normally does) during initial execution of the PAST.

3 To display the test results, the user must reselect the SATCOM system by pushing the LS key adjacent to the <SAT prompt on the SCDU MAIN MENU page, where the initial page shown is the TEST page. If the user does not reselect the SATCOM system on the SCDU MAIN MENU page after 5 minutes of completion of PAST, the page hierarchy resets to its original structure as shown in Figure 6-2.

4 The TEST IN PROGRESS 60S message during the POST/PAST Results Delay period is required to prevent the display of premature test results, i.e., to permit continuous monitoring sufficient time to add its contribution to the POST/PAST results.

(4) TEST Menu Page

(a) General

1 Access to this page is from the SAT–N (i.e., SATCOM MAINTENANCE) page by pushing LS key 2R. The purpose of this page is to initiate a PAST, to enable/disable a voice loopback on a selected (physical) channel, to enable/disable a test of the cockpit voice call light for a selected (logical) channel, and activation of the cockpit voice go-ahead chime test. See Figure 6-6 for example pages.

(b) Data Fields

1 Line 3

a This line displays SELF-TEST beginning in column 1. The asterisk prompt is not displayed if the aircraft is airborne.

b If the LS key 1L is pushed when the SELF-TEST asterisk prompt is shown, the system activates a PAST.

2 Line 4

a This line displays MP2ABCD VOICE LOOPBACK beginning in column 2. Pushing LS key 2l configures the SATCOM system to perform an audio loopback test of flight deck channel 1.

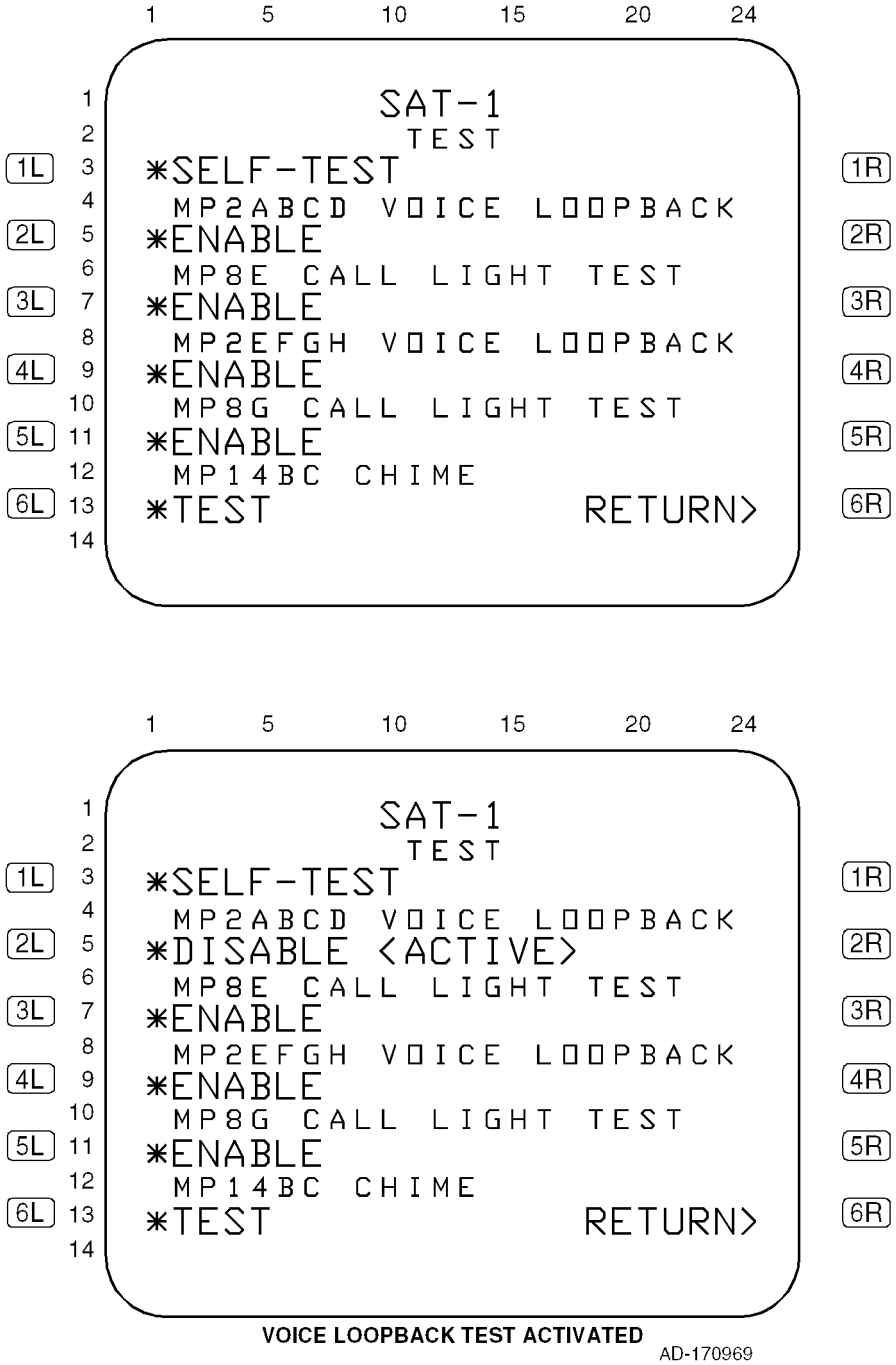
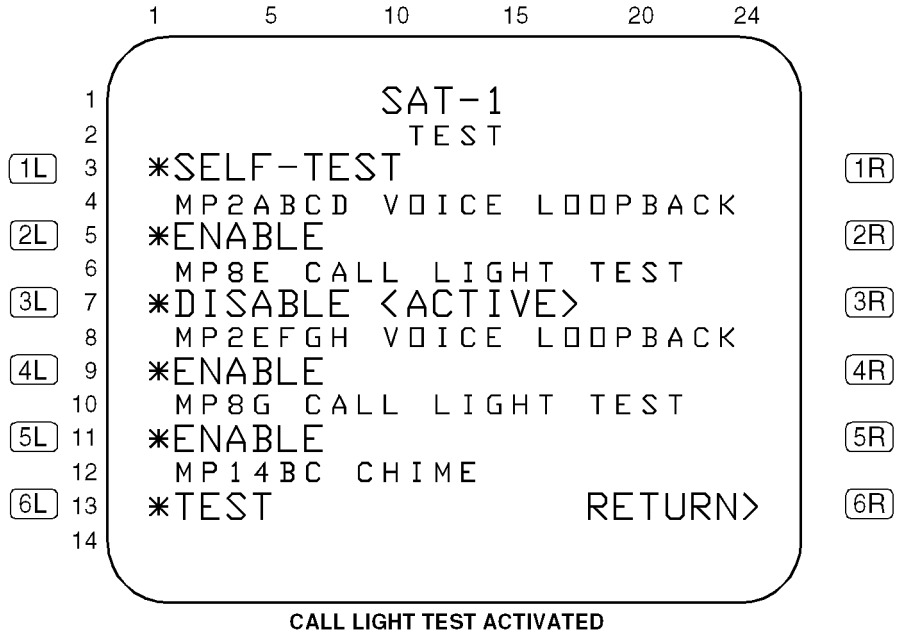
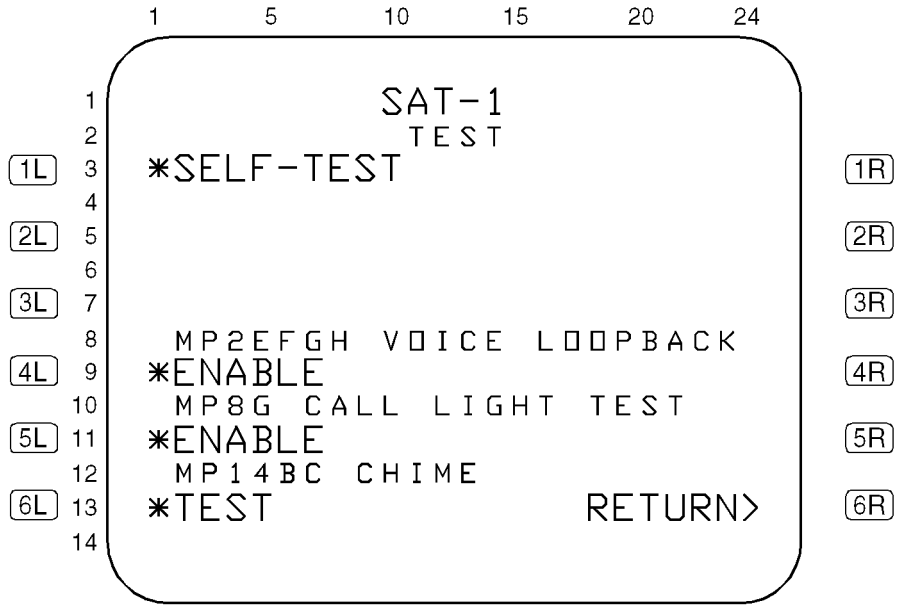


Figure 6-6 (Sheet 1). TEST Page



CALL LIGHT TEST ACTIVATED



EXAMPLE WITH ONLY ONE CHANNEL CONFIGURED
AD-170970

Figure 6-6 (Sheet 2). TEST Page

3 Line 5

a This line displays the message ENABLE beginning in column 1 when the test is not active. The asterisk prompt is displayed and the test allowed only if the log-on state is Standby. This line displays *DISABLE <ACTIVE> beginning in column 1 when the test is active. If the log-on state changes from Standby to any other state while the test is active, the test is terminated. The commands on lines 4 and 5 are shown only if the configuration straps indicate this channel is wired for headset use.

b Pushing LS key 2L when the ENABLE asterisk prompt is shown causes the voice channel selected to be activated into an analog loopback test state. Pushing LS key 2L when the DISABLE prompt is shown causes the voice loopback test state to be terminated.

4 Line 6

a This line displays MP8E CALL LIGHT TEST beginning in column 2. Pushing LS key 3L initiates a lamp test of the flight deck channel 1 call lamp.

5 Line 7

a This line displays *ENABLE beginning in column 1 when the test is not active. The asterisk prompt is shown and the test allowed only if the log-on state is Standby. This line displays *DISABLE <ACTIVE> beginning in column 1 when the test is active. If the log-on state changes from Standby to any other state while the test is active, the test is terminated. The commands on lines 6 and 7 are shown only if the configuration straps indicate this channel is wired for headset use.

b Pushing LS key 3L when the ENABLE asterisk prompt is shown causes the cockpit voice call light to be activated for a steady indication (regardless of the state of configuration pin TP13C). Pushing LS key 3L when the DISABLE prompt is displayed causes the cockpit voice call light test to be terminated.

6 LIne 8

a This line displays MP2EFGH VOICE LOOPBACK beginning in column 2. Pushing LS key 4L configures the SATCOM system to perform an audio loopback test of flight deck channel 2.

7 Line 9

a This line displays ENABLE beginning in column 1 when the test is not active. The asterisk prompt is shown and the test allowed only if the log-on state is Standby. This line displays *DISABLE <ACTIVE> beginning in column 1 when the test is active. If the log-on state changes from Standby to any other state while the test is active, the test is terminated. The commands on lines 8 and 9 are displayed only if the configuration straps indicate this channel is wired for headset use.

b Pushing LS key 4L when the ENABLE asterisk prompt is displayed causes the voice channel selected to be activated into an analog loopback test state. Pushing LS key 4L when the DISABLE prompt is displayed causes the voice loopback test state to be terminated.

8 Line 10

a This line displays MP8G CALL LIGHT TEST beginning in column 2. Pushing LS key 5L initiates a lamp test of the flight deck channel 2 call lamp.

9 Line 11

a This line displays *ENABLE beginning in column 1 when the test is not active. The asterisk prompt is displayed and the test allowed only if the log-on state is Standby. This line displays *DISABLE <ACTIVE> beginning in column 1 when the test is active. If the log-on state changes from Standby to any other state while the test is active, the test is terminated. The commands on lines 10 and 11 are displayed only if the configuration straps indicate this channel is wired for headset use.

b Pushing LS key 5L when the ENABLE asterisk prompt is displayed causes the cockpit voice call light to be activated for a steady indication (regardless of the state of configuration pin TP13C). Pushing LS key 5L when the DISABLE prompt is displayed causes the cockpit voice call light test to be terminated.

10 Line 12

a This line displays MP14BC CHIME beginning in column 2. Pushing LS key 6L initiates the channel test.

11 Line 13

a This line displays TEST beginning in column 1. The asterisk prompt is displayed and the test allowed only if the log-on state is Standby.

b Pushing LS key 6L when the asterisk prompt is displayed causes the cockpit voice go-ahead chime to be activated for a single stroke.

(5) SATCOM SELF–TEST (PAST) Page

(a) General

1 The purpose of this page is to initiate a PAST, to enable/disable a voice loopback on a selected (physical) channel, to enable/disable a test of the cockpit voice call light for a selected (logical) channel, and activation of the cockpit voice go-ahead chime test. See Figure 6-7 for example pages.

(b) Data Fields

1 Line 1

a This line displays the title of the page, SAT–N, beginning in column 10, where N represents 1 or 2 to indicate a single SDU (N = 1), SDU No. 1 (N = 1), or SDU No. 2 (N = 2) as determined by the settings of configuration pins TP12E and TP12F.

b If there are current failures to report after the execution of a PAST, columns 20 thru 24 display p/t in small font, where p represents the current displayed page, and t represents the total number of pages needed to show the current failures. The display of the slash is always in column 22, with p right-justified to the slash and t left-justified to the slash.

2 Line 3

a This line displays headers ATA beginning in column 1 and CLASS beginning in column 20 if there are current failures to report after execution of a PAST. This line is blank if there are no failures to report.

b In addition to the above, for CFDS type none, the header ATA is not displayed (CLASS is still displayed as specified).

3 Line 5

a This line displays the message TEST IN PROGRESS 60S beginning in column 3 within one second of a PAST being initiated on the SAT–N (i.e., SATCOM MAINTENANCE) page, and then throughout the duration of PAST. If there are no current failures to report at the conclusion of the PAST (including the POST/PAST results delay period), the message TEST OK is displayed. If there are current failures to report at the conclusion of the PAST (including the POST/PAST results delay period), refer to paragraph 4 for line requirements.

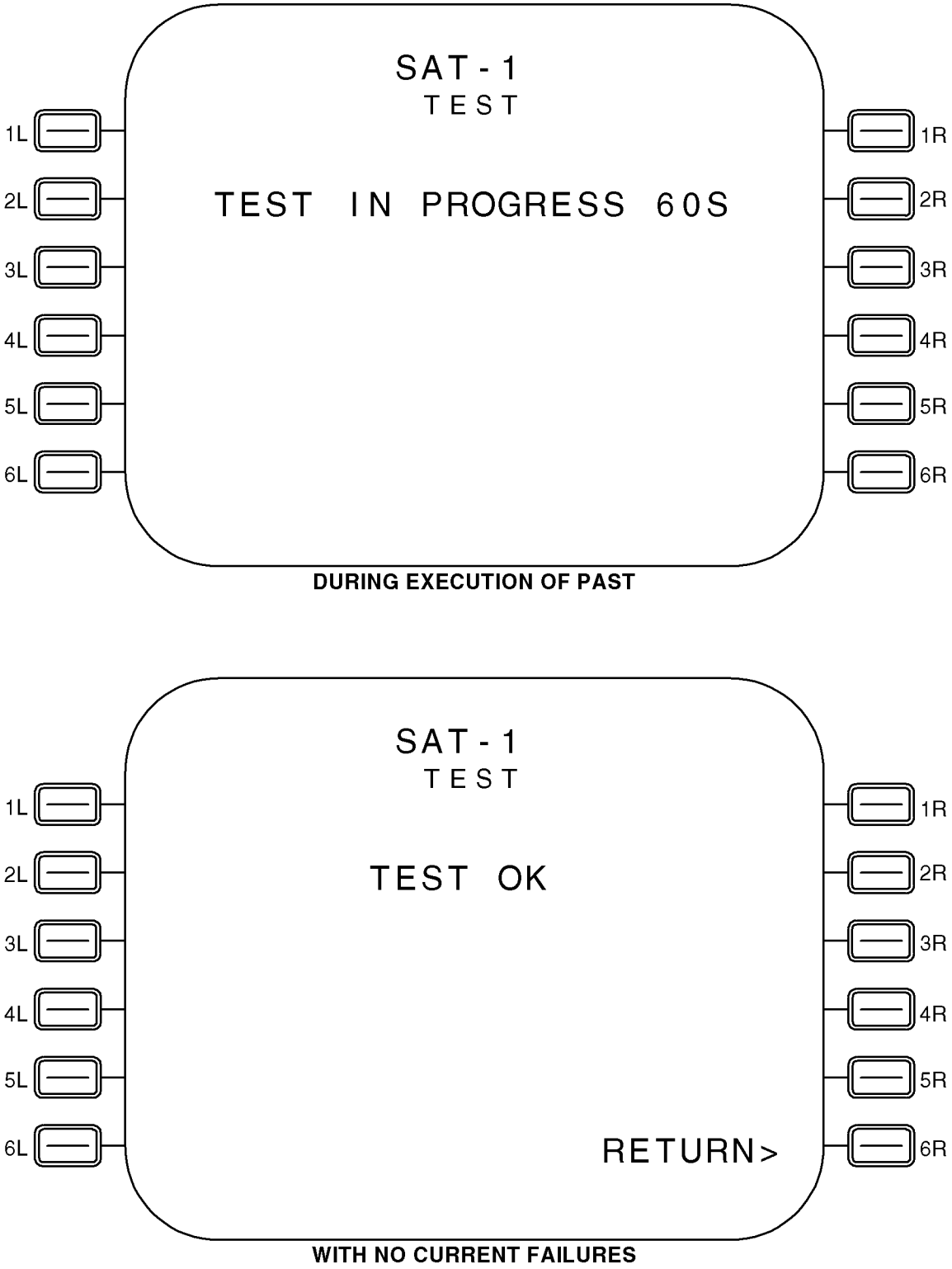


Figure 6-7 (Sheet 1). SATCOM SELF-TEST Page

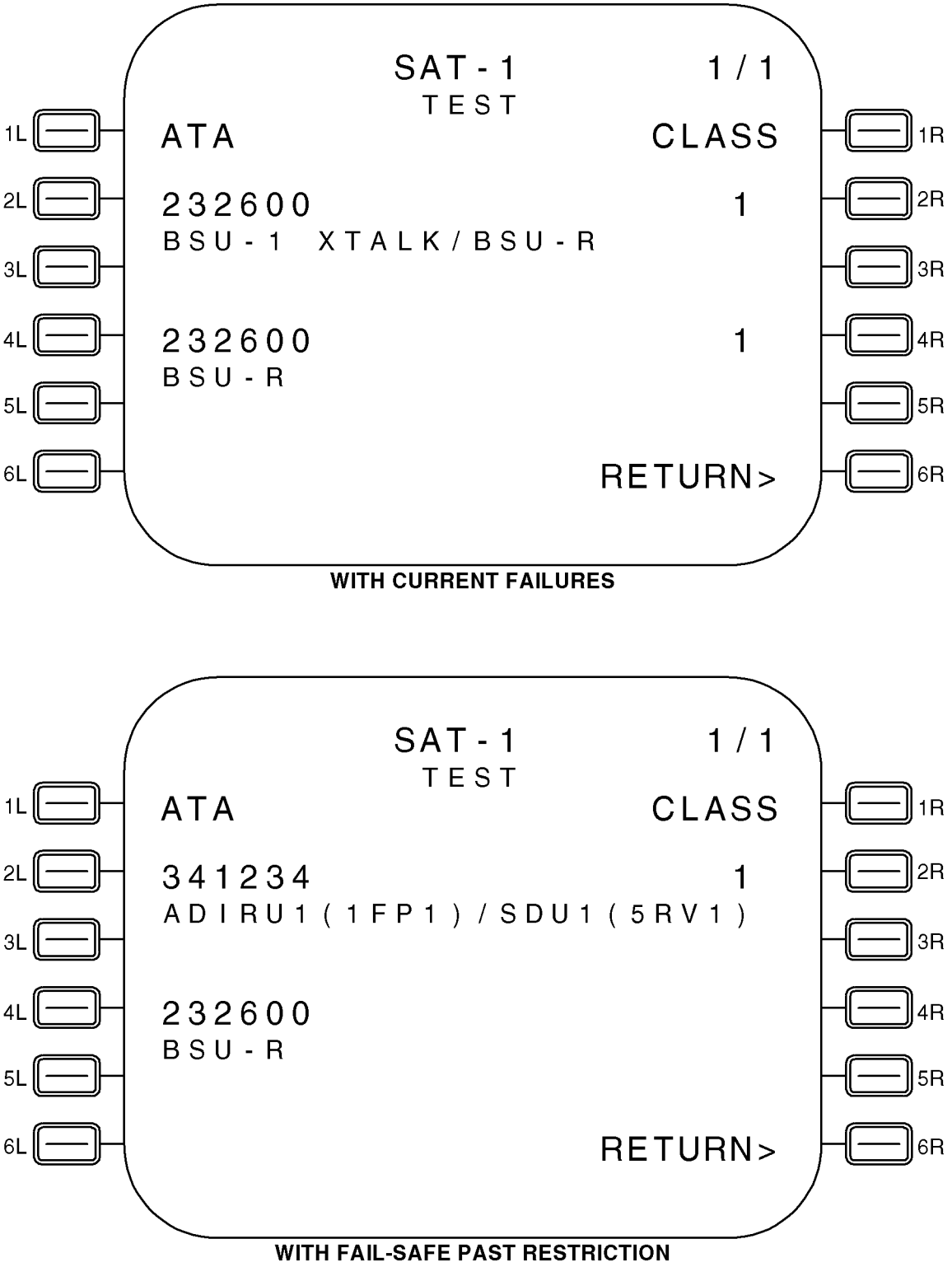


Figure 6-7 (Sheet 2). SATCOM SELF-TEST Page

4 Other Information

a The SELF–TEST page lists two failures per page if failures are detected during the PAST(self–test). These two sets of lines (lines 5, 6, and 7 and lines 9, 10, and 11) display Level 1 diagnosed current failures. Failures are shown in chronological order (i.e., the most recent detected failure last) with no more than two failures displayed per page.

b The number of TEST pages depends on the number of current failures to report (up to a maximum of 99 pages). When there is an odd number of current failures to report, the odd failure is displayed on a separate page in lines 5, 6, and 7, and lines 9, 10, and 11 are blank. If there are no failures to report, lines 5, 6, 7, 9, 10, and 11 are blank except as noted in paragraph 3.

c Line 5 and, if applicable, line 9 display the ATA number beginning in column 1 and the class number beginning in column 23. The ATA number is displayed as aaaaaa, where aaaaaa represents the ATA reference number of the reported failure as specified in paragraph 3.E. for each type of CFDS. For CFDS type none, no ATA number is displayed. The class number is displayed as c, where c represents the class (1, 2, or 3) of the failure.

d Lines 6 and 7 and, if applicable, lines 10 and 11 display a text message, as specified in paragraph 3.E. for each CFDS type, for the reported failure beginning in column 1.

