EMS
SATCOM

eNfusion™ HSD-Xi High-speed Data Terminal
System Description, Installation, and Maintenance Manual

This document provides procedures for the equipment listed below.

Model	PN
eNfusion™ HSD-Xi High-speed Data Terminal 115 V ac	1252-A-4100-01
eNfusion™ External Subscriber Configuration Module (ESCM)	1252-A-4120-01

Revision Table		
Revision	**ECR**	**Description**
A00	N/A	Initial release
B00	090543	Updated interconnect drawing, added outline drawings

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When revisions are received, insert revised pages, record the date, and initial.

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SERVICE BULLETIN LIST

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LIST OF EFFECTIVE PAGES

* An asterisk indicates pages changed, added, or deleted by the current revision.

F indicates a right foldout page with a blank back.

Section	Page	Date
TITLE-PAGE	T-1	May 8, 2009
INTRO	INTRO-1, INTRO-3 to INTRO-6	May 8, 2009
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INTRODUCTION

1. General

This manual provides the specifications, principles of operation, and information necessary to install an eNfusion™ HSD-Xi terminal, and the eNfusion™ External Subscriber Configuration Module (ESCM).

2. How This document is Organized

The information is presented in the following chapters:

- System Description

- System Operation

- Installation

- Test and Fault Isolation

- Maintenance and Repair

- Appendix A: Inmarsat Satellite Beam Coverage

- Appendix B: Troubleshooting Checklist

- Appendix C: Installation Planning Checklist

- Appendix D: Installation Checklist

- Appendix E: Inmarsat Cause Codes

- Appendix F: Setting Up SBB

NOTE: An Illustrated Parts List is not included with this manual.

Only qualified avionics personnel, knowledgeable in the technical and safety issues related to the installation of aircraft communications equipment, should perform the installation procedures provided in this manual.

This manual includes general installation guidelines only; it is not intended to provide specific procedures for every type of installation.

If necessary, the information in this manual will be revised. Before attempting the installation procedures presented in this manual, verify that you have a complete and up-to-date release of this document.

NOTE: Depending on the version of software and configuration mode of installation of the the HSD-Xi terminal, the actual (live) system messages, such as dialog boxes and screen displays, may differ slightly from the examples in this manual.

3. Illustration of Equipment
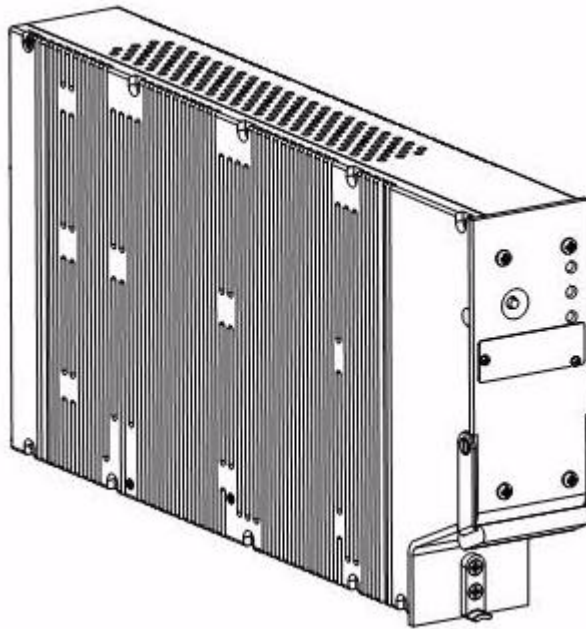
Figure INTRO-1 HSD-Xi Terminal

4. Product Terms and Conditions

As stipulated in the Terms and Conditions of Sale, which accompanied the Product, EMS SATCOM shall not at any time be liable for the activation, continuation, or cancellation of satellite airtime services relating to the Product nor be responsible for any Product-related airtime or network charges, however incurred. In the event EMS SATCOM is charged network or airtime fees relating to the customer's use of the Product, the customer shall immediately upon notification by EMS SATCOM reimburse EMS SATCOM in full for such charges.

5. Reference Documents

Document Title	EMS SATCOM Publication Number
Guidance for Aircraft Electrical Power Utilization and Transient Protection	ARINC 741. ARINC Report 413A—Attachment 3-2, Wire Shielding and Grounding Requirements and Appendix 7

6. Acronyms and Abbreviations

The following acronyms and abbreviations are used in this document.

ACSE	Access Control and Signalling Equipment
AERO	Aeronautical
AMBE	Advanced Multi-Band Excitation
AORE	Atlantic Ocean Region-East
AORW	Atlantic Ocean Region-West
BGAN	Broadband Global Area Network
BITE	Built-In Test Equipment
bps	Bits per second
C/No	Carrier-to-Noise
DLNA	Diplexer/Low-Noise Amplifier
EIRP	Effect Isotropic Radiated Power
ESCM	External Subscriber Configuration Module
ESD	Electrostatic Discharge
EST	Eastern Standard Time
FAA	Federal Aviation Authority
FWD ID	Forward ID
GES	Ground Earth Station
GND	Ground
HGA	High-gain Antenna
HPA	High Power Amplifier
Hz	Hertz
I/O	Input/Output
ICAO	International Civil Aviation Organization
IMN	Inmarsat Mobile Number
INS	Inertial Navigational System
IOR	Indian Ocean Region
IRS	Inertial Reference System
ISDN	Integrated Services Digital Network
ISN	Inmarsat Serial Number
ISP	Inmarsat Service Providers
ISP	Internet Service Provider
JAA	Joint Aviation Authorities
kbps	Kilobits per Second

LAN	Local Area Network
LES	Land Earth Station
LRU	Line Replaceable Unit
Mbps	Megabit per second
MCDU	Multipurpose Control Display Unit
MCU	Modular Concept Unit
MES	Mobile Earth Station
MPDS	Mobile Packet Data Services
MPU	Maintenance Port Utility
ms	Millisecond
MSN	Mobile Serial Number
MSN	Multiple Subscriber Number
O&I	Outline and Installation Diagram
OA	Other Antenna
ORR	Ocean Region Registration
ORT	Owner Requirements Table
PN	Part Number
POR	Pacific Ocean Region
POTS	Plain Old Telephone System
PPP	Point-to-Point Protocol
PPPoE	Point-to-Point Protocol over Ethernet
RAM	Random Access Memory
RF	Radio Frequency
RFU	Radio Frequency Unit
ROM	Read-only Memory
RTN	Return
Rx	Receive
SBB	SwiftBroadband
SCPC	Single Channel per Carrier
SDI	Source/Destination Identification
STU	Secure Telephone Unit
Tx	Transmit
USIM	Universal Subscriber Identity Module
VHF	very high frequency
WOW	Weight on Wheels

7. Safety Advisories

Warnings, cautions, and notes in this manual provide the reader with the following information:

- A WARNING describes an operation, procedure, or condition that, if not obeyed, could cause injury or death.

- A CAUTION describes an operation, procedure, or condition that, if not obeyed, could cause damage to the equipment.

- A NOTE provides supplementary information or explanatory text that makes it easier to understand and perform procedures.

All personnel who install, operate, and maintain the HSD-Xi terminal and associated test equipment must know and obey the safety precautions listed below. The procedures provided in this manual assume that the person performing installation or maintenance tasks is familiar with and obeys standard aviation shop and safety practices.

The general safety advisories include the following:

> **WARNING:** SERVICE PERSONNEL MUST OBEY STANDARD SAFETY PRECAUTIONS, SUCH AS WEARING SAFETY GLASSES, TO PREVENT PERSONAL INJURY WHILE INSTALLING OR PERFORMING SERVICE ON THIS TERMINAL.

> **WARNING:** ASSOCIATED SATELLITE COMMUNICATIONS EQUIPMENT RADIATES HIGH FREQUENCY RADIATION AND POSES A RADIATION HAZARD OF 1.6 GHZ. SERVICE PERSONNEL MUST EXERCISE CARE TO KEEP CLEAR OF THE ANTENNA'S BEAM WHILE PERFORMING OPERATIONAL TESTS OR INSTALLATION VERIFICATION PROCEDURES.
>
> DO NOT APPROACH WITHIN 8 FEET (2.5 METRES) OF THE ANTENNA DURING ANTENNA OPERATION (TRANSMISSION).
>
> DURING ANTENNA OPERATION (TRANSMISSION), MAKE SURE THAT PERSONNEL ARE EXPOSED TO A MINIMUM OF ANY REFLECTED, SCATTERED, OR DIRECT BEAMS.

> **WARNING:** TURN OFF POWER BEFORE DISCONNECTING ANY TERMINAL FROM WIRING. DISCONNECTING THE TERMINAL WITHOUT TURNING POWER OFF MAY CAUSE VOLTAGE TRANSIENTS THAT CAN DAMAGE THE TERMINAL.

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE DEVICES

CAUTION: THIS EQUIPMENT INCLUDES ITEMS THAT ARE ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. ESDS DEVICES ARE SUBJECT TO DAMAGE BY EXCESSIVE LEVELS OF VOLTAGE AND/OR CURRENT. THE LOW-ENERGY SOURCE THAT MOST COMMONLY DESTROYS ESDS DEVICES IS THE HUMAN BODY, WHICH, IN CONJUNCTION WITH NONCONDUCTIVE GARMENTS AND FLOOR COVERINGS, GENERATES AND RETAINS STATIC ELECTRICITY. TO ADEQUATELY PROTECT ESDS DEVICES, THE DEVICE AND EVERYTHING THAT CONTACTS IT MUST BE BROUGHT TO GROUND POTENTIAL BY PROVIDING A CONDUCTIVE SURFACE AND DISCHARGE PATHS. USE STANDARD INDUSTRY PRECAUTIONS TO KEEP RISK OF DAMAGE TO A MINIMUM WHEN TOUCHING, REMOVING, OR SERVICING THE EQUIPMENT.

SYSTEM DESCRIPTION

This section includes basic information about the HSD-Xi terminal, and includes the following sections:

- Inmarsat System Overview

- Equipment Overview

- Equipment Specifications

- Software Description

- Mechanical Description

- Electrical Description

- HSD-Xi Terminal System Interfaces

- User Interfaces

- Initiated Self-Test

1. Inmarsat System Overview

The satellite communication system includes global satellite networks, LESs, and Mobile Earth Stations (MESs).

The LES is the part of the satellite communication system that is on the ground. These numerous, international stations are responsible for routing voice and data calls from the MES to their destinations around the world.

The MES is the part of the satellite communication system that is on the aircraft. This station includes the following components:

- HSD terminal

- Antenna subsystem

- Cabin communications system

- Analog connected telephones

- Cockpit voice system

- Other aircraft avionics

Figure 1-1 illustrates a simplified satellite communications system.

<div align="center">23-15-30</div>
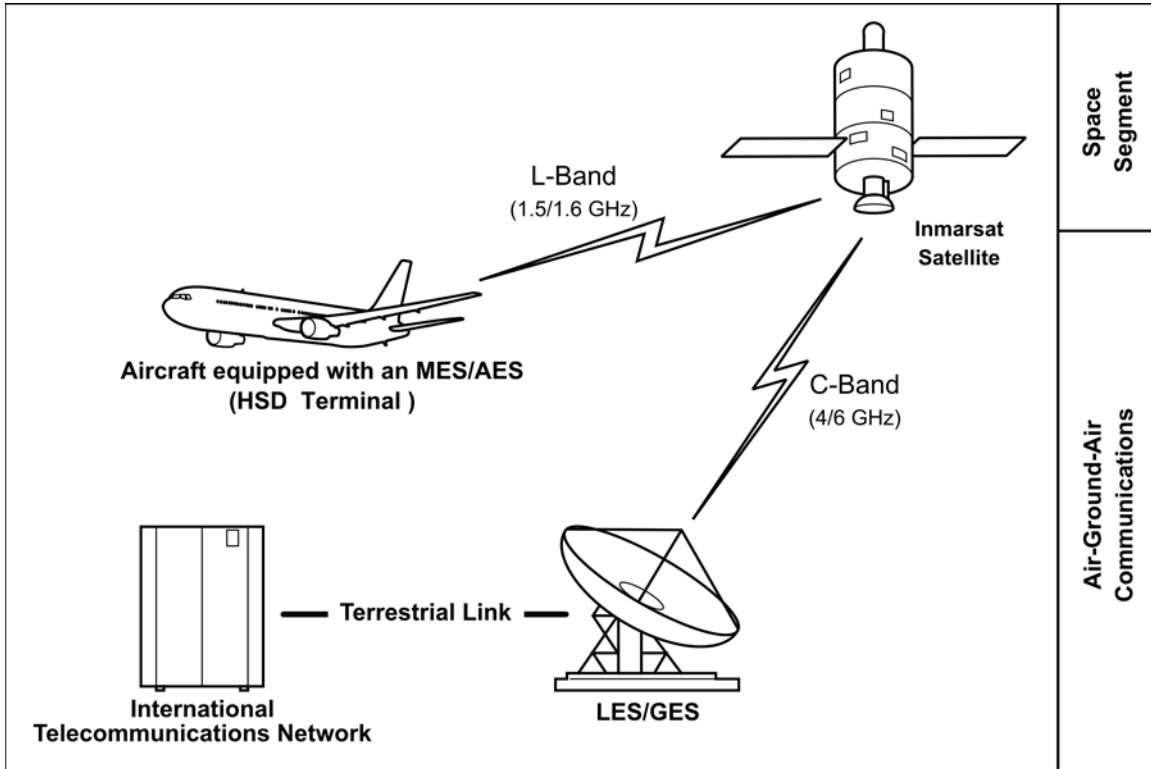
Figure 1-1 Simplified Aeronautical Satellite Communications System

Satellite communication systems provide users with long-range voice and data communication by accessing global satellite and ground communications networks.

Inmarsat is an international organization that operates and maintains multiple geostationary satellites and satellite networks. The satellites that provide Swift64 services are called I-3 satellites. Each satellite is located over an Ocean Region (OR); the current OR names are:

• Atlantic Ocean Region-East (AOR-E)

• Atlantic Ocean Region-West (AOR-W)

• Indian Ocean Region (IOR)

• Pacific Ocean Region (POR)

These satellites provide worldwide telecommunication services for aviation, shipping, and land-mobile terminal users. The satellites connect to ground telecommunication systems through the LES/GES.

The satellites that provide SBB services are called I-4 satellites. At the time of publishing, three I-4 satellites provide SBB services: Americas (98W), EMEA (25E) and Asia-Pacific (143.5E).

The HSD-Xi terminal extends the communication functions provided by other HSD terminals. It does not communicate with the satellite network on its own. It must be installed with a HSD to communicate with the satellite network.

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2. Equipment Overview

This section briefly describes the HSD-Xi terminal, the ESCM and the SwiftBroadband (SBB) services supported by the HSD-Xi terminal.

A. HSD-Xi

The HSD-Xi terminal cannot communicate with the satellite network on its own. It extends the communication functions provided by HSD-440 terminals. The HSD-440 terminal controls the power available to the HSD-Xi terminal and makes channels available to the HSD-Xi terminal. The HSD-440 terminal also allocates resources according to the needs of other equipment in the aircraft, such as communication and safety related equipment.

The HSD-Xi terminal works in conjunction with an HSD-440 terminal to provide one additional channel of Swift64 services and SBB services.

B. ESCM

The ESCM connects to the HSD-Xi terminal, and contains one standard USIM card that provides secure subscriber information for billing, and stores the Inmarsat network parameters that are required for SBB services.

In the ESCM, the microprocessor chip reads the USIM card, and the RS-422 serial transceiver chip communicates with the channel card in the HSD-Xi terminal.

The ESCM also contains a temperature control system and heating elements because the operating temperature range of the USM cards is smaller than the HSD-Xi terminal. When the temperature of the USIM cards is below their operational limit, the ESCM turns on the heaters and holds the microprocessor chips in reset mode until the USIM cards reach their operating temperature. SBB services are available after the ESCM has warmed up and the warm-up time for the ESCM may be up to ten minutes.

If the HSD-Xi detects a fault when it is connected to the ESCM, the HSD-Xi creates an event log entry.

C. SBB Services

SBB is high-speed satellite communication network to which satellite communication terminals can connect from any location within view of a satellite. The SBB network and its terminals enable the simultaneous use of voice and data services.

SBB services are defined by QoS, which assigns a priority to data traffic and guarantees a certain bandwidth according to that priority. There are two QoSs: streaming IP and standard IP.

(1) SBB Packet-Switched Services

    (a) Streaming IP

        Streaming IP service can transfer data at a guaranteed rate of up to 128 Kbps. Data can be transferred at the rates: 32 kbps, 64 kbps, or 128 kbps streaming service. The cost of streaming IP services is based on the amount of time the connection is active.

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(b)   Standard IP

Standard IP services, also known as Background IP services, can transfer data at a rate of up to 432 Kbps. Typical throughput rates range between 100 to 300 kbps. This bandwidth is shared by all users on a channel, and users may experience lower transfer rates when multiple users are transferring data.

Standard IP is the recommended service for using the Internet, e-mail, and VPN applications that have moments of high traffic followed by low or no traffic. The cost of standard IP services is based on the amount of data transferred.

(2)   SBB Circuit-Switched Services

SBB supports one 64 Kbps ISDN bearer to provide the following services:

- AMBE+2 voice

- 56 kbps RDI

- 64 kbps UDI

- 3.1 KHz audio

The cost of circuit-switched services is based on the amount of time the connection is active.

(3)   Primary and Secondary PDP Contexts

A PDP context defines connection aspects such as routing, QoS, security, and billing between the HSD-Xi terminal and a core network.

SBB requires a primary PDP context to establish IP services. Therefore, it is activated first. A primary PDP context is associated with a unique IP address.

A secondary PDP context can only be established after a primary PDP context has been activated. Secondary PDP contexts can be used when some applications require different QoS profiles. For example, a primary Background PDP context can provide Internet access and e-mail, and a secondary streaming 128 kbps PDP context can provide video conferencing.

A secondary PDP context has the same IP address as the primary context, but it can have different QoS profiles.

3.   Equipment Specifications

The HSD-Xi is a 2-MCU size terminal with mounting requirements that meet the ARINC 600 specification. The front panel has one, female, micro-D type connector for data loading and monitoring of the unit.

Table 1-1 lists the physical characteristics and equipment specifications for the HSD-Xi terminal.

Table 1-1 HSD-Xi Characteristics and Specifications

Characteristic	Specification
Physical Characteristics	
Size	2 MCU ARINC 600-10 Form Factor
Weight	8.8 lbs maximum
Cooling Air	Unit capable of continuous duty cycle operation, with or without forced air-cooling provided, as per ARINC 600 specifications. Refer to 1110-E-0401.
Electrical Characteristics	
Power dissipation	34 W
Input Power	115 V ac, 400Hz, 75 va
Input frequency range	1530.0 to 1559.9 MHz
Output frequency range	1626.5 to 1660.5 MHz
Receiver input impedance	50 ohms
Transceiver output impedance	50 ohms
Input level operational	-107 dBm to -47 dBm
Input level no damage	+10 dBm
External Interfaces	
Crosstalk bus	ARINC 429 high-speed (100 kbps) data bus
Maintenance port RS-232 data loader front and rear connector	RS-232 serial bus supports 57.6 kbps data load capacity
ISDN user interface	64 kbps ISDN Euro input and output
Ethernet	10BASE-T (full and half duplex)

Table 1-2 lists the environmental specifications for the HSD-Xi terminal.

