communications
Aviation Recorders

AFIRS 228S Iridium Global Communications System Installation Manual

Part Numbers

SDU: 228E5733-00
SCM: 418E5733-00
Publication: 165E5733-00 Rev. 03

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FCC Certification

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to pro-vide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RECORD OF REVISIONS

Rev.	Issue Date	Description	Pages	By
00	01 November 2013	Initial issue.	All	CM
01	15 December 2013	Corrected SDU & SCM Top-Level Part Numbers.	All	CM/SC
02	21 January 2014	Corrected SDU & SCM Top-Level Part Numbers.	All	CP
03	16 July 2014	Software PN Change, removed references to unused features, removed non-configurable, updated wiring diagrams, added MCDU screenshots, added voice and data modem models	1, 6, 7, 8, 9, 22, 23, 34, 38, 39, 70-73	CP

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1. INTRODUCTION

This section provides a general introduction to the Iridium SATCOM System and its applicable standards and references.

1.1 Applicability

This Installation Manual provides the information necessary to plan the Iridium SATCOM System installation and integration in the aircraft. It defines the mechanical and electrical interfaces for each Line Replaceable Unit (LRU) and provides the procedures required to properly configure, test, and maintain the Iridium SATCOM System. This manual is applicable to the following software version(s):

Software Part Number: 840E5733-09

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1.2 Model Designation

This manual covers model designation Iridium SATCOM System.

1.2.1 Iridium SATCOM System

The Iridium SATCOM System has a dual-channel Iridium link, one dedicated for safety-services data and the other prioritized for safety-services voice.

1.3 Part Numbers

The following part numbers are defined for the LRUs of the Iridium SATCOM System.

Table 1-1 – Part Numbers

Part Number	Description
228E5733-00	Iridium SATCOM System Satellite Data Unit (SDU)
418E5733-00	Iridium SATCOM System SDU Configuration Module (SCM)

1.4 Reference Documents

Table 1-2 – References

Ref.	Document Number	Description
1.	ANSI/TIA/EIA-232-F-1997	Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange
2.	ARINC 429-19	Mark 33 Digital Information Transfer System (DITS)
3.	ARINC 573-7	Mark 2 Aircraft Integrated Data System (AIDS Mark 2)
4.	ARINC 600-16	Air Transport Avionics Equipment Interfaces
5.	ARINC 619-3	ACARS Protocols For Avionic End Systems
6.	ARINC 664-2	Aircraft Data Networks

Ref.	Document Number	Description
7.	ARINC 702-6	Flight Management Computer System
8.	ARINC 702A-3	Advanced Flight Management Computer System
9.	ARINC 717-14	Flight Data Acquisition and Recording System
10.	ARINC 718-4	Mark 3 Air Traffic Control Transponder (ATCRBS/MODE S)
11.	ARINC 718A-2	Mark 4 Air Traffic Control Transponder (ATCRBS/MODE S)
12.	ARINC 739A-1	Multi-Purpose Control And Display Unit
13.	ARINC 741-13	Aviation Satellite Communication System
14.	ARINC 758-2	Communications Management Unit (CMU) Mark 2
15.	ARINC 761-4	Second Generation Aviation Satellite Communication System, Aircraft Installation Provisions
16.	FAA TSO C-159a	Technical Standard Order, Avionics Supporting Next Generation Satellite Systems (NGSS)
17.	GAMA Publication No. 11, Ver. 5.1	ARINC 429, General Aviation Subset
18.	IEEE 802.3-2008	IEEE Standard for Information Technology-Specific Requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CMSA/CD) Access Method and Physical Layer Specifications
19.	RTCA/DO-160G	Environmental Conditions and Test Procedures for Airborne Equipment
20.	RTCA/DO-214	Audio Systems Characteristics and Minimum Operational Performance Standards for Aircraft Audio Systems and Equipment
21.	RTCA/DO-262A	Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)
22.	TIA/EIA-422-B	Electrical Characteristics of Balanced Voltage Digital Interface Circuits

1.5 Definitions of Acronyms and Terms

Table 1-3 – Acronyms and Terms

Acronym	Definition
ACARS	Aircraft Communications Addressing and Reporting System
ACP	Audio Control Panel
ADB	Address Book
AFIRS	Automated Flight Information Reporting System
ANSI	American National Standards Institute
APU	Auxiliary Power Unit
ATE	Automatic Test Equipment
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
ARINC	Aeronautical Radio Incorporated
AWG	American Wire Gauge
BCD	Binary Coded Decimal
BITE	Built-In Test Equipment
BOP	Bit Oriented Protocol
BP	Bottom Plug
BSP	Board Support Package
CF	Compact Flash
CNSSA	Core Non-Safety Services Application
CTS	Clear To Send
DITS	Digital Information Transfer System
DTP	Date Time Position
EFB	**Electronic Flight Bag**
EIA	Electronics Industry Association
ELA	Embedded Logic Application
FAA	Federal Aviation Administration
F/W	Firmware

Acronym	Definition
FWC	Flight Warning Computer
GAMA	General Aviation Manufacturers Association
GFI	General Format Identifier
GPS	Global Positioning System
GSE	Ground Service Equipment
HBP	Harvard Bi-Phase
HYB	Hybrid
ICA	Instructions for Continued Airworthiness
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
ICE	Iridium Certified Equipment
ICT	Installation Configuration Table
IEEE	Institute of Electrical and Electronics Engineers
IMEI	International Mobile Equipment Identifier
ISO	International Organization for Standardization
LGCIU	Landing Gear Control Interface Unit
LED	Light Emitting Diode
LRU	Line Replaceable Unit
LSK	Line Select Key
MCDU	Multi-Purpose Control and Display Unit
MOPS	Minimum Operational Performance Specifications
MP	Middle Plug
MUI	Maintenance User Interface
N/C	Normally Closed
NGSS	Next Generation Satellite Systems
N/O	Normally Open
ORT	Owner Requirements Table
PBX	Public Branch Exchange

Acronym	Definition
PC	Personal Computer
P/N	Part Number
PSTN	Public Switched Telephone Network
PTT	Push To Talk
RMS	Root-Mean-Square
RTS	Request To Send
RTCA	Radio Technical Commission for Aeronautics
RX	Receive
SAL	System Address Label
SATCOM	Satellite Communications
SCM	SDU Configuration Module
SDI	Source/Destination Identifier
SDU	Satellite Data Unit
SIM	Subscriber Identity Module
SSA	Safety Service Application
SSM	Signed Status Matrix
SW	Software
TIA	Telecommunications Industry Association
TNC	Threaded Neill–Concelman
TP	Top Plug
TX	Transmit
TSO	Technical Standard Order
UAT	User Access Table
UTC	Coordinated Universal Time
VAC	Volts Alternating Current
VDC	Volts Direct Current
WPS	Words Per Second

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2. DESCRIPTION AND OPERATION

This section describes the system operation and architecture.

2.1 System Overview

The Iridium SATCOM System provides multiple voice and data communications functions in the aircraft. The Automated Flight Information Reporting System (AFIRS) provides a satellite voice and data communications (SATCOM) link with the Public Switched Telephone Network (PSTN) via the Iridium® satellite network. The system uses a standard ARINC 741/761 SATCOM interface to the flight crew's Audio Integrating System and ARINC 739A Multi-Purpose Control and Display Units (MCDUs) in the cockpit.

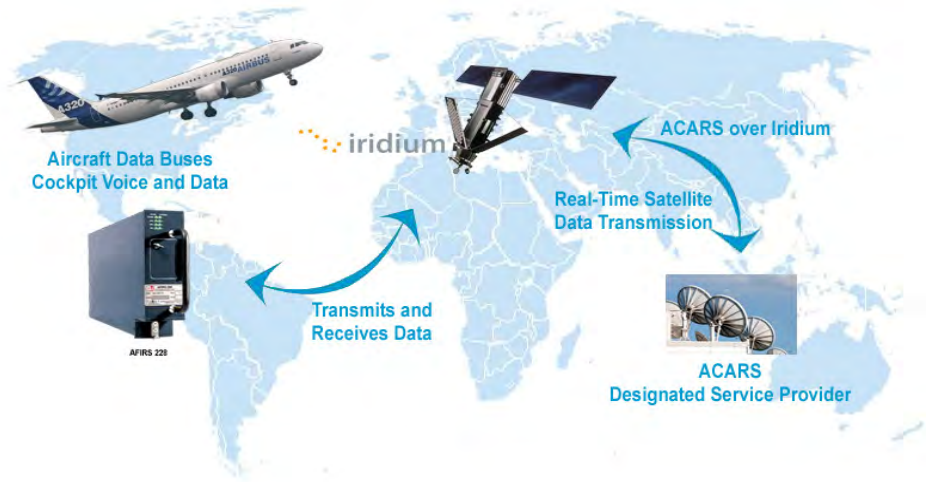

Figure 2-1 –Iridium SATCOM System Operational Concept

The Iridium SATCOM System provides a dedicated safety-services data channel with the capability to send and receive standard ACARS messages between the aircraft's Air Traffic Service Unit (ATSU) and a safety-services certified terrestrial service provider.

2.2 System Architecture

The Iridium SATCOM System consists of modular avionics components that can be tailored to meet customer needs. The core system components are the Satellite Data Unit (SDU), the SDU Configuration Module (SCM), and the Iridium Antenna (see Figure 2-2).

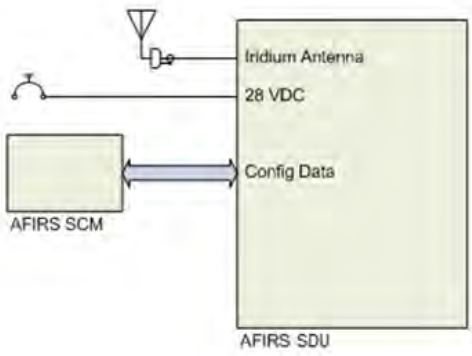

Figure 2-2 –Iridium SATCOM System Block Diagram

2.3 External System Interfaces

- Audio System Interface (1)
- ARINC 429 Transmitters (6) and Receivers (16)
- Discrete Outputs (8) and Inputs (16)
- Iridium Antenna (1)
- User Media Interfaces – SIM (1), CF (1)
- Maintenance Interfaces – Ethernet (1)
- Ethernet Ports (4)
- Voice Modem – Iridium 9523
- Data Modem – Iridium 9602

Figure 2-3 illustrates the interfaces that the Iridium SATCOM System provides to external aircraft systems or to the user.

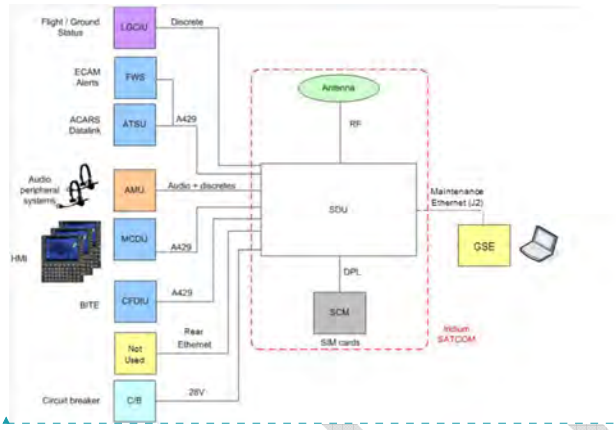

Figure 2-3 –Iridium SATCOM System External Interfaces NEED EFB GRAPHIC

- **Audio System Interface (1)**

This interface consists of a Microphone Input to the SDU and an Interphone Output from the SDU to connect to a standard (DO-214) Audio Integrating System (e.g. Audio Panel) in the aircraft.

- **ARINC 429 Transmitters (6) and Receivers (16)**

These interfaces can be software-configured to connect to various aircraft systems to support both the display and control functions of the Iridium SATCOM System. Typical interfaced systems include MCDUs, ACARS ATSUs, etc.

- **Maintenance Front Panel Ethernet Port J2 (1)**

An RJ45 jack on the front panel provides Maintenance Port access using an Ethernet connection.

- **Rear Ethernet Ports (4)**

These interfaces can be used to connect to several different systems. **Typical interfaced systems include EFB, etc.**One of these ports can also be used to provide a remote maintenance port interface (e.g. in the flight compartment).

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- **Discrete Outputs (8) and Inputs (16)**

Discrete inputs and outputs can be used to provide or supplement various flight crew control and display interactions, particularly for voice functions. Discrete inputs can also be used to determine the states of various aircraft systems when this information is not available on a databus (e.g. Weight-on-Wheels, Doors Closed, etc.).

- **Iridium Antenna (1)**

An antenna mounted on the top of the fuselage is used to communicate with both the Iridium satellite network and the GPS satellite network.

- **User Media Interfaces – SIM (1), CF (1)**

There are two types of media available for the user to insert or remove from the Iridium SATCOM System. The SCM contains a user accessible Subscriber Identity Module (SIM) card slot for storage of the Iridium communications management information. The SDU contains a front panel accessible Compact Flash (CF) that must be installed to be used for system fault testing.

- **Voice Modem – Iridium 9523**

Connects the Iridium System in the aircraft to the Iridium satellite for voice communication.

- **Data Modem – Iridium 9602**

Connects the Iridium System in the aircraft to the Iridium satellite for ACARS data communication.

3. EQUIPMENT SPECIFICATIONS

This section describes the mechanical and environmental specifications of the components of the Iridium SATCOM System.

3.1 Satellite Data Unit (SDU)

The SDU is housed in an ARINC 600 2MCU enclosure designed to be mounted in a standard ARINC 600 mounting tray.

Figure 3-1 –Iridium SATCOM System Satellite Data Unit (SDU)

3.1.1 Mechanical Specifications

Dimensions	7.81” x 2.27” x 15.02” (198.3mm x 57.7mm x 381.5mm)
Weight	7.7 lbs. (3.49 kg) Max
Material/Finish	Aluminum Alloy with Black Polyurethane Finish
Mounting	ARINC 600 2MCU Mounting Tray
Rear Mating Connector	Size 2 ARINC 600 Receptacle Radiall P/N: NSXN2P201S0004
Maintenance Connector	RJ45 (8P8C) Modular Connector Jack
Flash Card	CompactFlash® (Type I or Type II)

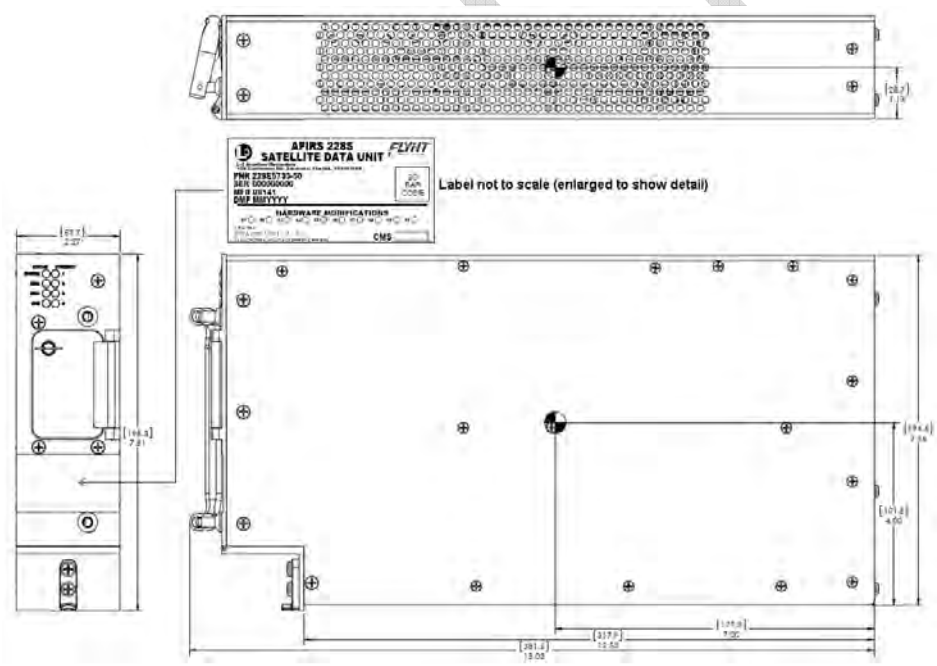

Figure 3-2 – SDU Outline Drawing (dimensions in [millimeters] and inches)

3.1.2 Environmental Specifications –Iridium SATCOM System

Refer to Supplemental Documents for environmental testing conditions, categories and descriptions of the SDU tests conducted.