(6) CONFIGURATION DATA Pages

(a) General

1 Access to these pages is from the SAT–N (i.e., SATCOM MAINTENANCE) page. The purpose of these pages is to display the status of SATCOM configuration input parameters. See Figure 6-8 for example pages.

(b) CONFIGURATION DATA Page 1 (Figure 6-8, sheet 1):

1 Data Fields

a Line 3

(1) This line displays the ICAO address of eight octal characters, as determined by discrete inputs from the ICAO address straps. This display is not derived from any ARINC 429 version of the ICAO address.

b Line 5

(1) This line displays CONFIG as determined by the setting of the system configuration pins, followed by (HEX). The configuration pin settings are mapped into hexadecimal digits as shown in Table 6-10. In the figure, digits 0 thru 9 correlate to hexadecimal digits 0 thru 9 in the table.

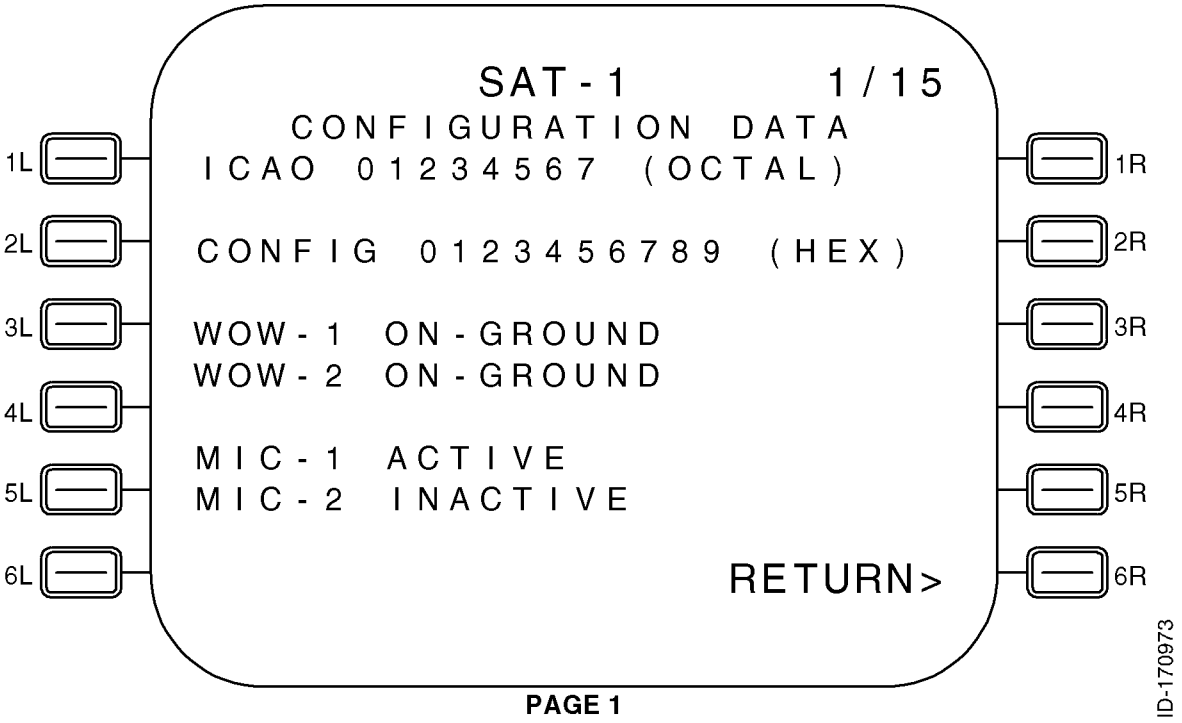


Figure 6-8 (Sheet 1). Configuration Data

Table 6-10. System Configuration Pin Mapping

Configuration Pins									
TP10			TP11			TP12			TP13		
A B C D	E F G H	J K	A B	C D E F	G H J K	A B C D	E F G H	J K	A B	C D E F	G H J K
Hex Digits											
0	1	2	3	4	5	6	7	8	9		

c Line 7

(1) This line displays the WOW–1 status of SDU weight-on-wheels discrete input No. 1 as IN-AIR/NOT WIRED or ON-GROUND.

d Line 8

(1) This line displays the WOW–2 status of the SDU weight-on-wheels discrete input No. 2 as IN-AIR/NOT WIRED or ON-GROUND.

e Line 10

(1) This line displays the MIC–1 status of the SDU cockpit voice microphone On discrete input No. 1 as ACTIVE or INACTIVE.

f Line 11

(1) This line displays the MIC–2 status of the SDU cockpit voice microphone On discrete input No. 2 as ACTIVE or INACTIVE.

(c) CONFIGURATION DATA Page 2 (Figure 6-8, sheet 2):

1 Data Fields

a Line 3

(1) This line displays the CHIME RESET status of the SDU cockpit voice go-ahead chime signal reset discrete input as ACTIVE or INACTIVE.

b Line 5

(1) This line displays the DUAL SYS SELECT status of the SDU dual system select discrete input as ACTIVE or INACT.

c Line 6

(1) This line displays the DUAL SYS DISABLE status of the SDU dual system disable discrete input as ACTIVE or INACT.

d Line 8

(1) This line displays IRS SOURCE as determined by which IRS input bus the SDU is using. A dash is displayed for the IRS source if a 429 source of IRS is not connected to the SDU.

e Line 10

(1) This line displays the PLACE/END CALL 1 status of the SDU cockpit voice place/end call 1 discrete input as ACTIVE or INACT.

f Line 11

(1) This line displays the PLACE/END CALL 2 status of the SDU cockpit voice place/end call 2 discrete input as ACTIVE or INACT.

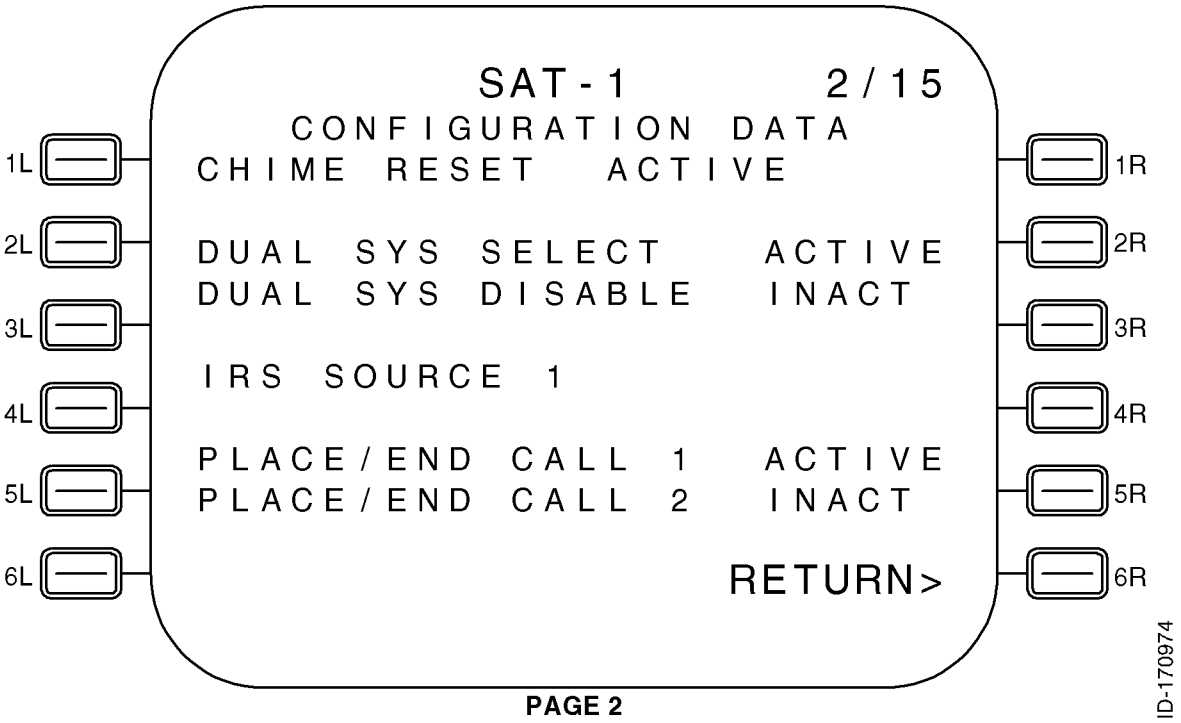


Figure 6-8 (Sheet 2). Configuration Data

(d) CONFIGURATION DATA Page 3 (Figure 6-8, sheet 3):

1 General

a For CONFIGURATION DATA pages 3 thru 10, the strap setting value 0 or 1 in parentheses is as follows: 1= open circuit; and 0 = tied to common.

2 Data Fields

a Line 4

(1) This line displays A(0) ICAO ADRS AVAIL or A(1) ICAO ADRS NOT AVAIL left-justified as determined by the state of system configuration pin TP10A.

b Line 6

(1) This line displays B(0) FMC1 CONNECTED or B(1) FMC1 NOT CONNECTED left-justified as determined by the state of system configuration pin TP10B.

c Line 8

(1) This line displays C(0) FMC2 CONNECTED or C(1) FMC2 NOT CONNECTED left-justified as determined by the state of system configuration pin TP10C.

d Line 10

(1) This line displays D(0) HS 429 TO/FROM CMUS or D(1) LS 429 TO/FROM CMUS left-justified as determined by the state of system configuration pin TP10D.

e Line 12

(1) This line displays E(0) CPDF CONNECTED or E(1) CPDF NOT CONNECTED left-justified as determined by the state of system configuration pin TP10E.

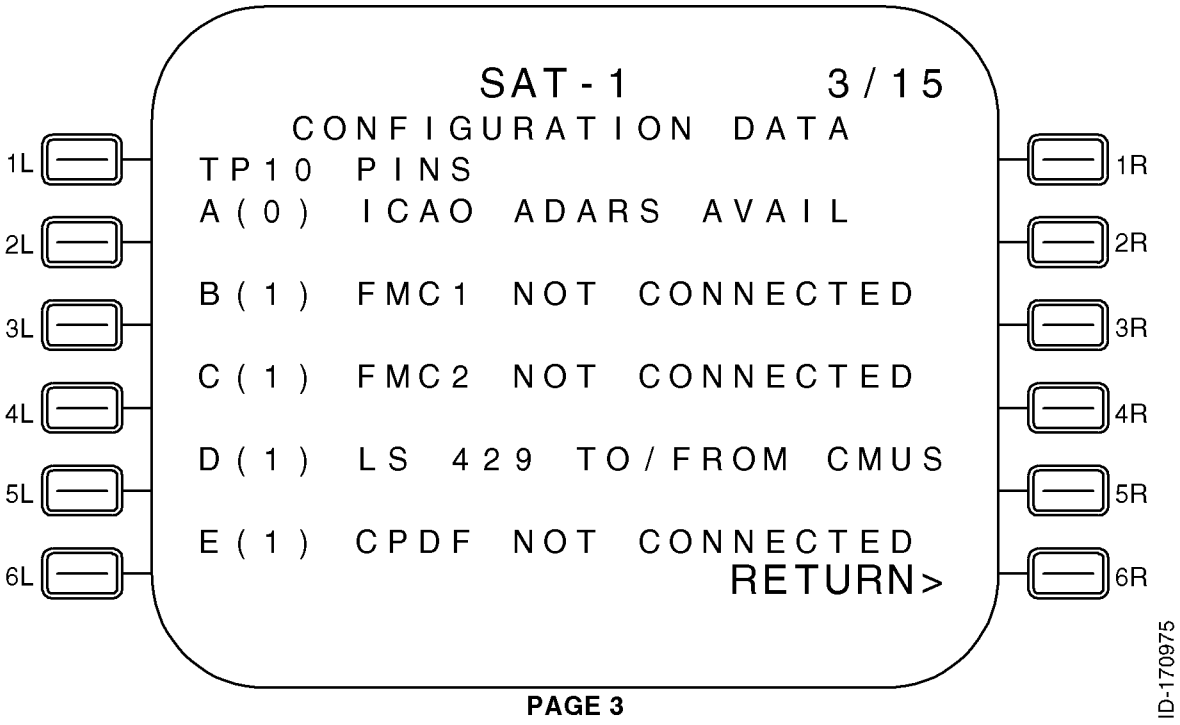


Figure 6-8 (Sheet 3). Configuration Data

(e) CONFIGURATION DATA Page 4 (Figure 6-8, sheet 4):

1 Data Fields

a Line 4

(1) This line displays F(0) HS 429 ICAO ADRS or F(1) LS 429 ICAO ADRS left-justified as determined by the state of system configuration pin TP10F.

b Line 6

(1) This line displays G(0) HSU CONNECTED or G(1) HSU NOT CONNECTED left-justified as determined by the state of system configuration pin TP10G.

c Line 8

(1) This line displays H(0) SDU CONTROLLER=WSC or H(1) SDU CONTROLLER=SCDU left-justified as determined by the state of system configuration pin TP10H.

d Line 10

(1) This line displays J(0) SPARE or J(1) SPARE left-justified as determined by the state of system configuration pin TP10J.

e Line 12

(1) This line displays K(0) LAMP ON CALL INIT or K(1) LAMP ON CALL CONNCT left-justified as determined by the state of system configuration pin TP10K.

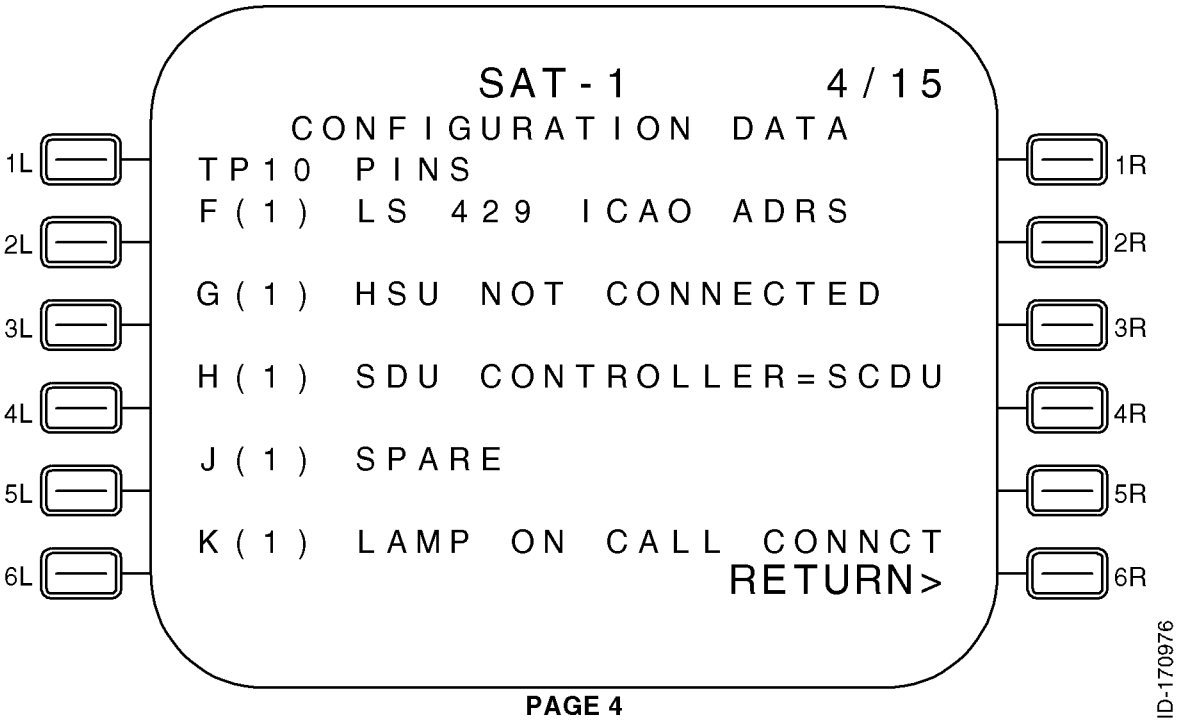


Figure 6-8 (Sheet 4). Configuration Data

(f) CONFIGURATION DATA Page 5 (Figure 6-8, sheet 5):

1 Data Fields

a Line 4

(1) This line displays A(0) PARITY: GOOD, A(1) PARITY: GOOD, A(0) PARITY: BAD, or A(1) PARITY: BAD left-justified as determined by the state of system configuration pin TP11A and the result of the parity validation test.

b Line 6

(1) This line displays B(0) CCS INSTALLED or B(1) CCS NOT INSTALLED left-justified as determined by the state of system configuration pin TP11B.

c Line 8

(1) This line displays C(0) PRI IRS INSTALLED or C(1) PRI IRS NOT INSTLLD left-justified as determined by the state of system configuration pin TP11C.

d Line 10

(1) This line displays D(0) SEC IRS INSTALLED or D(1) SEC IRS NOT INSTLLD left-justified as determined by the state of system configuration pin TP11D.

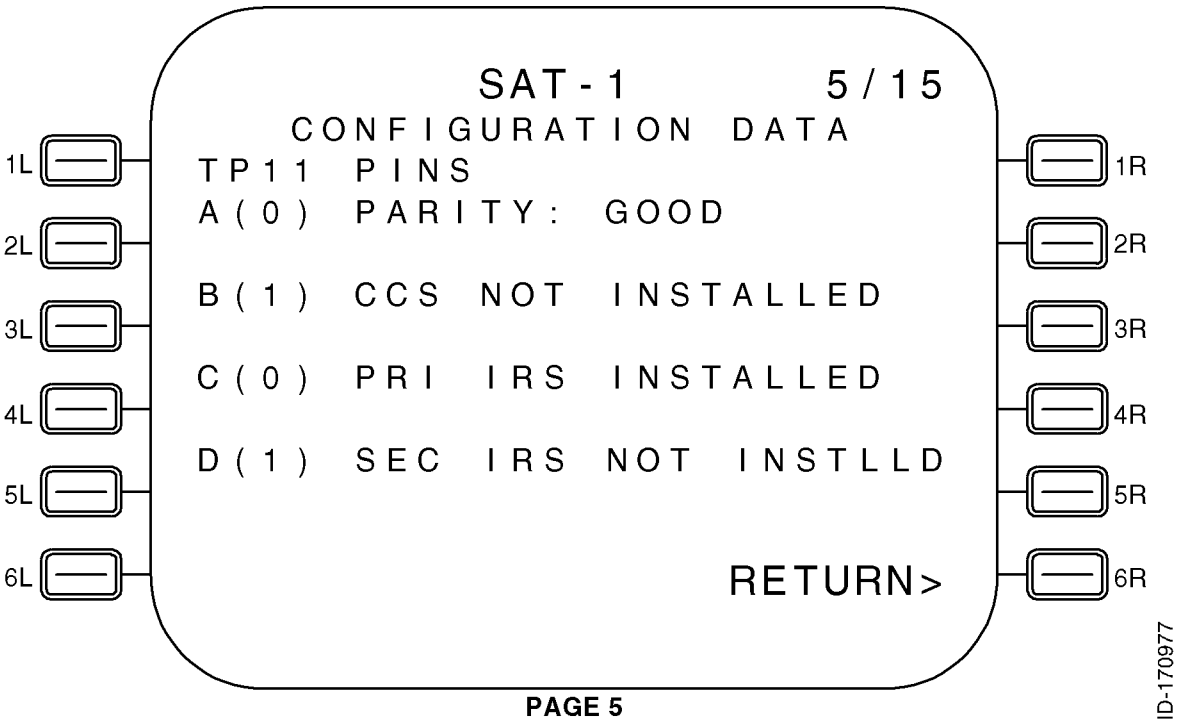


Figure 6-8 (Sheet 5). Configuration Data

(g) CONFIGURATION DATA Page 6 (Figure 6-8, sheet 6):

1 Data Fields

a Lines 4 thru 9

(1) These lines display X(0)* or X(1)* left-justified as shown in the figure, where X represents E, F, G, H, J, and K, respectively. X(0)* or X(1)* is determined by the states of system configuration pins TP11E, TP11F, TP11G, TP11H, TP11J, and TP11K. Asterisks are displayed in column 5 to indicate these pins are a coded group.

(2) Beginning in column 6, textual messages are displayed (refer to Table 6-11) in lines 4 thru 9 (as needed), where an x indicates the message(s) to be displayed based on the state of system configuration pins TP11E, TP11F, TP11G, TP11H, TP11J, and TP11K.