Table 1-2 HSD-Xi Terminal Environmental Characteristics

Characteristic	Specification/Category
Temperature and Altitude	A4 without cooling air, C4 with cooling air
Low Operating Temperature	-40 ºC (A4), -40 ºC (C4)
High Operating Temperature	+ 55 ºC (A4), +70 ºC (C4)
Altitude	Maximum operating altitude: 15,000 ft (A4), 55,000ft (A5)

Table 1-2 HSD-Xi Terminal Environmental Characteristics (Continued)

Characteristic	Specification/Category
Loss of cooling	Y
Temperature	B
Humidity	A
Shock	B
Vibration	SB
Explosion Proofness	E
Water Proofness	X
Fluids Susceptibility	X
Sand and dust	X
Fungus Resistance	F
Salt Spray	X
Magnetic Effect	Z
Power Input	A
Voltage Spike	A
Audio Frequency	A
Induced Signal	C
RF Susceptibility	RR
Emission of RF Energy	M
Lightning Induced Transient Susceptibility	A3E3
Lightning Direct Effects	X

4.   Software Description

This section describes the software specifications and operational software components of HSD-Xi terminal.

A. Software Specifications

The software meets the Swift64 to Level E DO-178B standard.

B. Operational Software Part Number

The HSD-Xi terminal software part number is L1-1252-42001.

5.   Mechanical Description

The rear connector complies with ARINC 600, shell size 1. The top and middle connectors have 60 number 22 pins, and the bottom connector has two number 16 pins, one number 12 pin, and two RF connections.

Figure 3-7 to Figure 3-10 present the HSD-Xi and network mode HSD terminals connection details.

6. Electrical Description

See Figure 3-7 to Figure 3-10 for installation information.

7. HSD-Xi Terminal System Interfaces

This section briefly describes the external HSD-Xi terminal system interfaces connections to other systems on the aircraft. For information on interface connections available to aircraft passengers, see "Installation" on page 3-1.

A. Forward IDs

Forward IDs identify the terminal to the Inmarsat Network.

The 24-bit Forward ID strap pins on the ARINC 600 connector form part of the Inmarsat Serial Number (ISN). The ISN consists of the type approval number and the Forward ID. Each Forward ID is associated with Inmarsat Mobile Numbers that a user on the ground dials to reach the terminal on the aircraft. There is a unique Inmarsat Mobile Number for each of the service types.

B. Discrete Outputs

The discrete outputs indicate the HSD-Xi terminal status.

Table 1-3 Discrete Outputs

Discrete Outputs	Description (when illuminated)
MP10 A Power	This output is illuminated if the unit has power. It flashes if the HSD-Xi has an active call.
MP10C HSD-Xi Fail	This output is illuminated if the HSD-Xi has a fault.
MP10 B - Channel Available	This output is illuminated when the HSD-Xi is registered and attached to a network operating in GAN or BGAN mode, or if the HSD terminal has allocated power to the HSD-Xi.

C. Front Panel LEDs

These fault conditions illuminate the LED on the front panel of the HSD-Xi:

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Table 1-4 Front Panel LEDs

LED	LED Color	Description (when illuminated)
Top	Green	MP10 A Power - This output is illuminated if the unit has power. It flashes if the HSD-Xi has an active call.
Middle	Red	MP10C HSD-Xi Fail - This output is illuminated if the HSD-Xi has a fault.
Bottom	Green	MP10 B - Channel Available - This output is illuminated when the HSD-Xi is registered and attached to a network operating in GAN or BGAN mode, or if the HSD terminal has allocated power to the HSD-Xi.

D. Fault Conditions

The HSD-Xi terminal can indicate one of the following fault conditions. Upon detection of a fault condition, the red colored Fault LED is illuminated.

- Channel card fault

- HPA fault

- Internal ROM fault

- Internal RAM fault

- Over temperature fault

E. HSD-Xi Maintenance Port

The HSD-Xi maintenance port provides access to the HSD-Xi maintenance utility which is a program that can monitor the HSD-Xi and test HSD-Xi functions.

The HSD-Xi maintenance port utility is also used to update the HSD-Xi software. For information on how to use the maintenance port utility in console mode, see Connecting to the HSD-Xi terminal through the network mode HSD Console Mode.

The HSD-Xi maintenance port connector is a female, micro-D type M83513/04-B11N.

The rear middle plug of the HSD-Xi terminal provides remote access to the maintenance port utility, see the interconnection diagram in Figure 3-9.

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Table 1-5 HSD-Xi Maintenance Port Pin Description

Label (Octal)	Pin	HSD-Xi In/Out	Signal Type
Data Loader in A	1	-	Reserved
Data Loader in B	2	-	Reserved
Spare	3	-	-
Data Loader out A	4	-	Reserved
Data Loader out B	5	-	Reserved
Spare	6	-	-
Data Loader Continuity Link (A)	7	-	Reserved
Maint port TD	8	Out	RS-232
Maint port GND	9	GND	RS-232
Maint port RD	10	In	RS-232
Data Loader Continuity Link (B)	11	-	Reserved
ATE reserved	12	-	ATE
ATE reserved	13	GND	ATE
ATE reserved	14	-	ATE
ATE reserved	15	-	ATE

8.   User Interfaces

The HSD-Xi terminal has the following user connections.

A. Ethernet Data Interface

The HSD-Xi terminal has one 10BASE-T Ethernet data interface.

B. ISDN Interface

The HSD-Xi terminal has one ISDN bearer channel available through the ISDN interface.

C. Maintenance Port Interface

The HSD-Xi terminal has one maintenance port, located on the front panel of the terminal. It provides remote access available through the rear ARINC 600 connector.

NOTE: Access to maintenance functions of the network mode HSD and the HSD-Xi terminal in flight is only available through the remote access port.

The maintenance port provides the physical connection to a password-protected MPU that provides a system interface for users or service personnel who need to upgrade, monitor, or troubleshoot the system.

- A standard VT100 compatible terminal or computer running an emulator program such as HyperTerminal©, ProComm (PCPLUS)©, or another serial communication package provides the user interface to the HSD-Xi terminals MPU. Configure the connection as follows:

- Bits per second—19200

- Data bits—8

- Parity—none

- Stop bits—1

- Flow control—none

The HSD-Xi terminals supports two different end user access levels within the maintenance port architecture: End User and Field Representative.

(1) End User Access: Level 1

Password: **menu**

This limited-access level is for anyone without technical training on the product. It provides read-only access to help users diagnose problems with the assistance of product support personnel.

(2) Field Representative Access: Level 2

Password: **maint**

This level is for trained installers and product support personnel. This access level supports read and limited write capabilities. Users are able to disable/mask/clear faults, change satellite or LES preferences, view and modify certain EEPROM parameters, and perform other maintenance or upgrade functions.

"Test and Fault Isolation" on page 4-1 provides a detailed description of the two levels of user access and the menus, report selections, functions, and system diagnostic procedures of the HSD-Xi terminals MPU.

9. Initiated Self-Test

The initiated self-test occurs during the power up sequence, or when you press and hold down the TEST button on the front panel of the terminal for 100 milliseconds or more.

SYSTEM OPERATION

This section describes how to register and activate the HSD-X and HSD-Xi terminals. For information on how to configure the system, see Configuring the system.

1. Registering and Activating Terminals

Registering and activating an HSD-X and HSD-Xi terminal includes the following:

- Preparing Terminal Information

- Choosing Service Providers

- Registering Terminals

A. Preparing Terminal Information

Before installing the HSD-X and HSD-Xi terminals, obtain an ISN and identify the Swift64 terminal type.

(1) Obtaining ISNs

EMS SATCOM provides ISNs for the HSD-X and HSD-Xi terminal based on the intended installation configuration. The last six digits of the ISN are the Forward ID.

When requesting ISNs, please have the following information available:

- End customer name, including contact information

- Purchase order number

- Tail registration number, aircraft type, and serial number of the aircraft on which the terminal is being installed

- Serial number of the HSD and the HSD-Xi terminal(s)

- Intended installation configuration mode (Stand-Alone or non-Stand-Alone)

EMS SATCOM Product Support is available Monday to Friday from 8 am to 5 pm (EST). On-call support is available outside business hours, Eastern Standard Time.

Contact information for EMS SATCOM:

Product Support	1.888.300.7415
Product Support direct	1.613.591.3086
Canada and USA toll-free Sales	1.800.600.9759
Outside Canada and USA	1.613.591.9064
Fax:	1.613.591.9120
Web:	www.emssatcom.com

(2) Identifying the Swift64 Service Terminal Type

The Swift64 terminal type for all modes of HSD-X and HSD-Xi terminals is 76ES09. Currently supported service types for HSD-400 terminals operating Swift64 are as follows:

- 64 kbps speech

- 3.1 kHz audio

- 56 kbps data

- 64 kbps UDI

- MPDS

B. Choosing Service Providers

Contact Inmarsat for an up-to-date list of Inmarsat Service Providers using the following contact information:

Inmarsat
99 City Road, London
EC1Y 1AX

Tel: +44 20 7728 1000
Fax: +44 20 728 1044

Customer Care
Tel: +44 20 7728 1777
Fax: +44 20 7728 1142
Email: customer_care@inmarsat.com

Web addresses: www.inmarsat.com and www.inmarsat.com/swift64/supp_ser.htm

C. Registering Terminals

Contact your Inmarsat service provider and ask for a **Registration for service activation of Aircraft Earth Station** form. Use the form to register for Swift64 services.

Complete the registration form for your HSD, and your HSD-Xi terminal. You need the following information:

- Customer information (address and contact information)

- Service provider details (obtained from your ISP)

- System and terminal information (terminal type, manufacturer, model number, serial number of terminal)

- ISN for Swift64 services

- Aircraft information (tail number, fuselage/airframe number, manufacturer and model, and country of registration)

- List of services required (for example, Swift64 Mobile ISDN)

To register for SBB services, request a BGAN Activation form from your service provider.

INSTALLATION

This section describes how to install HSD-Xi on an network mode HSD terminal. It includes the following sections:

- Advisories

- Pre-Installation Inspection

- Mechanical Installation

- Electrical Installation

- Installing the HSD-Xi and ESCM

- Configuring the system

1. Advisories

Before performing any installation procedures, read the safety advisories listed in the Introduction on page INTRO–5 of this manual.

2. Pre-Installation Inspection

Before installing a HSD-Xi terminal, conduct a pre-installation inspection of all parts to make sure that no damage occurred during shipping:

- Unpack the HSD-Xi terminal from the shipping container(s).

- Verify that the part number displayed on the shipping box and equipment component matches the model and part number ordered. If components are missing from the shipment, contact the supplier or EMS SATCOM Product Support immediately and report the problem.

- Visually inspect the terminal for any shipping damage. If any shipping damage has occurred, contact the shipping carrier immediately and report the problem.

- Check the HSD-Xi terminal connectors for corrosion and damage. If damage is noted, do not apply power to the terminal. Contact the supplier or EMS SATCOM Product Support immediately to report the problem.

3. Mechanical Installation

This section describes the mechanical installation requirements for the HSD-Xi. The System Interconnection diagrams are provided at the end of this section. Figure 3-7 to Figure 3-10 provide connection details for the HSD-Xi terminal. All foldout pages are odd-numbered and not-backed for print production purposes.

Electronic Cable Specialists (ECS) supplies a 2-MCU ARINC 600 mounting tray, part number 200-910002-101, for installing the HSD-Xi terminal. You can contact ECS at www.ecsdirect.com.

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You need the following hardware to install the HSD-Xi terminal:

• size 1 ARINC 600 connector

• size 1 coax contacts (on HSD-440 tray)—installation specific

• size 5 coax contacts—installation specific

4. Electrical Installation

A. Cabling Notes

The system transmit loss between the network mode HSD terminal and the HSD-Xi terminal should be as close as possible to 29.5 dB. Figure 3-1 illustrates the System Transmit (TX) loss.

Figure 3-1 HSD-Xi System Transmit (TX) Loss

23-15-30
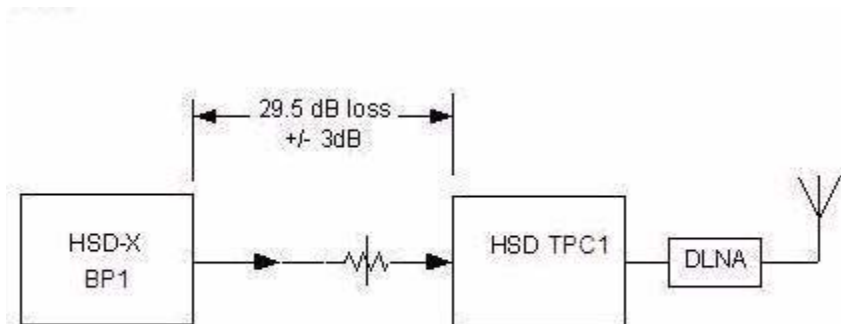
Figure 3-2 illustrates the network mode system RX loss.

Figure 3-2 System RX Loss
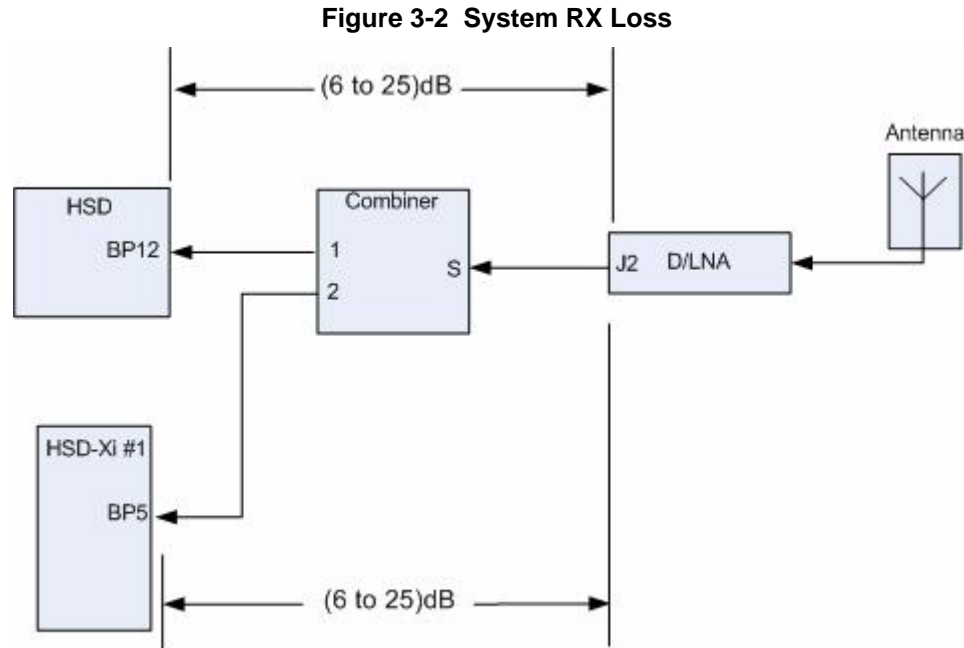
After you have installed the HSD-Xi, measure the cable loss. You must configure the HSD terminal with the measured value.

B. Source/Destination Identification (SDI)

Source/Destination Identification (SDI) is provided for the beam steering unit and the high-power amplifier (HPA) according to ARINC 741 specifications. Pins marked 0 are left open circuit. Pins marked 1 are strapped on the airframe side of the connector to the pin assigned as "SDI Common" (TP5D). For this High Gain Antenna (HGA) HPA application, pin TP5B (1) should be strapped and TP5A (0) should be left open.

C. Maintenance Port Interface

Use a HSD-Xi maintenance port cable to connect directly to the front-panel maintenance port of the HSD-Xi. The front connector maintenance port is a female, micro-D-type, M83513/04-B11N, or equivalent connector. You can also wire a permanent connector to the rear, middle-plug, of the ARINC-600 connector for remote access.

NOTE: The front panel and remote connections to the maintenance port of the network mode HSD terminal and the HSD-Xi terminal cannot be used simultaneously.

D. Remote Status Panel

The HSD-Xi remote LED shows the status of the HSD-Xi terminal. The open collector transistors located in the HSD-Xi can drive up to 500 mA of current—so you can use either incandescent lamps or LED circuits with the appropriate current limits. Figure 3-3 illustrates an LED powered with a 28-volt source.
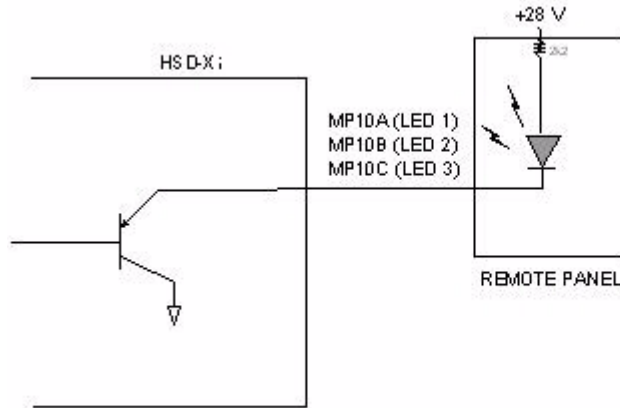
Figure 3-3 HSD-Xi Remote Status LED Driver Circuits

E. **System Mode Strapping**

To install the HSD-440 terminal in network mode, strap these pins as follows:

- TP-4A—Strapped

- TP-4B—Strapped

- TP-4C—Strapped

- TP-4D—Open

NOTE: Pins marked 0 are signaled by strapping to ICAO Common (TP7K). Pins marked
1 are signaled by an open circuit—no connection.

F. HSD-Xi Input/Output Strapping

Table 3-1 provides the Input/Output (I/O) strapping for the HSD-Xi.

Table 3-1 HSD-Xi Input/Output Strapping

MP11A	MP11B	MP11C	Input/Output Configuration
1	1	1	Invalid
1	1	0	Restricted (disable Data I/O)
1	0	1	MPDS (Future)1
1	0	0	SCPC (M4) only
0	1	1	Unrestricted (recommended if there are no specific user requirements)
0	1	0	Not Assigned
0	0	1	Not Assigned
0	0	0	Reserved

NOTE: MP11D: Reserved, 0 = FWD Address Comm

G. User Interfaces

For the HSD-Xi terminal Ethernet interface, install an RJ-45 interface connector in the cabin area. For the ISDN interface, install an RJ-45 interface connector in the cabin area.

5. Installing the HSD-Xi and ESCM

Install the HSD-Xi and ESCM according to the System Interconnection diagrams, Figure 3-7, Figure 3-8, Figure 3-9, and Figure 3-10.

Figure 3-4, Figure 3-5, and Figure 3-6 provide outline drawings for the HSD-Xi terminal and ESCM. Mount the ESCM on a flat surface using four screws or bolts that fit the 0.125 inch holes in the mounting flange. You can install the ESCM a maximum of three meters away from the HSD-Xi terminal.

A. Hardware and Software Requirements

You need a HSD-Xi terminal, 1252-A-4100, and an ESCM, 1252-A-4120, to use SBB services.

You need the following software to use SBB services.