Note:
DO-160G categories for the Iridium SATCOM System are as specified by the design.

3.2 SDU Configuration Module (SCM)

The SCM is housed in a small enclosure designed to be mounted within 24" of the SDU rear connector. Typically, the SCM will be mounted on or near the ARINC 600 mounting tray used for the SDU. See Figure 3-6 for an outline of this component.

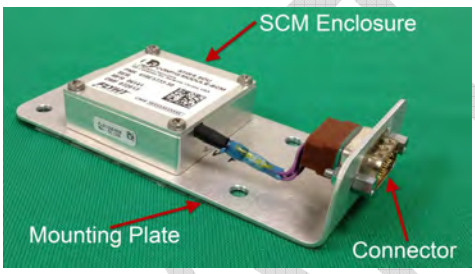

Figure 3-3 –Iridium SATCOM System SDU Configuration Module (SCM)

3.2.1 Mechanical Specifications

Dimensions	1.00” x 2.00” x 4.69” (25.4mm x 50.8mm x 119.1mm)
Weight	0.4 lbs. (0.18 kg) Max
Material/Finish	Aluminum alloy with clear chromate per MIL-DTL-5541, Type II, Class 3 on all surfaces

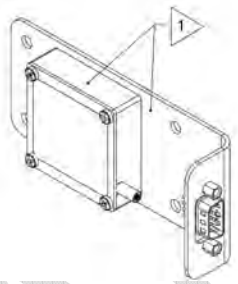

Figure 3-4 – SCM Oblique View

Note:
Resistance not to exceed 20 milli-ohms
- Between mounting plate and module
- Between mounting plate and aircraft structure

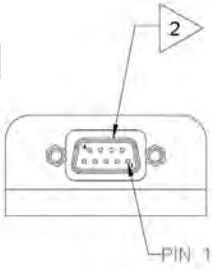

Figure 3-5 – SCM Connector View Showing Location of Pin 1

Note:
Connector is a 9-pin D-Sub, P/N ABS1145A09P03B

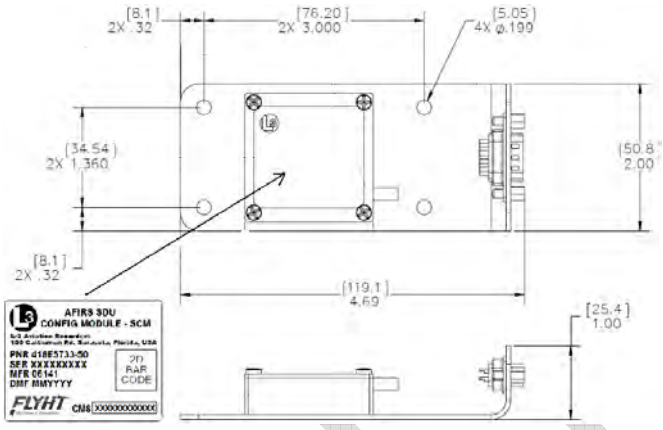

Figure 3-6 – SCM Outline Drawing (dimensions in [millimeters] and inches)

3.2.2 Environmental Specifications

Refer to Supplemental Documents for environmental testing conditions, categories, and descriptions of the SCM tests conducted.

3.3 Iridium SATCOM System Satellite Antenna

The antenna is a Commercial Off the Shelf (COTS) unit that is mounted on the top of the aircraft's fuselage. It provides satellite connectivity for both the GPS and Iridium satellite systems.

Figure 3-7 –Iridium SATCOM System Antenna

3.4 Antenna Coaxial Cable

For details on the selection and installation of the antenna coaxial cable, please see Section 4.3.3 which provides recommended coaxial cable types to be used which meet the Iridium SATCOM System requirements.

Figure 3-8 – Iridium Antenna Coaxial Cable and Connectors

3.5 Interface Specifications

3.5.1 SDU Rear Connector (J1)

Table 3-1 – J1A Top Plug (TP) Insert

	A	B	C	D	E	F	G	H	J	K
1	Ethernet 1A Tx+	Ethernet 1A Rx+	O	O	Ethernet 2B Tx+	Ethernet 2B Rx+	O	O	Ethernet 3B Tx+	Ethernet 3B Rx+
2	Ethernet 1A Rx-	Ethernet 1A Tx-		O	Ethernet 2B Rx-	Ethernet 2B Tx-	O	O	Ethernet 3B Rx-	Ethernet 3B Tx-
3	O	O	O	O	O	O	O	O	O	O
4	O	O	O	O	O	O	O	O	O	O
5	Ethernet 4B Tx+	Ethernet 4B Rx+	O	O	O	O	O	O	O	O
6	Ethernet 4B Rx-	Ethernet 4B Tx-	O	O	O	O	O	O	O	O
7	O	O	O	O	O	O	O	O	O	O
8	O	O	O	O	O	O	O	O	O	O
9	O	O	O	O	O	O	O	O	O	O
10	O	O	O	O	O	O	O	O	O	O
11	O	O	O	O	O	O	O	O	O	O
12	O	O	O	O	O	O	O	O	O	O
13	O	O	O	O	O	O	O	O	O	O
14	O	O	O	O	O	O	O	O	O	O
15	O	O	O	O	O	O	O	O	O	O

Table 3-2 – J1B Middle Plug (MP) Insert

	A	B	C	D	E	F	G	H	J	K
1	O	O	O	O	O	O	No. 1 A429Rx A	No. 1 A429Rx B	No. 1 A429Tx A	No. 1 A429Tx B
2	Ext. 1 Mic Audio Hi	Ext. 1 Mic Audio Lo	Ext. 1 Audio Out Hi	Ext. 1 Audio Out Lo	O	O	O	O	O	O
3	O	O	No. 2 A429Rx A	No. 2 A429Rx B	No. 3 A429Rx A	No. 3 A429Rx B	No. 4 A429Rx A	No. 4 A429Rx B	No. 2 A429Tx A	No. 2 A429Tx B
4	O	O	O	O	O	O	O	O	SCM Power	SCM Ground
5	No. 1 Discrete Output	LGCIU 1 Discrete Input	No. 2 Discrete Input	No. 3 Discrete Input	No. 4 Discrete Input	No. 5 Discrete Input	No. 6 Discrete Input	No. 7 Discrete Input	SCM Data	SCM Clock
6	No. 5 A429Rx A	No. 5 A429Rx B	No. 6 A429Rx A	No. 6 A429Rx B	No. 7 A429Rx A	No. 7 A429Rx B	No. 8 A429Rx A	No. 8 A429Rx B	No. 9 A429Rx A	No. 9 A429Rx B
7	No. 10 A429Rx A	No. 10 A429Rx B	No. 3 A429Tx A	No. 3 A429Tx B	No. 4 A429Tx A	No. 4 A429Tx B	No. 11 A429Rx A	No. 11 A429Rx B	No. 1 RS232 Com	No. 4 RS232 Com
8	No. 8 Discrete Input	No. 2 Discrete Output	No. 12 A429Rx A	No. 12 A429Rx B	No. 3 Discrete Output	No. 9 Discrete Input	No. 4 Discrete Output	No. 10 Discrete Input	No. 13 A429Rx A	No. 13 A429Rx B
9	No. 2 RS232 Com	No. 3 RS232 Com	No. 5 A429Tx A	No. 5 A429Tx B	No. 1 RS422Tx- RS232TXD	No. 1 RS422Tx+ RS232RTS	No. 1 RS422Rx+ RS232RXD	No. 1 RS422Rx- RS232CTS	No. 2 RS422Tx- RS232TXD	No. 2 RS422Tx+ RS232RTS
10	No. 2 RS422Rx+ RS232RXD	No. 2 RS422Rx- RS232CTS	No. 3 RS422Tx- RS232TXD	No. 3 RS422Tx+ RS232RTS	No. 3 RS422Rx+ RS232RXD	No. 3 RS422Rx- RS232CTS	No. 4 RS422Tx- RS232TXD	No. 4 RS422Tx+ RS232RTS	No. 4 RS422Rx+ RS232RXD	No. 4 RS422Rx- RS232CTS
11	No. 11 Discrete Input	No. 12 Discrete Input	No. 13 Discrete Input	No. 14 Discrete Input	No. 15 Discrete Input	LGCIU HPP	No. 5 Discrete Output	No. 6 Discrete Output	No. 7 Discrete Output	No. 8 Discrete Output
12	No. 14 A429Rx A	No. 14 A429Rx B	No. 6 A429Tx A	No. 6 A429Tx B	A717Rx A	A717Rx B	No. 15 A429Rx A	No. 15 A429Rx B	No. 16 A429Rx A	No. 16 A429Rx B
13	Fault Output N/C	Fault Output N/O	O	O	O	O	O	O	O	O
14	O	Chime Output	O	O	O	O	O	O	O	O
15	O	O	O	O	O	O	Phone Ext. 2 Tip	Phone Ext. 2 Ring	Phone Ext. 3 Tip	Phone Ext. 3 Ring

Table 3-3 – J1C Bottom Plug (BP) Insert

Pin	Size	Description
1	20	Not Used
2	12	Primary 28 VDC Power Input
3	12	Power Ground
4	20	Not Used
5	20	Not Used
6	20	Not Used
7	12	Not Used
8	16	Chassis Ground
9	16	Not Used
10	16	Not Used
11	16	Not Used
12	5	Not Used
13	5	Iridium/GPS Antenna

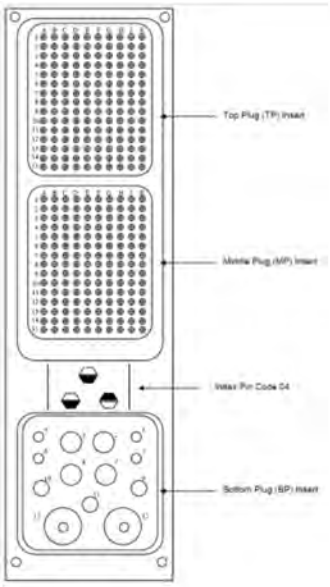

Figure 3-9 – SDU Connector Map

3.5.2 Power Input

The Iridium SATCOM System is powered by +28 VDC.

3.5.3 Chassis Ground

Quantity	1
Format	DC Chassis Ground For redundant chassis ground connection only. Not to be used as a normal current carrying conductor.

3.5.4 ARINC 429 Digital Serial Bus Input

Quantity	16
Format	DITS, ARINC 429 Low or high speed
Low Speed Data Rate	12.5 Kbps ± 1%
High Speed Data Rate	100 Kbps ± 1%
SSM/SDI/Data Definition	Software Selectable Protocols

3.5.5 ARINC 429 Digital Serial Bus Output

Quantity	6
Format	DITS, ARINC 429 Low or high speed
Low Speed Data Rate	12.5 Kbps ± 1%
High Speed Data Rate	100 Kbps ± 1%
SSM/SDI/Data Definition	Software Selectable Protocols

3.5.6 Rear Ethernet Ports

Quantity	4
Format	802.3 10BASE-T/100BASE-TX, half- and full-duplex modes (auto-negotiated) ARINC 664P2 Physical Layer

3.5.7 Discrete Inputs

Quantity	16 Configurable
Input Impedance	>10 kΩ
Fault Current	<15 mA
DIN+ Voltage Range	Logic High: 7.0 – 36.0 VDC Logic Low: 0 – 3.5 VDC
Pulse Width (Min)	100 ms

3.5.7.1 Configurable Inputs

Each configurable discrete input is individually software-configurable for the following:

- Signal Level: Open-Ground (Negative-Seeking) or Open-28V (Positive-Seeking)
- Logic Assignment: Active Low or Active High
- Function: Selected from list

Refer to Section 6.9 for additional information on use of configurable inputs.

3.5.8 Discrete Outputs

Each discrete output transitions between an “Open Circuit” (high-impedance-to-ground) and a “Closed Circuit” (low-impedance-to-ground) state to indicate a change in output logic.

Quantity	8 Configurable
“Open Circuit” Impedance	>100 kΩ
“Open Circuit” Voltage (Max)	36 VDC
“Closed Circuit” Current Limit (Min)	500 mA
Voltage Across “Closed Circuit”	<1.25 V

3.5.8.1 Configurable Outputs

The discrete outputs use “Open-Closed” signal levels, where the output is either high-impedance to ground (Open) or low-impedance to ground (Closed). Each configurable discrete output is individually software-configurable for the following:

- Logic Assignment: Active Low (Closed) or Active High (Open)
- Function: Selected from list.

Refer to Section 6.10 for additional information on use of configurable outputs.

3.5.9 Microphone Input

Quantity	1
Format	Standard DO-214 Microphone Input
Dynamic Range	20 mV to 1.5 V RMS
Input Impedance	150 Ω ± 20%
Mic. Bias (No Load)	16 ± 0.5 V
Mic. Bias Ripple	<1 mV RMS in the 300 – 3400 Hz band
Sidetone	Provided by System to Interphone Output
Sidetone Level	Software Configurable
Audio Band Pass	300 – 3400 Hz

3.5.10 Iridium / GPS Antenna

Coaxial Cable Insertion Loss (Max.)	3 dB @ 1626.5 MHz

3.6 Maintenance Front Panel Ethernet Port (J2)

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The Iridium SATCOM System SDU provides an RJ-45 Maintenance Port connector on the front panel, which provides for Ethernet connection to Ground Service Equipment (GSE) e.g. a laptop or Personal Computer with a standard web browser.

3.7 SDU Configuration Module (SCM)

The SCM and antenna connect directly to the SDU. The SDU is the heart of the system and provides all of the interfaces to other aircraft systems.

3.8 ARINC 429 Receiver Protocols

Table 3-4 – ARINC 429 Receiver Protocols – ATSU/FWC

Source: ATSU / FWC			**Speed:** High (Configurable)
Label	**Parameter**	**Format**	**Transmit Rate**
172	ATSU Identifier Word	BCD	1 s
270	ATSU Status Word and Monitoring	Boolean word	600 ms
307	SDU SAL	HYB	
377	ATSU Equipment Identifier	BCD	1 s
ARINC 618 Block Uplink	BOP (GFI=Eh)	ISO 5	N/A
ARINC 618 Block Downlink	BOP (GFI=Eh)	ISO 5	N/A

Table 3-5 – ARINC 429 Receiver Protocols – MCDU

Source: ARINC 739A MCDU			**Speed:** Low (Configurable)
Label	**Parameter**	**Format**	**Transmit Rate**
377	MCDU Identifier	BCD	1 s
270	Discrete Word #1	Discrete word	1 s
350	Maintenance Word #1	Discrete word	1 s
307	SDU SAL	HYB	

3.9 ARINC 429 Receiver Activity Status

Defines the criteria the Iridium SATCOM System uses to determine if a receiver port is active. A bus is generally declared active when four consecutive words at the specified rate are received, and declared inactive when four consecutive samples fail.

Table 3-6 – ARINC 429 Receiver Port Monitoring

Receiver	Activity Label	Minimum Update Rate
ATSU / FWC	270	1 Hz
ARINC 739A MCDU	270 / 377	1 Hz

3.10 ARINC 429 Transmitter Protocols

3.10.1 From SDU to ATSU / FWC

Table 3-7 – ARINC 429 Transmitter Protocols SDU – ATSU/FWC

Destination: ATSU / FWC			**Speed:** High (Configurable)	
Label	**Parameter**	**Format**	**Transmit Rate**	**Update Rate**
172	SDU Identifier	BCD	1 s	–
270	SDU Status Word and Monitoring	Boolean word	1 s	-
304	ATSU SAL	HYB		
ARINC 618 Block Uplink	BOP (GFI=Eh)	ISO 5	N/A	-
ARINC 618 Block Downlink	BOP (GFI=Eh)	ISO 5	N/A	-

3.10.2 From SDU to MCDU

Table 3-8 – ARINC 429 Transmitter Protocols SDU – MCDU

Destination:	ARINC 739A MCDU		**Speed:** Low (Configurable)	
Label	**Parameter**	**Format**	**Transmit Rate**	**Update Rate**
172	Subsystem Identifier	BCD	1 s	–
377	Equipment Identifier	BCD	1 s	–
220	MCDU Address Label for MCDU#1			
221	MCDU Address Label for MCDU#2			
222	MCDU Address Label for MCDU#3			

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4. INSTALLATION CONSIDERATIONS

4.1 Satellite Data Unit (SDU)

The SDU is housed in an ARINC 600 2MCU enclosure designed to be mounted in a standard ARINC 600 mounting tray. Although the SDU does not require forced-air cooling, every attempt should be made to install it in a well-ventilated area, preferably on a mounting tray that provides cooling air to the SDU.