Table 6-11. Textual Message Display (Page 6 – Lines 4 thru 9)

System Configuration Pin	System Configuration Pin Settings (1 = open circuit / 0 = tied to common)						
TP11E	1	0	1	0	1	1	All Other Pin Combinations
TP11F	1	1	0	0	1	1	
TP11G	1	1	1	1	1	1	
TP11H	1	1	1	1	0	0	
TP11J	1	1	1	1	1	0	
TP11K	1	1	1	1	1	0	
Textual Message	Textual Messages To Display Based On System Configuration Pin Settings						
LO GAIN ANT+DLNA	X		X	X			
HPA–LO GAIN	X		X	X			
HI GAIN ANT+BSU–T/L		X	X	X	X		
HI GAIN ANT+BSU–R				X	X		
HPA–HI GAIN		X	X	X	X		
HI POWER RELAY				X	X		
HPA–IGA						X	
ERROR/UNDEFINED							X

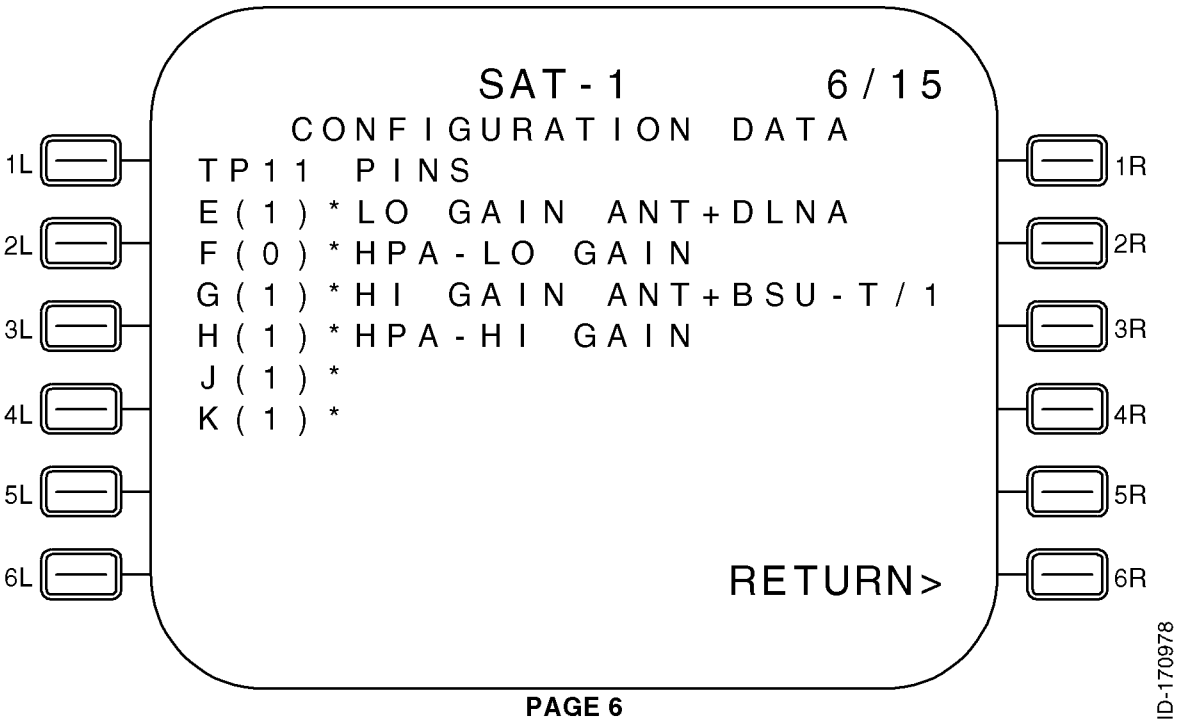


Figure 6-8 (Sheet 6). Configuration Data

(h) CONFIGURATION DATA Page 7 (Figure 6-8, sheet 7):

1 Data Fields

a Lines 4 thru 6

(1) These lines display X(0)* or X(1)* left-justified as shown in the figure, where X represents A, B and C, respectively. X(0)* or X(1)* are determined by the state of system configuration pins TP12A, TP12B, and TP12C. Asterisks are displayed in column 5 to indicate these pins are a coded group.

(2) CFDS/CMC TYPE = is displayed in line 4 beginning in column 6.

(3) Beginning in column 6, a textual message is displayed according to Table 6-12, where an x indicates the message to be displayed, based on the state of system configuration pins TP12A, TP12B and TP12C.

b Line 10

(1) This line displays D(0) RESERVED or D(1) RESERVED left-justified as determined by the state of system configuration pin TP12D.

c Line 12

(1) This line displays E(0) OTHER SDU INSTALLED or E(1) OTHER SDU NOT INSTD left-justified as determined by the state of system configuration pin TP12E.

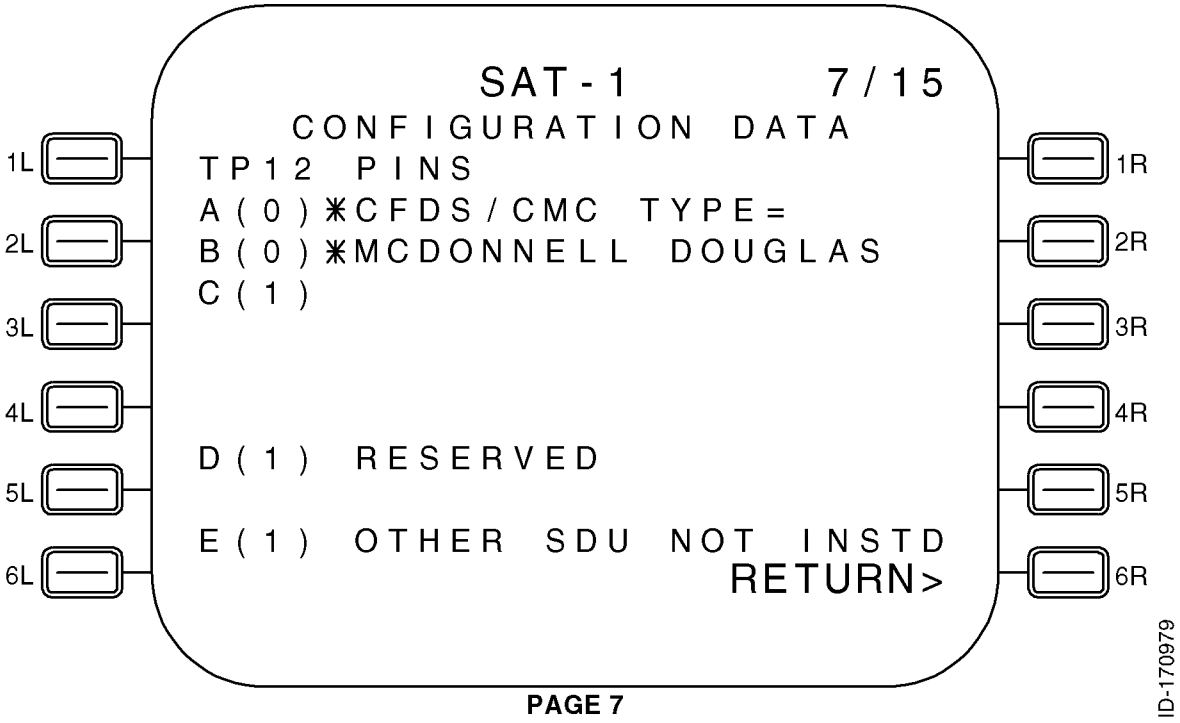


Figure 6-8 (Sheet 7). Configuration Data

Table 6-12. Textual Message Display (Page 7 – Lines 4, 5, and 6)

System Configuration Pin	System Configuration Pin Settings (1 = open circuit / 0 = tied to common)					
TP12A	0	0	1	1	0	All Other Pin Combinations
TP12B	0	1	0	1	1	
TP12C	1	0	0	1	1	
Textual Message	Textual Messages To Display Based On System Configuration Pin Settings					
MCDONNELL-DOUGLAS	X					
AIRBUS		X				
BOEING			X			
NOT INSTALLED				X		
ERROR/UNDEFINED						X
CAIMS					X	

(i) CONFIGURATION DATA Page 8 (Figure 6-8, sheet 8):

1 Data Fields

a Line 4

(1) This line displays F(0) THIS IS SDU2 or F(1) THIS IS SDU1 left-justified as determined by the state of system configuration pin TP12F.

b Line 6 –

(1) This line displays G(0) CMU1 INSTALLED or G(1) CMU1 NOT INSTALLED left-justified as determined by the state of system configuration pin TP12G.

c Line 8

(1) This line displays H(0) CMU2 INSTALLED or H(1) CMU2 NOT INSTALLED left-justified as determined by the state of system configuration pin TP12H.

d Line 10

(1) This line displays J(0) SCDU1 INSTALLED or J(1) SCDU1 NOT INSTALLED left-justified as determined by the state of system configuration pin TP12J.

e Line 12

(1) This line displays K(0) SCDU2 INSTALLED or K(1) SCDU2 NOT INSTALLED left-justified as determined by the state of system configuration pin TP12K.

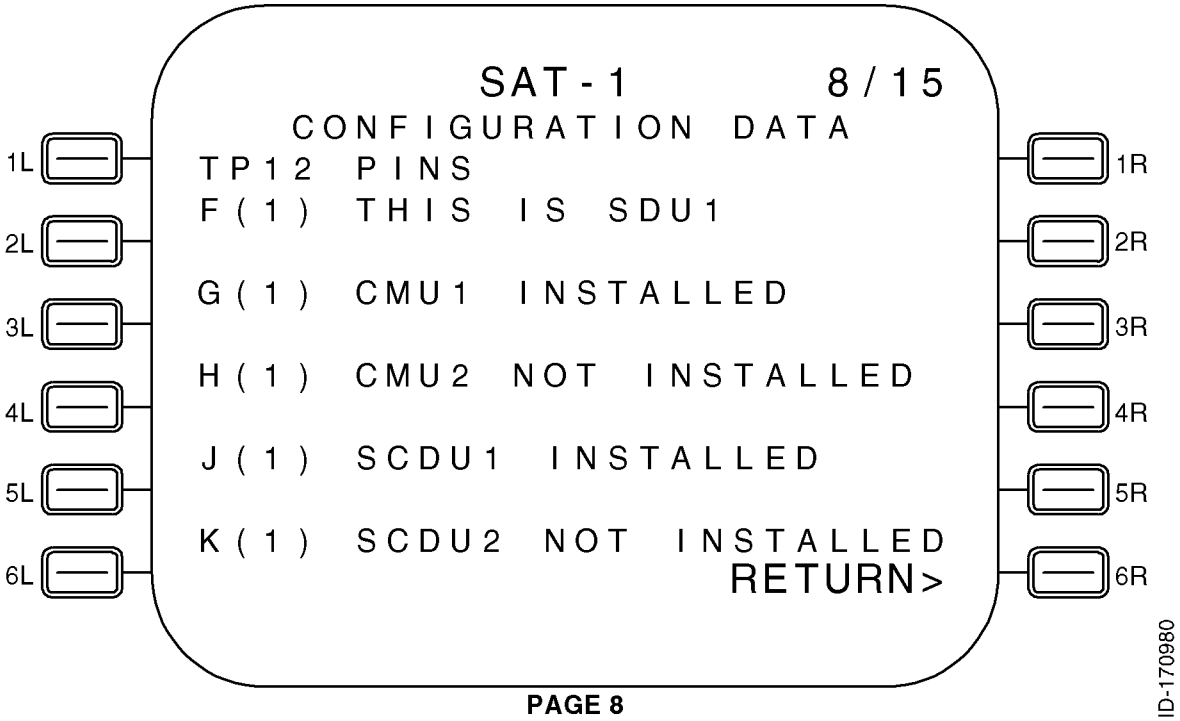


Figure 6-8 (Sheet 8). Configuration Data

(j) CONFIGURATION DATA Page 9 (Figure 6-8, sheet 9):

1 Data Fields

a Line 4

(1) This line displays A(0) NO HSET PRI 4 CALLS or A(1) HSET PRI 4 CALLS OK left-justified as determined by the state of system configuration pin TP13A.

b Line 6

(1) This line displays B(0) LS 429 TO SCDUS or B(1) HS 429 TO SCDUS left-justified as determined by the state of system configuration pin TP13B.

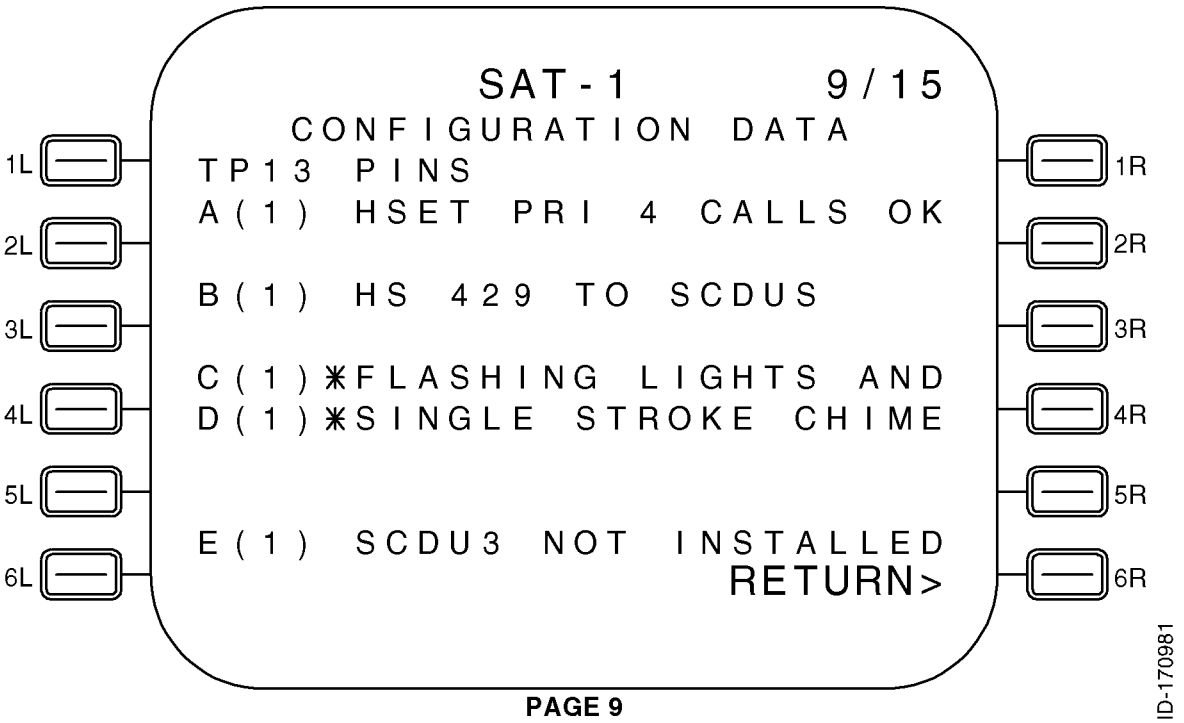


Figure 6-8 (Sheet 9). Configuration Data

c Lines 8 and 9

(1) These lines display X(0)* or X(1)* left-justified as shown in the figure, where X represents C and D, respectively. X(0)* or X(1)* are determined by the state of system configuration pins TP13C and TP13D. Asterisks are displayed in column 5 to indicate these pins are a coded group.

(2) Beginning in column 6, a textual message is shown in line 8 and according to Table 6-13, where an x indicates the message to be displayed, based on the state of system configuration pins TP13C and TP13D.

d Line 12

(1) This line displays E(0) SCDU3 INSTALLED or E(1) SCDU3 NOT INSTALLED left-justified as determined by the state of system configuration pin TP13E.

Table 6-13. Textual Message Display (Page 9 – Lines 8 and 9)

System Configuration Pin		System Configuration Pin Settings (1 = open circuit / 0 = tied to common)			
TP13C		0	0	1	1
TP13D		0	1	0	1
Textual Message		Textual Messages to Display Based on System Configuration Pin Settings			
LIGHTS AND CHIME UNDEFINED	(Line 8) (Line 9)	X			
STEADY LIGHTS AND MULTISTROKE CHIME	(Line 8) (Line 9)		X		
FLASHING LIGHTS AND SINGLE STROKE CHIME	(Line 8) (Line 9)			X	
STEADY LIGHTS AND SINGLE STROKE CHIME	(Line 8) (Line 9)				X

(k) CONFIGURATION DATA Page 10 (Figure 6-8, sheet 10):

1 Data Fields

a Lines 4 and 5

(1) These lines display X(0)* or X(1)* left-justified as shown in the figure, where X represents F and G, respectively. X(0)* or X(1)* are determined by the state of system configuration pins TP13F and TP13G.

(2) Beginning in column 6, a textual message is displayed in lines 4 and 5 according to Table 6-14, where an x indicates the message to be displayed based on the state of system configuration pins TP13F and TP13G.

b Lines 8 and 9

(1) These lines display X(0)* or X(1)* left-justified, where X represents H and J, respectively. X(0)* or X(1)* are determined by the state of system configuration pins TP13H and TP13J. Asterisks are displayed in column 5 to indicate these pins are a coded group.

(2) Beginning in column 6, a textual message is displayed in lines 8 and 9 according to Table 6-15, where an x indicates the message to be displayed based on the state of system configuration pins TP13H and TP13J.

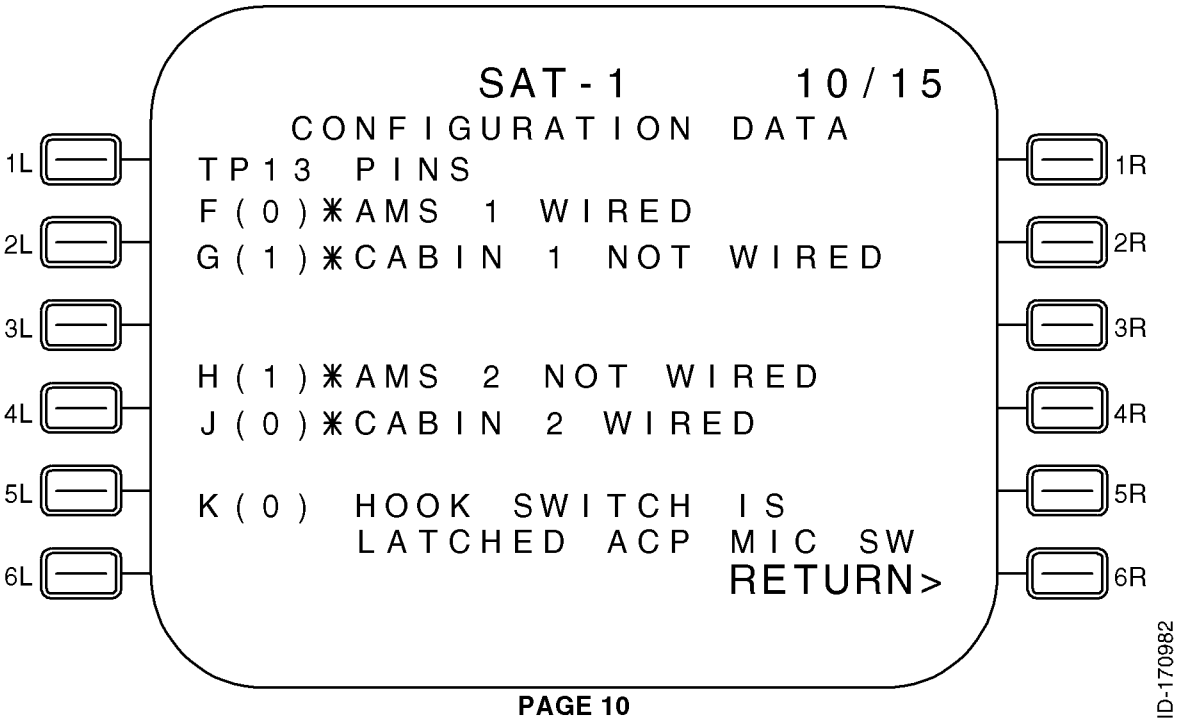


Figure 6-8 (Sheet 10). Configuration Data

c Lines 11 and 12

(1) Line 11 displays K(0) HOOK SWITCH IS left-justified and line 12 displays LATCHED ACP MIC SW beginning in column 6; or line 11 displays K(1) HOOK SWITCH IS left-justified and line 12 displays SWITCHED PTT/SCDU beginning in column 6, as determined by the state of system configuration pin TP13K.

Table 6-14. Textual Message Display (Page 10 – Lines 4 and 5)

System Configuration Pin	System Configuration Pin Settings (1 = open circuit / 0 = tied to common)			
TP13F	0	0	1	1
TP13G	0	1	0	1
Textual Message	Textual Messages to Display Based on System Configuration Pin Settings			
AMS 1 WIRED (Line 4) CABIN 1 WIRED (Line 5)	X			
AMS 1 WIRED (Line 4) CABIN 1 NOT WIRED (Line 5)		X		
AMS 1 NOT WIRED (Line 4) CABIN 1 WIRED (Line 5)			X	
AMS 1 NOT WIRED (Line 4) CABIN 1 NOT WIRED (Line 5)				X

Table 6-15. Textual Message Display (Page 10 – Lines 8 and 9)

System Configuration Pin	System Configuration Pin Settings (1 = open circuit / 0 = tied to common)			
TP13H	0	0	1	1
TP13J	0	1	0	1
Textual Message	Textual Messages to Display Based on System Configuration Pin Settings			
AMS 2 WIRED (Line 8) CABIN 2 WIRED (Line 9)	X			
AMS 2 WIRED (Line 8) CABIN 2 NOT WIRED (Line 9)		X		
AMS 2 NOT WIRED (Line 8) CABIN 2 WIRED (Line 9)			X	
AMS 2 NOT WIRED (Line 8) CABIN 2 NOT WIRED (Line 9)				X

(l) CONFIGURATION DATA Page 11 (Figure 6-8, Sheet 11):

1 General

a Page 11 of the CONFIGURATION DATA page is shown below.

