Installation and Operations Manual

ICS-120A/220A

Iridium Communications System

Installation and Operations Manual

Document Number 710702

November 2009

International Communications Group
www.icg.aero

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ICS-120A/220A

Installation and Operations Manual

This manual covers the following part number(s):

710616-1, 710617-1

Aviation Telecommunications System
International Communications Group, Inc.
Newport News, VA 23603
CAGE Code 088F2

Printed in the United States of America.

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RECORD OF REVISIONS

REVISION	ECN #	COMMENTS/DESCRIPTION	DATE REVISED
-		New version with new P/N.	06 Jun 2008
A	2486	Modifications to Install/Antenna information, corrections and clarifications made to text, addition of the ARINC key code, and response to DR#4759 concerning USB Driver. Also new screen shots as needed.	30 Dec 2008
B	2536	Responded to DRs 4990, 4992, 4993, 4994, 5004, 5017, 5025, and 5074. Added text for new features and I/O connections as described in the Product Requirements Document for Revision 05 of the software, P/N 710500. Corrected the polarizing key diagram. Added the CIM installation information. Added installation kit part numbers. Added Troubleshooting section. Added drawings for the 2-MCU Tray Assembly .	14 April 2009
C	2738	Updated the IC-120A/220A Installation manual to reflect the software -06 update.	17 November 2009

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SERVICE BULLETIN LIST

SERVICE BULLETIN NO.	TITLE	MANUAL REVISION NO.	MANUAL REVISION DATE
635001	Service Bulletin for Upgrade of ICS-120A and ICS-220A Unit Part Numbers 710616-1 and 710617-1 to Firmware 710500-02	-	18 Jul 2008
635002	Service Bulletin for Upgrade of ICS-120A and ICS-220A Unit Part Numbers 710616-1 and 710617-1 to Firmware 710500-03	-	19 Nov 2008

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1. ABOUT THIS MANUAL

1.1 Overview

This manual presents the general instructions for installing ICG's Iridium Communications System (ICS), the ICS-120A/220A, on an aircraft. This system provides telephony, data, and Internet capabilities to the aircraft via the global Iridium network of 66 polar orbiting satellites. A special Subscriber Identity Module (SIM) smart card is required to gain access to the Iridium satellite network as well as prearranged activation through an Iridium Network Service Provider.

A separate User's Guide (P/N 710701) focuses exclusively on general operating instructions for using the ICS-120A/220A. The User's Guide also gives a basic overview of the system.

NOTE:

The material in this document may be updated at any point. Therefore, before installing the ICS Iridium Communication System, please check with ICG at www.icg.aero to determine whether revisions have been issued to all or parts of this installation manual.

This document applies to all dash-number configurations of the ICS-120A/220A:

P/N 710616-1 and 710617-1

1.2 Product Support Services

The ICS-120A/220A meets all operational and environmental standards for avionic communication devices, as indicated in the section, System Specifications. Any alteration of this product automatically voids Federal Aviation Administration (FAA) certifications. In case of any questions regarding these issues, contact International Communications Group, Inc. (ICG) at the address below.

Repair and overhaul services, replacement parts, technical documentation, and other product support services are also available from ICG.

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Customer Support at ICG also welcomes your questions and comments about, and corrections for this manual. In any correspondence, we would appreciate the publication number, equipment designations (found on the label on the ICS-120A/220A chassis), document page or figure number, and your comments. Please send or e-mail your communication to the above address.

1.3 Notices, Patches, and Updates

ICG has established an area on the corporate website (*www.icg.aero*) where clients can register to receive advance information and notifications about changes to this unit. Clients who participate will also be able to download patches or future updates as they become available.

To take advantage of this free opportunity, simply fill out the requested information at the ICG website. You may remove your name from this service at any time by contacting ICG.

NOTE:

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ICG will not sell, trade, or transfer user addresses or information to any other sources.

1.4 Related Documents

The following documents may contain further information about the ICS-120A/220A:

- *ICS-120A/220A User’s Guide, P/N 710701*
- *Declaration of Design and Performance, ICS-120A /220A,* P/N 710700
- *USB Driver Manual,* P/N 234701

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1.5 Abbreviations and Acronyms

The following abbreviations, acronyms, and symbols are used in this manual. Standard electronic terms and circuit signal names are not listed.

Table 1-1. Abbreviations and Acronyms

ACRONYM	DEFINITION
ACARS	Aircraft Communications Addressing and Reporting System
AC	Alternating Current
AOC	Aeronautical Operation Control
ARINC	Aeronautical Radio Inc.
ARTU	ARINC Radio Telecommunications Unit
ATS	Air Traffic Services
ATG	Air-to-Ground
AW	Air Worthiness
CDU	Cabin Display Unit
CIM	Configuration Identity Module
CMU	Communications Management Unit
CNG	Calling Tone
COS	Class of Service
CTU	Cabin Telephony Unit
DC	Direct Current
DISA	Direct Inward Station Access
DLM	Data Link Manager
DMU	Data Management Unit
DPL	Digital Peripheral Link
DTMF	Dual-Tone Multi-Frequency
DSP	Digital Signal Processor
E&M Signaling	Commonly referred to as "ear & mouth" or "recEive and transMit", but its origin comes from the term earth and magnet. Earth represents electrical ground and magnet represents the electromagnet used to generate tone.
ECN	Engineering Change Notice
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
GTA	Ground to Air
HF	High Frequency
ICAO	International Civil Aviation Organization

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ACRONYM	DEFINITION
ICG	International Communications Group, Inc.
ICS	Iridium Communications System
ICCID	Integrated Circuit Card Identification
IMEI	International Mobile Equipment Identity
ISU	Iridium Satellite Unit
LBT	L-Band Transceiver providing access to the Iridium network.
LED	Light-Emitting Diode
LRU	Line Replaceable Unit
mA	Milli-amperes
MCDU	Multi-Purpose Control & Display Unit
MO	Mobile Originated
MOMSN	Mobile Originated Message Sequence Number
MT	Mobile Terminated
MTMSN	Mobile Terminated Message Sequence Number
N/A	Not Applicable
NADP	North American Dialing Plan
PA	Public Address
PABX	Private Automatic Branch exchange
PBX	Private Branch Exchange
PC	Personal Computer
PCM	Pulse Code Modulation
P/N	Part Number
PIN	Personal Identification Number
POTS	Plain Old Telephone System
PTT	Push to Talk
RMA	Return Material Authorization
RIU	Radio Interface Unit
RTU	Response To Unit
RX	Receive
SATCOM	Satellite Communications
SBD	Short-Burst Data
SDU	Satellite Data Unit
SIM	Subscriber Identity Module Card

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ACRONYM	DEFINITION
SLIC	Subscriber Line Interface Connection
SMS	Short Messaging Service
SPNet	Iridium's proprietary provisioning tool for contracted business partners.
TNC	(Threaded Neill Concelman) Antenna Coaxial Cable Connector
TRS	Transceiver
TX	Transmit
USB	Universal Serial Bus
W	Watts

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2. DESCRIPTION AND SPECIFICATIONS

2.1 Overview

The ICS-120A/220A Iridium Communications Systems provide the unique capabilities of a dual-channel voice system (only on the 220A) combined with a dedicated Iridium 9601 SBD transceiver. This unique combination allows the ICS-120A/220A to support simultaneous Aircraft Communications Addressing and Reporting System (ACARS) communication links over the Iridium network as an approved secondary means of uninterrupted communication. The ICS-220A features internal hardware redundancy for ACARS communications. In the event that a persistent hardware failure is detected, the system switches the ACARS communications to a different transceiver, ensuring ACARS operation is not interrupted.

The Iridium Network provides communications globally, including the Polar Regions, without interruption of coverage. Additionally, there are sufficient ARINC 429 interfaces that support up to three ARINC 739A-compliant MCDU devices. These MCDU devices dialing and response capability allowing users to make and receive calls over the Iridium network. In all, there are three ARINC 429-compliant transmitter circuits and six receiver circuits. All these features are provided in a compact 2-MCU package for a minimal footprint in the aircraft equipment bay which can support dual SatCom installations.

The 2-MCU form factor is made possible by the marriage of Iridium transceiver technology and the proprietary system software exclusive to International Communications Group, Inc. The ICS-120A is a single Iridium channel version of the ICS-220A. The two units provide the same basic feature set and physical connectivity supporting four 2-wire POTS interfaces and two 4-wire telco interfaces. The two 4-wire interfaces are typically used to provide connectivity to the cockpit audio panel and complete the MCDU dialing architecture, but they are capable of connecting to any 4-wire interface that uses standard E&M signaling, with a simple change in the configuration attribute of the 4-wire station. In addition to the telephony interfaces, eight Input/Output (I/O) circuits are available and assignable as discrete inputs and outputs using the same configuration editor tools provided.

Figure 2-1. ICS-220A

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The ICS-120A/220A supports the ICG external SIM reader, called a CIM (Configuration Identity Module), to allow the unit to be a truly line replaceable unit (LRU).

The ICS120A/220A is fully configurable to support many, if not all, conceivable cabin/cockpit communication scenarios.

NOTE: ***Users must register with a Service Provider (SP) for access to the Iridium network. Upon customer request, ICG will ship SIM cards installed in the CIM module.***

The ICS-120A/220A provides:

- Flexibility in installation. It can be installed in an Electronics Bay (E-Bay), cabin, or other location in an aircraft.
- Subscriber audio circuit connections, four 2-wire circuits for connections of POTS Tip/Ring-type telephones or external CTU systems, and two 4-wire circuits for connections to ICG Jetphone handsets or the flight deck audio system.
- Provides: provisions for MCDU dialing using ARINC 739A-compliant devices.
- CTU features such as call transfer, extension-to-extension calling, and 3-party conferencing.
- Provides: CIM (Configuration Identity Module), an externally mounted SIM reader to allow true Line Replaceable Unit (LRU) functionality.
- One serial data port for data transmissions.
- 3 Transmit and 6 Receive ARINC 429 interfaces.

The ICS-120A/220A enables communication functions on the ground or in flight, as long as the aircraft has an unobstructed view of the sky 360° and 8° above the horizon.

The ICS-120A/220A system is functionally divided into the following standard components:

- Iridium Communications System the ICS-120A or 220A.
- Installation Kit consisting of an ARINC 2-MCU tray and connector, Iridium antennas, and coaxial antenna interface cables.
- External SIM Reader/Configuration Storage device (CIM).

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2.2 Features

The ICS-120A/220A units have the following configurable features:

Table 2-1. ICS-120A/220A PBX Features

FEATURE	MCDU	2-WIRE STATION	4-WIRE STATION
Voice Prompts	√	√	√
Station-to-Station	X	√	√
3-Party Conference	N/A	√	√
Call Transfer	N/A	√	√
No Ring on Flaps	√	√	√
Credit Card	√	√	√
Credit Card PIN Dial-Around	√	√	√
PIN Restricted	√	√	√
Mode of Operation	Voice Only	Voice Only	Voice Only
Executive Override	√	√	√
Ring Down	N/A	√	√
White-list Only	√	√	√

Table 2-2. ICS-120A/220A Trunk Features

FEATURE	IRIDIUM TRUNK	4-WIRE TRUNK
Voice Prompts	√	√
DISA	√	√
Blind Dial	N/A	√
Echo Cancellation	√	N/A

Table 2-3. ICS-120A/220A External/Internal Interface Features

FEATURE	INTERFACE
I/O Support (8/8)	External
2-Wire POTS (4)	External
4-Wire POTS (2) w/E&M signaling	External
Configurable 3-Wire/9-Wire interface	External
ARINC 429 Interface (3 TX and 6 RX)	External
USB Port to monitor system operation, view/edit system configuration, and update system firmware	External
LBT Voice/Data 9255A: ICS-120A (1), ICS-220A (2)	Internal
SBD Modem 9601 (1)	Internal

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2.2.1 The Iridium Communication System (ICS)

The chassis is the ICG standard 2-MCU aeronautical enclosure with ARINC 600 Size-1 chassis connector. The ICS-120A/220A is mounted into the 2-MCU tray assembly, making the ICS-120A/220A a Line Replaceable Unit (LRU), and facilitating easy installation or removal. The ARINC 600 connector provides all connections, including power, data, audio, and antenna.

The Universal Serial Bus (USB) port on the front panel can be used to configure and program the unit. Specifications and dimensions of the system follow.

ICS-120A/220A COMPONENTS:

- A3LA-SA Iridium transceiver (ICS-120A – one transceiver / ICS-220A – two transceivers)
- 9601 SBD Transceiver
- ICG CTU main board with standard telephony interfaces
- Power supply

2-WIRE COMMUNICATION CIRCUITS (2/4)

• Loop Battery	48 VDC
• Ring Signal	20 Hz >40 VAC RMS
• Impedance	600 Ohms
• Audio Band Pass	300–3400 Hz
• Polarity Sensitivity	None

4-WIRE COMMUNICATION CIRCUITS (1/2)

• Transmit (TX) Audio (Microphone) Pair	600 Ohms
• Receive (RX) Audio (Earpiece) Pair	600 Ohms
• Discrete Hook Signal	+5 VDC (Optically Isolated)
• Discrete Ring Signal	Active Ground (Relay Isolated)
• Audio Band Pass	300–3400 Hz

OPERATIONAL FEATURES

- Digital Echo Suppression (not an optional feature)
- Fixed Gain Audio Level Adjustments
- Three-Party Conferencing
- Intercom Calling with Call Transfer
- Serial Data Capabilities up to 2400 bps
- CIM (Configuration Identity Module): an externally mounted SIM card reader and configuration storage module

OPTIONAL FEATURES

- Voice and data Encryption Capability

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2.2.1.1 The Iridium Transceiver

The ICS-120A/220A Iridium Communications Systems utilize the Iridium Slimline Iridium Transceiver module. This device is the latest model and supports both voice and low-rate (2400-bps) data communications. Specifications on the NAL Transceiver and the Iridium network follow:

Interface Connection: DPL Bus, ICS-120A as Intelligent Peripheral

Table 2-4. Operational Parameters

Frequency Range	1616–1626.5 MHz
Duplexing Method	TDD (Time Domain Duplex)
Oscillator Stability	±1.5 P/m
Input/Output Impedance	50 Ohm
Multiplexing Method	TDMA/FDMA
Average Power during transmit Slot	7 W (Maximum)
Average Power during a frame	0.6 W (Typical)
Receiver Sensitivity at 50 W	–118.5 dB/m
Receiver Spurious Rejection at Offsets >1 MHz	60 dB

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2.2.1.2 Communication Interfaces

The ICS-120A/220A provides up to four 2-wire connections for telephone handsets or CTU systems and up to two 4-wire audio connections or CTU systems with associated discrete “hook” and “incoming-ring” signals. The ICS units use a Subscriber Line Interface Connection (SLIC) to connect the 2-wire devices. The SLIC provides 48 VDC of loop battery to power the telephone circuits and a high-voltage ring signal to permit the handsets to ring.

A conventional telephone circuit removes the concern about cable distances and noise when planning the layout of the handsets in the aircraft cabin.

The device’s internal circuits convert the analog audio signals on the 2-wire or 4-wire audio circuits to a standard Pulse Code Modulation (PCM) digital format and provide connection to the Iridium transceivers.

Under microprocessor control, the ICS-120A/220A communicates with the Iridium transceiver and network as it provides conventional telephony operations.

The unit also incorporates audio signal processing using a Digital Signal Processor (DSP) that provides local dial tone and other telephony progress tones as well as such features as conferencing, audio-level adjustments, and digital echo suppression.

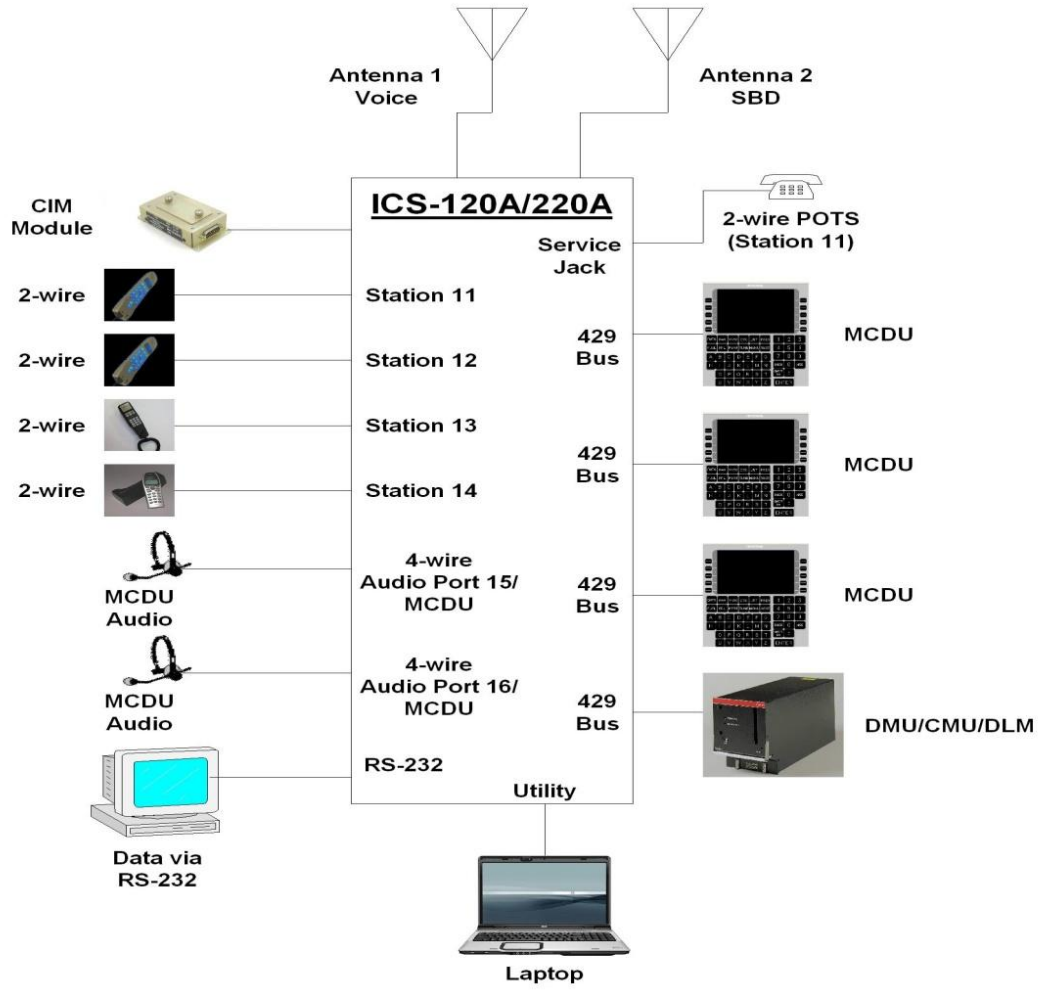

Figure 2-2. ICS-120A/220A Interfaces

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2.2.1.3 Service Jack

The Service Jack located on the front of the ICS-120A/220A can be used to test and troubleshoot the unit. The Service Jack has a 2-wire POTS interface and is paralleled internally to extension 11. The Service Jack is used primarily to verify dial tone, making Station-to-station, GTA, and ATG calls.

2.2.2 Installation Hardware

Installation parts can be obtained from ICG to support the ICS-120A/220A. See Table 2-5 for all the required installation hardware.

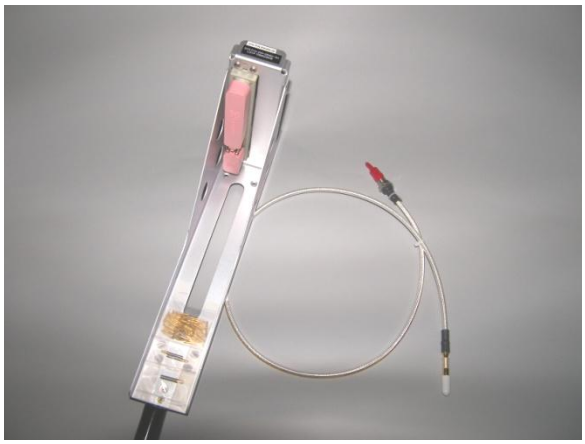

Figure 2-3. Typical ICS-120A/220A Installation Parts

Please contact your ICG sales representative for more details.

Table 2-5. Typical ICS-120A/220A Installation Parts

DESCRIPTION	ICG P/N
2-MCU Tray	935200-00
External coax assembly, 1 meter pigtail	500371
ARINC Connector, size 1, mating pins	500332
External SIM Card Reader w/ Configuration Storage (CIM)	327000
CIM Interface Cable	327383

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2.2.2.1 ARINC Pins

The ICS-120A/220A is shipped with all the nessesary pins required for the ARINC block, including:

- 120 size 22 crimp pin contacts
- 2 size 16 crimp socket contacts
- 1 size 12 crimp socket

The ARINC Pins conform to the following tables. See Figures 2-28 to 2-30 for more detailed information.

	WIRE SIZE		
Pin Size	**AWG**	**Insulation Diameter Max(in inches)**	**Strip Length (in inches)**
2222 (Green)	26 24 22	.054 (1.4)	.130/.110
1616 (Blue)	20 18 16	.106 (2.6)	.207/.203 (6.9)/(5.8)
1212 (Yellow)	14 12	.135 (3.4)	.207/.203 (6.9)/(5.8)

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2.3 Iridium Transceiver Antenna Specifications

Two standard antenna configurations are suggested possibilities for the ICS-120A/220A. The antenna can be either a dual-element antenna such as the model pictured below from Sensor Systems, or two antennas such as the model pictured below from Comant. Mounted on the top of an airframe, the antennas provide minimal drag and surface area while providing a high level of performance. ICG offers various antenna options, including blade-style antennas that provide superior low-elevation-angle performance. Consult ICG for the best choice of antenna for a particular installation.

Sensor Systems Antenna

Comant Comdat Antenna

Figure 2-4. ICS-120A/220A Antenna Kits

Figure 2-5. Antenna Cable

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Table 2-6. Suggested Antenna Models

MFR	MFR P/N	ICG P/N	DESCRIPTION
Sensor Systems	S67-1575-165	500644-3	Dual-element Iridium antenna (Iridium/Data)
Sensor Systems	S-67-1575-109	500644	Single-element Iridium antenna (Iridium/Data)
Comant	CL490-1	500644-1	Single-element Iridium antenna

NOTE: ***The ICS-220A will require two P/N 500644(s) or two P/N 500644-1(s) to operate correctly.***

Table 2-7. Suggested Antenna Cable Configuration

MFR	MFR P/N	ICG P/N	DESCRIPTION
ECS	500-18037-01	214175	Cable, coax, Iridium low-loss, 50', TNC-M 90 to TNC-M 180 (non term)

NOTE: ***Under no circumstances shall the coaxial cable loss exceed 3dB***

2.3.1.1 Band Pass Filter

If the aircraft also has an Inmarsat Aero SATCOM terminal co-resident with an ICS-120A/220A, an optional Iridium band pass filter (model 6FVSP-1622.375/X8.25-TP/T, ICG P/N 500918) should be installed to reduce opportunities for interference between the Inmarsat SATCOM and the Iridium system. Tests have shown that when the Inmarsat Aero terminal is transmitting, the Iridium receiver may be saturated with the Inmarsat higher-power signals, impairing ICS-120A/220A operation and communications. This is typically evident when the Iridium antenna is in a direct line with the Inmarsat Aero antenna's transmission beam to the Inmarsat satellite. Although this event is highly unlikely, any active communications on the Iridium system will be impaired. There is no evident interference between the Iridium system and the Inmarsat system when the Iridium system is in transmission mode.

NOTE: ***The filter is not required if an Inmarsat Aero SATCOM is not present. Location of the Iridium antenna may be adjusted to minimize the effect of the Inmarsat transmitter.***

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2.4 Fits, Clearances, and Other Particulars

Table 2-8. Fits, Clearances, and other Particulars for the ICS-120A/220A

Electrical Specifications	
Prime Power	12–36 VDC, 28 VDC NOMINAL
Power Consumption (MAX)	28 Watts +/- 2% at 28 VDC
Surge: ICS-120A ICS-220A	 0.8 A [typ] 2.0 A [surge <100 mSec] 1.1 A[typ] 4.0 A[surge <100 mSec]
Recommended Circuit Breaker	5.0 Amps
Mechanical Specifications	
Weight: 120A 220A	 5.9 lb (2.7kg) 6.8 lb (3.1kg)
Length	15.97 in. (40.56 cm)
Height	7.6 in. (19.3 cm)
Width	2.33 in. (5.92 cm)
Finish	Chemical film per MIL-C-5541, class 3, Paint: Sherwin-Williams Polane LG, Polyurethane Black
2-MCU Tray	
Weight	2.0 lbs (0.909 kg) (Approx.)
Height	7.25 in. (18.42 cm)
Width	2.39 in. (6.07 cm)
Length	14.92 in. (37.90 cm) short tray
Front Panel Connector	
Programming port	USB type B connector
Back Panel Connector	
Power, audio, and antenna connectors	ARINC 600 Size 1
Environmental Specifications	
Temperature	-20°C to +55°C (–4°F to +131°F)
Altitude	50,000 ft. (15,240 m)
Vibration	DO-160E Category S
EMI/RFI	DO-160E Category M
External Card Reader (CIM) Specifications	
Weight	5.5 oz
Height	1.34 in. (34.06 mm)
Length	4.88 in. (123.83 mm)
Width	2.50 in. (63.50 mm)
Finish	MIL-C-5541C3, Yellow

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2.5 Software

The ICS-120A/220A employs ICG-exclusive software to control and monitor performance as well as to enable all user features. Users are encouraged to register with ICG for updates, including future updates to the system firmware.

For information on viewing and editing the system configuration, see Section 9: Configuring the System. For information on the system firmware updating procedure, refer to Section 7: Upgrading the Firmware and Configuration File.

(See Section 1 for instructions on how to register for future communications from ICG Sales and/or Technical Support staff.)

2.6 Drawings and Diagrams

The table below lists the ICG drawings and diagrams included in this section.

FIGURE NUMBER(S)	DESCRIPTION	DRAWING NUMBER
2-6 and 2-7	Top-level Drawings and Diagrams	710616-1/710617-1
2-8	Installation Hardware Drawing	710620-
2-9	2-MCU Tray Detailed Assembly	935200-00A
2-10 and 2-11	Sensor Systems Dual Iridium Antenna	500644-3
2-12 and 2-13	Comant COMDAT Single-Element Iridium Antenna	500644-1
2-14	Single-Element Antenna with Cables Attached	N/A
2-15	Dual-Element Antenna with Cables Attached	N/A
2-16	ARINC Polarized Key Codes	500725E
2-17	CIM Assembly	327800-
2-18	CIM Chassis	327200-
2-19 through 2-21	CIM External Wiring Diagram	327381C
2-22 through 2-23	CIM Interface Cable	327383B
2-24	ARINC 600 Block	501513
2-25	Size 22 Crimp Removable Pin Contact	N/A
2-26	Size 16 Crimp Removable Socket Contact	N/A
2-27	Size 12 Crimp Removable Socket Contact	N/A

Note: Dimensions are in inches, followed by [milimeters].

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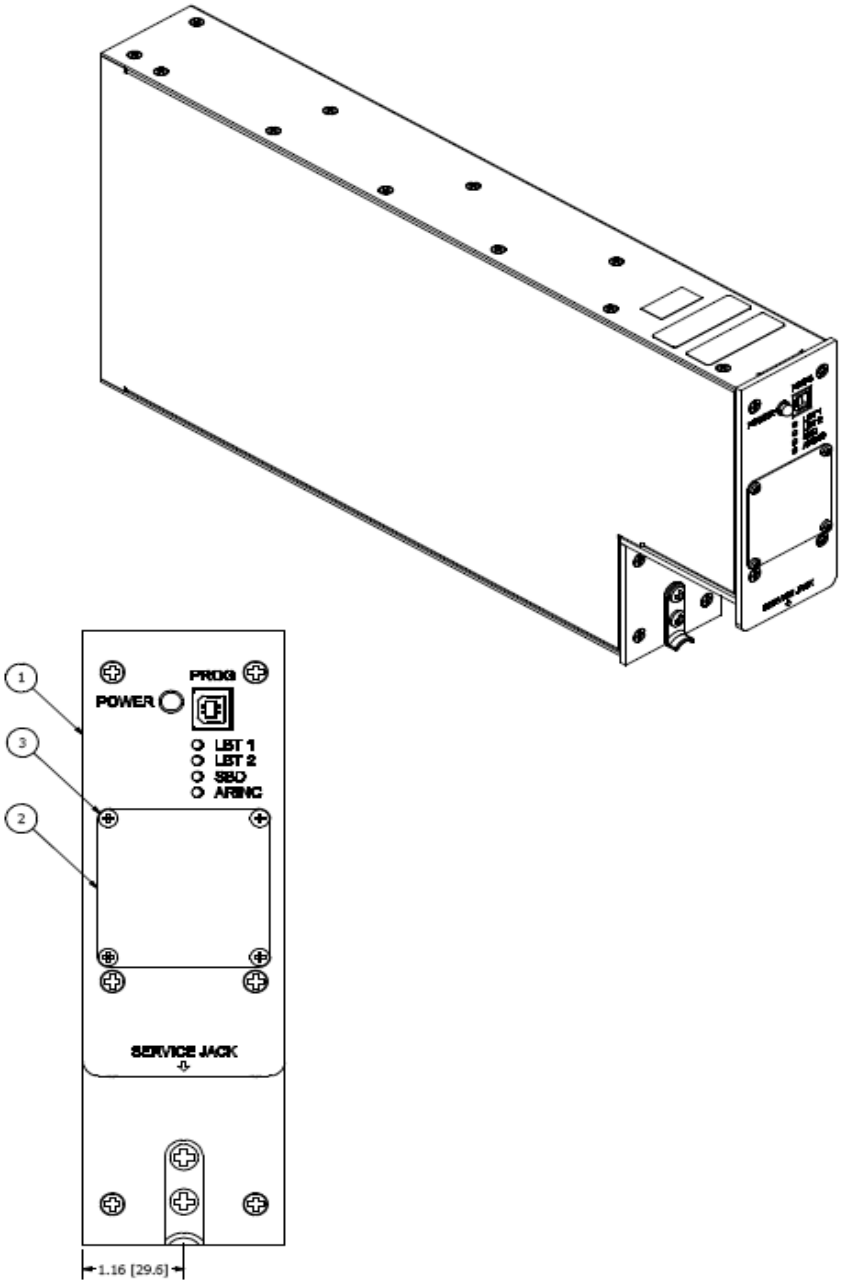

PARTS LIST				
ITEM	QTY	ICS-120A P/N	ICS-220A P/N	DESCRIPTION
3	4	501026	501026	SCREW, 4-40 X 1/8 PH
2	1	710401	710402	SERIAL PLATE
1	1	710801	710802	ASSEMBLY

Figure 2-6. ICS-120A/220A Top-Level Drawings – Part 1 of 2

Note: Dimensions are in inches, followed by [milimeters].

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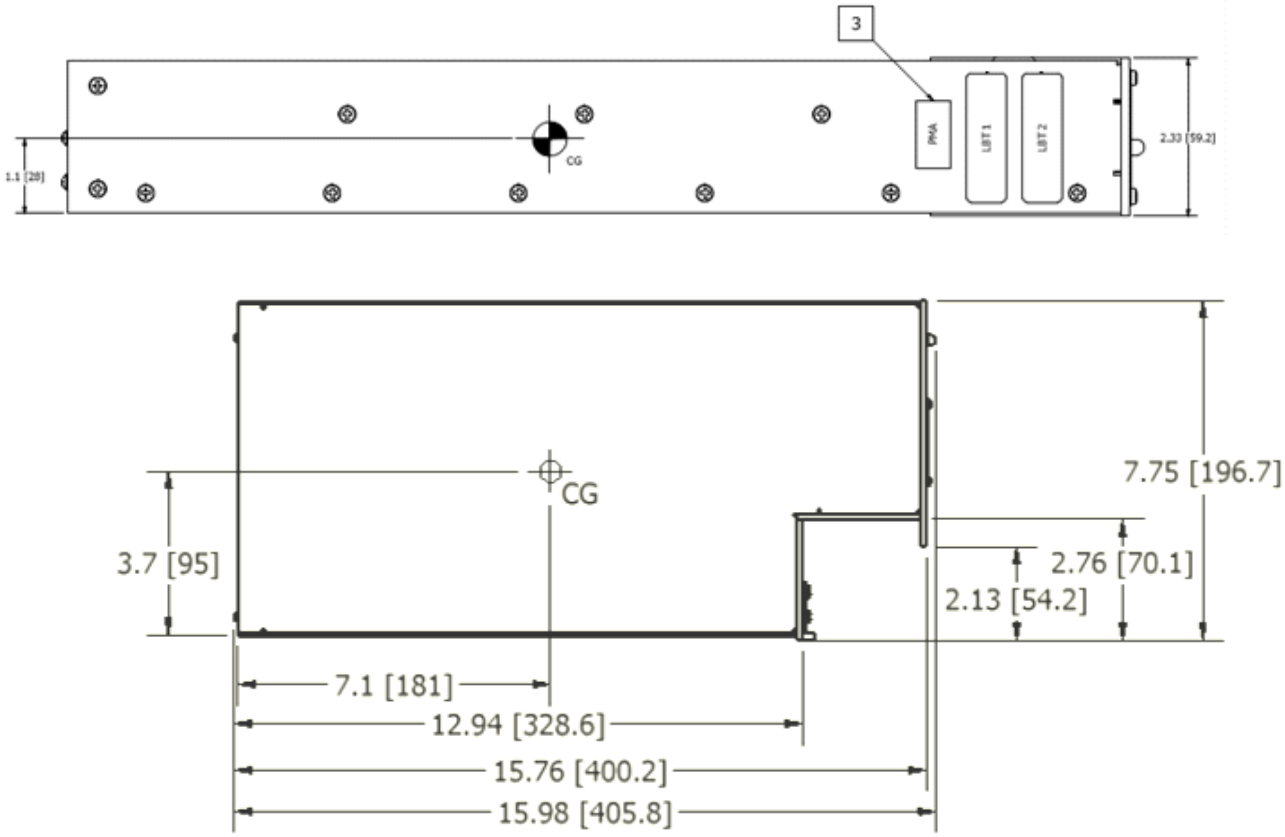

Notes:
1. ICS-120A: 5.9 lb (2.7kg) MAX, ICS-220A: 6.8 lb (3.1kg) MAX.
2. Refer to DDP 710700 for power requirements and qualification test results.
3. PMA label location (as required)

Figure 2-7. ICS-120A/220A Top-Level Drawings – Part 2 of 2

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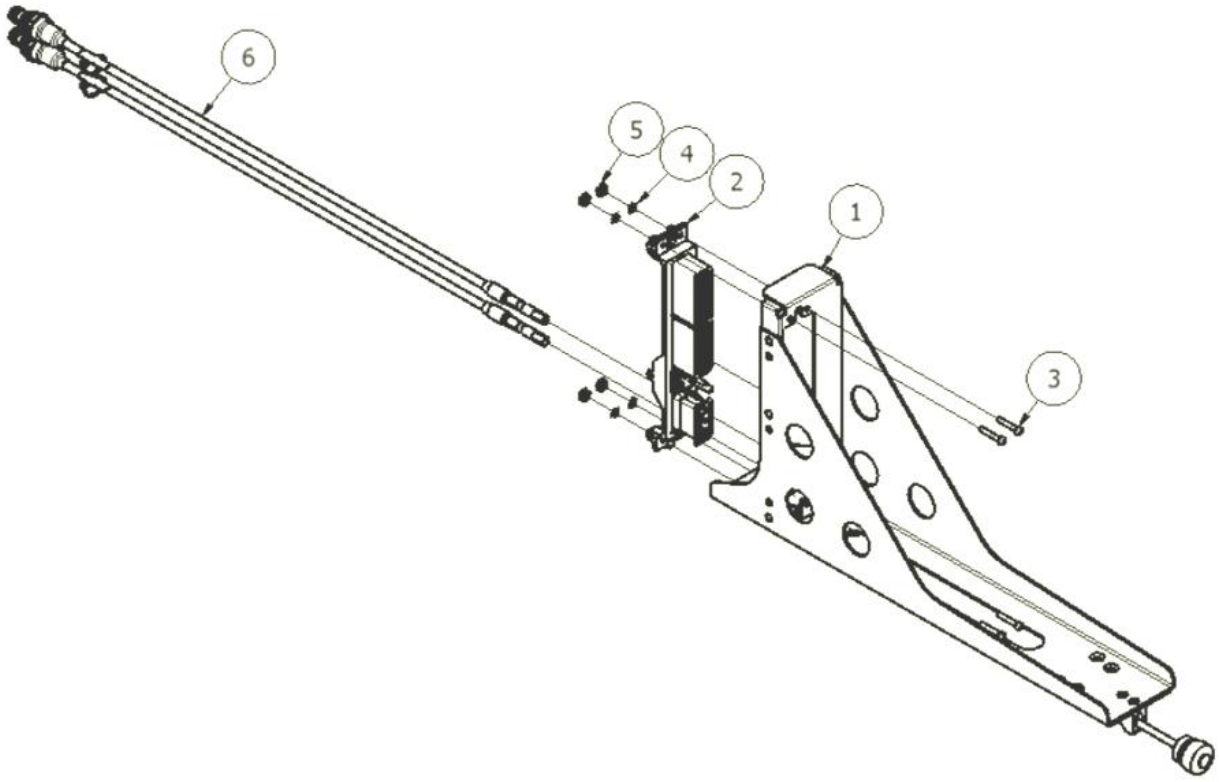

Height 7.25 in. (18.42 cm)
Width 2.39 in. (6.07 cm)
Length 14.92 in. (37.90 cm)
2.44 in. (6.20 cm) thumbscrew holddown
Weight 2.0lbs (0.91kg) MAX

ITEM	DESCRIPTION
1	2-MCU Tray (P/N 710620)
2	ARINC Size 1 Connector, Mating with Pins
3	Screw, 6-32 x ¾" Pan Head
4	Washer, Lock #6
5	Nut, 6-32
6	Cable, Coax External, 1m

Figure 2-8. 2-MCU Installation Tray Assembly

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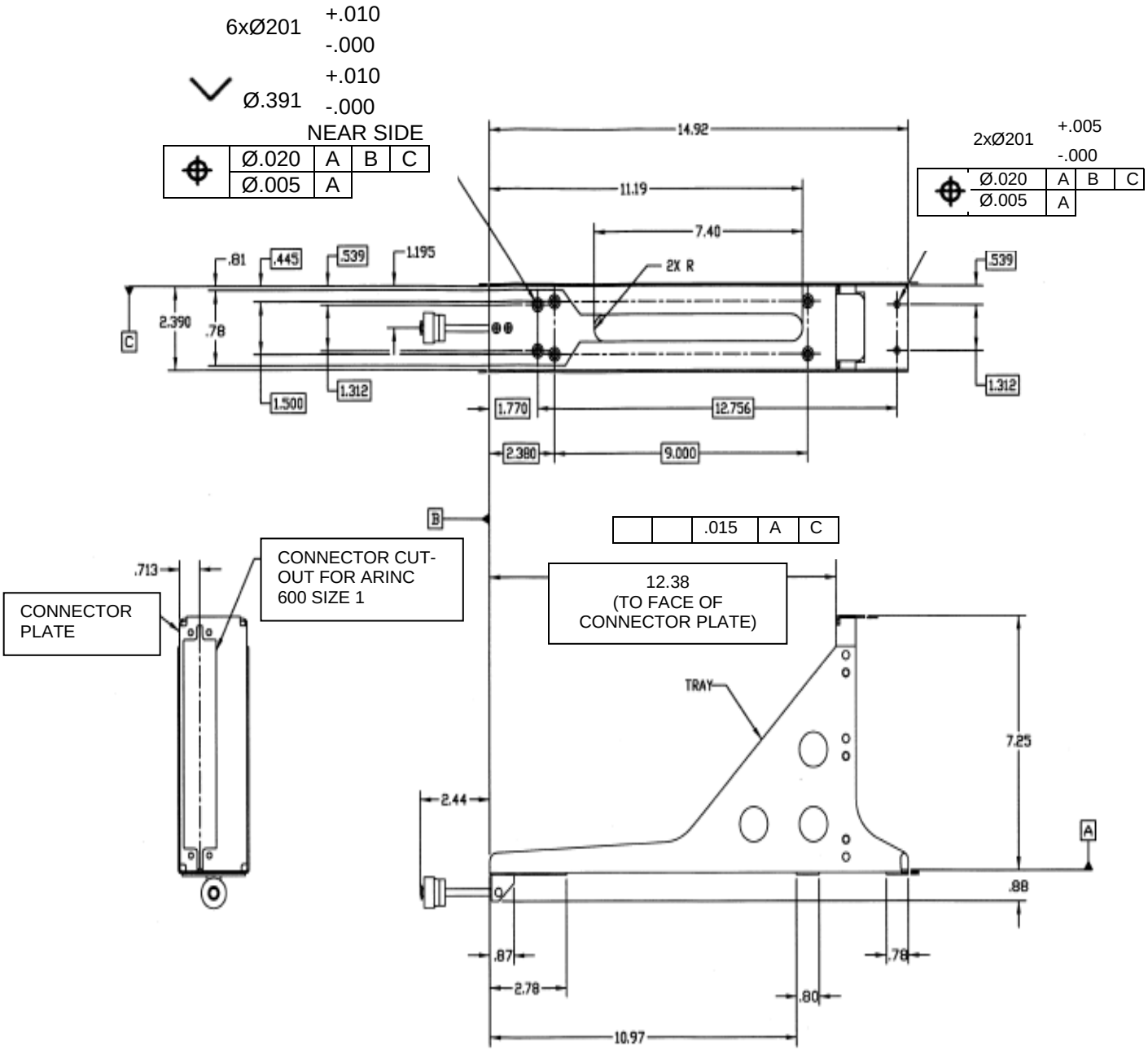

Figure 2-9.. 2-MCU Tray Detailed Assembly

NOTES:

1. DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
2. DESIGNED TO MEET THE APPLICABLE REQUIREMENTS OF THE FOLLOWING:
   a. ARINC 600-12: 2 MCU
      i. EXCEPTIONS AND LIMITATIONS TO ARINC 600: NON-ARINC CONNECTOR CUT OUT LOCATION
   b. RTCA/DO-160D ENV. CAT[(A2)-]BAB[S(B2)]XXXXXXXXXXXXXXXXX
3. TRAY AND CONNECTOR PLATE FINISH: CLEAR CHEM FILM PER MIL-C-5541, CLASS 3.