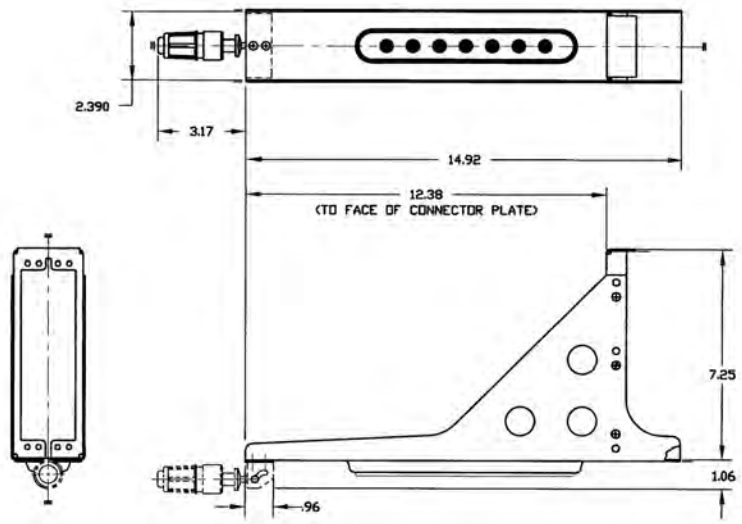

Figure 4-1 – Typical 2MCU Mounting Tray for the SDU

The SDU tray should be electrically bonded to the airframe (<20 milli-ohms), and installed so that there is easy access to the front panel to facilitate replacing the flash card or connecting to the Maintenance Port.

4.2 SDU Configuration Module (SCM)

The SCM can be mounted on or near the SDU tray within 24 inches of the SDU rear connector. The SCM should be electrically bonded to the airframe (<20 milli-ohms). Ensure that the installation location allows easy access to the cover should the SIM card require replacement. Refer to Figure 3-6 for the SCM mounting footprint.

4.3 Iridium Antenna System

The Iridium SATCOM System has a single combined Iridium/GPS RF connection on the rear interface connector, which is to be connected to a single combined Iridium/GPS Antenna. The antenna system is comprised of all the components from the rear interface connector up to, and including, the antenna. The total gain of the antenna system must be greater than **0 dB at 1626.5 MHz** (measured at the antenna zenith).

Most Iridium antennas have a gain of +3 dBic at the zenith; therefore the maximum attenuation in the rest of the antenna system must be less than 3 dB.

4.3.1 Antenna Specifications

The antenna is a low-profile, circular device that can be mounted directly to the aircraft fuselage, and connects to the Iridium SDU through a coaxial cable – see Figure 3-8.

Weight (Typical)	0.170 kg (6 oz.)
Height (Typical)	16.8 mm (0.66 inches)
Diameter (Typical)	89 mm (3.5 inches)
Manufacturer's Reference Documentation	Drawing 009E5733-00, Revision B Iridium Antenna – Passive, 1565 – 1626.5 MHz RHCP – see Figure 4-2. Iridium SATCOM System Supplier Equipment Specification: Doc. No. 905-E5750-07, Revision N
Environmental The Iridium SATCOM System antenna meets the environmental requirements of RTCA DO-262A, where applicable, as referenced in Doc. No. 905-E5809-42, Revision C. Testing was performed to DO-160F, MIL-STD-810, EN-60068, ISO-2669, and the applicable ABDs, unless otherwise noted.	
Temperature	-55° C (-67° F); to +85° C (+185° F)
Altitude	-100 to +55,000 FT
Vibration	10 Gs (DO-160D/E F2-AB)

Electrical	
Frequency	1616.0 – 1626.5 MHz
VSWR	≤ 1.5:1
Impedance	50-Ohms
Polarization	RHCP
Axial Ratio	≤ 3.0 db @ zenith
Power Handling	60 Watts CW

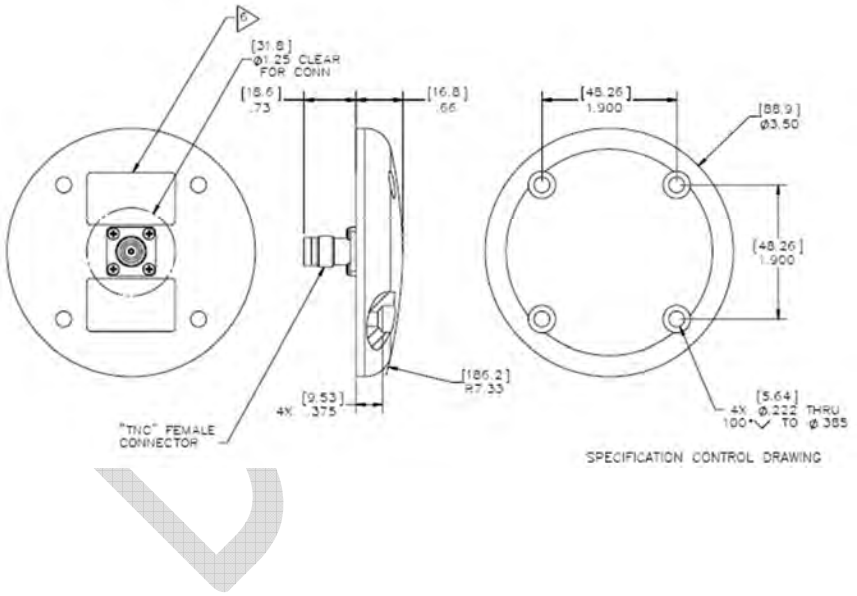

Figure 4-2 - Iridium Antenna, Outline and Dimensions

4.3.2 Antenna Mounting

A .020 thick conductive gasket is provided. L-3 recommends using four screws (MS24693-C274) for mounting the Iridium Antenna.

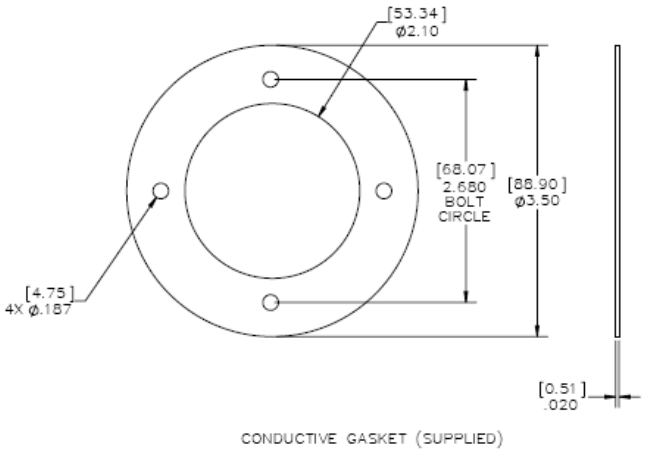

Figure 4-3 - Iridium Antenna, Gasket

4.3.3 Coaxial Antenna Cable

The Iridium SATCOM System uses an RF cable designed to cover the frequency range from 1565 MHz to 1626.5 MHz for Iridium transmit / receive operations and GPS reception. It is a low-loss, aircraft-grade cable that will be mounted in the aircraft fuselage. This cable provides the interconnection between the Iridium SATCOM System Satellite Data Unit and the Iridium Antenna. One end of the coaxial cable has an ARINC Size 5 coaxial contact installed and the other end has a TNC male connector.

Specifications

Weight (Typical)	• 024E5733-01 - 1.64 kg (57.85 oz) • 024E5733-02 – 1.50 kg (52.91 oz) • 024E5733-03 – 1.47 kg (51.85 oz) • 024E5733-04 – 1.68 kg (59.26 oz)
Length (Typical)	• 024E5733-01 – 11.30 m (445.0 inches) • 024E5733-02 – 10.20 m (402.0 inches) • 024E5733-03 – 9.95 m (392.0 inches) • 024E5733-04 – 11.56 m (455.1 inches)
Diameter (Typical)	8.1 mm (0.32 inches)
Manufacturer's Reference Documentation	Drawing 024E5733-00, Revision D Iridium Antenna Coax Cable – see Figure 4-4. Iridium SATCOM System Supplier Equipment Specification: Doc. No. 905-E5750-07, Revision N
Environmental The Iridium SATCOM System coaxial cable meets the environmental requirements of RTCA DO-262A, where applicable, as described in Doc. No. 905E5836-42 Revision B. Testing was performed to DO-160F, EN 4604, EN 3475, and the applicable ABDs, unless otherwise noted.	

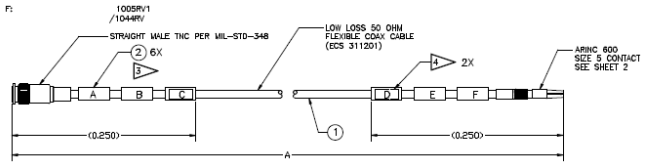

Figure 4-4 – Iridium Antenna Coaxial Cable

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5. SATCOM INSTALLATION MATERIALS

In addition to the Iridium SATCOM System LRUs (SDU and SCM), the materials described in this section are generally required as part of a typical Iridium SATCOM System installation.

Note:
The system integrator is responsible to ensure that all installation materials used meet the regulatory requirements for the intended aircraft installation environment.

5.1 Required Materials

- ARINC 600 2MCU mounting tray
- ARINC 600 Size 2 connector, with contacts
- ARINC 600 ground block, with contacts
- Iridium antenna
- Antenna coaxial cable(s)
- System interface wiring

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6. SYSTEM INTERFACE WIRING

6.1 General

All wire types and installation practices must comply with the requirements for the aircraft. Unless otherwise noted, minimum wire size is 22 AWG for standard copper wire or 24 AWG for high-strength copper alloy wire.

Terminate all shields at ground block or ground stud on SDU tray. Keep shield drains and unshielded conductor lengths as short as practicable (<3").

6.2 Primary Power, Antenna, and SCM

The primary power, antenna, and SCM connections in Figure 6-1 are required for all Iridium SATCOM System installations. The system will start, and continue to operate, whenever power (20.5 – 32.2 VDC) is available at the Primary Power Input pin (J1C-2).

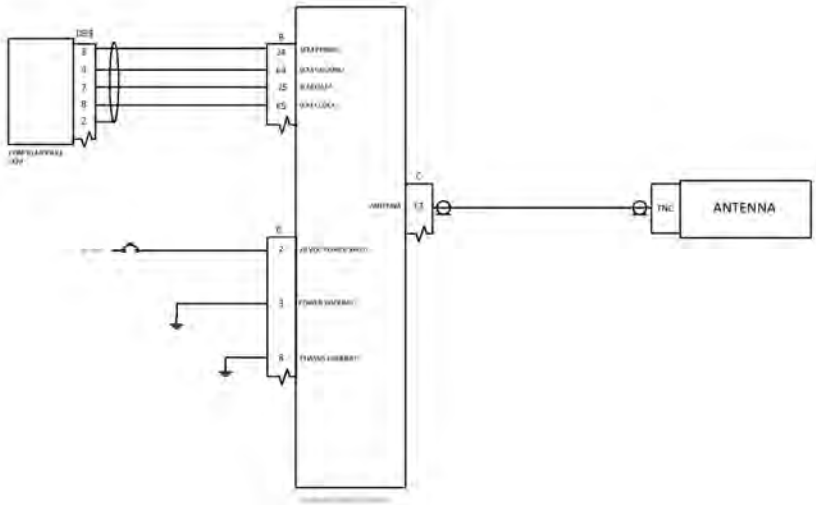

Figure 6-1 – Primary Power, Antenna, and SCM Interface

6.3 ARINC 429 Interfaces

The Iridium SATCOM System has 16 ARINC 429 receive ports and 6 ARINC 429 transmit ports. Each port is software-configurable for high or low speed, and the receive ports are also individually software-configurable for odd, even, or no parity checking. The transmit ports always transmit odd parity.

6.3.1 Receiver Protocols

Each of the ARINC 429 receivers can be configured in software for the proper protocol of the external aircraft system to which it is interfaced. Once a protocol (except “None”) is selected for any given receive port, it is no longer available for assignment to any other port. When an input is not connected to an active system (e.g. no connection, or wiring provisions only are installed), the port should be configured as “None” to avoid triggering bus inactivity faults.

- None
- ACARS 1
- ACARS 2
- A739 MCDU 1
- A739 MCDU 2
- A739 MCDU 3

See Section 0 for the label specifications for each receiver protocol.

6.3.2 Transmitter Protocols

Each of the ARINC 429 transmitters can be configured in software for the proper protocol of the external aircraft system to which it is interfaced. Once a protocol (except “None”) is selected for any given port, it is no longer available for assignment to any other port.

- None
- ACARS
- A739 MCDU

See Section 3.10 for the label specifications for each transmitter protocol.

6.4 MCDU

If an ARINC 739A MCDU is installed:

- MCDU 1 should be connected to ARINC 429 Tx 1 and ARINC 429 Rx 1
- MCDU 2 and 3 can be connected to any ARINC 429 Rx port from 2-16
  (Ports 2 and 3 are used in Figure 6-2)

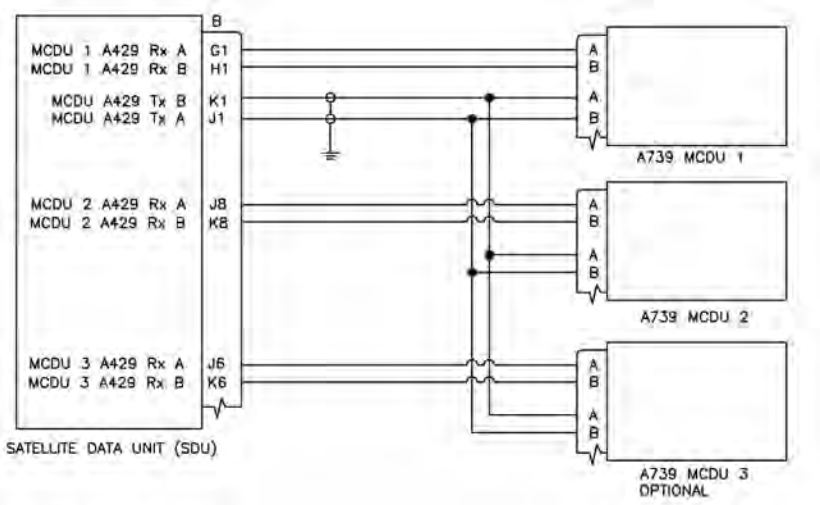

Figure 6-2 – MCDU Interface

6.5 ACARS ATSU

The ACARS ARINC 429 Tx interface provides safety-services data functionality for the Iridium SATCOM System. It is recommended that if the ACARS ATSU ARINC 429 Rx connection will not be used, that the wires be capped and stowed near the connectors as shown. Any Rx port from 2 to 16 may be used (ARINC 429 Rx port 4 is used in Figure 6-3).

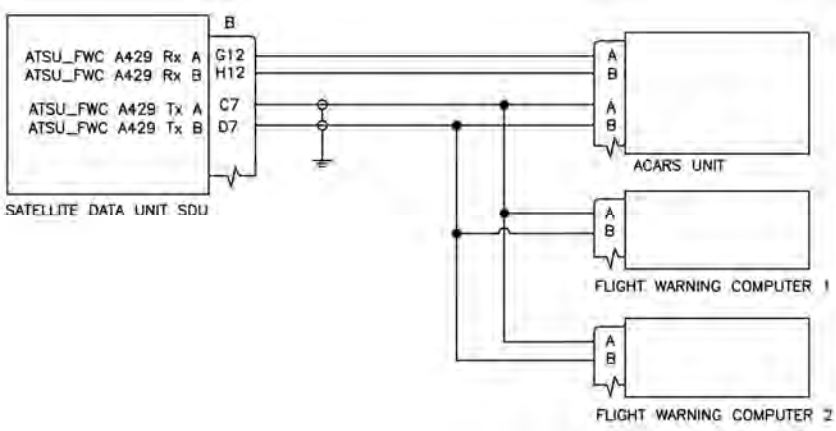

Figure 6-3 – ACARS ATSU Interface

6.6 CFDIU Interface

The SDU communicates with the Centralized Fault Display Interface Unit (CFDIU) over two ARINC 429 Low Speed busses, (1) input and (1) output as shown in Figure 6-4.