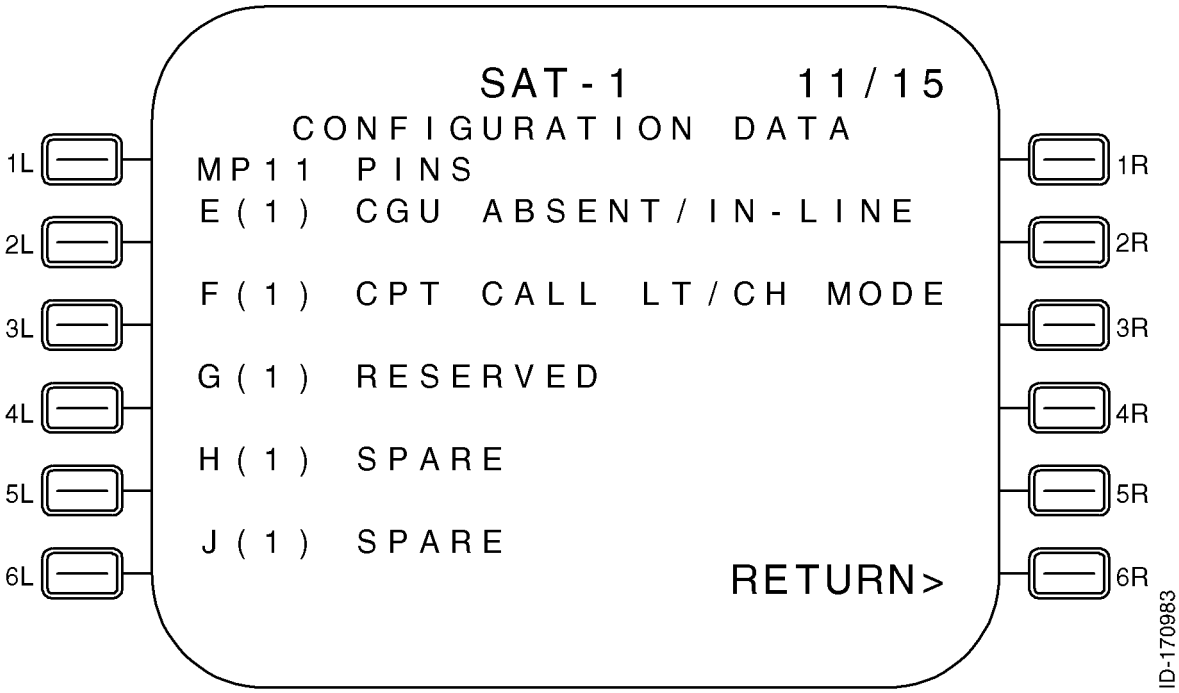


Figure 6-8 (Sheet 11). Configuration Data

(m) CONFIGURATION DATA Page 12 (Figure 6-8, Sheet 12):

1 General

a Page 12 of the CONFIGURATION DATA page is shown below.

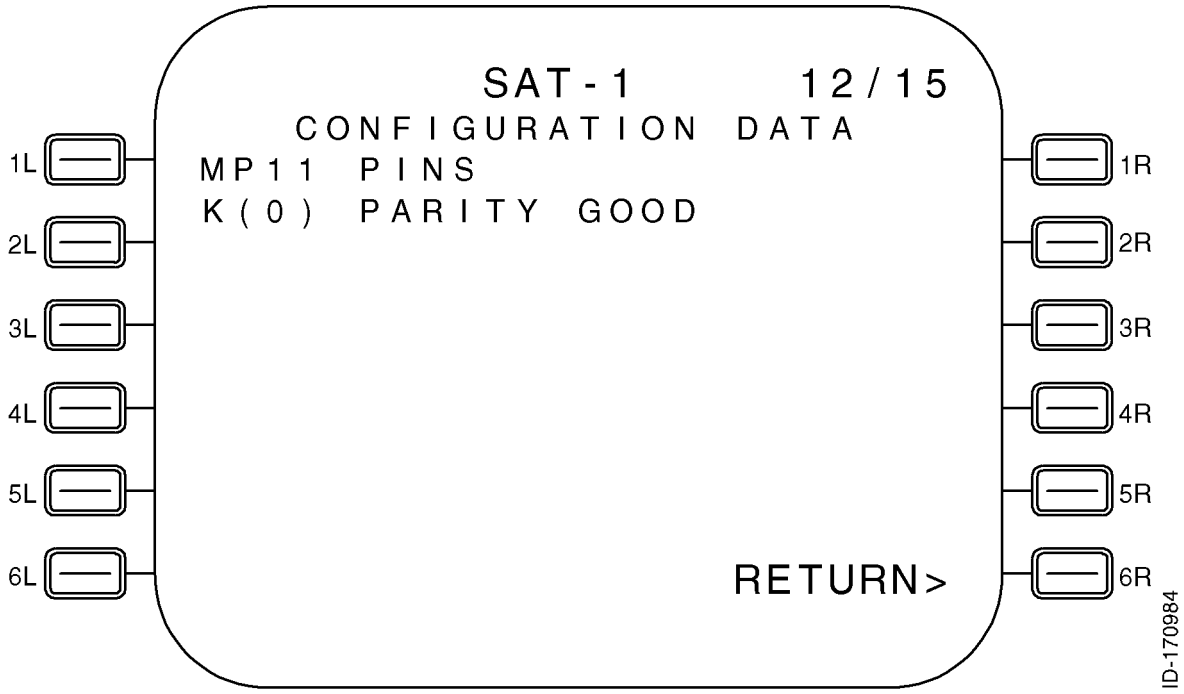


Figure 6-8 (Sheet 12). Configuration Data

(n) CONFIGURATION DATA Page 13 (Figure 6-8, Sheet 13):

1 Data Fields

a Line 3

(1) This line displays the CALL LAMP 1 status of the SDU Cockpit Voice-Call Lamp Discrete Output as ACTIVE or INACT as appropriate.

b Line 4

(1) This line displays the CALL LAMP 2 status of the SDU Cockpit Voice-Call Lamp Discrete Output as ACTIVE or INACT as appropriate.

c Line 6

(1) This line displays the DUAL SYS SELECT status of SDU Dual System Select Discrete Output as ACTIVE or INACT as appropriate.

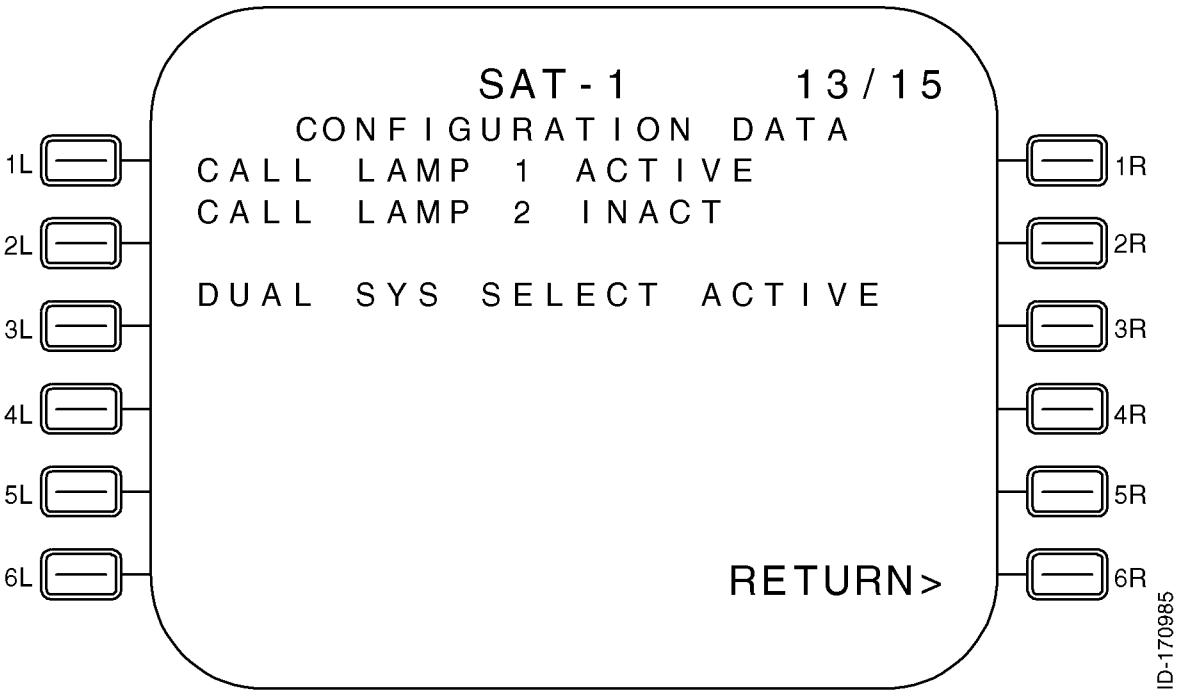


Figure 6-8 (Sheet 13). Configuration Data

(o) CONFIGURATION DATA Page 14 (Figure 6-8, sheet 14):

1 Data Fields

a Line 3

(1) This line displays HPA CMND/STAT beginning in column 1, HGA beginning in column 15, and LGA beginning in column 22.

b Line 4

(1) This line displays BACKOFF(DB) beginning in column 1. The HGA HPA commanded backoff power level (in dB) is displayed (if configured) right-justified in column 17 (as determined from the HGA HPA command word Label 143). The LGA HPA commanded backoff power level (in dB) is displayed (if configured) right-justified in column 24 (as determined from the HGA HPA command word Label 143. The ranged allowed for display of the backoff is 0 to 31 dB in increments of 1 dB.

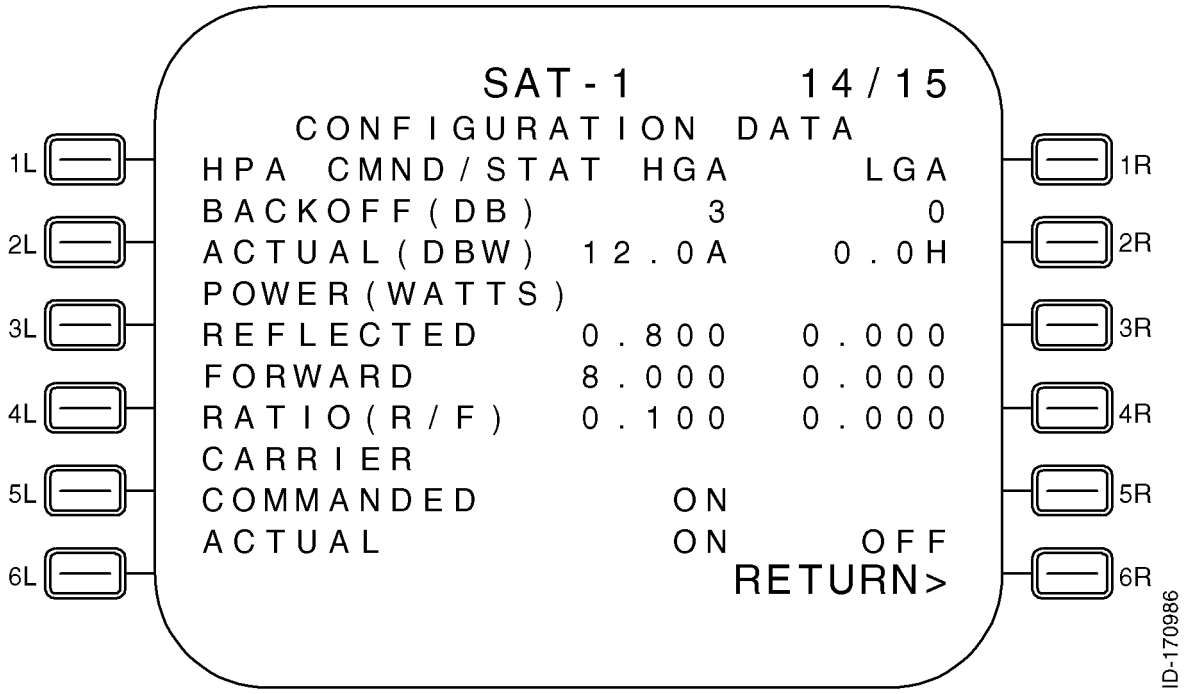


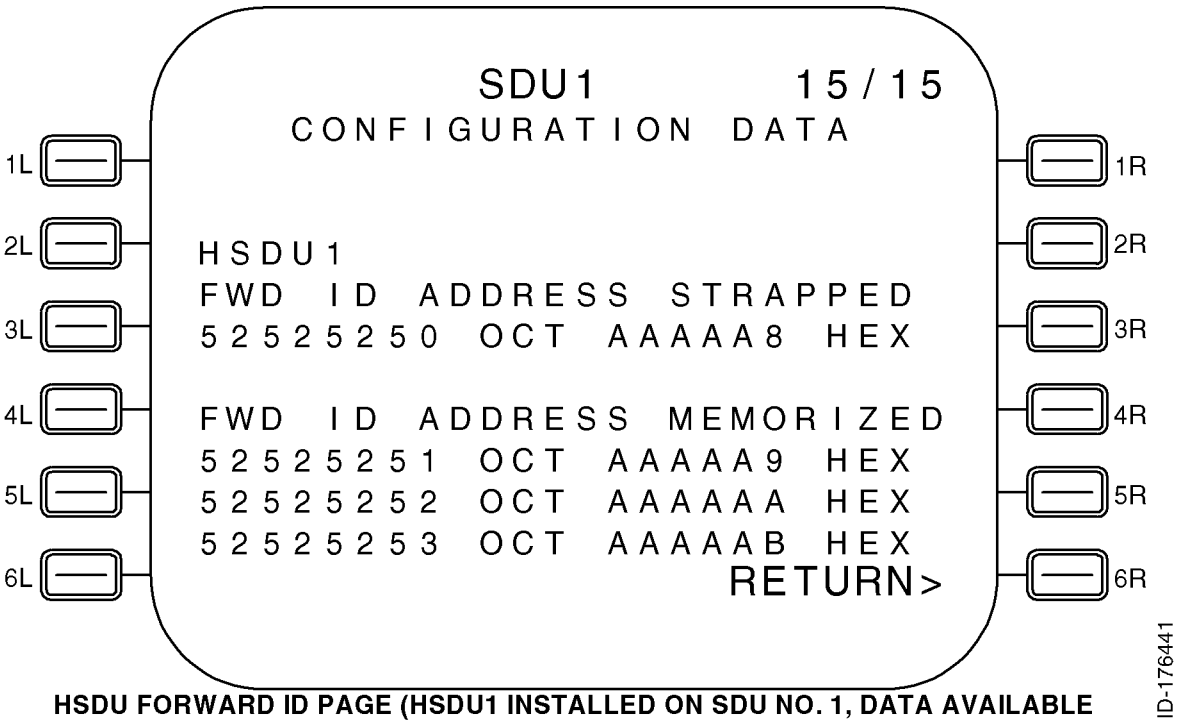
Figure 6-8 (Sheet 14). Configuration Data

c Line 5

(1) This line displays ACTUAL(DBW) beginning in column 1. The HGA HPA reported power level (in dB Watts) is displayed (if configured) right-justified in column 16 (as determined from the HGA HPA status word Label 144). The state of the actual power out status (APOS) bit is indicated as either A for actual or H for held and is displayed in column 17. The LGA HPA commanded backoff power level (in dB Watts) is displayed (if configured) right-justified in column 23 (as determined from the LGA HPA status word Label 144). The state of the APOS status bit is displayed in column 24 as previously stated. The allowable range for display of the actual power is −11.5 to 19.0 dBW in increments of 0.5 dBW. If the actual power value is outside the measurable range, dashes are displayed for the actual power value. If valid data is not available for the HPA status label, dashes are displayed to indicate the unknown data.

d Line 6

(1) This line displays POWER(WATTS) beginning in column 1.



HSDU FORWARD ID PAGE (HSDU1 INSTALLED ON SDU NO. 1, DATA AVAILABLE

Figure 6-8 (Sheet 15). Configuration Data

e Line 7

(1) This line displays REFLECTED beginning in column 1. The HGA HPA reflected power level (in Watts) is displayed (if configured) right-justified in column 17 (as determined from the HGA HPA). The LGA HPA reflected power level (in Watts) is displayed (if configured) right-justified in column 24 (as determined from the LGA HPA). The allowable range for the display of the reflected power value is 0.000 to 25.056 Watts. If the power level is unavailable, dashes are displayed.

f Line 8

(1) This line displays FORWARD beginning in column 1. The HGA HPA reflected power level (in Watts) is displayed (if configured) right-justified in column 17 (as determined from the HGA HPA). The LGA HPA reflected power level (in Watts) is displayed (if configured) right-justified in column 24 (as determined from the LGA HPA). The allowable range for the display of the reflected power value is 0.000 to 80.000 Watts. If the power level is unavailable, dashes are displayed.

g Line 9

(1) This line displays RATIO(R/F) beginning in column 1. The HGA HPA reflected power to forward power ratio is displayed (if configured) right-justified in column 17 (as determined from the HGA HPA). The LGA HPA reflected power to forward power ratio is displayed (if configured) right-justified in column 24 (as determined from the LGA HPA). The allowable range for the display of the reflected power to forward power ratio is 0.000 to 1.000 Watts. If the reported ratio is over-range, the text OVER is displayed. If the ratio number is unavailable, dashes are displayed.

NOTE: The over-range condition occurs when the forward power is more than 50 Watts while the reflected power is at the maximum of 25.056 Watts. The HPA indicates the over-range condition through the solo word ratio value of $FF_{H.}$

h Line 10

(1) This line displays CARRIER beginning in column 1.

i Line 11

(1) This line displays COMMANDED beginning in column 1. The HGA HPA commanded carrier state is displayed (if configured) right-justified in column 17 (as determined from the HGA HPA). The LGA HPA commanded carrier state is displayed (if configured) right-justified in column 24 (as determined from the LGA HPA). The commanded carrier state is displayed as either ON or OFF.

j Line 12

(1) This line displays ACTUAL beginning in column 1. The HGA HPA actual carrier state is displayed (if configured) right-justified in column 17 (as determined from the HGA HPA). The LGA HPA commanded carrier state is displayed (if configured) right-justified in column 24 (as determined from the LGA HPA). The actual carrier state is displayed as either ON or OFF.

k Line 13

(1) This line displays RETURN> right-justified. Pushing LS key 6L causes the page display to revert to the SAT–N (SATCOM MAINTENANCE) page.

(7) DATA LOADER MENU Page

(a) General

1 Access to this page is from SATCOM SUBMENU page (or the SATCOM MAINTENANCE page). The access page depends on the configuration of the aircraft as defined in Figure 6-2. The purpose of this page is to supply a means of commanding data loader actions. See Figure 6-9 for example pages.

(b) Data Fields

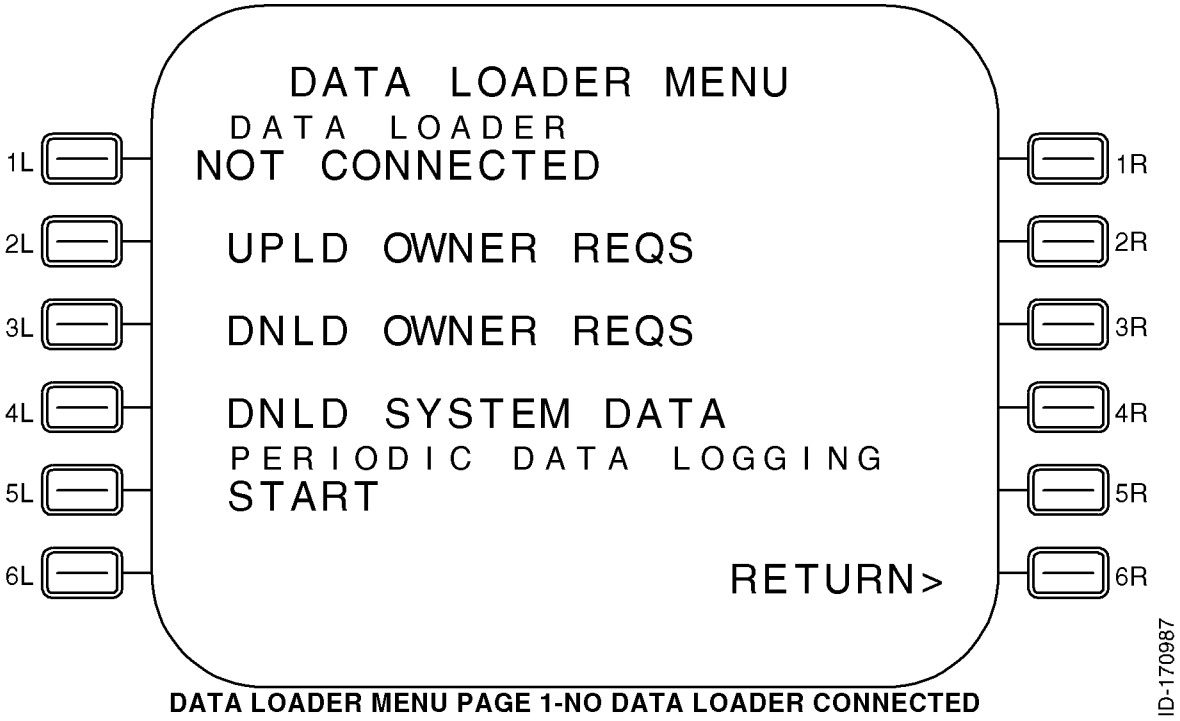
1 Field 1L

a This field displays DATA LOADER in the label line and the data loader status in the data line. Possible status displays depend on the data loader status as follows:

- NOT CONNECTED – Displayed when the status of both data loader is absent.
- CONNECTED – Displayed when at least one data loader status is CONNECTED, and the status of neither data loaders is READY, BUSY, or ERROR.
- READY – Displayed when a data loader status is READY.
- BUSY – Displayed when a data loader status is BUSY.

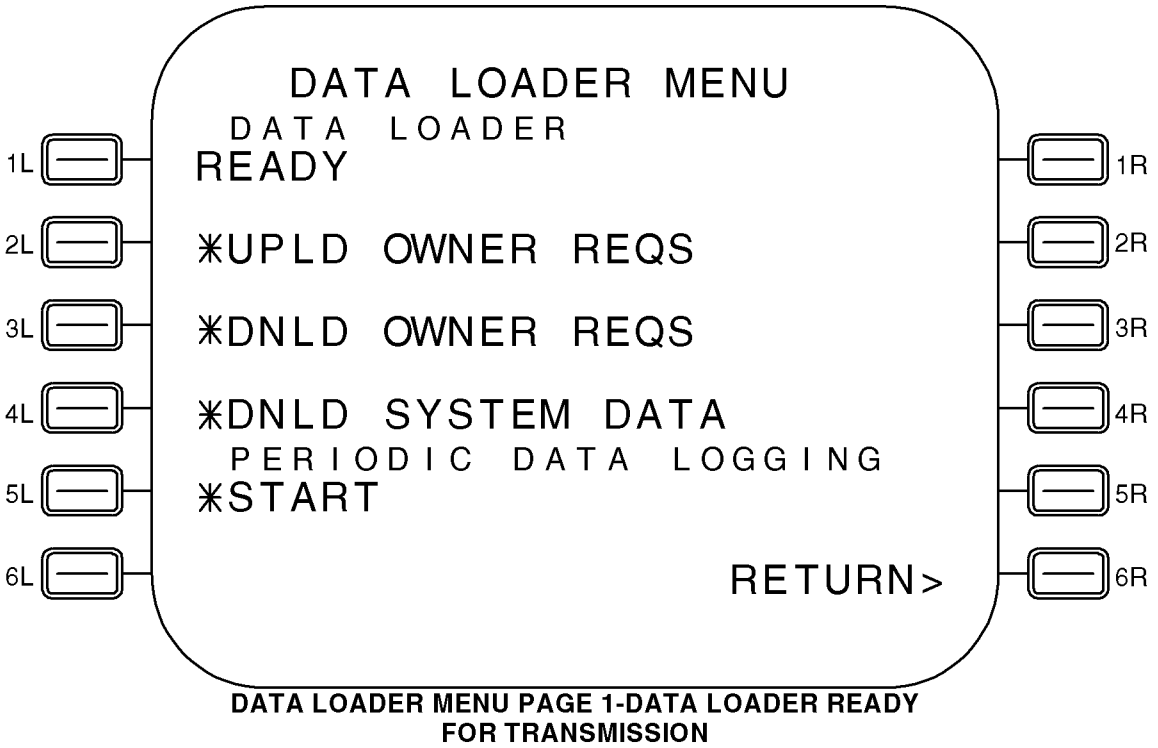
b READY must be displayed before data uploading or downloading can be performed.

c Asterisks are only displayed adjacent to the left LS keys when the data loader status is READY.