- HSD-Xi, LI-1252-42001
- HSD-440, LI-1252-33374

B. User Interfaces

You can access SBB services through the following interfaces:

- Ethernet
- ISDN

C. Creating Connections

For information on creating SBB connections, see "Setting Up SBB" on page F-1, or the eNfusion™ HSD High-speed Data Terminal Developer's Guide, MN-1252-13005.

6. Configuring the system

After installing the HSD-Xi, you must configure the HSD to operate in network mode, and set the HSD-Xi cable loss.

This section contains the following procedures:

- Configuring the HSD Terminal for Network Mode
- Enabling and Disabling the Classic Channel Card

A. Configuring the HSD Terminal for Network Mode

An ORT parameter in the HSD terminal defines the cable loss between the HSD terminal and the HSD-Xi terminal. If the HSD-440 system configuration strapping is not set to network mode, you can set the terminal category to network mode by following these steps.

To configure the HSD terminal to operate in network mode, follow these steps.

1. Connect a computer to the maintenance port of the HSD terminal.

2. Open a VT100 compatible terminal running an emulator program (such as HyperTerminal, ProComm Plus, or similar) and configure the serial port for ASCII, 19200 bps, 8 bits, Parity None, 1 Stop Bit, No Flow Control.

3. Log on to the HSD terminal using the password **maint**.

   You can navigate through the HSD menus by pressing CRTL+N to scroll through the menus.

4. Go to **Menu 3 - M parameter 16** and select **2** =HW STRAPPED VALUE.

5. Go to **Menu 3 - K parameter 48** Installed and select **1=Yes**.

6. Reboot the HSD terminal and the HSD-Xi terminal.

B. Enabling and Disabling the Classic Channel Card

You can operate the network mode HSD system with or without operating the Classic channel card in the HSD terminal. **Note**: This feature is available in Release LI-1252-33374 A00.

To activate or deactivate the classic channel card of the network mode HSD terminal:

1. Connect a computer to the maintenance port of the network mode HSD terminal and go to **Menu 3**. To navigate to Menu 3, press **CTRL + N**.

2. To set control processor parameters, press **k**.

   A list of control processor parameters appears.

3. To access the classic AERO service parameter, type **83**.

    A prompt to enable or disable the classic channel card appears.

4. Press **1** to enable the classic channel card.

5. Press **0** to disable the classic channel card.

6. To activate the new parameter setting, reboot the network mode HSD terminal.

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NOTES:

1. THIS UNIT MEETS THE APPLICABLE REQUIREMENTS OF ARINC 600 FOR A SIZE 2 MODULAR CONCEPT UNIT (2MCU).

2. WEIGHT: 8.8 LBS MAX.

3. APPROXIMATE CENTRE OF GRAVITY IS SHOWN BY

4. FINISH: ALL SURFACES EXCEPT BOTTOM: ISM POWDER COAT PB134LT (POLYESTER POWDER, SATIN SANTEX BLACK) APPLIED AND CURED PER PRODUCT MANUFACTURER S INSTRUCTIONS.

5. INPUT POWER IS 115VAC, 400Hz, SINGLE PHASE.

6. POWER DISSIPATION: 30 WATTS NOMINAL, 40 WATTS MAXIMUM.

7. UNIT IS DESIGNED TO OPERATE WITH, OR WITHOUT, FORCED-AIR COOLING PER ARINC 600. COOLING AIR IS REQUIRED ONLY WHEN UNIT IS MOUNTED IN AN UN-PRESSURIZED LOCATION.

8. COOLING AIR REQUIREMENTS ARE:
   - FLOW RATE: 15.5 LBS/HR.
   - PRESSURE DROP: .044 ± .025 INCHES WATER.

9. THIS UNIT SHALL BE MOUNTED IN A 2MCU TRAY.

10. ENVIRONMENTAL TESTING PER DO-160D.
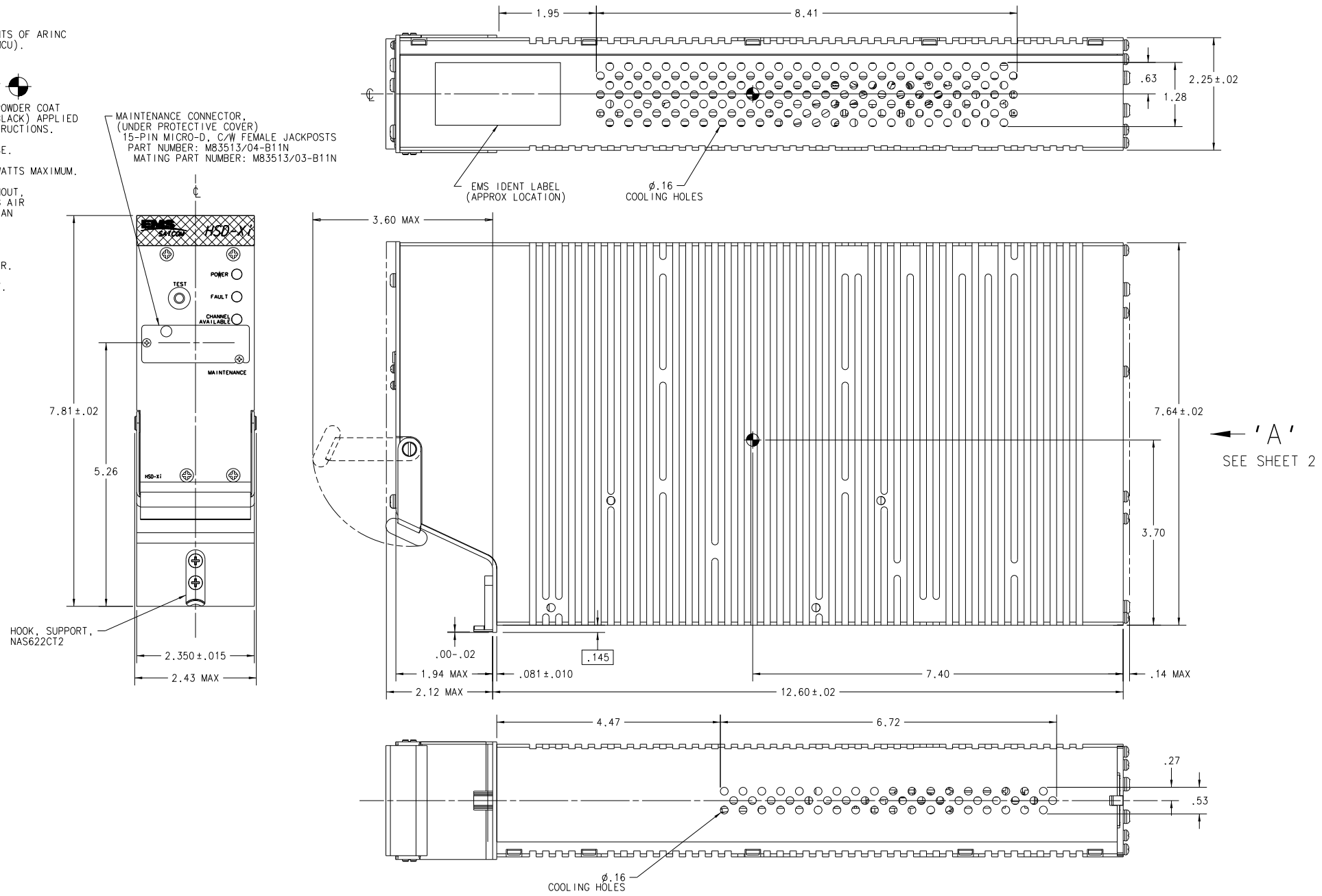
Figure 3-4. HSD-Xi Outline Diagram, 1252-E-4124 Rev. A00 (Sheet 1 of 2)

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ISOMETRIC VIEW

CONNECTOR, RECEPTACLE,
ARINC 600, SIZE 1,
RADIALL P/N: NSXF1R101Y0008

INSERT ARRANGEMENT 01
60 - #22 SOCKETS
2 PLACES

INDEX PIN CODING 08

INSERT ARRANGEMENT 03
2 - #5 COAX
2 - #16 PIN
1 - #12 PIN

.000-.012 PROTRUSION OF CONNECTOR
BOSS BELOW CHASSIS

VIEW ON 'A'
SCALE 2/1
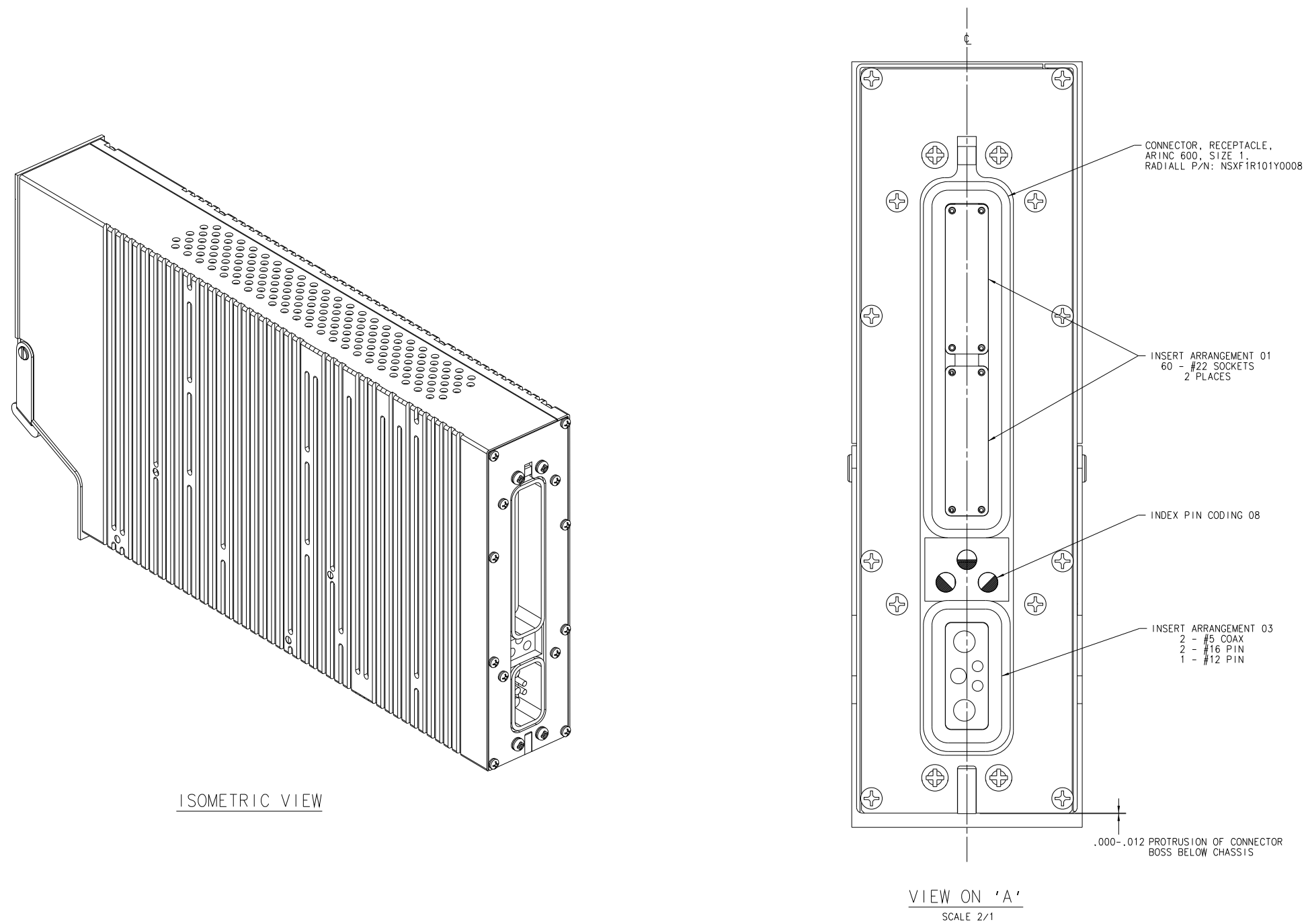
DWG No 1252-E-4124
REV A SHT 2

Figure 3-5. HSD-Xi Outline Diagram, 1252-E-4124 Rev. A00 (Sheet 2 of 2)

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NOTES:

1. MAXIMUM WEIGHT IS .22 KG (.5 LBS).

2. ⊕ INDICATES APPROXIMATE CENTER OF GRAVITY.

TOP VIEW WITH DUST CAP REMOVED

SIDE VIEW WITH DUST CAP REMOVED
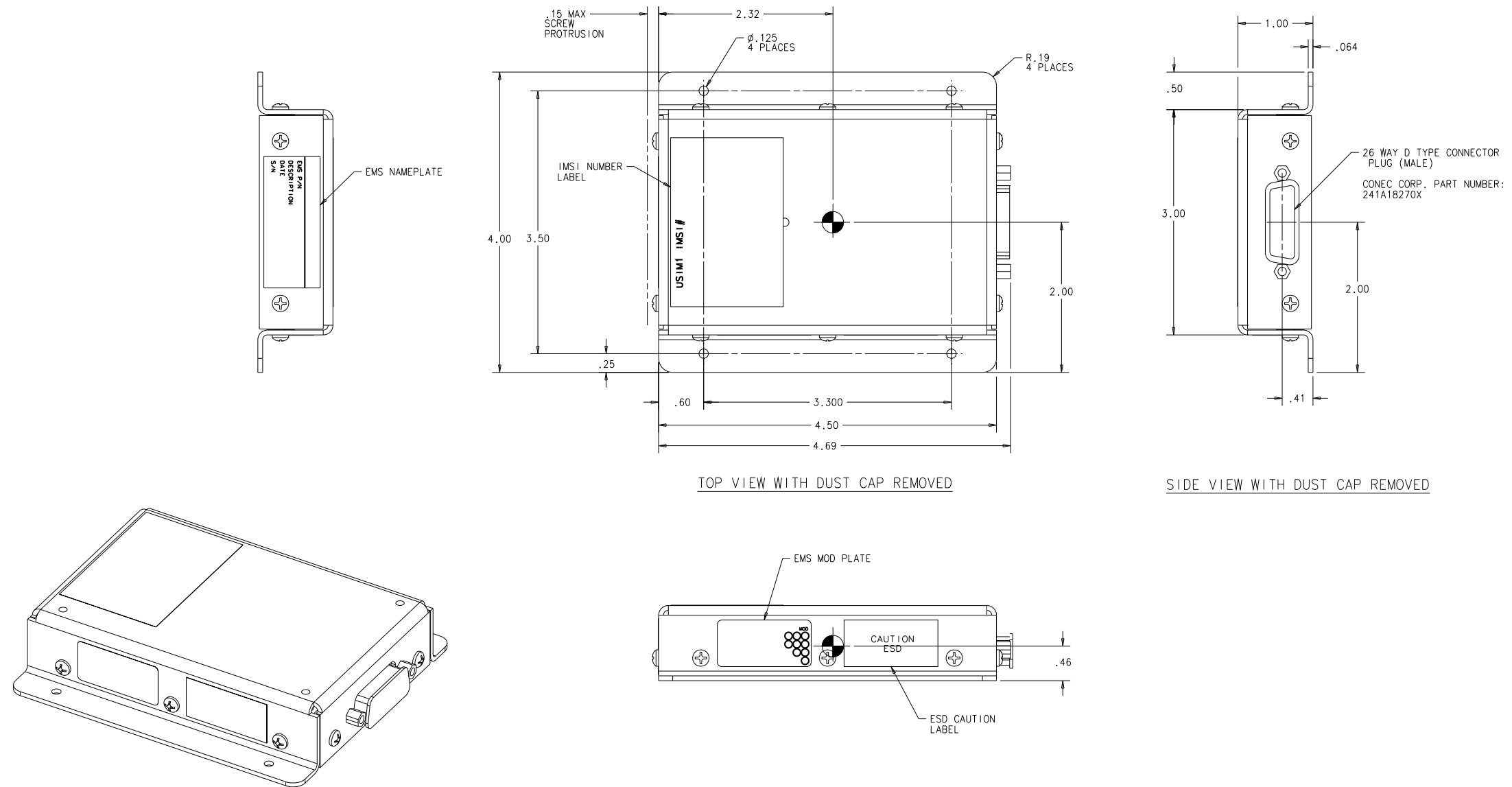
Figure 3-6. ESCM Outline Diagram, 1252-E-4123 Rev. A00

23-15-30
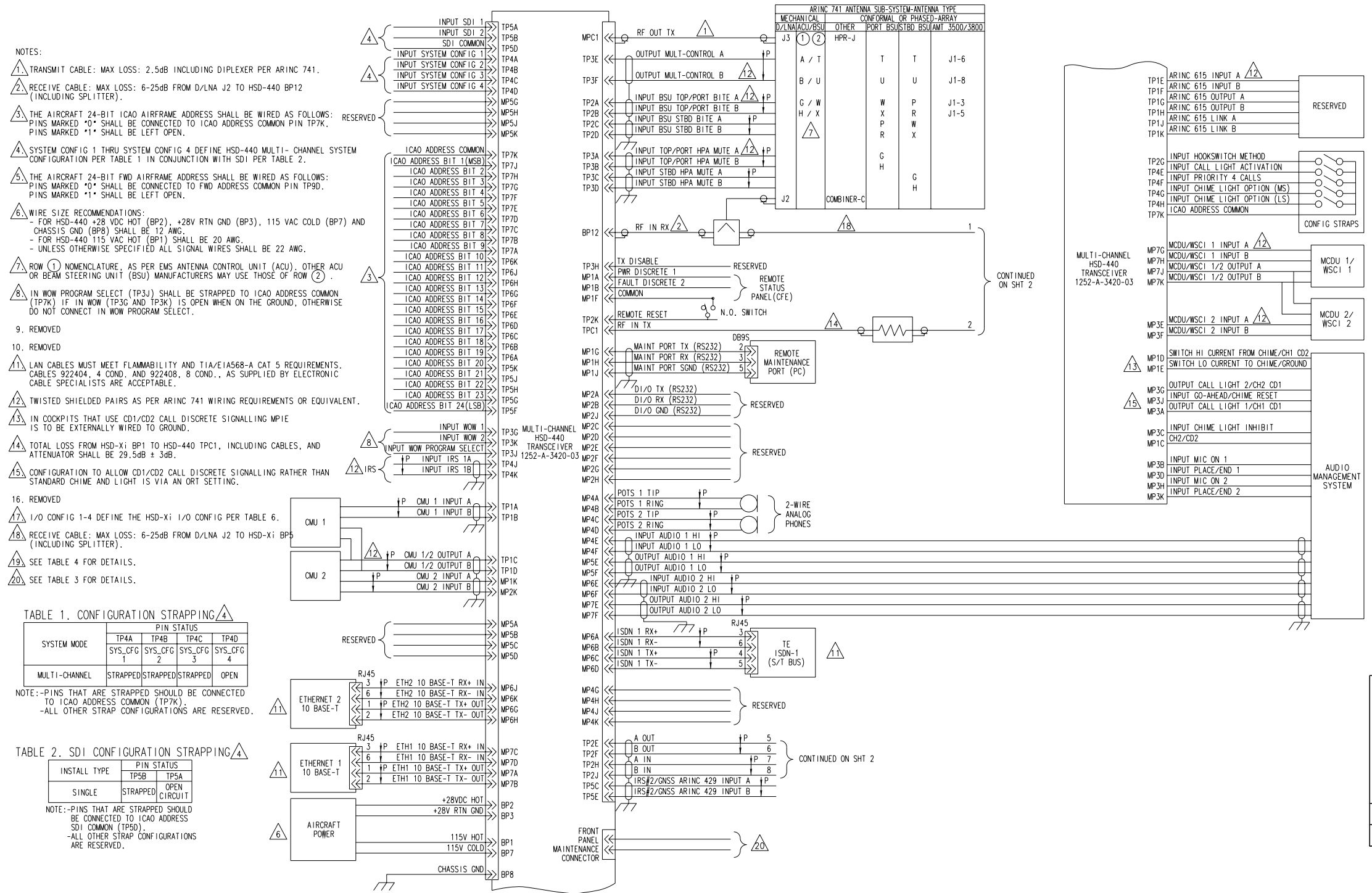
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Figure 3-7. System Interconnection Diagram HSD-440 Network Mode (HSD-Xi), 1252-B-4303 Rev. B00, (Sheet 1 of 4)