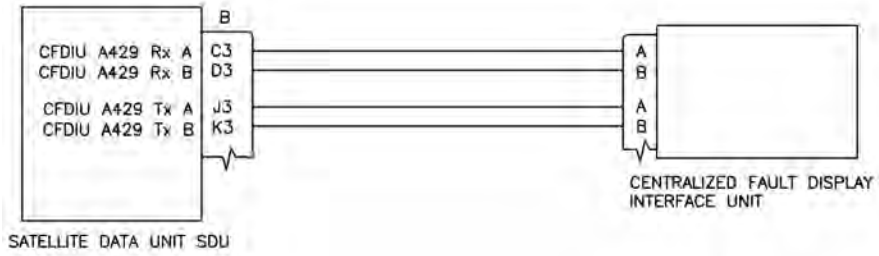

Figure 6-4 – CFDIU Interface

6.7 Date, Time, and Position

The Iridium SATCOM System's internal GPS provides date, time, and position information to be used in various ways; for example, attaching information tags to various reports and events.

6.8 Rear Ethernet Ports

The Iridium SATCOM System has four rear Ethernet ports (see Figure 6-5) that should be set to "none". Each port can auto-negotiate the best speed (10/100) and mode (full/half duplex).

A 4-conductor Ethernet cable must be used. The rear connector pin layout provides slightly better noise immunity with a star-quad cable construction, but a twisted-pair cable construction can generally also be used.

- For star-quad cables, the conductor lay order should be maintained without crossing the conductors when terminating.
  Examples: PIC P/N E51424 and ECS P/N 422404
- For twisted-pair construction, the conductor twists should be maintained right up to the rear connector.
  Examples: PIC P/N E40424 and ECS P/N 922404

In either case, the best noise immunity is obtained by keeping the strip length of the shield as short as physically possible, preferably <0.25 inches.

Each of the Ethernet ports can be configured in software for the proper protocol of the external aircraft system to which it is interfaced. Below is a list of the available protocols.

- None
- Not Monitored
- Monitored

Unused Ethernet ports should be configured as "None." A "Monitored" port is one where the system expects an active link and it will generate a fault if the Ethernet link to the external system is not

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available. For example, if the SDU is connected by Ethernet to a Class 2 **EFB that is routinely turned off and stowed for take-off and landing, the port should be configured as "Not Monitored" or the system will generate a fault whenever the EFB is disconnected.**
REPLACE WITH UPDATED DIAGRAM FROM AIRBUS – This was NOT updated when the Non-EFB document was because only the non-EFB drawing was created at that time.

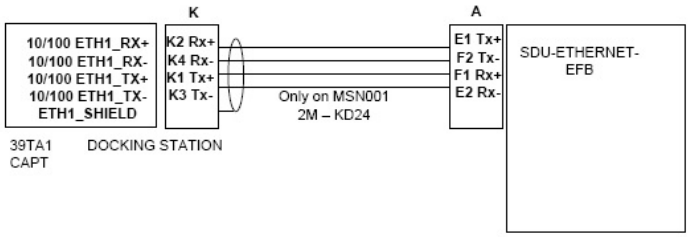

Figure 6-5 – Rear Ethernet Ports

6.9 Discrete Inputs

The Iridium SATCOM System has 16 Discrete Inputs, of which 14 are software-configurable for Open-Ground or Open-28V signaling levels, Active High or Active Low logic, and the assigned function.

6.9.1 Landing Gear Control Interface Unit (LGCIU) Input

Discrete input no. 1 (Din 1) is dedicated for use as a Landing Gear Control Interface Unit (LGCIU1) input. When there is only one LGCIU input (i.e. the LGCIU2 function is not assigned to a discrete input; see Section 6.9.2) and the LGCIU1 input transitions to the active state, the system is signaled that the aircraft is on the ground, and the inactive state indicates that the aircraft is in the air.

LGCIU1 (Din 1) is only an Open-Ground input; it cannot be configured as an Open-28V input. A Hardware Programming Pin (HPP) is provided to set whether the LGCIU1 input is Active High or Active Low. If the LGCIU HPP pin (J1B-11F) is tied low, LGCIU1 is configured as an Active Low input, i.e. Ground = On Ground. If the LGCIU HPP pin is connected to ground, LGCIU1 is configured as an Active High input, i.e. Ground = In Air.

If one of the configurable discrete inputs is configured for the LGCIU2 function (see Section 6.9.2), the following logic is used to determine the aircraft's Air-Ground status:

- When the LGCIU1 discrete input is in the active state (as configured by the LGCIU HPP strapping) and the LGCIU2 discrete input is in the active state (as defined by the ICT setting for the discrete input configured as "LGCIU 2"), the aircraft is considered as "on the ground."
- When any of the LGCIU discrete inputs are in the inactive state, the aircraft is considered as "in the air."

6.9.2 Function Assignment

The discrete inputs are software configurable. Once a function is selected for any given input, it is no longer available for assignment to any of the other inputs. See Figure 6-6.

The Mic On and Call Light functions are used in conjunction with the Extension 1 audio interface and are discussed in Section 6.11.1.1 below.

- Discrete input no. 1 (Din 1) is dedicated as a LGCIU input.
- Only discrete inputs Din 2 through Din 15 are software-configurable.
- Discrete input no. 16 (Din 16) is dedicated as “aircraft on ground” (LGCIU HPP).

None

When an input is not connected to an active system (e.g. no connection, or wiring provisions only are installed), configure the input as “None.”

System Reset

The System Reset discrete input, when configured, will reset the system only after an inactive to active transition. The system will reset only once even if the discrete input is left active. The System Reset function is independent of the “In-Air” or “On-Ground” status of the aircraft.

Landing Gear Control Interface Unit 2 (LGCIU2)

A second Landing Gear Control Interface Unit input may optionally be provided to the AFIRS system. Refer to Section 6.9.1 for the logic used when a LGCIU2 input is provided.

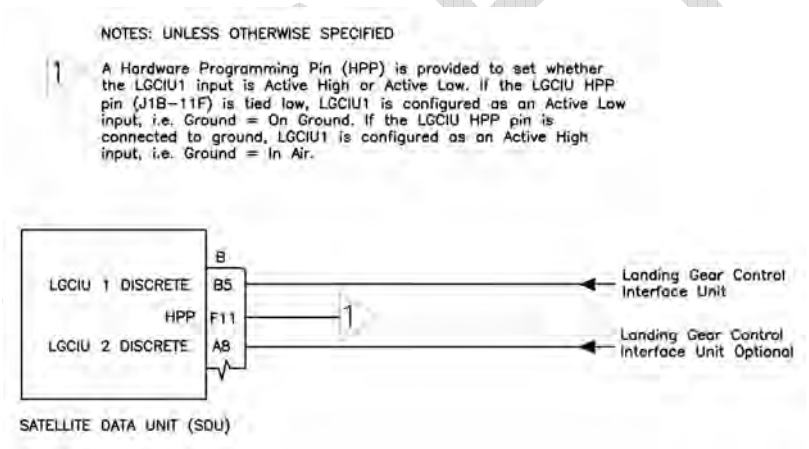

Figure 6-6 – Discrete Input Interfaces

6.10 Discrete Outputs

The Iridium SATCOM System has 8 configurable discrete outputs, each of which is software-configurable for Active High or Active Low logic and the assigned function. The discrete outputs use "Open-Closed" signal levels, where the output is either high-impedance to ground (Open) or low-impedance to ground (Closed).

Once a function (except "None") is selected for any given output, it is no longer available for assignment to any of the other outputs.

6.11 SATCOM

This section describes the interface and integration requirements for the Iridium SATCOM System with an Audio Integrating System.

6.11.1 Audio Integrating System

Extension 1 is generally intended to be connected to the aircraft's audio integrating system for flight crew use. The interfaces required to fully support this functionality vary significantly depending on the design of the audio integrating system. Generally, the MCDUs are used for control and display of the SATCOM functions for Extension 1.

6.11.1.1 Audio Discrete Signals

There is one discrete input and one discrete output that can be used to support the integrated audio interface.

Mic On Input

The Mic On function is dedicated as a Latched ACP mode; therefore, Voice Extension 1 (Mic/Phone input) will answer an incoming call when the Mic On input transitions to the active state. Once a call is in progress, the microphone audio channel will function as long as the Mic On input is in the active state. If a call is in progress and the Mic On input toggles to the inactive state, the call will be terminated. For outgoing calls when the Mic On input is configured for Latched ACP, the function is dependent on which control source is configured for Extension 1. When an MCDU is the Extension 1 dialing control, setting the "Mic On" input to the active state will initiate the dialing process using the phone number preselected on the MCDU.

Call Light Output

The Call List Output is Software configurable for either steady or flashing lights.

- Incoming Call is Ringing = Call Light output will transition to the active state, either in a steady state or flashing at approximately a 1 Hz rate.
- Call is Answered = Call Light output remains active in the steady state as long as the call is in progress.
- Call is Terminated = Call Light output will go inactive.

6.11.1.2 Latched ACP Configuration

If the Audio Integrating System provides a latched Mic On output, the following interface can be used. When an incoming call is ringing and the SATCOM switch on the Audio Control Panel is pressed, the call will be answered and microphone audio will always be live. The SATCOM switch on the Audio Control Panel is pressed a second time to end the call. Calls cannot be answered and terminated on the MCDU screen in this configuration.

The following diagram also shows how the Call Light output can be interfaced to an Audio Integrating System that provides SATCOM visual and aural call indications. In this case, a Call Light, Chime and Chime Reset switch are not required.

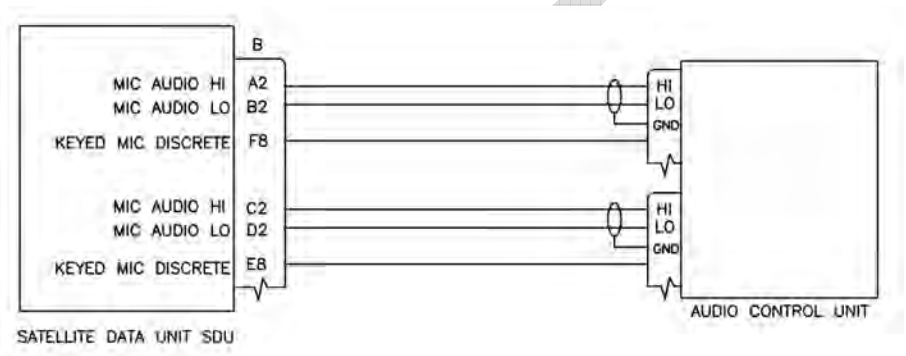

Figure 6-7 – Latched ACP Audio Interface

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7. SATCOM SYSTEM CONFIGURATION

The Iridium SATCOM System Satellite Data Unit (SDU) is configured via the Maintenance Port Ethernet connection, using a laptop, web browser, and the AFIRS Maintenance User Interface (MUI).

Note:
The MUI only accepts English-language characters and numbers.

IMPORTANT:
This manual provides information on how to connect to the Maintenance Port and access the Maintenance User Interface (MUI), as well as general information on the steps required to configure and update the Iridium SATCOM System.

An RJ-45 Maintenance Port jack is located behind the access door on the front panel of the SDU.

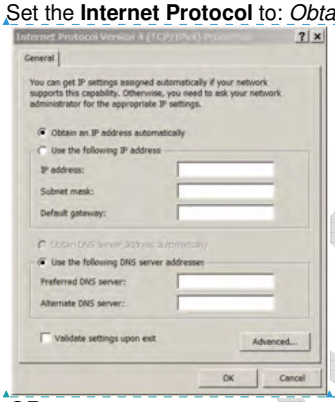
Figure 7-1 – Maintenance Port Location

Note:
Upon initial configuration of an installed system, perform and complete the ***Before Power-On Tests*** in Section 8.1, before applying power to the Iridium SATCOM System.

7.1 Access the Maintenance User Interface (MUI)

If an Electronic Flight Bag (EFB) with a supported web browser installed is connected to one of the rear Ethernet port connections, the EFB can be used as an AFIRS maintenance terminal and a laptop is not required.

1. On the laptop computer set the IP address to one of the following:
   a. Set the **Internet Protocol** to: *Obtain an IP Address Automatically*



   OR

   b. Use the following IP address:

IP address:	196.168.128.10
Subnet mask:	255.255.255.0

2. Connect an Ethernet cable to the Maintenance Port via the front panel access door of the SDU - system power may be on or off.
3. Connect the other end of the Ethernet cable to a laptop with a web browser.

Note:
Mozilla Firefox ® is the recommended Internet browser with the SDU.

4. If not already powered, apply power to the SDU.
5. Confirm that there is either a steady, or flashing, green link light (adjacent to Maintenance Port RJ45 connector). A flashing light indicates that data is being transmitted.
6. Open a web browser on the laptop. In the Address bar, type the following IP address:

   192.168.128.1

Note:
Before opening the web page, clear the web browser's cache, or Ctrl+F5 and re-open the web page.

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The Iridium SATCOM System home page appears with the **General** tab information displayed.

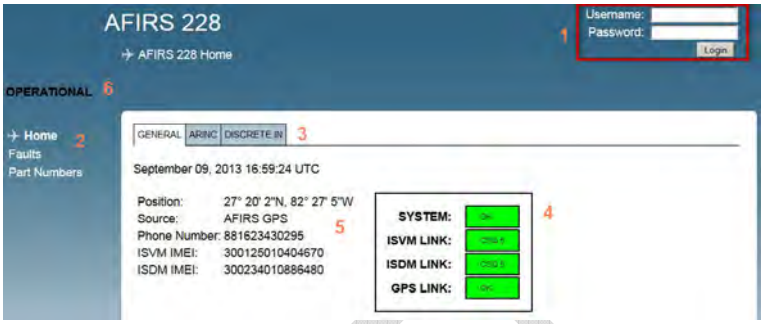


Figure 7-2 – Home Page – General Tab

1. Login area
2. Menu of available links to pages accessible to various users upon login
3. Tabs: **General**, **ARINC**, and **Discrete In**
4. System and Link status display area
5. System information data display area
6. Mode: OPERATIONAL, MAINTENANCE, INITIALIZING, etc.

7.1.1 Home Page Tab Descriptions

No user name or password is required to open the MUI home page.

General Tab

- **UTC Date and Time**: This is correlated to a GPS clock if the ICT parameter “Internal GPS = Active”. If no link is available (i.e. during startup), a default date is displayed.
- **Position**: This is the AFIRS GPS position. If no GPS is fixed, no GPS will be displayed.
- **Phone Number**: Displays the aircraft phone number (12 digits).
  ***Important: The phone number displayed may not be correct - check the SIM card.**
- **ISVM IMEI**: Iridium Satellite Voice Modem International Mobile Equipment Identity (15 digits).
- **ISDM IMEI**: Iridium Satellite Data Modem International Mobile Equipment Identity (15 digits).

- **Iridium SATCOM System Status Indicators**

System	
Yellow = (INIT) initializing	Green = OK
Yellow = FAULT	Yellow (blank) = system is in Maintenance Mode
Red = SDU Configuration Module (SCM) or Satellite Data Unit (SDU) Hardware failure or other critical error.	
ISVM and ISDM LINK	
Yellow = NO LINK, no Iridium link if CSQ (Channel Signal Quality) is 0-1	
Green = OK, if CSQ is 2-5	
GPS LINK	
Yellow = NO FIX	
Green = OK	

ARINC Tab

- Displays the status of the 16 ARINC 429 RX channels.
- The status of a configured function is either ACTIVE (green) or FAULT (red).
- The ARINC 717 RX configuration is currently not used.

Discrete In Tab

- Displays the state of the 16 Discrete Inputs.
- The state of the configured functional input is either ACTIVE (green) or INACTIVE (blue).

7.1.2 Faults Page

The **Faults** page provides access to the system fault log and fault history.