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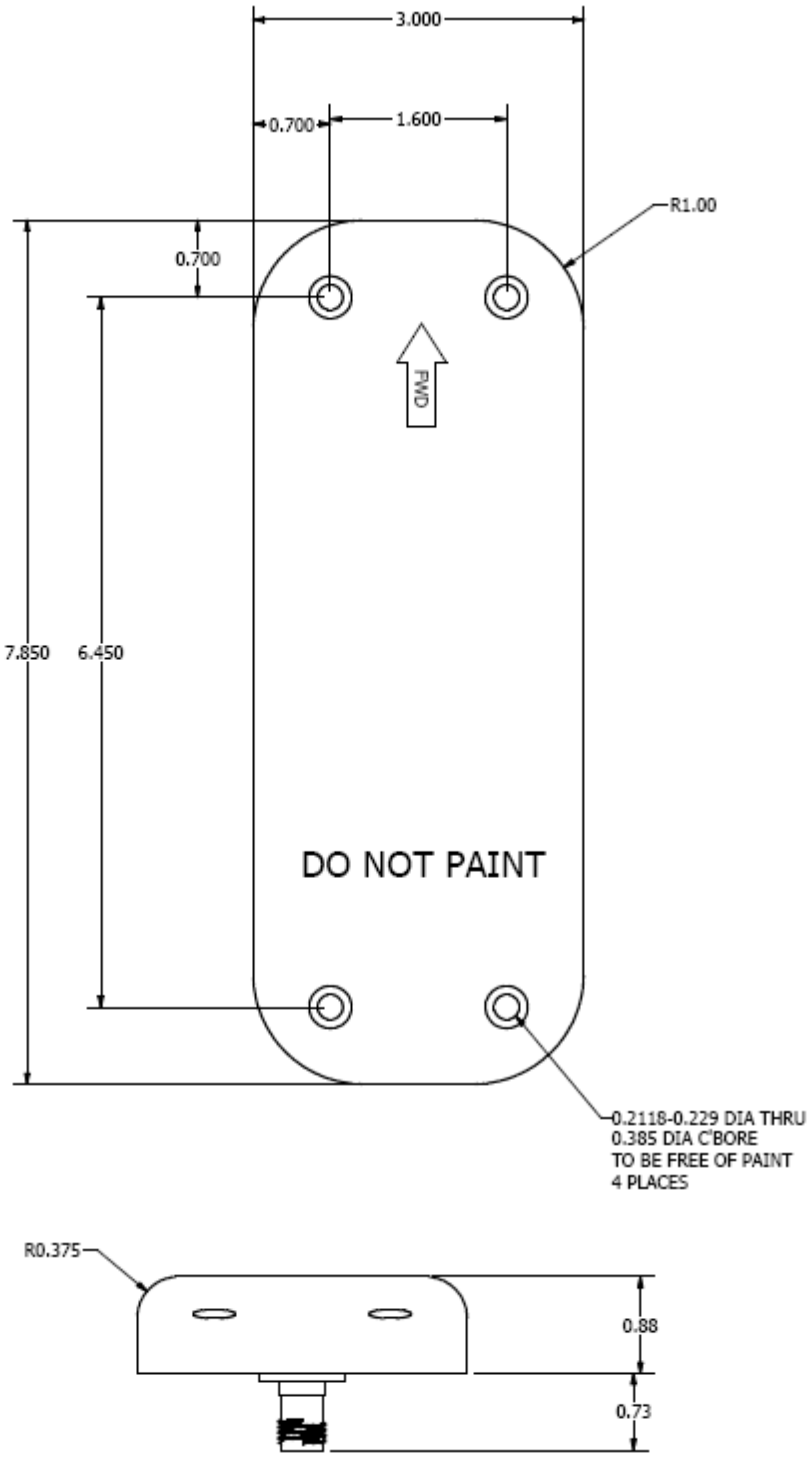

Figure 2-10. Sensor Systems Dual-Element Iridium Antenna – Part 1 of 2

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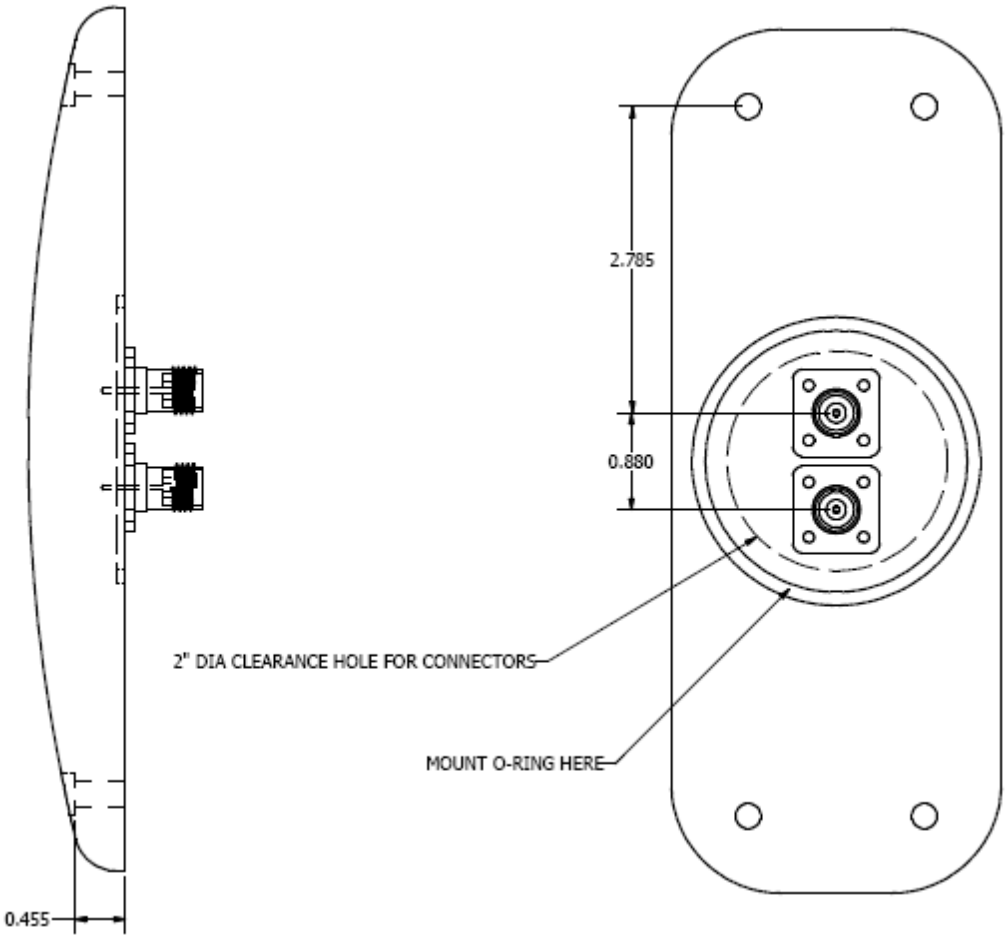

SPECIFICATIONS

ELECTRICAL

FREQUENCY
- J1 RX/TX.....1610-1626 MHZ
- J2 RX/TX.....1530-1660.5 MHZ

VSWR..... 2.0:1

POLARIZATION.....RHCP

IMPEDANCE.....50 OHMS

POWER HANDLING
- J1 RX/TX.....60 WATTS
- J2 RX/TX.....60 WATTS

GAIN.....+3 dBi

LIGHTNING PROTECTION...DC GROUND

MECHANICAL
- WEIGHT.....16oz
- HEIGHT..... 0.88in
- LENGTH..... 7.85in
- WIDTH..... 3.0in
- MATERIAL..... 6061-T6 ALUMINUM
- FINISH.....SKYDROL RESISTANT ENAMEL
- CONNECTORS.....TNC FEMALE (2)

ENVIRONMENTAL
- TEMPERATURE.....-55C TO +85 C
- VIBRATION.....10 G'S
- ALTITUDE.....55000 ft

Figure 2-11. Sensor Systems Dual-Element Iridium/GPS Antenna – Part 2 of 2

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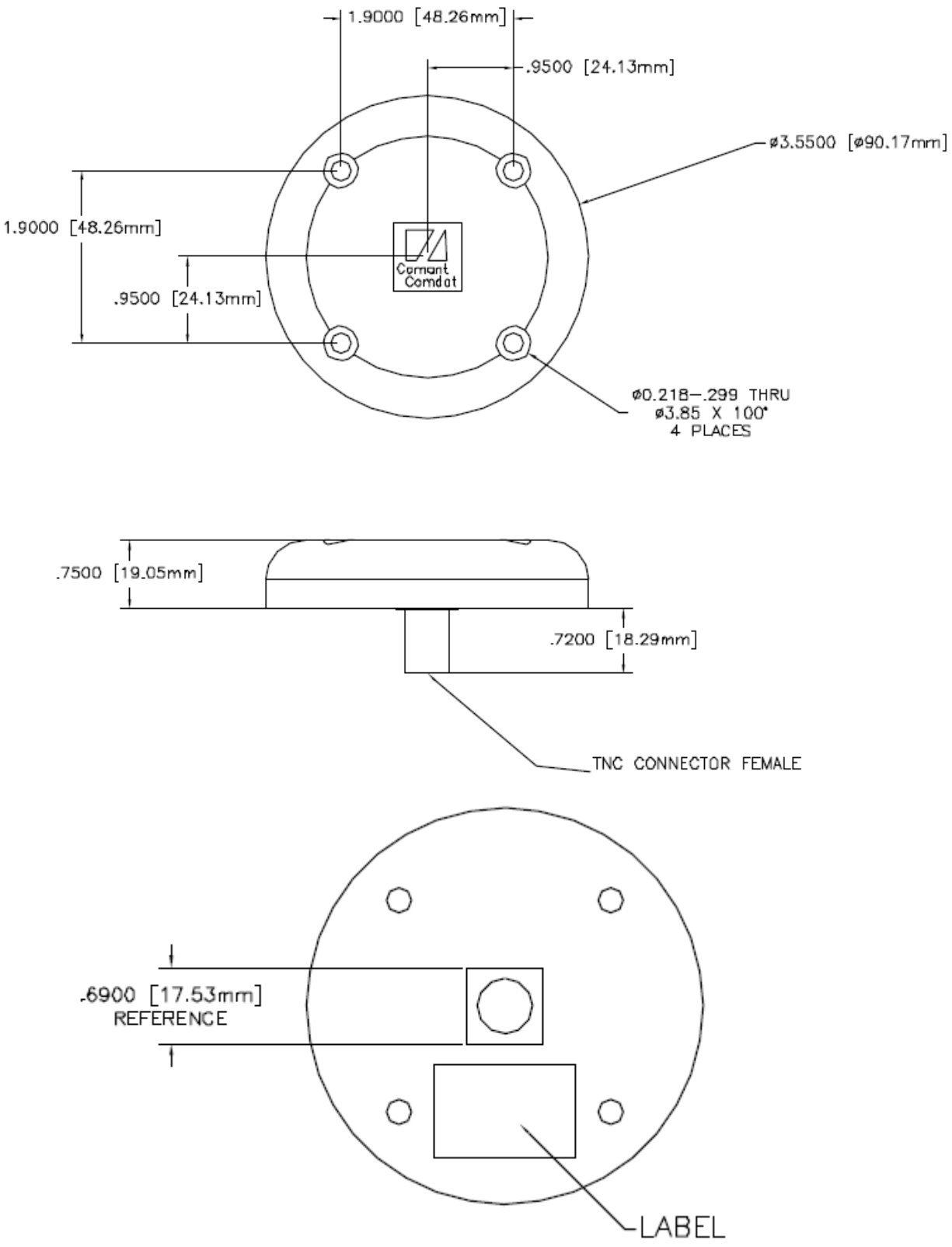

Figure 2-12. Comant Single-Element Iridium Antenna – Part 1 of 2

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OEM: COMANT INDUSTRIES, INC.
PART #: CI490-1. PART NAME: COMDAT IRIDIUM / GPS ANTENNA

1. RF Characteristics

Frequency:	GPS: 1575 ±10 MHz Iridium: 1616 -1626.5 MHz
VSWR:	1.5:1 MAX
R/L:	-14.0db MAX
Polarization:	Right Hand Circular
Radiation Pattern:	Hemispherical
Impedance:	50 OHMS
Gain:	Less than or equal to 3.0dBic @ Zenith
Power Handling:	60 W
Lightning Protection:	DC Grounded

2. Weight 0.5lbs

3. Speed Rating 600 Knots @ 55,000 Ft

4. Finish Gloss white paint
Mounting surface, mounting holes and connector are free of paint

5. TSO C144

6. RTCA DO-160D ENV. CAT.:[F2X]ABC[T(E,E1,P)] XRFDXSXXXXX[XX]X[XXXX]XCX

7. Clearance holes: ø15/64 for mounting screws and ø1.00 for connector installation

8. A49011 Installation instructions supplied with antenna

Figure 2-13. Comant Single-Element Iridium Antenna – Part 2 of 2

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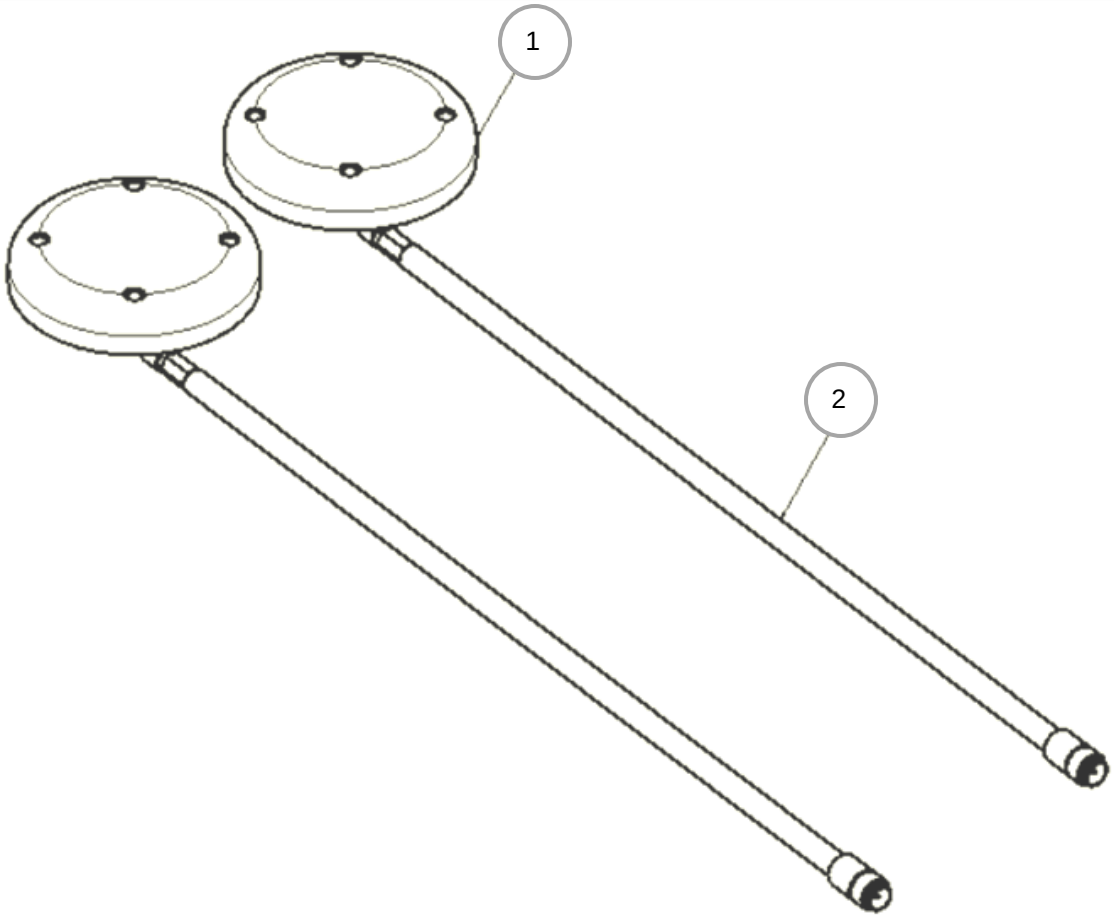

ITEM PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	500644-1	COMANT COMDAT SIGNLE-ELEMENT IRIDIUM
2	2	214175	COAX CABLE, 50 OHM

Figure 2-14. Single-Element Iridium Antennas with Cables Attached

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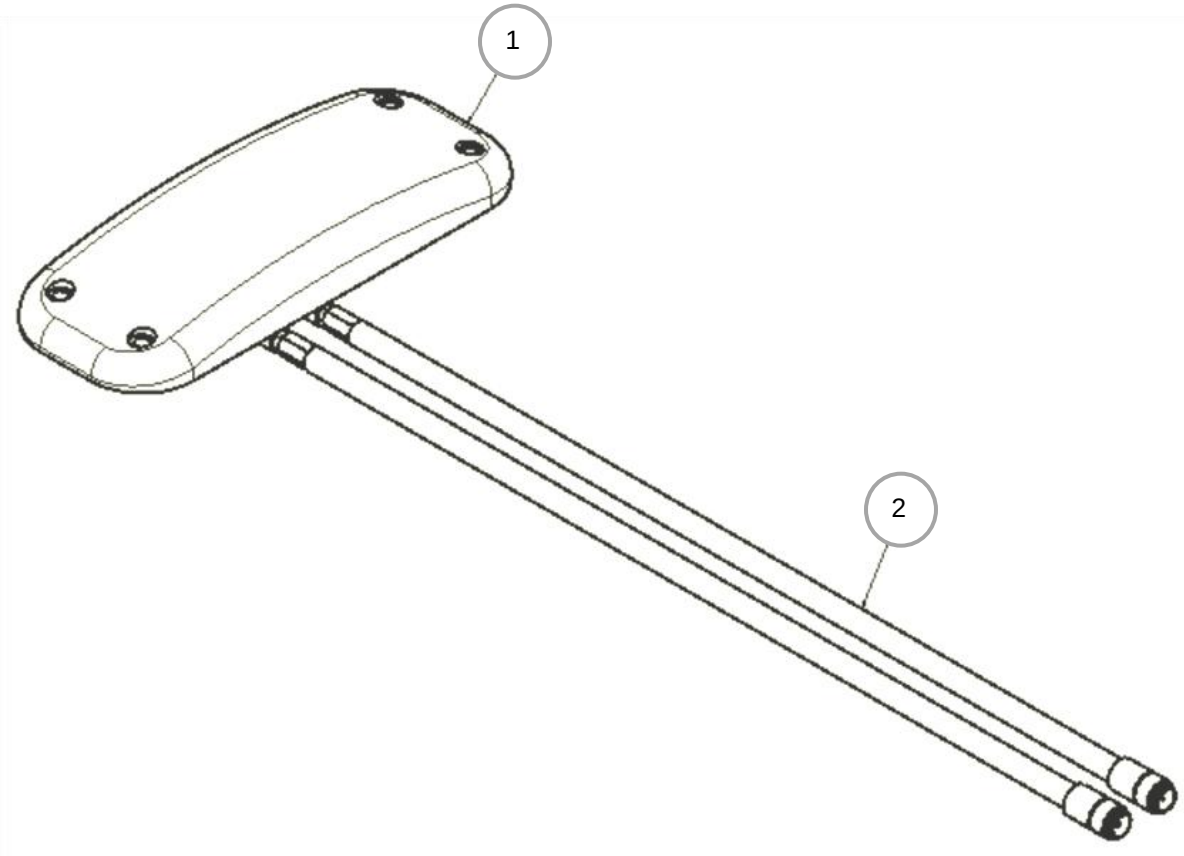

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	500644-3	SENSOR SYSTEMS DUAL-ELEMENT IRIDIUM
2	2	214175	COAX CABLE, 50 OHM

Figure 2-15. Dual-Element Iridium Antenna with Cables Attached

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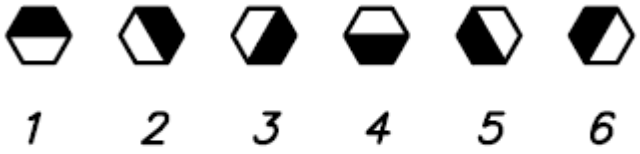
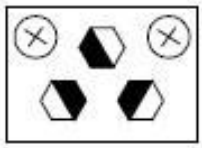


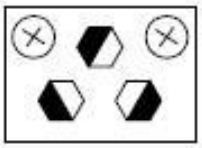
DARK AREA REPRESENTS POST

ICS 120A / 220A 28VDC

KEY # 209
ICS 120A/220A
IRIDIUM TRANSCEIVER
UNIT



POST # 209
ICS 120A/220A
IRIDIUM TRANSCEIVER
TRAY



NOTE:

THE UNIT AND THE TRAY DIAGRAMS LOOK THE SAME. THE UNIT RECEIVES THE KEY (HOLE) AND THE TRAY RECEIVES THE POSTS. PLEASE NOTE EACH POST FITS INTO A HOLE. IN THE CASE OF THE UNIT THE KEY IS FITTED SO THE MATING POST WILL ALIGN WITH THE CORESPONDING KEY.

Figure 2-16. ARINC Polarized Key Codes

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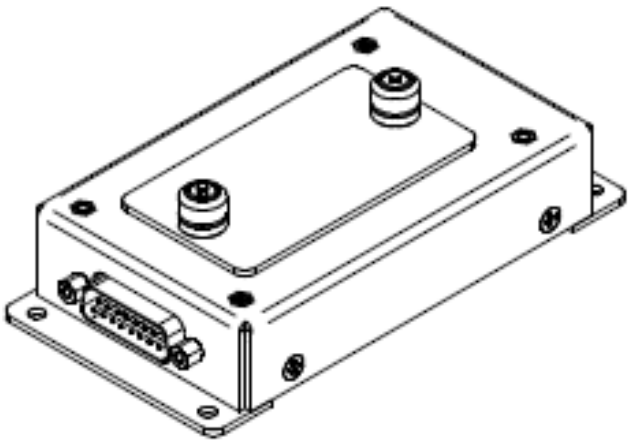

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	327200	CHASSIS
2	1	327201	BOTTOM PLATE
3	1	327203	COVER PLATE ASSEMBLY
4	1	327001	PCB ASSEMBLY
5	4	501055	WASHER, FLAT #4
6	4	500928	WASHER, SPLIT LOCK #4
7	4	500151	SCREW, 4-40 X ¼ PH
8	4	500316	SCREW, 4-40 X ¼" FH BLACK
9	1	327205	FOAM INSULATOR
10	2	500423	SCREW, JACK 4-40 X ¼

Figure 2-17. CIM Assembly

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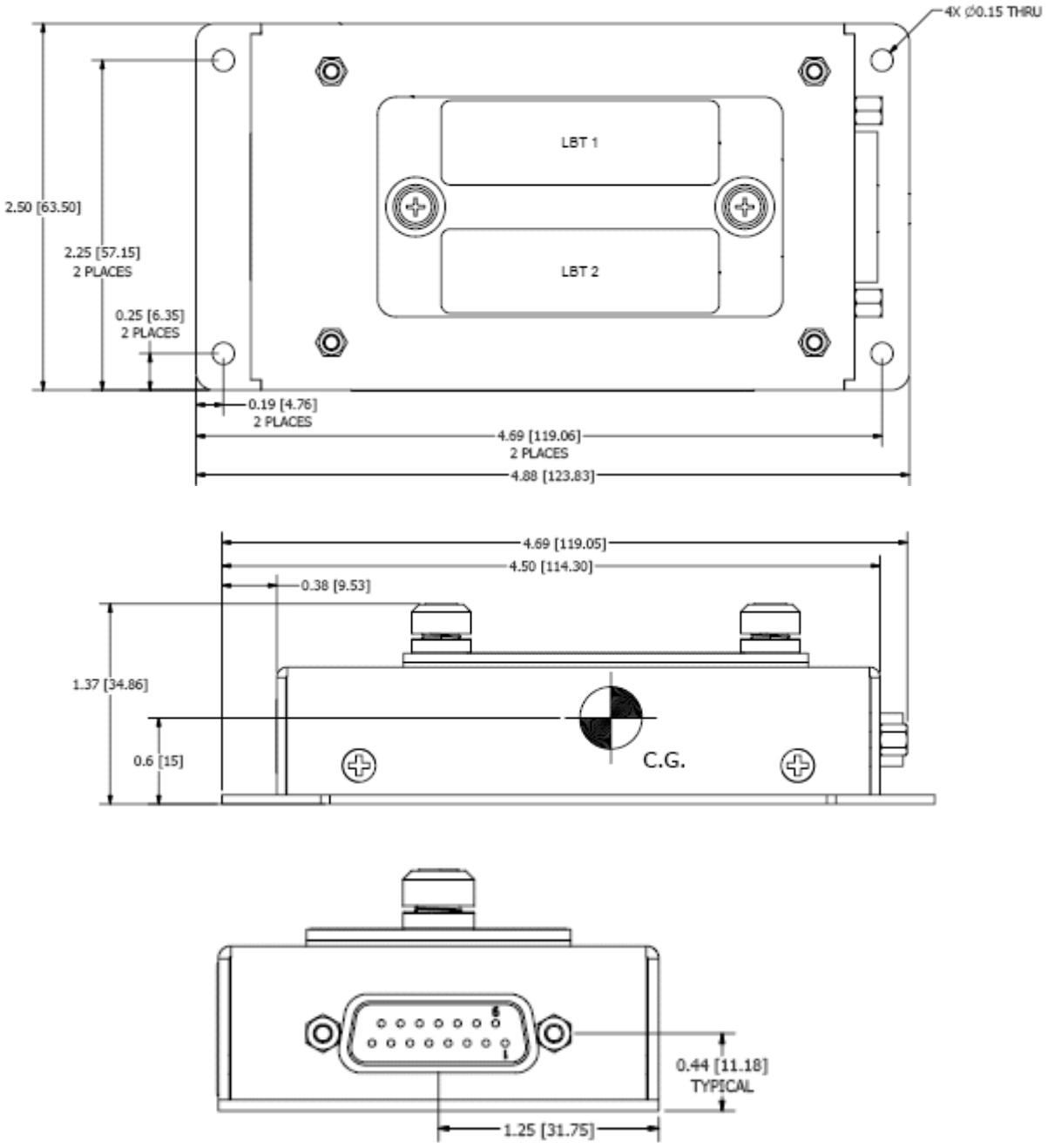

Figure 2-18. CIM Chassis

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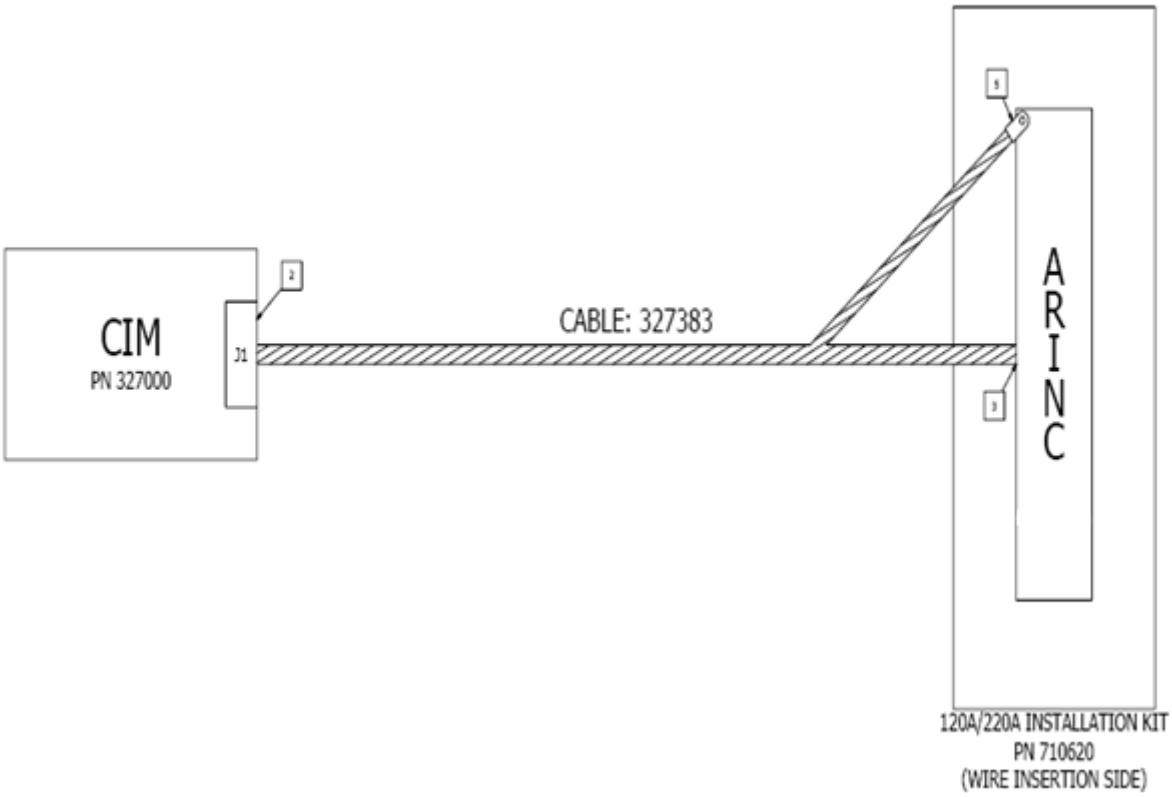

NOTES:

1. DB-15 CONNECTOR (J1) TERMINATES TO CIM MODULE.
2. REFER TO LABELS PLACED ON CABLING FOR INSTALLING ARINC PINS INTO ARINC CONNECTOR.
3. RING TERMINAL IS TO BE INSTALLED ONTO REAR OF TRAY.

Figure 2-19. CIM External Wiring Diagram – Part 1 of 3

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WIRE TERMINATION CHART					
CABLE DESIGNATOR	COLOR	J1 DB-15	ARINC INSERT A	ARINC INSERT B	DESCRIPTION (J1)
A	WHITE	12	-	A4	+11 VDC
A	WHITE/BLUE	3	-	-	N/C
A	GREEN	-	-	-	-
B	WHITE	4	-	A6	DPL_TX2
B	WHITE/BLUE	5	-	A5	DPL_RX2
B	GREEN	-	-	-	-
C	WHITE	7	C7	-	DPL_TX1
C	WHITE/BLUE	8	C6	-	DPL_RX1
C	GREEN	-	-	-	-
D	WHITE	1	B11	-	+11 VDC
D	WHITE/BLUE	2	B13	-	SHIELD
D	GREEN	-	-	-	-
E	WHITE	10	C12	-	CSM_TX1
E	WHITE/BLUE	11	C11	-	SSM_RX1
E	GREEN	-	-	-	-
F	WHITE	13	C5	-	+12 VDC
F	WHITE/BLUE	14	C4	-	PWR_GND
F	GREEN	-	-	-	-
N/A	-	6	-	-	N/C
N/A	-	9	-	-	N/C
N/A	-	15	-	-	N/C

Figure 2-20. CIM External Wiring Diagram – Part 2 of 3

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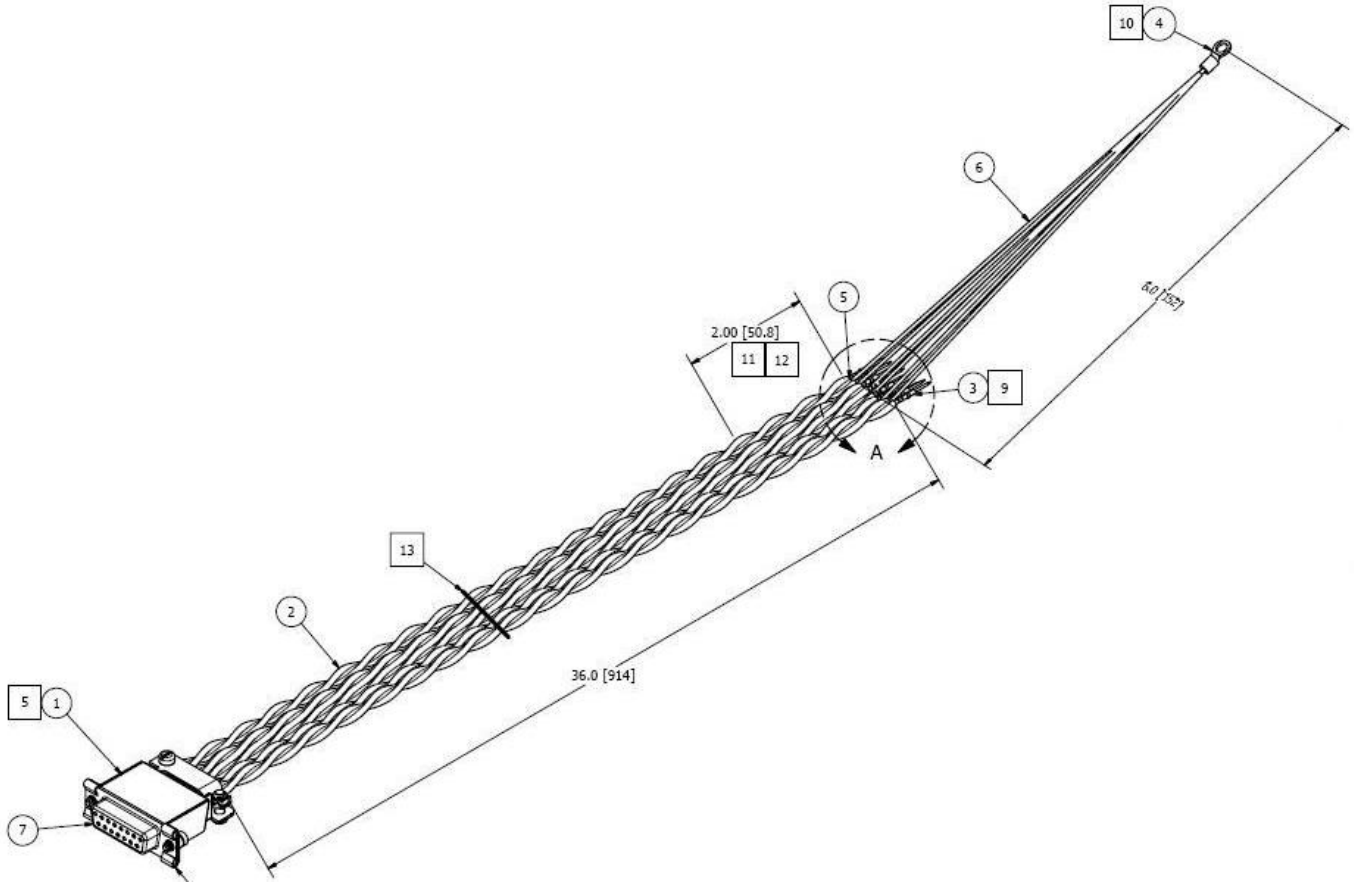

Figure 2-21. CIM Interface Cable – Part 1 of 3

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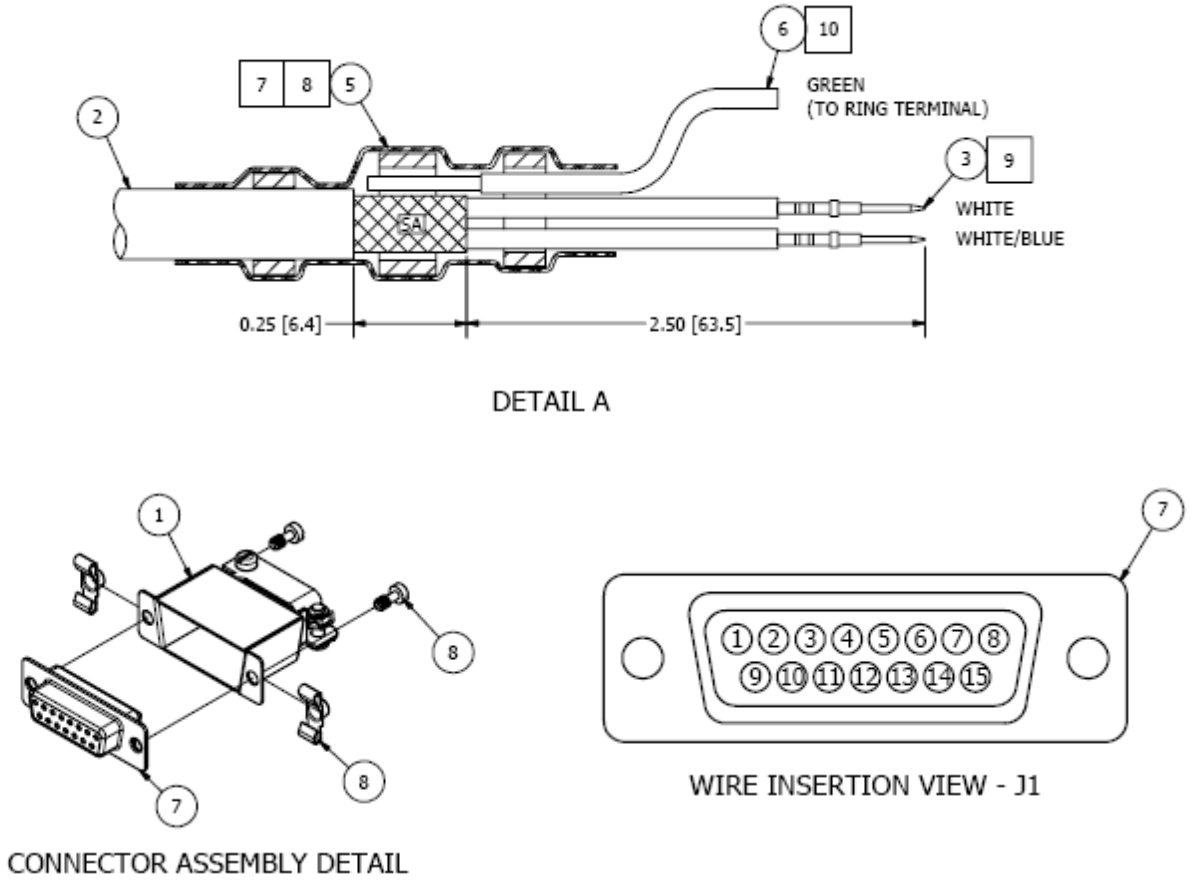

Figure 2-22. CIM Interface Cable – Part 2 of 3

WIRE TERMINATION CHART									
CABLE DESIGNATOR	COLOR	DB-15	ARINC INSERT A	ARINC INSERT B	501771 (SHIELD ARINC SIDE)	RING TERMINAL	WIRE LENGTH	DESCRIPTION (ARINC)	PART NUMBER
A	WHITE	12	-	A4	-	-	36in	SIM PWR2	211098
A	WHITE/BLUE	3	-		-	-	36in	N/C	211098
A	GREEN	-	-	-	SA	RT	6in	-	211013
B	WHITE	4	-	A6	-	-	36in	SIM TX2	211098
B	WHITE/BLUE	5	-	A5	-	-	36in	SIM RX2	211098
B	GREEN	-	-	-	SA	RT	6in	-	211013
C	WHITE	7	C7	-	-	-	36in	SIM TX1	211098

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WIRE TERMINATION CHART									
CABLE DESIGNATOR	COLOR	DB-15	ARINC INSERT A	ARINC INSERT B	501771 (SHIELD ARINC SIDE)	RING TERMINAL	WIRE LENGTH	DESCRIPTION (ARINC)	PART NUMBER
C	WHITE/BLUE	8	C6	-	-	-	36in	SIM RX1	211098
C	GREEN	-		-	SA	RT	6in	-	211013
D	WHITE	1	B11	-	-	-	36in	SIM PWR1	211098
D	WHITE/BLUE	2	B13	-	-	-	36in	SHIELD	211098
D	GREEN	-	-	-	SA	RT	6in	-	211013
E	WHITE	10	C12	-	-	-	36in	CIM TX1	211098
E	WHITE/BLUE	11	C11	-	-	-	36in	CIM RX1	211098
E	GREEN	-	-	-	SA	RT	6in		211013
F	WHITE	13	C5	-	-	-	36in	+12 VDC	211098
F	WHITE/BLUE	14	C4	-	-	-	36in	PWR GND	211098
F	GREEN	-	-	-	SA	RT	6in	-	211013
N/A	-	6	-	-	-	-	-	-	-
N/A	-	9	-	-	-	-	-	-	-
N/A	-	15	-	-	-	-	-	-	-

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	500490	BACKSHELL, DB15
2	18.0 FT	211098	CABLE, SHEILDED TWISTED PAIR
3	11	938201	PIN, ARINC SIZE 2222
4	1	501512	TERMINAL, #6 RING TONGUE 16-22 AWG
5	6	501799	SLEEVE, SOLDER 0.169 OD
6	3.0 FT	211013	WIRE, 24 AWG, TEFLON, GREEN
7	1	501449	CONNECTOR, DB-15 RECEPTACLE
8	1	500645	HARDWARE KIT, MALE SCREW LOCKS W/ CLIPS
9	0.4 FT	500691	HEAT SHRINK, 1/8”

Figure 2-23. CIM Interface Cable – Part 3 of 3

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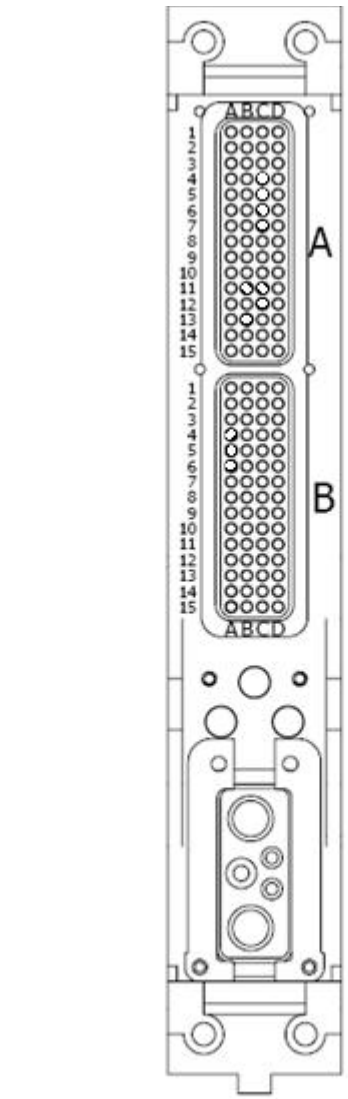