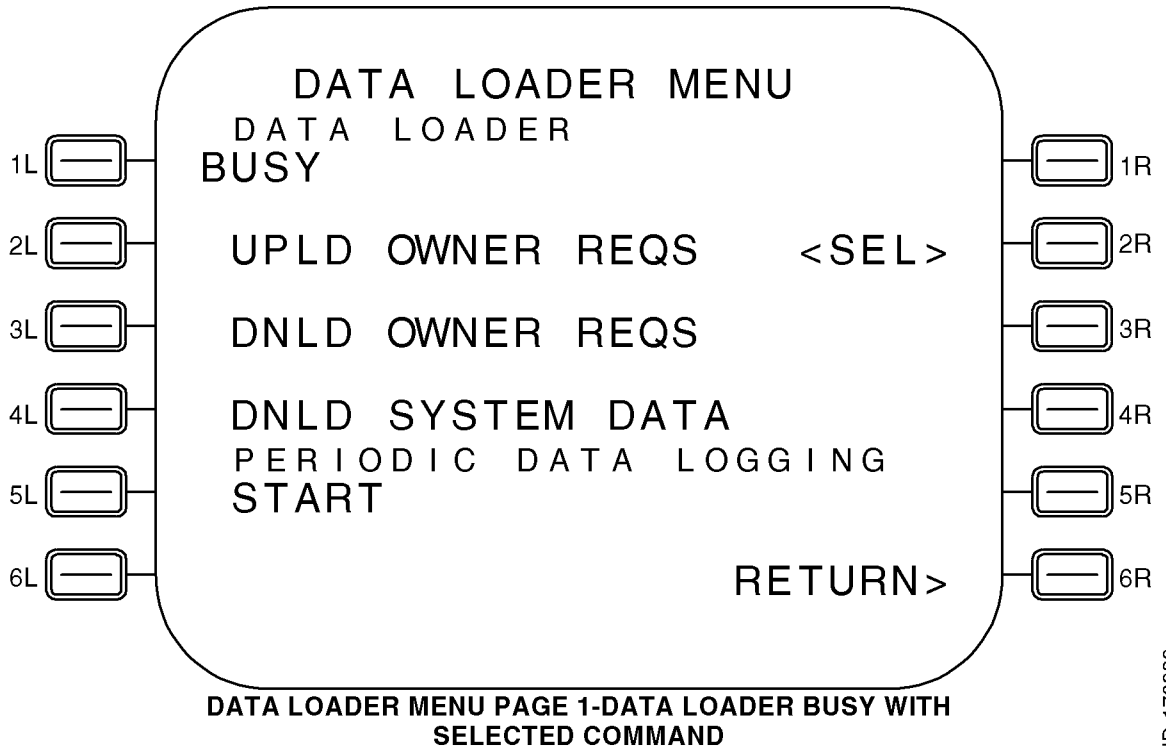
DATA LOADER MENU PAGE 1-NO DATA LOADER CONNECTED

Figure 6-9 (Sheet 1). DATA LOADER MENU



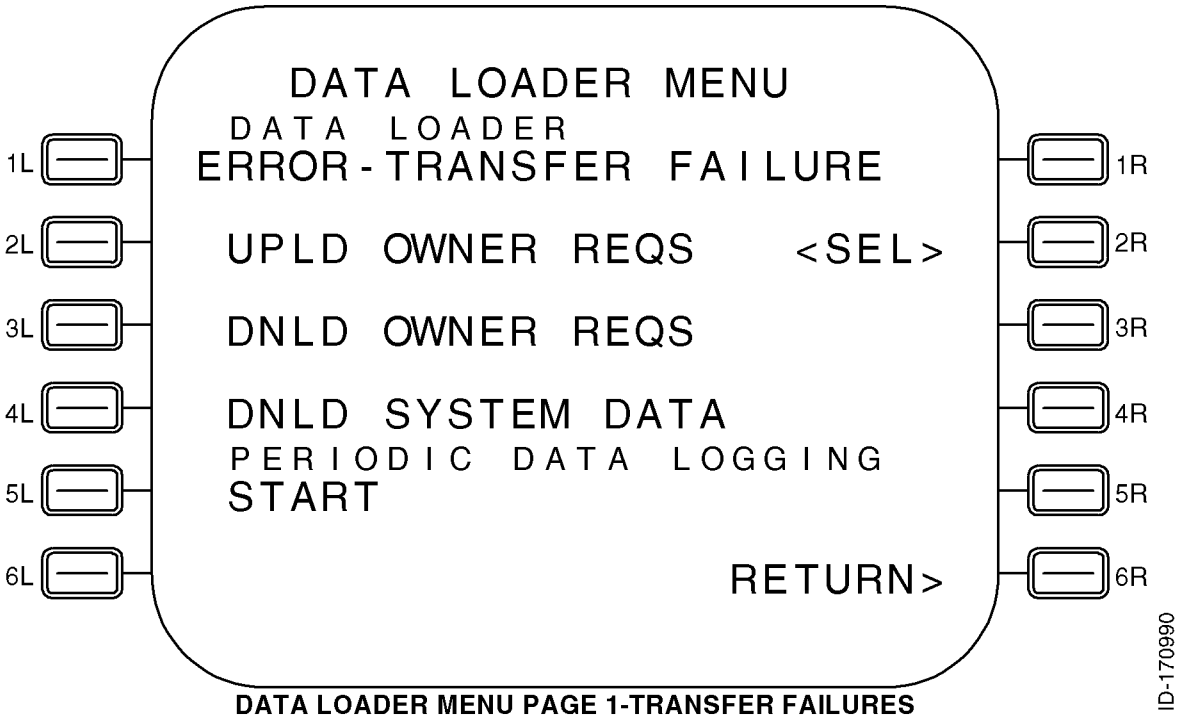
DATA LOADER MENU PAGE 1-DATA LOADER READY FOR TRANSMISSION

Figure 6-9 (Sheet 2). DATA LOADER MENU



DATA LOADER MENU PAGE 1-DATA LOADER BUSY WITH SELECTED COMMAND

Figure 6-9 (Sheet 3). DATA LOADER MENU



DATA LOADER MENU PAGE 1-TRANSFER FAILURES

Figure 6-9 (Sheet 4). DATA LOADER MENU

d Several messages are displayed when the status of a data loader is ERROR . If the status becomes ERROR, an appropriate error message is appended to ERROR, separated by a dash. Possible error messages are displayed as follows:

- DISK FULL
- TRANSFER FAILURE
- FILE NOT FOUND
- CRC FAILURE
- BAD FILE HEADER
- BAD OWNER REQS VER
- OPEN DISK
- CLOSE DISK
- WRITE PROTECT
- COMP ORT NOT ALLOW.

e The TRANSFER FAILURE error message indicates an ARINC 615 protocol transfer failure (e.g., loss of communications). The OPEN DISK and CLOSE DISK error messages are displayed when an undefined disk command completion code is received. COMP ORT NOT ALLOW is indicated when a composite ORT version upload is attempted and the setting for ORT item liv does not allow it.

2 Fields 2L thru 5L

a These fields display prompts in the data line for commanding data loader actions. The prompts that can be displayed for the indicated DATA LOADER MENU page (1 or 2) are as given in Table 6-16.

Table 6-16. DATA LOADER MENU Page Prompts

LS Key	Display Prompt
2L	UPLD OWNER REQS
3L	DNLD OWNER REQS
4L	DNLD SYSTEM DATA
5L	START

b The display prompts given in Table 6-16 command the following actions:

- UPLD OWNER REQS – upload owner requirements table
- DNLD OWNER REQS – download owner requirements table
- DNLD SYSTEM DATA – download all event/fail/config/ORT logs

c Asterisks are only displayed beside the adjacent left LS key when the data loader status is READY (except as stated below). When asterisks are displayed, pushing the left LS key adjacent to the desired action commands the data loader to initiate that action.

d Uploads are allowed regardless of the log-on state (composite uploads are inhibited only by ORT item liv and not the log-on state).

e Once a left LS key is pushed, the <SEL> message is displayed to the right of the selected data loader action, right-justified. The data loader status changes to BUSY and data transfers occur. There is only one data loader command selected at a time. The <SEL> message remains displayed until the 6L key is pushed if the data loader status becomes ERROR after a left LS key is pushed. When the data transfer is completed, or after an error has been acknowledged, the <SEL> message is removed and the data loader status changes appropriately.

3 Fields 5L and 5R

a PERIODIC DATA LOGGING is displayed in the label line beginning in column 2. In the data line, START is displayed adjacent to the 5L key. No asterisk is displayed beside the 5L key when the data loader status is either NOT CONNECTED, CONNECTED, BUSY, or ERROR.

b When the START prompt is selected by pushing the 5L key when the data loader status is READY:

- Periodic data logging starts
- The asterisk next to START is removed
- The <SEL> message is displayed beginning in column 8
- STOP is displayed adjacent to the 5R key.

c Periodic data logging continues until the 5R key is pushed, at that time the data line display reverts to its original state (i.e., only the START prompt with or without an asterisk as appropriate).

d The <SEL> message remains displayed and the STOP prompt is blanked if the data loader status changes to ERROR after periodic data logging has started. This condition remains until the error is acknowledged by pushing the 6L key and/or the data loader status changes, at that time the data line display changes as appropriate.

4 Field 6L

a 6L – This data line displays the *ACK ERROR prompt. This prompt is displayed when the data loader status is ERROR. Pushing the 6L key causes the SDU to remove the ERROR status and display the current data loader status (i.e., NOT CONNECTED or CONNECTED) in the 1L data line.

b The SDU completes the upload/download data transfer by commanding the data loader transfer complete function. The data loader responds with a TRANSFER COMPLETE indication and enters a no loop. To return the data loader to the READY state, the user must cause the data loader to read the configuration file on the diskette (i.e., cycle data loader power or remove/insert the diskette).

5 Field 6R

a 6R – This data line displays the RETURN> prompt. Pushing the 6R key causes the display to revert to the SATCOM SUBMENU page (or SATCOM MAINTENANCE page) as appropriate.

(8) LAST LEG REPORT Page

(a) Access to this page is from the SAT–N (i.e., SATCOM MAINTENANCE) page. The purpose of this page is to display Class 1 and 2, Level 1 diagnosed, failures reported during the last leg. See Figure 6-10 for example pages.

(b) The Last Leg Report lists two failures per page if a failure is present during the last leg. These two sets of lines display Class 1 and 2, Level 1 diagnosed, last leg failures. Failures are displayed in chronological order (i.e., the most recent detected failure last) with no more than two failures displayed per page. The number of LAST LEG REPORT pages depends on the number of failures to report (up to a maximum of 99 pages). When there is an odd number of failures to report, the odd failure is displayed on a page of its own in lines 5, 6, and 7, and lines 9, 10, and 11 are blank. If there are no failures to report, lines 6, 7, 9, 10, and 11 are blank. Line 5 displays NO FAULT DETECTED beginning in column 4 if there are no failures to report.

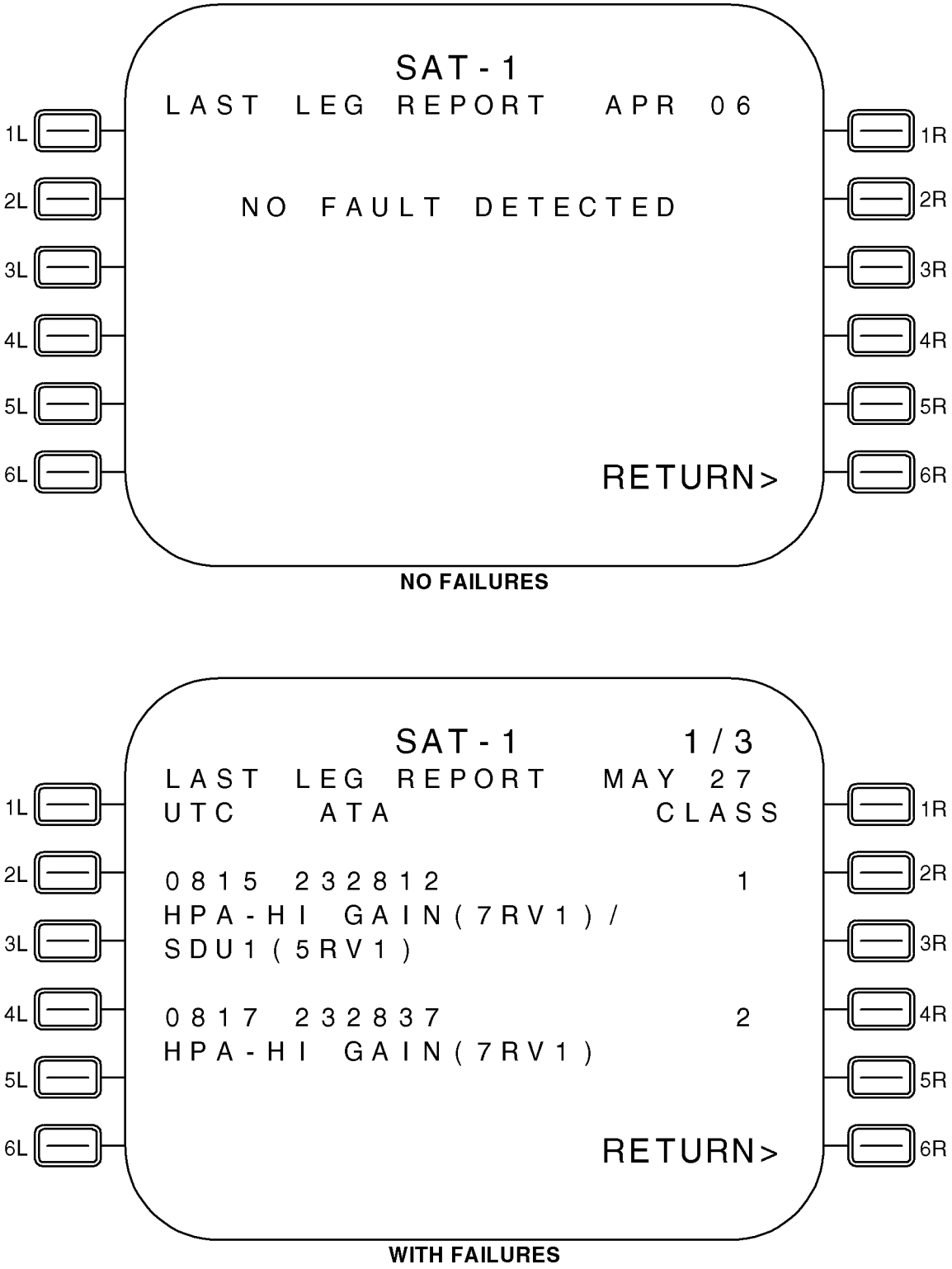


Figure 6-10. LAST LEG REPORT Page

(c) Line 5 and, if applicable, line 9 display the universal time coordinated (UTC) beginning in column 1, and ATA beginning in column 6, and the class number in column 23.

(d) The UTC is displayed as hhmm, where hh represents the UTC hours from 00 to 23, and mm represents the UTC minutes from 00 to 59. The UTC is the time of the failure reporting as stored in the SDU system failure memory log. Dashes are displayed if no valid UTC data is available.

(e) The ATA number is displayed as aaaaaa, where aaaaaa represents the ATA reference number of the reported failure as specified in paragraph 3.E. for each type of CFDS. For CFDS type none, no ATA number is displayed.

(f) The class number is displayed as c, where c represents the class (1 or 2) of the failure.

(9) PREVIOUS LEGS REPORT Page

(a) Access to this page is from the SAT–N (i.e., SATCOM MAINTENANCE) page. The purpose of this page is to display Class 1 and 2, Level 1 diagnosed, failures reported during previous legs. See Figure 6-11 for example pages.

(b) The Previous Leg Report lists two failures per page if a failure was present during the previous leg. These two sets of lines display Class 1 and 2, Level 1 diagnosed, last leg failures. Failures within each flight leg are displayed in chronological order (i.e., the most recent detected failure last) with no more than two failures displayed per page. However, the flight leg display is in reverse chronological order (i.e., flights go back in time while failures for each individual flight go forward in time).

(c) The number of PREVIOUS LEGS REPORT pages depends on the number of failures to report (up to a maximum of 99 pages). If there are no failures to report, lines 6, 7, 9, 10, and 11 are blank. Line 5 displays NO FAULT DETECTED beginning in column 4 if there are no failures to report.

(d) Failures from different flight legs with the same aircraft identification are mixed on the same page. When the last leg falls in lines 5, 6, and 7, failures from the previous flight leg are displayed on the same page in lines 9, 10, and 11.

(e) When the given flight leg has a different aircraft identification recorded than the flight leg before it, the failure display begins in lines 5, 6, and 7 on the next page of the multiple page sequence. When there are no failures to report for a given flight leg, nothing is reported for that flight leg (i.e., the flight leg is skipped).