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Figure 3-8. System Interconnection Diagram HSD-440 Network Mode (HSD-Xi), 1252-B-4303 Rev. B00, (Sheet 2 of 4)

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TPC1 — RF IN TX

TOP PLUG

	A	B	C	D	E	F	G	H	J	K
1	CMU 1 INPUT A	CMU 1 INPUT B	CMU 1/2 OUTPUT A	CMU 1/2 OUTPUT B	RESERVED ARINC 615 INPUT A	RESERVED ARINC 615 INPUT B	RESERVED ARINC 615 OUTPUT A	RESERVED ARINC 615 OUTPUT B	RESERVED ARINC 615 LINK A	RESERVED ARINC 615 LINK B
2	INPUT BSU TOP/PORT BITE A	INPUT BSU TOP/PORT BITE B	INPUT BSU STBD BITE A	INPUT BSU STBD BITE B	A OUT	B OUT	INPUT HOOKSWITCH METHOD	A IN	B IN	REMOTE RESET SWITCH
3	INPUT TOP/PORT HPA MUTE A	INPUT TOP/PORT HPA MUTE B	INPUT STBD HPA MUTE A	INPUT STBD HPA MUTE B	OUTPUT MULT-CONTROL A	OUTPUT MULT-CONTROL B	INPUT WOW #1	RESERVED INPUT TX DISABLE	INPUT WOW PROGRAM SELECT	INPUT WOW #2
4	INPUT SYSTEM CONFIG 1	INPUT SYSTEM CONFIG 2	INPUT SYSTEM CONFIG 3	INPUT SYSTEM CONFIG 4	INPUT CALL LIGHT ACTIVATION	INPUT PRIORITY 4 CALLS	INPUT CHIME LIGHT OPTION (MS)	INPUT CHIME LIGHT OPTION (LS)	INPUT IRS 1A	INPUT IRS 1B
5	INPUT SDI #1	INPUT SDI #2	IRS #2/GNSS ARINC 429 INPUT A	SDI COMMON	IRS #2/GNSS ARINC 429 INPUT B	ICAO ADDRESS BIT #24	ICAO ADDRESS BIT #23	ICAO ADDRESS BIT #22	ICAO ADDRESS BIT #21	ICAO ADDRESS BIT #20
6	ICAO ADDRESS BIT #19	ICAO ADDRESS BIT #18	ICAO ADDRESS BIT #17	ICAO ADDRESS BIT #16	ICAO ADDRESS BIT #15	ICAO ADDRESS BIT #14	ICAO ADDRESS BIT #13	ICAO ADDRESS BIT #12	ICAO ADDRESS BIT #11	ICAO ADDRESS BIT #10
7	ICAO ADDRESS BIT #9	ICAO ADDRESS BIT #8	ICAO ADDRESS BIT #7	ICAO ADDRESS BIT #6	ICAO ADDRESS BIT #5	ICAO ADDRESS BIT #4	ICAO ADDRESS BIT #3	ICAO ADDRESS BIT #2	ICAO ADDRESS BIT #1	ICAO ADDRESS COMMON

MIDDLE PLUG

	A	B	C	D	E	F	G	H	J	K
1	PWR LED OUTPUT #1	FAULT LED OUTPUT #2	CH2/CD2	SWITCH HI CURRENT FROM CHIME/CH1 CD2	SWITCH LO CURRENT TO CHIME/GND	DISCRETE COMMON	MAINT PORT TX (RS232)	MAINT PORT RX (RS232)	MAINT PORT SGND (RS232)	CMU 2 INPUT A
2	DI/O TX (RS232)	DI/O RX (RS232)	SDU DATA TO SCM A	SDU DATA TO SCM B	SCM DATA TO SDU A	SCM DATA TO SDU B	SCM PWR +12V	SCM PWR RETURN 0V	DI/O GND (RS232)	CMU 2 INPUT B
3	OUTPUT CALL LIGHT 1/ CH1 CD1	INPUT MIC ON 1	INPUT CHIME LIGHT INHIBIT	INPUT PLACE/END 1	MCDU/WSCI 2 INPUT A	MCDU/WSCI 2 INPUT B	OUTPUT CALL LIGHT 2/ CH2 CD1	INPUT MIC ON 2	INPUT GO AHEAD/ CHIME RESET	INPUT PLACE/END 2
4	POTS 1 TIP	POTS 1 RING	POTS 2 TIP	POTS 2 RING	INPUT AUDIO 1 HI	INPUT AUDIO 1 LO	RESERVED	RESERVED	RESERVED	RESERVED
5	CEPT-E1 RX+ (FUTURE)	CEPT-E1 RX- (FUTURE)	CEPT-E1 TX+ (FUTURE)	CEPT-E1 TX- (FUTURE)	OUTPUT AUDIO 1 HI	OUTPUT AUDIO 1 LO	RESERVED	RESERVED	RESERVED	RESERVED
6	ISDN 1 RX+	ISDN 1 RX-	ISDN 1 TX+	ISDN 1 TX-	INPUT AUDIO 2 HI	INPUT AUDIO 2 LO	ETH 2 10 BASE-T TX+ OUT	ETH 2 10 BASE-T TX- OUT	ETH 2 10 BASE-T RX+ IN	ETH 2 10 BASE-T RX- IN
7	ETH 1 10 BASE-T TX+ OUT	ETH 1 10 BASE-T TX- OUT	ETH 1 10 BASE-T RX+ IN	ETH 1 10 BASE-T RX- IN	OUTPUT AUDIO 2 HI	OUTPUT AUDIO 2 LO	MCDU/WSCI 1 INPUT A	MCDU/WSCI 1 INPUT B	MCDU/WSCI 1/2 OUTPUT A	MCDU/WSCI 1/2 OUTPUT B

RF OUT TX TO D/LNA
MPC1

BOTTOM PLUG

4 RESERVED	3 +28V RTN GND	2 +28VDC HOT	1 115V HOT
6 RESERVED			5 SPARE
10 SPARE	8 CHASSIS GND	7 115V COLD	9 SPARE
13 RESERVED	11 SPARE		12 RF IN RX FROM D/LNA

CONTACT ASSIGNMENTS FOR J1 OF MULTI-CHANNEL HSD-440
VIEW SHOWN ON MATING FACE

DWG No 1252-B-4303   REV B   SHT 3

TABLE 3

HSD FRONT PANEL MAINTENANCE CONNECTOR DESCRIPTIONS

PIN	SIGNAL NAME	DESCRIPTION
1	RESERVED	CHANNEL CARD ETHERNET LINK TO DIO RX-
2	FR ETH1 TX+	USER ETHERNET 1 RX+
3	FR ETH1 TX-	USER ETHERNET 1 RX-
4	FR ETH1 RX+	USER ETHERNET 1 TX+
5	FR ETH1 RX-	USER ETHERNET 1 TX-
6	NO CONNECTION	
7	RESERVED	DATA I/O MAINTENANCE PORT GND
8	RESERVED	DATA I/O MAINTENANCE PORT RX
9	RESERVED	DATA I/O MAINTENANCE PORT TX
10	CP MAINT GND	CONTROL PROCESSOR MAINTENANCE PORT
11	CP MAINT TX TO USER	CONTROL PROCESSOR MAINTENANCE PORT
12	CP MAINT RX FROM USER	CONTROL PROCESSOR MAINTENANCE PORT
13	NO CONNECTION	
14	RESERVED	CHANNEL CARD ETHERNET LINK TO DIO TX-
15	RESERVED	CHANNEL CARD ETHERNET LINK TO DIO TX-
16	RESERVED	CHANNEL CARD ETHERNET LINK TO DIO TX+
17	RESERVED	CHANNEL CARD 1 MAINTENANCE PORT GND
18	RESERVED	CHANNEL CARD 1 MAINTENANCE PORT RX
19	RESERVED	CHANNEL CARD 1 MAINTENANCE PORT TX
20	NO CONNECTION	
21	RESERVED	CHANNEL CARD 2 MAINTENANCE PORT GND
22	RESERVED	CHANNEL CARD 2 MAINTENANCE PORT RX
23	RESERVED	CHANNEL CARD 2 MAINTENANCE PORT TX
24	NO CONNECTION	
25	RESERVED	CP SELF TEST ACTIVE LOW

Figure 3-9. System Interconnection Diagram HSD-440 Network Mode (HSD-Xi), 1252-B-4303 Rev. B00, (Sheet 3 of 4)

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TOP PLUG (TP)

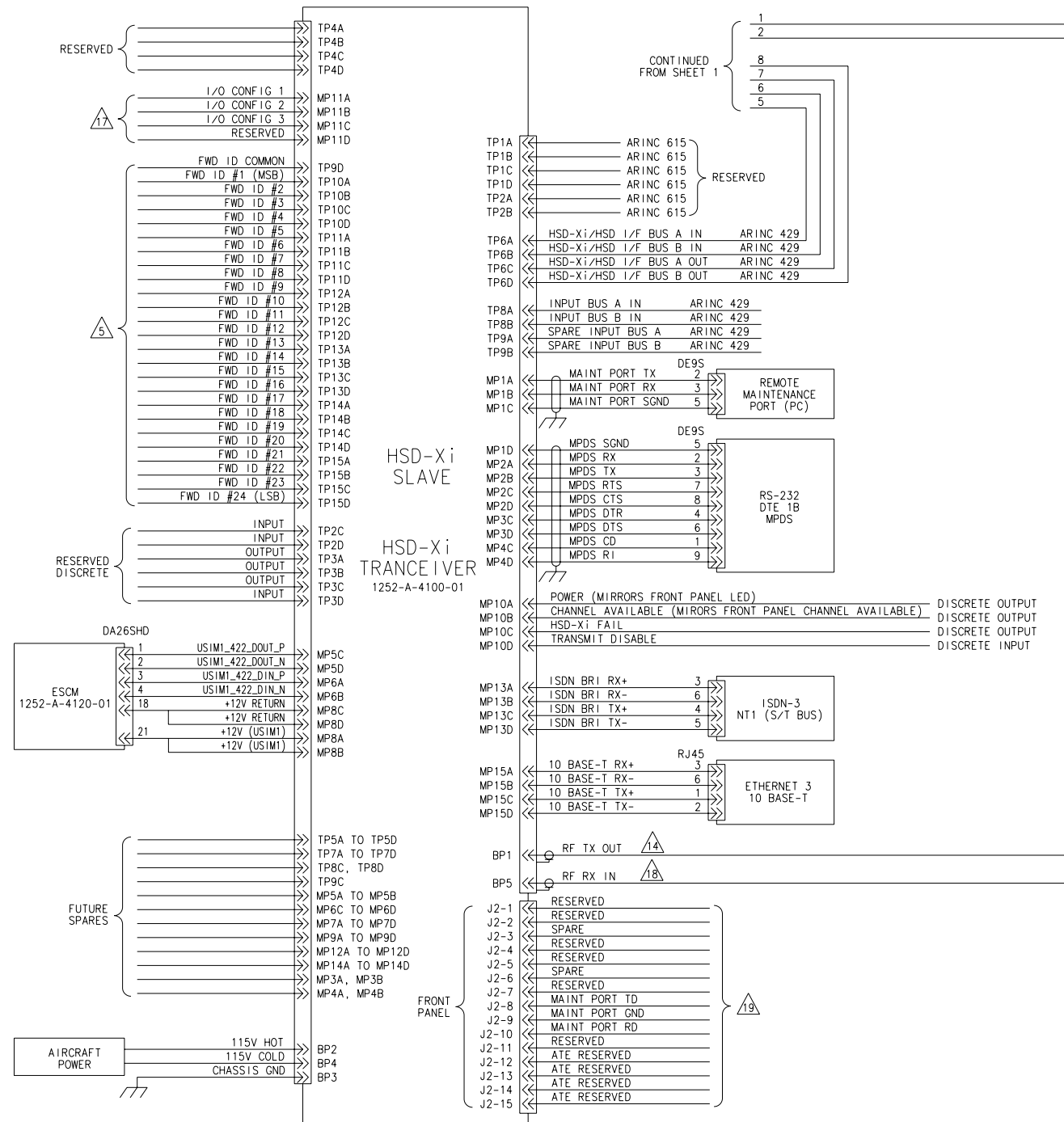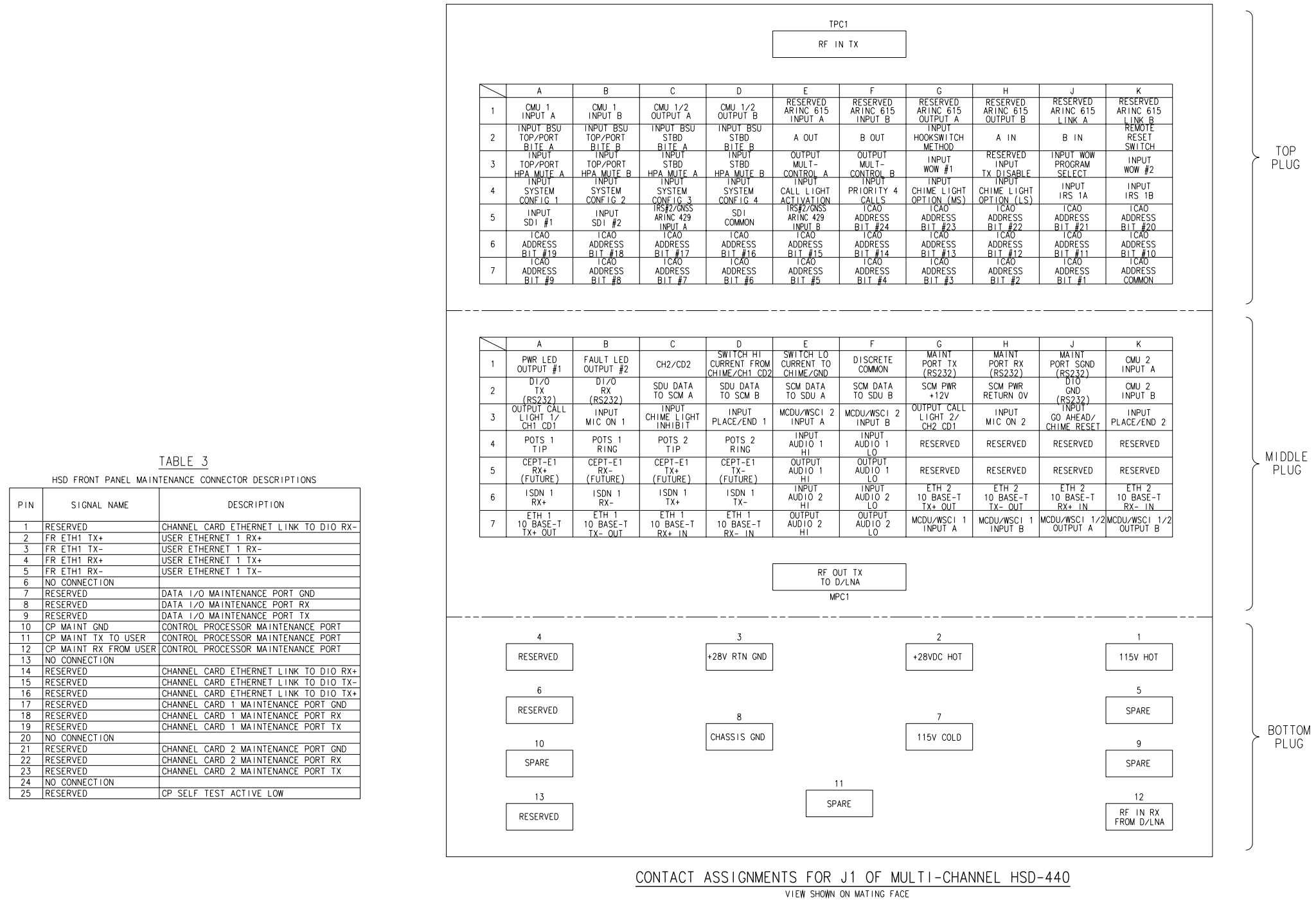|	A	B	C	D
1	INPUT DATA LOADER A	INPUT DATA LOADER B	OUTPUT DATA LOADER A	OUTPUT DATA LOADER B
2	INPUT DATA LOADER LINK A	GND DATA LOADER LINK B	INPUT RESERVED DISCRETE	INPUT RESERVED DISCRETE
3	OUTPUT RESERVED DISCRETE	OUTPUT RESERVED DISCRETE	OUTPUT RESERVED DISCRETE	INPUT RESERVED DISCRETE
4	INPUT SYSTEM CONFIG 1	INPUT SYSTEM CONFIG 2	INPUT SYSTEM CONFIG 3	INPUT SYSTEM CONFIG 4
5	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE
6	INPUT HSD-Xi/HSD I/F BUS A	INPUT HSD-Xi/HSD I/F BUS B	OUTPUT HSD-Xi/HSD I/F BUS A	OUTPUT HSD-Xi/HSD I/F BUS B
7	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE
8	A IN	B IN	FUTURE SPARE	FUTURE SPARE
9	SPARE INPUT BUS A	SPARE INPUT BUS B	FUTURE SPARE	GND FWD ID COMMON
10	INPUT FWD ID #1	INPUT FWD ID #2	INPUT FWD ID #3	INPUT FWD ID #4
11	INPUT FWD ID #5	INPUT FWD ID #6	INPUT FWD ID #7	INPUT FWD ID #8
12	INPUT FWD ID #9	INPUT FWD ID #10	INPUT FWD ID #11	INPUT FWD ID #12
13	INPUT FWD ID #13	INPUT FWD ID #14	INPUT FWD ID #15	INPUT FWD ID #16
14	INPUT FWD ID #17	INPUT FWD ID #18	INPUT FWD ID #19	INPUT FWD ID #20
15	INPUT FWD ID #21	INPUT FWD ID #22	INPUT FWD ID #23	INPUT FWD ID #24

MIDDLE PLUG (MP)