ARINC CONNECTOR FROM INSTALLATION KIT PN 710620
WIRE INSERTION VIEW

Figure 2-24. ARINC 600 Block

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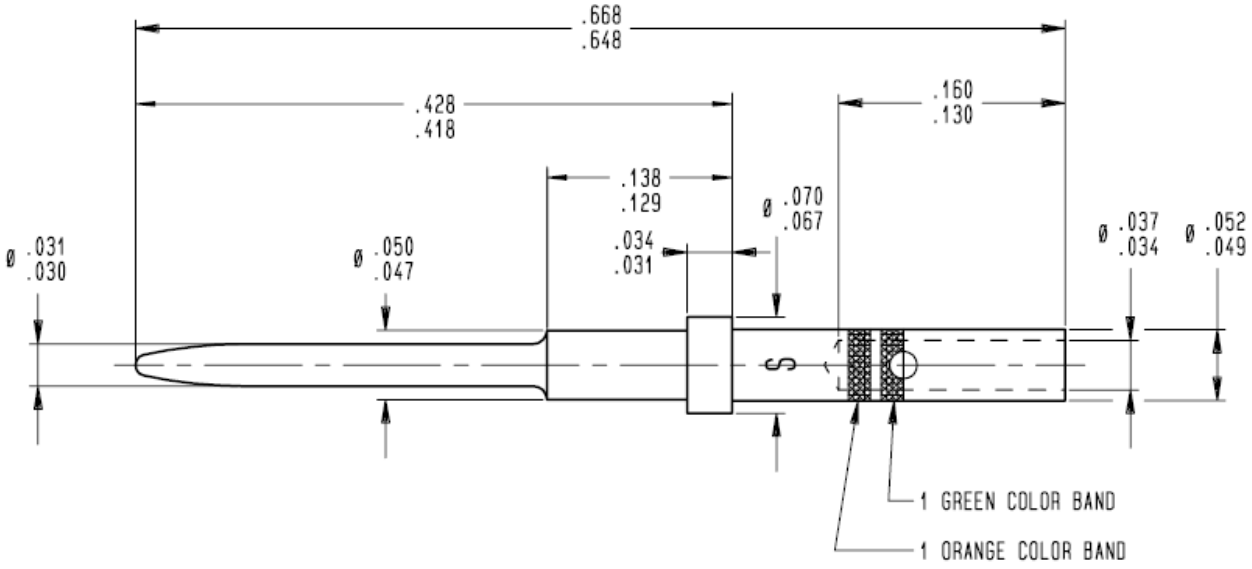

Figure 2-25. Size 22 Crimp Removable Pin Contact (In Inches)

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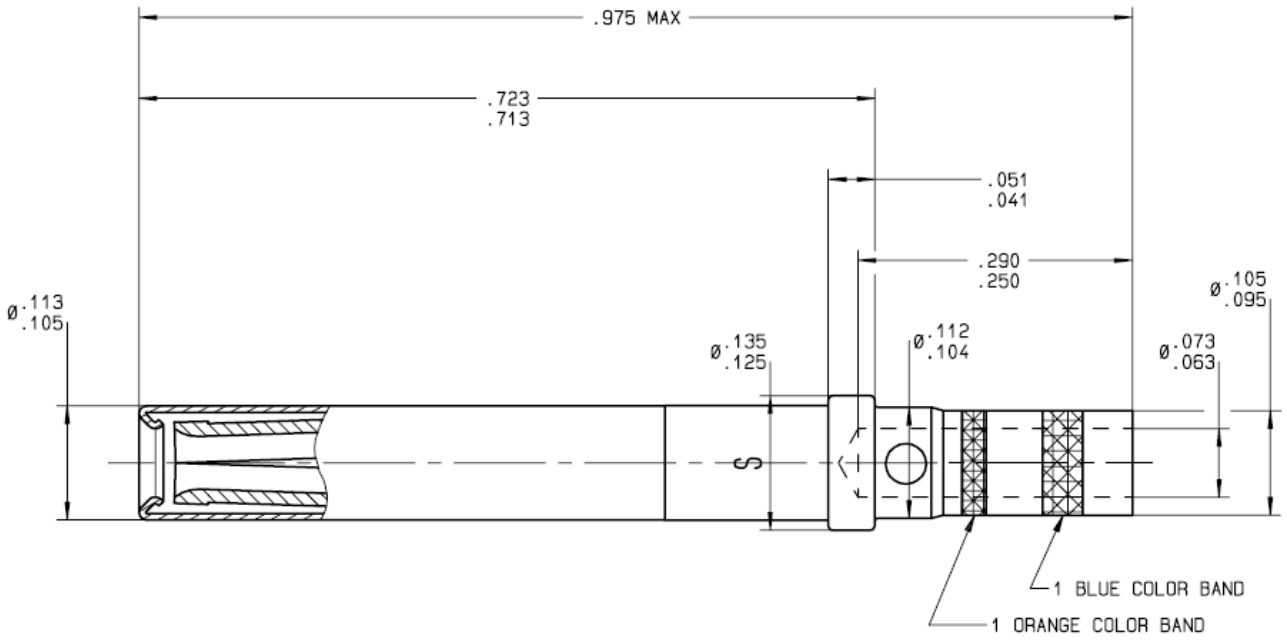

Figure 2-26. Size 16 Crimp Removable Socket Contact (In Inches)

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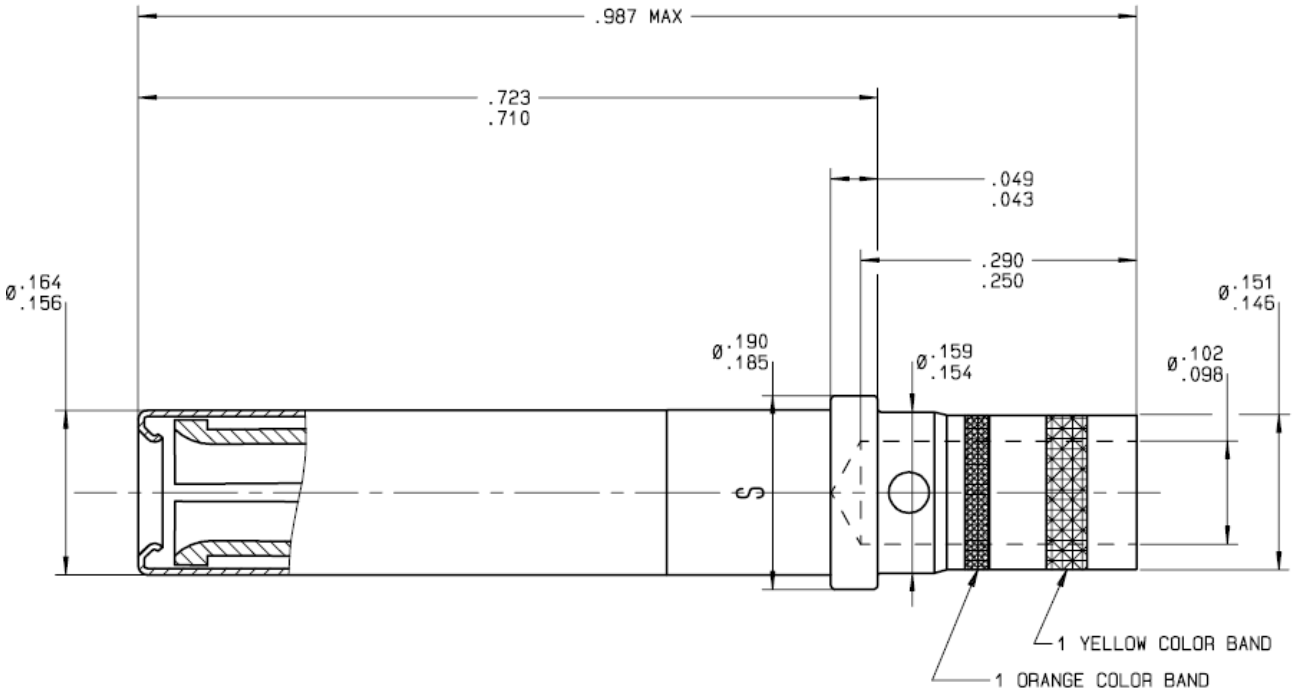

Figure 2-27. Size 12 Crimp Removable Socket Contact (In Inches)

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3. INSTALLATION PROCEDURES

3.1 Overview

The following table shows a high-level view and the major steps involved in the installation process. Details are in the sections below.

This section also includes safety information. Installers should review this manual thoroughly along with any industry-established electronic equipment practices prior to installing this unit.

STEP	ACTION	DESCRIPTION
1	**Prepare for installation.**	▪ Review industry-established electronic equipment practices to prepare for installing the ICS-120A/220A. ▪ Review the Precautions, Warnings, and Advisories in Section 3.2. ▪ Review the procedures in this manual.
2	**Select the equipment location.**	**Note: Although the ICS-120A/220A has been tested for various conditions under DO-160D guidelines, ICG recommends that the ICS-120A/220A be mounted in an Electronics Bay or location that maintains temperature between 0°C (32°F) and 50°C (122°F).** ▪ Choose the equipment locations. ▪ Ensure that the target location is free of all water, spray, lubricants, or other stray fluids. ▪ Check Section 2.4, “Fits, Clearances, and other Particulars”, for dimensions of the unit. ▪ Check for adequate space around the connectors and cabling.
3	**Assess wiring and cabling needs.**	**Wire recommendation:** 22 AWG Stranded, with overall shield and drain wire. Wire lengths are not a concern as the ICG telephony circuits provide reliable operation for cable length of over 400 meters.
4	**Unpack the unit.**	▪ Unpack the unit carefully. ▪ Reserve the shipping material and packaging, if possible, in case a future return is required. ▪ Inspect unit for damage. ▪ Report any damage immediately to ICG and use the original shipping material to return the system to ICG. Instructions for the return procedure can be found in the section, Air Worthiness/RMA Procedure.

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5	**Complete the basic wiring connections.**	See Sections 3.4 through 3.12 below for details. ▪ Complete the input power connections. See section 3.4. ▪ Connect the telephone devices. See Section 3.8. ▪ Connect the RS-232 port. See Section 3.9. ▪ Connect the ARINC 429 datalink port(s). See Section 3.8.2. ▪ Connect the MCDU units. See Section 3.8. ▪ Install the antenna(s). See Section 3.5. ▪ Connect the front panel programming port. See section 3.9 ▪ Connect the CIM device. See section 3.11 ▪ Activate ACARS. See section 3.10. ▪ Check the external indicators. See Section 15.1
6	**Clean the surface, if needed**.	Stray fingerprints, smudges, wire clippings, metal shavings, or other debris on outside surfaces of the chassis should be removed upon completion of installation or repair work. **If cleaning is necessary:** ▪ Use only mild soap and limit water amount to avoid letting any moisture reach the internal components. ▪ Lightly moisten a cloth and lightly swab the exterior surface.
7	**Install the USB driver.**	See Section 4.
8	**Carry out the firmware upload, if needed.**	See Section 7 for instructions.
9	**Complete the system configuration, if needed.**	See Section 9 for instructions.
10	**Test the unit.**	Test the unit in accordance with the requirements set forth in the Aircraft Test plan (ATP) for normal operation of the communications equipment.

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3.2 Precautions, Warnings, and Advisories

1. WARNINGS are provided before potentially dangerous procedures, materials, methods, and processes and must be followed precisely to avoid injury.

2. CAUTIONS are provided before procedures, materials, methods, and processes and must be followed precisely to avoid equipment damage.

3. NOTES are provided after applicable procedural steps, when necessary, to highlight or clarify information.

	OBSERVE STANDARD SAFETY PRECAUTIONS AND WEAR SAFETY GLASSES AND OTHER PROPER SAFETY GEAR TO PREVENT PERSONAL INJURY DURING INSTALLATIONS.
	TURN OFF POWER BEFORE DISCONNECTING ANY COMPONENT FROM WIRING. DISCONNECTING THE COMPONENT WITHOUT TURNING POWER OFF MAY CAUSE VOLTAGE TRANSIENTS THAT CAN DAMAGE THE COMPONENT.
	WHILE THE ICS-120A AND THE ICS-220A ARE NOT CLASSIFIED AS STATIC SENSITIVE DEVICES, GOOD SHOP PRACTICES SHOULD BE FOLLOWED WHEN HANDLING AND INSTALLING ALL EQUIPMENT. USE OF GROUNDED CONDUCTIVE SURFACES AND ANTISTATIC MATERIALS IS RECOMMENDED.

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THE FOLLOWING PRECAUTIONS SHOULD BE FOLLOWED WHILE INSTALLING THE ICS-120A/220A:

- **De-energize or disconnect all power and signal sources and loads before installing the ICS-120A/220A.**
- **Place the component on a grounded, conductive surface**
- **Ground the installer through a conductive wrist strap or other device using a 470-kilohm or 1-megohm series resistor to protect the equipment.**
- **Ground any electrical tools, such as soldering equipment that will contact the component. Contact with the operator's hand provides sufficient ground for tools that are otherwise electrically isolated.**

DO NOT INSTALL IN LOCATIONS WHERE UNIT MAY COME IN DIRECT CONTACT WITH FLUIDS SUCH AS SKYDROL. SEE DDP (P/N 710700) FOR FLUID SUSCEPTIBILITY CLASSIFICATION.

NOTE:

The stand-alone User's Guide (P/N 710701) gives a basic overview of the system and its capabilities for the ICS-120A/220A user. It also provides general instructions for using the unit's basic telephony and data services. Please refer to that document for basic functions. [A copy is also on the CD(s) accompanying the ICS-120A/220A.]

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3.3 Iridium Communication System Mounting Location

The ICS-120A/220A is mounted using an ARINC 2-MCU aeronautical tray and can be installed in the aircraft's equipment bay (E-bay), in the cabin area, or in the non-controlled environment outside of the aircraft's pressure envelope. Mount the ICS-120A/220A as close to the antenna as practical. Minimal cable runs improve system performance.

Do not install in locations where unit may come in direct contact with fluids such as Skydrol. See DDP (P/N 710700) for fluid susceptibility classification.

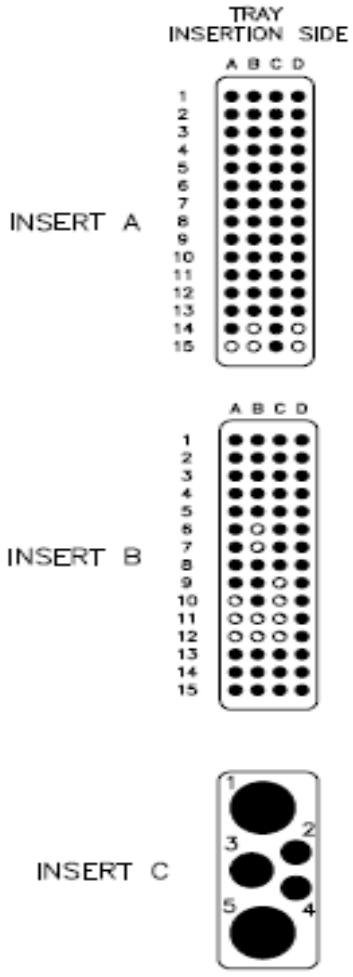

Figure 3-1. ARINC 600 Connectors

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2-WIRE AUDIO		
INSERT A	STATION	
PIN	DESCRIPTION	
A1	TIP1	STATION 11
A2	RING1	
A3	SHIELD	
B1	TIP2	STATION 12
B2	RING2	
B3	SHIELD	
C1	TIP3	STATION 13
C2	RING3	
C3	SHIELD	
D1	TIP4	STATION 14
D2	RING4	
D3	SHIELD	

SERIAL PORT		
INSERT A		
PIN	DESCRIPTION	
D4	DCD	SERIAL PORT 1
D5	RD	
D6	TD	
D7	DTR	
D8	GROUND	
D9	DSR	
D10	RTS	
D11	CTS	
D12	RI	
D13	SHIELD	

4-WIRE AUDIO			
INSERT A	STATION / MCDU	TRUNK	
PIN	DESCRIPTION	DESCRIPTION	
A4	MIC HI 1	MIC HI 1	STATION 15 CO 60
A5	MIC LOW 1	MIC LOW 1	
A6	SPEAKER HI 1	SPEAKER HI 1	
A7	SPEAKER LOW 1	SPEAKER LOW 1	
A8	RING OUTPUT 1	OFF HOOK OUTPUT 1	
A9	OFF HOOK INPUT 1	RING INPUT 1	
A10	SHIELD	SHIELD	
B4	MIC HI 2	MIC HI 2	STATION 16 CO 61
B5	MIC LOW 2	MIC LOW 2	
B6	SPEAKER HI 2	SPEAKER HI 2	
B7	SPEAKER LOW 2	SPEAKER LOW 2	
B8	RING OUTPUT 2	OFF HOOK OUTPUT 2	
B9	OFF HOOK INPUT 2	RING INPUT 2	
B10	SHIELD	SHIELD	

12V TO CIM INTERFACE	
INSERT A	DESCRIPTION
PIN	
C5	CISI POWER
C4	CISI RETURN
B13	SHIELD
C11	RXD
C12	TXD

ARINC-429 1	
INSERT B	
PIN	DESCRIPTION
D1	TXA+
D2	TXA-
D3	SHIELD
D4	RINA+
D5	RINA-
D6	SHIELD

ANTENNA CONNECTIONS	
INSERT C	
PIN	DESCRIPTION
1	LBT 1 & 2
5	SBD MODEM

DC POWER INPUT	
INSERT C	
PIN	DESCRIPTION
2	+12VDC TO +36VDC
3	CHASSIS GROUND
4	GROUND

Figure 3-2. ARINC 600 Pinout (Drawing 710300) – Part 1 of 2

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INPUTS		
INSERT B		
PIN	DESCRIPTION	
A13	INPUT1	ACTIVE LOW INPUTS
B13	INPUT2	
C13	INPUT3	
D13	INPUT4	
A14	INPUT5	
B14	INPUT6	
C14	INPUT7	
D14	INPUT8	

OUTPUTS		
INSERT B		
PIN	DESCRIPTION	
C1	OUTPUT1	NORMALLY OPEN OUTPUTS GROUNDS WHEN ACTIVATED
C2	OUTPUT2	
C3	OUTPUT3	
C4	OUTPUT4	
C5	OUTPUT5	
C6	OUTPUT6	
C7	OUTPUT7	
C8	OUTPUT8	

EXTERNAL SIM 1	
INSERT A	
PIN	DESCRIPTION
B11	SIM POWER
B12	SIM RETURN
C6	SIM RX
C7	SIM TX
C8	GROUND

EXTERNAL SIM 2	
INSERT B	
PIN	DESCRIPTION
A4	SIM POWER
A1	SIM RETURN
A5	SIM RX
A6	SIM TX
A2	GROUND

UTILITY VOLTAGES		
INSERT B		
PIN	DESCRIPTION	
A15	+12VDC TO +36VDC	UTILITY OUTPUT 1
B15	RETURN	
C15	+12VDC TO +36VDC	UTILITY OUTPUT 2
D15	RETURN	

ARINC-429 2	
INSERT B	
PIN	DESCRIPTION
D7	TXB+
D8	TXB-
D9	SHIELD
D10	RINB+
D11	RINB-
D12	SHIELD

ARINC-429 TX3	
INSERT A	
PIN	DESCRIPTION
A14	SHIELD
C13	TXC+
C14	TXC-

ARINC-429 RX3	
INSERT A	
PIN	DESCRIPTION
C15	SHIELD
INSERT B	
PIN	DESCRIPTION
A8	RINC+
A9	RINC-

ARINC-429 RX4	
INSERT B	
PIN	DESCRIPTION
A7	SHIELD
B1	RIND+
B2	RIND-

ARINC-429 RX5	
INSERT B	
PIN	DESCRIPTION
B3	SHIELD
B4	RINE+
B5	RINE-

ARINC-429 RX6	
INSERT B	
PIN	DESCRIPTION
B10	SHIELD
B8	RINF+
B9	RINF-

Figure 3-3. ARINC 600 Pinout (Drawing 710300) – Part 2 of 2

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Table 3-1. Unused Pins

UNUSED PINS – INSERT A	
PIN	**DESCRIPTION**
A11	No Connection
A12	Ground
A13	No Connection
A15	No Connection
B14	No Connection
B15	No Connection
D13	Shield
D14	No Connection
D15	No Connection

UNUSED PINS – INSERT B	
PIN	**DESCRIPTION**
A10	No Connection
A11	No Connection
A12	No Connection
B6	No Connection
B7	No Connection
B11	No Connection
B12	No Connection
C9	No Connection
C10	No Connection
C11	No Connection
C12	No Connection

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3.4 Aircraft Power

Standard aeronautical wiring practices are required when connecting power to the ICS-120A/220A units.

NOTE: **The ICS-120A/220A provides ancillary fused voltage connections. Check the manufacturer's literature for guidance on voltage/amperage tolerances of ancillary devices.**

See Figures below for wiring information.

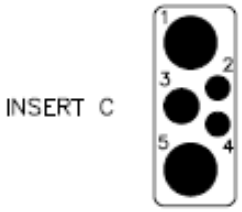

Figure 3-4. Insert C of the ARINC 600

Table 3-2. DC Power Input Pin Diagram

INSERT C	
PIN	**DESCRIPTION**
2	+28VDC nominal aircraft power
3	SHIELD
4	GROUND

3.5 Antenna Installation Guide

Antenna installation must comply with applicable FARs. As a minimum, the antenna installation must meet FAA FAR 23.571 or FAA FAR 25.571.

NOTE: ***Consult the antenna manufacturer's installation manual for the proper antenna installation procedures.***

Follow the antenna manufacturer's instructions for recommended antenna placement as long as they do not conflict with the aircraft manufacturer's instructions.

Table 3-3. Antenna Connections

INSERT C	
PIN	**DESCRIPTION**
1	LBT 1 and 2
5	SBD Modem (ACARS)

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3.5.1 FAA Regulatory Approval

Any aircraft penetration must be officially inspected and approved. This inspection is generally performed by an FAA-authorized Designated Engineering Representative (DER) and is documented on FAA Form 8110-3. The completed form should be included with the installation certification data.

NOTE: ***Consult the aircraft manufacturer's installation manual for the proper procedures for any airframe penetrations.***

3.5.2 Antenna Bonding

Antennas must be bonded to the airframe for static and lightning protection.

NOTE: ***Check the aircraft manufacturer's instruction manual for recommended antenna bonding practices.***

3.6 Utility Voltages

The utility voltages interface uses the following pinouts in Insert B of the ARINC 600:

Table 3-4. Utility Voltages Connections

UTILITY OUTPUT	INSERT B PINS	DESCRIPTION
1	A15	+12VDC to +36VDC
	B15	RETURN
2	C15	+12VDC to +36VDC
	D15	RETURN

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3.7 Inputs and Outputs

The ICS-120A/220A has eight inputs and eight outputs with the following pinouts:

Table 3-5. Inputs/Outputs Connections (Insert B)

DESCRIPTION	PIN	INPUT
ACTIVE LOW INPUTS	A13	**1**
	B13	2
	C13	3
	D13	4
	A14	5
	B14	6
	C14	7
	D14	8

DESCRIPTION	PIN	OUTPUT
NORMALLY OPEN OUTPUTS GROUNDS WHEN ACTIVATED	C1	**1**
	C2	2
	C3	3
	C4	4
	C5	5
	C6	6
	C7	7
	C8	8

3.8 Interface Connections

The ICS-120A/220A has a back-panel ARINC 600 Size 1 connector. The unit provides the following circuits:

- Four 2-wire signal circuits
- Two 4-wire E&M signal circuits
- One RS-232 serial port for data communications
- Three Tx and six Rx ARINC 429 dual-speed ports
- CIM module

3.8.1 Telephony Circuits

As with any telecommunications system, the customer must select a Service Provider from among the companies that offer Iridium satellite services. Service Providers offer differing pricing and services and have distinct coding on their SIM cards for recognition by the separate satellite networks. Because of these unique interaction protocols, ICG requires advance notification of the selected Service Provider, and registration/billing information must be pre-arranged with the Service Provider for activation of service in order for the ICS to be shipped with the preprogrammed SIM card.

If activation has been pre-arranged and ICG has installed the SIM card, ICG will affix a label that contains the relevant Iridium Service Provider access contact number to the chassis. The Iridium satellite network allows access at any time.

Use the following tables to install the 2-wire and 4-wire audio circuit devices.

NOTE:

ICG tests its products constantly with different and new Management Systems please contact ICG Customer Support for a complete list.

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Table 3-6. 2-Wire Audio Circuits

STATION	INSERT A PINS	SIGNAL	STATION	INSERT A PINS	SIGNAL
11	A1	TIP	13	C1	TIP
	A2	RING		C2	RING
	A3	SHIELD		C3	SHIELD
12	B1	TIP	14	D1	TIP
	B2	RING		D2	RING
	B3	SHIELD		D3	SHIELD

Table 3-7. 4-wire Dual-Function Connections

STATION/TRUNK	INSERT A PINS	STATION DESCRIPTION	TRUNK DESCRIPTION
AUDIO 1 / STATION 15 OR CO 60	A4	MIC HI 1	MIC HI 1
	A5	MIC LO 1	MIC LO 1
	A6	SPEAKER HI 1	SPEAKER HI 1
	A7	SPEAKER LO 1	SPEAKER LO 1
	A8	RING OUTPUT 1	OFF HOOK INPUT 1
	A9	OFF HOOK INPUT 1	RING OUTPUT 1
	A10	SHIELD	SHIELD
AUDIO 2 / STATION 16 OR CO 61	B4	MIC HI 2	MIC HI 2
	B5	MIC LO 2	MIC LO 2
	B6	SPEAKER HI 2	SPEAKER HI 2
	B7	SPEAKER LO 2	SPEAKER LO 2
	B8	RING OUTPUT 2	OFF HOOK INPUT 2
	B9	OFF HOOK INPUT 2	RING OUTPUT 2
	B10	SHIELD	SHIELD

NOTE: ***The 4-wire ports may be configured as either stations or trunks.***

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3.8.2 ARINC 429 Data Link Ports

The specific interfaces the ICS unit provides are the ARINC 429 DataLink (required to connect and communicate with the aircraft portion of the ACARS system) and the Iridium Network communications link (necessary to transmit and receive data over the Iridium data link).

The first interface is the ARINC 429 connection to the aircraft's ACARS-compliant Data Management Unit (DMU). The DMU manages the message data being transmitted to the ACARS Service Provider. It also manages the responses to requests and the normal up-linked messages used in the operation of the aircraft.

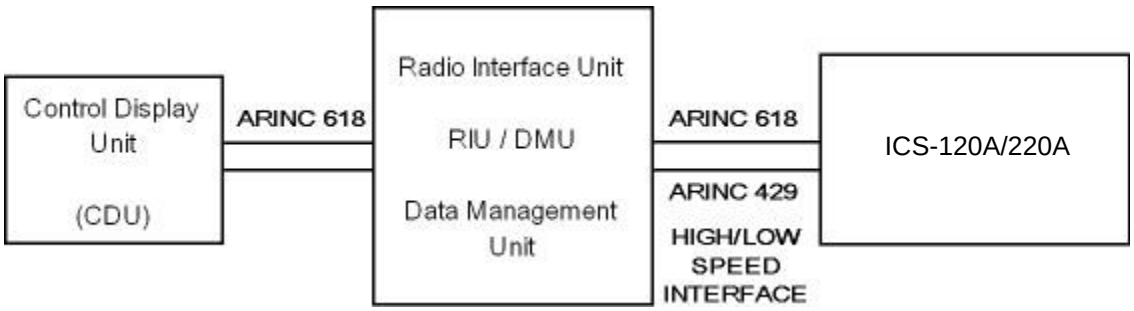

Figure 3-5. ACARS DMU Interfaces

Using the Iridium Utility, the ACARS messages can be monitored to confirm that the ICS-120A/220A is receiving and transmitting messages properly. The Utility also has a logging function for these messages. Please refer to appropriate sections of this manual for instructions on the use of the logging and monitoring functions.

Once the DataLink ports have been connected, the ACARS service can be installed and the functionality tested.

3.8.2.1 Rockwell Collins Data Link Product Connections

MODEL: Radio Interface Unit (RIU)
PN#: 822-1469-001, -151
ARINC-429 BUS SPEED: High Speed
And
MODEL: Communication Management System (CMU-4000)
PN#: 822-1739-001, -002, -003, -151
ARINC 429 BUS SPEED: High Speed

Table 3-8. Rockwell Collins Data Link Product Connections

ICS-120A/220A (INSERT B)		RIU (INSERT P2)	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
D4	RX (HI)	15	TX (HI)
D5	RX (LO)	16	TX (LO)
D6	SHIELD	NC	
D1	TX (HI)	11	RX (HI)
D2	TX (LO)	12	RX (LO)
D3	SHIELD	NC	

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3.8.2.2 Honeywell AFIS Data Link Product Connections

MODEL: AFIS Data Management Unit (DMU)
PN#: 400-0455 00-2011
ARINC 429 BUS SPEED: Low Speed

Table 3-9. Honeywell AFIS Data Link Product Connections

ICS-120A /220A (INSERT B)		DMU (CONNECTOR J1)	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
D4	RX (HI)	6	TX (HI)
D5	RX (LO)	7	TX (LO)
D6	SHIELD	NC	
D1	TX (HI)	10	RX (HI)
D2	TX (LO)	11	RX (LO)
D3	SHIELD	NC	

3.8.2.3 Data Link Product Connections

The DMU/MU's listed below are 758 compliant.

MODEL: Rockwell Collins Communication Management System (CMU-900)
PN#: 822-1239-101, -151
ARINC 429 BUS SPEED: High Speed

MODEL: Honeywell MK III
PN#: 7519200-901
ARINC-429 BUS SPEED: High Speed

MODEL: Honeywell MK II
PN#: 965-0758-002
ARINC 429 BUS SPEED: High Speed

MODEL: Teledyne Controls
PN#: 2231900-1
ARINC 429 BUS SPEED: High Speed

Table 3-10. 758-Compliant DMU/MU Data Link Product Connections

ICS-120A/220A (INSERT B)		DMU/MU (INSERT P2)	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
D4	RX (HI)	MP 12A	TX (HI)
D5	RX (LO)	MP 12B	TX (LO)
D6	SHIELD	NC	
D1	TX (HI)	TP 6H	RX (HI)
D2	TX (LO)	TP 6J	RX (LO)
D3	SHIELD	NC	

The DMU/MU's listed below are 724B compliant.

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MODEL: Rockwell Collins DLM-900
PN#: 822-0666-003
ARINC 429 BUS SPEED: Low Speed

MODEL: Rockwell Collins DLM-700
PN#: 622-9349-301
ARINC 429 BUS SPEED: Low Speed

MODEL: Honeywell MK II
PN#: 965-0758-001
ARINC 429 BUS SPEED: Low Speed

MODEL: Teledyne Controls
PN#: 2231500-800G
ARINC 429 BUS SPEED: Low Speed

Table 3-11. 724B-Compliant DMU/MU Data Link Product Connections

ICS-120A/220A (INSERT B)		DMU (CONNECTOR J1)	
PIN	**SIGNAL NAME**	**PIN**	**SIGNAL NAME**
D4	RX (HI)	TP 7G	TX (HI)
D5	RX (LO)	TP 7H	TX (LO)
D6	SHIELD	NC	
D1	TX (HI)	TP 2C	RX (HI)
D2	TX (LO)	TP 2D	RX (LO)
D3	SHIELD	NC	

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3.8.3 ARINC 429 CIRCUITS

The ICS-120A/220A SDU provides three Tx circuits and six Rx ARINC 429 circuits. Each ARINC 429 circuit is individually configurable for high-speed (100 kbps) or low-speed (12.5 kbps) operation. Per system configuration, CMU/DMU and MCDU devices can be interfaced to any mix of ARINC 429 circuits, as required.

Table 3-12. ARINC 429 Circuit Connections

CIRCUIT	PIN	DESCRIPTION
TX1	INSERT B	
	D3	SHIELD
	D1	TXA+
	D2	TXA-
TX2	INSERT B	
	D9	SHIELD
	D7	TXB+
	D8	TXB-
TX3	INSERT A	
	A14	SHIELD
	C13	TXC+
	C14	TXC-

CIRCUIT	PIN	DESCRIPTION
RX1	INSERT B	
	D6	SHIELD
	D4	RINA+
	D5	RINA-
RX2	INSERT B	
	D12	SHIELD
	D10	RINB+
	D11	RINB-
RX3	INSERT A	
	C15	SHIELD
	INSERT B	
	A8	RINC+
	A9	RINC-
RX4	INSERT B	
	A7	SHIELD
	B1	RIND+
	B2	RIND-
RX5	INSERT B	
	B3	SHIELD
	B4	RINE+
	B5	RINE-
RX6	INSERT B	
	B10	SHIELD
	B8	RINF+
	B9	RINF-

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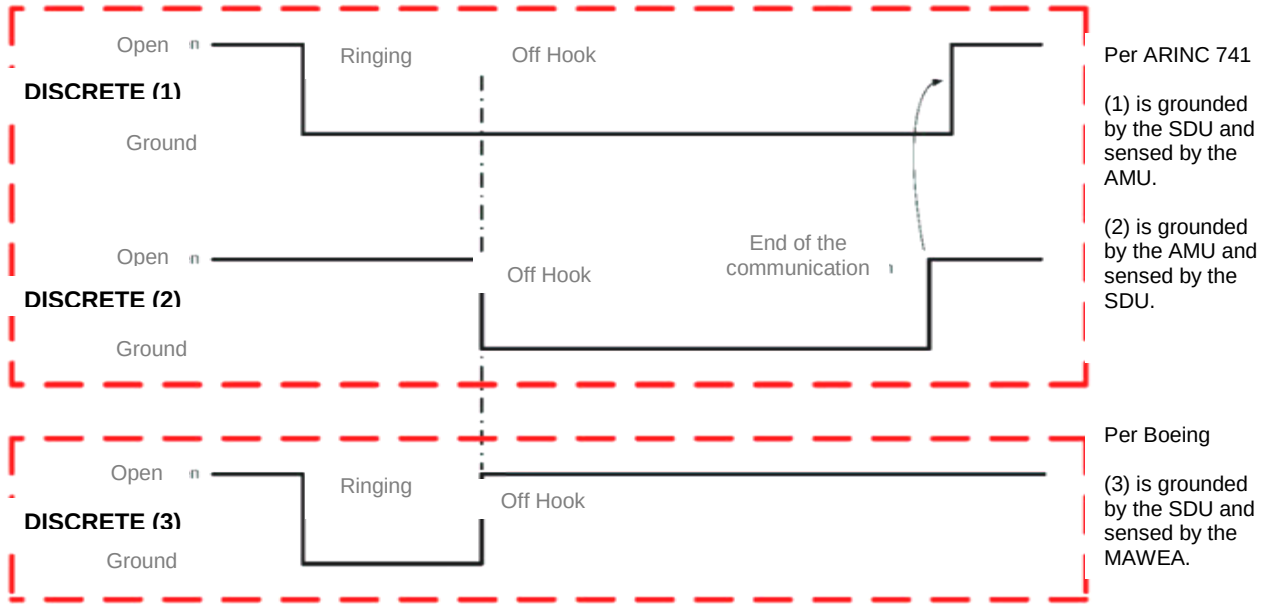
3.8.4 Audio Discretes (MCDU Only)

Discrete (1) – Ring Output: The ICS-120A/220A (SDU) provides a ground on the Ring Output to the Audio Management Unit (AMU) when there's an Incoming Call Indication. The Ring Output remains grounded until the call is ended. When the call ends, the Ring Output returns to open state.

Discrete (2) – Hook Input: When the ICS-120A/220A (SDU) senses a ground on the Hook Input signal from the AMU, Off-Hook Indication, the incoming call is answered. When the Hook Input is opened, On-Hook Indication, the active call is ended. Note: this method of ending a call is only applicable when the AMS Mode is set to 'Latched Mic-On'; see section 9.2 for more information on how to configure the AMS Mode.

Discrete (3) – MAWEA Output: The ICS-120A/220A (SDU) provides a ground to the MAWEA (Modularized Avionics Warning Electronics Assembly) to activate the chime. The MAWEA discrete output is grounded when there's an Incoming Call Indication, and returns to open state when the call is answered (Off Hook Indication). The MAWEA Output is only activated for incoming calls (ground-to-air).

Ground to Air Call (Incoming)



Air to Ground Call

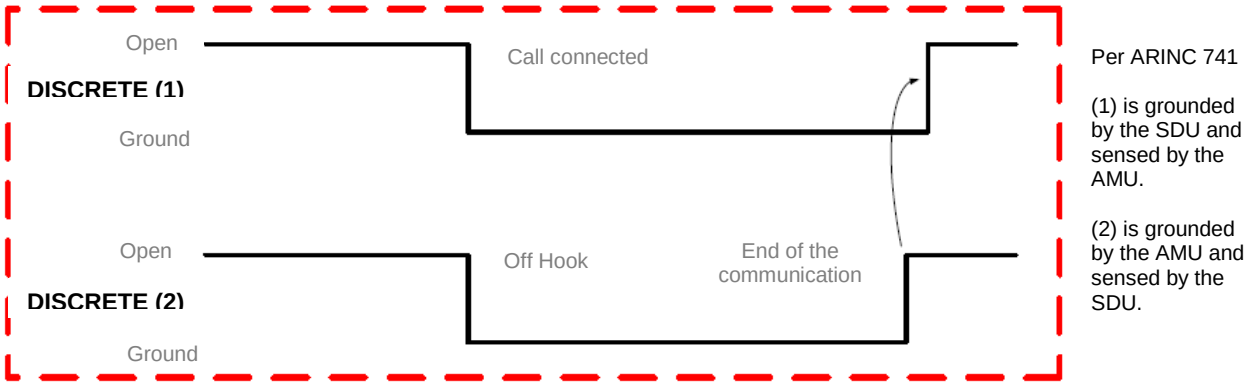


Figure 3-6. Audio Discretes

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3.9 RS-232 Serial Port

Use the following table to connect the Serial data port.

Table 3-13. Serial Port 1 Connections

INSERT A	SIGNAL
D4	DCD
D5	RD
D6	TD
D7	DTR
D8	GROUND
D9	DSR
D10	RTS
D11	CTS
D12	RI
D13	SHIELD

3.10 Activating the ACARS Service

The ACARS service requires an ACARS Service Provider (such as ARINC Direct) that will forward or respond to messages from the aircraft. The ICS-220A features internal hardware redundancy for ACARS communications. In the event that a persistent hardware failure is detected, the system automatically switches the ACARS communications to a different transceiver, ensuring ACARS operation is not interrupted. The SBD modem device is always by default dedicated to ACARS communications, and the other Iridium transceiver(s) is used as backup. Some ACARS service providers may support automatic updating of the Aircraft IMEI address. Hence for installations operating with such service providers, and interested in utilizing the hardware redundancy feature for ACARS communications, the IMEIs for all Iridium transceivers need to be provisioned on SPNet for delivery to the SP's server. For more information, see table below for Activating ACARS service.

NOTE:

Users cannot have a different Service Provider for HF, VHF, and SATCOM. The SP information is embedded in the ACARS message and cannot be modified by the ICS unit.

The steps for activating and testing the ACARS function are outlined in the table below.

STEP	ACTION	DESCRIPTION
1	Select an ACARS Service Provider.	Some choices are GLOBALink, ARINC Direct, Honeywell GDC, and SITA. If none of the above choices are appropriate, then "Other" will need to be chosen in Step 3 when configuring the ICS unit for ACARS.
2	Connect the appropriate ARINC 429 dual-channel port to the aircraft CMU (Communications Management Unit), DMU (Data	Consult the CMU/DMU (MU) Installation Manual for more detailed instructions and configuration options and restrictions concerning the ARINC 429 port speeds and devices to be connected.

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STEP	ACTION	DESCRIPTION
	Management Unit), MU (Management Unit), or RIU (Radio Interface Unit) if not already done.	
3	Configure the ICS unit for ACARS as shown in Section 9.9.	Ensure that ACARS is ENABLED and that the SBD modem has been selected.
4	Determine the SBD modem IMEI (International Mobile Equipment Identity) number.	This number can be found in one of two ways: 1. Check the SBD IMEI label on the outside of the ICS unit. 2. Check the SBD Modem Monitor screen. (Note: ACARS must be set to ENABLED and the SBD Modem selected before the screen will show the correct IMEI number. See Step 1 above for more details.)
5	Contact the Service Provider to provision the SBD modem. **Note**: The SBD modem should be used for ACARS.	The SBD modem used for ACARS data messaging must be registered with an Iridium SP (a member of Iridium's SPNet) for Short-Burst Data (SBD) messaging. The SP is responsible for setting up the IMEI number with Iridium to point to the SP's server for processing MO (Mobile Originated) and MT (Mobile Terminated) messages. The SP is also required to enable SBD RING alerts from SPNet. **Note:** in order for SBD modem switchover feature to work correctly, contact your service provider and provide IMEI numbers for registration.
6	Test to ensure ACARS messages are being transmitted and received properly.	The ACARS provisioning and testing should be done in conjunction with the ACARS service providers technical support team. Not all equipment will generate MO messages automatically to be sent to the ground SPs (An example is the Honeywell AFIS system). It may be necessary to reconfigure the equipment to allow traffic to flow to the SDU connection. Other equipment may be configured to automatically select lower cost media such as via HF, VHF, etc. Refer to the RIU, CMU, or DMU (MU) User's Manual for equipment-specific directions and procedures on ACARS messaging. **NOTE:** ***The ACARS equipment may have other setup information that needs to be configured before the SDU (Satellite Data Unit) will properly work with the DMU (Data Management Unit). Some equipment is very flexible with respect to the configuration of the ARINC 429 ports speeds and attached devices, while others have a more dedicated approach with few options.***

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For general information on ACARS messaging, see the following:

- *Implementation Manual for Iridium Satellite Communications*
  http://www.icao.int/anb/panels/acp/wg/m/wgm11/ACP-WGM11-WP03-Draft%20Iridium%20Implementation%20Manual%20Version%201.4%20-%20051906.pdf

3.11 Configuration Identity Module (CIM)

The CIM functions as the remote SIM reader that allows the ICS-120A/220A to operate with the SIM cards stored externally in this module. It also stores the ICS-120A/220A configuration, and the ATS and AOC directory files. The following table describes the wiring interface between the CIM and the ICS-120A/220A device. The CIM module and SIM card(s) are part of the CIM. The ICS-120A has one SIM card installed while the ICS-220A has two SIM cards. Configuration storage is a common function for both systems. Refer to Table 3-14. CIM Connections for more information.