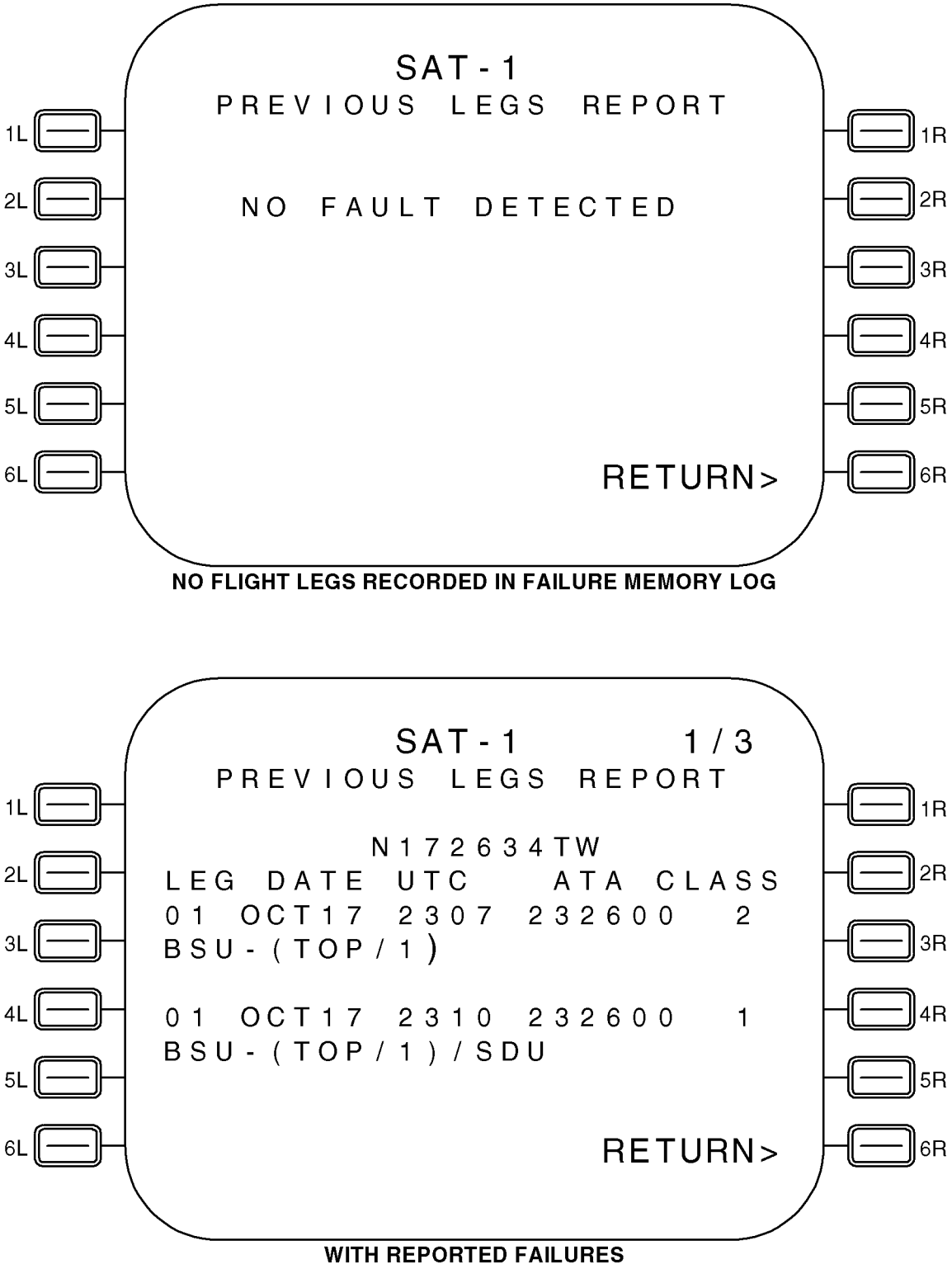
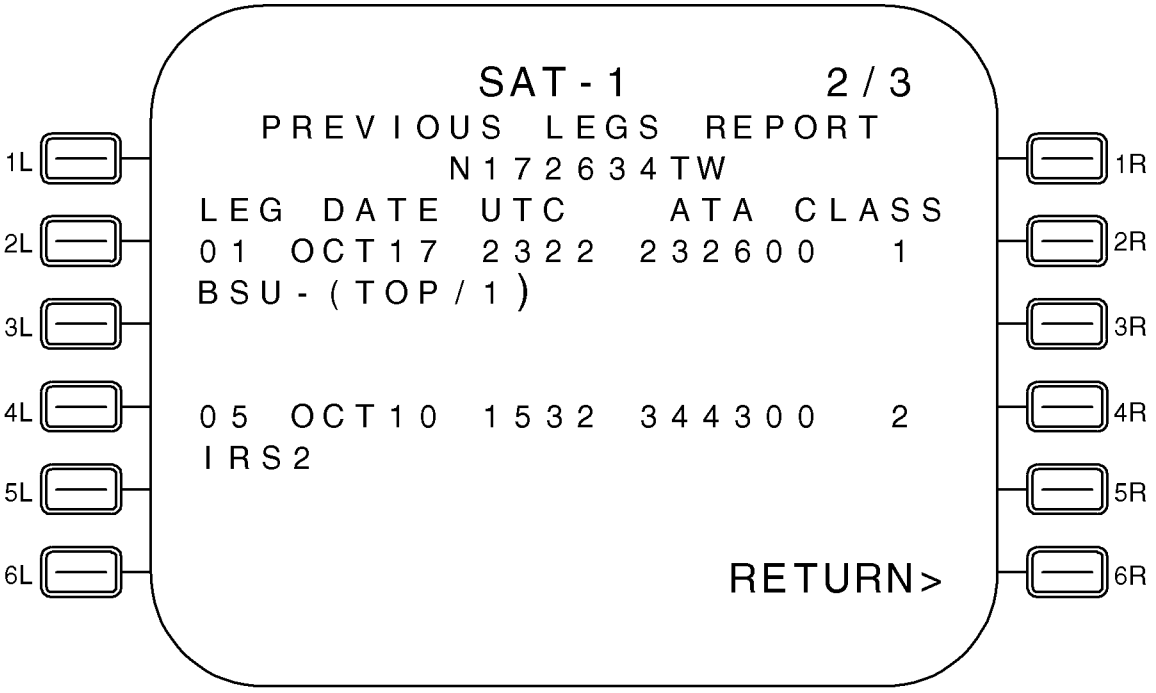
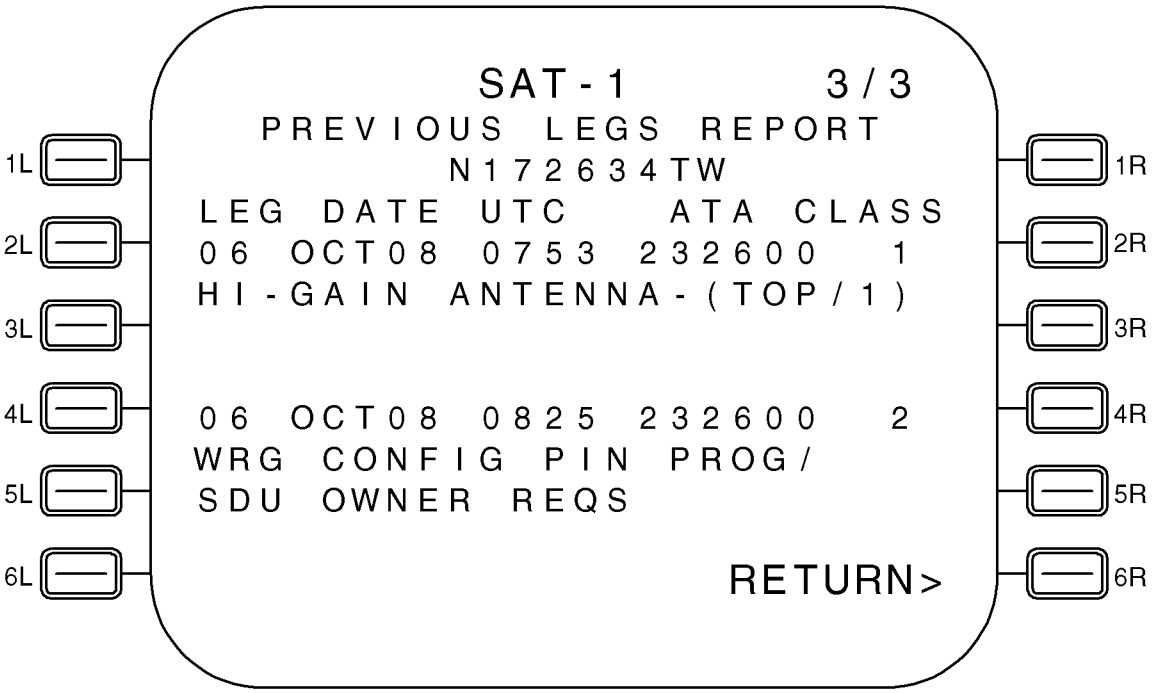


Figure 6-11 (Sheet 1). PREVIOUS LEG REPORT Page



WITH REPORTED FAILURES



WITH REPORTED FAILURES

Figure 6-11 (Sheet 2). PREVIOUS LEG REPORT Page

(f) Line 5 and line 9 (if applicable) display the flight leg number beginning in column 1, the UTC beginning in column 10, and the ATA number beginning in column 15.

(g) The flight leg is displayed as fl, where fl represents the flight leg number from 01 to either:

- The number of flight legs recorded in the SDU system failure memory log
- 63 flight legs
- From 01 to the maximum number of flight legs that can be displayed given the PREVIOUS LEGS REPORT page limit of 99.

(h) The date is displayed as mmmdd, where mmm represents the month of the year as JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, or DEC, and dd represents the day of the month from 01 to 31. The date is the date of the flight leg number as stored in the SDU system failure memory log. Dashes are displayed if no valid UTC data is available.

(i) The UTC time is displayed as hhmm, where hh represents the UTC hours from 00 to 23, and mm represents the UTC minutes from 00 to 59. The UTC is the time of the failure reporting as stored in the SDU system failure memory log. Dashes are displayed if no valid UTC data is available.

(j) The ATA number is displayed as aaaaaa, where aaaaaa represents the ATA reference number of the reported failure as specified in paragraph 3.E. for each type of CFDS. For CFDS type none, no ATA number is displayed.

(k) The class number is displayed as c, where c represents the class (1 or 2) of the failure.

(10) LRU IDENTIFICATION Page

(a) Access to this page is from the SAT–N (i.e., SATCOM MAINTENANCE) page. The purpose of this page is to display a list of all installed LRUs with their associated part numbers, modification levels, and serial numbers, and to display ORT identification data. See Figure 6-12 for example pages.

(b) If a Honeywell/Thales HPA is installed, the associated part/serial number is displayed; otherwise the HPA display entry is removed. The number of LRU IDENTIFICATION pages depends on the number of LRUs to list.

(c) For the LRUs, line 4 and, if applicable, line 9 display a three letter acronym representing the installed LRU. The possible LRU acronyms are given in Table 6-17.

Table 6-17. LRU Acronyms

LRU Acronym	LRU Name
SDU	Satellite Data Unit
HPH	High Power Amplifier – High Gain Antenna
HPL	High Power Amplifier – Low Gain Antenna
HSU	High–Speed Data Unit

(d) For the LRUs, line 5 and, if applicable, line 10 display P/N beginning in column 1, the LRU end-item part number beginning in column 6, and the software modification level in columns 23 and 24.

(e) The P/N is displayed as bbbbbbb–hhsss, where bbbbbbb–hhsss represents the LRU end-item part number consisting of a seven-digit LRU base part number (i.e., bbbbbbb), a two-digit hardware configuration number (i.e., hh), and a three-digit software configuration number (i.e., sss). Dashes are displayed if no valid data is available.

(f) The software modification level is displayed as nn, where nn represents up to a two-character LRU software modification level.

(g) Line 6 and, if applicable, line 11 display S/N beginning in column 1 and the LRU serial number beginning in column 5. The S/N is diplayed as ssssssss, where ssssssss represents the LRU serial number. Dashes are displayed if no valid data is available.

(h) For the Honeywell/Thales MCS system, the two-digit LRU hardware and LRU serial number must be manually entered through the CMT interface for valid data to be available for display. This data is stored during an LRU end-item test. All other numbers reside within the LRU software. For non-Honeywell/Thales interfacing HPAs, no such data is available to the SDU, therefore, dashes are displayed for the HPA part/serial numbers.

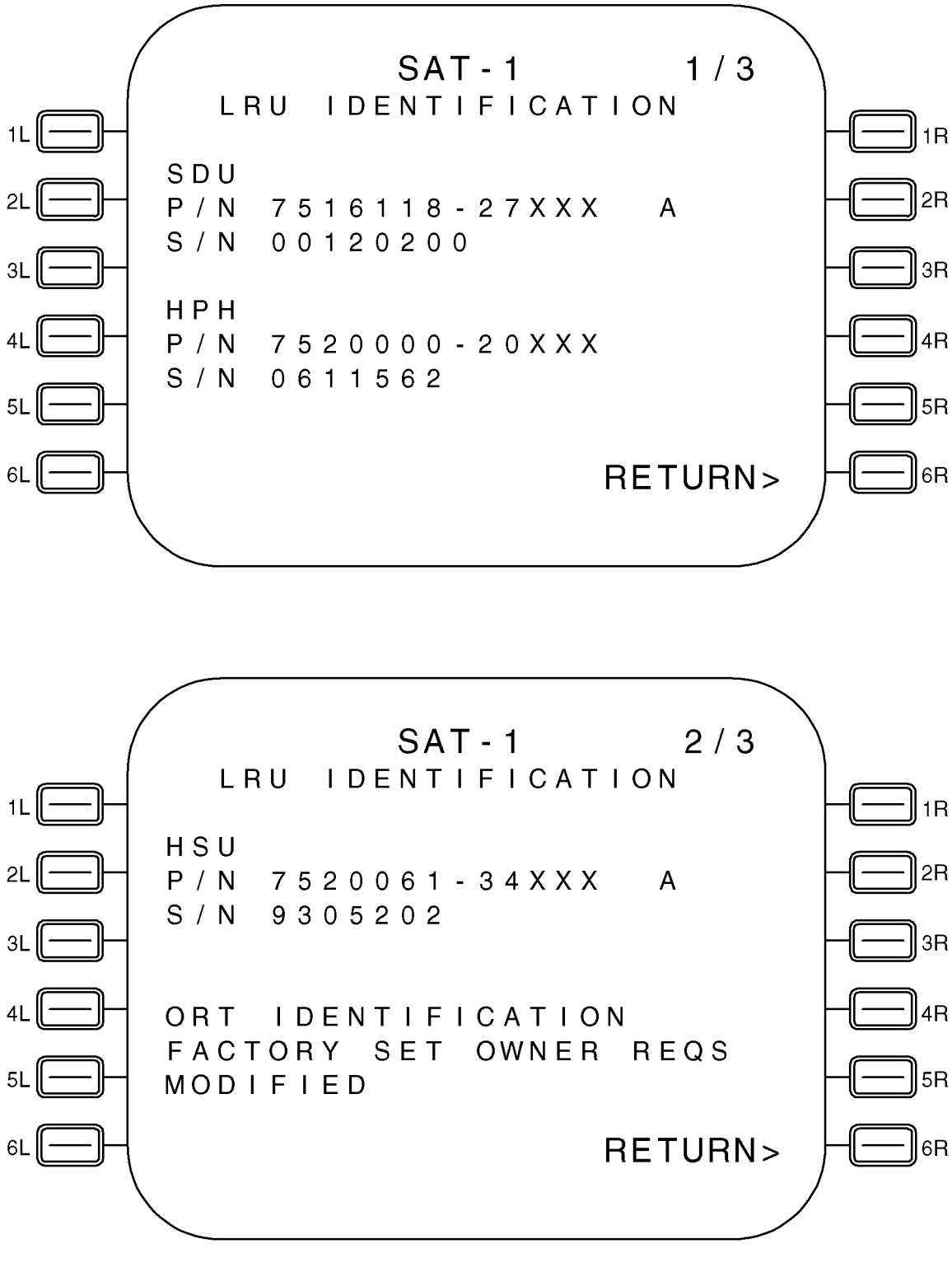


Figure 6-12 (Sheet 1). LRU IDENTIFICATION Page

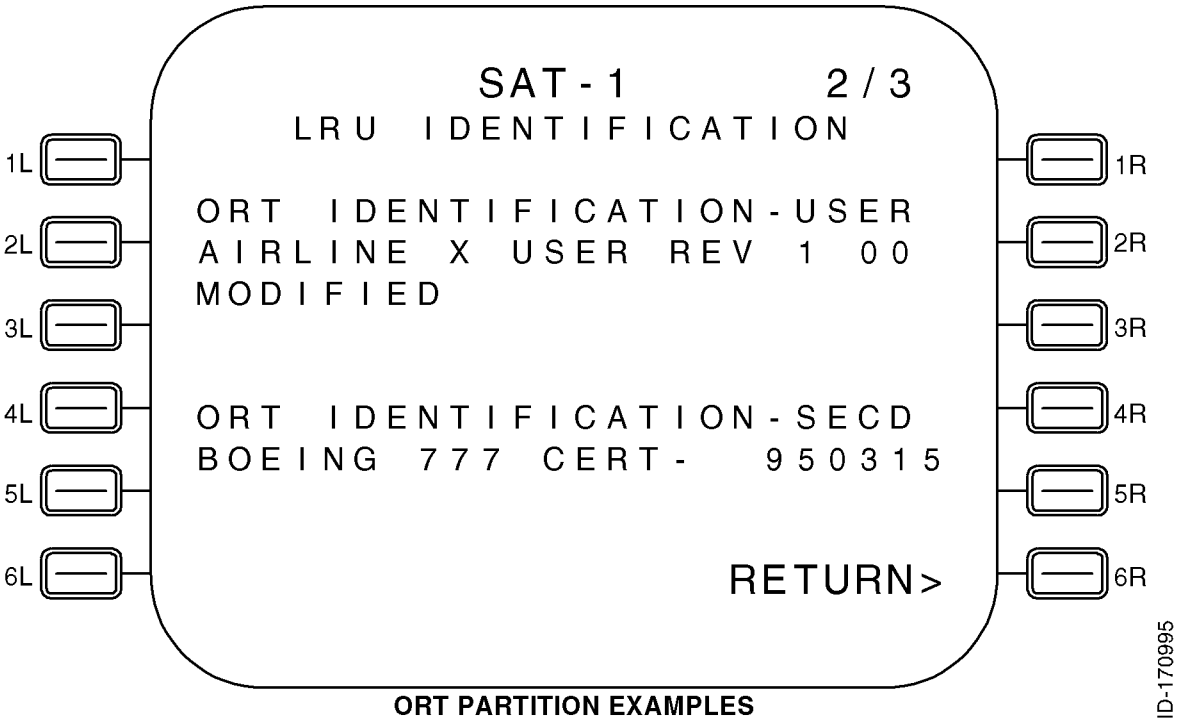


Figure 6-12 (Sheet 2). LRI IDENTIFICATION Page

(i) The ORT identification is displayed in either lines 4, 5, and 6, or in lines 9, 10, and 11 depending on where the LRU list falls. Line 4 or line 9, as appropriate, displays the header ORT IDENTIFICATION left-justified. If the ORT is a partitioned version, the text, –USER, is added to the end of the header text. Line 5 or line 10, as appropriate, displays the ORT 24-character description as contained in ORT item xxxiii (refer to Appendix B). Line 6 or line 11, as appropriate, displays MODIFIED left-justified, if the state of ORT item xxxvii (refer to Appendix C) is modified. If the state of ORT item xxxvii is unmodified, the MODIFIED flag is not displayed.

(j) If the ORT is loaded as separate partitions, the secured ORT identification is displayed in either lines 4, 5, and 6, or in lines 9, 10, and 11 depending on where the first ORT ident falls. Line 4 or line 9, as appropriate, displays the header ORT IDENTIFICATION–SECD left-justified. Line 5 or line 10, as appropriate, displays the ORT 24-character description as contained in ORT item liii (refer to Appendix C) for the secured partition. Line 6 or line 11, as appropriate, displays MODIFIED left-justified, if the state of the ORT secured partition modified flag (refer to Appendix C) is modified. If the state of the ORT secured partition modified flag is unmodified, the MODIFIED flag is not displayed.

(11) TROUBLE SHOOTING DATA Page

(a) General

1 Access to this page is from the SAT-N (i.e., SATCOM MAINTENANCE) page. The purpose of this page is to display Class 1 and 2, Level 1, diagnosed failures reported during the last leg and previous legs. See Figure 6-13 for example pages.

2 The Trouble Shooting Data pages display the class 1 and 2 last leg and previous legs failure details. Failures are displayed in chronological order (i.e., the most recent detected failure last) with one failure displayed per page. Flight leg display order is reverse chronological (i.e., flights go back in time while failures for each individual flight go forward in time). The number of pages depends on the number of failures to report (up to 64 flight legs or 99 pages).

(b) Data Fields

1 Line 4

a Line 4 displays the date beginning in column 2 and the UTC beginning in column 8. The date and time are displayed as follows.

b The month is displayed as mmm, where mmm represents the month of the year as JAN, FEB, MAR, APR, MAY JUN, JUL, AUG, SEP, OCT, NOV, or DEC.

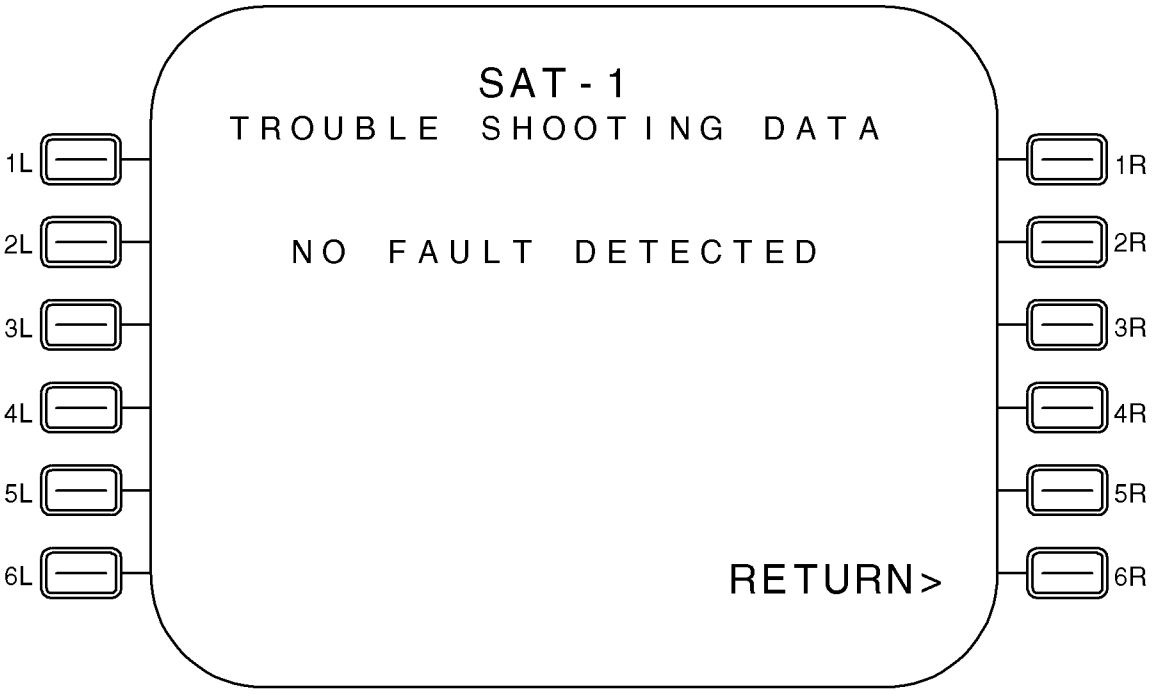
c The day is displayed as dd, where dd represents the day of the month from 01 to 31.

d The UTC is displayed as hh:mm, where hh represents the UTC hours from 00 to 23 and mmm represents the UTC minutes from 00 to 59. The UTC is the time the failure was stored in the failure memory log on this flight leg. Dashes are displayed if no valid UTC data is available.

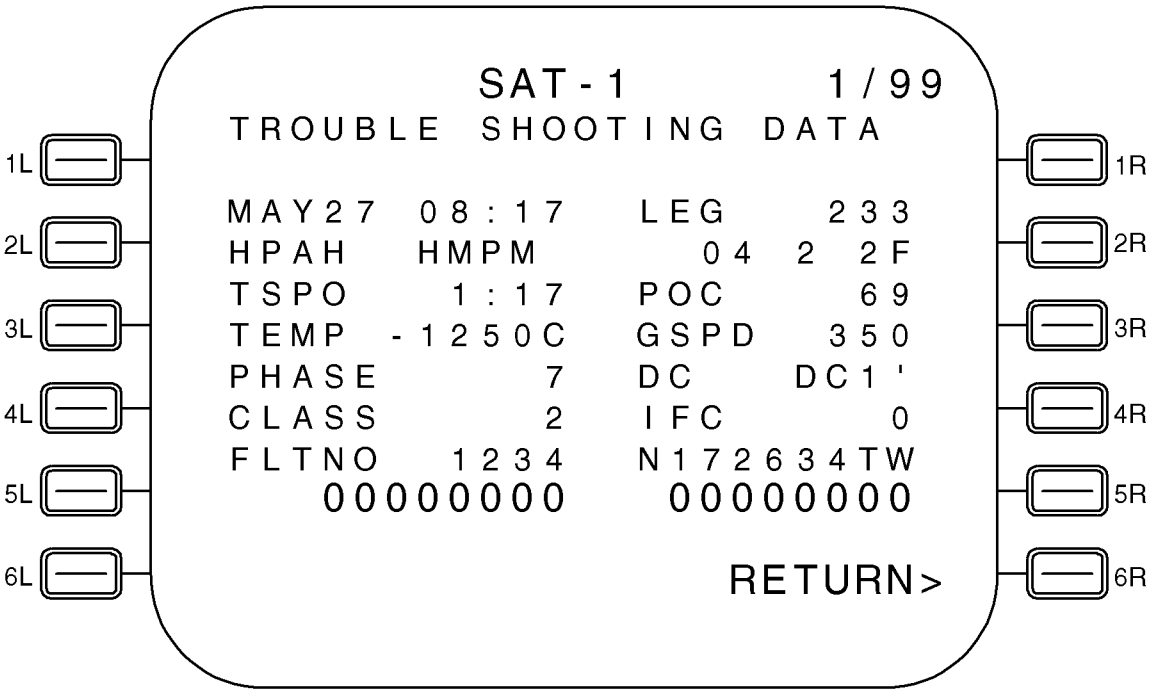
e Line 4 displays the header, LEG, beginning in column 15 and the flight leg count right-justified from column 23.