	A	B	C	D
1	OUTPUT MAINTENANCE PORT TX	OUTPUT MAINTENANCE PORT RX	GND MAINTENANCE PORT SGND	GND MPDS SGND
2	INPUT MPDS RX	OUTPUT MPDS TX	MPDS RTS	MPDS CTS
3	FUTURE SPARE	FUTURE SPARE	MPDS DTR	MPDS DSR
4	FUTURE SPARE	FUTURE SPARE	MPDS CD	MPDS RI
5	FUTURE SPARE	FUTURE SPARE	USIM1_422_DOUT_P	USIM1_422_DOUT_N
6	USIM1_422_DIN_P	USIM1_422_DIN_N	FUTURE SPARE	FUTURE SPARE
7	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE
8	+12V (USIM1)	+12V (USIM1)	+12V RETURN	+12V RETURN
9	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE
10	OUTPUT SERVICE READY	OUTPUT CHANNEL AVAILABLE	OUTPUT HSD-Xi FAIL	INPUT TRANSMIT DISABLE
11	INPUT I/O CONFIG 1	INPUT I/O CONFIG 2	INPUT I/O CONFIG 3	INPUT I/O CONFIG 4
12	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE
13	INPUT ISDN BRI RX+	INPUT ISDN BRI RX-	OUTPUT ISDN BRI TX+	OUTPUT ISDN BRI TX-
14	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE	FUTURE SPARE
15	INPUT 10 BASE-T RX+	INPUT 10 BASE-T RX-	OUTPUT 10 BASE-T TX+	OUTPUT 10 BASE-T TX-

BOTTOM PLUG (BP)

- BP1 — OUTPUT RF TX
- BP2 — INPUT 115VAC/400Hz HOT
- BP3 — CHASSIS GROUND
- BP4 — INPUT 115VAC/400Hz COLD
- BP5 — INPUT RF RX

CONTACT ASSIGNMENTS FOR J1 OF HSD-Xi
VIEW SHOWN ON MATING FACE

TABLE 4
HSD-Xi FRONT PANEL CONNECTOR DESCRIPTIONS

FUNCTION	PIN	HSD-Xi IN/OUT	SIGNAL TYPE
DATA LOADER IN A	J2-1	IN	RESERVED
DATA LOADER IN B	J2-2	IN	RESERVED
SPARE	J2-3		
DATA LOADER OUT A	J2-4	OUT	RESERVED
DATA LOADER OUT B	J2-5	OUT	RESERVED
SPARE	J2-6		
DATA LOADER CONTINUITY LINK (A)	J2-7	IN	RESERVED
MAINT PORT TD	J2-8	OUT	RS232
MAINT PORT GND	J2-9	GND	RS232
MAINT PORT RD	J2-10	IN	RS232
DATA LOADER CONTINUITY LINK (B)	J2-11	GND	RESERVED
ATE RESERVED	J2-12		ATE
ATE RESERVED	J2-13	GND	ATE
ATE RESERVED	J2-14		ATE
ATE RESERVED	J2-15		ATE

TABLE 6
HSD-Xi I/O DATA STRAPPING

MP11A	MP11B	MP11C	I/O CONFIG
1	1	1	INVALID
1	1	0	RESTRICTED (DISABLE DATA I/O)
1	0	1	MPDS
1	0	0	SCPC (M4) ONLY
0	1	1	UNRESTRICTED (RECOMMENDED IF NO SPECIFIC USER REQUIREMENTS)
0	1	0	NOT ASSIGNED
0	0	1	NOT ASSIGNED
0	0	0	RESERVED

0=FWD ID COMMON, 1=NO CONNECTION

Figure 3-10. System Interconnection Diagram HSD-440 Network Mode (HSD-Xi), 1252-B-4303 Rev. B00, (Sheet 4 of 4)

DWG No 1252-B-4303 REV B SHT 4

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TEST AND FAULT ISOLATION

This section provides the information required to determine the operational readiness of the HSD-Xi terminal, and to aid service personnel in diagnosing system faults. It includes the following sections:

- Operational and Diagnostic Testing

- Adjustment and Alignment Procedures

- Modification History

The operational and diagnostic tests described in this section require you to use the network mode HSD terminals built-in diagnostic tool, terminal MPU.

NOTE: Depending on the version of software installed, the MPU report and menu screens displayed may differ from those shown as examples in this manual.

1. Operational and Diagnostic Testing

A. General

Usually, terminals require testing for one of the following reasons:

- To verify the operational readiness of the terminal during and after installation on an aircraft

- To verify that a fault exists and produce system reports for troubleshooting purposes

- To verify the operational readiness of repaired LRUs during re-installation on an aircraft

This section includes test and fault isolation procedures for the HSD-X and HSD-Xi terminals.

B. Verifying the HSD-X and HSD-Xi Terminal Installation

To verify that the HSD-X and HSD-Xi is installed correctly, you need the following equipment:

- Computer with Ethernet and serial connections

- HyperTerminal© or equivalent terminal emulator

- Maintenance port interface cable

Perform these procedures to verify that the HSD-X and HSD-Xi is installed correctly.

To activate a connection between the network mode HSD terminal and the HSD-Xi terminal:

1. Connect a computer to the maintenance port utility of the network mode HSD terminal.

2. To navigate to **Menu 3**, press CTRL + N.

3. To set control processor parameters, press **k**.

4. A list of control processor parameters appears.

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5. To access the HSD-Xi parameter, type **48**.

   A prompt to define the HSD-Xi as installed or not installed appears.

6. To activate the connection between the network mode HSD terminal and the HSD-Xi terminal, press **1**.

7. Power cycle both units. The network mode HSD terminal can now communicate with the HSD-Xi terminal.

To verify the HSD-Xi installation:

1. Connect to the maintenance port utility of the HSD-Xi terminal.

2. To navigate to **Menu 4**, press CTRL + N.

3. To verify the Forward ID of the terminals in the HSD-Xi, press **q**.

   The forward ID for CC #1 appears.

4. To verify the system configuration and I/O strapping, press **=,** type **13**, press **ENTER**, and then press **esc**.

   Report 13 is activated and displays the system configuration and data I/O strapping.

5. To navigate to **Menu 3**, press **CTRL + O**.

6. To verify LES access codes, press **O**.

   The LES access codes appear.

7. To verify that the network mode HSD system recognizes the HSD-Xi terminal, press **=**, type **78**, press ENTER, and then press **esc**.

   Report 78 is activated and displays information about the connected HSD-Xi terminal.

To Verify that the Network mode HSD terminal is operating correctly:

1. Connect a computer to the maintenance port utility of the network mode HSD terminal.

2. To verify receive C/No (Rx) signals, press **=**, type **69**, press ENTER, and then press **esc**.

   Report 69 is activated and displays the receive C/No signal values for each channel card in the network system. Make sure that receive C/No signal values are greater than 50 dB/Hz.

3. To verify transmit (Tx) signals, press **=,** type **69** and press ENTER to disable report 69, then press **=,** type **78**, press ENTER, and then press **esc**.

   Report 78 is activated and displays transmit EIRP/Watt values for components of the network system.

4. To verify that the network mode HSD is operating correctly, place a Swift64 call on the HSD-Xi terminal, and make sure that EIRP/Watt values are between 14.5 dBW and 22.5 dBW.

   If the network mode HSD system does not pass these installation tests, refer to the Testing and Fault Isolation section of HSD-440 System Description, Installation, and Maintenance Manual, MN-1252-33077.

2. Adjustment and Alignment Procedures

There are no adjustment or alignment procedures required for HSD-Xi terminals.

3. Modification History

The HSD-Xi terminal currently has no history of modifications.

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MAINTENANCE AND REPAIR

This section provides maintenance and repair information for the HSD-X and HSD-Xi terminal. It includes the following sections:

- Maintenance

- Repair

1. Maintenance

The HSD-X and HSD-Xi terminals do not require routine maintenance.

This section contains the following sections:

- Basic Troubleshooting for the network mode HSD

- Connecting to the HSD-Xi terminal through the network mode HSD Console Mode

- Disconnecting Software Load Equipment

- Monitoring the HSD-Xi Terminal

A. Basic Troubleshooting for the network mode HSD

This section provides basic fault checks for the network mode HSD.

- If the Ocean Region registration fails, make sure that the same LES access code is configured for all components of the system.

- If the HSD-Xi terminal does not transmit calls, make sure that the system configuration and I/O configuration strapping is correct.

- If the Fault LED illuminates, check the HPA status and Forward ID and SDI strapping.

- If the network mode HSD does not communicate with the aircraft avionics, make sure that the multi-control and BITE wiring is correct.

- If you cannot make a Swift64 call with the HSD terminal, activate report 38 and verify the power request value, and verify that RF coax connections in the transmit path to the DLNA are properly installed.

- If the network mode HSD drops calls when multiple calls are in progress, verify that the HPA to antenna cable loss value is accurate. Measure again the cable loss values from the HSD-Xi to the network mode HSD and from the HPA to the antenna. Reconfigure the cable loss values if necessary.

- If the SBB service is not working, check the Subscriber Identity Module (SIM), Access Point Name (APN) and the Inmarsat Account.

- During satellite re-clocking, SBB and Classic services may not be available on the same satellite at a given time. If this occurs, make sure the Classic service is turned off to access SBB services. See Enabling and Disabling the Classic Channel Card.

NOTE: For information about SBB, or on how to configure Swift64 or SBB services, or for information about maintenance and monitoring of the network mode HSD, see the eNfusion™ HSD-440 High-speed Data Terminal System Description, Installation, and Maintenance Manual, MN-1252-33077.

B. **Connecting to the HSD-Xi terminal through the network mode HSD Console Mode**

Use the procedures in this section to verify the operation of the HSD-Xi terminal. These procedures use the console mode of the network mode HSD terminal maintenance port utility.

NOTE: For information about how to connect to the network mode HSD terminal maintenance port utility, see the eNfusion™ HSD-440 High-speed Data Terminal System Description, Installation, and Maintenance Manual, MN-1252-33077.

To activate the console mode of the network mode HSD maintenance port utility:

1. Connect to the maintenance port utility of the network mode HSD terminal.

2. To navigate to **Menu 18**, press CTRL + N.

3. To activate the HSD-Xi console mode, press **x**.

    A prompt appears for the number of the associated HSD-Xi terminal. The network mode HSD supports only one HSD-Xi terminal.

4. To select the HSD-Xi terminal, press **1**, and then press ENTER.

    The maintenance port utility connects to the HSD-Xi terminal.

5. To access the HSD-Xiterminal, type the password **maint**.

    Menu 1 of the HSD-Xi maintenance port utility appears. You are connected to the HSD-Xi terminal.

C. **Loading Software to the HSD-Xi Terminal**

You can perform a software upload on the HSD-Xi terminal using the HSD-Xi maintenance port, or ARINC connector.

To upload HSD-Xi terminal channel card software:

1. Connect a computer to the maintenance port of the HSD-Xi terminal.

2. Save the HSD Load Program file (PN 1110-SW-1021) to a folder on your computer.

    NOTE: EMS SATCOM recommends that you create a folder named HSD_Load in the root directory of the computer and save the load application file to this folder.

3. Apply power to the HSD-Xi terminal.

4. Close all other applications running on the computer.

    The load program may not execute successfully if other programs are running.

5. To launch the load application, in the HSD_Load folder, double-click on **ADT_LOAD.exe**.

    The ADT_LOAD application opens in a DOS window and displays the Load Target menu.

6. To load channel card application software (for example: appl41.hex, cfig41.hex) to channel card #1, from the **Which Target** menu type **22**, and then press ENTER.

    The load application prompts you to type in a filename.

7. Type the appropriate filename for the software being loaded to the HSD-Xi Channel Card (for example appl41.hex or cfig41.hex), and then press ENTER.

    The application prompts you to select a COM port.

8. Type the appropriate COM port (1 or 2—typically 1), and then press ENTER.

9. To start the load, press ENTER.

    Communication with the HSD-Xi transceiver is established. A percentage (%) progress indicator appears on the screen and shows the load status. Once the load is complete, a confirmation message briefly appears on the screen indicating that the file has been successfully loaded. The DOS window then closes, and the HSD resets automatically.

D. Disconnecting Software Load Equipment

After you install the software and verify that the software loaded successfully, disconnect your equipment properly from the HSD-Xi terminal.

To remove power and disconnect the HSD-Xi terminal properly:

1. Turn off the computer.

2. Disconnect the serial cable connector from the COM port.

3. Disconnect the cable connector from the HSD Maintenance Port.

E. Monitoring the HSD-Xi Terminal

Monitor the HSD-Xi terminal status by reading the maintenance port utility reports.

To activate a report:

1. Connect to the maintenance port utility of the HSD-Xi terminal.

2. To view a list of reports, press **=**.

3. To access a report, type the report number.

4. To activate the report, press **esc**.

The following reports provide useful information on the HSD-Xi terminal status.

*   Report 7—provides a log of call codes and events for every call made through the HSD-Xi terminal.

*   Report 46—a comprehensive report that describes the overall health of the terminal

*   Report 78—provides transmit power values for components of the network mode HSD system. NOTE: This report is not available on the HSD-Xi. HSD-Xi Transmit power can be monitored in HSD-440 Report 78.

F. Software Load Procedure

EMS SATCOM may occasionally release new software for the HSD-Xi terminal.

CAUTION: DO NOT LOAD SOFTWARE INTO THE HSD-XI TERMINAL WHEN THE TERMINAL IS FULLY INSTALLED IN THE AIRCRAFT.

CAUTION: MAKE SURE THAT ALL REPORTS AND MENUS ARE TURNED OFF.

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Load new software with a laptop or computer connected to the maintenance port of the HSD-Xi terminal, using the EMS Loader application.

Load new software with a laptop or computer connected to the maintenance port of the HSD terminal, using the EMS Loader application.

NOTE: Refer to the applicable software release note or service bulletin for a specific list of the software files that need to be loaded. If in doubt, verify with EMS SATCOM Product Support that the software version being loaded is the latest release.

This section describes how to load channel card software to HSD-Xi terminals using the EMS Loader.

To load channel software:

1. Remove power from the HSD-Xi terminal.

2. Connect a computer to the maintenance port of the HSD-Xi terminal.

3. Turn on the computer.

4. Save the EMS Loader application file (ADT_LOAD.exe) to the same folder on your computer that contains the software files.

   EMS SATCOM recommends that you create a folder named **HSD Load** in the root directory and save the load program file and the software files to this folder.

5. Apply power to the HSD-Xi terminal.

6. Close all other applications running on the computer. The load program will not execute successfully if other programs are using the COM port.

7. In the **HSD Load** folder, double-click **ADT_LOAD.exe**.

   The EMS Loader opens in a DOS window, displays the Load Target menu, and prompts you to select a target for the software.

8. To load all software on channel card 1, type **22**.

9. Press ENTER.

   The EMS Loader prompts you to select a COM port.

10. Type the COM port connected to the HSD-Xi terminal, and then press ENTER.

    The EMS Loader prompts you to type a filename.

11. Type **Swift64-PR-9140-x.xx-config.hex**, and then press ENTER.

    The prompt asks if this is RF control software for TAL2 (channel card 1).

12. To choose the default, N (No), press ENTER.

    The EMS Loader continues to prompt for the next filename.

13. Type the following file names one at a time, press ENTER after each one, type **Y** or **N**, and then press ENTER again.

    • Swift64-PR-9140-x.x.x-cpumain.hex, ENTER, N, ENTER

    • Swift64-PR-9140-x.x.x-release.hex, ENTER, N, ENTER

    • Swift64-PR-9140-x.x.x-tmsc33.hex, ENTER, N, ENTER

    • Swift64-PR-9140-x.x.x-tmsc64.hex, ENTER, N, ENTER

- Swift64-PR-9140-x.x.x-rfcontrol.hex, ENTER, N, ENTER

    NOTE: Do not load Swift64-PR-9140-x.xx-rfcontrol2.hex.

14. To terminate the list, press ENTER at the prompt.

    Communication with the HSD-Xi terminal is established. A percentage (%) load status indicator appears on the screen. Once the load is complete, a confirmation message briefly appears on the screen indicating that the file has been successfully loaded. The DOS window closes, and the HSD-Xi terminal resets.

15. Repeat steps 7 to 14 to load the software:
    SwiftSBB_PR_9140_x_x_x-Config.hex, and:

    - SwiftSBB_PR_9140_x_x_x-cpumain.hex, ENTER, N, ENTER

    - SwiftSBB_PR_9140_x_x_x-CPUSwiftBB.hex, ENTER, N, ENTER

    - SwiftSBB_PR_9140_x_x_x-Modem.hex, ENTER, N, ENTER

    - SwiftSBB_PR_9140_x_x_x-ReleaseMarker.hex, ENTER, N, ENTER

    - SwiftSBB_PR_9140_x_x_x-VoiceCodec.hex, ENTER, N, ENTER

    NOTE: Do not load SwiftSBB_PR_9140_x_x_x-RFControl.hex.

16. If no other software loads are required, proceed to "Verifying Software Loads" on page 5-7.

    NOTE: If the load fails, restart the load from the beginning of the procedure. If, after two attempts, the load still does not complete successfully, contact EMS SATCOM Product Support for assistance.

(1) Loading Control Process Software

This section describes how to load control processor software on to terminals.

CAUTION: SOFTWARE MUST NOT BE LOADED TO THE HSD-Xi TERMINAL WHEN THE TERMINAL IS FULLY INSTALLED IN THE AIRCRAFT.

To load control processor software to the HSD-Xi terminal:

1. Remove power from the HSD-Xi terminal.

2. Connect a computer to the maintenance port of the HSD-Xi terminal.

3. Turn on the computer.

4. Save **ADT_LOAD.exe** to the same folder on your computer that contains the software files.

    EMS SATCOM recommends that you create a folder named **HSD Load** in the root directory and save the load program file and the software files to this folder.

5. Apply power to HSD-Xi terminal.

6. Close all other applications running on the computer. The load program will not execute successfully if other programs are using the COM port.

7. In the **HSD Load** folder, double-click **ADT_LOAD.exe** to launch the load application.

   The EMS Loader opens in a DOS window, displays the Load Target menu, and prompts you to select a target for the software.

8. To load control processor software to the control processor, press 0 (zero), and then press ENTER.

   The load application prompts you to type a filename.

9. Type the filename for the software being loaded to the HSD-Xi terminal control processor, and then press ENTER.

   The EMS Loader prompts you to select a COM port.

10. Type the COM port connected to the HSD-Xi terminal, and then press ENTER.

11. To start the load, press ENTER. To abort the software load, press ESC.

    Communication with the HSD-Xi terminal is established. A percentage (%) load status indicator appears on the screen. Once the load is complete, a confirmation message briefly appears on the screen indicating that the file has been successfully loaded. The DOS window closes, and the HSD-Xi terminal resets.

12. If no other software loads are required, go to "Verifying Software Loads" on page 5-7.

    NOTE: If the load fails, restart the load from the beginning of the procedure. If, after two attempts, the load still does not complete successfully, contact EMS SATCOM Product Support for assistance.

(2) Updating Displayed Software Versions

Once you have uploaded the major software to the HSD-Xi terminal, you must load a BIN file to display the new versions. Load this file according to the applicable software service bulletin released by EMS SATCOM.

To update displayed software versions:

1. Remove power from the HSD-Xi terminal.

2. Connect a computer to the maintenance port of the HSD-Xi terminal.

3. Turn on the computer.

4. Save **ADT_LOAD.exe** to the same folder on your computer that contains the software files.

   It is recommended that you create a folder named **HSD Load** in the root directory and save the load program file and the software files to this folder.

5. Apply power to the HSD-Xi terminal.

6. Close all other applications running on the computer. The load program will not execute successfully if other programs are using the COM port.