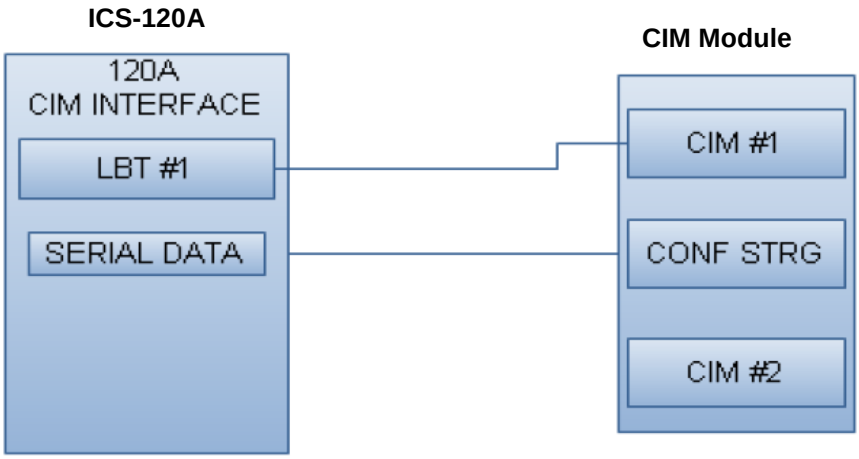

Figure 3-7. ICS-120A CIM Interface

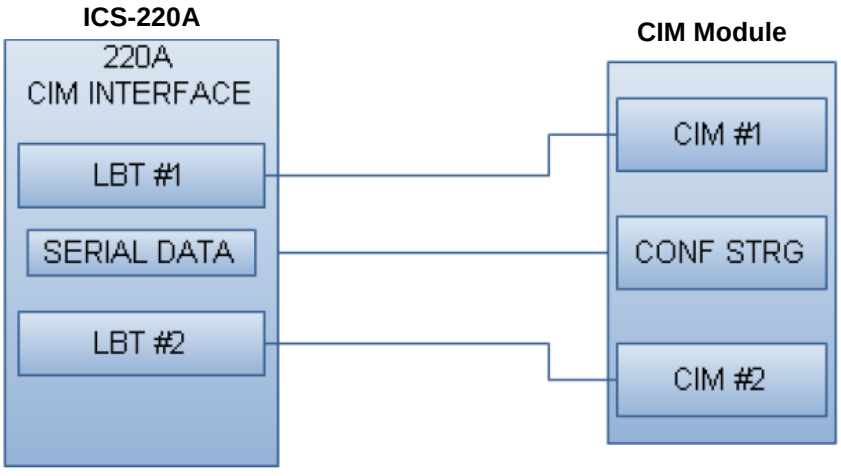

Figure 3-8. ICS-220A CIM Interface

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Table 3-14. CIM Connections

EXTERNAL SIM 1	
INSERT A PIN	DESCRIPTION
B11	CIM POWER
B12	CIM RETURN
C6	CIM RX
C7	CIM TX
C8	GROUND

EXTERNAL SIM 2	
INSERT B PIN	DESCRIPTION
A4	CIM POWER
A1	CIM RETURN
A5	CIM RX
A6	CIM TX
A2	GROUND

CONFIGURATION STORAGE	
INSERT A PIN	DESCRIPTION
C5	CIM POWER
C4	CIM RETURN
B13	SHIELD
C11	RXD
C12	TXD

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4. THE CIM

4.1 Overview

The system reads the product configuration from the CIM (Configuration Identity Module) when the CIM is detected by the system during system power-up. If the CIM is not detected, or if the product configuration data stored in the CIM is corrupted or missing, the built-in product configuration data will be used instead.

The CIM also stores the ATS directory file and the AOC directory file. See Section 5, The ICS-120A/220A Data Files, for instructions on how to download and upload these files.

The CIM also functions as the remote SIM card reader that allows the ICS-120A/220A to operate with the SIM cards stored externally in this module. This capability facilitates field replacements without the need to manually remove and re-install the SIM cards. The SIM cards in this configuration are installed in the CIM (Configuration Identity Module), which must be wired to the ICS-120A/220A installation tray.

The CIM is powered by 12VDC supplied on the ICS-120A/220A ARINC 600 block, and consumes less than 100 mA.

NOTE: ***Whenever the configuration is modified, the changes must be saved using the CIM Editor screen and the unit must be rebooted.***

NOTE: ***These data files should be downloaded to a PC as a backup in case of CIM failure.***

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4.2 CIM Module LEDs

The CIM Module contains three LEDs. These LEDs are power indicators for the Configuration Board, SIM slot 1, and SIM slot 2. The LEDs have two states, ON (green) or OFF (no color), to indicate power supplied to the unit.

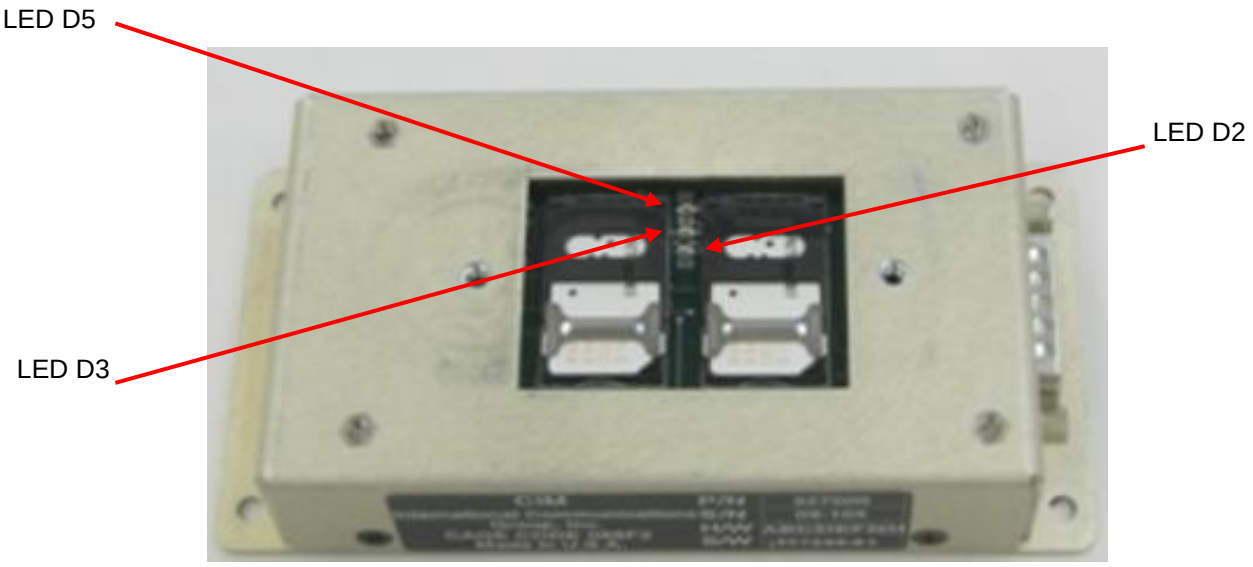

Figure 4-1. CIM Module LEDs

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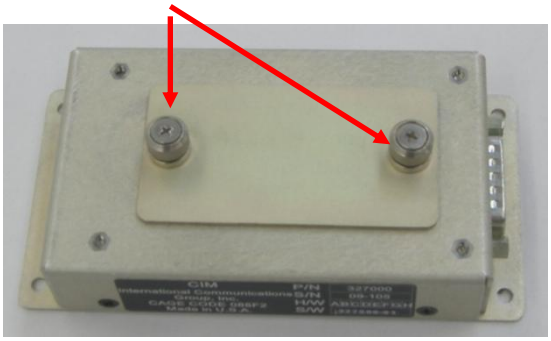
4.3 Inserting the SIM Cards

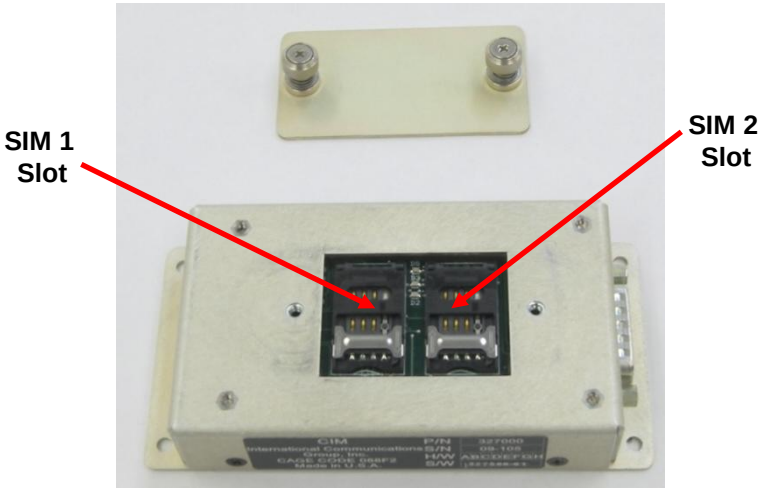
To insert the SIM cards into the CIM:

STEP	ACTION
1	**IMPORTANT**! Power down the ICS-120A/220A unit before installing the SIM cards.
2	Remove the front cover of the CIM.

Screws holding front cover in place over SIM card slots



CIM with front cover removed showing the SIM card slots



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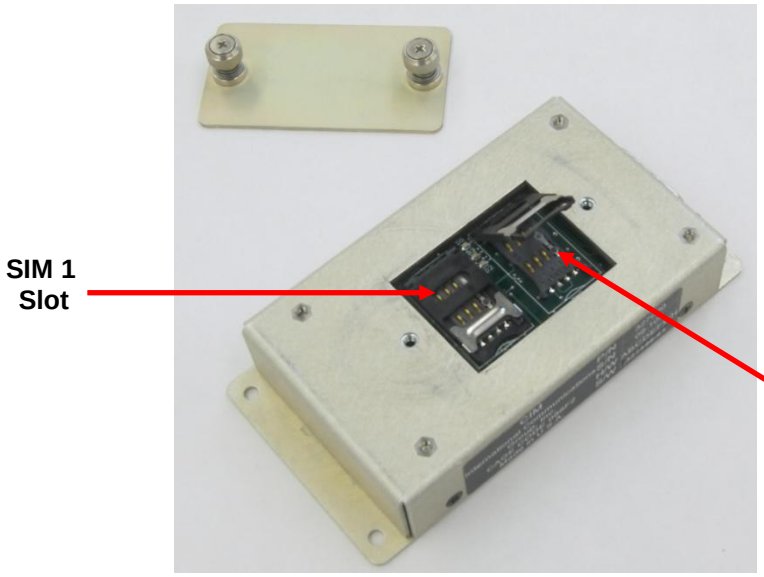
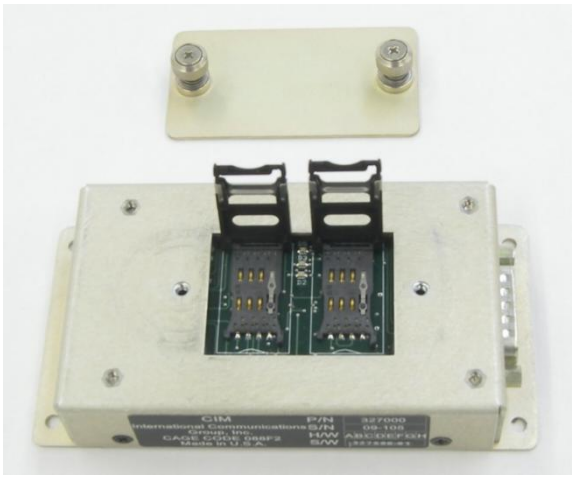
	CIM with one SIM card holder raised 
3	Lift both SIM card holders (for an ICS-220A only. An ICS-120A will only need SIM Card slot #1). **CIM with both SIM card holders raised** 

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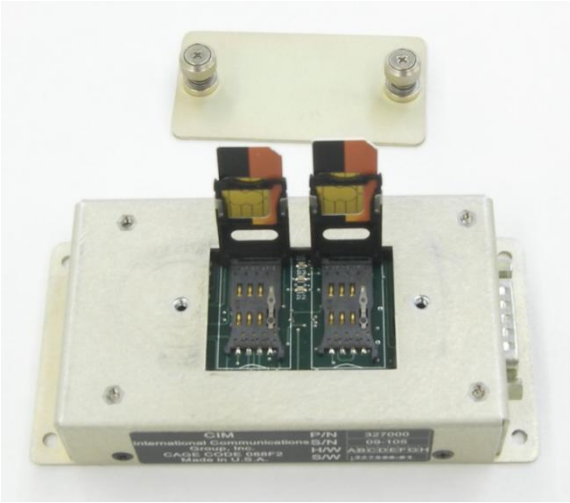
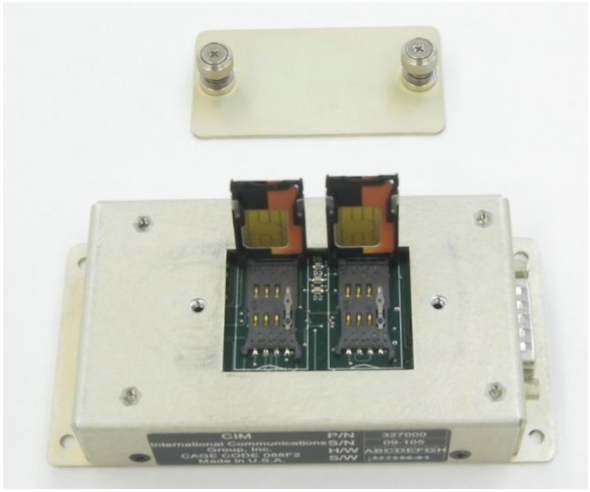
	Insert the SIM cards into the slots, making sure the clipped corner of the card is in the proper position, as shown in the picture below. 
4	Push the cards down into their holders so the tops of the cards are even with the tops of the holders. 

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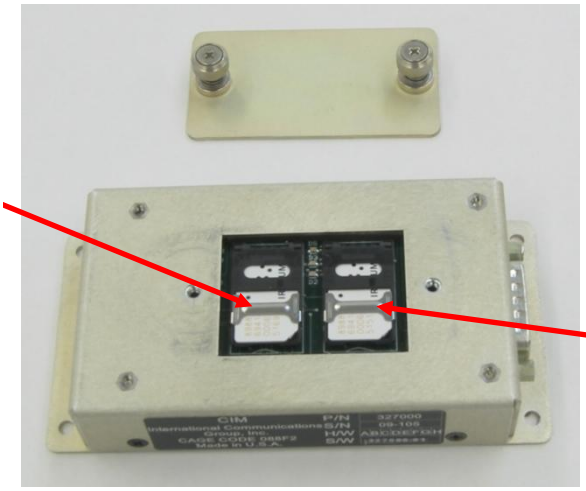
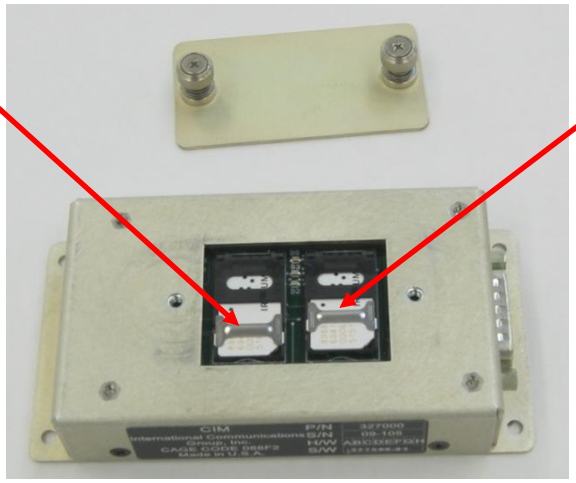
5	Push the cards and their holders down parallel to the surface of the CIM to seat them within the CIM. **Bar used to lock SIM 1 in place**  **Bar used to lock SIM 2 in place**
6	Slide the bar on each card holder down until the holder clicks and the SIM cards are locked in place. **SIM 1 is seated and locked in place**  **SIM 2 is seated but not locked in place**

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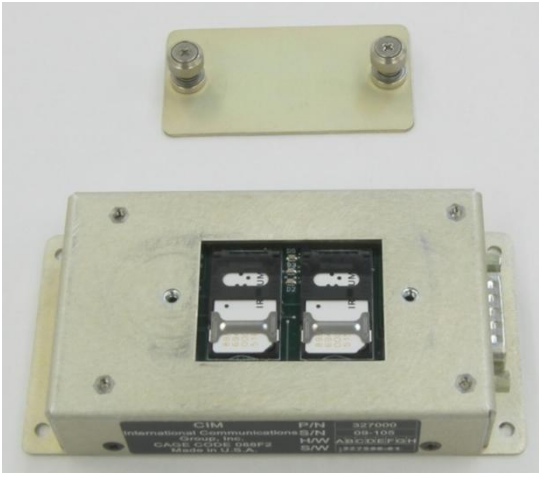
	Both SIM cards are now seated properly and locked in place. 
7	Replace the front cover of the CIM.
8	Power up the ICS-120A/220A.
9	Check the Trunk Monitor screen to ensure the transceivers initialize and go to IDLE, indicating the SIM cards have been properly registered.

4.4 De-pinning the SIM Cards

The system software provides the capability to de-pin SIM cards that are Pin-locked. The default PIN code is 1111. The SIM cards can be de-pinned via the USB interface. These interfaces do not require that the SIM cards be removed. The SIM cards are installed external to the system in the CIM (Configuration Identity Module).

NOTE: ***All ICG SIM Cards have their PIN requirements removed at ICG prior to shipping.***

To de-pin a SIM card via the USB interface:

STEP	ACTION
1	Using HyperTerminal or an equivalent application, press CTRL-C to bring up the command line interface.
2	Enter the following commands as needed. (type in all lower-case) To de-pin the SIM card for transceiver #1: 'connect lbt1' To de-pin the SIM card for transceiver #2 (in the ICS-220A only): 'connect lbt2'

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STEP	ACTION
3	Use the following AT command sequence once a serial connection has been made to the desired transceiver: 1. Command: AT 2. Response: OK 3. Command: AT+CPIN? 4a. If pin is unlocked, Response: +CPIN: READY ...or... +CPIN: SIM PIN2 4b. If pin is locked, Response: +CPIN: SIM PIN 5. Command: AT+CPIN=”1111” 6. Response: OK (may take up to 20 seconds) 7. Command: AT+CLCK=”SC”,0,”1111” 8. Response: OK (may take up to 20 seconds)
4	Reboot the system.

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5. ICS-120A/220A DATA FILES

5.1 Overview

The ICS-120A/220A installation CD includes four files along with the software firmware file (710500-XX.sim). Two of these files, the ATS (Air Traffic Services) directory file and the AOC (Aeronautical Operation Center) directory file, contain the telephone numbers of various air traffic control towers, among other air traffic services centers (ATS), and the telephone numbers of various centers that are specific to the aircraft or airline (AOC). The voice prompts file consists of four prompts for situations such as "Number not Found" and PIN entry calls. These prompts are recorded in English but can be translated to any language desired. Finally, the configuration file contains the default configuration for the ICS-120A/220A.

.

The file set for the ICS-120A/220A consists of the following files:

Table 5-1. The ICS-120A/220A Data files

FILE NAME	DESCRIPTION	FILE INSTALLATION METHOD	WHERE FILE RESIDES
710500-XX.sim*	Software Rev-XX firmware	Boot-loader	ICS-120A/220A
710500-XX-CFG.dat	Default configuration file	Command Line Interface (CLI)	CIM
710500-XX-VP.dat	Default voice prompts file	Command Line Interface	ICS-120A/220A
710500-XX-ATS.CSV	Default ATS directory file	Command Line Interface	CIM
710500-XX-AOC.CSV	Default AOC directory file	Command Line Interface	CIM

*Note: **XX** is the current Software Revision Number. For Revision 4, for example, the default voice prompts file would be 710500-04-VP.dat.

The following sections describe files 2 through 5 in the table above in greater detail.

5.2 The ATS Directory File

The Air Traffic Services or ATS Directory resides in the CIM (Configuration Identity Module) memory space. It is viewable and can be edited from the MCDU interface. However, the interface is password-protected: it can be viewed but not edited without first entering the password. This directory can accommodate a maximum of 400 entries.

NOTE: ***While the existing file entries can be modified, no entries can be added or deleted directly on the MCDU terminal.***

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Each entry in the ATS file includes the following information:

- Short code (6 digits)
- Description
- Phone number

These fields can be modified. See Section 12.12.3 for more information.

The ATS directory file may be uploaded and downloaded using the command line interface. See Section 5.6 for instructions.

5.2.1 Short Code Dialing

Each entry in the ATS directory has a unique, six-digit short code. If the user enters just six digits when making a call, the system compares these digits with all of the short codes in the ATS directory for a match. If there is a match, the call is processed using the corresponding phone number stored in the ATS.

5.3 The AOC Directory File

The Aeronautical Operation Center or AOC Directory resides in the CIM memory space. It is viewable and can be edited from the MCDU interface. This interface is password-protected. However, the file can be viewed but not edited without first entering the password.This directory can accommodate a maximum of 100 entries. If this file has been customized, it is advisable to download a copy to a PC as a backup in case of CIM failure.

NOTE: ***While the existing file entries can be modified, no entries can be added or deleted directly on the MCDU terminal.***

Each entry in the directory includes the following data:

- Speed-dialing code (3 digits)
- Description
- Phone number

See Section 12.12.3 for more information on how to modify these parameters.

The AOC directory file may also be uploaded and downloaded using the command line interface. See Section 5.6 for instructions.

5.3.1 Speed Dialing

Each entry in the AOC directory has a unique, three-digit short code. If the user enters just three digits when making a call, the system compares these digits with all of the speed-dialing codes in the AOC directory for a match. If there is a match, the call is processed using the corresponding phone number stored in the AOC.

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5.4 The Voice Prompt File

This file contains the voice prompts for the ICS-120A/220A PABX subsystem. An ICS-120A/220A unit must be used if it is desired to translate the default prompts into a different language. Note, however, that the particular function of a given voice prompt must be maintained. See Section 14 for more information on how to customize the voice prompts.

This file is stored within the system itself as digitized audio data, and not on the CIM. However, it can be downloaded via the Command Line Interface. If this file has been customized, it is advisable to download a copy to a PC as a backup.

This file may be uploaded and/or downloaded using the command line interface. See Section 5.6 below for instructions.

5.5 The ICS-120A/220A Configuration File

The configuration file contains the ICS-120A/220A unit default configuration parameters. During normal operations, the system reads the product configuration from the CIM (Configuration Identity Module) when the CIM is detected by the system during system power-up. If the CIM is not detected, or if the product configuration data stored in the CIM is missing or corrupted, the built-in product configuration data will be used instead.

5.6 Uploading and Downloading the Data Files

The system software supports the ability to upload and download the data files from a PC to the CIM. Press <**Ctrl/C**> on the keyboard connected to the unit to open the command prompt screen.

The following table summarizes the Command Line Interface (CLI) methods for uploading and downloading data files to the ICS-120A/220A unit.

Table 5-2. Uploading/Downloading Data Files Summary

CLI COMMAND	ACTION TAKEN
upload	Prepares the unit to accept a data file. Data files supported: • ATS Directory file • AOC Directory file • Unit Configuration file • Unit Voice Prompts file The data file is sent to the unit using the Terminal program's "Send Text File" utility. Any terminal program that can send text files may be used, e.g. HyperTerminal, PuTTY.
download	Downloads a specified data file from the unit. Command examples: download config download voice-prompts download ats-directory download aoc-directory

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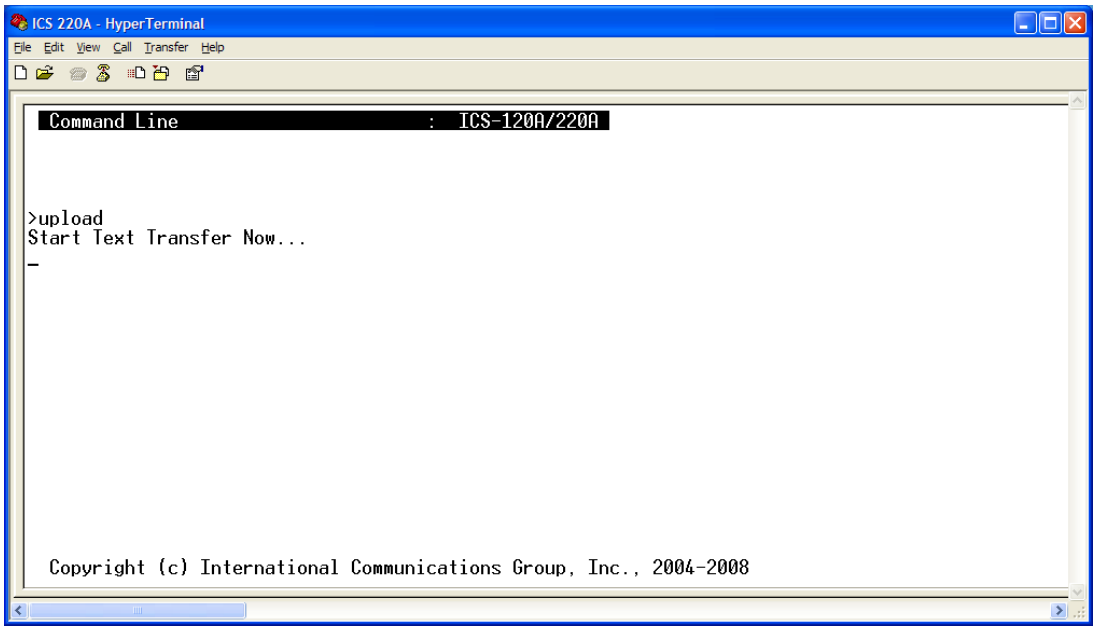
5.6.1 Uploading a Data File

All uploads are done from the command prompt with the 'upload' keyword, no other information will be needed. The upload handler can determine the upload type from the header information uploaded.

After the upload process is completed, the file will be processed by the application and either a success or a failure message will be returned to the user.

To upload a file using HyperTerminal or an equivalent application:

STEP	ACTION
1	Press <**Ctrl/C**> to bring up the Command Line Interface (CLI).
2	At the prompt, type in "upload" and press <**Enter**>. 
3	Click on Transfer>Send Text File... in the menu bar.

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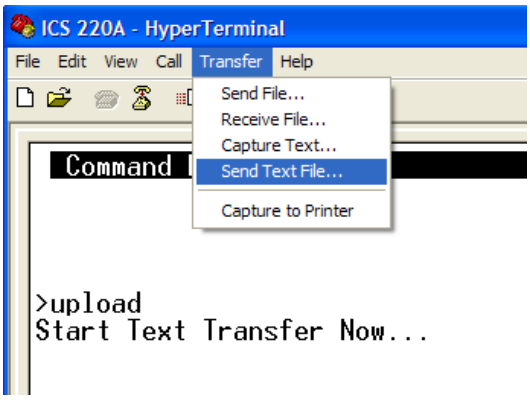
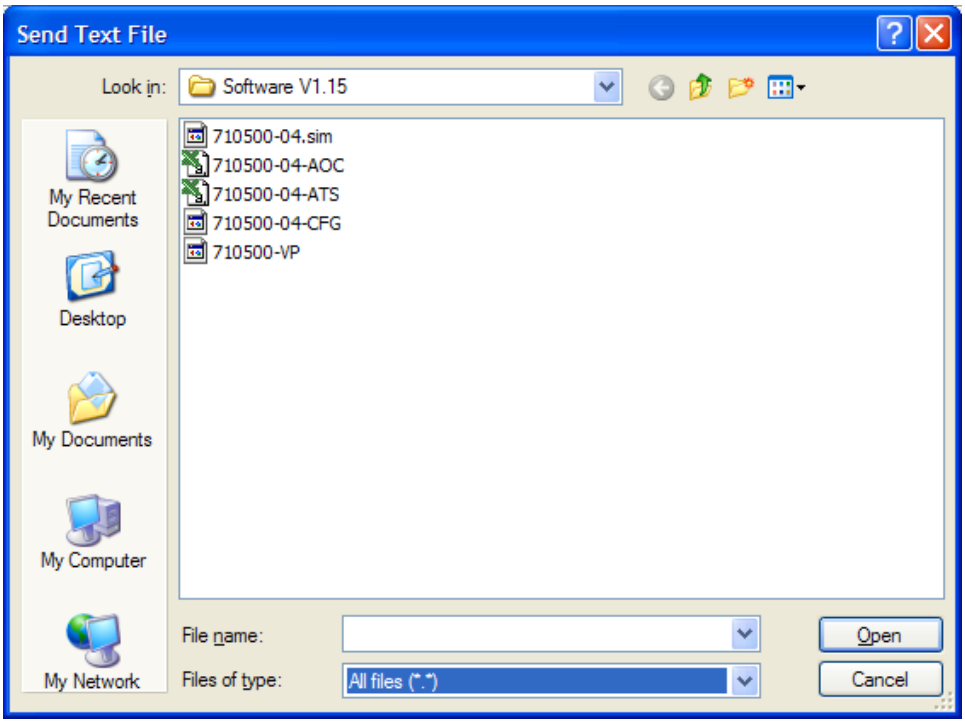


4 Select file to upload and click on <**Open**>.



NOTE: **Be sure the parameter <Files of type: > is set to <All files (*.*)>**

5 Wait for upload to complete.

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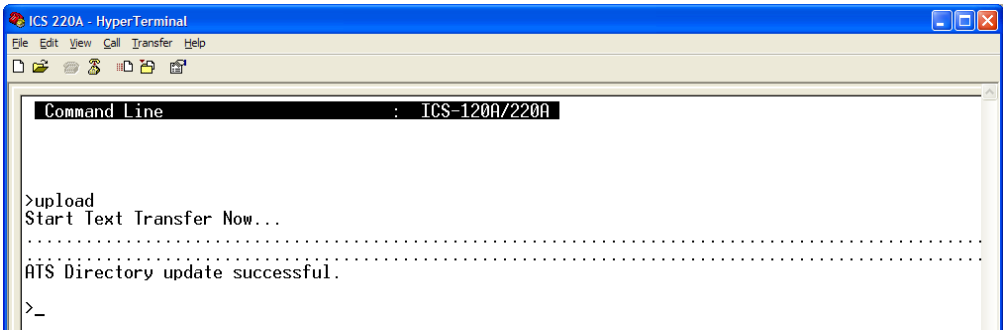
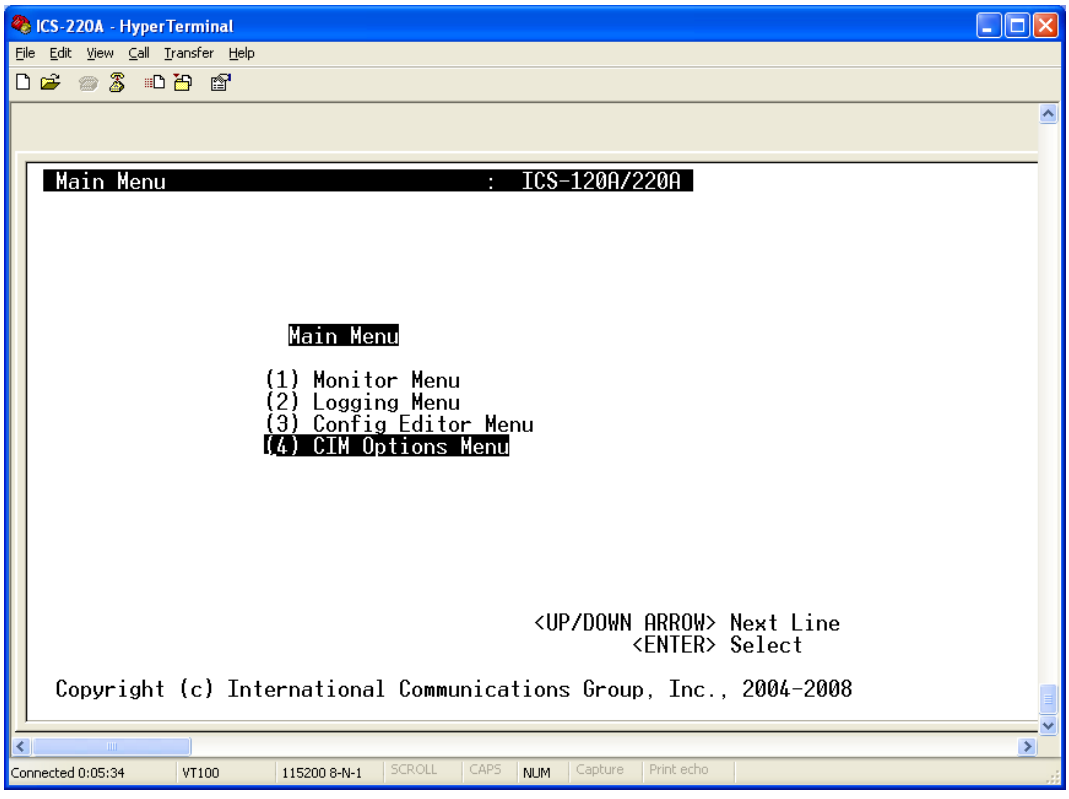


NOTE: **It may take a couple of minutes for the Voice Prompts file uploads to complete.**

6	Return to step 2 if there are more files to upload. Otherwise press <**F3**> to return to the Main Menu.
7	Select the CIM Editor on the Main Menu and press <**Enter**>.



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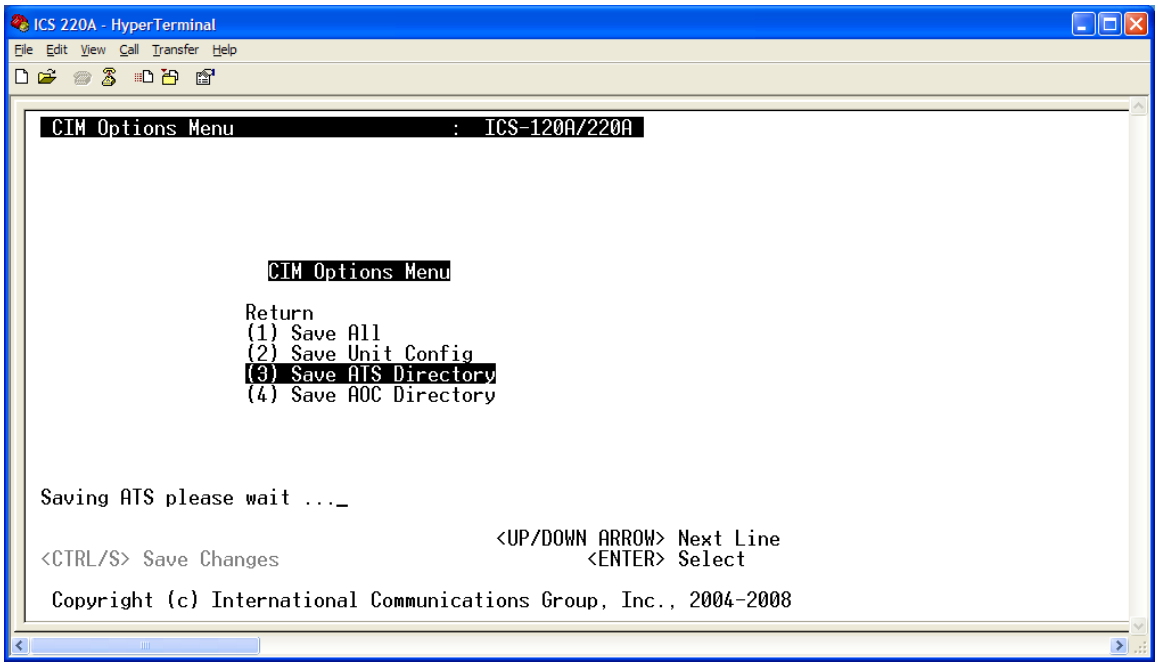
	NOTE: **The Voice Prompts file is uploaded directly to the ICS-120A/220A system and is not stored on the CIM. Once the voice prompts file has been customized, it should be downloaded and stored on a PC as a backup measure.**
8	If only one file is to be updated, select the option that fits that file type. If all the data files are being updated, select option 1, "Save All". 
9	Press <**Ctrl/S**> to save the file(s) to the CIM.
10	Wait for the success message to appear.

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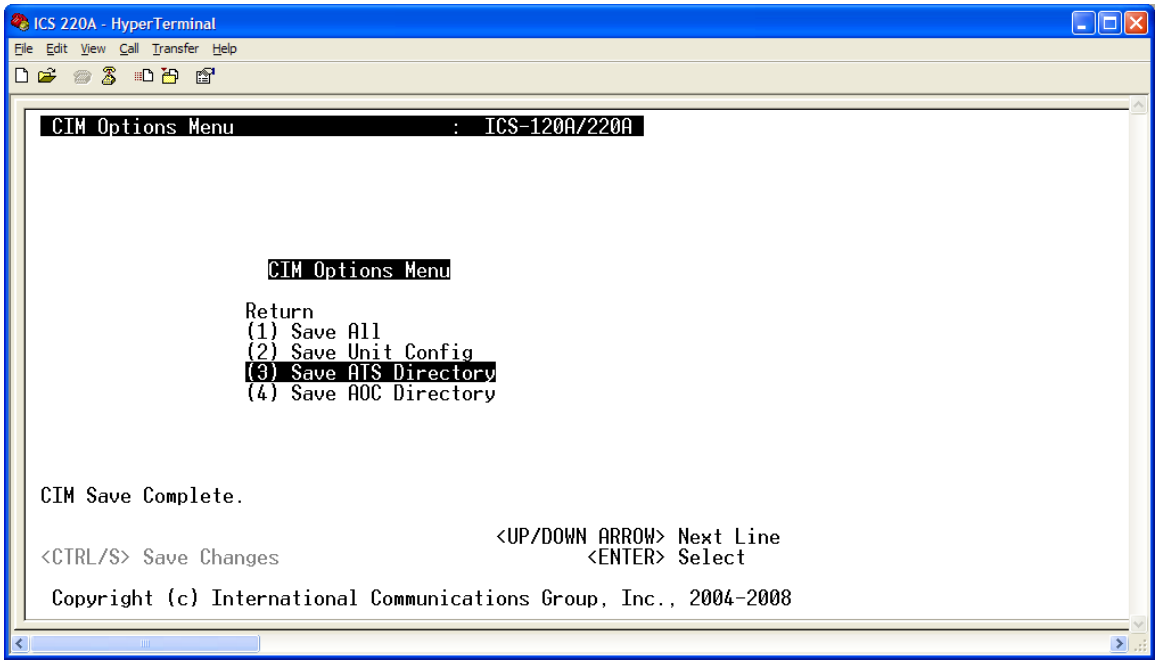
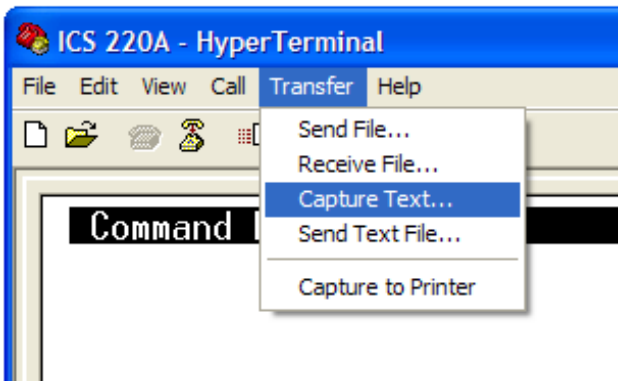
	
11	Reboot the system for the changes to take effect.

5.6.2 Downloading a Data File

All downloads are done from the command prompt with the 'download' keyword being used. Eg: 'download configuration' will download the configuration block from the unit.

To download a file from the CIM to a file on the PC:

STEP	ACTION
1	Press <**Ctrl/C**> to bring up the Command Line Interface (CLI).
2	Click on Transfer > Capture Text... in the menu bar. 

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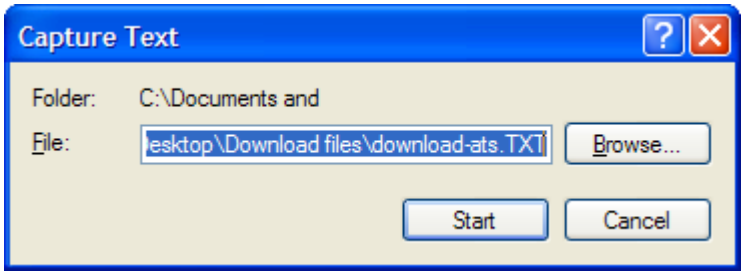
3	Select the file location to store the downloaded file. 
4	Select file and click on <**SAVE**>. **NOTE:** **Be sure "Files of type: " is set to "All files (*.*)"**
5	At the prompt, enter one of the following, depending on which file is to be downloaded and then press <**Enter**>: >download config >download voice-prompts >download ats-directory >download aoc-directory **NOTE:** **It may take a couple of minutes for the Voice Prompts file downloads to complete.**
6	Click on Transfer > Capture Text > Stop when the download is complete.
7	Press <**F3**> to return to the Main Menu. **NOTE:** **If there are more files to download, return to step 2** .

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6. INITIALIZING THE SYSTEM

The ICS-120A/220A system may not initially have all the files installed that are required for all functions and features to run properly. It will most likely come with the voice prompts file and the configuration file installed, but not the ATS and AOC directory files installed.

Normally, the ICS-120A/220A unit is delivered already configured. The CIM will already contain the default ATS Directory file and the default AOC Directory file. The default voice prompt set will already be installed in the unit.

When the ICS-220A unit is first installed into a tray, but is not already configured, the POWER lamp will flash Red/Green. This indicates that the unit is not functioning with the configuration in the CIM module. This is normal for units with BLANK CIM modules.

Once the ICS-120A/220A is installed into the tray on the aircraft, the installer may need to do all, some, or none of the following to complete the initialization of the unit:

STEP	ACTION
1	Check with ICG Technical Support if unsure what needs to be done.
2	Upload the configuration file to the CIM. See Section 5.6 for instructions.
3	Proceed to the CIM Options menu on the HyperTerminal screen, press <**Ctrl/S**>, and save the configuration to the CIM.
4	Customize the AOC Directory file, if needed (see Sections 5 and 12), and upload to the CIM.
5	Proceed to the CIM Options menu on the HyperTerminal screen, press <**Ctrl/S**>, and save the AOC directory file to the CIM.
6	Upload the ATS Directory file to the CIM.
7	Proceed to the CIM Options menu on the HyperTerminal screen, press <**Ctrl/S**>, and save the ATS directory file to the CIM.
8	Upload the voice prompts file to the system.
9	Reboot the unit.
10	Check the POWER lamp. The POWER lamp should remain GREEN when running, meaning the CIM is functioning and the configuration has been properly saved.

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7. UPGRADING THE FIRMWARE AND CONFIGURATION FILE

The following procedure describes how to upgrade the firmware on the ICS-120A/220A. This procedure assumes that the necessary steps were carried out to install the required USB drivers (see the USB Driver Manual P/N 234701)

7.1 Equipment Needed

The following equipment is needed for this procedure:

- A PC with an available USB port running Windows 2000/XP with installed ICS-120A/220A device drivers.
- USB cable.
- 28-VDC power supply.

7.2 Procedure

Use the steps outlined below to load the firmware file (710500-XX.sim where XX is the revision number). It is recommended that the installer read through the steps before beginning the procedure.

STEP	ACTION
1	Connect the power supply to the ICS-120A/220A per Slot C pinouts (see Figure 3-4 and Section 3.4) and keep the power off.
2	Connect the USB cable from the ICS-120A/220A to the PC.
3	Start HyperTerminal on the PC with the saved terminal configuration created when setting up the drivers.
4	Power up the ICS-120A/220A. The power indicator will be red for 10 seconds.
5	Wait for the power indicator to turn green.
6	Click the <**Call**> button in HyperTerminal quickly; you have only 10 seconds to enter the boot loader while th power indicator is green. Then you will see the following: "Testing Memory.....[done]"
7	Wait for the “BOOTLOADER Version .....” message to appear on the screen.
8	Type the word <**load**>. You should see the text, “Start the Xmodem transfer now…” followed by a “C” as shown above.
9	Select “Transfer” in the HyperTerminal menu bar at the top of the window.