- FAULT tab displays only currently-raised faults
- HISTORY tab displays all raised and cleared faults since the last system reboot

Figure 7-3 – Faults Page (Fault Tab)

Figure 7-4 – Faults Page (History Tab)

7.1.3 Part Numbers Page

The **Part Numbers** page provides the software and hardware configuration status of the Iridium SATCOM System.

Figure 7-5 – Part Numbers Page (Software Tab)

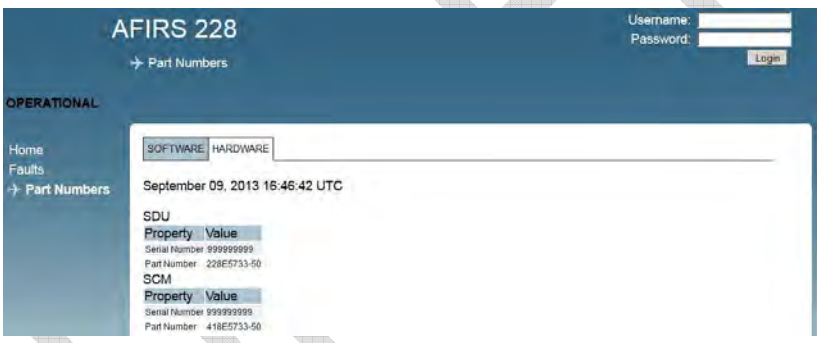


Figure 7-6 – Part Numbers Page (Hardware Tab)

7.2 Maintenance Mode

To enter Maintenance Mode, the aircraft must be deemed “On-Ground.” If the aircraft is deemed “In-Air”, the [Enter Maintenance Mode] button will be, or will become, unavailable.

If the aircraft status changes to “In-Air” while in Maintenance Mode, the system will reboot automatically and return to Operational Mode.

The following users can enter Maintenance Mode after log in:

Maintenance User (View Upgrades page, modify 5 parameters on the ORT page)

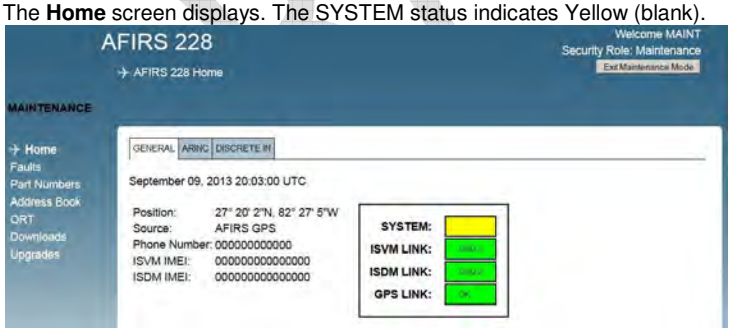
Administrator User (View Upgrades page, modify parameters on the UAT page)

Role-based MUI permissions are provided in Table 7-1 through Table 7-3 at the end of this section.

Enter Maintenance Mode

1. Once connected to the Iridium SATCOM System MUI, on the **Home** page, enter your user name and password and click **Login**.
2. If the aircraft is deemed “On-Ground”, the [Enter Maintenance Mode] button is available at the top right corner of the screen.
3. Click **Enter Maintenance Mode**.
   The following message displays, prompting for confirmation to enter Maintenance Mode.

4. Click **OK**.
   The **Home** screen displays. The SYSTEM status indicates Yellow (blank).

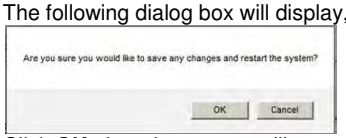


Note:
Entering Maintenance Mode disables all MCDU functions.

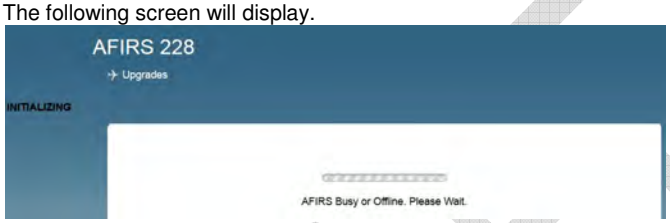
Figure 7-7 – Maintenance Mode Initial Display Screen

Exit Maintenance Mode

1. Upon completion of uploading of data or software files or modifying parameters, click **Exit Maintenance Mode** for the changes to take effect.
   The following dialog box will display, prompting for confirmation to save changes.



2. Click **OK**, then the system will restart.
   The following screen will display.

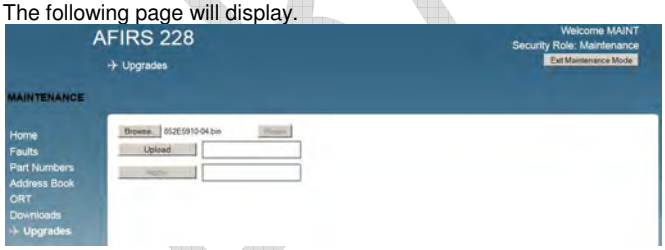


Note:
Exiting Maintenance Mode enables all MCDU functions.

If the aircraft status changes to “In-Air” while in Maintenance Mode, the system will reboot automatically and return to Operational Mode, disregarding incomplete file uploads.

7.2.1 Maintenance Mode Upgrades Page

1. Click **Upgrades** from the Maintenance menu to upload software or data files.
   The following page will display.



2. Click **Browse** to navigate and select the software or data file to be uploaded.

3. Click **Upload**.
   Success
   - The blue progress bars turn green.
   - The uploaded data files display a CRC code.
   - The uploaded software file displays the part number of the software.

   Incomplete
   - Non-compatible files will be rejected and an error message will display.
4. Click **Apply** to start the verification process.
   Success
   - The blue progress bars turn green.

   Incomplete
   - Non-compatible files will be rejected and an error message will display.
5. Click **Reset** in to upload another file.
6. Click **Exit Maintenance Mode**. The system must re-boot for changes to take effect.

Note:
If the aircraft's status changes to "In-Air" before uploading is complete, the system will reboot automatically and return to Operational Mode - disregarding incomplete uploads.

7. **Maintenance User** can modify only 5 ORT parameters:
   a. Click **ORT** (Owner Requirements Table) to configure customized settings for specific aircraft and or operator requirements.
8. **Administrator User** can modify any UAT parameter:
   a. Click **UAT** (User Access Table) to configure user access privileges.
9. Click **Exit Maintenance Mode**. The system reboots and returns to Operational Mode.

Note:
If the aircraft's status changes to "In-Air" before uploading is complete, the system will reboot automatically and return to Operational Mode - disregarding incomplete uploads.

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Table 7-1 - Read Privileges by Role

Roles	Read Privileges								
	Status and Part Numbers					Configurations			
	Status: Operating Mode, GPS Source, Configured Phone Number, ISVM IMEI, ISDM IMEI, Status LEDs (System, GPS, ISVM, ISDM)	ARINC 429 Rx Channels Status (Active/ Inactive)	Discrete Inputs Status (Active/ Inactive)	Fault Status	Part Numbers: ICT P/N, ORT P/N, ISVM F/W Ver., ISDM F/W Ver., S/W P/N, SDU P/N, SCM P/N, SCM S/N	ORT	ICT	ADB (Address Book)	UAT (User Access Table)
Guest (no login required)	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Data Collector	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Maintenance	Yes	Yes	Yes	Yes	Yes	Yes (Limited)	No	Yes	No
Administrator	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes

Table 7-2 - Download Privileges by Role

Roles	Download Privileges								
	Logs					Configurations			
	Failures	In-Air Faults	On-Ground Faults	Status (Link Changes)	Debug	ICT	ORT	ADB (Address Book)	UAT (User Access Table)
Guest (no login required)	No	No	No	No	No	No	No	No	No
Data Collector	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Maintenance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Administrator	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes

Table 7-3 – Modify Privileges by Role

Roles	Modify Privileges								
	Modifications				Software/Data Loading (Upload)				
	ORT Parameters	ICT Parameters	Address Book	UAT (User Access Table)	S/W Upgrades	ICT	ORT (Complete)	ADB (Address Book)	UAT (User Access Table)
Guest (no login required)	No	No	No	No	No	No	No	No	No
Data Collector	No	No	No	No	No	No	No	No	No
Maintenance	**Yes (Limited)**	No	No	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Administrator	No	No	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

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7.3 Configure the Iridium SATCOM System

The following sections are intended to provide information on the configuration process and data inputs required to install and verify a system as operational. For the purposes of installation, system configuration, and verification, the following steps should be completed:

1. **Address Book** to upload
2. **ORT** parameters for Maintenance User
3. **ICT** file to upload
4. **UAT** parameters for user roles

Reminder:
To enter Maintenance Mode, the aircraft must be deemed "On-Ground".

The following users can enter Maintenance Mode after log in:

Maintenance User – 5 ORT parameters

Administrator User – UAT parameters

7.3.1 Address Book

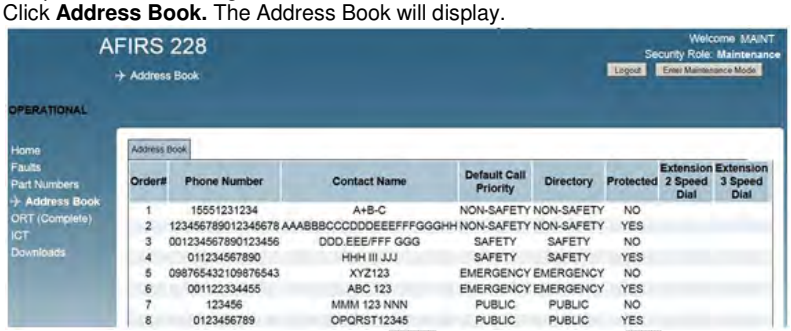
- Can be uploaded as a comma-separated-values file (adb.csv).
- Can contain up to 300 Address Book entries.
- Can be viewed by Maintenance and Administrator users after login in Operational mode.
- Entries can be modified, if unprotected, via the MCDU in Operational mode.
- Can be downloaded as 'adb.csv' file in the MUI (including modifications that have been made via the MCDU) by the Maintenance User after login in Operational Mode

The following restrictions and limitations apply to the parameters of a compatible adb.csv file:

- **Phone Number** – up to 18 digits
- **Name** – up to 23 upper-case alpha-numeric characters; A-Z, 0-9, +, -, /, space
- **Priority** – 4 (Public), 3 (Non-Safety), 2 (Safety), 1 (Emergency)
- **Protected** – 0 (No) = Entry can be modified or deleted via the MCDU in Operational Mode., 1 (Yes) = Entry cannot be modified via the MCDU in Operation Mode.
- **Directory** - 4 (Public), 3 (Non-Safety), 2 (Safety), 1 (Emergency)
- **Speed Dial 1** – 1 (address book appears in the cockpit for pilot's use)
- **Speed Dial 2** – 0 (currently not used)
- **Speed Dial 3** – 0 (currently not used)

View the Address Book in the MUI

1. In Operational Mode, log in as Maintenance User or Administrator User.
2. Click **Address Book.** The Address Book will display.



Order#	Phone Number	Contact Name	Default Call Priority	Directory	Protected	Extension 2 Speed Dial	Extension 3 Speed Dial
1	15551231234	A+B-C	NON-SAFETY	NON-SAFETY	NO		
2	123456789012345678	AAABBBCCCDDDEEEFFFGGGHH	NON-SAFETY	NON-SAFETY	YES		
3	001234567890123456	DDD.EEE/FFF GGG	SAFETY	SAFETY	NO		
4	01123456789O	HHH III JJJ	SAFETY	SAFETY	YES		
5	098765432109876543	XYZ123	EMERGENCY	EMERGENCY	NO		
6	001122334455	ABC 123	EMERGENCY	EMERGENCY	YES		
7	123456	MMM 123 NNN	PUBLIC	PUBLIC	NO		
8	0123456789	OPQRST12345	PUBLIC	PUBLIC	YES		

3. Address Book entry fields:

   - **Order#**: Up to 300 address book entries

     Note: This parameter is not part of the adb.csv file.
   - **Phone Number:** From 6 to 18 digits
   - **Contact Name:** Up to 23 upper-case alpha-numeric characters
   - **Default Call Priority and Directory:** Options displayed are Emergency, Safety, Non-Safety, and Public.
   - **Protected:**
     YES = Entry cannot be modified via the MCDU in Operational Mode
     NO = Entry can be modified or deleted via the MCDU in Operational Mode
   - **Extension 2 and 3 Speed Dial**: Currently not used.

7.3.2 Owner Requirements Table (ORT) Parameters

The Owner Requirements Table (ORT) contains the parameters that may be customized by the individual aircraft operator.

These settings may be changed as required to meet operational requirements or preferences.

The ORT file can be uploaded and downloaded as a binary file by the Maintenance User.

Modification of the ORT will cause the MOD label to display on the MCDU under the ORT P/N.

The file name of an up-loadable ORT file has a part number; for example, “852E5927-00.bin”. It is version-controlled and the CRC is calculated and displayed during the upload process for verification. If the ORT has been modified, the text “MOD” will be displayed on the MCDU, under the ORT Part Number.

The default file name of a downloaded ORT file is “ort.bin”.

Note:
An ORT Configuration Worksheet is provided in Appendix B to assist the operator in selecting and documenting the correct ORT configuration settings.

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Access and Modify ORT Parameters

ORT Group	ORT Parameter Name	Value
Air to Ground Calls	Call Progress Tones	☐ NORTH AMERICAN ☐ EUROPEAN
Allow Manual Dialing	Extension 1	☐ YES ☐ NO
Other Call Parameters	Allow Low Priority Calls in Cockpit	☐ YES ☐ NO
Safety Services (Iridium SATCOM System)	Additional ACARS Header Parameter	☐ NONE ☐ ARINC
	ATS Enabled	☐ YES ☐ NO

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1. **Log in** with user name and password as Maintenance User while aircraft is "On-Ground".
2. Click **Enter Maintenance Mode**.
3. Click the **ORT** link on the left side of the screen to open the ORT page.
4. **AIR TO GROUND CALLS - CALL PROGRESS TONES**:
   The call progress tones can be configured to either North American (default) or European.
5. **ALLOW MANUAL DIALING** - **EXTENSION 1**:
   YES = Manually-dialed phone calls can be placed from the cockpit, and via the directory.
   NO = Phone calls from the cockpit can be placed only by using the directory

Note:
If set to **NO**, the MANUAL DIAL prompt will not be available on the MCDU.

IMPORTANT! For operational approval for safety-services voice in accordance with FAA AC20-150A, Extension 1 must be configured **YES** to allow manual dialing for the flight crew.

6. **OTHER CALL PARAMETERS** – **ALLOW LOW PRIORITY CALLS IN COCKPIT**:
   Low-priority calls are considered PUBLIC or Priority 4.
   YES = Low-priority calls can be received in the cockpit, and low-priority calls can be placed from the cockpit.
   NO = Low-priority incoming calls will not ring in the cockpit, and no low-priority calls can be placed from the cockpit.

Note:
If set to **NO**, the PUBLIC directory prompt will not be available on the MCDU.

7. **SAFETY SERVICES (Iridium SATCOM System) – ADDITIONAL ACARS HEADER PARAMETER**: The default configuration of **NONE** corresponds to SITA; alternatively, select **ARINC**.

8. **ATS ENABLED**:
   YES = Safety / ATS (Air Traffic Service) SIM card installed in the SCM.
   NO = Non-Safety / NON-ATS (Air Traffic Service) SIM card installed in the SCM.

7.3.3 Installation Configuration Table (ICT)

The Installation Configuration Table (ICT) parameters may not be viewed or modified.

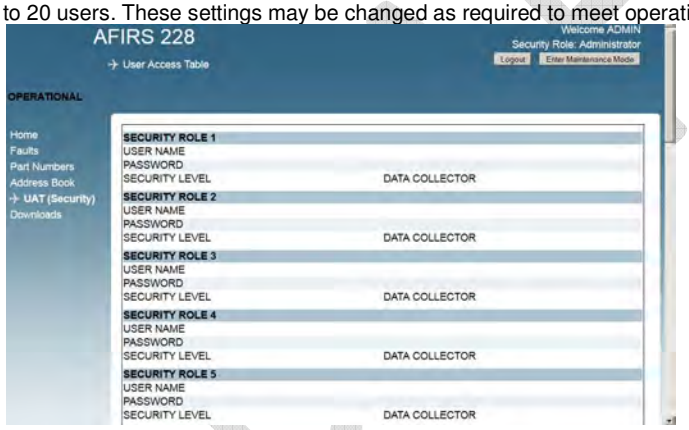
The ICT file can be uploaded and downloaded as a binary file by the Maintenance User.