2 Line 5

a Line 5 displays beginning in column 2 the LRU abbreviated name of up to five characters that corresponds to the level 1 failure code. The SRU abbreviated name of up to five characters is displayed beginning in column 8. If the SRU designation in the failure code is 0, no SRU abbreviation is displayed. The LRU failure code is displayed as two hexadecimal digits beginning in column 17. The SRU failure code is displayed as one hexadecimal digit beginning in column 20. The failure code is displayed as two hexadecimal digits beginning in column 22.



NO FAILURES



LAST LEG AND PREVIOUS LEGS FAILURES

Figure 6-13. TROUBLESHOOTING DATA Page

3 Line 6

a Line 6 displays the time since power–on (TSPO) header beginning in column 2, and the LRU power–on counter (POC) header beginning in column 15. The LRU time since power-on is displayed right-justified from column 12.

b The TSPO is displayed as hhh:mm, where hhh represents the hours of the elapsed time since the unit powered up from 0 to 999, and mm represents the minutes portion of the elapsed time from 0 to 59.

c Line 6 displays the power-on count value from 0 to 65535 right-justified from column 23.

4 Line 7

a Line 7 displays the headers, TEMP, beginning in column 2, and groundspeed (GSPD), beginning in column 15. The LRU-failed SRU (or PSU) temperature is displayed right-justified from column 12. Dashes are displayed if no valid temperature data is available. The GSPD is displayed right-justified from column 23.

5 Line 8

a Line 8 displays the headers, PHASE, beginning in column 2, and DC, beginning in column 15. The flight phase is displayed right-justified from column 12. If a numbered flight phase is not available, then an **a** or **g** is shown in column 12, as appropriate. The DC state is displayed as DC0, DC0', DC1, DC1', or DC2 right-justified from column 23.

6 Line 9

a Line 9 displays the headers, CLASS, beginning in column 2, and IFC, beginning in column 15. The failure class is displayed in column 12. The intermittent failure count is displayed in column 23.

7 Line 10

a Line 10 displays the header FLTNO beginning in column 2. The flight number is displayed right-justified from column 12. The aircraft tail number is displayed right-justified from column 23. Dashes are displayed if no valid flight number or tail number data is available.

8 Line 11

a Line 11 displays the failure parameter as eight hexadecimal digits beginning in column 5. The associated parameter is displayed as eight hexadecimal digits beginning in column 16.

(12) LAST LEG CLASS 3 FAULTS Page

(a) Access to this page is from the SAT–N (CFDS SATCOM Maintenance Menu) page. The purpose of this page is to display Class 3, Level 1 diagnosed, failures reported during the last leg. See Figure 6-14 for example pages.

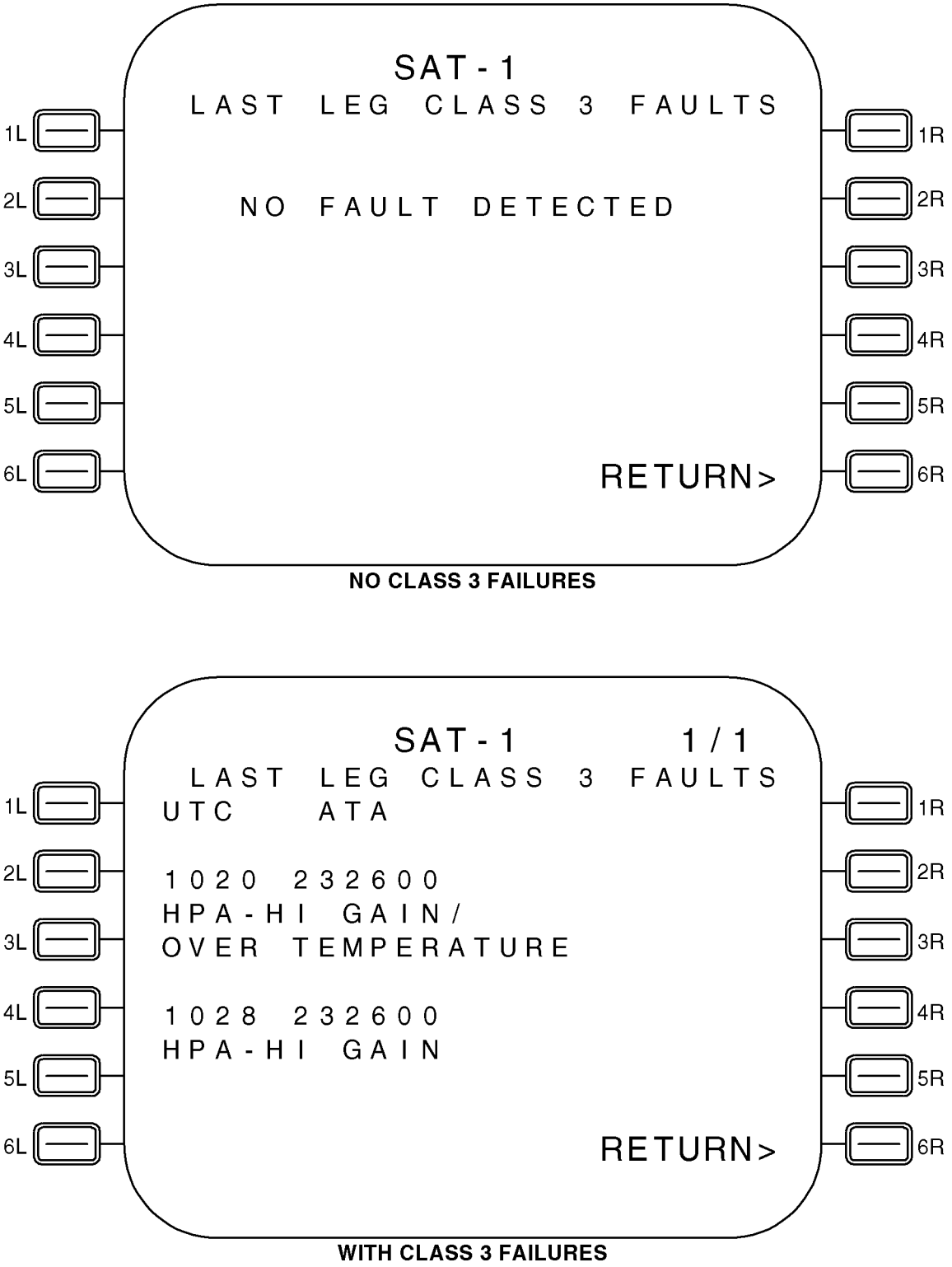


Figure 6-14. LAST LEG CLASS 3 FAULTS Page

(b) The Last Leg Class 3 Faults lists two Class 3 faults per page if Class 3 faults are present during the last leg. These two sets of lines display Class 3, Level 1 diagnosed, last leg failures. Failures are displayed in chronological order (i.e., the most recent detected failure last) with no more than two failures displayed per page.

(c) The number of LAST LEG CLASS 3 FAULTS pages depends on the number of failures to report (up to a maximum of 99 pages). When there is an odd number of failures to report, the odd failure is displayed on a separate page in lines 5, 6, and 7, and lines 9, 10, and 11 are blank. If there are no failures to report, lines 6, 7, 9, 10, and 11 are blank. Line 5 displays NO FAULT DETECTED beginning in column 4 if there are no failures to report.

(d) Line 5 and, if applicable, line 9 display the UTC beginning in column 1 and the ATA number beginning in column 6.

(e) The UTC number is displayed as hh:mm, where hh represents the UTC hours from 00 to 23, and mm represents the UTC minutes from 00 to 59. The UTC is the time of the failure reporting as stored in the SDU system failure memory log. Dashes are displayed if no valid UTC data is available.

(f) The ATA number is displayed as aaaaaa, where aaaaaa represents the ATA reference number of the reported failure as specified in paragraph 3.E. for each type of CFDS. For CFDS type none, no ATA number is displayed.

(13) GROUND REPORT Page

(a) Access to this page is from the SAT–N (i.e., SATCOM MAINTENANCE) page. The purpose of this page is to display Class 1, 2, or 3, Level 1 diagnosed ground failures that occurred during the last leg. See Figure 6-15 for example pages.

(b) The Ground Report lists two failures per page if failures are detected during the last leg. These two sets of lines display Class 1, 2, and 3, Level 1 diagnosed, last leg failures. Failures are displayed in chronological order (i.e., the most recent detected failure last) with no more than two failures displayed per page.

(c) The number of GROUND REPORT pages depends on the number of failures to report (up to 99 pages). When there is an odd number of failures to report, the odd failure is displayed on a separate page in lines 5, 6, and 7, and lines 9, 10, and 11 are blank. If there are no failures to report, lines 6, 7, 9, 10, and 11 are blank. Line 5 displays NO FAULT DETECTED beginning in column 4 if there are no failures to report.

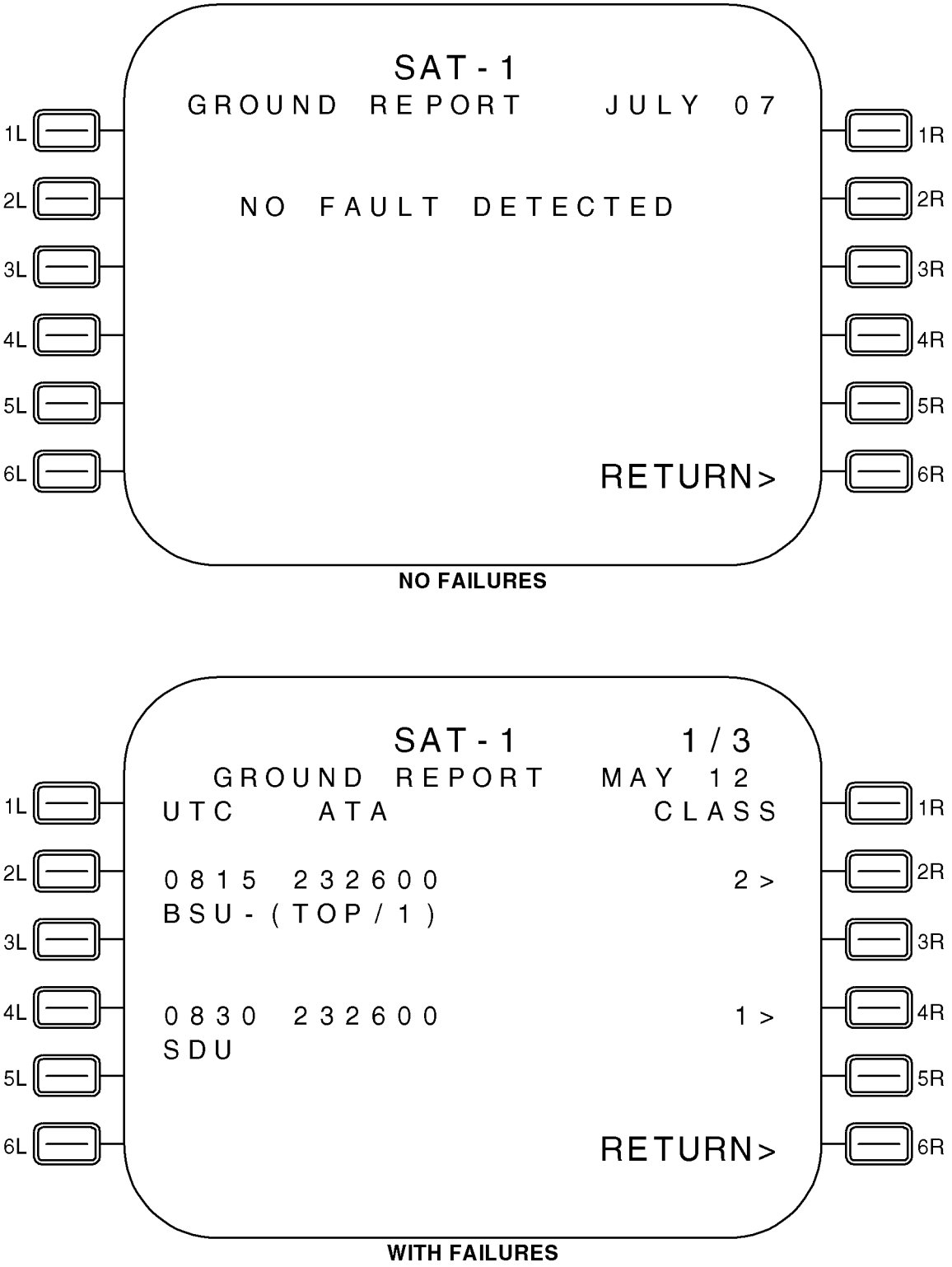


Figure 6-15. GROUND REPORT Page

(14) GROUND REPORT (TROUBLE SHOOTING DATA) Page

(a) General

1 Access to this page is from the GROUND REPORT page. The purpose of this page is to display Class 1, 2, or 3, Level 1 diagnosed ground failures that occurred during the last leg ground report. See Figure 6-16 for example pages.

2 One failure is listed per page if a failure is present. These lines display Class 1, 2, and 3, Level 1 diagnosed, last leg ground report failure details corresponding to the Level 1 failures from which the troubleshooting data was initiated. Failures are displayed in chronological order (i.e., the most recent detected failure last) with one failure displayed per page.

(b) Line 4

1 Line 4 displays the date beginning in column 2 and the UTC beginning in column 8. The date and time are displayed as follows.

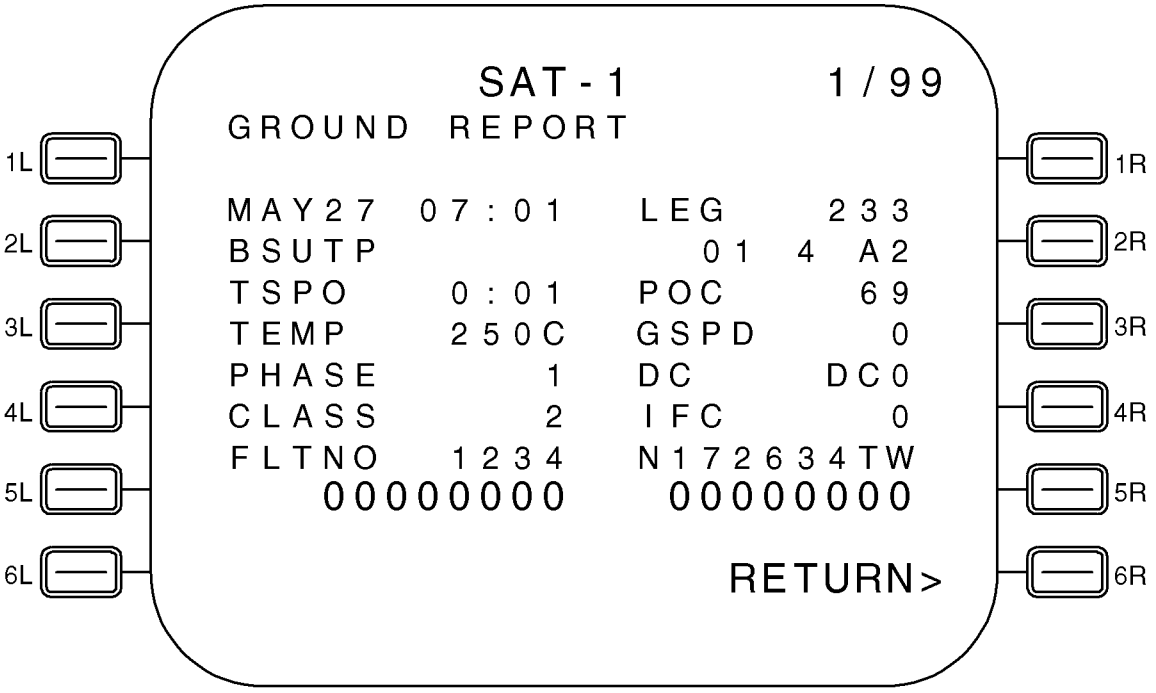
2 The month is displayed as mmm, where mmm represents the month of the year as JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, or DEC.

3 The day is displayed as dd, where dd represents the day of the month from 01 to 31.

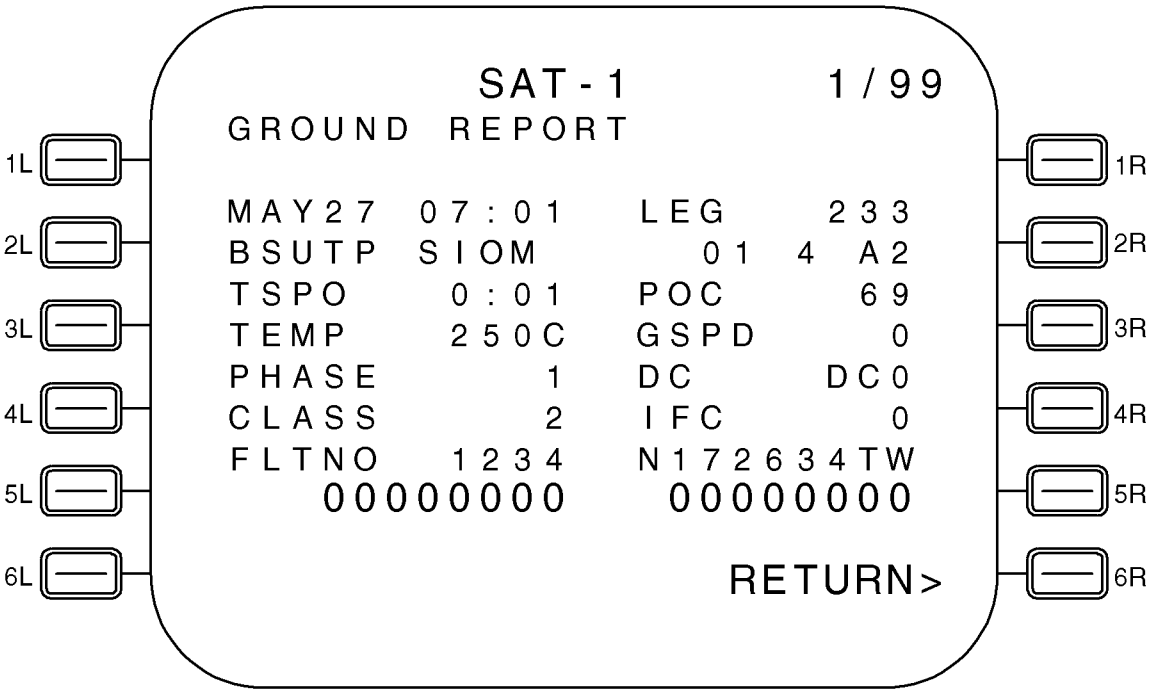
4 The UTC is displayed as hh:mm, where hh represents the UTC hours from 00 to 23 and mm represents the UTC minutes from 00 to 59. The UTC is the time the failure was stored in the failure memory log on this flight leg. Dashes are displayed if no valid UTC data is available.

(c) Line 5

1 Line 5 displays the LRU abbreviated name of up to five characters that corresponds to the Level 1 failure code. The SRU abbreviated name of up to five characters is displayed beginning in column 8. If the SRU designation in the failure code is 0, no SRU abbreviation is displayed. The LRU failure code is displayed as two hexadecimal digits beginning in column 17. The SRU failure code is displayed as one hexadecimal digit beginning in column 20. The failure code is displayed as two hexadecimal digits beginning in column 22.



FOR CLASS 2 FAILURE



FOR CLASS 1 FAILURE

Figure 6-16. GROUND REPORT TROUBLE SHOOTING DATA Page

(d) Line 6

1 Line 6 displays the headers, TSPO, beginning in column 2 and, POC, beginning in column 15. The LRU time since power-on is displayed right-justified from column 12.

2 The UTC is displayed as hh:mm, where hh represents the UTC hours from 00 to 23 and mm represents the UTC minutes from 00 to 59. The UTC is the time the failure was stored in the failure memory log on this flight leg. Dashes are displayed if no valid UTC data is available.

3 Line 6 displays the power-on count value from 0 to 65535 right-justified from column 23.

(e) Line 7

1 Line 7 displays the headers, TEMP, beginning in column 2, and GSPD, beginning in column 15. The LRU-failed SRU (or PSU) temperature is displayed right-justified from column 12. Dashes are displayed if no valid temperature data is available. The groundspeed is displayed right-justified from column 23.

(f) Line 8

1 Line 8 displays the headers, PHASE, beginning in column 2, and DC, beginning in column 15. The flight phase is displayed right-justified from column 12. If a numbered flight phase is not available, then an **a** or **g** is shown in column 12, as appropriate. The DC state is displayed as DC0, DC0', DC1, DC1', or DC2 right-justified from column 23.

3. Maintenance Computer Interface

A. General

(1) The SDU is designed to interface with the Boeing 747–400 Central Maintenance Computer (CMC) or the Boeing 777 On–board Maintenance System (OMS), the Airbus Central Fault Display System (CFDS), and the McDonnell Douglas CFDS in accordance with guidelines outlined in Boeing documents D220U050 (747–400 CMC – release date 3 June 1991) and D243W201–1 (777 OMS – release date 30 October 1992) and Airbus document ABD0048 issue C, all of which supersede ARINC 604 for their respective applications.

(2) The Boeing maintenance computers (i.e., 747–400 CMC and 777 OMS) are virtually indistinguishable to the SDU. The operations to support these two systems are very similar and, therefore, are presented together. The operations to support the Airbus and McDonnell Douglas maintenance computers are very similar and, therefore, are presented together. The SDU determines the aircraft type on which the SDU is installed, and then supports only the functionality required by that particular system.

B. Boeing 747–400 CMC/777 OMS

(1) General

(a) The CMC and SDU communicate with each other through an ARINC 429 data bus using ARINC 429 words.

(b) When the SDU receives the standard ground test command containing its equipment ID and source destination identifier (SDI), the SDU responds by setting the command word (ARINC label 350) acknowledge bit to ACK for four seconds. The SDU initiates a system-wide functional test. As soon as possible during the execution of the functional test, the SDU sets the SSM for ARINC label 350 to functional test.