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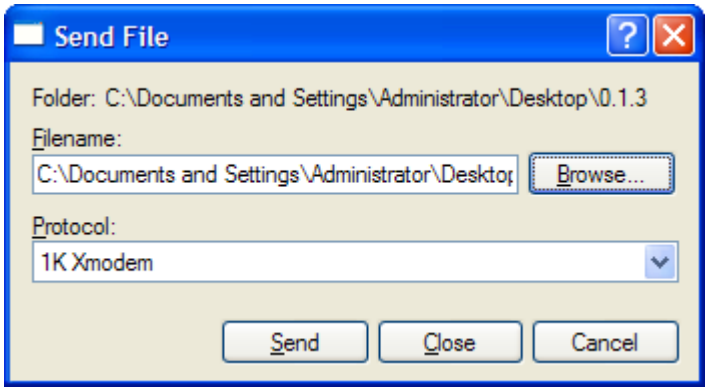
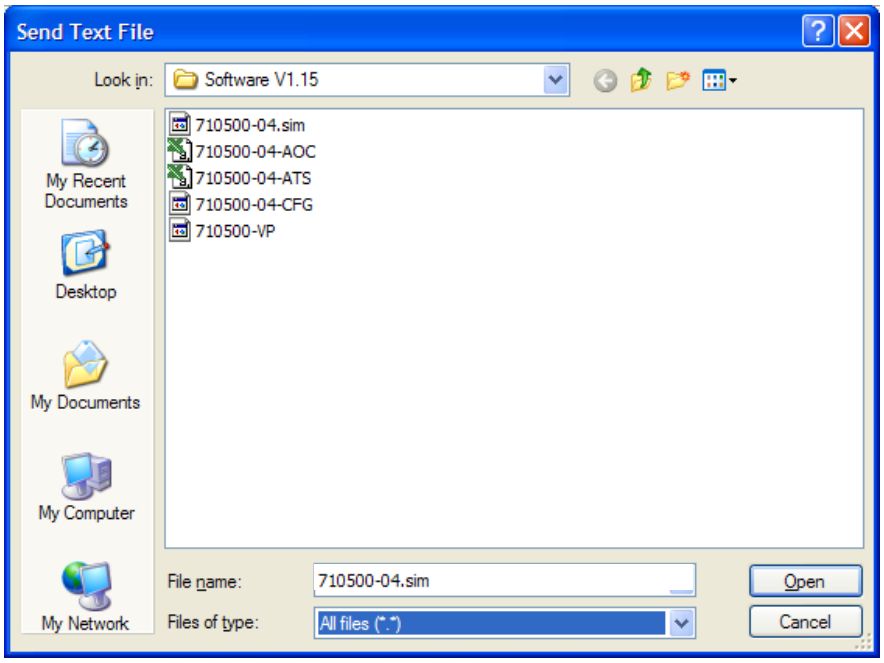
STEP	ACTION
10	Select the “Send” menu option.
11	Change the Protocol field to 1K Xmodem, if needed, and then click on the <**Browse**> button. 
12	Select the firmware file (710500-XX.sim) to upload to the ICS-120A/220A. 
14	Click on <**Open**>.

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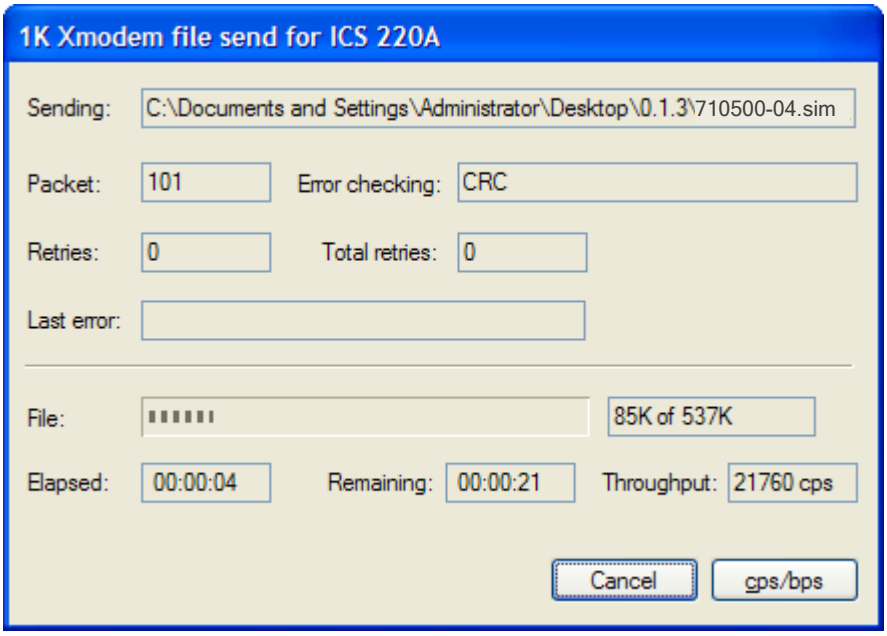
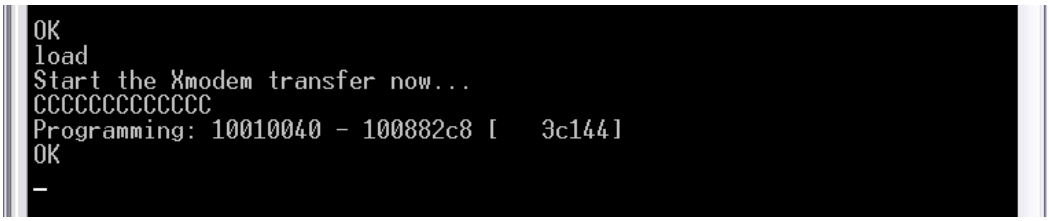
STEP	ACTION
15	Wait for the following screen to be displayed: 
16	Wait for the upload process to complete and for “OK” to appear on the screen: 
17	To exit the bootloader simply type “exit” and press <**Enter**>. The unit will begin to start the main application.

Once the USB driver has been installed, the firmware and configuration files loaded, and a PC attached to the unit, the following operations are available using HyperTerminal:

- Viewing and Editing the System Configuration
- System Monitoring
- System Logging
- CIM Operations

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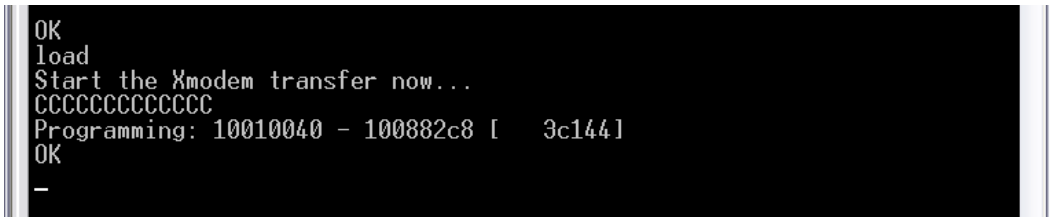
7.3 Troubleshooting

7.3.1 Known Problem with the Windows USB Driver

There is a known bug in the Windows USB driver which shows up in certain USB chipsets. When this bug is present, the ICS-120A/220A is unable to report the programming result at the end of a firmware upgrade.

However, the configuration is not affected and the problem does not affect the USB User Interface function to Configure and Monitor system settings and operations.

On platforms where the problem does not exist, the figure below shows the end of the Firmware Upgrading procedure.



On computer platforms with the problem, the firmware upgrade succeeds but the final message “Programming: 100010040 – 100xxxxx OK’, does not appear.

7.3.2 Workaround

After the XModem file transfer completes, the user must wait 1 minute before power-cycling the system. Verification of the firmware upgrade by inspecting the System Monitor screen is recommended. At this point the Firmware Upgrade is complete.

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8. THE ICS-120A/220A MENU SYSTEM

8.1 Starting HyperTerminal

To enter HyperTerminal:

1	Connect the USB cable from the ICS-120A/220A to the PC.
2	Start HyperTerminal on the PC with the saved terminal configuration created when setting up the drivers.
3	Power up the ICS-120A/220A. The power indicator will be red for 10 seconds.
4	Wait for the power indicator to turn green.
5	Wait ten seconds. Click the <**Call**> button in HyperTerminal. **NOTE:** ***If you accidentally enter the bootloader instead of the HyperTerminal Main Menu, type "exit" and disconnect from HyperTerminal (by pressing <Disconnect>) and try again.***

8.2 Navigating through the HyperTerminal Screens

The list below describes the keys used in navigation:

<↑>	Selects the previous menu or field
<↓>	Selects the next menu or field
<←>	Selects the previous field data option
<→>	Selects the next field data option
<**Enter**>	Selects a menu option or allows changes to a field
<**F1**>	Displays the Stations Monitor screen
<**F2**>	Displays the Trunks Monitor screen
<**F3**>	Displays the Main Menu screen
<**F4**>	Displays the Hunt Groups Monitor screen
<**=**>	Copies all station/trunk features to all other similar stations/trunks
<**Esc**>	Navigates to the previous screen
<**Ctrl/S**>	Saves configuration changes to flash

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8.3 The Main Menu

The starting point for any system operation is the **Main Menu**. The **Main Menu** consists of four options for navigation purposes. These are the Monitor, Logging, Configuration Editor, and CIM Options Menu options.

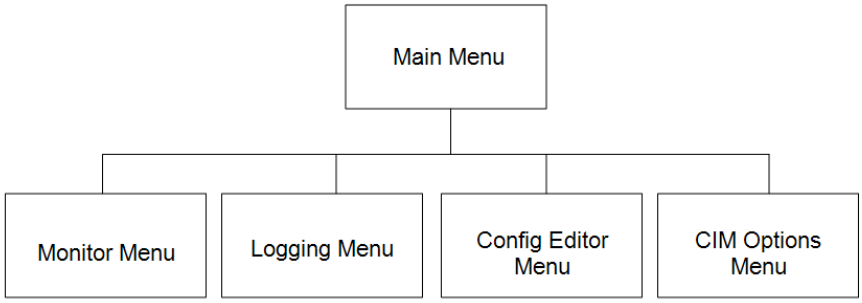

Figure 8-1. The Main Menu

STEP	ACTION
1	Press <**F3**> if the Main Menu is not already displayed on the screen.
2	Use the <↑> and <↓> arrow keys on the keyboard to highlight the desired menu selection.
3	Press <**Enter**>.

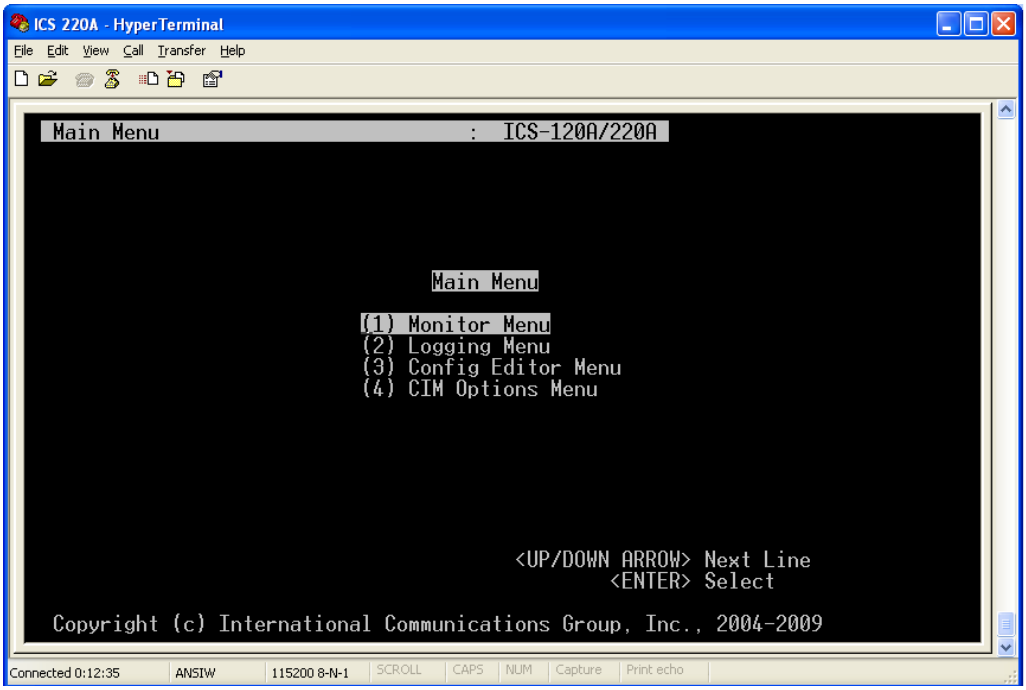

Figure 8-2. Sample Main Menu Screen.

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The CIM Options Menu only has one screen which displays the various options for saving the data files.

The Monitoring utility includes the following screens:

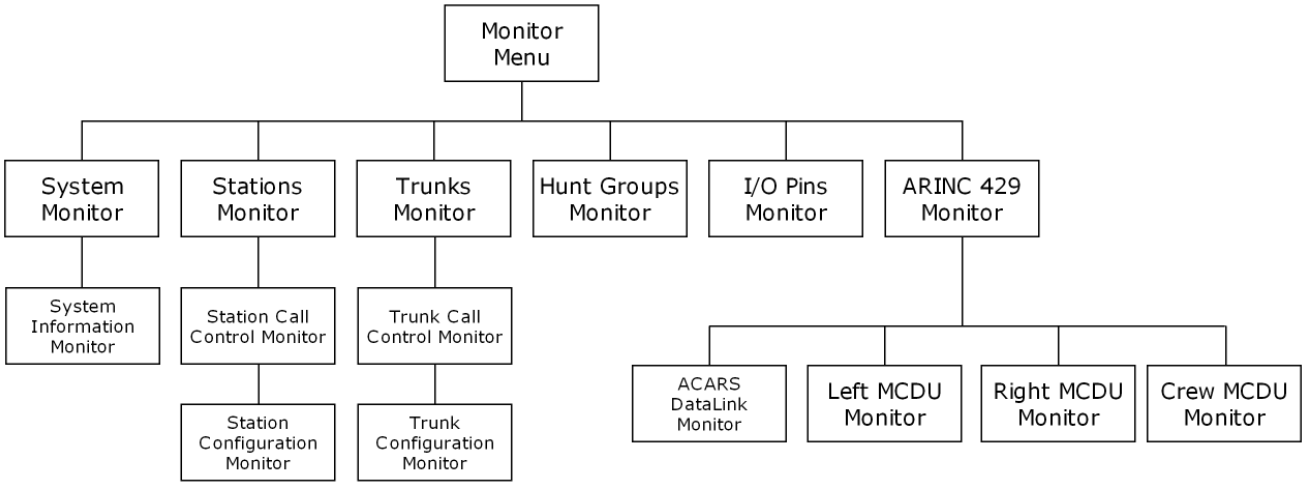

Figure 8-3. Monitoring Screens

The logging utility includes the following screens:

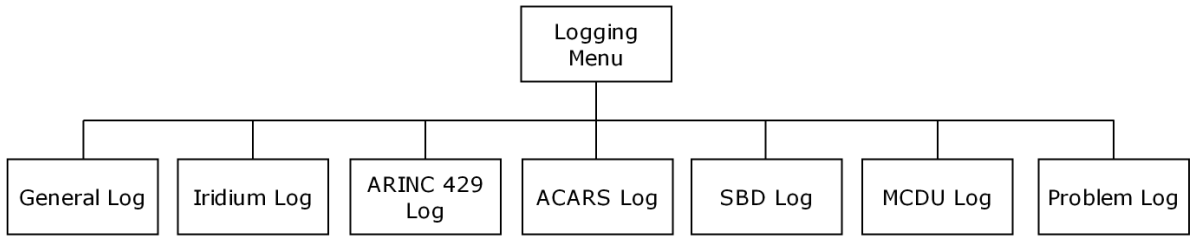

Figure 8-4. Logging Screens

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The Configuration Editor utility includes the following screens:

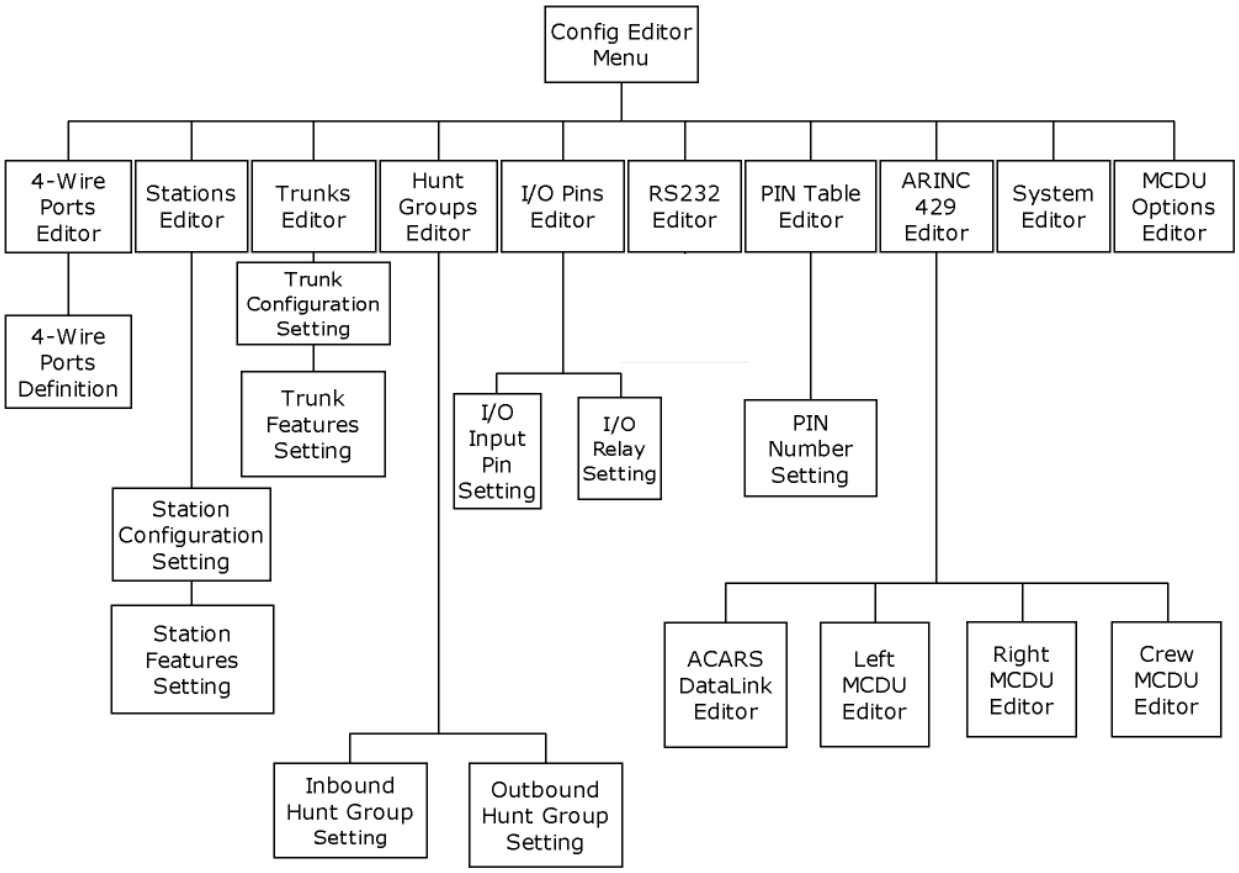

Figure 8-5. Configuration Editor Screens

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9. CONFIGURING THE SYSTEM

9.1 Overview

Simple editor screens have been designed to allow the user to modify the current configuration setup, which is stored in the CIM Module. To make changes, simply select the screen associated with the action or change required, and adjust the parameters shown.

NOTE:

It is important to understand what each screen does, as these are the only way to make changes to the system.

To start the Configuration Editor:

STEP	ACTION
1	Power up the unit and wait for it to initialize.
2	Click on HyperTerminal. (Start>All Programs>Accessories>Communications>HyperTerminal)
3	Press <**F3**> and wait for the Main Menu to appear on the Iridium Utility screen.
4	Select the “Config Editor Menu” option using the <↓> key and press <**Enter**>.

After the Configuration Editor initializes, the unit software copies the current configuration from flash memory into Random Access Memory (RAM) where it can be modified.

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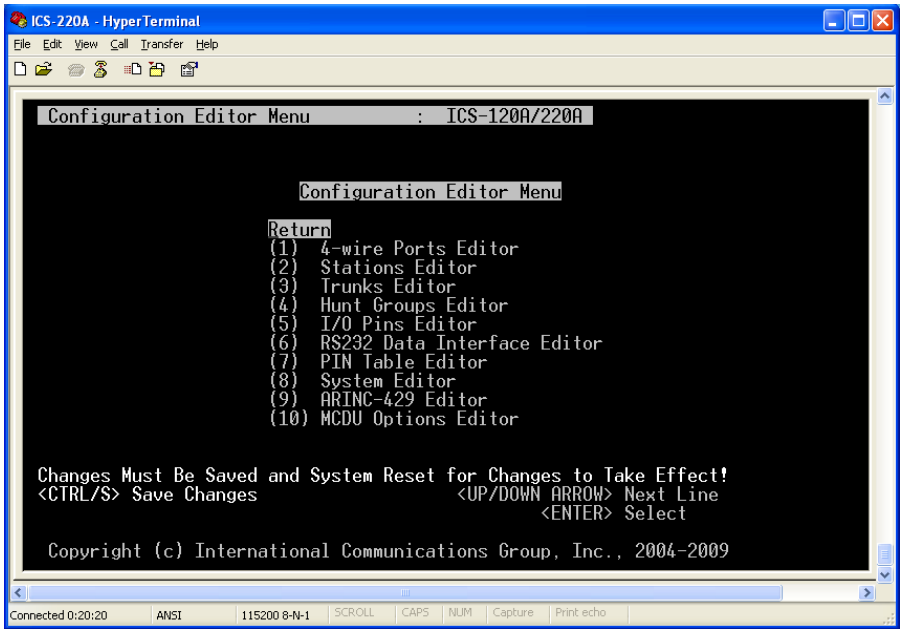

Figure 9-1. Sample Configuration Editor Menu Screen

To select the desired Configuration Editor option:

STEP	ACTION
1	Move the cursor from option to option by pressing the <↑> and <↓> keys and press <**Enter**> when the desired option is highlighted.
2	Wait for the selected editor screen to appear.
3	Move the cursor from field to field by pressing the <↑> and <↓> keys. There are two different types of editable fields on the various screens: Text Fields: Many text fields display validation rules. List Fields: Select a parameter value from a pre-defined list of values by using the <←> and<→> keys.
4	After editing the fields, return to the Configuration Editor Menu Screen (Unit Setting Screen) by pressing the <**Esc**> key.
5	Press <**Ctrl/S**>. The unit application verifies that a change has been made and then saves it. If no changes were made, it ignores the “Save” command.

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NOTE:

The Save Option is presented only on the Configuration Editor Menu Screen. To permanently save changes, you must save your configuration to the CIM Module.

NOTE:

Multiple changes can be introduced during a configuration session. All the changes will be saved when you click on <Ctrl/S>.

NOTE:

***IMPORTANT:** When making adjustments to the Gain Control parameters, the unit must be rebooted. The DSP must be reloaded in order for the Gain Control changes to take effect.*

NOTE:

***IMPORTANT:** When making adjustments to the I/O parameters the unit must be rebooted in order for the changes to take effect.*

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9.2 4-Wire Ports Definition

Main Menu > Configuration Editor Menu > 4-Wire Ports Editor

The ICS-120A/220A has two 4-wire ports. Each 4-wire port can assume one of the following logical configurations:

- MCDU (default)
- STATION
- TRUNK

Use the **4-Wire Ports Definition** screen to set the ports to one of these configurations.

STEP	ACTION
1	Select the **4-Wire Ports Editor** option from the **Configuration Editor Menu** using the keyboard <↑> and <↓> keys.
2	Press <**Enter**>.

NOTE: ***A reboot is required whenever a change is made in the port configuration and saved. Note that such a change also requires changes in hunt groups and other parameters.***

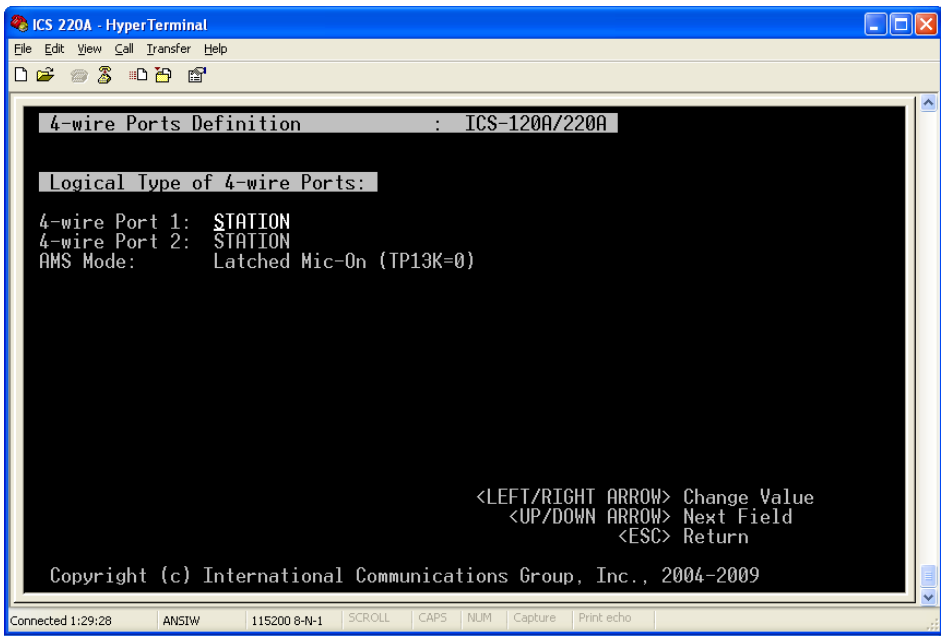

Figure 9-2. 4-Wire Ports Definition Screen

The ports in Figure 9-2 are currently set to MCDU (Multi-Purpose Control and Display Unit). If Station (4-Wire) is selected or Trunk is selected, the related parameters and features are set using the Stations Editor for the 4-wire stations and the Trunks Editor for a Trunk.

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The Audio Management System (AMS) mode has two options. The difference between the two modes is how active calls are terminated for extensions 15 and 16 (when configured as MCDU devices).

PARAMETER	VALUES	DESCRIPTION
AMS Mode	1. Latched Mic-On (TP13K=0)	The call is terminated when the Hook Switch signal (Discrete-2) transitions from closed to open.
	2. Switched PTT (TP13K=1)	The call is terminated when the <END CALL Line Select Key button is pressed on the MCDU.

NOTE:

When a 4-wire port is configured for the MCDU, it is associated to either or both transceivers depending on how they are set up in their respective outbound hunt groups.

9.3 The Stations Editor

Main Menu > Configuration Editor Menu > Stations Editor

This screen is used to select a 2-wire station, a 4-wire station, or an MCDU port in order to make changes to the settings. To access the **Stations Editor** screen:

STEP	ACTION
1	Select the **Stations Editor** option from the **Configuration Editor Menu** using the keyboard <↑> and <↓> keys.
2	Press <**Enter**>.

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9.3.1 Editing a 2-Wire Station (Ports 11 through 14 Only)

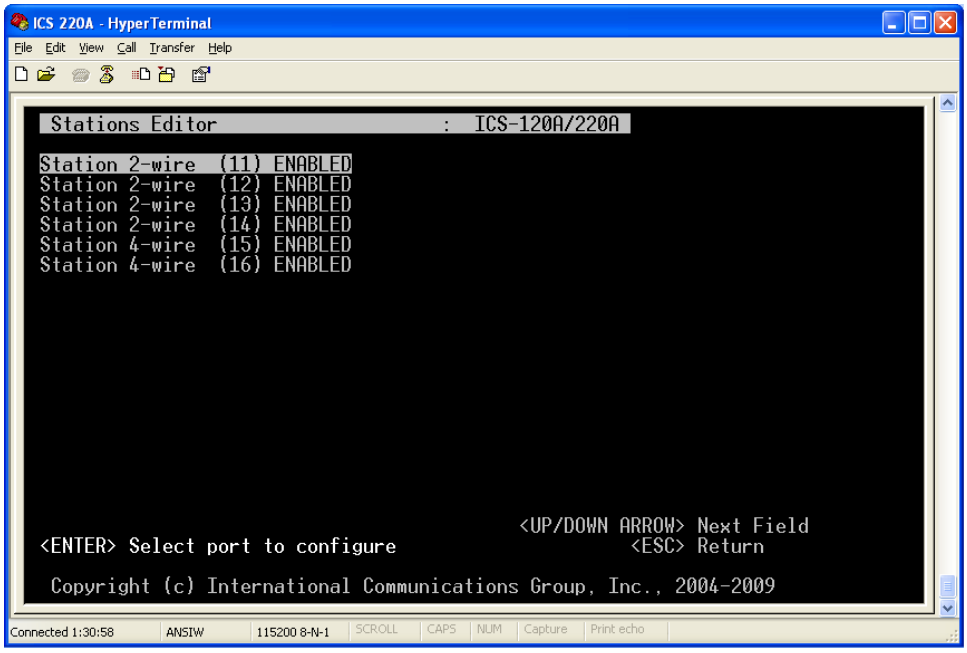

Figure 9-3. Sample Stations Editor Screen

The Stations Editor Screen presents a title consisting of the label "**Station**"**,** the port type, and the associated extension number, <xx> (a unique 2-digit number from 11 to 16). The station can either be **ENABLED** or **DISABLED**. The port type has one of three possible values:

- 2-wire telco tip-and-ring port (ports 11 to 14)
- 4-wire audio port, which has hook-and-incoming-ring signals (ports 15 and 16 only).
- MCDU port (ports 15 and 16 only)

9.3.1.1 Station Configuration Setting Screen for 2-Wire Stations

Main Menu > Configuration Editor Menu > Stations Editor > Station Configuration Setting

The **Station Configuration Setting** screen**,** as shown in the figure below, is used to make changes to a particular station port.

To access the **Station Configuration Setting** screen from the Stations Editor Screen:

STEP	ACTION
1	Select a station port on the **Stations Editor** screen using the keyboard <↑> and <↓> keys.
2	Press the <**Enter**> key on the highlighted station port row.
3	Press the <**Esc**> key to return to the Stations Editor screen when done.

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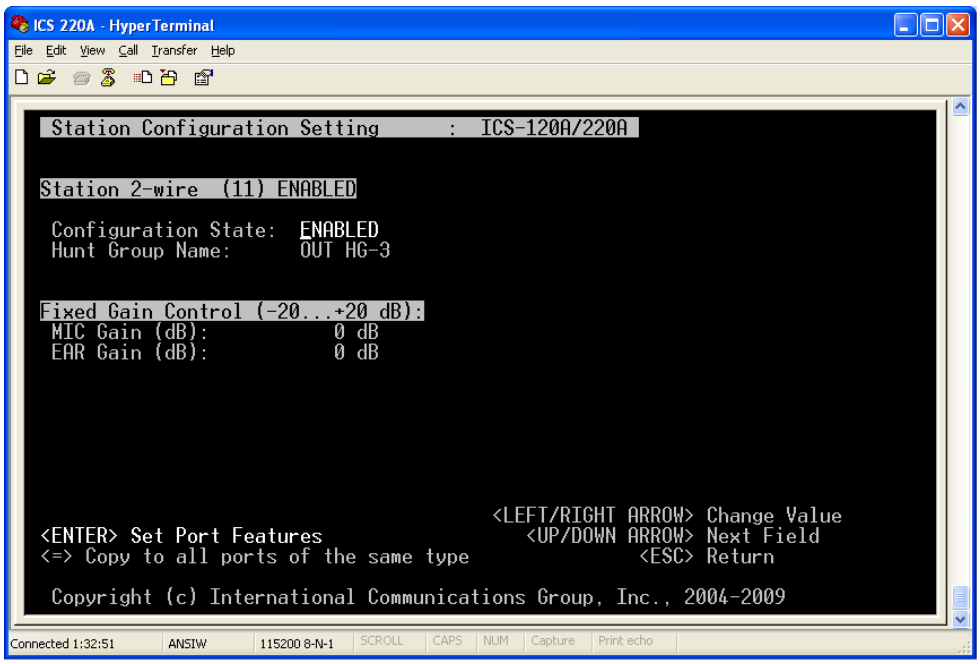

Figure 9-4. Sample Station Configuration Setting Screen

PARAMETER	DESCRIPTION
Configuration State	A 2-wire station can either be ENABLED or DISABLED.
Hunt Group Name	Select either HG-3 or HG-4. (**Note**: although other Hunt Groups are listed, HG-3 and HG-4 are the default Hunt Groups for the 2-wire stations 11 through 14. It is suggested that HG-1 and HG-2 are not modified to ensure MCDU compatability.)
Fixed Gain Control	The Gain Control parameters permit gain or attenuation adjustments in the RX (EAR) and TX (MIC) directions, ranging between -20 dB and +20 dB in 1 dB steps. 0 dB is the default gain value in both RX and TX directions.

9.3.1.2 Station Features Setting Screen: 2-Wire Stations

Main Menu > Configuration Editor Menu > Stations Editor > Station Configuration Setting > Station Features Setting

The Configuration Editor displays permission, restriction, and configuration parameters as a set of Class of Service (COS) Fields. All the currently supported features are listed on the Station Features Setting Screen.

You can **ENABLE** and **DISABLE** a selected feature by using the <←> and <→> keys:

STEP	ACTION
1	Use the <↑> and <↓> keys to select a parameter or field.
2	Press the <←> and<→> keys to scroll through the permissible settings for the port.

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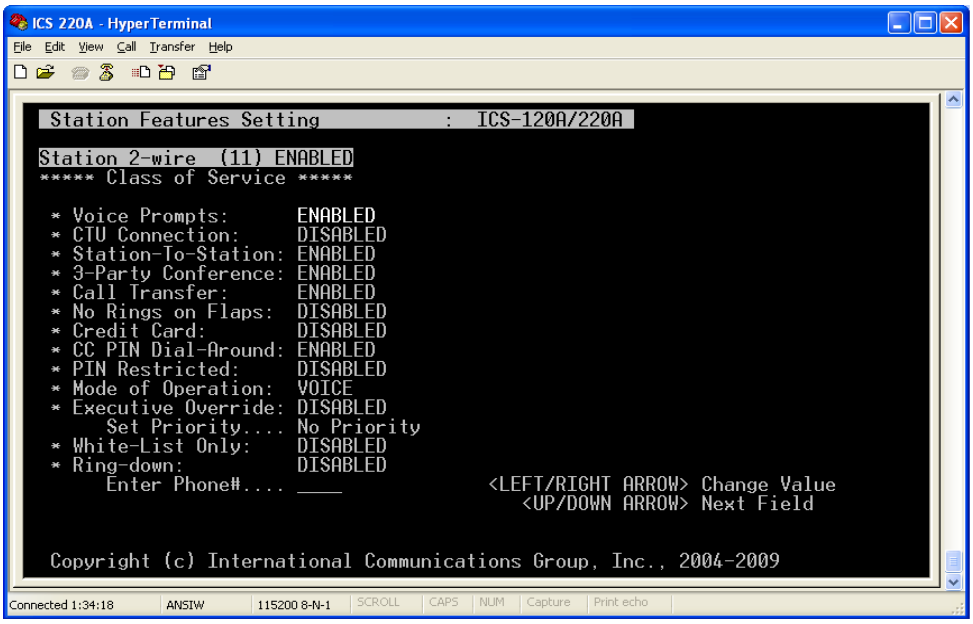

Figure 9-5. Station Features Setting Screen: 2-Wire Stations

The following are the current features defined for an ICS-120A/220A 2-wire station port:

FEATURE	DESCRIPTION
Voice Prompts	Set to Enabled to activate this feature. See Section 14 for more information.
CTU Connection	Set to Enable to activate this feature. This feature is designed to be used with CTU integrations, where dial-tone could be used as a machine interface to indicate an Iridium channel is available for making a voice call. If no Iridium channels are available for the extension port in use, no dial-tone is played back.
Station-To-Station (Analog and MCDU)	Allows calls from one on-board extension to another.
3-Party Conference (Analog only)	Allows an extension to initiate a three-party conference call.
Call Transfer (Analog only)	Allows the transfer of an incoming call to another on-board extension.
No Rings on Flaps	Allows control over whether the system rings the flight deck telephone during critical flight operations such as take-off and landing. **NOTE:** ***This feature requires that the flap switch position signal be wired to the input.***
Credit Card	To place a credit card call over the Iridium network: • A SIM card provisioned for credit card service must be installed (internal to the LBT or external in the CIM). • The system software must dial the appropriate dialing pre-fix to instruct the Iridium switching network to route the call to the Iridium Credit Card Platform on the ground side.

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<table>
<tr><th>FEATURE</th><th>DESCRIPTION</th></tr>
<tr><td></td><td>
<table>
<tr><td>Pre-Fix Digits
e.g. 00</td><td>Phone Number
e.g. 1 757 947 1030</td></tr>
</table>
<table>
<tr><th>Pre-Fix Digits</th><th>Call Routing</th><th>Call Processing</th></tr>
<tr><td>00</td><td>Normal Routing</td><td>The call is routed to the normal Iridium switching platform on the ground. Credit card prompts are not generated and the call succeeds normally.</td></tr>
<tr><td>280</td><td>Credit Card Routing</td><td>The call is routed to the Iridium Credit Card Platform on the ground. Credit card prompts are generated on the ground and the user inputs the credit card information. The call succeeds when the user information is validated on the ground.</td></tr>
<tr><td>28</td><td>Post-Paid Routing</td><td>The call is routed to the Post-Paid Iridium switching platform on the ground. Credit card prompts are not generated and the call succeeds normally. The customer (account holder of SIM card in use) is billed at the end of the billing cycle.</td></tr>
</table>
Note: The user should not dial the pre-fix digits. The ICS unit automatically selects the call routing based on system configuration.”
</td></tr>
<tr><td>CC PIN Dial-Around</td><td>The Credit Card PIN Dial-Around is a PABX capability that allows the user to bypass the credit card processing by entering a valid PIN. The Credit Card PIN Dial-Around is only applicable when the Credit Card Restriction is enabled for that given extension. Note that it is assumed that Credit Card PIN Dial-Around and Credit Card Restriction COS (Class of Service) are enabled only when the ICS-120A/220A system has Credit Card provisioned SIM cards installed.

When enabled, if a PIN is entered by the user, if a match is found, the call is routed to the Iridium Post-Paid switching network.

If the entered PIN is not found in the global PIN Table, or is not entered at all, the call is routed to the Iridium Credit Card Platform to collect the User’s credit card information. This is true when the ICS-120A/220A system has Credit Card provisioned SIM cards installed.</td></tr>
<tr><td>PIN Restricted</td><td>Restricts station use by non-authorized users. When this feature is enabled, a caller must enter a valid PIN before the call will go through. A valid PIN number is any number enabled in the PIN table. The PIN numbers in the PIN table are configurable (see Section 9.8).</td></tr>
<tr><td>Mode of Operation
(Analog only)</td><td>Voice or Data.</td></tr>
<tr><td>Executive Override
(Analog and MCDU)</td><td>Allows you to define the station priority for placing an outbound call, the highest of which is priority 1. Calls placed from this station with predefined priority may pre-empt an existing call if the existing call has been placed from a station with a</td></tr>
</table>

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FEATURE	DESCRIPTION
	lower-priority setting. The station priority may be set in the **Configuration Editor** List Field, "Set Priority." The following options for this field are available: • No Priority (default) • Priority N, where N = a number between 1 and 6
White-List Only	The ICS-120A/220A supports restricting calls to ONLY those numbers contained in the ATS/AOC phone books. This feature can be enabled and disabled on a station-by-station basis. Once enabled, each number entered will be checked by the system to see if it is present in either the AOC or ATS Directories before the number is dialed. No other outbound numbers will be allowed.
Ring-Down (Analog only)	Allows the system to automatically dial a predefined ground-based number. **NOTE:** ***If you ENABLE this feature, the predefined phone number must be set in the "Enter Phone#" Field. You cannot return to the Configuration Editor Menu screen unless you insert a value in this field.***

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9.3.2 Editing a 4-Wire Station (Ports 15 and 16 only)

Main Menu > Configuration Editor Menu > Stations Editor

To access the **Stations Editor** screen:

STEP	ACTION
1	Select the **Stations Editor** option from the **Configuration Editor Menu** using the keyboard <↑> and <↓> keys.
2	Press <**Enter**>.

The following screen will appear.

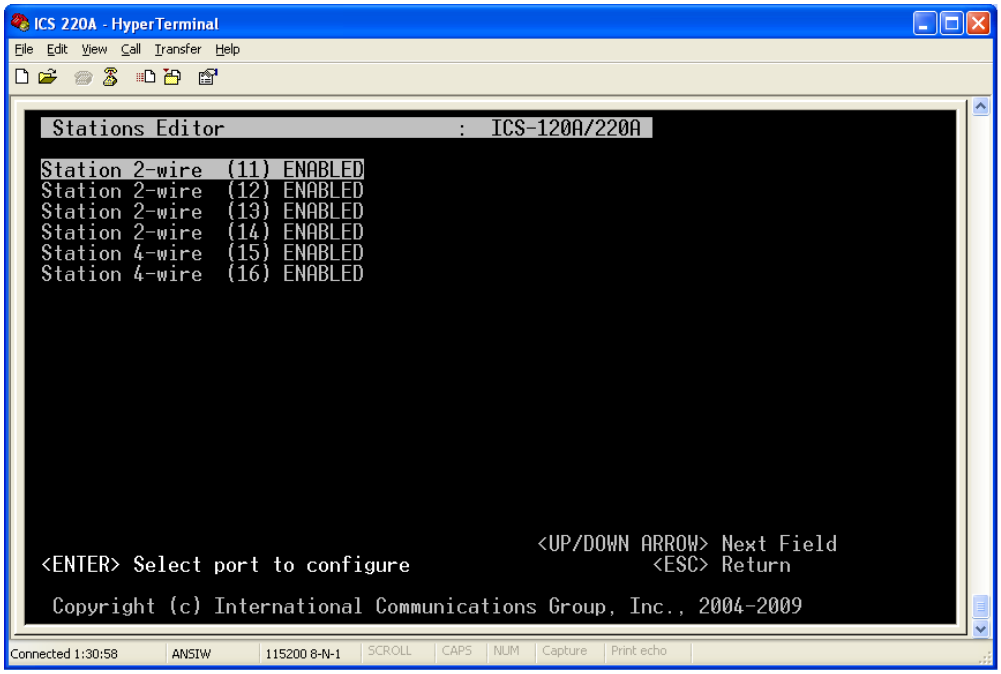

Figure 9-6. Sample Stations Editor Screen with 4-Wire Stations Enabled

The Stations Editor screen presents a title consisting of the label "**Station**"**,** the port type (4-wire, in this case), and the associated extension number, <xx> (either 15 or 16). The station can either be **ENABLED** or **DISABLED**.