The file name of an uploadable ICT file has a part number; for example, “852E5910-00.bin”. It is version-controlled and the CRC is calculated and displayed during the upload process for verification.

The default file name of a downloaded ICT file is “ict.bin”.

7.3.4 User Access Table (UAT) Parameters

The User Access Table (UAT) is used by an Administrator User to set up user access privileges for up to 20 users. These settings may be changed as required to meet operational requirements.



Access and Modify UAT Parameters

1. Log in with user name and password as Administrator User while the aircraft is “On-Ground”.
2. Click **Enter Maintenance Mode**.
3. Click the **UAT (Security)** link on the left side of the screen to open the UAT page.
4. **USER NAME**: From 4 to 20 upper-case alphanumeric characters
5. **PASSWORD**: From 4 to 20 upper-case alphanumeric characters
6. **SECURITY LEVEL**: Select either **DATA COLLECTOR** (default) or **MAINTENANCE** or **ADMINISTRATOR**.

Exit Maintenance Mode

Upon completion of modifying parameters, click **Exit Maintenance Mode** for the system to reboot and the changes to take effect.

Note:
Exiting Maintenance Mode enables all MCDU functions.

If the aircraft status changes to “In-Air” while in Maintenance Mode, the system will reboot automatically and return to Operational Mode.

7.4 Upgrade Iridium SATCOM System Software

The Iridium SATCOM System software may be upgraded in the field using the **Upgrade** function of the MUI in Maintenance Mode.

Maintenance and Administrator Users have privileges to login and upload software and data files while aircraft status is “On-Ground”.

7.4.1 Upgrade Materials

Make sure to have the following materials available before beginning the upgrade procedure.

- A notebook computer with an Ethernet port, running the Microsoft Windows operating system and a web browser such as Mozilla Firefox ® (see Section 7.1 Access the Maintenance User Interface).
- A standard, straight-through Ethernet patch cable.
- The software release folder that contains the upgrade file (upgrade.tgz).
- The software release notes to identify any changes to functionality or special upload instructions.

7.4.2 Upgrade the Iridium SATCOM System Software

1. From the left menu, click **Upgrades**. The **Upgrades** screen will display.
2. Click **Browse** to locate the software file to upload (upgrade.tgz).
3. Select the software file and click **Upload**.

   Blue progress bars indicate the file uploading status. When the upload is complete and successful, the progress bars turn green, and the new Software Part Numbers of the new software image will be displayed.

Note:
Incompatible files will be rejected. The progress bars will turn red, and an error message will display next to the progress bars. Click **Reset** to restart the upgrade process.

If you uploaded an incorrect file, but have not yet clicked **Apply**, click **Reset** to restart the upgrade process.

4. Click **Apply** to verify and load the software into non-volatile memory.

   Blue progress bars indicate the status of the software file being installed on the SDU. When the software verification has successfully completed, the progress bars turn green, and a message displays that the system must be restarted for the changes to take effect.

Note:
If the aircraft status changes to “In-Air” at any time during the upgrade process, the system will reboot automatically and return to Operational Mode, disregarding incomplete upgrades.

To activate the newly installed software, you must **Exit Maintenance Mode** and restart the SDU.

5. Click **Exit Maintenance Mode** at the top-right corner of the MUI screen.

   A confirmation message displays prompting to confirm that you want to exit Maintenance Mode.

6. Click **OK.**

   The SDU automatically restarts and applies the newly-installed software. A message displays indicating that the AFIRS system is rebooting.

7. When the restart is complete, verify that the SDU is in Operational Mode and functioning as expected. To verify that the correct software version and configurations have been loaded, check the following:

   a. From the **Home** page, click on the **General**, **ARINC**, and **Discrete In** tabs to review the system and link status, and the status of the ARINC 429 Rx and Discrete In connections.

   b. Click on the **Faults** page to verify any faults that might be raised.

   c. Click on the **Part Numbers** page to verify that the software part number displayed matches the software version and part number as noted in the release notes or upgrade instructions.

   d. Enter **User Name** and **Password** (Maintenance User) and click **Login**.

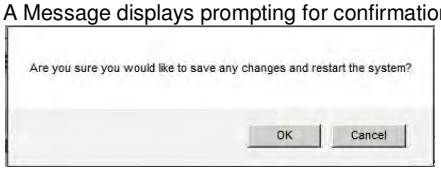
   e. Maintenance User - Click **ORT** and review the ORT configurations to confirm that they are correct.

   f. Click **Logout** after your review is complete and satisfactory.

7.5 Exit Maintenance Mode

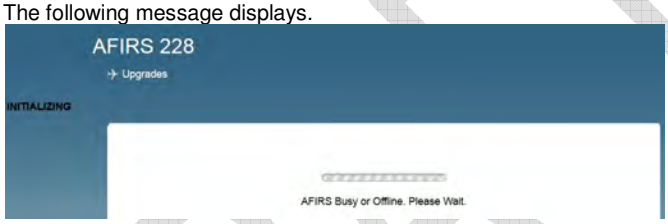
1. To save changes and uploaded configuration data, exit maintenance mode for the changes to take effect

1. In the top-right corner of the screen, click **Exit Maintenance Mode.**
2. A Message displays prompting for confirmation to exit Maintenance Mode



Note:
If you click **Cancel**, changes are still active but not saved.

3. Click **OK** to exit Maintenance Mode, save your changes, and reboot the system.
The following message displays.



4. Once the system reboots to Operational Mode, verify your changes and confirm that the correct software and data files have been installed.
5. Click the **Part Numbers** page and review the Software tab for the correct Part Numbers. The **Part Numbers** screen displays.

8. MAINTENANCE AND CHECKOUT

This section provides instructions on post-installation checkout procedures and information on Instructions for Continued Airworthiness.

8.1 Post-Installation Checkout

8.1.1 Before Power-On Tests

1. Before installing the SDU in the mounting tray, confirm that all aircraft interface wiring is correct as per the aircraft wiring integration design.
2. Confirm that a valid SIM card is installed in the SDU Configuration Module (SCM).
3. Set the system circuit breaker for the Main power source and confirm that 28 VDC power is available between pins J1C-2 and J1C-3. Pull the circuit breaker and ensure that Main power is removed.
4. Place the SDU in the mounting tray and secure the front hold-down.
5. Open the front panel door and confirm that a flash card is installed in the SDU.

Note:
If no flash card is present, a FLASH CARD FAULT is generated in the MUI, and an SDU FAIL will display on the MCDU SATCOM BITE STATUS page.

Only FLYHT P/N 502-1180-x flash cards should be used in the Iridium SATCOM System.

6. If installed, the cockpit FAULT indication should be illuminated when power is not applied to the system.
7. Set the system circuit breaker for the Main power source. The SYSTEM LED indicator on the front panel of the SDU will be yellow, indicating that the system is initializing.

Note:
The first time an SDU is installed in an aircraft, the SYSTEM LED indicator will typically remain yellow even after it has initialized. The MUI will display an SCM Configuration Fault indicating that the proper configuration settings have not yet been made.

8. Connect an Ethernet cable to the Maintenance Port in the front panel and follow procedures to open the Maintenance User Interface (MUI) as described in Section 7.
9. Log in to the MUI as Maintenance User and Enter Maintenance Mode to install ICT and ORT files in accordance with the procedures contained in Section 7. Exit Maintenance Mode to reboot the system. Keep the laptop connected to the Maintenance Port after finishing the configuration procedure.
10. Once the system resets, the SYSTEM LED indicator on the front panel of the SDU will turn green once the system is operational.
11. The cockpit FAULT annunciator should remain illuminated whenever the SYSTEM STATUS indicator is amber, and extinguish when the SYSTEM LED indicator turns green.

8.1.2 Aircraft Systems Interface Tests

Note:

The tests listed in this section are generic in nature and are not intended to be used as a test plan for any specific aircraft installation. They should only be used by the aircraft systems integrator as a guide in developing the correct and complete aircraft-specific integration tests. The aircraft systems integrator's test plan should ensure that the aircraft and its systems are in a safe condition for each test to be performed.

8.1.2.1 Main Power Test

1. Confirm that 28 VDC power is available at the Main power input, and that the Iridium SATCOM System is initialized and operating.
2. Using the MUI Home page General tab, confirm that the System status and Datalinks are green.

8.1.2.2 ARINC 429 Databus Interface Tests

1. On the MUI, click on the ARINC tab on the Home page.
2. Confirm the aircraft systems connected to the databus ports being tested are operational and transmitting on the databus.
3. Confirm that the ARINC 429 Rx (1-16) channels used are shown as ACTIVE.

8.1.2.3 MCDU Tests

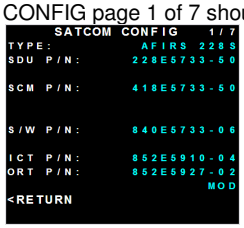
Confirm SATCOM functionality on each MCDU as follows:

1. On the MCDU MENU page, the <SAT prompt should be available at one of the Line Select Keys (LSKs). Press the LSK to display the SATCOM MAIN MENU page.

2. On the SATCOM MAIN MENU, press the LSK for the SATCOM STATUS page.

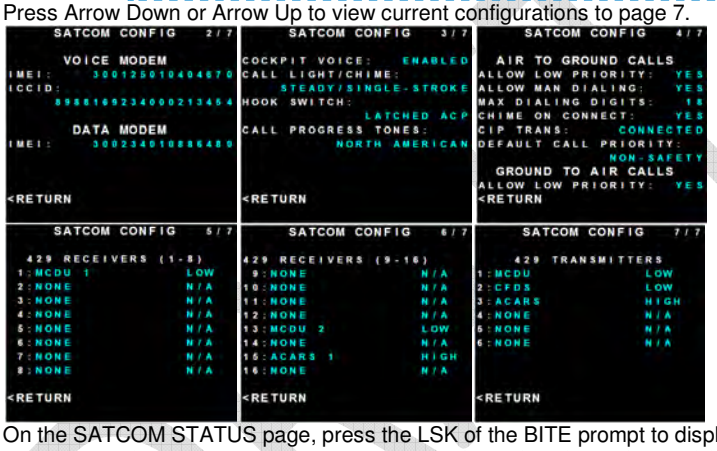
The SATCOM STATUS page should be displayed with log-on state as well as voice and datalink status information.

3. On the SATCOM STATUS page, press the LSK of the CONFIG prompt. The SATCOM CONFIG page 1 of 7 should be displayed.



If the ORT has been modified, the text "MOD" will be displayed on the MCDU, under the ORT Part Number.

4. Press Arrow Down or Arrow Up to view current configurations to page 7.



5. On the SATCOM STATUS page, press the LSK of the BITE prompt to display the SATCOM BITE STATUS page to display the status of the SDU, SIM CARDS, and SCM.

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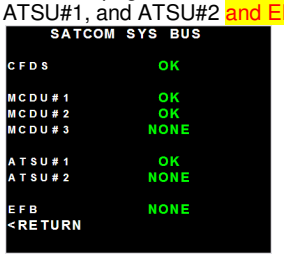
6. On the SATCOM BITE STATUS page, press the LSK of the SYS BUS prompt. The SATCOM SYS BUS page should display with status information of the MCDU#1, MCDU#2, MCDU#3, ATSU#1, and ATSU#2 and EFB.



7. Press the <RETURN LSK several times to return to the SATCOM MAIN MENU page.

8.1.2.4 Ethernet Port Tests

1. Confirm connectivity to each Ethernet device as follows:
2. Confirm that the SDU front panel ETHERNET LEDs for the connected ports are green. Flashing green indicates data is being transferred.
3. Perform any tests specific to the connected system to confirm that it is communicating with the SDU over the Ethernet port.

8.1.2.5 Discrete Input Tests

For each discrete input connected (1-16), confirm the correct aircraft system interface as follows:

1. Using the Maintenance User Interface (MUI), click on the Discrete In tab on the Home page.
2. Select the discrete input to its inactive state. Confirm proper operation of the interfaced aircraft system.
3. Select the discrete input to its active state. Confirm proper operation of the interfaced aircraft system.

8.1.2.6 Discrete Output Tests

For each discrete output configured and connected (1-8), confirm the correct state is detected as follows:

1. Manipulate the system providing the discrete output as required to indicate the output active state

8.1.3 Operational System Tests

Note:
The tests in this section require the aircraft to be powered and outside the hangar in a location that has a clear view of the Iridium and GPS satellites. Aircraft systems that interface with the Iridium SATCOM System must be installed and operational.

These tests also require the AFIRS system to be activated on the Iridium network by SIM card provider, and a valid SIM card installed in the SCM. Ensure that the ORT configuration ATS Enabled (Yes/No) matches the SIM card type installed.

8.1.3.1 Date, Time, and Position Tests

1. Open the MUI to display the AFIRS Home page.
2. Confirm that the correct date, time, and position (UTC) information is displayed.
3. If the Internal GPS is configured as Active, the MUI display is showing AFIRS GPS and the GPS Link is displayed green.

8.1.3.2 Datalink Tests

1. Confirm on the MUI that the ISVM and ISDM Links are green, and the MCDU SATCOM STATUS page displays LOGGED-ON.

8.1.3.3 SATCOM Voice Tests

1. Confirm that the MCDU SATCOM MAIN MENU page displays Ready to Connect.

2. Place an air-to-ground call by using the MCDU. Confirm proper MCDU indications for a call in progress.

3. Terminate the call from the cockpit. Confirm proper cockpit indications and return to Ready to Connect state.
4. Place a ground-to-air call. Confirm proper cockpit indications for an incoming call. Answer the call and confirm proper cockpit indications for a call in progress.

5. Place a ground-to-air call and reject the incoming call. Confirm proper cockpit indications.
6. Place a ground-to-air call. Allow call to go unanswered. Confirm proper ring sequencing, eventual call termination, and proper cockpit indications.
7. If SIM card installed is ATS-enabled, place a ground-to-air call. While the call is in progress, place a higher priority ground-to-air call. Confirm that the existing call is terminated and pre-empted by a call of higher priority.
8. Terminate call from the ground. Confirm proper cockpit indications.

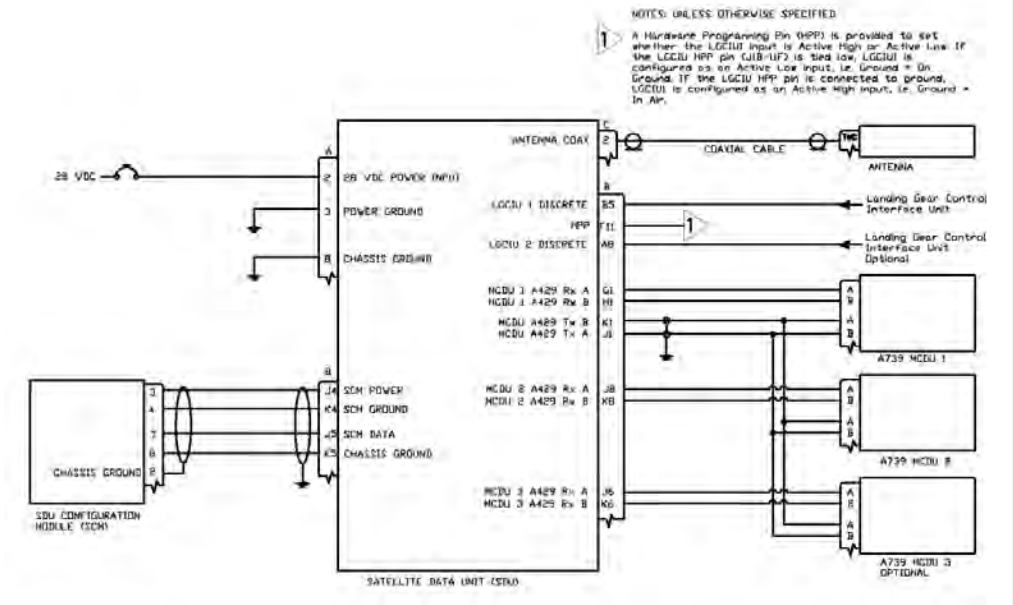
8.1.4 EMI Tests

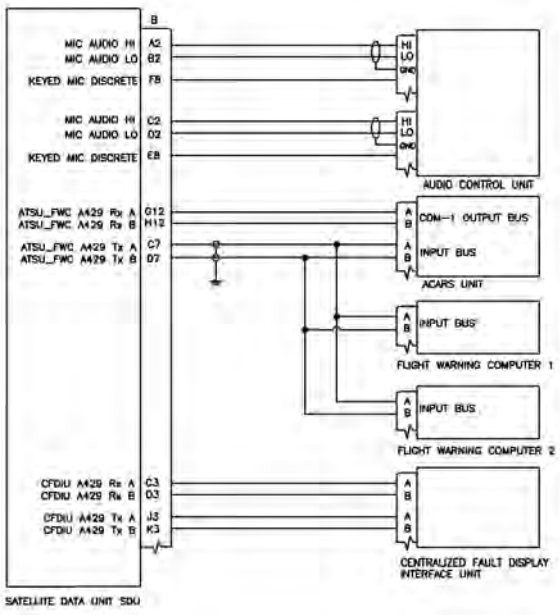
Each Iridium SATCOM System aircraft installation should be tested for electromagnetic interference in accordance with procedures developed by the aircraft systems integrator. The tests should be developed to ensure that there is no objectionable interference between the Iridium SATCOM System and other aircraft systems. This can include ground tests with engine running and flight tests as required.