7. In the **HSD Load** folder, double-click **ADT_LOAD.exe** to launch the load application.

   The EMS Loader opens in a DOS window, displays the Load Target menu, and prompts you to select a target for the software.

8. To load application software, type **24**.

9. Press ENTER.

   The system prompts you for a filename.

   NOTE: The filename follows the format **li_XX.bin**.

10. Type the filename of the software.

11. Press ENTER.

    The program prompts you to select a COM port.

12. Type the COM port connected to the HSD-Xi terminal, and then press ENTER.

13. To start the load, press ENTER.

    A percentage (%) progress indicator appears on the screen. A confirmation message briefly appears on the screen indicating that the file has been successfully loaded, and the DOS window closes. This completes the software load.

When you finish loading all the software load, make sure the software loaded successfully by following "Verifying Software Loads" on page 5-7

If a software load fails, restart the load from the beginning of the procedure. If, after two attempts, the load still does not complete successfully, contact EMS SATCOM Product Support for assistance.

(3) **Verifying Software Loads**

   After loading all software as specified in the applicable software service bulletin released by EMS SATCOM verify that all software loaded successfully.

   NOTE: The screens shown in this procedure are examples only. The software and other versions may differ from your terminal.

   To verify software loads:

   1. Apply power to the HSD-Xi terminal.

   2. On the computer, open a terminal emulation program, such as HyperTerminal, and start the HSD-Xi terminal MPU.

   3. Connect the computer to the maintenance port of the HSD-Xi terminal.

   4. Type **maint**, and then press ENTER.

      Menu 1 appears.

   5. To scroll to Menu 2, press CTRL+N.

   6. To display the versions of software loaded onto the HSD-Xi terminal, press V.

      A list of firmware versions appears similar to the example provided below (actual versions will differ depending on the software installed on the terminal).

```
FIRMWARE VERSIONS:
  KERNEL:            V1.4 -- Wed Feb 21 08:58:08 2007
  APPLICATION:       V11.9 -- Wed Mar 28 10:07:24 2007
  CHANNEL CARD #1:  4.9.8.0 -- 0.3.6.2 -- 2.1.0.0 -- 2.7.0.0
  CHANNEL CARD #2:  1.17.0.1 --  --  -- 2.7.0.0
  DATA I/O CARD:     Version 1.39.0.0 built on Feb  2 2007 13:
```

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7. Verify that all software has loaded successfully to both channel cards. Verify that the firmware versions shown match the versions listed on the load disk (or files) and in the software service bulletin (examples shown above).

8. Close the terminal emulation program.

9. Remove power from the HSD-Xi terminal.

   This completes the software load verification.

(4) Disconnecting the Load Equipment

You must complete all required software loads and load verification before you disconnect the load equipment.

To disconnect load equipment:

1. Remove power from the HSD-Xi terminal (if applicable).

2. Turn off the computer (if applicable).

3. Disconnect the serial cable connector from the COM port.

4. Disconnect the serial cable connector from the HSD-Xi terminal maintenance port.

2. Repair

All repair procedures must be completed by EMS SATCOM-approved repair facilities.

A. Repair Tools and Supplies

No special supplies are required to repair this equipment.

HSD-X and HSD-Xi terminals that require service must be returned to EMS SATCOM or to an EMS SATCOM-approved service center. Refer to "Test and Fault Isolation" on page 4-1 for terminal testing requirements and procedures.

B. Repair Procedures

This equipment does not require any special repair procedures.

C. Removal Procedures

If an HSD-X and HSD-Xi terminal must be removed from service for repair, remove power, disconnect all equipment from the terminal and then remove it from the ARINC tray.

D. Repair Facility Approvals

EMS SATCOM, located at 400 Maple Grove Road in Ottawa, Ontario, Canada, is a Transport Canada Approved Maintenance Organization (AMO). In accordance with the Technical Arrangement on Maintenance between Canada and the European aviation authority JAA, and due to the Bilateral Agreement between Canada and the United States aviation authority FAA, EMS SATCOM conforms to the maintenance requirements of JAR 145 and FAR 145 respectively.

E. **Return for Repair Information**

To return equipment to EMS SATCOM for repair, follow the Return Materials Authorization procedure. Failure to comply with this procedure may cause shipping delays and additional charges.

(1) Warranty Returns

Equipment that qualifies for warranty repair can be returned to EMS SATCOM for repair or replacement at our discretion. The customer shall pay the shipping costs to EMS SATCOM and EMS SATCOM will pay for the shipping costs to return the repaired/replaced terminal to the customer.

(2) Non-Warranty Returns

Equipment that fails to work properly because of improper or negligent use, abuse, shipping damage, or any other condition can still be returned to EMS SATCOM for repair or replacement at our discretion. The customer will be notified of the cost to repair or replace the terminal prior to invoicing for the repair or replacement. The customer shall pay for the shipping costs to and from EMS SATCOM.

(3) Repackaging Requirements

An HSD-X and HSD-Xi terminal returned to EMS SATCOM must be returned in its original shipping container. Failure to do so may invalidate the warranty. If an HSD-Xi terminal shipping container is unavailable, the customer must request a replacement container from EMS SATCOM or assume responsibility for the packaging and shipping.

(4) Return Materials Authorization (RMA) Procedure

If it is determined that a terminal must be returned to EMS SATCOM for repair or overhaul, please follow the RMA procedure below.

1. Have the following information ready before calling EMS SATCOM Product Support:

   - Model (for example HSD-400 terminal)
   - Terminal part number (for example, 1252-A-3500)
   - Serial number
   - Description of failure
   - Aircraft tail number, serial number, and aircraft model number

2. Call EMS SATCOM Product Support at 1-888-300-7415 (North America) or +1-613-591-3086 (rest of the world).

3. An EMS SATCOM Product Support Specialist will attempt to resolve the problem by telephone. If the terminal must be returned to EMS SATCOM, the Product Support Specialist will authorize the R&O Coordinator to issue an RMA Number.

4. Pack the HSD-X and HSD-Xi terminal in the original shipping container or an EMS SATCOM-approved shipping-container.

5. Write the RMA number on the outside of the shipping container and on all shipping documents and ship prepaid to:

   EMS SATCOM (867480857)

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400 Maple Grove Road

Ottawa, Ontario

Canada K2V 1B8

RMA#_____

Attn: Repair & Overhaul

6. Fax or email the details of the shipment to the R&O Coordinator, including the following information: Shipment date, carrier name and the waybill number.

> NOTE: The processing of LRU returns is limited to standard business hours from 8:30 am to 5:00 pm EST. For General inquires and status requests, please contact the R&O department directly:

Tel: 613-591-6040 Ext. 1214

Fax: 613-591-8951

Email: rmareturns@emssatcom.com

3. Instructions for Continued Airworthiness

This section presents the instructions for continued airworthiness, as per FAR 25.1529, of the HSD-X and HSD-Xi terminal.

Installation of the HSD-X and HSD-Xi terminal on an aircraft by supplemental type certificate (STC) or Form 337 obligates the aircraft operator to include the maintenance information supplied by this manual in the operator's Aircraft Maintenance manual and the operator's Aircraft Scheduled Maintenance Program.

The following paragraphs describe all maintenance requirements and instructions for continued airworthiness of the HSD-X and HSD-Xi terminal.

- Add the LRU part numbers and other necessary part numbers contained in this manual to the aircraft operator's appropriate, aircraft illustrated parts catalog (IPC).

- Add all wiring diagram information contained in this manual to the aircraft operator's appropriate aircraft Wiring Diagram Manuals.

- HSD-X and HSD-Xi terminals are considered on-condition units. No additional or routine maintenance is required.

- If an HSD-X and HSD-Xi terminal is inoperative, remove the terminal, secure cables and wiring, collar applicable switches and circuit breakers, and placard them as inoperative. Before flight, revise the equipment list and weight and balance data as applicable and record the removal of the terminal in the log book [refer to section 91.213 of the FAR or the aircraft's minimum equipment list (MEL)].

- HSD-X and HSD-Xi terminals are not field-repairable. All terminals must be returned to the EMS SATCOM factory or authorized repair centers for repair.

- Repaired terminals must be re-installed on the aircraft in accordance with the instructions provided in this manual. The operation of all repaired terminals must be verified using the operational verification tests and procedures provided in this manual before being approved for return to service. All special tools required to test the terminal for approval for return to service are listed and described in "Test and Fault Isolation" on page 4-1.

Approval for return to service must be entered in the logbook as required by section 43.9 of the FAR.

- The following scheduled maintenance tasks must be added to the aircraft operator's appropriate aircraft maintenance program:

  - Recommended periodic scheduled servicing tasks: None required.

  - Recommended periodic inspections: None required.

  - Recommended periodic scheduled preventative maintenance tests (tests to determine system condition and/or latent failures): None required.

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APPENDIX A: INMARSAT SATELLITE BEAM COVERAGE

Inmarsat operates strategically placed geostationary satellites called I-3 and I-4. I-3 satellites provide access to services such as Swift64 and Aero H/H+, and I-4 satellites provide access to SBB services.

Each I-3 satellite is located over and named after an OR. The four satellite ORs are:

- Atlantic Ocean Region-East (AOR-E)

- Atlantic Ocean Region-West (AOR-W)

- Indian Ocean Region (IOR)

- Pacific Ocean Region (POR)

Figure A-1 represents the satellite ORs with approximate transfer coordinates for satellite transitions.
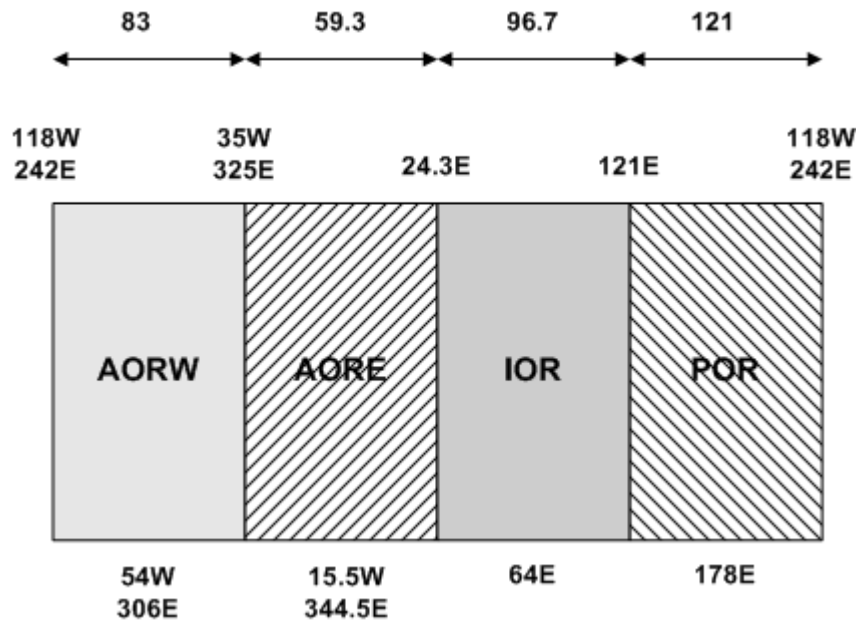
Figure A-1 Satellite ORs

The four satellite ORs are made up of smaller, spot-beam coverage areas. The following maps show the Inmarsat satellite spot-beam coverage for the four ORs, and a composite map of the four regions combined.

NOTE: Figure A-2 and Figure A-3 depict Inmarsat's expectations of coverage but do not represent a guarantee of service and should not be relied upon. The availability of service at the edge of coverage areas fluctuates depending upon a variety of conditions.
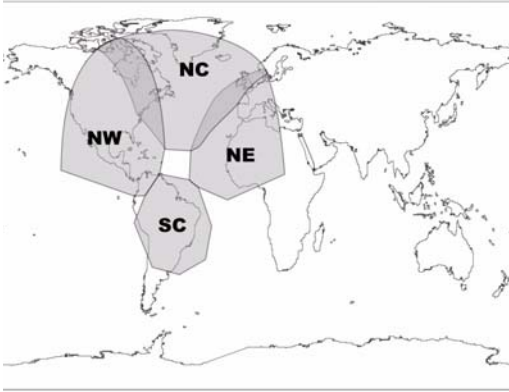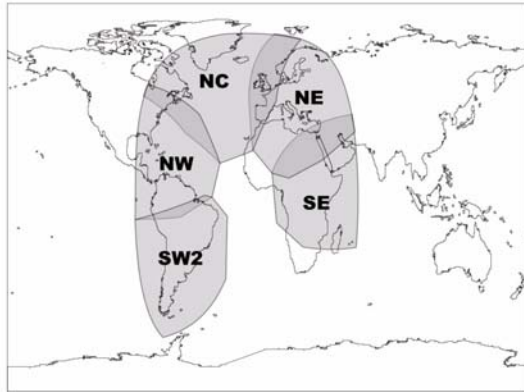
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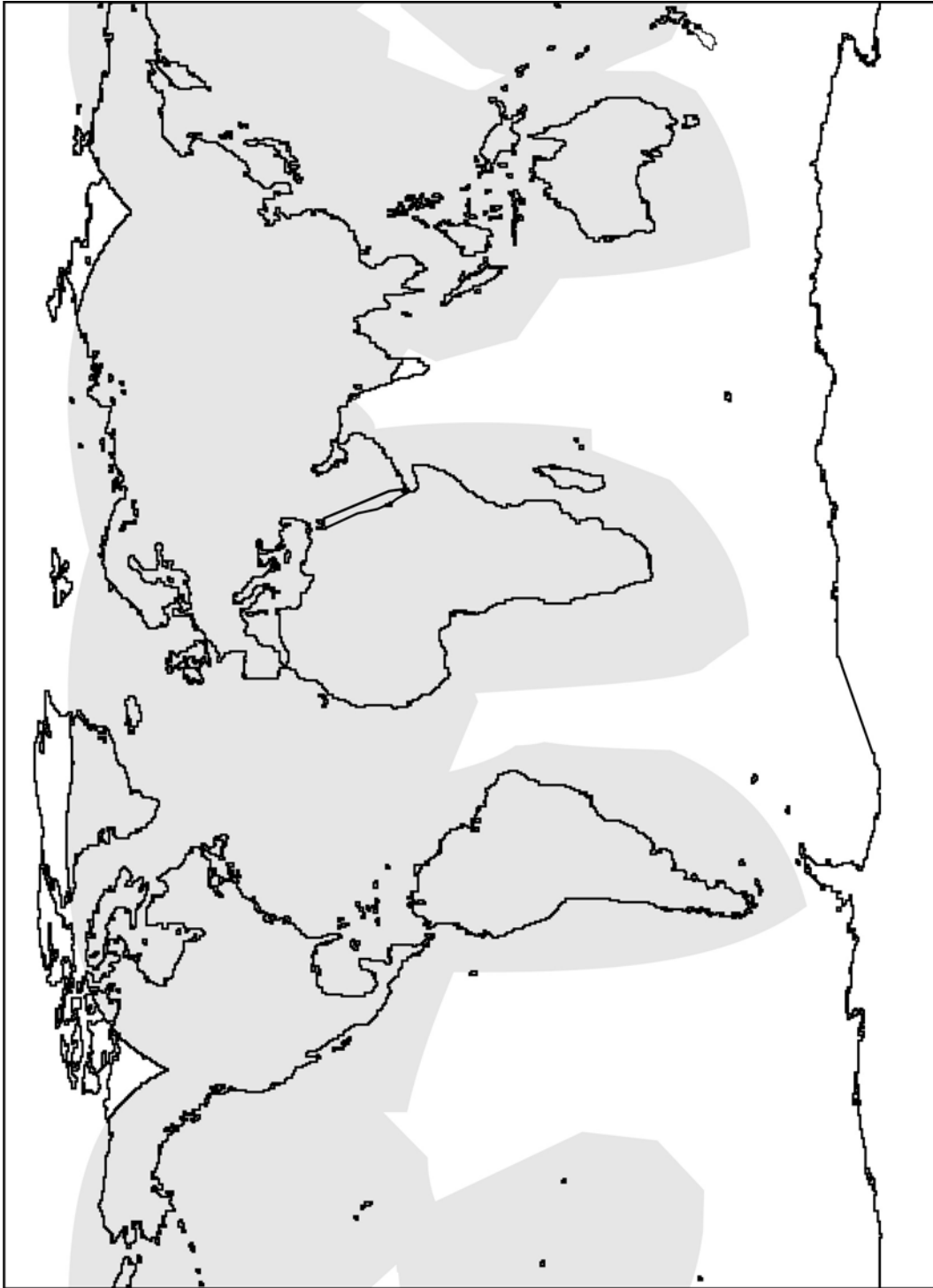
Figure A-2 Inmarsat I3 Satellite Beam Coverage—Composite Map

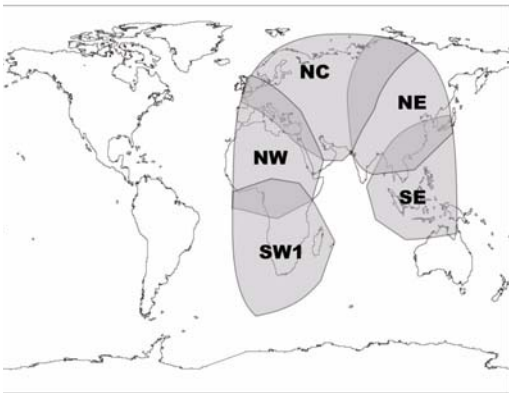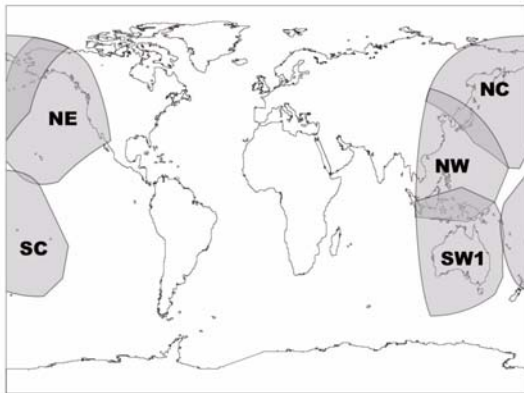**Figure A-3 Inmarsat I-3 Satellite Beam Coverage—OR Maps**

At the time of publishing, three I-4 satellites provide SBB services: Americas (98W), EMEA (25E) and Asia-Pacific (143.5E).