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9.3.2.1 Station Configuration Setting Screen: 4-Wire Stations

Main Menu > Configuration Editor Menu > Stations Editor > Station Configuration Setting

The **Station Configuration Setting** screen**,** as shown in the figure below, is used to make changes to a particular station port.

To access the **Station Configuration Setting** screen from the Stations Editor screen:

STEP	ACTION
1	Select a station port using the keyboard <↑> and <↓> keys.
2	Press the <**Enter**> key on the highlighted station port row.
3	Press the <**Esc**> key to return to the Stations Editor screen when done.

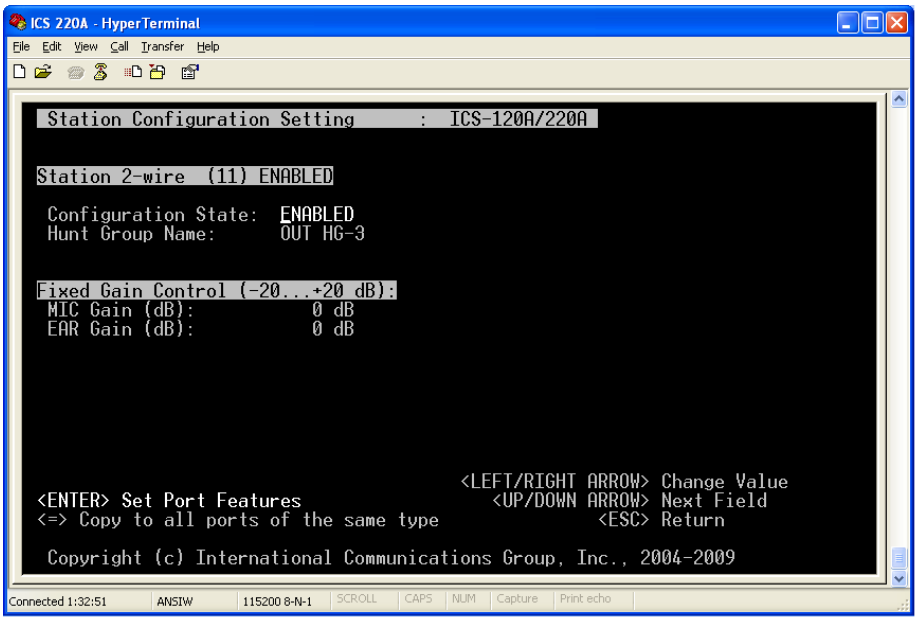

Figure 9-7. Sample Station Configuration Setting Screen

PARAMETER	DESCRIPTION
Configuration State	A station can either be ENABLED or DISABLED.
Hunt Group Name	Select either HG-3 or HG-4. (**Note**: although other Hunt Groups are listed, only HG-3 and HG-4 are valid for the 4-wire stations 15 and 16.)
Fixed Gain Control	The Gain Control parameters permit gain or attenuation adjustments in the RX (EAR) and TX (MIC) directions, ranging between -20 dB and +20 dB in 1 dB steps. 0 dB is the default gain value in both RX and TX directions.

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STEP	ACTION
1	Use the <↑> and <↓> keys to access the Gain Control parameters.
2	Increase the value (plus direction <→>) to add gain to the circuit and decrease the value (minus direction <←>) to add attenuation.

9.3.3 Station Features Screen: 4-Wire Station

Main Menu > Configuration Editor Menu > Stations Editor > Station Configuration Setting > Station Features Setting

The Configuration Editor displays permission, restriction, and configuration parameters as a set of Class of Service (COS) fields. All the currently supported features are listed on the Station Features Setting screen.

You can **ENABLE** or **DISABLE** a selected feature by using the <←> or <→> keys:

STEP	ACTION
1	Use the <↑> and <↓> keys to select a parameter or field.
2	Press the <←> and <→> keys to scroll through the permissible settings for the port.

The following screen appears:

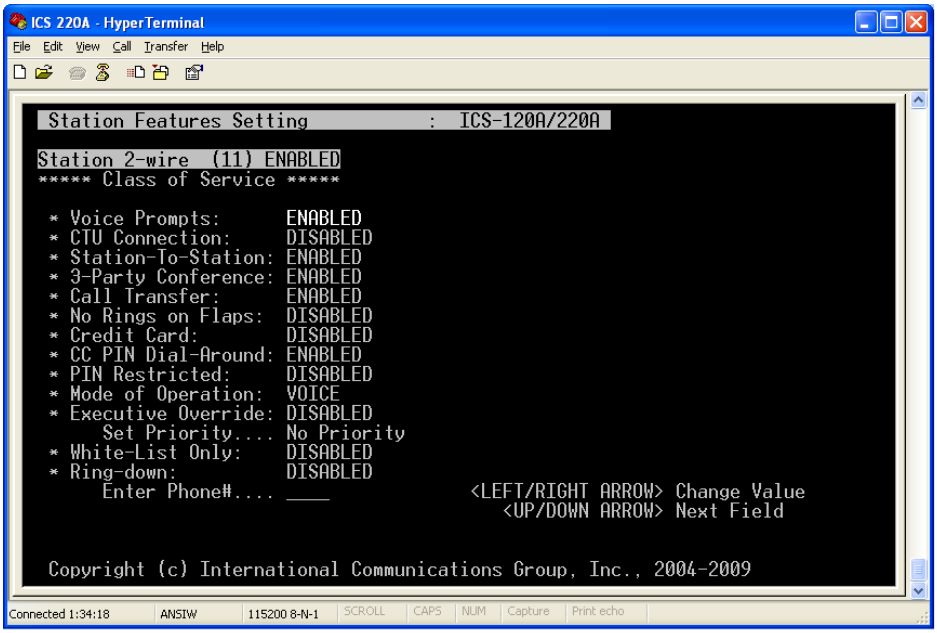

Figure 9-8. Station Features Setting Screen: 4-Wire Station

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The following are the current features defined for an ICS-120A/220A 4-wire port:

<table>
<tr><th>FEATURE</th><th>DESCRIPTION</th></tr>
<tr><td>Voice Prompts</td><td>Set to ENABLED to activate this feature. See Section 14 for more information.</td></tr>
<tr><td>CTU Connection</td><td>Set to Enable to activate this feature. This feature is designed to be used with CTU integrations, where dial-tone could be used as a machine interface to indicate an Iridium channel is available for making a voice call. If no Iridium channels are available for the extension port in use, no dial-tone is played back.</td></tr>
<tr><td>Station-To-Station (Analog and MCDU)</td><td>Allows calls from one on-board extension to another.</td></tr>
<tr><td>3-Party Conference (Analog only)</td><td>Allows an extension to initiate a three-party conference call.</td></tr>
<tr><td>Call Transfer (Analog only)</td><td>Allows the transfer of an incoming call to another on-board extension.</td></tr>
<tr><td>No Rings on Flaps</td><td>Allows control over whether the system rings the flight deck telephone during critical flight operations such as take-off and landing.
NOTE: This feature requires that the flap switch position signal be wired to the input.</td></tr>
<tr><td>Credit Card</td><td>To place a credit card call over the Iridium network:
A SIM card provisioned for credit card service must be installed (internal to the LBT or external in the CIM)
The system software must dial the appropriate dialing prefix to instruct the Iridium switching network to route the call to the Iridium Credit Card Platform on the ground side
<table>
<tr><td>Pre-Fix Digits
e.g. 00</td><td>Phone Number
e.g. 1 757 947 1030</td></tr>
</table>
<table>
<tr><th>Pre-Fix Digits</th><th>Call Routing</th><th>Call Processing</th></tr>
<tr><td>00</td><td>Normal Routing</td><td>The call is routed to the normal Iridium switching platform on the ground. Credit card prompts are not generated and the call succeeds normally.</td></tr>
<tr><td>280</td><td>Credit Card Routing</td><td>The call is routed to the Iridium Credit Card Platform on the ground. Credit card prompts are generated on the ground and the user inputs the credit card information. The call succeeds when the user information is validated on the ground.</td></tr>
<tr><td>28</td><td>Post-Paid Routing</td><td>The call is routed to the Post-Paid Iridium switching platform on the ground. Credit card prompts are not generated and the call succeeds</td></tr>
</table></td></tr>
</table>

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FEATURE	DESCRIPTION
	<table><tr><td></td><td></td><td>normally. The customer (account holder of SIM card in use) is billed at the end of the billing cycle.</td></tr></table> Note: The user should not dial the pre-fix digits. The ICS unit automatically selects the call routing based on system configuration.”
CC PIN Dial-Around	The Credit Card PIN Dial-Around is a PABX capability that allows the user to bypass the credit card processing by entering a valid PIN. The Credit Card PIN Dial-Around is only applicable when the Credit Card Restriction is enabled for that given extension. Note that it is assumed that Credit Card PIN Dial-Around and Credit Card Restriction COS (Class of Service) are enabled only when the ICS-120A/220A system has Credit Card provisioned SIM cards installed. When enabled, if a PIN is entered by the user the Station class looks it up and if it finds a match, the call is routed to the Iridium Post-Paid switching network. If the entered PIN is not found in the global PIN Table, or is not entered at all, the call is routed to the Iridium Credit Card Platform to collect the User’s credit card information. This is true when the ICS-120A/220A system has Credit Card provisioned SIM cards installed.
PIN Restricted	Restricts station use for non-authorized users. When this feature is enabled, a caller must enter a valid PIN before the call will go through. A valid PIN number is any number enabled in the PIN table. The PIN numbers in the PIN table are configurable (see Section 9.8).
Mode of Operation (Analog only)	Voice or Data.
Executive Override	Allows you to define the station priority for placing an outbound call, the highest of which is priority 1. Calls placed from this station with predefined priority may pre-empt an existing call if the existing call has been placed from a station with a lower priority setting. If you select this feature, the station priority may be set in the **Configuration Editor** List Field, “Set Priority.” The following options for this field are available: • No Priority (default) • Priority N, where N = a number between 1 and 6
White-List Only	The ICS-120A/220A supports restricting calls to ONLY those numbers contained in the ATS/AOC phone books. This feature can be enabled or disabled on a station-by-station basis. Once enabled, each number entered will be checked by the system to see if it is present in either the AOC or ATS Directories before the number is dialed. No other outbound numbers will be allowed if they are NOT contained in either directory.
Ring-Down (Analog only)	Allows the system to automatically dial a predefined ground-based number.

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FEATURE	DESCRIPTION
	NOTE: ***If you ENABLE this feature, the predefined phone number must be set in the "Enter Phone#" Field. You cannot return to the Configuration Editor Menu screen unless you insert a value in this field.***

9.3.4 Editing an MCDU Port (Ports 15 and 16 only)

Main Menu > Configuration Editor Menu > Stations Editor

The Stations Editor screen is used to select a 2-wire station, a 4-wire station, or an MCDU port in order to make changes to the station settings. To access the **Stations Editor** screen:

STEP	ACTION
1	Select the **Stations Editor** option from the **Configuration Editor Menu** using the keyboard <↑> and <↓> keys.
2	Press <**Enter**>.

The following screen appears:

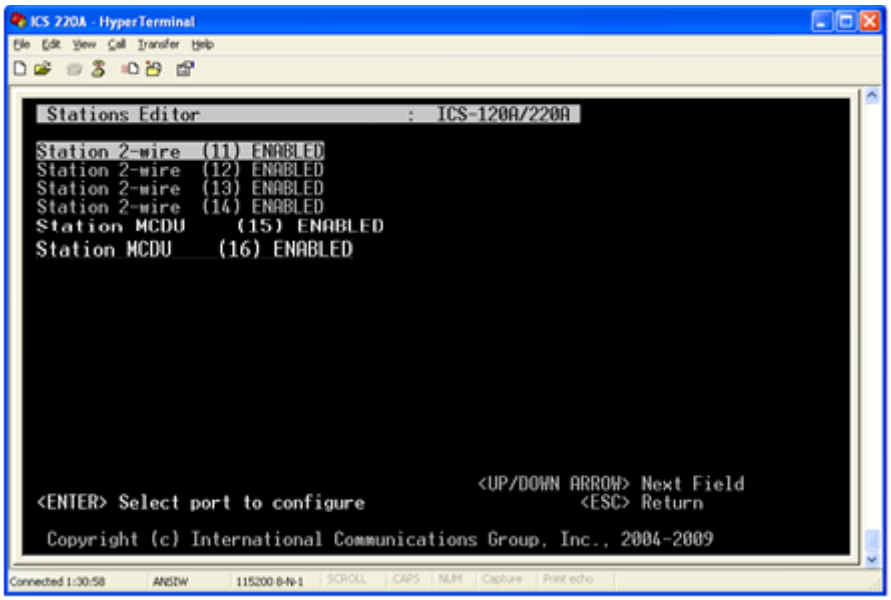

Figure 9-9. Sample Stations Editor Screen Showing the MCDU Ports

The Stations Editor screen presents a title consisting of the label "**Station**"**,** the port type (MCDU, in this case), and the associated extension number, <xx> (either port 15 or 16). The station can either be **ENABLED** or **DISABLED**.

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9.3.4.1 Station Configuration Setting Screen: MCDU Port

Main Menu > Configuration Editor Menu > Stations Editor > Station Configuration Setting

The **Station Configuration Setting** screen**,** as shown in the figure below, is used to make changes to a particular station port.

To access the **Station Configuration Setting** screen from the Stations Editor screen:

STEP	ACTION
1	Select an MCDU station port using the keyboard <↑> and <↓> keys.
2	Press the <**Enter**> key on the highlighted station port row.
3	Press the <**Esc**> key to return to the Stations Editor screen when done.

The following screen appears for MCDU port 15:

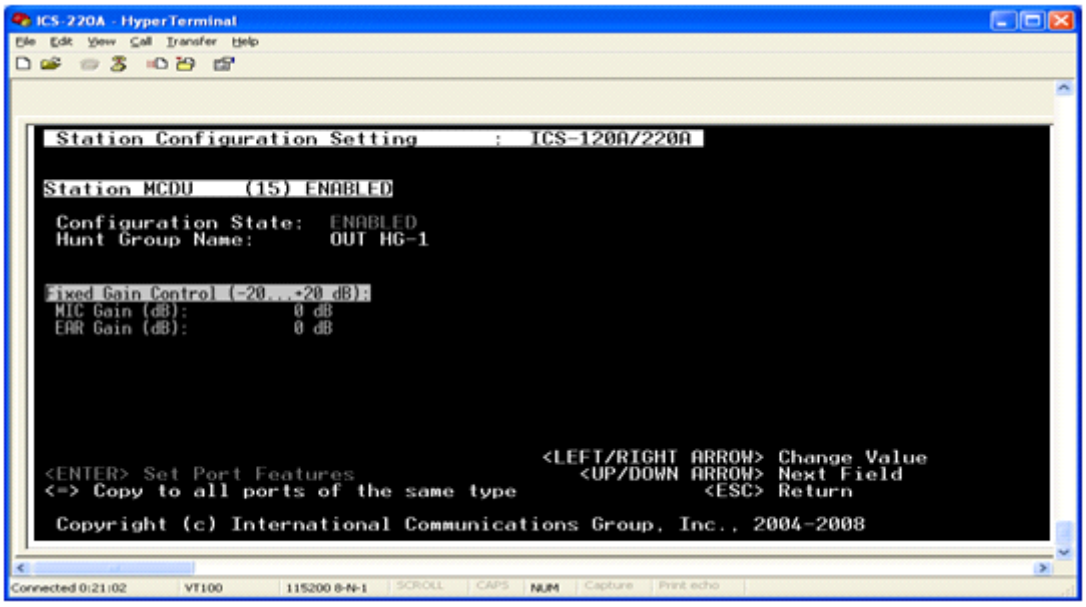

Figure 9-10. Sample Station Configuration Setting Screen: MCDU Port 15

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The following screen appears for MCDU port 16:

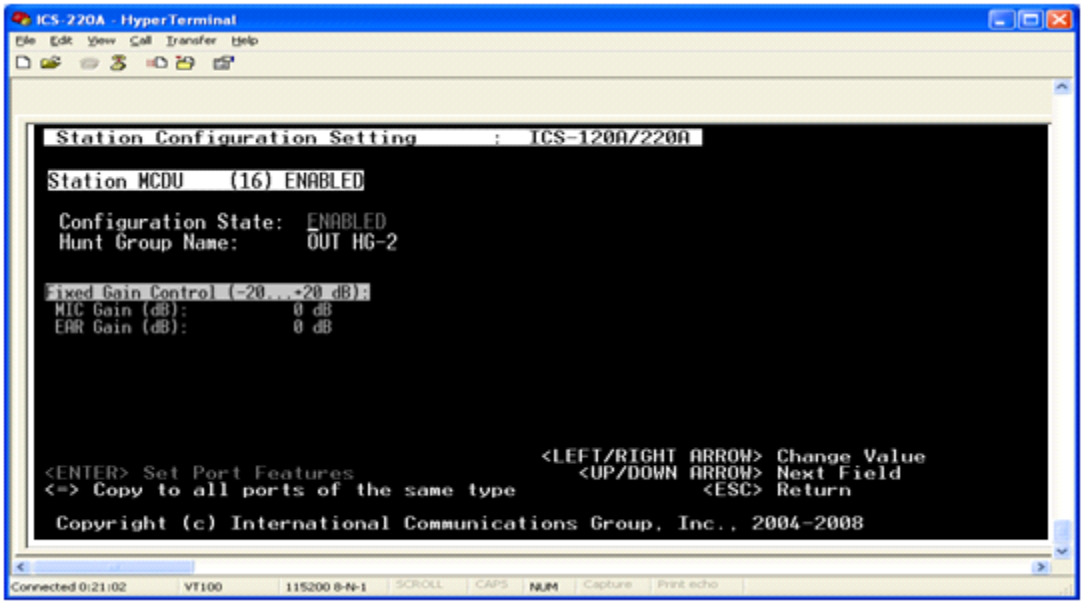

Figure 9-11. Sample Station Configuration Setting Screen: MCDU Port 16

These Station Configuration Setting screens display the following parameters:

PARAMETER	DESCRIPTION
Configuration State	A station can either be ENABLED or DISABLED.
Hunt Group Name	OUT HG-1 must be selected for MCDU port 15. OUT HG-2 must be selected for MCDU port 16.
Fixed Gain Control	Fixed gain control can be set to a target value between -20 dBm and +20 dBm. The default value is -20 dBm.

STEP	ACTION
1	Use the <↑> and <↓> keys to access the Gain Control parameters.
2	Increase the value (plus direction <→>) to add gain to the circuit and decrease the value (minus direction <←>) to add attenuation.

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9.3.4.2 MCDU Features Setting Screen: MCDU Port

Main Menu > Configuration Editor Menu > Stations Editor > Station Configuration Setting > Station Features Setting

The Configuration Editor displays permission, restriction, and configuration parameters as a set of Class of Service (COS) fields. All the currently supported features are listed on the MCDU Features Setting screen.

You can ENABLE or DISABLE a selected feature by using the <←> and<→> keys:

STEP	ACTION
1	Use the <↑> and <↓> keys to select a parameter or field.
2	Press the <←> and<→> keys to scroll through the permissible settings for the port.

The following screen appears:

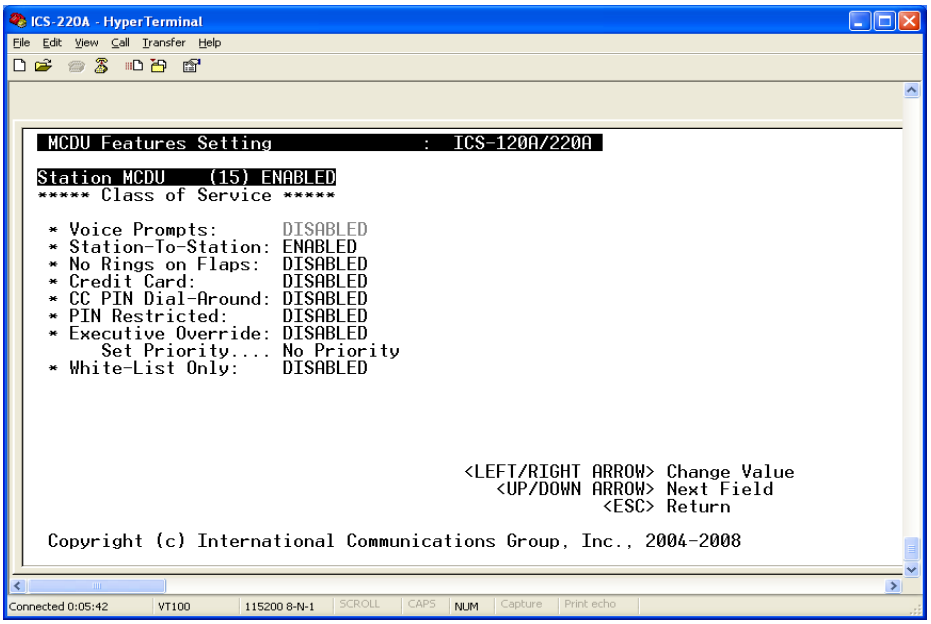

Figure 9-12. Sample MCDU Features Setting Screen: MCDU Ports 15 and 16

The following are the current MCDU features defined for an ICS-120A MCDU port. Although the features are all listed on the screen, only the ones indicated in the table below by an asterisk (*) are available for MCDU.

FEATURE	DESCRIPTION
Voice Prompts	Set to ENABLED if desired. See Section 14 for more information.
***Station-To-Station**	Allows calls from one on-board extension to another. Set to ENABLED.
No Rings on Flaps	Allows control over whether the system rings the flight deck telephone during critical flight operations such as take-off and landing.

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<table>
<tr><th>FEATURE</th><th>DESCRIPTION</th></tr>
<tr><td></td><td>NOTE: This feature requires that the flap switch position signal be wired to the input.</td></tr>
<tr><td>Credit Card</td><td>To place a credit card call over the Iridium network:

• A SIM card provisioned for credit card service must be installed (internal to the LBT or external in the CIM)
• The system software must dial the appropriate dialing prefix to instruct the Iridium switching network to route the call to the Iridium Credit Card Platform on the ground side

The phone number prefix digits determine the call routing on the ground.

<table>
<tr><td>Pre-Fix Digits
e.g. 00</td><td>Phone Number
e.g. 1 757 947 1030</td></tr>
</table>
<table>
<tr><th>Pre-Fix Digits</th><th>Call Routing</th><th>Call Processing</th></tr>
<tr><td>00</td><td>Normal Routing</td><td>The call is routed to the normal Iridium switching platform on the ground. Credit card prompts are not generated and the call succeeds normally.</td></tr>
<tr><td>280</td><td>Credit Card Routing</td><td>The call is routed to the Iridium Credit Card Platform on the ground. Credit card prompts are generated on the ground and the user inputs the credit card information. The call succeeds when the user information is validated on the ground.</td></tr>
<tr><td>28</td><td>Post-Paid Routing</td><td>The call is routed to the Post-Paid Iridium switching platform on the ground. Credit card prompts are not generated and the call succeeds normally. The customer (account holder of SIM card in use) is billed at the end of the billing cycle.</td></tr>
</table>

Note: The user should not dial the pre-fix digits. The ICS unit automatically selects the call routing based on system configuration.”</td></tr>
<tr><td>*CC PIN Dial-Around</td><td>The Credit Card PIN Dial-Around is a PABX capability that allows the user to bypass the credit card processing by entering a valid PIN. The Credit Card PIN Dial-Around is only applicable when the Credit Card Restriction is enabled for that given extension. Note that it is assumed that Credit Card PIN Dial-Around and Credit Card Restriction COS (Class of Service) are enabled only when the ICS-120A/220A system has Credit Card provisioned SIM cards installed.</td></tr>
</table>

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FEATURE	DESCRIPTION
	When enabled, if a PIN is entered by the user the Station class looks it up in the global PIN Table and if it finds a match, the call is routed to the Iridium Post-Paid switching network. If the entered PIN is not found in the global PIN Table, or is not entered at all, the call is routed to the Iridium Credit Card Platform to collect the User's credit card information. This is true when the ICS-120A/220A system has Credit Card provisioned SIM cards installed.
PIN Restricted	The PIN Restriction is a PABX capability configurable per user extension (Station) port. The PIN Restriction is implemented as a Class of Service feature. PIN Restriction is a call restriction applied only to outbound calls; the user may still make a Station-to-Station call without using a PIN, even when PIN Restriction is enabled. When PIN Restriction is enabled, and Voice Prompts are enabled, for a given extension, a voice prompt is played back to enter the PIN (VP ID: *PIN_ENTRY*). If Voice Prompts are not enabled for the given extension, a Bong Tone is played back instead. The User must enter their PIN at that time. If the PIN matches an entry in the global PIN Table, the User is granted access to make an outbound call. This feature is N/A for the MCDU and should be set to DISABLED. **Note:** Unlike the Credit Card PIN Dial-Around, PIN Restriction is not optional and forces the User to enter a valid PIN before the call is processed. PIN Restriction does not restrict Station-to-Station calls.
Executive Override	Allows you to define the station priority for placing an outbound call, the highest of which is priority 1. Calls placed from this station with predefined priority may pre-empt an existing call if the existing call has been placed from a station with a lower-priority setting. Set to ENABLED if desired. If you select this feature, the station priority may be set in the **Configuration Editor** List Field, "Set Priority." The following options for this field are available: • No Priority (default) • Priority N, where N = a number between 1 and 6
White-List Only	The ICS-120A/220A supports restricting calls to ONLY those numbers contained in the ATS/AOC phone books. This feature has been added to the Class-Of-Service to ENABLE or DISABLE this feature on a station-by-station basis. Once enabled, each number entered will be checked by the system to see if it is present in either the AOC or ATS Directories before the number is dialed. No other outbound numbers will be allowed if they are NOT contained in either directory.

- CC PIN Dial-Around is not applicable when CC Restriction is not enabled.
- CC Restriction is not applicable when the installed SIM card is not provisioned for credit card service.

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9.4 The Trunks Editor

Main Menu > Configuration Editor Menu > Trunks Editor

The **Trunks Editor** screen allows a user to select the specific trunk to configure. Typically, the following information is displayed here: trunk type (4-wire, Iridium, SBD), trunk number; and trunk status.

If the 4-wire trunks have been configured to be stations or MCDUs, then the unit will have the following configuration:

TRUNKS	DESCRIPTION
60	Iridium
61	Iridium
62	SBD (Short Burst Data) Modem (not configurable)

However, if the 4-wire trunks are enabled, then the unit will have the following configuration:

TRUNKS	DESCRIPTION
60	4-Wire Trunk
61	4-Wire Trunk
62	Iridium
63	Iridium
64	SBD (Short Burst Data) Modem

The Hunt Groups will also need to be configured to conform to the Trunks assignments

STEP	ACTION
1	Highlight the **Trunks Editor** in the **Configuration Editor Menu** by using the <↑> and <↓> arrow keys.
2	Click <**Enter**> on the keyboard. The **Trunks Editor** screen is displayed.
3	Select a trunk by using the <↑> and<↓> arrow keys on the keyboard.
4	Press <**Enter**> to navigate to the **Trunk Configuration Setting** screen for the selected trunk. (See next section for details and step table.)

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The following screen will appear:

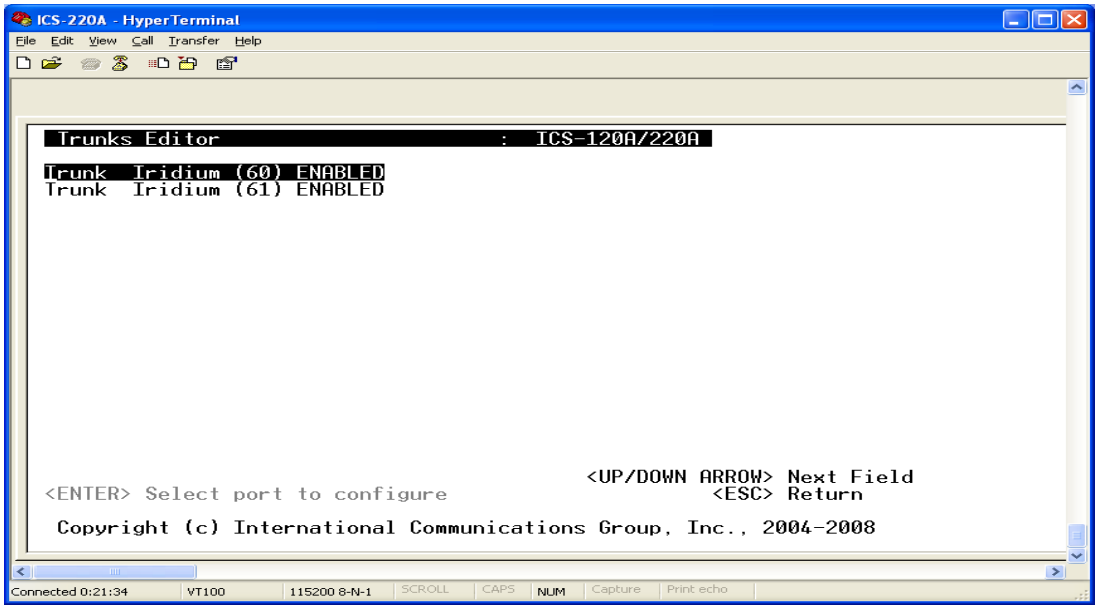

Figure 9-13. Sample Trunks Editor Screen

9.4.1 Trunk Configuration

Main Menu > Configuration Editor Menu > Trunks Editor > Trunk Configuration Setting

The **Trunk Configuration** screen allows a user to enable or disable the trunk, assign an inbound hunt group, change the medium type, and adjust the audio gain control.

The medium types vary depending on the type of equipment the trunk is connected to and the type of port used to interface with the equipment. The following medium types can be used with the ICS-120A/220A's 4-wire interfaces:

- Iridium
- Aero-I
- Aero-M
- Aero-H
- Aero-H+
- Iridium-A

The Gain Control parameters permit gain or attenuation adjustments in the RX (EAR) and TX (MIC) directions, ranging between -20 dB and +20 dB in 1 dB steps. 0 dB is the default gain value in both RX and TX directions.

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To change the features of each trunk:

STEP	ACTION
1	Press <**Enter**> to move from the **Trunks Editor** screen to the **Trunk Configuration Setting** screen for the selected trunk.
2	Use the <↑> and <↓> arrow keys to select each field.
3	Use the <←> and <→> keys to select the desired option for each field: 1. **Configuration State:** select either **ENABLED** or **DISABLED**. 2. **Hunt Group Name:** select a number **1 to 4**. 3. **Medium Type**: see Table 9-1 for values. 4. **Fixed Gain Control**: -20 to +20 dBm.
4	Press <**ENTER**> to display the **Trunk Features Setting** screen for the selected trunk. (See next section for details and step table.)
5	If more changes need to be made, go back to step 2; otherwise, navigate back to the **Configuration Editor Menu** screen using the <**Esc**> key.
6	Press <**Ctrl/S**> to save all the changes made in the settings.

REMINDER:

If appropriate, press <=> to copy all trunk configuration settings of the same type to the rest of the trunks, with the exception of the configuration state. This step should be performed on the Trunk Configuration Setting Screen of the trunk to be duplicated.

If a trunk is disabled, it will remain disabled even though the trunk that is being copied is enabled. This copy feature saves time when a common set of features and configurations is the same for each trunk.

The following figures display sample Trunk Configuration Setting screens:

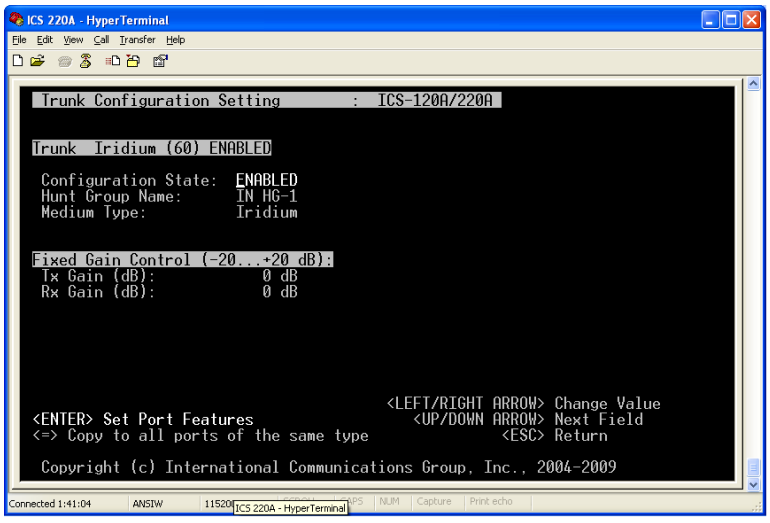

Figure 9-14. Sample Trunk Configuration Setting Screen

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9.4.2 Trunk Features

Main Menu > Configuration Editor Menu > Trunks Editor > Trunk Configuration Setting >Trunk Features Setting

The **Trunk Features Setting** screen is used to change the class of service for each trunk. The fields can be either enabled or disabled. A detailed description of each class of service is described below.

STEP	ACTION
1	Press <**Enter**> to move from the **Trunk Configuration Setting** screen for a given trunk to the **Trunk Features Setting** screen for that trunk.
2	Use the <↑> and <↓> arrow keys to select a Class of Service feature (see Table 9-2).
3	Use the <←> and <→> keys to select the desired option for each feature: either **ENABLED** or **DISABLED**.
4	If more changes need to be made go back to step 2, otherwise navigate back to the **Configuration Editor Menu** screen using the <**Esc**> key.
5	Press <**Ctrl/S**> to save all the changes made in the settings.

The following screen will appear:

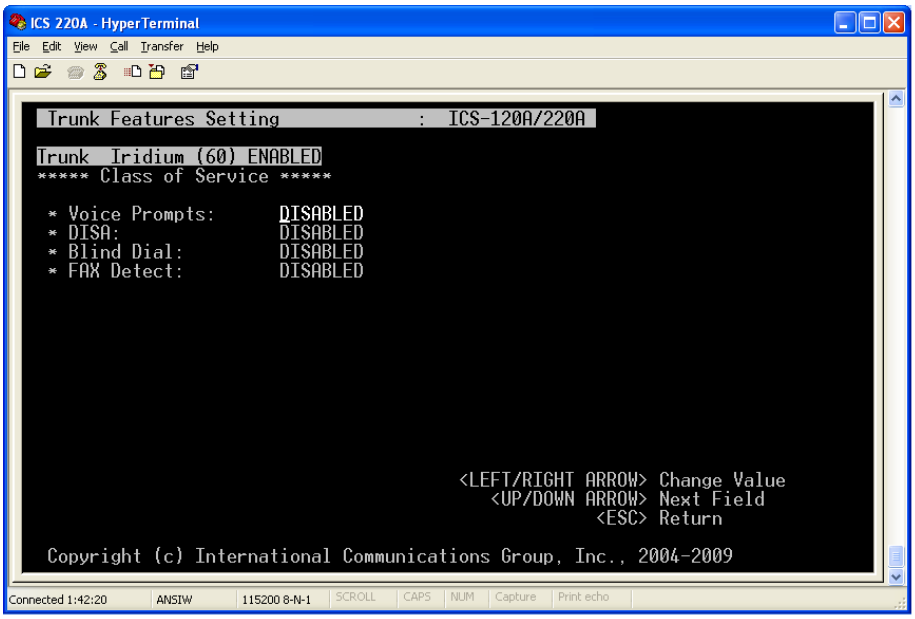

Figure 9-15. Sample Trunk Features Setting Screen

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Table 9-1. Trunk Classes of Service

CLASS OF SERVICE	DESCRIPTION
Voice Prompts	ENABLED: Voice prompts are played to a caller when required. DISABLED: No voice prompts are played. The *beep* tone prompts the caller to enter required information such as PIN or CC. **Note:** This COS is currently set to DISABLED. Only the DISA greeting is available at this time and it must be recorded by the customer/installer.
DISA	ENABLED: Direct Inward Station Access (DISA) allows an incoming caller to dial an extension on-board the aircraft. DISABLED: The system connects an incoming call to the first available station from the trunk's hunt group.
Blind Dial	Blind dial allows the trunk to immediately dial a number without detecting a dial tone first. ENABLED: The system skips analysis of trunk availability. DISABLED: The system analyzes if the trunk is available to process the call.

The various features interact with each other in the following ways depending upon which ones are enabled or disabled:

Note: √ = Enabled

DISA	Voice Prompt	RESULT
√		Answer and provide dial tone
√	√	Answer, provide voice prompt, then dial tone

NOTE: ***DISA must be enabled, along with Voice Prompts, in order to enable DISA.***

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9.5 Hunt Groups Editor

Main Menu > Configuration Editor Menu > Hunt Groups Editor

The **Hunt Groups Editor** screen allows a user to change and/or define hunt groups for inbound and outbound calls. The recommended configuration is as follows:

TYPE	IN	OUT
MCDU – Extension 15	HG-1 (SAT-1)	HG-1 Trunk 60
MCDU – Extension 16	HG-2 (SAT-2)	HG-2 Trunk 61
4-Wire Trunk – Ext. 11-14	HG-3	
4-Wire Station		HG3 Trunks 60, 61

STEP	ACTION
1	Highlight the **Hunt Groups Editor** in the **Configuration Editor Menu** by using the <↑> and <↓> arrow keys.
2	Press <**ENTER**> on the keyboard. The **Hunt Groups Editor** screen is displayed.
3	Select a hunt group by using the <↑> and <↓> arrow keys on the keyboard.
4	Press <**ENTER**> to navigate to the **Outbound or Inbound Hunt Group Setting** screen for the selected group. (See next section for details and step table.)
5	If more changes need to be made, go back to step 3; otherwise, navigate back to the **Configuration Editor Menu** screen using the <**Esc**> key.
6	Press <**Ctrl/S**> to save all the changes made in the settings.

NOTE: ***Changes can only be saved from the Configuration Editor Menu screen.***

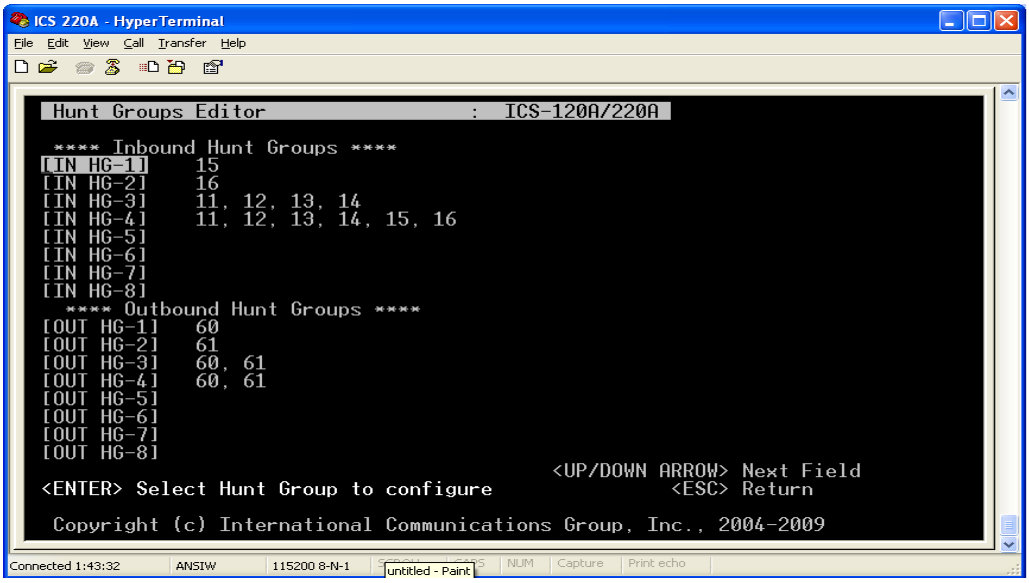

Figure 9-16. Sample Hunt Groups Editor Screen

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9.5.1 Inbound Hunt Group Setting

Main Menu > Configuration Editor Menu > Hunt Groups Editor > Inbound Hunt Group Setting

The **Inbound Hunt Group Setting** screen allows a user to change the name of the hunt group and the station members for a particular hunt group.

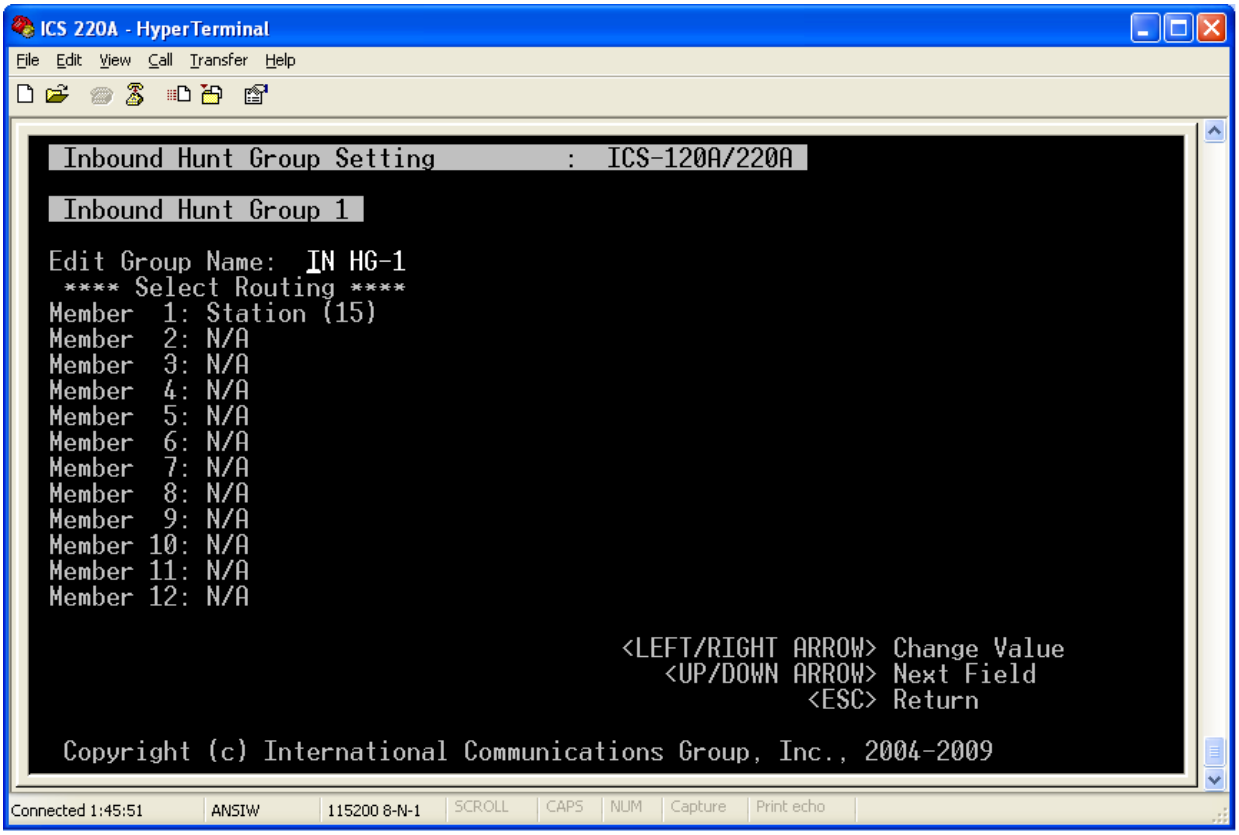

Figure 9-17. Sample Inbound Hunt Group Setting Screen

The fields are described as follows.