8.2 Instructions for Continued Airworthiness

The aircraft systems integrator is responsible to provide Instructions for Continued Airworthiness (ICA) for the Iridium SATCOM System specific to the aircraft installation. The general content in this Installation Manual may be referenced by the aircraft systems integrator when developing the ICA.

Appendix A – Wiring Diagram




B
MIC AUDIO HI
MIC AUDIO LO
KEYED MIC DISCRETE
MIC AUDIO HI
MIC AUDIO LO
KEYED MIC DISCRETE
ATSU_FWC A429 Rx A
ATSU_FWC A429 Rx B
ATSU_FWC A429 Tx A
ATSU_FWC A429 Tx B
CFDIU A429 Rx A
CFDIU A429 Rx B
CFDIU A429 Tx A
CFDIU A429 Tx B
A2
B2
F8
C2
D2
E8
G12
H12
C7
D7
C3
D3
J3
K3
HI
LO
GND
AUDIO CONTROL UNIT
COM-1 OUTPUT BUS
INPUT BUS
ACARS UNIT
INPUT BUS
FLIGHT WARNING COMPUTER 1
INPUT BUS
FLIGHT WARNING COMPUTER 2
CENTRALIZED FAULT DISPLAY INTERFACE UNIT
SATELLITE DATA UNIT SDU

Appendix B – ORT Configuration Worksheet

ORT Group	ORT Parameter Name	Value
Air to Ground Calls	Call Progress Tones	☐ NORTH AMERICAN ☐ EUROPEAN
Allow Manual Dialing	Extension 1	☐ YES ☐ NO
Other Call Parameters	Allow Low Priority Calls in Cockpit	☐ YES ☐ NO
Safety Services (Iridium SATCOM System)	Additional ACARS Header Parameter	☐ NONE ☐ ARINC
	ATS Enabled	☐ YES ☐ NO

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Appendix C – System Faults

Iridium SATCOM Built-In-Tests (BIT)

Most of the checks are run as part of the Power-On Self-Test (POST) functionality or the Continuous Built-In Test (C-BIT) functionality.

- POST checks are run when the system is in Initialization Mode
- C-BIT checks are run at regular intervals during Operational Mode and Maintenance Mode

As BIT Checks are performed, the system will identify any "Raise Fault/Failure" conditions (system errors) that will affect functionality. Sometimes an error can cleared immediately, and there will be no record of it in the fault log. If a system error cannot be resolved immediately, a Failure, Fault, or Status Message will be recorded and tagged with the specific Date, Time, Position (DTP), and the value will be stored as the ORT Aircraft ICAO Address parameter.

During the next periodic Continuous tests the system will determine if a recorded system error is still affecting functionality. If it is not, the Failure, Fault, or Status Message may be cleared. In the event that a condition is cleared, the system will record it as cleared, and tag it with the specific Date, Time, Position and the value of the associated ORT Aircraft ICAO Address parameter.

Data Area Checks: Ensures that the various data areas utilized by the Iridium SATCOM system are accessible

Power Checks: Monitors voltage inputs to the Iridium SATCOM system and internal voltage rails of the power supply

Temperature Checks: Responds to system critical temperatures reported by the temperature sensors built into the SDU

Internal Interface Checks: Monitors communication with system devices, including the Internal GPS, ISVM, ISDM, the SCM

External Interface Checks: Monitors communication between the Iridium SATCOM system and external systems

Satellite Link Checks: Monitors the availability of the GPS and Iridium satellite links

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Iridium BIT and Status Checks Indicator Summary

Faults, failures, or status conditions are raised or cleared,
logged in non-volatile memory, and can be accessed via the Maintenance User interface.

Front Panel LED Indicators

LED indicators require power to the Iridium SATCOM system. Every indicator will be off if no power is applied.

Status Indicator Name	LED = OFF	LED = GREEN	LED = AMBER	LED = RED
System	Never Off	Operational Mode No Failure/Fault	Initialization Mode or Maintenance Mode or Fault/Event	Critical Failure
ISVM Link	Never Off	Operational Mode No Failure/Fault	Fault/Event	Never Red
ISDM Link	Never Off	Operational Mode No Failure/Fault	Fault/Event	Never Red
GPS Link	Internal GPS Active Parameter Set to Inactive	Operational Mode No Failure/Fault	Fault/Event	Never Red
Ethernet Link (for each port)	Not Used or Fault	Steady = Link OK Flashing = Data Being Transmitted	Never Amber	Never Red

Fault Light Discrete Indicator

Indicator is an optional feature; it may or may not be present on the aircraft.

Fault Light = OFF Fault Light = ON

Functions Provisioned

Indicates the system-level function impact that can be expected when the fault/condition is present.

No Impact Partial Impact (See *Comments* to Determine) Full Impact

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
Data Area Checks																				
N/A	RAM Check POST	The "RAM Failure" will be raised if the system cannot successfully write or read from the RAM.	The "RAM Failure" cannot be cleared once raised.	●	■	○	○	○	□	□	□	□	□	□	□	N/A	N/A	N/A	N/A	Critical Error. Transition to Unserviceable Mode. Log Failure Message (if able).
Config Fail	Configuration Table Check POST (Read) EVENT	The "Configuration Table Failure" will be raised if the system is unable to read or write the Configuration Data stored in the ACM EEPROM.	The "Configuration Table Failure" cannot be cleared once raised.	●	■	○	○	○	□	□	□	□	□	■	□	No	N/A	N/A	N/A	Critical Error. Transition to Unserviceable Mode. Log Failure Message.
Config Fault	SCM Configuration Table CRC Check POST	The "SCM CRC Fault" will be raised if the calculated CRC of the Configuration Data in the SCM EEPROM does not match the CRC stored for the SCM Configuration Data.	The "SCM CRC Fault" cannot be cleared once raised.	●	●	○	○	○	□	□	□	□	□	■	□	No	N/A	N/A	N/A	Transition to Configuration Invalid State. Log Fault Message.
	SCM Compatibility Check POST	The "SCM Compatibility Fault" will be raised if the SDU software load is not compatible with the valid Configuration Data stored in the SCM EEPROM.	The "SCM Compatibility Fault" cannot be cleared once raised.	●	●	○	○	○	□	□	□	□	■	■	□	No	N/A	N/A	N/A	MCDU will display compatibility fault on main menu if default config signs with installation. Transition to Configuration Invalid State.
Flash Card Fault	R-NVM Check POST C_BIT-10	The "R-NVM Fault" will be raised if any of the following is the case: R-NVM is missing or not detected. R-NVM does not initialize. R-NVM is judged to be corrupted.	The "R-NVM Fault" will be cleared if the R-NVM, is detected, initialized, and is not judged corrupted.	●	●	●	●	●	■	■	■	■	■	■	■	Yes	Fail	OK	Fail	Flight logging to removeable card impacted. Transition to Degraded Operation State – Data Storage and Retreival function inoperable.
NVM Fail	NR-NVM Check POST C_BIT-10	The "NR-NVM Failure" will be raised if any of the following is the case: NR-NVM is missing or not detected. NR-NVM does not initialize. NR-NVM is judged to be defective.	The "NR-NVM Failure" cannot be cleared once raised.	●	■	●	●	●	■	■	■	■	■	■	■	Yes	Fail	OK	Fail	Flight logging to internal memory impacted. Transition to Degraded Operation State – Data Storage and Retreival function inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Pulfishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
Power Checks																				
Low Volts	Low Voltage Check EVENT	The "Low Voltage Status" will be raised if the system enters the Low Input Voltage state.	The "Low Voltage Status" will be cleared if the system exits the Low Input Voltage state.													Yes	OK	OK	OK	
Power Loss	Power Loss Check EVENT	The "Power Loss Status" will be raised if the system enters the Power Failure state.	The "Power Loss Status" will be cleared if the system exits the Power Failure state.													NO	Fail	NO	Fail	
Alternate Power	Alternate Power Check EVENT	The "Alternate Power Status" will be raised if the system enters the Alternate Power super-state.	The "Alternate Power Status" will be cleared if the system exits the Alternate Power super-state.													Yes	OK	OK	OK	
N/A	Primary Power Monitor Check C-BIT-INIT C-BIT-1	The "Primary Power Status" will be raised if the voltage in the Primary Input is below 18.0 V or above 32.2 V.	The "Primary Power Status" will be cleared if the voltage at the Primary Input is within an inclusive range of 18.0 V to 32.2 V.													N/A	N/A	N/A	N/A	
N/A	Alternate Power Monitor Check C-BIT-INIT C-BIT-1	The "Alternate Power Status" will be raised if the voltage in the Alternate Input is below 18.0 V or above 32.2 V.	The "Alternate Power Status" will be cleared if the voltage at the Alternate Input is within an inclusive range of 18.0 V to 32.2 V.													N/A	N/A	N/A	N/A	
N/A	High Current Monitor Check C-BIT-INIT C-BIT-1	The "High Current Fault" will be raised if the system input current exceeds 2.5 A.	The "High Current Fault" will be cleared if the system input current is 2.5 A or less.													N/A	N/A	N/A	N/A	

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
Power Checks																				
N/A	Hold Up Monitor Check C_BIT_INIT C_BIT_1	The "Hold Up Fault" will be raised if the monitored voltage exceeds 40.0 V.	The "Hold Up Fault" will be cleared if the monitored voltage is 40.0 V or less.	●	●	●	●	●	■	■	■	■	■	■	■	N/A	N/A	N/A	N/A	
N/A	+3.3 V Monitor Check C_BIT_INIT C_BIT_1	The "+3.3 V Fault" will be raised if the monitored voltage exceeds ±10%.	The "+3.3 V Fault" will be cleared if the monitored voltage is within an inclusive range of ±10%.	●	●	●	●	●	■	■	■	■	■	■	■	N/A	N/A	N/A	N/A	
N/A	+5 V Monitor Check C_BIT_INIT C_BIT_1	The "+5 V Fault" will be raised if the monitored voltage exceeds ±10%.	The "+5 V Fault" will be cleared if the monitored voltage is within an inclusive range of ±10%.	●	●	●	●	●	■	■	■	■	■	■	■	N/A	N/A	N/A	N/A	
N/A	+12 V Monitor Check C_BIT_INIT C_BIT_1	The "+12 V Fault" will be raised if the monitored voltage exceeds ±10%.	The "+12 V Fault" will be cleared if the monitored voltage is within an inclusive range of ±10%.	●	●	●	●	●	■	■	■	■	■	■	■	N/A	N/A	N/A	N/A	
N/A	-12 V Monitor Check C_BIT_INIT C_BIT_1	The "-12 V Fault" will be raised if the monitored voltage exceeds ±10%.	The "-12 V Fault" will be cleared if the monitored voltage is within an inclusive range of ±10%.	●	●	●	●	●	■	■	■	■	■	■	■	N/A	N/A	N/A	N/A	

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SBIT	SCSI	Bite Summary	
Temperature Checks																				
Temp Sense Fault	Temperature Sensors Check C-BIT-INIT C-BIT-1	A "Temperature Sensor Fault" will be raised if one or more of the temperature sensors are considered unreasonable.	The "Temperature Sensor Fault" will be cleared if all of the temperature sensors report a reasonable temperature.													Yes	OK	OK	OK	
Warm UP	System Low Temperature Monitor Check C-BIT-INIT C-BIT-1	The "System Low Temperature Status" will be raised if the system enters the System Low Temperature state.	The "System Low Temperature Status" will be cleared if the system exits the System Low Temperature state.													Yes	OK	OK	OK	
N/A	ISVM Low Temperature Monitor Check C-BIT-INIT C-BIT-1	The "ISVM Low Temperature Status" will be raised if the system enters the ISVM Low Temperature state.	The "ISVM Low Temperature Status" will be cleared if the system exits the ISVM Low Temperature state.													N/A	N/A	N/A	N/A	
HI Temp	ISVM Elevated Temperature Monitor Check C-BIT-INIT C-BIT-1	The "ISVM Elevated Temperature Status" will be raised if the system enters the ISVM Elevated Temperature state.	The "ISVM Elevated Temperature Status" will be cleared if the system exits the ISVM Elevated Temperature state.													Yes	OK	OK	OK	
	ISVM High Temperature Monitor Check C-BIT-INIT C-BIT-1	The "ISVM High Temperature Status" will be raised if the system enters the ISVM High Temperature state.	The "ISVM High Temperature Status" will be cleared if the system exits the ISVM High Temperature state.													Yes	OK	OK	OK	
	System High Temperature Monitor Check C-BIT-INIT C-BIT-1	The "System High Temperature Status" will be raised if the system enters the System High Temperature state.	The "System High Temperature Status" will be cleared if the system exits the System High Temperature state.													Yes	OK	OK	OK	

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
Internal Interface Checks																				
Audio Fail	ISVM DPL Communication Check C-BIT-1	The "DSP or DPL Interface Communication Failure" will be raised if the Iridium All Off Mode is not Active and the ISVM driver reports no communication with the ISVM DPL port after three retry attempts. The ISVM driver continues to try to resume the communication.	The "DSP or DPL Interface Communication Failure" will be cleared if the ISVM driver reports communication with the ISVM DPL port.													Yes	OK	OK	OK	Transition to Degraded Operation State Voice Communications functions inoperable.
ISVM Fail	ISVM AT Communication Check C-BIT-1	The "ISVM AT Interface Communication Failure" will be raised if the Iridium All Off Mode is not Active and the ISVM driver reports no communication with the ISVM AT port after three retry attempts. The ISVM driver continues to try to resume the communication.	The "ISVM AT Interface Communication Failure" will be cleared if the ISVM driver reports communication with the ISVM AT port.													Yes	Fail	OK	Fail	Transition to Degraded Operation State – Non-Safety Services Data Communications functions inoperable.
ISDM Fail	ISDM Communication Check C-BIT-1	The "ISDM Communication Failure" will be raised if the Iridium All Off Mode is not Active and the ISDM driver reports no communication with the ISDM after three retry attempts. The ISDM driver continues to try to resume the communication.	The "ISDM Communication Failure" will be cleared if the ISDM driver reports communication with the ISDM.													Yes	Fail	OK	Fail	FWC still provisioned. Transition to Degraded Operation State – Safety Services Data function inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
Internal Interface Checks																				
SIM Card Fail	SIM Communication Check EVENT	The "SIM Communication Failure" will be raised if the system fails to read or write to the SIM card.	The "SIM Communication Failure" will be cleared if the system successfully reads and writes to the SIM card.		●	●	●	●	■	■	■	□	■	■	■	Yes	OK	Fail	Fail	Transition to Degraded Operation State – Voice Communications function inoperable
GPS Fail	GPS Communication Check C-BIT-1	The "GPS Communication Failure" will be raised if the GPS Receiver reports no communication with the GPS after three retry attempts.	The "GPS Communication Failure" will be cleared if the GPS Receiver reports communication with the GPS.		●	●	●	●	□	■	■	■	■	■	■	Yes	Fail	OK	Fail	Flight logging and reporting may be impacted. If DTP 1 interface, DTP 2 interface, and DTP 3 interface not available, transition to Degraded Operation State – Data Storage and Retrieval and Non-Safety Services Data functions inoperable