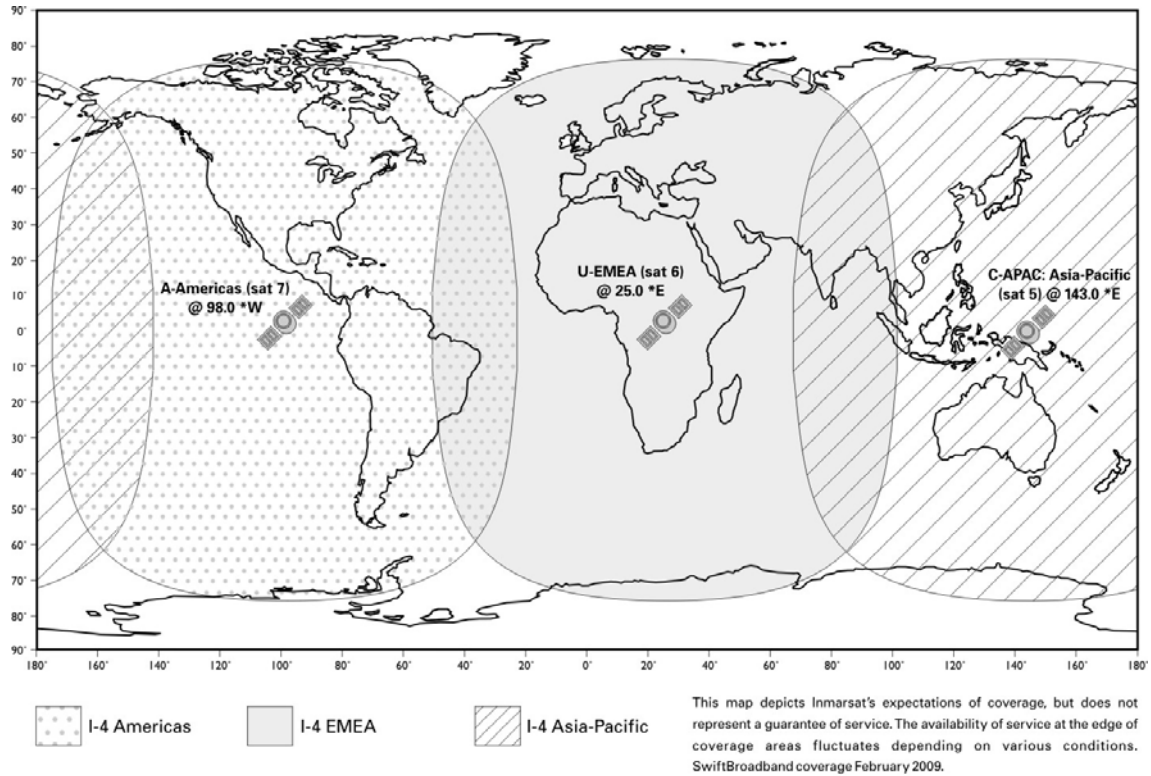Figure A-4 shows the area covered by I-4 satellites.

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Figure A-4 I-4 Satellite Coverage Map

APPENDIX B: TROUBLESHOOTING CHECKLIST

Before performing the detailed testing and troubleshooting procedures provided in this manual, read the following Troubleshooting Checklist. Use the Troubleshooting Checklist to make sure that you have not missed any key steps in the HSD-X and HSD-Xi terminal setup.

1. **Have you registered with a service provider to activate service?**

    You must register with an Inmarsat-authorized service provider to activate an account to access the Satellite Communications network using an HSD-X and HSD-Xi terminal. Contact Inmarsat for a list of available service providers at:

    > Inmarsat Customer Care
    > 99 City Road, London, EC1Y 1AX
    >
    > Tel: +44 20 7728 1777
    > Fax: +44 20 7728 1142
    >
    > E-mail: customer_care@inmarsat.com

2. **Has your account been activated?**

    Once registered, your HSD-X and HSD-Xi terminal is assigned terminal identification numbers called FWD IDs. The HSD-X and HSD-Xi terminal must be strapped accordingly. Refer to "Installation" on page 3-1 for detailed strapping and installation instructions.

    NOTE: The service registration information may take a few days to be incorporated into the system databases at the LES level. New terminals being commissioned are not validated by the LES until their customer database has been updated by Inmarsat to reflect the registration and activation of your terminal.

    NOTE: To verify that the service registration information has been validated at the LES, call 33 POUND KEY for assistance. Confirm with the LES operator that the FWD IDs assigned to your terminal are valid and active.

3. **Is the HSD-X and HSD-Xi terminal seated properly?**

    In cases where the HSD-X and HSD-Xi terminal is not fully seated into the ARINC 600 connector (to the rear of the Fan Tray), the user may experience intermittent system operation. If intermittent system operation occurs:

    *   Check that the polarization pins are installed correctly as indicated on the applicable Outline and Installation diagram.

    *   Make sure that the HSD-X and HSD-Xi terminal is fully inserted into the tray and that the front hold-down screws are properly tightened to secure the terminal.

4. **Is all cabling attached correctly and securely?**

    Broken connections and improper cabling are the most common causes of HSD-X and HSD-Xi terminal malfunctions. Before proceeding with testing and troubleshooting, complete the following checks:

    *   Check that all cables and wiring are routed and connected correctly and securely.

    *   Make sure that the terminal is installed with the correct power source.

- Verify that all external user and networking devices (for example: TAs, routers, fax, telephones, computers) are connected and configured properly.

5. **Have any changes to the system been made?**

For previously installed and functional terminals, make note of any changes made to the system since the last time the terminal functioned without problems.

- Were any new devices or systems connected to the terminal?

- Have any connecting devices or equipment been removed or replaced? If so, check that all new or replaced connections are attached and configured correctly.

- Have you changed service providers or re-configured the system in any way?

6. **Are your Primary and Secondary LES Access Codes programmed for all ORs?**

The system default for LES access codes is set to 0 (zero), which must be configured to valid LES access codes before operation. Refer to "System Operation" on page 2-1 for details.

7. **Was the operational mode of the system strapped or configured correctly?**

Verify that the system mode wiring straps match the installation configuration mode.

APPENDIX C: INSTALLATION PLANNING CHECKLIST

Installation Planning Steps					
1. Register the terminal					
Record the following information (provided by EMS SATCOM upon purchase)					
Inmarsat Serial Numbers (ISN) x 4	1				☐
	2				
	3				
	4				
Contact your Service Provider and provide the four 12-digit ISNs from above					
IMSI Number		1			☐
IMSI Number		2			☐
Record the FWD IDs received (from your Service Provider or from Inmarsat) and corresponding Inmarsat Mobile Numbers (IMN)					☐
	1	2	3	4	
FWD IDs (last 6 digits of ISN)					
IMNs					
ISDN speech					
ISDN (3.1 kHz audio)					
ISDN 56 kbps					
ISDN 64 kbps					
ISDN (4.8k audio)					
MPDS					
Service Provider					☐
LES Access Codes (depend on Service Provider)					
AOR-W					
AOR-E					
IOR					
POR					
2. Pin Strapping					
The following strapping is required					
Item	Strapped pins, for example, TP1A to BP1A				

Installation Planning Steps		
Fwd ID		☐
System mode		☐
Data I/O (if applicable)		☐
SDI		☐
3. Wiring		
Antenna	Multi-Control	☐
	BITE A/B	☐
	HPA Mute A/B	☐
Power		☐
ISDN: Wire the ISDN line. Channels 1 and 2 operate over ISDN 1.	ISDN-1	☐
Ethernet: Wire the Ethernet port for SBB.	Ethernet-1	☐
Inertial Navigation System (INS)		☐
Analog Tip/Ring (POTS)		☐
CEPT-E1, *Future PBX applications (optional)*		☐
4. Configuration		
Program the Land Earth Station (LES) Access Codes		☐
Configure the CNX Cabin Gateway if required		☐

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APPENDIX D: INSTALLATION CHECKLIST

Aircraft Identification:		Network Mode HSD Terminal Model No.:	
HSD Terminal Install. Mode:		Network Mode HSD Terminal Serial No.:	
	Name	**Signature**	**Date**
Checks completed by:			
Approved/Witnessed by:			

Section	Parameter	Item	N/A	✔	Value
Installation / Mechanical	Physical	Service/maintenance access			
		Environmental considerations—see "HSD-Xi Terminal Environmental Characteristics" on page 1-5			
	Fan Tray	Plug configuration—see			
		Chassis bonding—see			
		Fan rotation—unobstructed			
	ARINC 600 Con.	Polarized pins			
Installation / Electrical	Power Connections	+ 28 V dc polarity			
		115 V ac polarity			
		Chassis grounding			
	Voltage Levels	+ 28 V dc level			
		115 V ac level			
	IRS Input	IRS wiring			
		IRS format			

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Section	Parameter	Item	N/A	✓	Value
	Config. Strap Pins	SDI			
		System configuration			
		Forward address			
		WOW (optional)			
	Ethernet	Wired to RJ45 distribution points			
	ISDN	Wired to RJ45 distribution points			
	Remotes	Manual reset switch operation			
		Maintenance port (DB9 access)			
		Power and Fault indicators			
	RF Coaxial	Rx i/p cable loss			
		Tx o/p cable loss			
	Antenna	Antenna manufacturer and type			
		Wired as per manufacturer			
	Configuration	LES Access codes			
		Stand-Alone Mode			
		FWD ID			
Test	System Power-Up	Visual LED indications			
		Power-up computer display			
Test On-Air	System Logon	Reset message observed			
		Logon verified			
Test	Optional Checks	Ground segment			
		Flight segment			

Move the aircraft in a circle and check the signal and C/No.

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	Heading (Deg)	Antenna Selected	Antenna Azimuth	HSD-Xi terminal CH 1	
				Signal	
Operational Test	15				
	30				
	45				
	60				
	75				
	90				
	105				
	120				
	135				
	150				
	165				
	180				
	195				
	210				
	225				
	240				
	255				
	270				
	285				
	300				
	315				
	330				
	345				
	360				

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APPENDIX E: INMARSAT CAUSE CODES

Table E-1 defines the maintenance port menu fault codes of the HSD-X and HSD-Xi terminal.

Table E-1 Inmarsat Cause Code Definitions

Inmarsat Cause Code	Code Definition
1001	Call cleared by MES terminal (normal termination of call)
1011	Call failed, MES terminal busy
1012	Call cleared, MES terminal busy
1021	Call failed, MES time-out (no answer)
1081	Call failed, MES terminal not installed
1091	Call failed, MES terminal out-of-service
1092	Call cleared, MES terminal out-of-service
1141	MES preempted clear by higher priority call
1142	MES preempted fixed call by higher priority call
1143	Offered call cleared, pre-empted at MES
1144	Call cleared, MES initiated preemption
1145	Attempted call cleared, pre-empted at MES
1146	Attempted call abandoned by MES terminal
1202	Handover, MES ready
1281	Call failed, MES cannot accept
1291	Call failed, MES cannot accept at present
1351	Call cleared, insufficient free memory
1361	Call cleared by MES cable unwrap
1362	Call cleared, long interruption in reception at MES
1363	MES secondary clear due to repoint OR
1391	Call cleared, traveled distance exceeds 700km
1392	Call cleared, spot beam transition (call terminated because aircraft left spot beam)
1393	Call cleared, cooperative mode
1451	Call failed, terrestrial circuits congested
1452	Call failed, LES congested (no channel and no circuit)
1502	Handover, LES Ready, normal clear
1551	Call failed, LES congested (no channel)
1581	Call failed, service not provided at this LES
1591	Call failed, service temporarily not available at this LES
1592	Call cleared, credit card type not supported
1651	Call failed, LES congested (no channel terminal)

Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
1661	Call failed, long interruption in reception at LES
1662	LES long term blockage of SCPC MES
1790	Call cleared, failure credit card validation process
1791	Call cleared, failure authentication process
1811	NCS MES ID busy
1812	NCS MES ID busy IPDS
1841	Call cleared, NCS initiated preemption for incoming Pri.1 call
1842	Call cleared, NCS initiated preemption for incoming Pri.2 call
1843	Call cleared, NCS initiated preemption for incoming Pri.3 call
1844	Call cleared, NCS initiated preemption
1851	Call failed, satellite congestion NCS reject no SCPC available
1852	Call failed, satellite congestion NCS reject SCPC does not match request
1853	Call failed, lease channel congestion
1854	Call failed, MES outside spot beam coverage area
1855	Call rejected, preemption failed, no channel available
1856	Call rejected, spot beam selection failed
1857	Handover failed, channel not available
2000	MES int reject MES RQ invalid CNO
2001	MES int reject MES RQ failed qualification
2010	MES int reject MES RP invalid CNO
2011	MES int reject MES RP failed qualification
2012	MES int reject MES RP operation timeout
2020	MES int reject NCSA missing
2021	MES int reject NCSA invalid CNO
2022	MES int reject NCSA failed qualification
2023	Call failed, Signal lost on NCSA during call setup, check antenna and try again
2024	Call failed, Missing channel assignment, try again
2025	Call failed, Signal lost on NCSC during call setup, check antenna and try again
2030	MES int reject LES ID failed qualification
2040	MES int reject SCCS invalid CNO
2041	MES int reject SCCS not paired
2048	Call failed, invalid number dialed
2049	Call failed, terminal not ready for call, try later
2050	Call failed, Not allowed to make another mobile call yet, wait 20 seconds and try again

Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
2051	Call failed, dialed number is barred
2052	Call failed, LES selected is barred
2053	Call failed, number dialed must be in a phonebook
2053	Call failed, terminal can only be used with a valid SIM
2055	Call failed, user not logged in
2056	Call failed, user not logged in to SIM
2057	Call failed, LES is not in SIM allowed list
2058	Call cleared, SIM removed during call
2059	Call failed, terminal is locked for outgoing calls
2060	MES int reject NCSS failed qualification
2061	MES int reject spot beam invalid
2062	Call failed, no spot beams in the ocean region, select another OR
2063	Terminal ID is not set correctly, check with dealer
2070	Lost NCSC signal, seeking
2071	Stand-Alone Mode finished, seeking network
2080	SIM error, check SIM is inserted correctly
2090	MES int reject ORR query invalid
2091	MES int reject ORR invalid
2092	MES int reject MES RR failed qualification
2093	MES int reject MES RR invalid CNO
2094	MES int reject NCRA missing
2095	MES int reject NCRA lost lock
2100	MES int reject illegal call type
2101	MES Int reject illegal peripheral
2102	Call request failed, call already in progress
2103	Call failed, star code is badly formatted
2104	Call failed, cannot accept two address book star codes
2105	Call failed, address book entry not found
2106	Call failed, star code does not exist
2120	MES int reject no transmit power available
2200	Battery flat for terminal operation
2201	Call cleared, used all allocated time for call type
2300	MES int reject no coop response
2301	MES int reject no power
2302	MES int reject no location report
2400	MES int reject no ORA SU found

Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
8000	ACSE Recycling
8001	ACSE Top Of Find BB
8002	ACSE Top Of Process BB
8010	ACSE Finding Primary NCS Long
8011	ACSE Finding Secondary NCS Short
8012	ACSE Finding Primary Standalone Short
8013	ACSE Finding Primary NCS Short
8014	ACSE Finding Primary Standalone Long
8018	ACSE Finding Secondary Standalone Short
8019	ACSE Finding Secondary Standalone Long
8020	ACSE Found Primary NCS
8021	ACSE Found Secondary NCS
8022	ACSE Found Primary Standalone
8023	ACSE Found Secondary Standalone
8024	ACSE found primary NGNCS
8025	ACSE found secondary NGNCS
8030	ACSE NSR Invalid
8040	ACSE Inert
8041	ACSE ODU Status
8080	ACSE NSR Valid
8081	ACSE NSR Valid LES A
8100	ACSE Booting
8110	ACSE Booted
8120	ACSE FIDR ID Invalid
8200	ACSE Spot Beam Selection
8201	ACSE Next Spot Beam
8202	ACSE Successful Spot Beam Selection
8203	ACSE Failed To Find Spot Beam
8204	ACSE Spot Beam Selective Clear
8210	ACSE Spot Beam Reject Mobile Call No ID
8211	ACSE Spot Beam Reject Mobile Call No TDM
8300	ACSE ORR
8301	ACSE Successful ORR
8302	ACSE Failed ORR
8303	ACSE No ORR
8304	ACSE ORR Tune NCRA
8305	ACSE ORR MES RR

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Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
8306	ACSE failed retry ORR
8310	ACSE ORR Query Begin
8311	ACSE ORR Query Burst
8312	ACSE ORR Query Successful
8313	ACSE ORR Query Failed
8400	ACSE Fixed Begin
8401	ACSE Fixed MESRP
8402	ACSE Fixed Call Type Set
8410	ACSE Fixed Tune NCSA
8411	ACSE Fixed Channel Assignment
8420	ACSE Fixed Clearing Call
8421	ACSE Fixed Selective Clear
8480	ACSE Fixed SCPC Begin
8481	ACSE Fixed SCPC Transmitting
8482	ACSE Fixed Authentication Begin
8483	ACSE Fixed Authentication End
8484	ACSE Fixed Power Control
8485	ACSE Fixed MES Connect
8486	ACSE Fixed Ringing Begin
8500	ACSE Mobile Begin
8501	ACSE Mobile MES RQ1
8502	ACSE Mobile MES RQ2
8503	ACSE Mobile Call Type Set
8510	ACSE Mobile Tune NCSA
8511	ACSE Mobile Channel Assignment
8520	ACSE Mobile Clearing Call
8521	ACSE Mobile Selective Clear
8580	ACSE Mobile SCPC Begin
8581	ACSE Mobile SCPC Transmitting
8582	ACSE Mobile Authentication Begin
8583	ACSE Mobile Authentication End
8584	ACSE Mobile Power Control
8585	ACSE Mobile LES Connect
8586	ACSE Mobile Ringing Begin
8600	MPDS SCPC Mode Selected
8800	ACSE cable call begin
8801	ACSE cable call successful

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Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
8900	ACSE Logoff Begin
8901	ACSE Successful Logoff
8902	ACSE No ORR Logoff
9000	ACSE accepts call
9003	ACSE accepted
9004	ACSE rejected
9020	ACSE call waiting
9021	ACSE idle selective clear
9022	ACSE TDM not found
9080	ACSE rejected fixed call due to invalid NSR
9081	ACSE In MRSi
9082	ACSE sounder turned on
9083	ACSE sounder turned off
9084	ACSE in lock
9085	ACSE out of lock
9086	ACSE ext sounder turned on
9087	ACSE ext sounder turned off
9088	ACSE timer about to expire
9090	ACSE Smartcard activated
9091	ACSE Smartcard removed
9092	ACSE Smartcard error
9100	Peripheral on hook
9101	Peripheral off hook
9102	Peripheral connected
9103	Peripheral ringing
9104	Peripheral ready
9105	Peripheral hanging up
9106	Peripheral hang up
9107	Peripheral not responding
9108	Peripheral dialing
9109	Peripheral abort dialing
9120	Peripheral DTMF accepted
9121	Peripheral DTMF rejected
9122	Peripheral invalid request
9123	Peripheral valid request
9124	Peripheral bonding auto
9125	Peripheral bonding slave

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Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
9126	Peripheral bonding none
9130	Peripheral STU enabled
9131	Peripheral STU disabled
9200	MSG T_AM received
9201	MSG A_AM received
9202	MSG T_HA received
9203	MMI normal
9204	MMI inert
9205	MMI programming
9206	MMI reboot
9207	MMI powerdown
9208	MMI accepted
9209	MMI rejected
400000	CT SP bad
400000	No call pending
400001	CT SP good
400002	CT SP full
400003	CT SP access denied
400080	CT SP find
400081	CT SP enumerate
400082	CT SP no entries
400090	CT SP delete
400100	CT SP spot beam selection
400105	CT SP MPDS
400110	CT SP ocean region registration
400111	CT SP ORR query
400112	CT SP log off
400120	CT SP cable call
400200	CT SP go idle
400201	CT SP go idle due to configuration
400202	CT SP selective clear
400208	CT SP go idle clear spot beam
400209	CT SP go idle clear NSR
400210	CT SP go inert
400211	CT SP go inert Smartcard
400212	CT SP go inert DDS poll
400900	CT SP ODU status

Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
400901	CT SP ODU status no alarms
400902	CT SP ODU status DDS
400910	CT SP prod test
400911	CT SP prod test ODU
401000	CT SP clear spot beam
800103	Mobile AMBE
800124	Mobile aero 64k speech
800404	Mobile data
800504	Mobile facsimile
800606	Mobile 64k UDI
800607	Mobile 56k UDI
800610	Mobile 64k audio 3k1
800622	Mobile aero 64k UDI
800623	Mobile aero 56k UDI
800625	Mobile aero 64k audio 3k1
11A0	Call cleared, credit card not accepted
11D1	Call failed, Request data invalid
11D2	Call failed, insufficient digits in service address
11D3	Call failed, invalid service address
11D4	Call cleared, credit card data information invalid
11D5	Call cleared, invalid country code
11D6	Call cleared, PID information is not consistent
11D7	Call rejected, invalid service for Pri.1 or 2 call
11D8	Call cleared, dialed number not 2 or 3 digits for Pr.1 or 2 call
11E0	Call cleared, invalid credit card PIN at this LES
11E1	Call cleared, too many invalid credit card call attempts
12B1	Call cleared by MES for unspecified reason, for example: • GPS conflict • Insufficient HPA power available to make call • HPA over current
12C2	Call cleared, no credit card valid message received
12C3	Call failed, MES time-out (no terrestrial answer)
12C4	Call cleared, authentication query not received (usually caused by call setup failure)
12C5	Call cleared, MES missing sup service SU
12C6	Call cleared, MES missing sup service 2SU

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Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
12C7	Call cleared, MES missing SCPC channel release SU sup service
12C8	Handover failed, LES not detected
12D1	Call failed, Spot-beam data invalid
12D2	Call failed, invalid scrambling vector
15A1	Call failed, MES not authorized at this LES
15A2	Call failed, service not authorized at this LES
15A3	Call cleared, credit card not authorized
15A4	Call cleared, authentication reply invalid
15A5	Call failed, PID not authorized for any service
15A6	Call failed, PID not authorized for requested service
15B1	Call cleared by LES for unspecified reason
15C1	Call failed, LES time-out (no assignment)
15C2	Call failed, LES time-out (no service address)
15C3	Call failed, LES time-out (no scrambling vector)
15C4	Call failed, no service address and no scrambling vector
15C5	Call cleared, incomplete credit card data information
15C7	Call failed, LES time-out (no MES Connect)
15C9	Call cleared, no authentication reply
15CA	Call cleared, notification ack not received
15CB	Call cleared, invalid sequence number in notification ack
15CC	Handover failed, no response to request
15CD	Handover failed, MES not ready
15D1	Call failed, LES time-out (invalid assignment)
15D2	LES MES already busy
15E1	Call cleared but MES still transmitting (FAULT)
16C2	LES missing MES SCPC
16C3	Handover failed, MES not detected
18A1	NCS MES ID not found
18A2	Call failed, MES not authorized
18A3	Call failed, LES not authorized
18B1	Call failed by NCS for unspecified reason
18B2	Call rejected, invalid service requested
18C1	NCS MES burst missing
18C3	NCS MES busy preemption failed
18D1	Call failed, invalid call request
18E1	NCS MES busy already

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Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
18E2	NCS MES busy already MPDS
1F01	Call cleared by terrestrial circuit (normal call termination from ground source)
1F11	Call failed, terrestrial party busy
1F21	Call failed, LES time-out (no answer)
1F61	Call failed, terrestrial circuit failure (call attempted during ORR)
1F62	Call failed, early clear by terrestrial circuit
2F00	LES int reject lack of MES RESP response
2F01	LES int reject lack of MES ARN response
2F02	LES int reject incorrect SVECSCPC
4000A0	CT SP any
4000F0	CT Terminal ID
4000F1	CT Options
4000F2	CT config names
80010F	Mobile 64k speech
8D0FFF	Mobile Mini-M
8E0FFF	Mobile HSD
8F0FFF	Mobile
90A0	EXPPORT bonding started
90A1	EXPPORT bonding ended
90A2	EXPPORT remote panel present
90A3	EXPPORT remote panel removed
90B0	ACSE MPDS mode selected
90B1	ACSE SCPC mode selected
90C0	ACSE transmit on
90C1	ACSE transmit off
90D0	ACSE spot beam handover started
90D1	ACSE spot beam termination timer started
90F0	Event log wiped
B000	Mod error, general
B001	Mod error, tune failed
B002	Mod error, mode failed
B003	Mod error, mmr failed
B004	Mod error, not responding
B010	MOD Invalid Mode
B011	MOD Command Invalid
B020	Mod error, su underflow

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Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
B021	MOD Su overflow
B022	MOD Su not transmitted
B024	MOD invalid frame no
B025	MOD invalid slot no
B028	MOD cannot Tx Su while tuning
B030	MOD channel out of range
B032	MOD cannot tune while Tx
B033	MOD tuning in progress
B040	MOD error watchdog
B100	DEMOD error, general
B101	DEMOD error, tune failed
B102	DEMOD error, mode failed
B110	DEMOD invalid mode
B130	DEMOD channel out of range
B133	DEMOD tuning in progress
B200	Generic modem error
B201	RF error RX VHF
B202	RF error RX Lband
B204	RF error RX VHF
B208	RF error TX Lband
B210	RF error RF error
B220	RF error Ref error
B27F	Mod watchdog tripped
B280	Generic voice codec errors
B281	TMS spurious interrupt
B300	Outdoor terminal failure, check connections to ODU
B301	ODU error cannot set cable attenuator
B310	ODU error power response missing
B311	ODU error tune response missing
B312	ODU error HPA control response missing
B313	ODU error HPA status response missing
B314	ODU error alarm response missing
B315	ODU error burst timer response missing
B316	ODU error HPA backoff response missing
B320	ODU error alarm heat
B321	ODU error alarm burst
B322	ODU error alarm power

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Table E-1 Inmarsat Cause Code Definitions (Continued)

Inmarsat Cause Code	Code Definition
B323	ODU error alarm over voltage
B324	ODU error alarm reverse power
B328	ODU failed due to tx power check
B329	ODU error alarm timeout
B330	ODU error alarm timeout no trip
B400	Internal temperature of terminal too high, turn off for 10 minutes
B401	Internal temperature sensor failed
B410	Mod error, handshake failure, power down/up and try again
B500	Battery charging communication failure
B501	Power supply error
B580	Battery is over temperature, charging disabled
B581	Battery temperature is now ok, charging enabled
C00103	Fixed AMBE
C0010F	Fixed 64k speech
C00124	Fixed aero 64k speech
C00404	Fixed data
C00504	Fixed facsimile
C00606	Fixed 64k UDI
C00607	Fixed 56k UDI
C00610	Fixed 64k audio 3k1
C00622	Fixed aero 64k UDI
C00623	Fixed aero 56k UDI
C00625	Fixed aero 64k audio 3k1
CD0FFF	Fixed Mini-M
CE0FFF	Fixed HSD
CF0FFF	Fixed
FFFD	ACSE end marker (MPDS)
FFFE	Status undefined (MPDS)
FFFF	Status OK (MPDS)

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APPENDIX F: SETTING UP SBB

This appendix describes how to set up a single client on a packet-switched SBB connection.

1.   Requirements

To configure and use a background standard IP connection, you must connect a computer to the Ethernet port of the HSD-X and HSD-Xi terminal. If you are connecting a computer or router to the Ethernet port of the HSD-Xi terminal, use a RJ-45 cross-over cable. If you are connecting a hub or switch, use a RJ-45 straight-through cable.

2.   Configuring a Standard IP Primary PDP Context

The connection that you configure in this section defines the primary PDP context. You can configure any type of connection for the primary PDP context, but a standard IP connection, as illustrated in this procedure, is the most common and useful. To create other connections, see "Creating Connections for Other Services" on page F-7.

NOTE: This connection must be active before you can establish other connections with other PDP contexts.

    (a)   To create a PPPoE connection

        1.   Click the **Start** button, point to **Settings**, and then click **Control Panel**.

            The Control Panel appears.

        2.   Double-click **Network Connections**.

            The Network Connections window appears, as shown in Figure F-1.
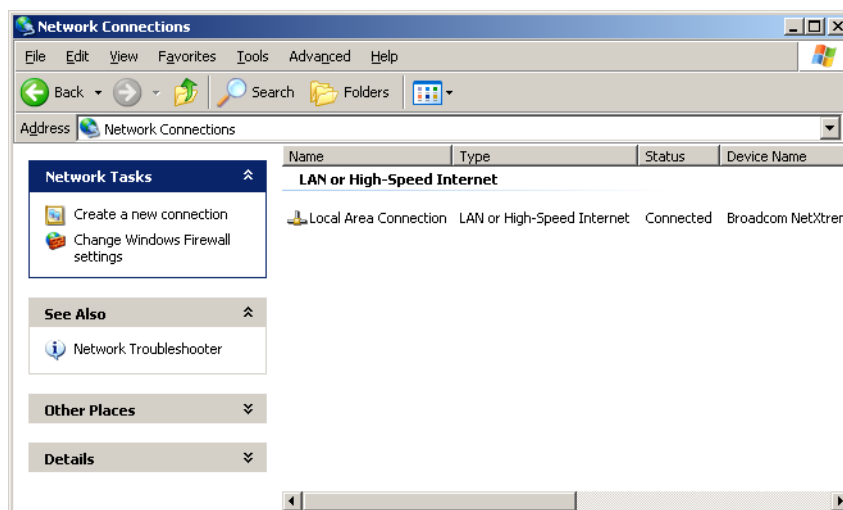
Figure F-1 Network Connections Window

3.   Click **Create a new connection**.

The New Connection Wizard appears, as shown in Figure F-2.
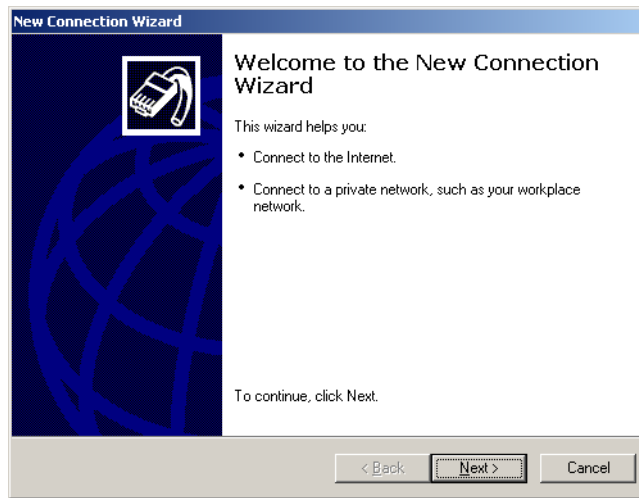
Figure F-2 New Connection Wizard

4.   Click **Next**.

The Network Connection Type page appears, as shown in Figure F-3.
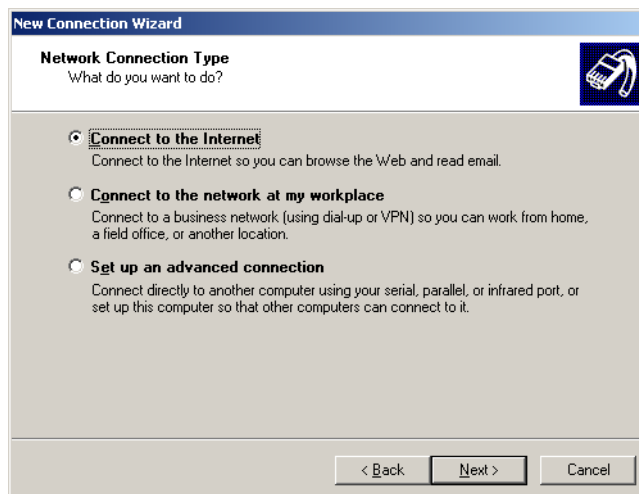
Figure F-3 Network Connection Type Page

5.   Click **Connect to the Internet**, and then click **Next**.

The Getting Ready page appears, as shown in Figure F-4.
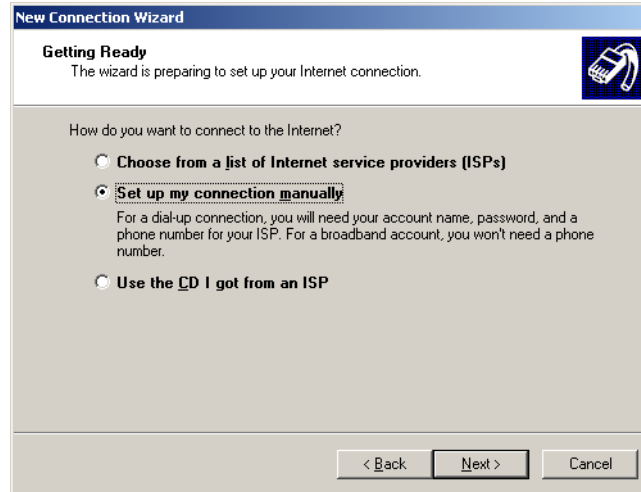
Figure F-4 Getting Ready Page

6. Click **Set up my connection manually**, and then click **Next**.

    The Internet Connection page appears, as shown in Figure F-5.
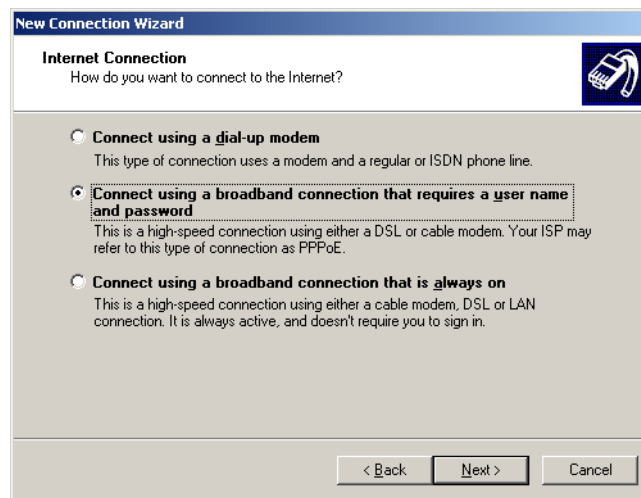
Figure F-5 Internet Connection Page

7. Click **Connect using a broadband connection that requires a user name and password**, and then click **Next**.

    The Connection Name page appears, as shown in Figure F-6.
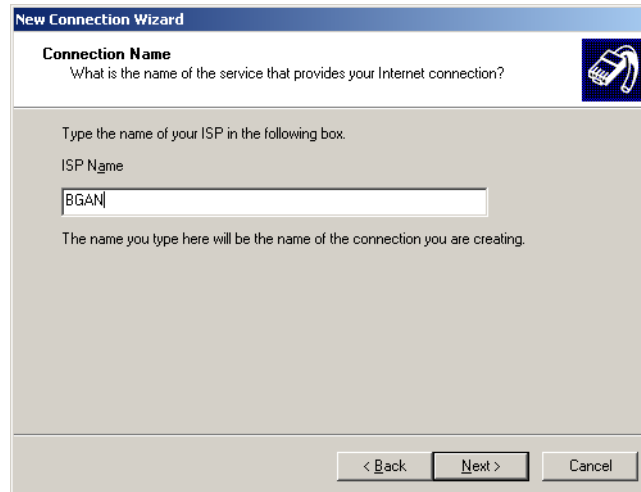
Figure F-6 Connection Name Page

8. In the **ISP Name** box, type **BGAN**, and then click **Next**.

    The name you type is the name that appears in the list of connections available on your computer.

    The Connection Availability page appears, as shown in Figure F-7.
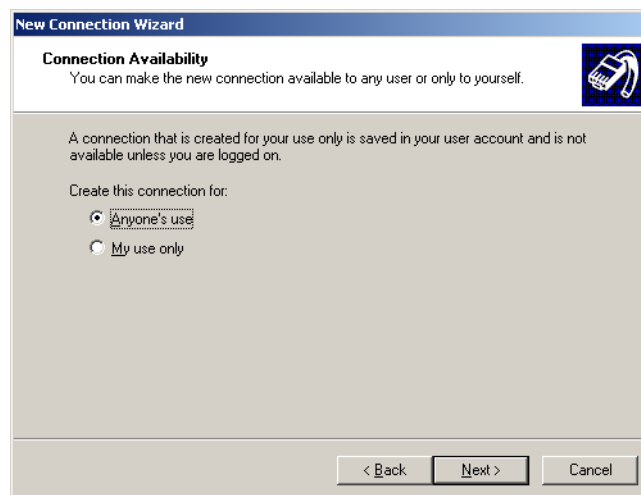
Figure F-7 Connection Availability Page

9. Click **Anyone's use** or **My use only**, and then click **Next**.

    The Internet Account Information page appears, as shown in Figure F-8.

Figure F-8 Internet Account Information Page

10. In the **User name** box, type a user name that you will remember.

11. In the **Password** box, type a password that you will remember.

12. In the **Confirm password** box, retype your password.

13. Click **Next**.

   The Completing the New Connection Wizard page appears, as shown in Figure F-9.

Figure F-9 Completing the New Connection Wizard Page

14. To complete the connection setup, click **Finish**.

   The Connect dialog box appears, as shown in Figure F-10.

Figure F-10 Connect Dialog Box

15. Click **Properties**.

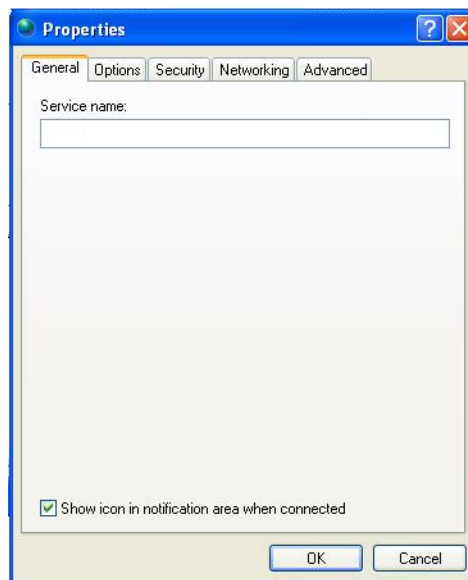The Properties dialog box appears, as shown in Figure F-11.

Figure F-11 Properties Dialog Box

16. In the **Service Name** box, type the service string
**SBB:BACKGROUND@USER=username@PASS=password@APN=my
.apn.com**.

   • SBB:BACKGROUND for Background IP service

- **SBB:BACKGROUND@APN=my.apn.com** for Background IP service that uses specific access point name

- **SBB:BACKGROUND@USER=username@PASS=password** for Background IP service that uses a specific username and password.

Replace "username", "password", and "my.apn.com" with your username, password, and APN IP address.

This defines the primary PDP context as a background SBB connection.

NOTE: Some routers do not support dial strings. To access a service, configure the default service name in the data I/O card, and the HSD-X and HSD-Xi terminal will add the service name to the call.

3. Creating Connections for Other Services

You can create a connection for every service you use on your computer, such as 32 kbps and 64 kbps services.

To create a connection:

- Follow the procedure above for Configuring a Standard IP Primary PDP Context, and, in step 16, type one of the following service names:

  - **SBB:STREAM32K** for 32 K streaming service

  - **SBB:STREAM64K** for 64 K streaming service

  - **SBB:STREAM128K** for 128 K streaming service

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