FIELD	DESCRIPTION
Edit Group Name	Allows a user to change the descriptive name for a hunt group. The name can be any meaningful name up to 10 characters.
Routing Members	Defines what stations will be rung and in what order. Routing member 1 is the first station to ring, with 8 being last.

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9.5.2 Outbound Hunt Group Setting

Main Menu > Configuration Editor Menu > Hunt Groups Editor > Outbound Hunt Group Setting

The **Outbound Hunt Group Setting** screen allows a user to change the name and trunk members for a particular hunt group.

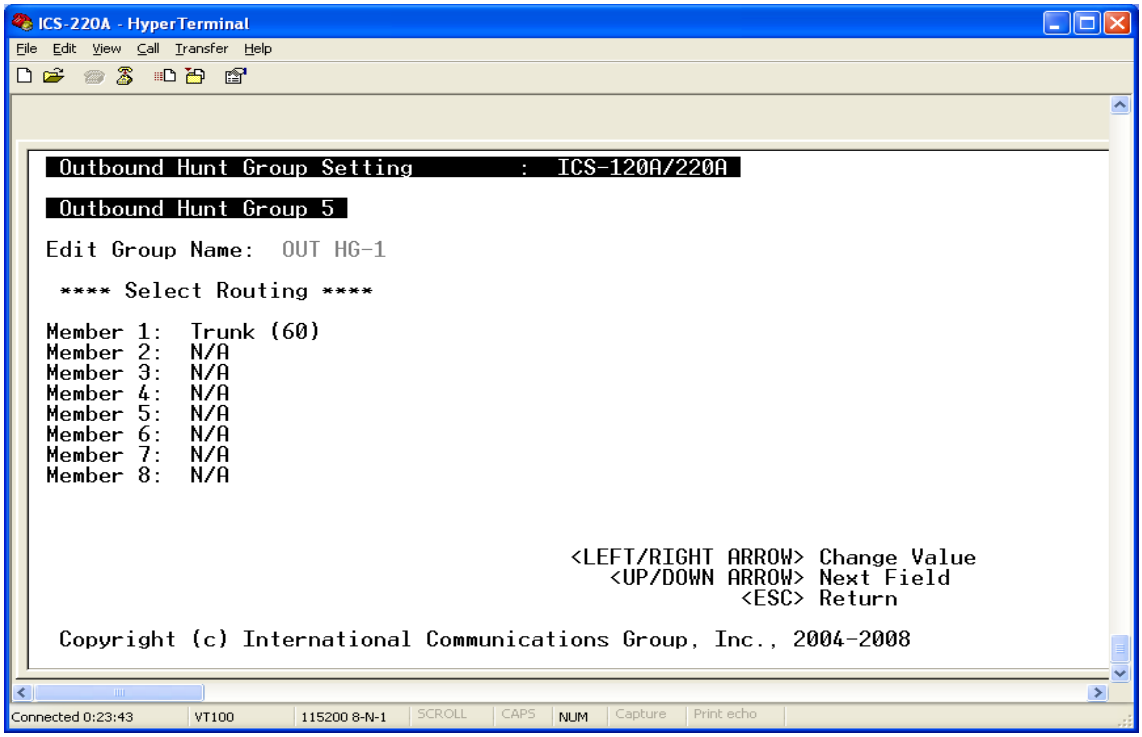

Figure 9-18. Sample Outbound Hunt Group Setting Screen

The fields are described as follows.

FIELD	DESCRIPTION
Edit Group Name	Allows a user to change the descriptive name for a hunt group. The name can be any meaningful name up to 10 characters.
Routing Members	Define what trunks will be used for outbound calls. Routing member 1 is the first trunk to be used, with 8 being last.

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9.6 I/O Pins Editor

Main Menu > Configuration Editor Menu > I/O Pins Editor

The ICS-120A/220A has eight input discrete circuits, where circuits can alert the unit to some state change and provide an opportunity to make a change. For example, the Flap Discrete signal will show when the flaps have been moved into the take-off or landing position. The ICS-120A/220A will disallow calls to the Flight Deck during that operation to avoid distracting the pilot. The ICS also has eight discrete output circuits that can be used to alert external devices to particular events or transceiver state changes.

NOTE: ***The Flap Discrete signal feature requires that the flap switch position signal be wired to the input.***

To access the I/O Pins Editor Screen:

STEP	ACTION
1	Select the **I/O Pins Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.

The resulting screen is divided into two sections:

- Upper: I/O Inputs List
- Lower: I/O Relays List

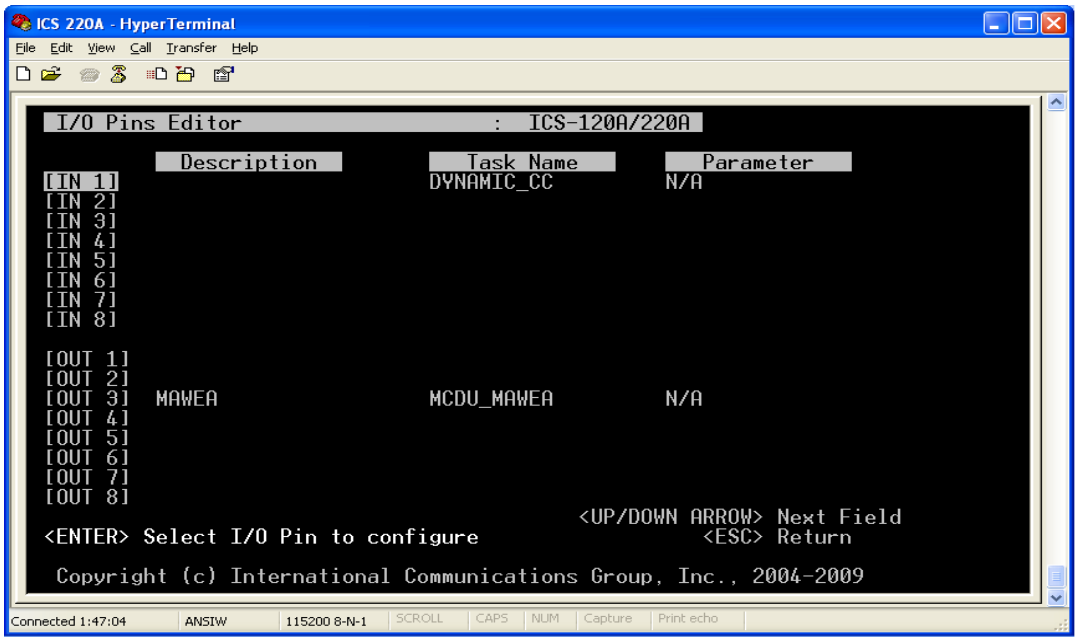

Figure 9-19. Sample I/O Pins Editor Screen

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Each I/O Editor screen record presents the current I/O pin setting in the following format:

[<**pin type**> <**pin number**>] **Task** <**pin task**> **Parameter** <**pin task parameter**>, where

- <**pin type**> is IN for inputs and OUT for relays.
- <**pin number**> is a sequential <pin type> number.
- <**pin task**> is a string of up to 20 characters.

The different tasks are defined for I/O inputs and relays (see next discussion).

The <**pin task parameter**> is a string up to 20 characters. The task-dependent parameters are predefined and described next.

STEP	ACTION
3	Select the highlighted pin by clicking on <**Enter**>.
4	Press <**Esc**> to return to the **I/O Pin Editor Screen**.

The unit software opens the I/O Pin Setting screen to allow you to select a pin task.

9.6.1 I/O Input Pin Setting Screen

Main Menu > Configuration Editor Menu > I/O Pins Editor > I/O Input Pin Setting

The **I/O Input Pin Setting** screen allows the user to select a Pin Task and Pin Parameter. It also allows the user to enter an I/O Pin Description of up to 20 characters.

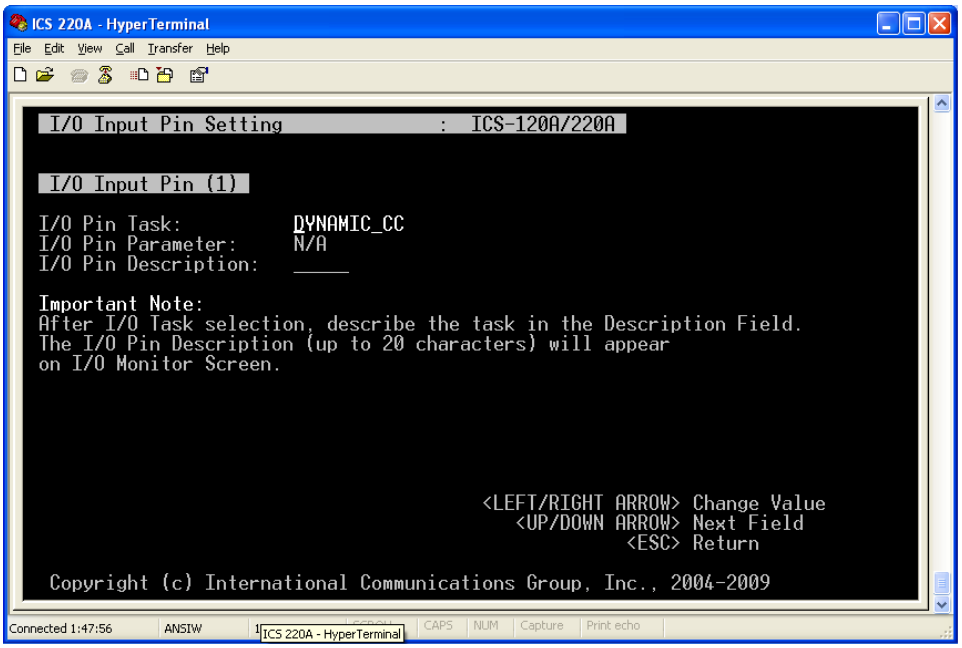

Figure 9-20. Sample I/O Input Pin Setting Screen

The available tasks for the I/O Input pins are defined below.

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TASK	DESCRIPTION
N/A	No Task assignment.
FLAPS	Prohibits calls to the cockpit during take-off and landing flight phases. Before routing a call to the cockpit extension, the unit application checks signal level on the input pin assigned with the FLAPS task. The I/O input signal level depends on the flaps position on the aircraft. No parameter is required for this task. **NOTE:** ***This feature requires that the aircraft flap switch position signal be wired to the input. Currently limited tasks have been assigned to the I/O pins. As customer requirements become known, additional features and tasks may be assigned. To be notified when additional features are added, see the instructions in Section 1 on how to receive e-mail updates as ICG issues them.***
SLAVE_SELECT	In a dual SATCOM installation, when this input pin is activated (grounded), the ICS unti report as a slave SDU device (sets bit 18 of Label 270 word).
DYNAMIC_CC	DYNAMIC_CC, or Dynamic Credit Card Restriction, applies Credit Card Restriction to user extensions configured as such. When the input pin is sensed as active (grounded), the PABX restricts a given User extension port to Credit Card calls only. Each User port may be configured individually with Dynamic Credit Card Restriction. This change was an insignificant modification to the existing software architecture.
RELAY	Allows input to trigger a change on the selected output relay state. This is primarily a production task setting used for testing.

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9.6.2 I/O Relay Setting Screen

Main Menu > Configuration Editor Menu > I/O Pins Editor > I/O Relay Setting

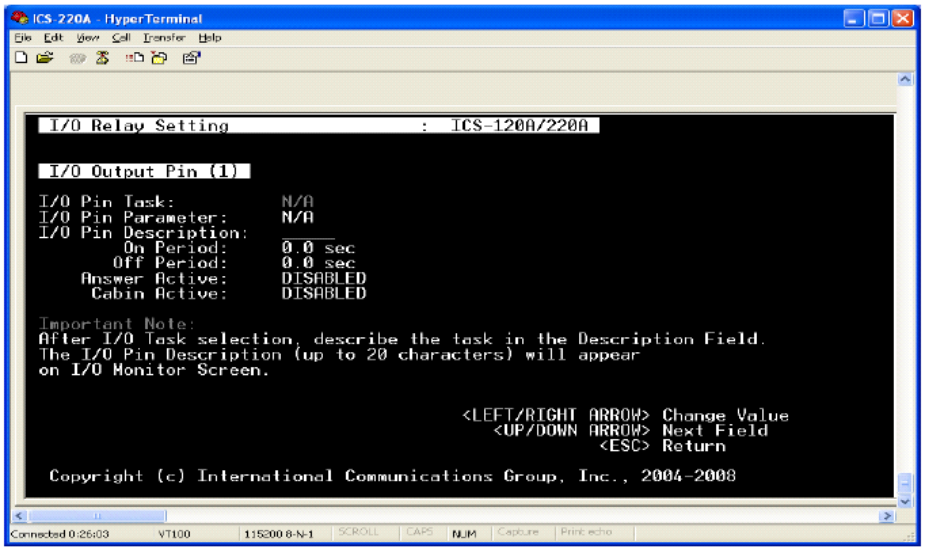

Figure 9-21. I/O Relay Screen

The available tasks for the I/O Relay are defined below.

TASK	DESCRIPTION
LBT_INUSE	The LBT_INUSE discrete output provides a ground on the selected output pin when the selected LBT is actively in progress or connected in an active call (voice or data).
LBT_AVAILABLE	The LBT_AVAILABLE discrete output provides a ground on the selected output when the selected LBT is available for placing an outbound call (voice or data). Signal strength is a factor in reporting the availability of the LBT.
MAWEA_CADENCE	The MAWEA (Modular Avionics and Warning Electronics Assembly) Cadence discrete output provides a cadence on the selected output pin when there's an incoming call on an Iridium Satcom channel ringing one of the selected stations (or groups).
MAWEA_PULSE	The MAWEA Pulse discrete ouptput provides a single pulsed output on the selected output pin when there is an incoming call on an Iridium Satcom channel ringing one of the selected stations or groups.
MCDU_MAWEA	MAWEA Output: The ICS-120A/220A (SDU) provides a ground to the MAWEA (Modularized Avionics Warning Electronics Assembly) to activate the chime. The MAWEA discrete output is grounded when there's an Incoming Call Indication, and returns to open state when the call is answered (Off Hook Indication). The MAWEA Output is only activated for incoming calls (ground-to-air).
STATION_HOOK	Indicates when a particular station goes off hook. The pin parameter determines to which station the relay output is assigned.

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TASK	DESCRIPTION
STATION_RING	Indicates when a particular station is ringing. The pin parameter determines to which station the relay output is assigned.
DFDAU_AUDIO	When the ICS-120A/220A is configured for MCDU on the 4-wire ports, DFDAU (Digital Flight Data Acquisition Unit) output goes to a ground state when the call is active and returns to an open state once the call is terminated. All MCDU 4-wire ports will activate output during the connected trunk state (MCDU status = ACTIVE). Cabin-to-Cockpit calls are optionally configurable to activate output.
STATION_BUSY	Provides status when an extension is busy. The relay is closed when the station is NOT idle (includes off-hook and ring status), and open otherwise.
IRIDIUM_NOT_AVAILABLE	The IRIDIUM_NOT_AVAIL output task is assignable to any of the eight output pins, and does not include a configurable parameter. The IRIDIUM_NOT_AVAIL output indicates that all Iridium data & voice channels (ISU 9522A devices) are not available for data or voice calls. When this condition exists, the configured LBT_NOT_AVAILABLE discrete output is activated (grounded state). The Iridium SBD channel (ISU 9601 device) is not considered in the IRIDIUM_NOT_AVAIL output.

The task and the expected parameter(s) that need setting when configured are as follows:

TASK	WHAT TO SET
LBT_INUSE	1. I/O Pin Parameter: Select an Iridium trunk number 60, 61, or 62. 2. Describe the task in the Description field.
LBT_AVAILABLE	1. I/O Pin Parameter: Select an Iridium trunk number 60, 61, or 62. 1. Describe the task in the Description field.
MAWEA_CADENCE	1. I/O Pin Parameter: Select a station number 15, 16, or MCDUs. 2. Describe the task in the Description field. 3. On Period: From 0.1 seconds to 9.9 seconds. 4. Off Period: From 0.1 seconds to 9.9 seconds. 5. Answer Active: Select ENABLED or DISABLED. 6. Cabin Active: Select ENABLED or DISABLED.
MAWEA_PULSE	1. I/O Pin Parameter: Select a station number 15, 16, or MCDUs. 2. Describe the task in the Description field. 3. On Period: From 0.1 seconds to 9.9 seconds. 4. Cabin Active: Select Enabled or Disabled.
MCDU_MAWEA	1. I/O Pin Parameter: N/A 2. Describe the task in the Description field.
STATION_HOOK	1. I/O Pin Parameter: Select a station number 11, 12, 13, 14, or 15. 2. Describe the task in the Description field.
STATION_RING	1. I/O Pin Parameter: Select a station number 11, 12, 13, 14, or 15. 2. Describe the task in the Description field.
DFDAU_AUDIO	1. I/O Pin Parameter: N/A 2. Describe the task in the Description field. 3. Cabin Active: Select ENABLED or DISABLED.
STATION_BUSY	1. I/O Pin Parameter: Select a station number 11, 12, 13, 14, or 15. 2. Describe the task in the Description field.

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TASK	WHAT TO SET
IRIDIUM_NOT_AVAILABLE	1. I/O Pin Parameter: N/A 2. Describe the task in the Description field.

- Answer Active, if enabled, indicates the output will become active (grounded) when the call is answered by the selected station.
- Cabin Active, if enabled, indicates the output is allowed to be triggered by a cabin call to the selected station.

9.7 RS232 Data Interface Editor

Main Menu > Configuration Editor Menu > RS232 Data Interface Editor

To support depinning SIM cards (see Section 4.3), the system software must provide a method to route the external RS232 Data Interface to either one of the Iridium data & voice transceivers (ISU 9522A devices). The RS232 Data Interface Routing has been added to the product configuration data set. Therefore, either one of the LBTs can be assigned to serial data applications, including dial-up connections, SMS, and SBD messaging. The RS232 Data Interface Editor allows the user to select either 3-wire or 9-wire as the Serial Port Mode. To access the RS232 Data Interface Editor Screen:

STEP	ACTION
1	Select the **RS232 Data Interface Editor** option on the **Configuration Editor Menu** using the <↑> and <↓> keys.
2	Press <**Enter**>.

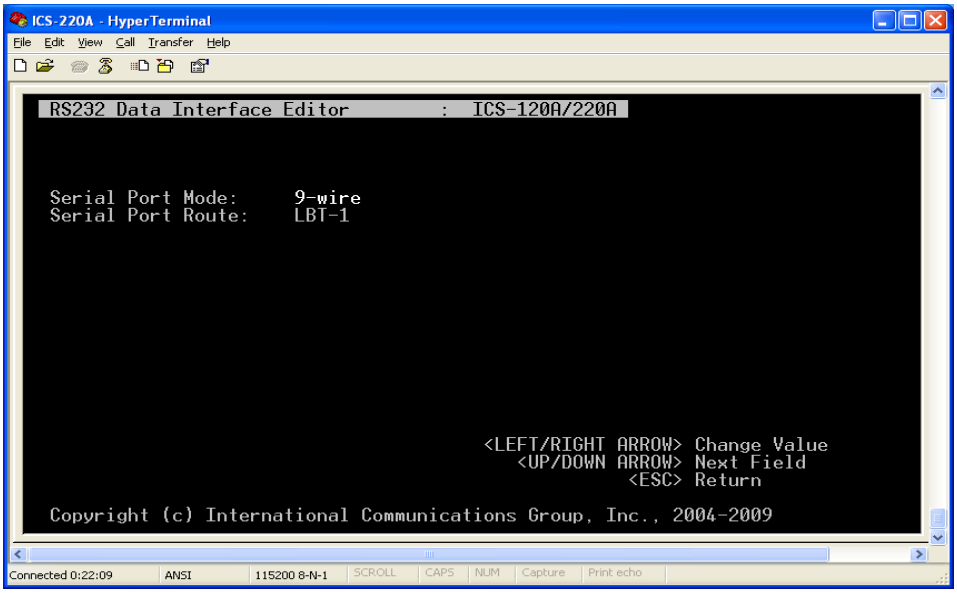

Figure 9-22. Sample RS232 Data Interface Editor Screen

Serial Port Mode	Choose either 3-wire or 9-wire. The default value is 9-wire.
Serial Port Route	Choose either LBT-1 or LBT-2 (or LBT-1 for the ICS-120A)

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9.8 The PIN Table Editor

Main Menu > Configuration Editor Menu > PIN Table Editor

The PIN Table supports the **PIN-Restricted** feature. To access the PIN Table Editor Screen:

STEP	ACTION
1	Select the **PIN Table Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.

The **PIN Table Editor** screen displays the current PIN settings in the following format:

[PIN <**pin number**>] <**PIN**> <**status**>, where

- <**pin number**> is a sequential table entry number;
- <**PIN**> is the 4-digit Personal Identification Number; and
- <**status**> is current PIN status, either ENABLED or DISABLED.

All enabled PIN numbers will be valid on all PIN-restricted handsets.

NOTE: ***When a PIN is disabled, it cannot be used for call processing.***

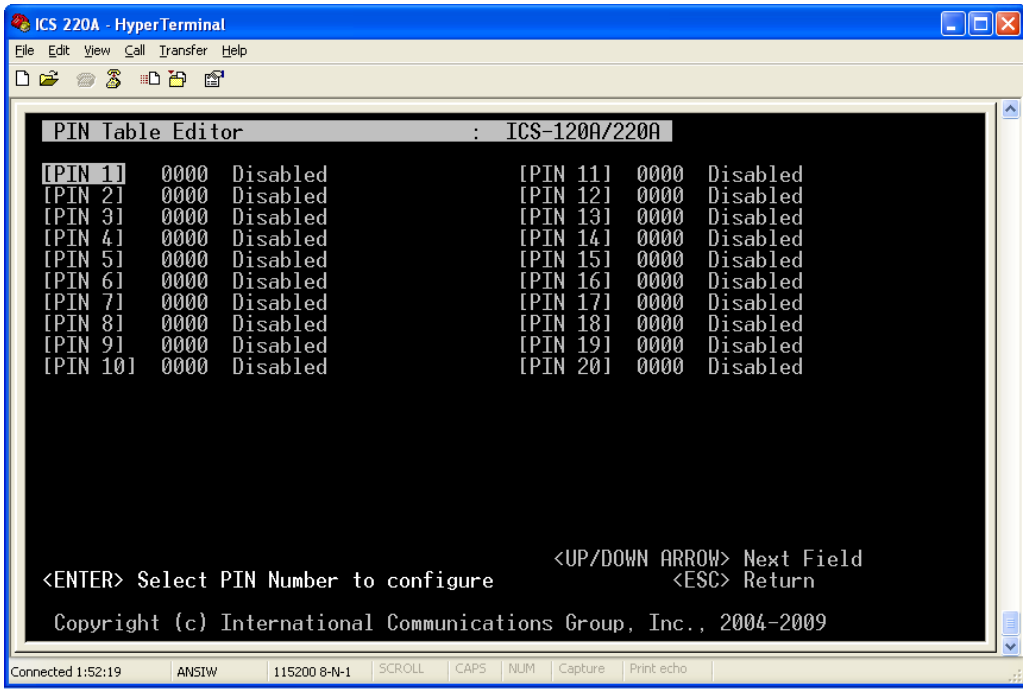

Figure 9-23. Sample PIN Table Editor Screen

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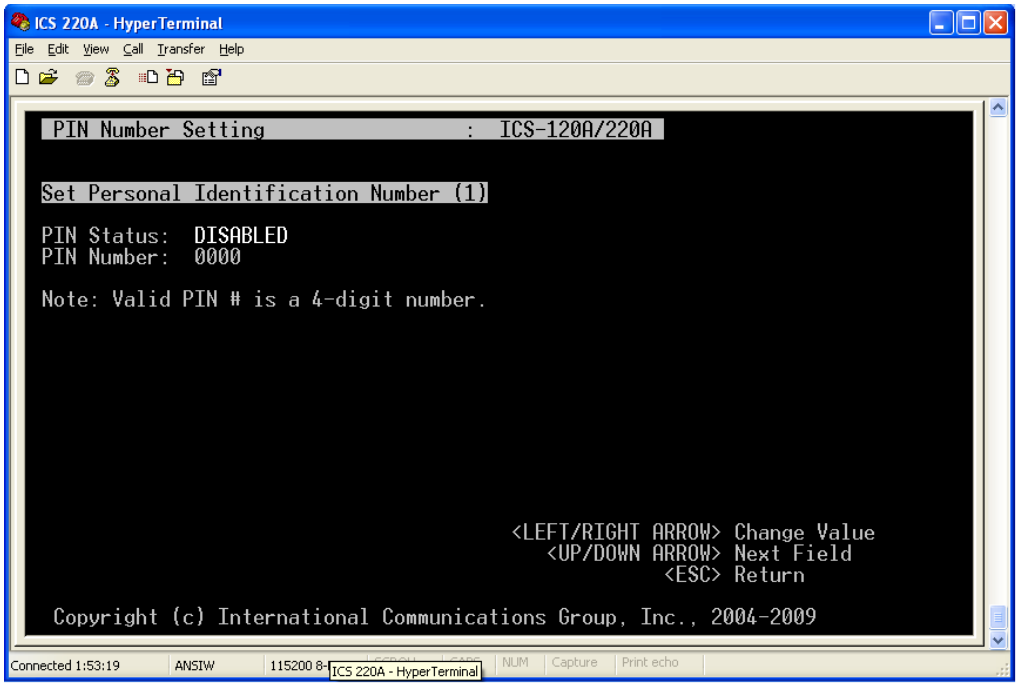

Figure 9-24. Sample PIN Number Setting Screen

The PIN Number Setting screen (see Figure above) displays the following fields:

DATA FIELD	DESCRIPTION
PIN #	Defines the 4-digit PIN.
PIN Status	Defines the current PIN status. If PIN is DISABLED, it cannot be used for call processing.

To modify the PIN settings:

STEP	ACTION
3	Select a PIN Table entry using the <↑> and <↓> keys.
4	Press the <**Enter**> key on the highlighted PIN row to access the **PIN Number Setting** screen.
5	Change the current Status by using the <←> and <→> keys.
6	Change the PIN, if needed, by entering a new 4-digit PIN.
7	Press the <**Esc**> key to return to the **PIN Table Editor** screen.

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9.9 System Editor

Main Menu > Configuration Editor Menu > System Editor

This screen permits entry of telephone numbers, serial numbers, and related information. To access the System Editor screen:

STEP	ACTION
1	Select the **System Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.
3	Press <**Esc**> to return to the **Configuration Editor Menu** screen.

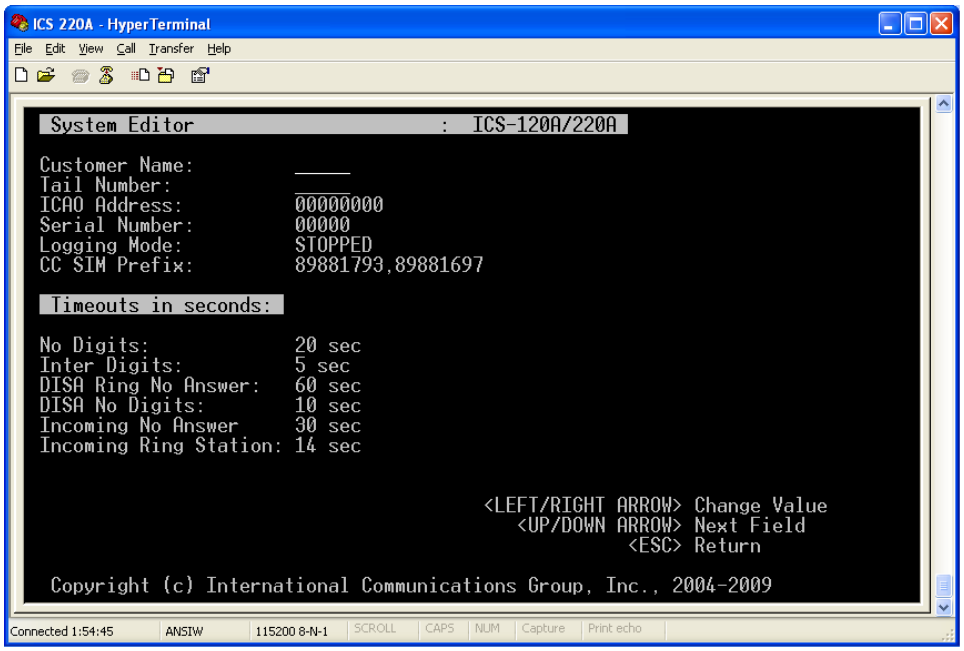

Figure 9-25. Sample System Editor Screen

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All **System Editor** fields are normally used for information purposes only. The System Editor displays the following data:

DATA FIELD	DESCRIPTION
Customer Name	Aircraft Customer Name.
Tail Number	Aircraft identification number.
ICAO Address	International Civilian Aviation Organization address.
Serial Number	A 5-digit number assigned by ICG.
Logging Mode	The data logging feature is configurable to run once, run continuously, or stop to permit collection of the device operation status as needed.
CC SIM Prefix	The System software uses this field to determine if the installed SIM card is provisioned for credit card service, and accordingly dials the appropriate prefixes for outbound calls. This field accepts a comma separated list of SIM card serial number prefixes that are provisioned for 'post-paid' credit card calling.
Timeouts in Seconds	
No Digits	Period of time allowed between off-hook condition and first digit is dialed.
Inter Digits	Period of time allowed between dialed digits.
DISA Ring No Answer	Period of time allowed before incoming DISA call is terminated.
DISA No Digits	Period of time allowed between off-hook state and first digit is dialed.
Incoming No Answer	Period of time allowed before incoming call is terminated.
Incoming Ring Station	Period of time allowed before incoming Ring Station call is terminated.

NOTE: ***The data are usually pre-assigned and should not be changed.***

To change the settings:

STEP	ACTION
1	Use the <↑> and <↓> keys to move the cursor to the desired field and press <**Enter**>.
2	Either type in the requested data or use the <←> and <→> keys until the desired entry is highlighted.
3	Press <**Esc**> to return to the previous screen.

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9.10 ARINC 429 Editor

Main Menu > Configuration Editor Menu > ARINC-429 Editor

The ARINC 429 Editor screen presents the user with access to four separate editors:

- ACARS Datalink Editor
- Left MCDU Editor
- Right MCDU Editor
- Crew MCDU Editor

To access the ARINC 429 Editor screen:

STEP	ACTION
1	Select the **ARINC 429 Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.
3	Press <**Esc**> to return to the **Unit Setting** screen.

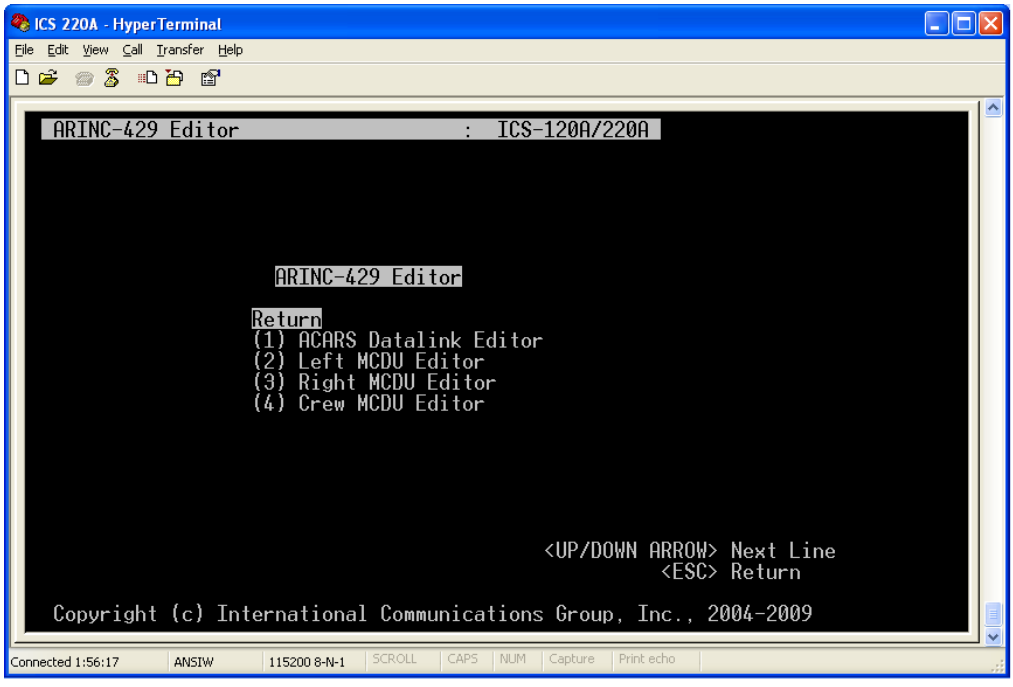

Figure 9-26. Sample ARINC 429 Editor Screen

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9.10.1 ACARS Datalink Editor

Main Menu > Configuration Editor Menu > ARINC-429 Editor > ACARS Datalink Editor

To access the ACARS Datalink Editor screen:

STEP	ACTION
1	Select the **ARINC-429 Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.
3	Select the ACARS Datalink Editor option from the ARINC-429 Editor menu using the <↑> and <↓> keys.
4	Press <**Enter**>.
5	Press <**Esc**> twice to return to the **Configuration Editor** screen.

The following screen will appear.

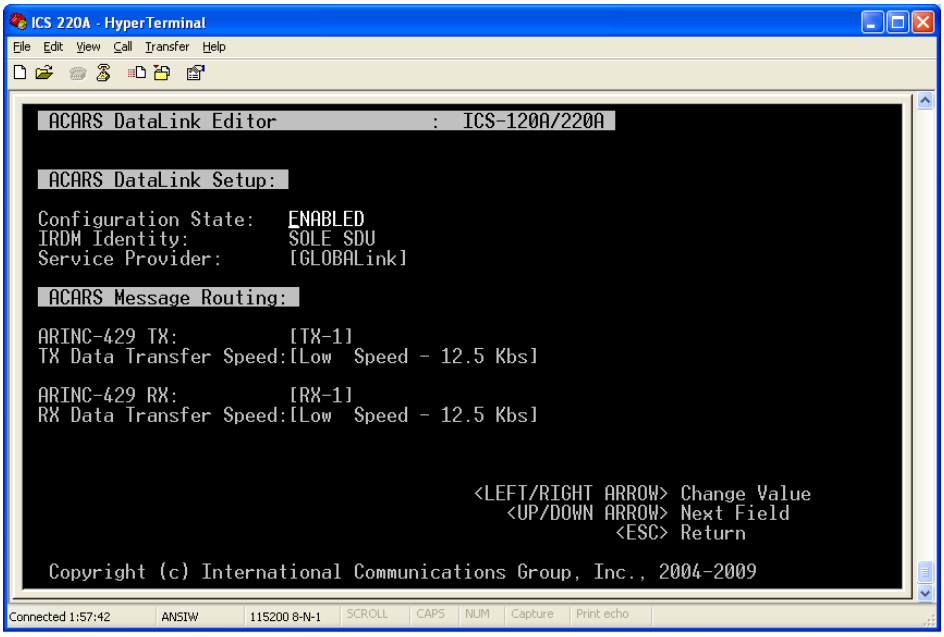

Figure 9-27. Sample ACARS DataLink Editor Screen

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The data fields are described below.

DATA FIELD	DESCRIPTION
Configuration State	Choices: ENABLED or DISABLED (default). If state is changed from DISABLED to ENABLED, then the changes must be saved and the unit must be rebooted.
IRDM Identity	Choices: SOLE SDU, SDU #1, or SDU#2 Sole SDU and SDU#1 set the ICS-120A/220A System Address Label (SAL) to 307 octal in the ARINC 429 communications. SDU#2 sets the ICS-120A/220A SAL to 173 octal.
Service Provider	Choices: GLOBALink, ARINC Direct, Honeywell GDC, SITA, and Other.
ARINC-429 TX	TX-1, TX-2, or TX-3
TX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs)
ARINC-429 RX	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6
RX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs)

NOTE:

SBD messaging must be enabled through the Iridium Service Provider for one or more transceivers designated for ACARS use. The default is the SBD Modem, but other transceivers may be assigned as backup devices in case of hardware failure. See section 3.10 for more information.

NOTE:

When ACARS is enabled, no other data device can access the selected data port. ICG recommends that handsets for voice calls also be restricted from using the ACARS SBD Modem, as messages cannot be transmitted or received if a voice call is in progress on the transceiver.

9.10.2 Left MCDU Editor

Main Menu > Configuration Editor Menu > ARINC-429 Editor > Left MCDU Editor

To access the Left MCDU Editor screen:

STEP	ACTION
1	Select the **ARINC-429 Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.
3	Select the **Left MCDU Editor** option from the **ARINC-429 Editor** menu using the <↑> and <↓> keys.
4	Press <**Enter**>.
5	Press <**Esc**> twice to return to the **Configuration Editor** screen.

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The following screen will appear:

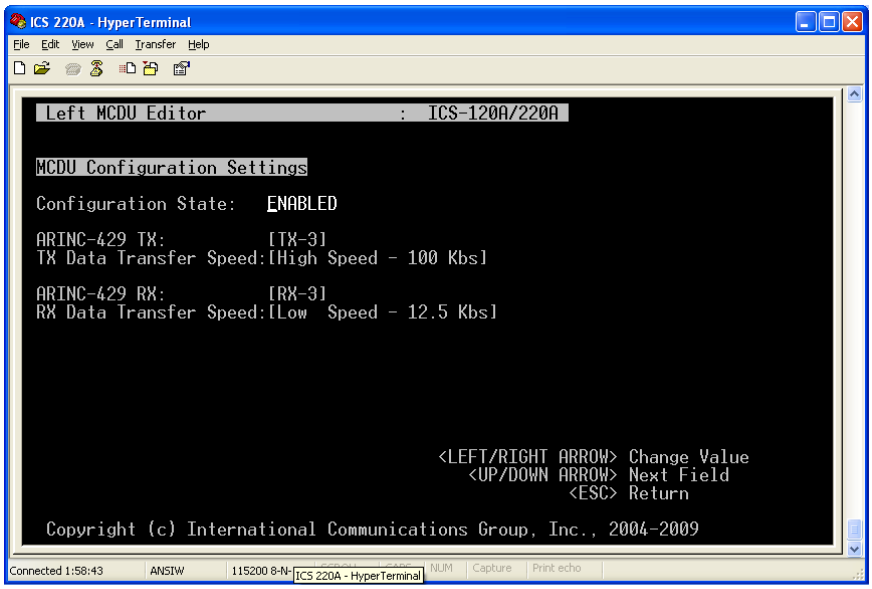

Figure 9-28. Sample Left MCDU Editor Screen

The data fields are described below.

DATA FIELD	DESCRIPTION
Configuration State	Choices: ENABLED or DISABLED (default). If state is changed from DISABLED to ENABLED, then the changes must be saved and the unit must be rebooted.
Service Provider	Choices: GLOBALink, ARINC Direct, Honeywell GDC, SITA, and Other.
ARINC-429 TX	TX-1, TX-2, or TX-3
TX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs)
ARINC-429 RX	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6
RX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs)

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9.10.3 Right MCDU Editor

Main Menu > Configuration Editor Menu > ARINC-429 Editor > Right MCDU Editor

This screen allows the user to set the parameters for the Right MCDU:

To access the Right MCDU Editor screen:

STEP	ACTION
1	Select the **ARINC-429 Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.
3	Select the **Right MCDU Editor** option from the **ARINC-429 Editor** menu using the <↑> and <↓> keys.
4	Press <**Enter**>.
5	Press <**Esc**> twice to return to the **Configuration Editor** screen.

The following screen will appear.

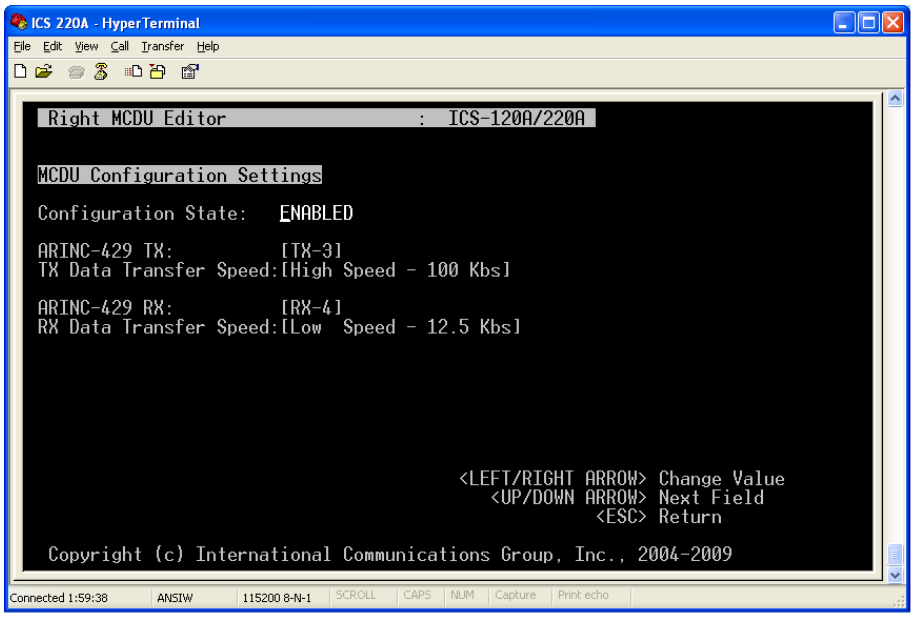

Figure 9-29. Sample Right MCDU Editor Screen

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The data fields are described below.

DATA FIELD	DESCRIPTION
Configuration State	Choices: ENABLED or DISABLED (default). If state is changed from DISABLED to ENABLED, then the changes must be saved and the unit must be rebooted.
Service Provider	Choices: GLOBALink, ARINC Direct, Honeywell GDC, SITA, and Other.
ARINC-429 TX	TX-1, TX-2, or TX-3.
TX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).
ARINC-429 RX	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6.
RX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).

9.10.4 Crew MCDU Editor

Main Menu > Configuration Editor Menu > ARINC-429 Editor > Crew MCDU Editor

This screen allows the user to set the parameters for the Crew MCDU.