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
External Interface Checks																				
N/A	ARINC 573/717 Receive Overflow Check EVENT	The "ARINC 573/717 Receive Port Overflow Fault" will be raised if the ARINC 573/717 is configured Active and if an overflow for the port is reported by the FPGA.	The "ARINC 573/717 Receive Port Overflow Fault" will be cleared if no overflow is reported by the FPGA for the ARINC 573/717 port.													N/A	N/A	N/A	N/A	Flight logging and reporting may be impacted.
N/A	ARINC 573/717 Receive Underflow Check EVENT	The "ARINC 573/717 Receive Port Underflow Fault" will be raised if the ARINC 573/717 is configured Active and if an underflow for the port is reported by the FPGA.	The "ARINC 573/717 Receive Port Underflow Fault" will be cleared if no underflow is reported by the FPGA for the ARINC 573/717 port.													N/A	N/A	N/A	N/A	Flight logging and reporting may be impacted.
N/A	ARINC 573/717 Receive Bus Fault Check EVENT	The "ARINC 573/717 Bus Fault" will be raised if the ARINC 573/717 is configured Active and if a bus fault is reported by the FPGA.	The "ARINC 573/717 Receive Bus Fault" will be cleared if no bus fault is reported by the FPGA for the ARINC 573/717 port.													N/A	N/A	N/A	N/A	Flight logging and reporting may be impacted.
N/A	ARINC 573/717 Receiver Synchronization Check C-BIT-1	The "ARINC 573/717 Receiver Synchronization Fault" will be raised if the ARINC 573/717 is configured Active and if a loss of bit or frame synchronization for the port is reported by the FPGA.	A raised "ARINC 573/717 Receiver Synchronization Fault" will be cleared if the FPGA reports bit and frame synchronization for the port.													N/A	N/A	N/A	N/A	Flight logging and reporting may be impacted.
A717 Inactive	ARINC 573/717 Receiver Inactive Check C-BIT-1	The "ARINC 573/717 Receiver Inactive Fault" will be raised if the ARINC 573/717 is configured Active and if a loss of bit or frame synchronization for the port is reported by the FPGA for 4 seconds in a row.	A raised "ARINC 573/717 Receiver Inactive Fault" will be cleared if the FPGA reports bit and frame synchronization for the port for 4 seconds in a row.													Yes	OK	OK	OK	Flight logging and reporting may be impacted. Transition to Degraded Operation State – FDM Data Storage and Retrieval function inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions						MCDU Indicators				Comment
					System	ISYM	ISDU	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	S/M	Bite Summary	
External Interface Checks																			
N/A	ARINC 429 Receive Overflow Check EVENT	The "ARINC 429 Receiver Port Overflow Fault" will be raised for an active ARINC 429 Receiver Port if an overflow for that port is reported by the FPGA.	The "ARINC 429 Receiver Port Overflow Fault" will be cleared if no overflow is reported by the FPGA for the port for which the "ARINC 429 Receiver Port Overflow Fault" was raised.													N/A	N/A	N/A	N/A	Flight logging and reporting may be impacted.
N/A	ARINC 429 Receive Underflow Check EVENT	The "ARINC 429 Receiver Port Underflow Fault" will be raised for an active ARINC 429 Receiver Port if an underflow for that port is reported by the FPGA.	The "ARINC 429 Receiver Port Underflow Fault" will be cleared if no underflow is reported by the FPGA for the port for which the "ARINC 429 Receiver Port Underflow Fault" was raised.													N/A	N/A	N/A	N/A	Flight logging and reporting may be impacted.
A429 RXnn Inact (nn=Port Number)	ARINC 429 Receiver Port Inactive Check C_BIT_1	An "ARINC 429 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port that is configured as Generic 429 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "ARINC 429 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "ARINC 429 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	OK	Flight logging and reporting may be impacted.
ACARS1 RX Inact	ACARS 1 Receiver Port Inactive Check C_BIT_1	The "ACARS 1 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as ACARS 1 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "ACARS 1 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "ACARS 1 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	Fail	ACARS 1 inoperable. FWC still provisioned. FWC still provisioned. Flight logging and reporting may be impacted. If ACARS 2 interface not available, transition to Degraded Operation State - Safety Services Data function inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
External Interface Checks																				
ACARS2 RX Inact	ACARS 2 Receiver Port Inactive Check C_BIT_1	The "ACARS 2 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as ACARS 2 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "ACARS 2 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "ACARS 2 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	Fail	ACARS 2 inoperable. FWC still provisioned. Flight logging and reporting may be impacted If ACARS 1 interface not available, transition to Degraded Operation State – Safety Services Data function inoperable.
FMS1 RX Inact	FMS 1 Receiver Port Inactive Check C_BIT_1	The "FMS 1 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as the No. 1 DTP source has not received a recognized label with correct parity for 4 seconds in a row.	A raised "FMS 1 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "FMS 1 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	OK	Flight logging and reporting may be impacted. If DTP 2 interface, DTP 3 interface, and Internal GPS not available, transition to Degraded Operation State – Data Storage and Retrieval and Non-Safety Services Data functions inoperable.
FMS2 RX Inact	FMS 2 Receiver Port Inactive Check C_BIT_1	The "FMS 2 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as the No. 2 DTP source has not received a recognized label with correct parity for 4 seconds in a row.	A raised "FMS 2 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "FMS 2 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	OK	Flight logging and reporting may be impacted. If DTP 1 interface, DTP 3 interface, and Internal GPS not available, transition to Degraded Operation State – Data Storage and Retrieval and Non-Safety Services Data functions inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition (system error not recorded)	Clear Fault/Failure Condition (system error recorded)	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (FFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bit Summary	
External Interface Checks																				
FMS3 RX Inact	FMS 3 Receiver Port Inactive Check C-BIT-1	The "FMS 3 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as the No. 3 DTP source has not received a recognized label with correct parity for 4 seconds in a row.	A raised "FMS 3 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "FMS 3 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	OK	Flight logging and reporting may be impacted. If DTP 1 interface, DTP 2 interface, and internal GPS not available, transition to Degraded Operation State – Data Storage and Retrieval and Non-Safety Services Data functions inoperable.
MCDU1 RX Inact	MCDU 1 Receiver Port Inactive Check C-BIT-1	The "MCDU 1 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as ARINC 739 MCDU 1 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "MCDU 1 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "MCDU 1 Receiver Port Inactive Fault" was raised.													No	OK	OK	Fail	Display on MCDU 1 inoperable. If MCDU 2 interface and MCDU 3 interface not available, transition to Degraded Operation State – Control and Display and Voice Communications functions inoperable.
MCDU2 RX Inact	MCDU 2 Receiver Port Inactive Check C-BIT-1	The "MCDU 2 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured ARINC 739 MCDU 2 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "MCDU 2 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "MCDU 2 Receiver Port Inactive Fault" was raised.													No	OK	OK	Fail	Display on MCDU 2 inoperable. If MCDU 1 interface and MCDU 3 interface not available, transition to Degraded Operation State – Control and Display and Voice Communications functions inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Front Panel LEDs: Fault Light Discrete Indicator	Front Panel LEDs: System	Front Panel LEDs: ISVAI	Front Panel LEDs: ISDAI	Front Panel LEDs: GPS	System Response for Impacted Functions: Flight Monitoring and Reporting	System Response for Impacted Functions: Safety Services Data (ACARS)	System Response for Impacted Functions: Non-Safety Services Data (EFB)	System Response for Impacted Functions: Voice Communications (Audio)	System Response for Impacted Functions: MCDU and Discrete Controls	System Response for Impacted Functions: Maintenance (Web Page)	System Response for Impacted Functions: CFDS Publishing	MCDU Indicators: Operable (Yes or No)	MCDU Indicators: SDU	MCDU Indicators: SCM	MCDU Indicators: Bite Summary	Comment
External Interface Checks																				
MCDU3 RX Inact	MCDU 3 Receiver Port Inactive Check C_BIT_1	The "MCDU 3 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as ARINC 739 MCDU 3 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "MCDU 3 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "MCDU 3 Receiver Port Inactive Fault" was raised.													No	OK	OK	Fail	Display on MCDU 3 inoperable. If MCDU 1 interface and MCDU 2 interface not available, transition to Degraded Operation State – Control and Display and Voice Communications functions inoperable.
XPDR1 RX Inact	Mode S 1 Receiver Port Inactive Check C_BIT_1	The "Mode S 1 Receiver Port Inactive Status" will be raised if an ARINC 429 Receiver Port configured as Mode S 1 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "Mode S 1 Receiver Port Inactive Status" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "Mode S 1 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	OK	Flight logging and reporting may be impacted.
XPDR2 RX Inact	Mode S 2 Receiver Port Inactive Check C_BIT_1	The "Mode S 2 Receiver Port Inactive Fault" will be raised if an ARINC 429 Receiver Port configured as Mode S 2 has not received a recognized label with correct parity for 4 seconds in a row.	A raised "Mode S 2 Receiver Port Inactive Fault" will be cleared if a recognized label with correct parity is received for 4 seconds in a row over the port for which the "Mode S 2 Receiver Port Inactive Fault" was raised.													Yes	OK	OK	OK	Flight logging and reporting may be impacted.
N/A	ARINC 429 Transmit Overflow Check EVENT	The "ARINC 429 Transmit Port Overflow Fault" will be raised for an active ARINC 429 Transmitter Port if an overflow for that port is reported by the FPGA.	The "ARINC 429 Transmit Port Overflow Fault" will be cleared if no overflow is reported by the FPGA for the port for which the "ARINC 429 Transmit Port Overflow Fault" was raised.													N/A	N/A	N/A	N/A	CFDS label publishing may be inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
External Interface Checks																				
A429 TXn Fail (n=Port Number)	ARINC 429 Transmitter Port Loopback Check EVENT	An "ARINC 429 Transmitter Port Loopback Failure" will be raised if an active ARINC 429 Transmitter Port is configured as a GP Bus or CFDS and the loopback from the port is not detected.	A raised "ARINC 429 Transmitter Port Loopback Failure" will be cleared if the loopback is detected from the port for which the "ARINC 429 Transmitter Port Loopback Fault" was raised.													Yes	Fail	OK	Fail	CFDS label publishing may be inoperable. Transition to Degraded Operation State – Control and Display functions inoperable
ACARS TX Fail	ACARS Transmitter Port Loopback Check EVENT	The "ACARS Transmitter Port Loopback Failure" will be raised if an ARINC 429 Transmitter Port is configured as ACARS and the loopback from the port is not detected.	A raised "ACARS Transmitter Port Loopback Failure" will be cleared if the loopback is detected from the port for which the "ACARS Transmitter Port Loopback Failure" was raised.													Yes	Fail	OK	Fail	ACARS and FWC may be inoperable. Transition to Degraded Operation State – Safety Services Data function inoperable
ACARS Fault	ACARS Loop Test Check C-BIT-10	The "ACARS Loop Test Fault" will be raised if an ACARS Loop Test does not pass on at least one ACARS system.	A raised "ACARS Loop Test Fault" will be cleared if the ACARS Loop Test passes on at least one ACARS system.													Yes	OK	OK	Fail	ACARS may be inoperable. Transition to Degraded Operation State – Safety Services Data function inoperable
MCDU TX Fail	MCDU Transmitter Port Loopback Check EVENT	The "MCDU Transmitter Port Loopback Failure" will be raised if an ARINC 429 Transmitter Port is configured as ARINC 739 MCDU and the loopback from the port is not detected.	A raised "MCDU Transmitter Port Loopback Failure" will be cleared if the loopback is detected from the port for which the "MCDU Transmitter Port Loopback Failure" was raised.													No	Fail	OK	Fail	Display on MCDUs may be inoperable. Transition to Degraded Operation State – Control and Display and Voice Communications function inoperable

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDU	SCM	Bite Summary	
External Interface Checks																				
Serialn Fault (n=Port Number)	RS-232/422 Receive Check C-BIT-1	A "RS-232/422 Receive Fault" will be raised for any active RS-232/422 Serial Port for which a received data error is reported by the UART.	A raised "RS-232/422 Receiver Fault" will be cleared if the UART reports that data is received without error over the port for which the fault was raised.													Yes	OK	OK	OK	
Serialn Fail (n=Port Number)	RS-232/422 Transmission Loopback Check POST	The "RS-232/422 Transmission Loopback Failure" will be raised for any Active RS-232 Serial Port whose loopback is not detected after three loopback attempts.	The "RS-232/422 Transmission Loopback Failure" cannot be cleared once raised.													Yes	Fail	OK	Fail	
DOUTn Fail (n=Port Number)	Discrete Output Check C-BIT-1	A "Discrete Output Failure" will be raised for any Discrete Output Port that is Active and does not output the expected voltage.	The "Discrete Output Failure" will be cleared if the expected voltage is output from the port for which the fault was raised.													Yes	Fail	OK	Fail	Call indicators may be inoperable.
Ethernetn Fault (n=Port Number)	Ethernet Link Check C-BIT-1	The "Ethernet Link Fault" will be raised if Ethernet is Monitored and the PHY reports that there is no link.	The "Ethernet Link Fault" will be cleared if Ethernet is Monitored and the PHY reports that there is a link.													Yes	OK	OK	Fail	Access to MUI may be impacted if Ethernet inoperable.

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Fault Name	BIT Check	Raise Fault/Failure Condition *(system error not recorded)*	Clear Fault/Failure Condition *(system error recorded)*	Fault Light Discrete Indicator	Front Panel LEDs				System Response for Impacted Functions							MCDU Indicators				Comment
					System	ISVM	ISDM	GPS	Flight Monitoring and Reporting	Safety Services Data (ACARS)	Non-Safety Services Data (EFB)	Voice Communications (Audio)	MCDU and Discrete Controls	Maintenance (Web Page)	CFDS Publishing	Operable (Yes or No)	SDL	SCM	Bite Summary	
Satellite Link Checks																				
No GPS Link	GPS Link Check C-BIT-1	The "GPS Link Status" will be raised if the internal GPS is configured as Active and the GPS Receiver reports no navigation solution for 5 seconds in a row.	The "GPS Link Status" will be cleared if the GPS Receiver reports a navigation solution for 5 seconds in a row.		●	●	●	●	□	■	■	■	■	■	■	Yes	OK	OK	OK	Flight logging may not have accurate DTP. If DTP 1 interface, DTP 2 interface, and DTP 3 interface also not available, transition to Degraded Operation State – Data Storage and Retrieval and Non-Safety Services Data functions inoperable.
No ISVM Link	ISVM Link Check C-BIT-1	The "ISVM Link Status" will be raised if the AT interface to the 9523 modem indicates a signal level of 0 and/or NO SERVICE.	The "ISVM Link Status" will be cleared if the AT interface to the 9623 modem indicates a signal level greater than 0 and IN SERVICE.		●	●	●	●	■	■	□	□	■	■	■	Yes	OK	OK	OK	Transition to Degraded Operation State – Non-Safety Services Data and Voice Communications functions inoperable.
No ISDM Link	ISDM Link Check C-BIT-1	The "ISDM Link Status" will be raised if the AT interface to the 9602 modem reports a signal level of 0 and/or NO SERVICE.	The "ISDM Link Status" will be cleared if the AT interface to the 9602 modem indicates a signal level greater than 0 and IN SERVICE.		●	●	●	●	■	□	■	■	■	■	■	Yes	OK	OK	OK	FWC still provisioned. Transition to Degraded Operation State –Safety Services Data functions inoperable
No DTP Source	DTP Source Check C-BIT-1	The "DTP Source Status" will be raised if DTP 1 interface, DTP 2 interface, DTP 3 interface, and internal GPS are all not providing valid data.	The "DTP Source Status" will be cleared if at least one of DTP 1 interface, DTP 2 interface, DTP 3 interface, or internal GPS is providing valid data.		●	●	●	●	□	■	■	■	■	■	■	Yes	OK	OK	OK	

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Supplemental Documents

Document Number	Date	Description
905-E5750-63 Rev. A	10/2/14	Environmental Qualification Form – AFIRS 228S Satellite Data Unit and Satellite Control Module

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