(2) CMC to SDU Communication – Automatic Fault Reporting

(a) The CMC and SDU communicate with each other through an ARINC 429 data bus using ARINC 429 words.

(b) When the SDU receives the standard ground test command containing its equipment ID and source destination identifier (SDI), the SDU responds by setting the command word (ARINC label 350) acknowledge bit to ACK for 4 seconds. The SDU then initiates a system-wide functional test. As soon as possible during the execution of the functional test, the SDU sets the SSM for ARINC label 350 to functional test.

(c) At the conclusion of the functional test, the SDU builds the fault summary words using ARINC labels 350 thru 354 by mapping currently active failures to the appropriate bits in the words. Once the words are built they are latched for 30 seconds, then the SDU returns to automatic fault reporting. The SDU continuously transmits the fault summary words to the CMC at a rate of 1 to 2 Hz, with the SSM bits set to normal operation during reporting of the test results.

(3) CMC Interactive Mode

(a) The SDU supports configuration data in CMC interactive mode for a Boeing 777 installation. If the CMC transmits a configuration data interactive mode command addressed to the SDU on ARINC label 227, the SDU processes the command by supplying the first page of configuration information and then resumes automatic mode processing. The configuration data command is used to display configuration information for the SATCOM LRUs (SDU and HPAs). The SDU responds to the configuration data command from the automatic mode.

(b) The SDU does not support ground test and shop faults in CMC interactive mode. If the CMC transmits a ground test or shop faults interactive mode command addressed to the SDU on label 227, the SDU ignores the command.

(4) Configuration Data Messages

(a) General

1 When configuration data is commanded, the MCS configuration data page(s) is(are) displayed. These data pages display installed LRUs as determined by the SDU system configuration pin settings with their associated part/serial number data. These lines also display the ORT identification along with modification status. Figure 6-17 supplies an example of the configuration data page.

2 The ORT 24-character description as contained in ORT item xxxiii is displayed. For non-777 installations, the text is limited to 20 characters per line.

(b) USER ORT STATUS

1 This displays MODIFIED if the state of the ORT user partition is modified, otherwise no status or header is displayed.

(c) SECD ORT IDENTIFICATION

1 This is the 24-character description as contained in ORT item liii. For non-777 installations, the text is limited to 20 characters per line.

(d) SECURED ORT STATUS

1 This displays MODIFIED if the state of the ORT secured partition is modified, otherwise, no status or header is displayed. For software package C3.5, the ORT is not partitioned so only a single ORT IDENTIFICATION is supplied for the ORT display lines.

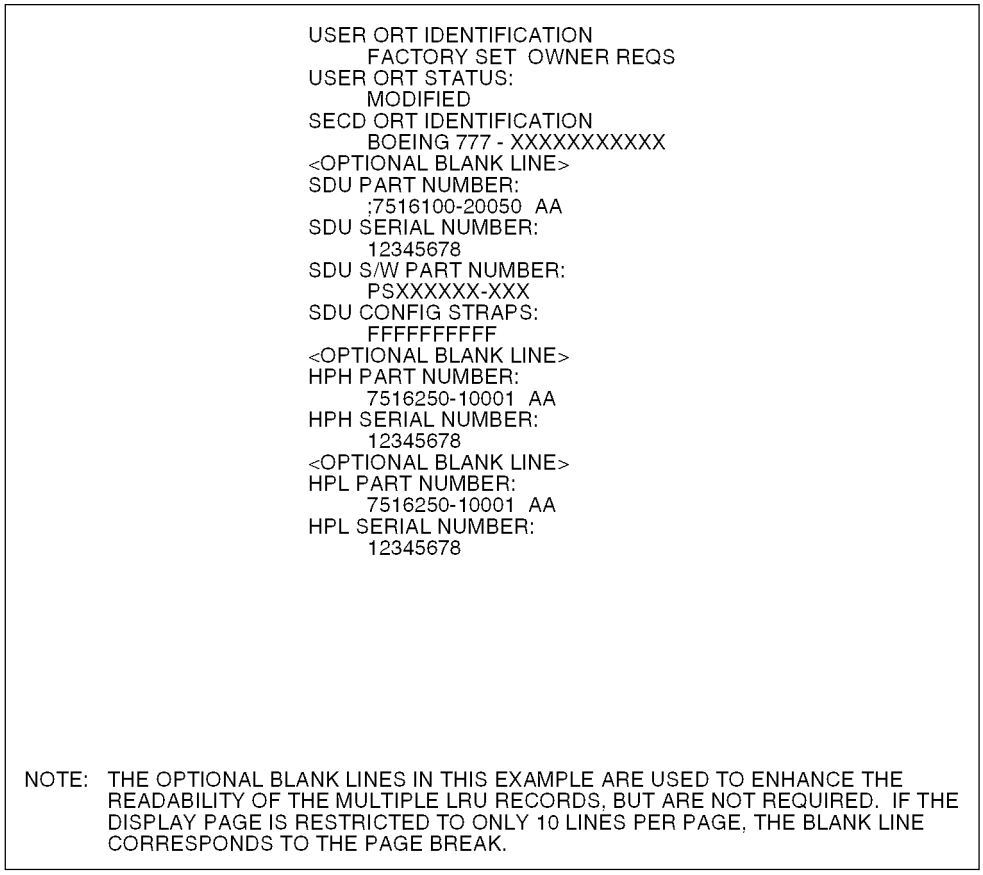


Figure 6-17. Configuration Data Pages for Boeing 777 Installation

(e) LRU PART NUMBER

1 The part numbers for the LRUs installed are displayed as follows. The word LRU is displayed, which is substituted with the appropriate LRU acronym. The LRU part number is displayed as bbbbbbb-hhsss, where bbbbbbb-hhsss represents the LRU end item part number consisting of a seven-digit LRU base part number (bbbbbbb), a two-digit hardware configuration number (hh), and a three-digit software configuration number (sss). Dashes are displayed if no valid data is available.

(f) LRU SERIAL NUMBER

1 The serial numbers of the LRUs installed are displayed as follows. The word LRU is displayed, which is substituted with the appropriate LRU acronym. The LRU serial number is displayed as ssssssss, where ssssssss represents the LRU serial number. Dashes are displayed if no valid data is available.

(g) SDU S/W PART NUMBER

1 This displays the software part number that corresponds to the software load. The configuration data page includes the header SDU CONFIG STRAPS and the raw strap setting for the current installation.

(5) Standard Ground Test (Non–interactive)

(a) When a standard test on a CMC ground test menu is selected, the CMC commands the SDU to start a standard ground test. The SDU prevents the CMC commanded standard ground test while the aircraft is airborne. The SDU starts a system-wide PAST after it has responded to the receipt of a standard ground test command from the CMC.

(b) At the end of the CMC-commanded PAST, the SDU builds labels 350 thru 354 fault summary words by mapping PAST-detected SATCOM subsystem failures to the appropriate bits. The SDU continuously transmits these fault summary words to the CMC at a rate of 1 to 2 Hz, with the SSM set to Normal Operation, during reporting of the test results.

C. Airbus/Douglas CFDS

(1) General

(a) The CFDS uses a centralized fault display interface unit (CFDIU) as an interface between the SDU and the SCDU. Throughout these paragraphs the acronym CFDIU is used to include both the A320 CFDS and the A340 CMC.

(b) When the SDU is installed on an Airbus or McDonnell Douglas aircraft with a CFDS, it supports the normal mode and interactive mode as required by the CFDS.

(2) CFDIU to SDU Communication

(a) The CFDIU communicates with the SDU through an ARINC 429 data bus using ARINC 429 words.

(3) SDU to CFDIU Communication

(a) The SDU supports both the normal mode and the interactive mode, as required by the CFDS. The SDU also transmits the LRU part number and serial number and ORT identification data blocks to the CFDIU.

(b) The LRU/ORT identification data records make up the LRU/ORT identification data blocks. Each LRU data record contains the LRU acronym, part number, and serial number. Each ORT identification data record contains the ORT IDENTIFICATION header, the ORT 24 character description, and the state of the modified flag.

(4) Normal Mode Failure Messages

(a) As specified, the SDU transmits failure messages and LRU/ORT identification information while operating in the normal mode. The following paragraphs defined the contents of these reports.

(b) Once a failure is reported in the normal mode, the failure remains in the report for that entire flight, regardless of whether the failure is cleared. As new failures are reported, they are added to the beginning of the report (i.e., the report is in reverse chronological order, bearing in mind the CFDS considers the time of the failure to be the time it is first reported on this flight leg rather than when it first occurs).

(c) In addition to latching the failures, the contents of the normal mode report depend on the failure class and when it occurs in relationship to other failures against the same LRU. Level I failures against the same LRU reported in the normal mode are not to be transmitted more than once unless they are an upper class and the upper class failure occurs after the lower class failure(s). Once a report is sent to the CFDIU during the normal mode for the current flight, the SDU does not change the content or order except to add new failure messages, as appropriate to the beginning of the report.

(d) The McDonnell Douglas CFDIU does not decode the normal mode report until the CFDIU detects an increase in the block word count. However, unlike the Airbus CFDIU, the McDonnell Douglas CFDIU decodes the entire report. After sending an All Call DC2 command for a new flight leg, the Airbus CFDIU delays processing the normal mode report for about 30 seconds before regarding the report as pertaining to the new flight leg.

(e) The SDU transmits the names of the installed LRUs, as determined by the system configuration pin settings, along with their associated part/serial numbers. At the end of this LRU transmission, the SDU transmits the ORT identification with a modification status. The LRU names can be transmitted in any order. Transmission of an HPA LRU part/serial number uses the same criteria as the display of HPA data.

(5) Interactive Mode

(a) The CFDIU supplies for two-way communication between the SCDU and the SDU, which is referred to as the interactive mode. When the SDU operates in the interactive mode, it is responsible for all information displayed on the CFDS maintenance pages, with exception of the scratchpad. The SDU enters the interactive mode upon receiving an ENQ command from the CFDIU when the aircraft is on the ground.

D. Central Aircraft Information and Maintenance System

(1) The central aircraft information and maintenance system (CAIMS) is a distributive maintenance system where each member system performs its own built–in test (BIT) and stores its own faults. Also, each system supplies real–time status information on the health of each of its LRUs and their interfaces. The member systems support CAIMS during normal operation and during on–ground maintenance.

(2) In the normal operation mode, member systems gather and store fault data when equipment failure occurs during normal operation. This is typically performed by continuous BIT and power–up BIT, with identified faults stored in the member systems non–volatile memory (NVM). The CAIMS does not store fault information for member systems, but the fault warning processor (FWP) supplies fault event data, such as: flight leg, date, time, fault zone, and aircraft serial number information that is stored with the fault in the member systems NVM.

(3) In the maintenance mode, the CAIMS is active and is called the on–board maintenance system (CAIMS OMS). The CAIMS OMS is the ground maintenance function and is accessible through communication link to a portable maintenance access terminal (PMAT). With the PMAT, the aircraft maintenance crew can retrieve stored fault data from a member system. For member systems, the CAIMS OMS displays fault information, commands BITE test, and displays real–time data for status displays, and commands the download of NVM fault data.

E. Level I Failure Messages and ATA Reference Numbers

(1) The Level I failure messages and ATA reference numbers that are available for transmittal in the CFDS normal mode, for display in the CFDS interactive mode, and for display on SCDU accessed maintenance pages are specified in the following paragraphs for each CFDS type installed. Level I failure messages are intended for use by line maintenance crews. Therefore, the failure messages are designed to be LRU-based and only supply LRU-level identification.

(2) The Level 1 failure codes are two-digit hexadecimal numbers that define the LRU, data communication bus, or miscellaneous interface signal where a failure, bus inactivity, or signal error has been determined to have occurred. When multiple LRUs are suspect, the most likely LRU is listed first followed by the next most likely LRU, separated by a slash. The ATA number listed is for the first suspect LRU. Additional text can be supplied at the end to help clarify the failure message.

- Table 6-18 describes the Level I failure messages and ATA reference numbers to use for display on the SCDU accessed maintenance pages when the installed CFDS type is a Boeing CMC. Also shown is the CMC message ID which is displayed by the CMC in response to the Level I failure messages (refer to the OEM’s maintenance manual and fault isolation manual).
- Table 6-19 and Table 6-20 describe the Level I failure messages and ATA reference numbers to use for transmittal in the CFDS normal mode, and the CFDS interactive mode pages displayed when the installed CFDS type is an Airbus. Table 6-19 is for the SDU (single configuration) or SDU No. 1 (dual configuration), and Table 6-20 is for SDU No. 2 (dual configuration) as determined by the settings of configuration pins TP12E and TP12F.
- Table 6-21 describes the Level I failure messages and ATA reference numbers to use for transmittal in the CFDS normal mode, and the CFDS interactive mode pages displayed when the installed CFDS type is a McDonnell Douglas.
- For CFDS type none, the Level I failure messages displayed on the SCDU accessed maintenance pages are the same as those specified for Boeing (refer to Table 6-18). However, no ATA reference numbers are displayed.

(3) For Level I codes identified as not applicable in the tables, the SDU does not report the failure on that particular interface (i.e., CFDS normal and interactive modes or SCDU accessed maintenance pages as appropriate). Where TBD is used in the Level I failure message column, it is coded as literally read. For failures that occur that are undefined in the tables, the SDU does not report the failure on that particular interface.

Table 6-18. Boeing Level I Failure Messages and ATA Reference Numbers

Failure Code	SCDU Accessed Maintenance Pages	ATA Number	CMC Message ID
01	SDU	232500	23205
02	OTHER SDU INCOMPATIBILITY	232500	23205
03	HSU	232500	
04	HPA-HI GAIN [IGA] HPA-HI GAIN [HGA]	232500	23207
07	HPA-LO GAIN	232500	23209
0A	HI POWER RELAY	232500	23218
0D	LNA/DIP-(TOP/PORT)	232500	23210
0F	LNA/DIP-STBD	232500	23211
10	LNA/DIP-LO GAIN	232500	23212
13	BSU-(TOP/PORT)	232500	23213
15	BSU-STBD	232500	23214
1A	IN GAIN ANTENNA-TOP [IGA] HI GAIN ANTENNA-(TOP/PORT) [HGA]	232500	23215
1C	HI GAIN ANTENNA-STBD	232500	23216
1F	LO GAIN ANTENNA	232500	23225
21	MCDU1	346100	
22	MCDU2	346100	
23	MCDU3	346100	
33	(ACARS MU/CMU)1	232700	23219
34	(ACARS MU/CMU)2	232700	23219
35	IRS-PRI	342100	34222
36	IRS-SEC	342100	34224
37	RESERVED		
38	RESERVED		

TEMPORARY REVISION NO. 23-1

INSERT PAGE 43 OF 53 FACING PAGE 6-96.

Reason: To add a new failure code, 0B, to Table 6-18 between failure codes 0A and 0D.

Failure code 0B is added as follows:

Table 6-18. Boeing Level I Failure Messages and ATA Reference Numbers

Failure Code	SCDU Accessed Maintenance Pages	ATA Number	CMC Message ID
0B	HDM	232500	

Table 6-18. Boeing Level I Failure Messages and ATA Reference Numbers (cont)

Failure Code	SCDU Accessed Maintenance Pages	ATA Number	CMC Message ID
39	RESERVED		
3D	FMC1	346100	
3E	FMC2	346100	
40	ARINC 429 ICAO ADDRESS	None	23251
42	CTU	231900	23235
43	(CFS/CPDF)	233200	
50	HSU/SDU	232500	
52	(CFS/CPDF)/SDU	233200	
53	(ACARS MU/CMU)1/SDU	232700	23219
54	CTU/SDU	231900	23235
55	MCDU1/SDU	346100	
56	MCDU2/SDU	346100	
57	(ACARS MU/CMU)2/SDU	232700	23235
59	CMC/SDU	454500	23201
5A	IRS-PRI/SDU	342100	23222
5B	IRS-SEC/SDU	342100	23224
5C	HPA-IN GAIN/SDU [IGA] HPA-HI GAIN/SDU [HGA]	232500	23226
5F	HPA-LO GAIN/SDU	232500	23225
62	BSU-(TOP/PORT)/SDU	232500	23213
64	BSU-STBD/SDU	232500	23214
66	MCDU3/SDU	346100	
67	RESERVED		
68	RESERVED		
6A	RESERVED		
6C	RESERVED		
6D	RESERVED		
6E	RESERVED		
6F	RESERVED		

Table 6-18. Boeing Level I Failure Messages and ATA Reference Numbers (cont)

Failure Code	SCDU Accessed Maintenance Pages	ATA Number	CMC Message ID
71	OTHER SDU/THIS SDU	232500	
73	FMC1/SDU	346100	
74	FMC2/SDU	346100	
80	RESERVED		
82	RESERVED		
88	RESERVED		
90	SDU M–CTRL/HPA–IN GAIN [IGA] SDU M–CTRL/HPA–HI GAIN [HGA]	232500	23246
96	SDU M–CTRL/HPA–LO GAIN	232500	23248
98	SDU M–CTRL/BSU–(TOP/PORT)	232500	23249
9A	BSU–STBD XTALK/BSU–PORT	232500	23252
9C	SDU M–CTRL/BSU–STBD	232500	23250
9D	BSU–PORT XTALK/BSU–STBD	232500	23253
9E	SDU/HSU	232500	
A6	HSU ETHERNET PORT 1	232500	
A7	HSU ETHERNET PORT 2	232500	
A8	HSU ISDN PORT 1	232500	
A9	HSU ISDN PORT 2	232500	
C0	WRG:CONFIG PIN PROG/SDU	232500	23236
C1	SDU WOW MISCOMPARE	N/A	
C2	SDU/OTHER SDU SELECT–DISABLE DISCRETE	232500	
C3	WRG:ICAO ADDRESS PIN PROG/SDU	232500	23251
C4	TX PATH VSWR–IN GAIN [IGA] TX PATH VSWR–HI GAIN [HGA]	232500	23257
C5	WRG:CONFIG PIN PROG/SDU OWNER REQS	232500	
C6	TX PATH VSWR–LO GAIN	232500	23216
C7	HPA–HI GAIN/OVER TEMPERATURE [IGA] HPA–HI GAIN/OVER TEMPERATURE [HGA]	232500	23247
C8	BAD DATA FROM GROUND EARTH STATION	None	

Table 6-18. Boeing Level I Failure Messages and ATA Reference Numbers (cont)

Failure Code	SCDU Accessed Maintenance Pages	ATA Number	CMC Message ID
C9	HPA–LO GAIN/OVER TEMPERATURE	232500	23254
CA	SDU/LNA/DIP–LO GAIN	232500	23237
CB	WRG:SDI PIN PROG/HPA–IN GAIN [IGA] WRG:SDI PIN PROG/HPA–HI GAIN [HGA]	232500	
CC	WRG:SDI PIN PROG/HPA–HI GAIN	232500	
CD	SDU (POC/TOTC) DATA RESET	None	
CE	RESERVED		
CF	HPA–IN GAIN (POC/TOTC) DATA RESET [IGA] HPA–HI GAIN (POC/TOTC)DATA RESET [HGA]	None	
D0	HPA–LO GAIN (POC/TOTC) DATA RESET	None	
D1	WRG:SDI PIN PROG/HPA–IN GAIN [IGA] WRG:SDI PIN PROG/HPA–HI GAIN [HGA]	232500	
D2	WRG:SDI PIN PROG/HPA–LO GAIN	232500	
D3	WRG:SDI PIN PROG/BSU–(TOP/PORT)	232500	
D4	WRG:SDI PIN PROG/BSU–STBD	232500	
D5	SDU COAX/HPA–IN GAIN [IGA] SDU COAX/HPA–HI GAIN [HGA]	232500	23237
D6	SDU COAX/HPA–LO GAIN	232500	23237
D7	RESERVED		
D8	LNA/DIP/ (SDU)–(TOP/PORT)	232500	23236
D9	LNA/DIP/ (SDU)–STBD	232500	23236
DA	LNA/DIP/ (SDU)–LO GAIN	232500	23236
DB	LO GAIN SUBSYSTEM	232500	
DC	NO ACTIVE ACARS MU/CMU	232700	
DD	SDU OWNER REQS – SECURED	None	
DE	SDU OWNER REQS – USER	None	
DF	IN GAIN SUBSYSTEM [IGA] HI GAIN SUBSYSTEM [HGA]	232500	
E0	RESERVED		
E1	BAD HSU DISABLE DISCRETE	232500	

Table 6-18. Boeing Level I Failure Messages and ATA Reference Numbers (cont)

Failure Code	SCDU Accessed Maintenance Pages	ATA Number	CMC Message ID
E4	HSU/SDU INTERFACE VER INCOMPATIBILITY	232500	
E6	HSU/HPA TX RF PATH	232500	
E8	DLNA/HSU RX RF PATH	232500	
EC	WRG: CONFIG PIN PROG/HSU	232500	
ED	WRG: CONFIG PIN PROG/HSU SDU OWNER REQS	232500	
EE	WRG: FWD ID PIN PROG/HSU	232500	
FE	POWER SUPPLY INTERRUPT	None	

Table 6-19. Airbus Level I (SDU No. 1) Failure Messages and ATA No.

Failure Code	SDU/SDU No. 1 – CFDS Normal and Interactive Modes		ATA Number
01	SDU1(105RV1)	[IGA]	232834
	SDU1(5RV1)	[HGA]	232834
02	SDU2(105RV2)	[IGA]	232834
	SDU2(5RV2) INCOMPATIBILITY	[HGA]	232834
03	HSDU1 (63RV1)		232839
04	HPA1(110RV1)	[IGA]	232831
	HPA–HI GAIN(7RV1)	[HGA]	232831
07	HPA–LO GAIN(9RV)		232835
0A	HI POWER RELAY(21RV)		232842
0D	DLNA1(119RV1)	[IGA]	232838
	DLNA–TOP(19RV1)	[Top Mount]	232838
	DLNA–L(20RV1)	[Conformal]	232837
0F	DLNA–R(20RV2)	[Conformal]	232837
10	DLNA–LO GAIN(14RV)		232836
13	BSU(8RV1)	[Top Mount]	232846
	BSU–L(15RV1)	[Conformal]	232844
15	BSU–R(15RV2)	[Conformal]	232844