To access the Crew MCDU Editor screen:

STEP	ACTION
1	Select the **ARINC-429 Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.
3	Select the **Crew MCDU Editor** option from the **ARINC-429 Editor** menu using the <↑> and <↓> keys.
4	Press <**Enter**>.
5	Press <**Esc**> twice to return to the **Configuration Editor** screen.

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The following screen will appear.

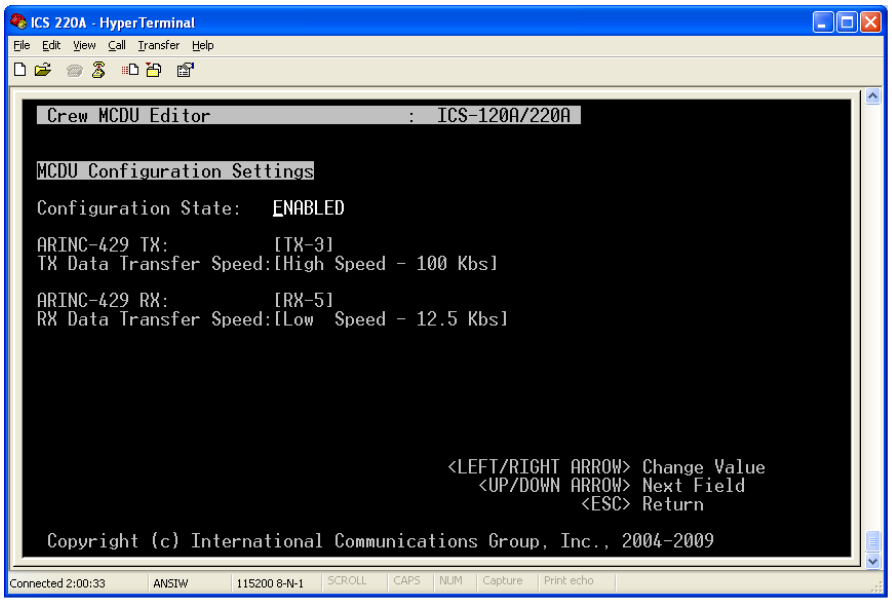

Figure 9-30. Sample Crew MCDU Editor Screen

The data fields are described below.

DATA FIELD	DESCRIPTION
Configuration State	Choices: ENABLED or DISABLED (default). If state is changed from DISABLED to ENABLED, then the changes must be saved and the unit must be rebooted.
Service Provider	Choices: GLOBALink, ARINC Direct, Honeywell GDC, SITA, and Other.
ARINC-429 TX	TX-1, TX-2, or TX-3.
TX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).
ARINC-429 RX	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6.
RX Data Transfer Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).

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9.11 MDCU Options Editor

Main Menu > Configuration Editor Menu > MCDU Opetions Editor

The MCDU Options Editor allows the user to set a password for access to the MCDU directory in order to edit the contents. Additionally the MCDU Options Editor screen allows the user to customize the identity string for the MCDU label (which is set to "SAT" as a default). Editing the MCDU Menu Label allows users to customize the ICS-120A/220A identification on the MCDU display (e.g. Figure 9-31 below shows "IRDM," which would replace the default "SAT" LSK and Menu labels in the MCDU Menu screens).

To access the MCDU Options Editor screen:

STEP	ACTION
1	Select the **MCDU Options Editor** option from the **Configuration Editor** menu using the <↑> and <↓> keys.
2	Press <**Enter**>.
3	Press <**Esc**> to return to the **Configuration Editor Menu** screen.

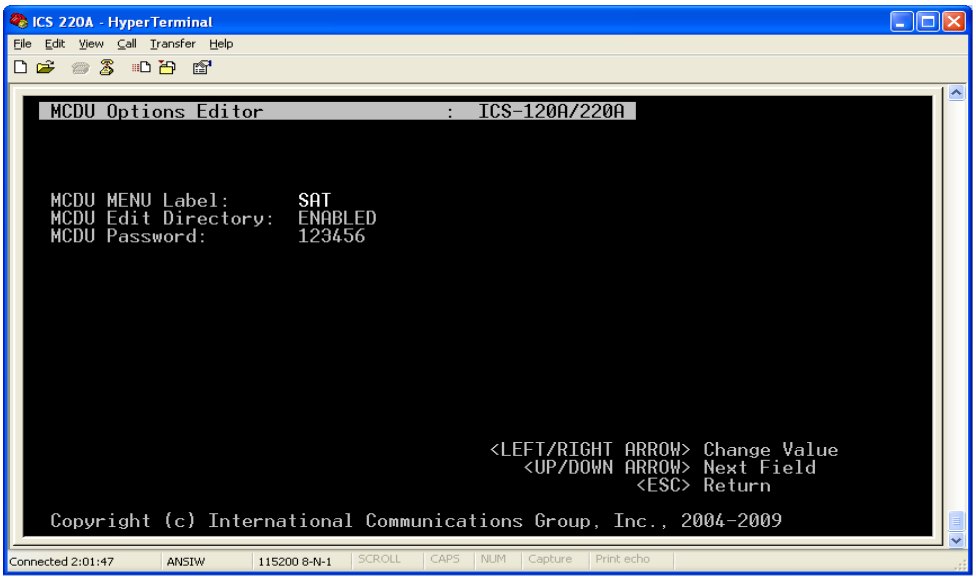

Figure 9-31. Sample MCDU Options Editor Screen

DATA FIELD	DESCRIPTION
MCDU MENU Label	Changing the text of this identity string will modifiy the accompanying labels (e.g. Figure 9-31 above shows "IRDM," which would replace the default "SAT" label in the MCDU Menu screens). 6-character maximum.

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DATA FIELD	DESCRIPTION
MCDU Edit Directory	ENABLED: allows users to access and edit the MCDU directories from the MCDU using the password stipulated in the MCDU Password field. DISABLED: restricts MCDU directory editing.
MCDU Password	The customizable password that allows access to MCDU directory editing. The password has no minimum requirements and is completely customizable. 6-character maximum.

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10. MONITORING THE SYSTEM

The Monitors Menu Screen permits access to the various system monitor screens. These include the following screens.

- **System Monitor:** shows system status and assignments
- **Stations Monitor:** shows 2-wire, 4-wire, and MCDU station status
- **Trunks Monitor:** Shows transceiver and SBD modem status
- **Hunt Groups Monitor:** Shows hunt group settings and status
- **I/O Pins Monitor:** shows assigned inputs or outputs
- **ARINC-429 Monitor:** shows ACARS Datalink and MCDU settings and status

STEP	ACTION
1	Use the <↑> and <↓> keys to scroll through the Monitors Menu.
2	Press the <**Enter**> key when the desired option is highlighted.
3	Press the <**Esc**> key to return to the previous screen.

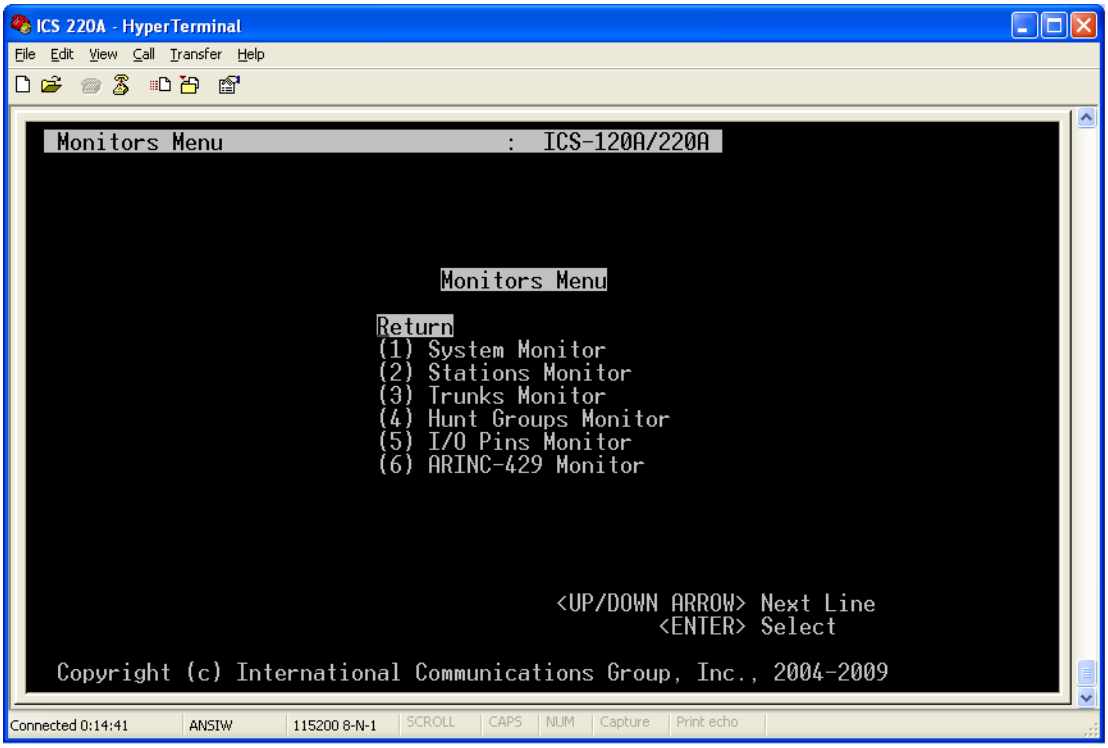

Figure 10-1. Sample Monitors Menu Screen

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10.1 System Information Monitor Screen

Main Menu > Monitors Menu > System Monitor

The **System Information Monitor** screen includes the serial number, hardware revision, and various types of Timeouts (in seconds), and other information that uniquely identify the customer and describe the system.

STEP	ACTION
1	Use the <↑> and <↓> keys to highlight the **System Monitor** option in the **Monitors Menu**.
2	Press the <**Enter**> key when the desired option is highlighted.
3	Press the <**Esc**> key to return to the previous screen.

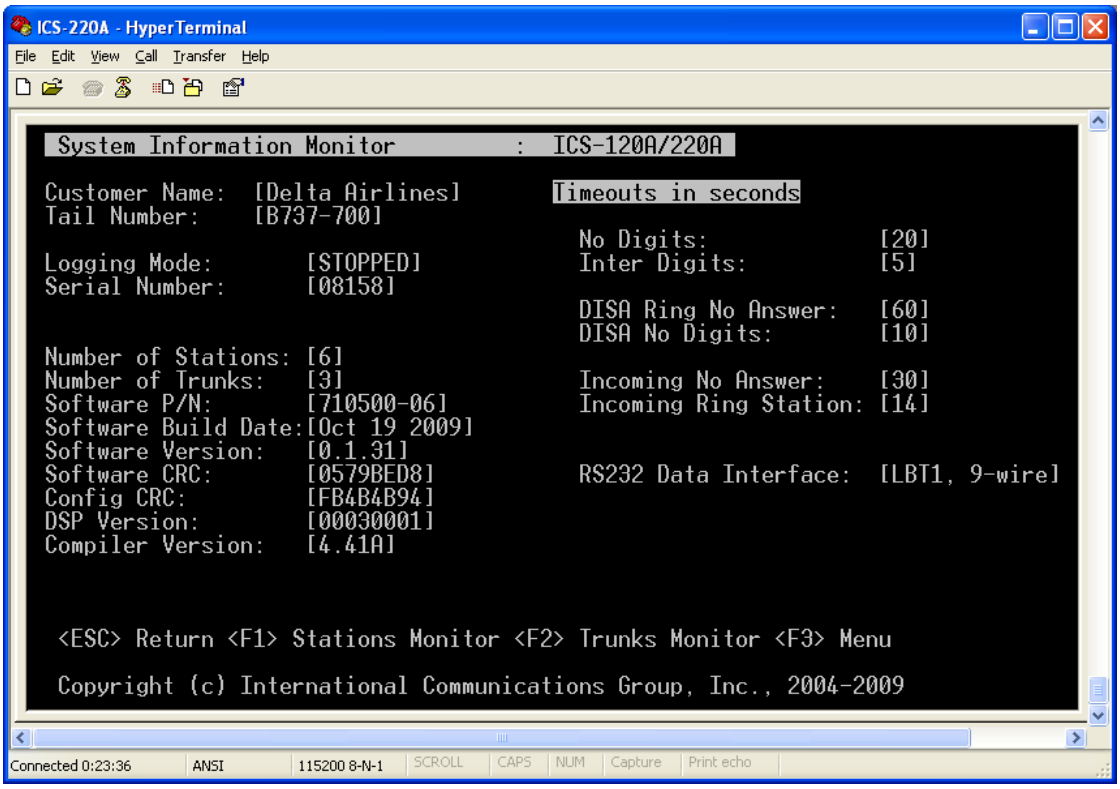

Figure 10-2. Sample System Information Monitor Screen

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The following information is displayed on the **System Information Monitor screen**.

DATA FIELD	DESCRIPTION
Customer Name	Customer ID.
Tail Number	Aircraft identification number.
Serial Number	ICS-120A/220A unit serial number.
Number of Stations	The ICS-120A/220A has a maximum of 6 stations.
Number of Trunks	The ICS-220A has 2 Iridium trunks and 1 SBD modem. The ICS-120A has 1 Iridium trunk and 1 SBD modem.
Software P/N	Software Part Number.
Software Build Date	Date of current software build.
Software Version	Version number.
Software CRC	32-bit CRC (Cyclic Redundancy Check) which validates the software load against the QA records for the software release. It also verifies a software load has been successful.
Config CRC	Config CRC is an eight digit hexadecimal number and may be used to uniquely identify/verify the active system configuration.
DSP Version	DSP (Digital Signal Processor) version number.
Compiler Version	Utility compiler version.
TIMEOUTS IN SECONDS	
No Digits	Period of time allowed between off-hook condition and first digit is dialed.
Inter Digits	Period of time allowed between dialed digits.
DISA Ring No Answer	Period of time allowed before incoming DISA call is terminated.
DISA No Digits	Period of time allowed between off-hook state and first digit is dialed.
Incoming No Answer	Period of time allowed before incoming call is terminated.
Incoming Ring Station	Period of time allowed before incoming Ring Station call is terminated.
RS-232 Data Interface	Indicates which LBT is being accessed (LBT-1 or LBT-2) and what the configuration is (9-wire or 3-wire).

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10.2 Stations Monitor Screen

Main Menu > Monitors Menu > Stations Monitor

The **Stations Monitor** screen provides information regarding the status of each 2-wire, 4-wire, and MCDU station. Call progress can be monitored to verify the operation of inbound or outbound voice calls as well as data calls.

STEP	ACTION
1	Use the <↑> and <↓> keys to highlight the **Stations Monitor** option in the **Monitors Menu**.
2	Press the <**Enter**> key.
3	Press the <**Esc**> key to return to the previous screen.

Or:

STEP	ACTION
1	Press the <**F1**> key.
2	Press the <**Esc**> key to return to the previous screen.

The following screen appears:

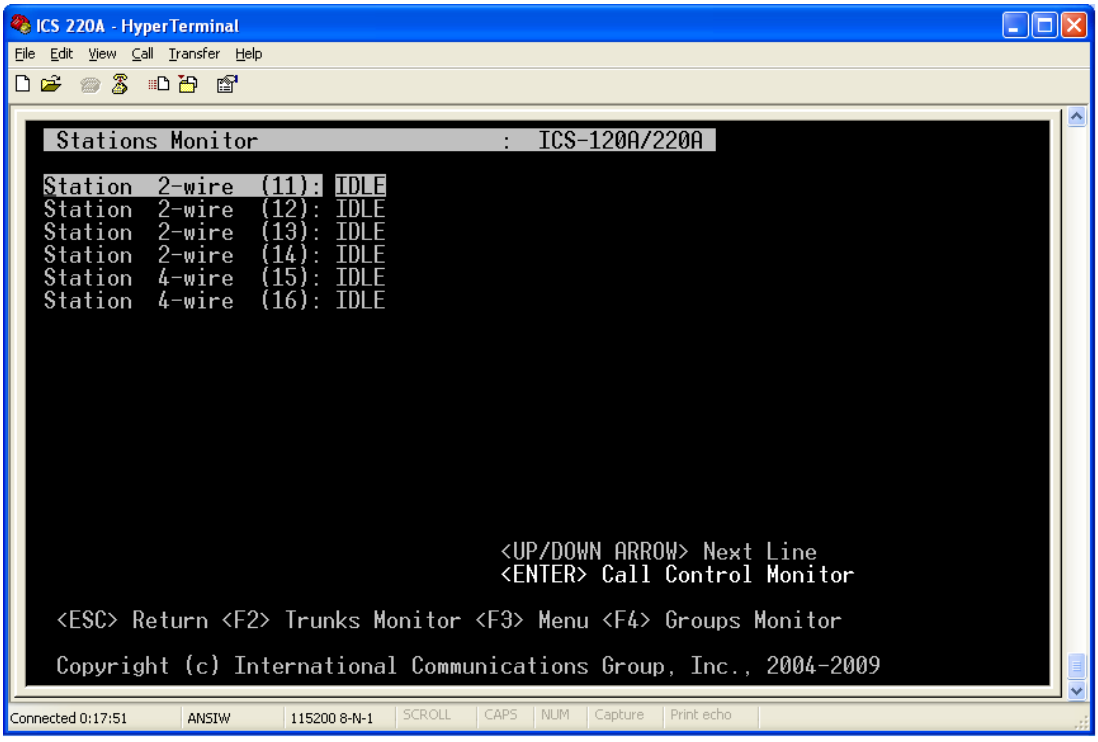

Figure 10-3. Sample Stations Monitor Screen

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The following information is displayed on this screen:

DATA FIELD	DESCRIPTION
Station port type	2-wire, 4-wire, or MCDU
Station number	Station number (11 to 16)
Port state	IDLE, BUSY, ACTIVELY RINGING, WAITING FOR DISCONECT, WAITING FOR CONNECT, WAITING FOR FLASH (appears briefly after a flash).

10.2.1 Station Call Control Monitor Screen

Main Menu > Monitors Menu > Stations Monitor > Station Call Control Monitor

To access a station's call control information and current state:

STEP	ACTION
1	Use the <↑> and <↓> keys to highlight the desired station on the **Stations Monitor** screen.
2	Press the <**Enter**> key to bring up the **Station Call Control Monitor** screen.
3	Press the <**Esc**> key to return to the previous screen.

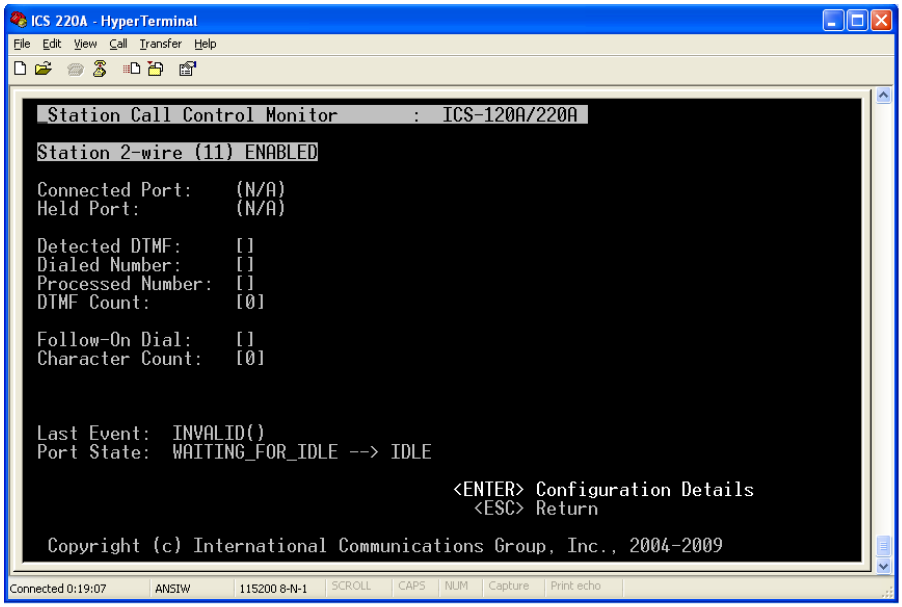

Figure 10-4. Sample 2-Wire Station Call Control Monitor Screen

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The following information is displayed on this screen.

DATA FIELD	DESCRIPTION
Station Type	2-wire, 4-wire, or MCDU.
Extension number	Normally a number from 11 to 16.
Station status	Choices: ENABLED or DISABLED
Connected Port	Port connected to this station.
Held Port	Port on hold by this station.
Detected DTMF	Detected DTMF digit.
Dialed Number	Phone number dialed on this station.
Processed Number	Phone number processed for this station.
DTMF Count	Number of DTMF digits dialed.
Follow-On Dial	DTMF digits for follow-on dialing.
Character Count	Number of follow-on digits dialed.
Last Event	Most recent event to occur on the port.
Port State	Current state of port.

10.2.1.1 Station Configuration Monitor Screen: 2-Wire

Main Menu > Monitors Menu > Stations Monitor > Station Call Control Monitor > Station Configuration Monitor

To see the configuration details for a selected station, press <**Enter**>.

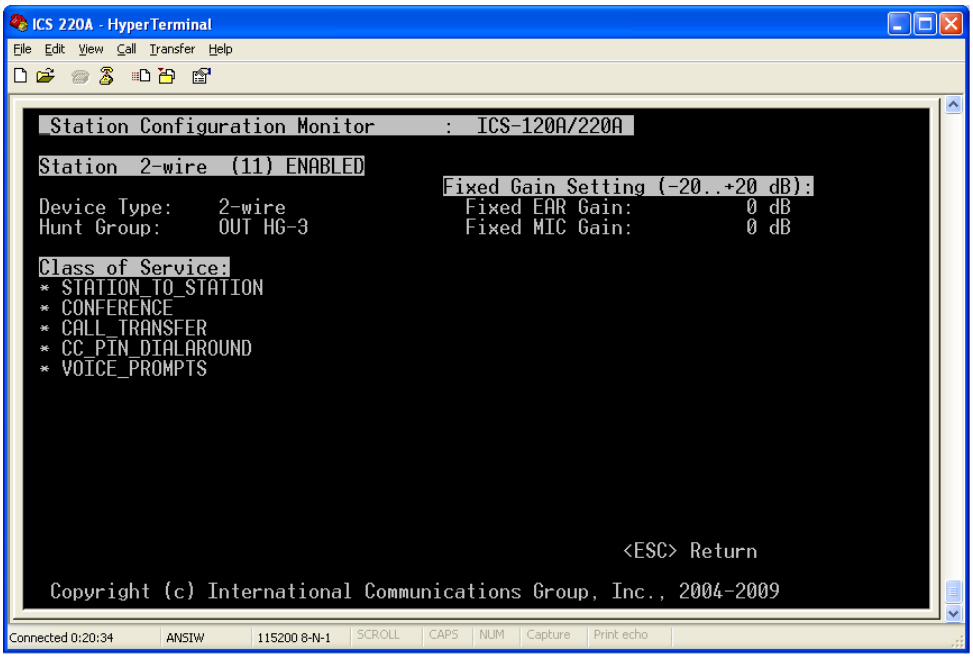

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Figure 10-5. Sample 2-Wire Station Configuration Monitor Screen

The following information is displayed on this screen.

DATA FIELD	DESCRIPTION
Station Type	2-wire, 4-wire, or MCDU.
Extension number	Normally a number from 11 to 16.
Station status	ENABLED or DISABLED.
Device Type	2-wire, 4-wire, or MCDU.
Hunt Group	Associated hunt group.
Fixed Gain Control	The Gain Control parameters permit gain or attenuation adjustments in the RX (EAR) and TX (MIC) directions, ranging between -20 dB and +20 dB in 1 dB steps. 0 dB is the default gain value in both RX and TX directions.
Class of Service	List of services ENABLED for this station.

10.3 Trunks Monitor Screen

Main Menu > Monitors Menu > Trunks Monitor

The **Trunks Monitor** screen provides overall information about the state of the three available trunks. To display this screen:

STEP	ACTION
1	Use the <↑> and <↓> keys to highlight the **Trunks Monitor** option in the **Monitors Menu**.
2	Press the <**Enter**> key.
3	Press the <**Esc**> key to return to the previous screen.

Or:

STEP	ACTION
1	Press the <**F2**> key.
2	Press the <**Esc**> key to return to the previous screen.

The Trunks Monitor screen appears:

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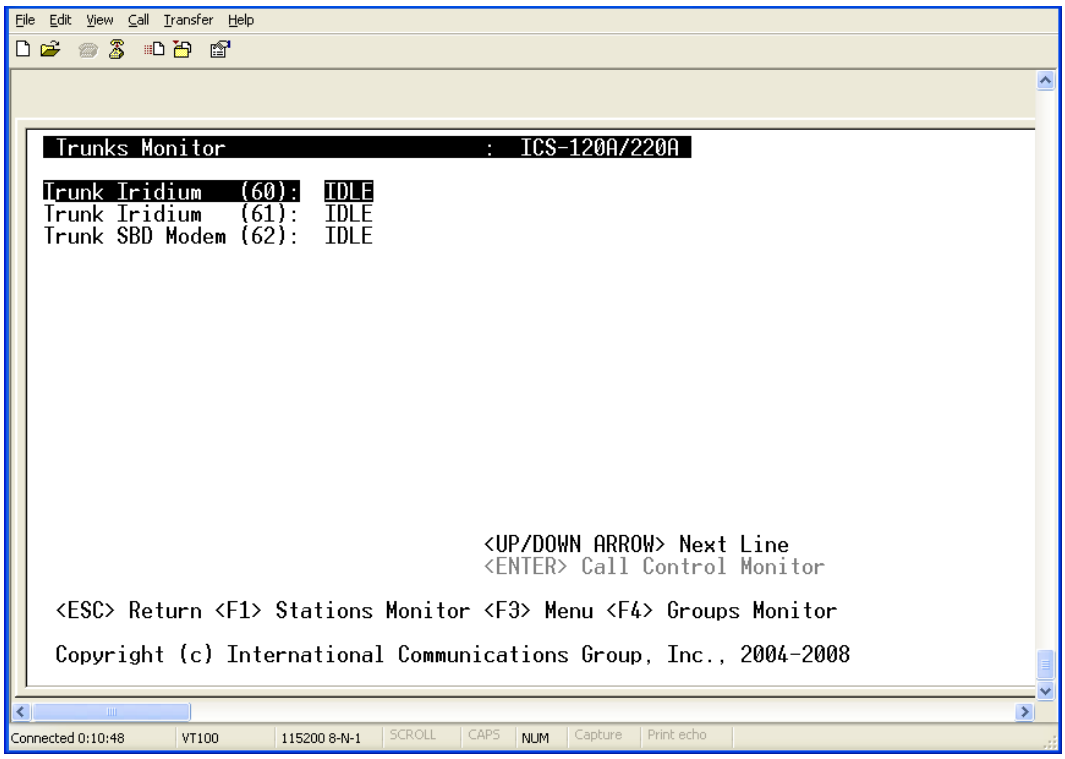

Figure 10-6. Sample Trunks Monitor Screen

Which trunks are displayed will depend upon the configuration of the unit. See Section 7.4 for more information.

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10.3.1 Trunk Call Control Monitor Screen: Iridium

Main Menu > Monitors Menu > Trunks Monitor > Trunk Call Control Monitor

To access a selected trunk's call control information and current state:

STEP	ACTION
1	Use the <↑> and <↓> keys to highlight the desired trunk on the **Trunks Monitor** screen.
2	Press the <**Enter**> key to bring up the **Trunk Call Control Monitor** screen.
3	Press the <**Esc**> key to return to the previous screen.

The following screen appears:

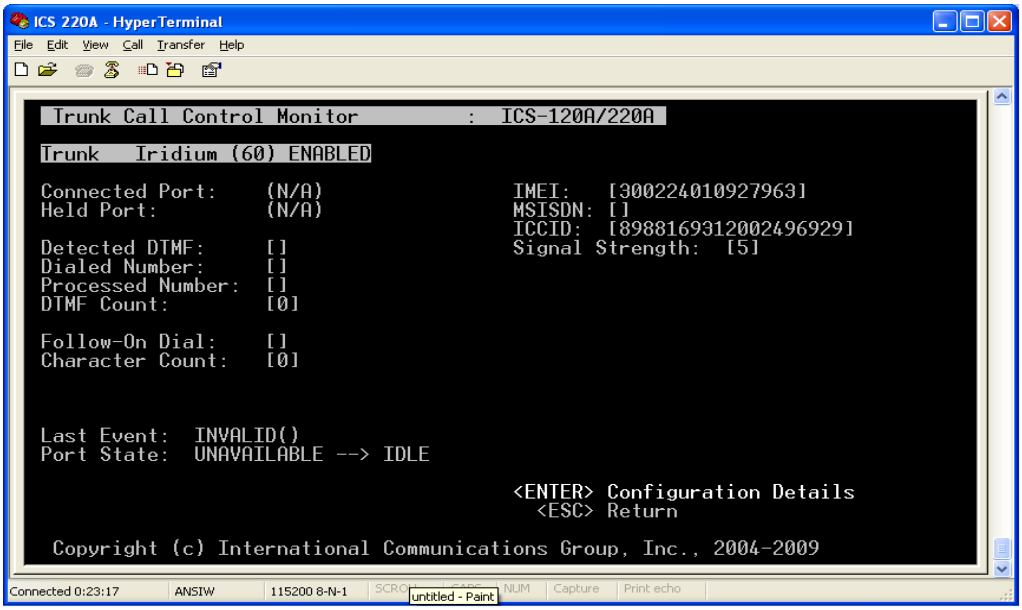

Figure 10-7. Sample Iridium Trunk Call Control Monitor Screen

The following information is displayed on the trunk call control monitor screen.

DATA FIELD	DESCRIPTION
Trunk medium type	Iridium, etc.
Trunk number	Normally a number from 60 to 63, depending upon configuration.
Trunk status	Choices: ENABLED or DISABLED.
Connected Port	Port connected to this trunk.
Held Port	Port on hold by this station.
Detected DTMF	Detected DTMF digit.
Dialed Number	Phone number dialed on this trunk.

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DATA FIELD	DESCRIPTION
Processed Number	Phone number processed by this trunk.
DTMF Count	Number of DTMF digits dialed.
Follow-On Dial	DTMF digits for follow-on dialing.
Character Count	Number of follow-on digits dialed.
Last Event	Most recent event to occur on the port.
Port State	Current state of port.

10.3.1.1 Trunk Configuration Monitor Screen: Iridium

Main Menu > Monitors Menu > Trunks Monitor > Trunk Call Control Monitor > Trunk Configuration Monitor

To see the configuration details for a selected trunk, press <**Enter**>.

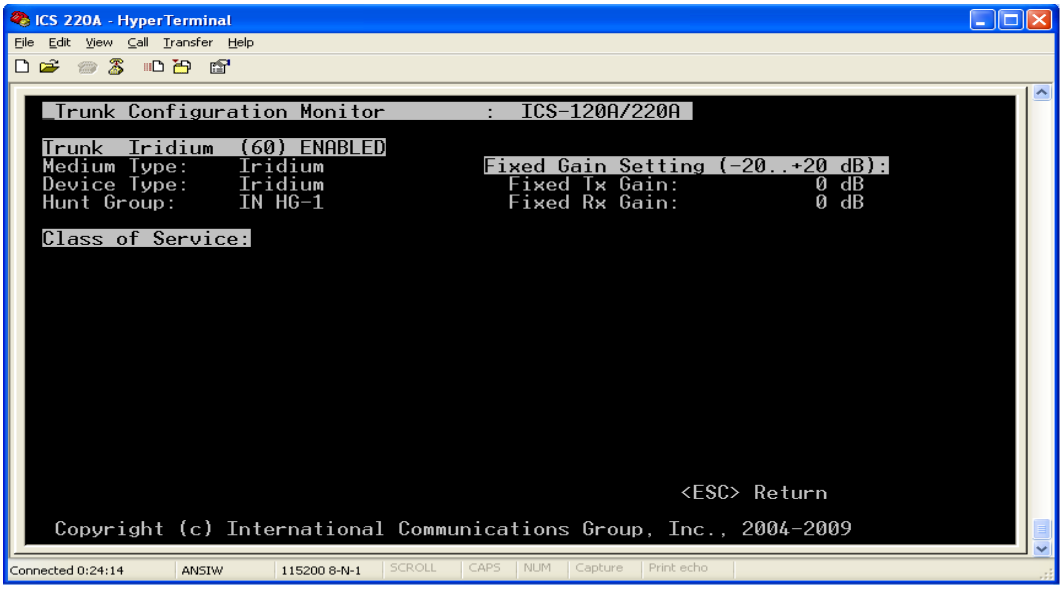

Figure 10-8. Sample Iridium Trunk Configuration Monitor

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10.3.2 Iridium SBD Modem Monitor

Main Menu > Monitors Menu > Trunks Monitor > Iridium SBD Modem Monitor

To access the **Iridium SBD Modem Monitor** screen:

STEP	ACTION
1	Use the <↑> and <↓> keys to highlight the SBD Modem on the **Trunks Monitor** screen.
2	Press the <**Enter**> key to bring up the **Iridium SBD Modem Monitor** screen.
3	Press the <**Esc**> key to return to the previous screen.

The following screen appears:

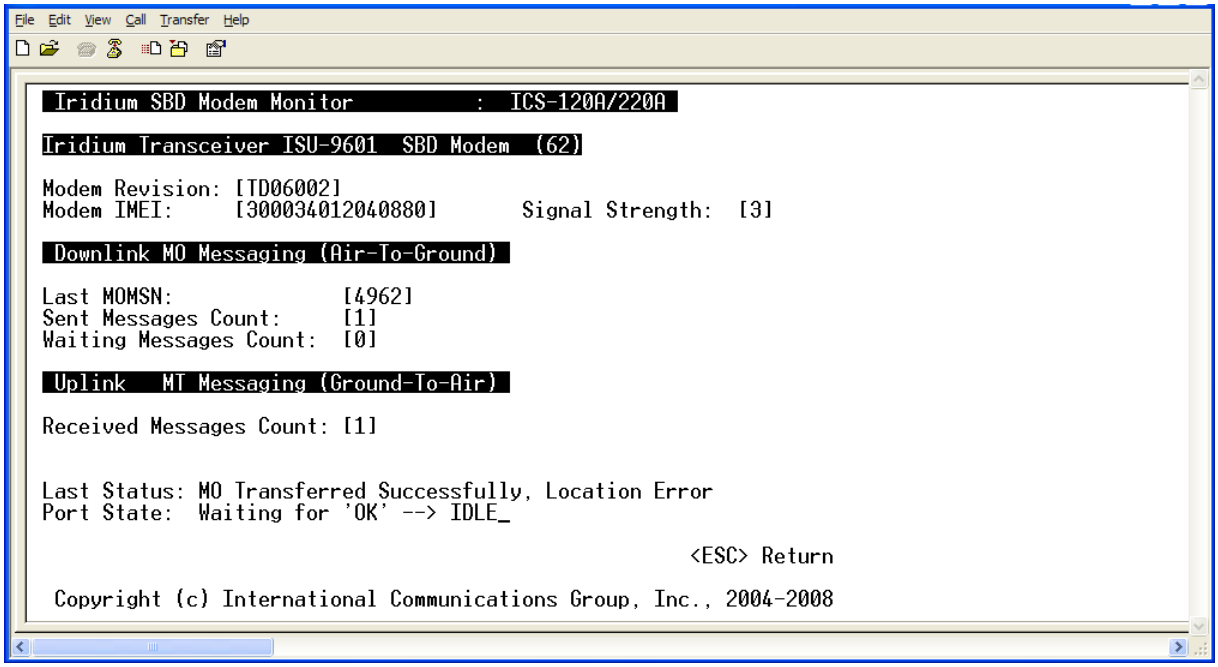

Figure 10-9. Sample Iridium SBD Modem Monitor Screen

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The following information is displayed on this screen and is useful in monitoring SBD modem traffic.

DATA FIELD	DESCRIPTION
Modem Revision	Software revision for the SBD/LBT modem.
Modem IMEI	SBD/LBT IMEI number needed to provision the modem for ACARS traffic.
Last MOMSN	Previous Mobile Originated Message Sequence Number which ranges from 0 to 65535 in value. For each message exchange this value is incremented and saved by the SBD modem. Note: The ICS unit does not reset this value. It can be reset using AT commands if needed.
Sent Messages Count	Total number of messages sent by the unit since power on.
Waiting Messages Count	Number of messages waiting to be delivered by the ICS unit.
Received Messages Count	Total number of messages received by the ICS unit since power on.
Signal Strength	Polled every 15 seconds from the LBT and displayed on the screen.
Last Status	Shows the text response from the last modem transfer. On power up, the status is successful regardless. Status (A,B): A,B indicates the (MO,MT) status in the SBDIX response from a transaction. MO session status provides an indication of the disposition of the mobile originated transaction.
Port State	Shows the current state of the modem. Possible states include: • IDLE (99% of the time, default state) • WAITING_FOR_STRING • WAITING_FOR_OK • WAITING_FOR_BLOCK

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10.4 Hunt Groups Monitor Screen

Main Menu > Monitors Menu > Hunt Groups Monitor

The **Hunt Groups Monitor** screen shows a user the port assignments for each inbound and outbound hunt group.

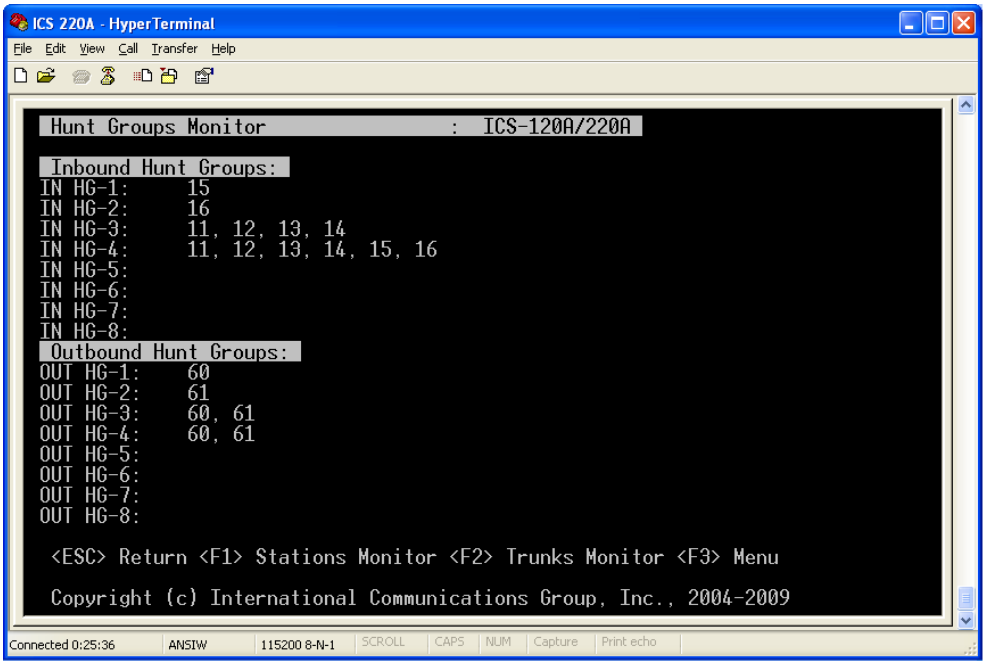

Figure 10-10. Sample Hunt Groups Monitor Screen

10.5 I/O Pins Monitor Screen

Main Menu > Monitors Menu > I/O Pins Monitor

The I/O **Pins Monitor** screen displays the state of the discrete assigned inputs or outputs, as well as the external on/off switch.

To access this screen:

STEP	ACTION
1	Press the <**F3**> key.
2	Select the **Monitor Menu** using the <↑> and <↓> keys.
3	Select the **I/O Pins Monitor** option using the <↑> and <↓> keys.
4	Press <**Enter**>.
5	Press the <**Esc**> key to return to the previous screen.

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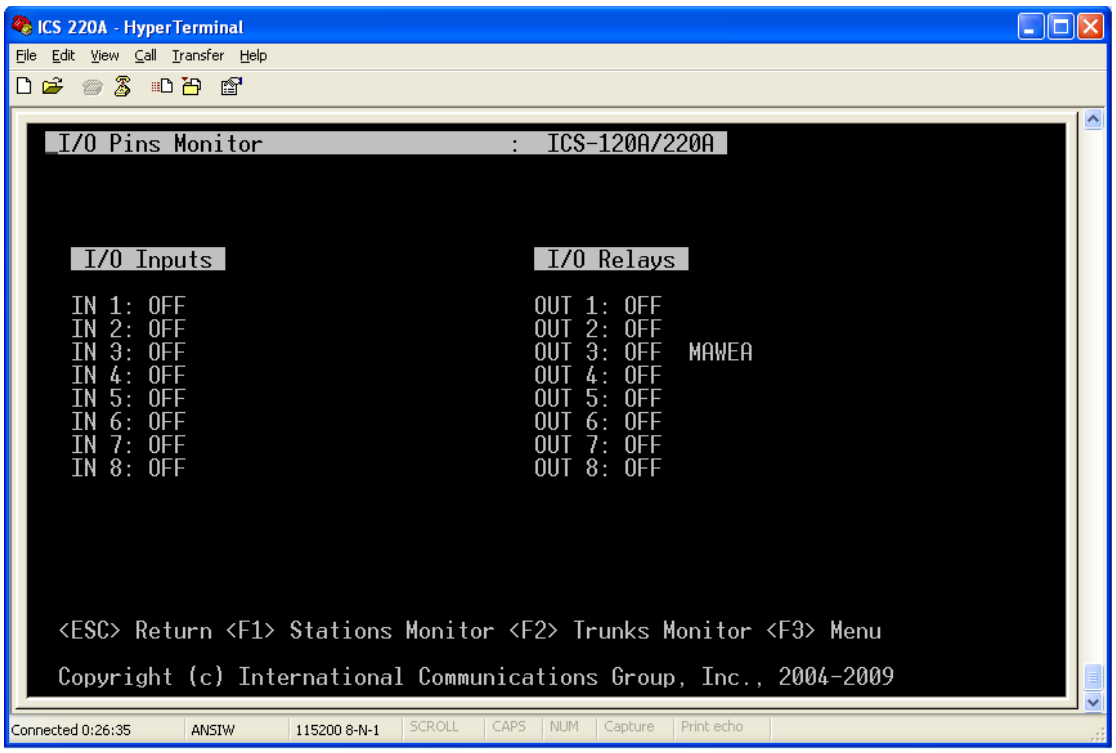

Figure 10-11. Sample I/O Pins Monitor Screen

The following information is displayed.

- Assigned inputs and their states
- Assigned outputs and their states
- External on/off Switch state

10.6 ARINC-429 Monitor Menu

Main Menu > Monitors Menu > ARINC-429 Monitor

The **ARINC-429 Monitor** screen presents the user with access to four individual monitors:

- ACARS Datalink Monitor
- Left MCDU Monitor
- Right MCDU Monitor
- Crew MCDU Monitor

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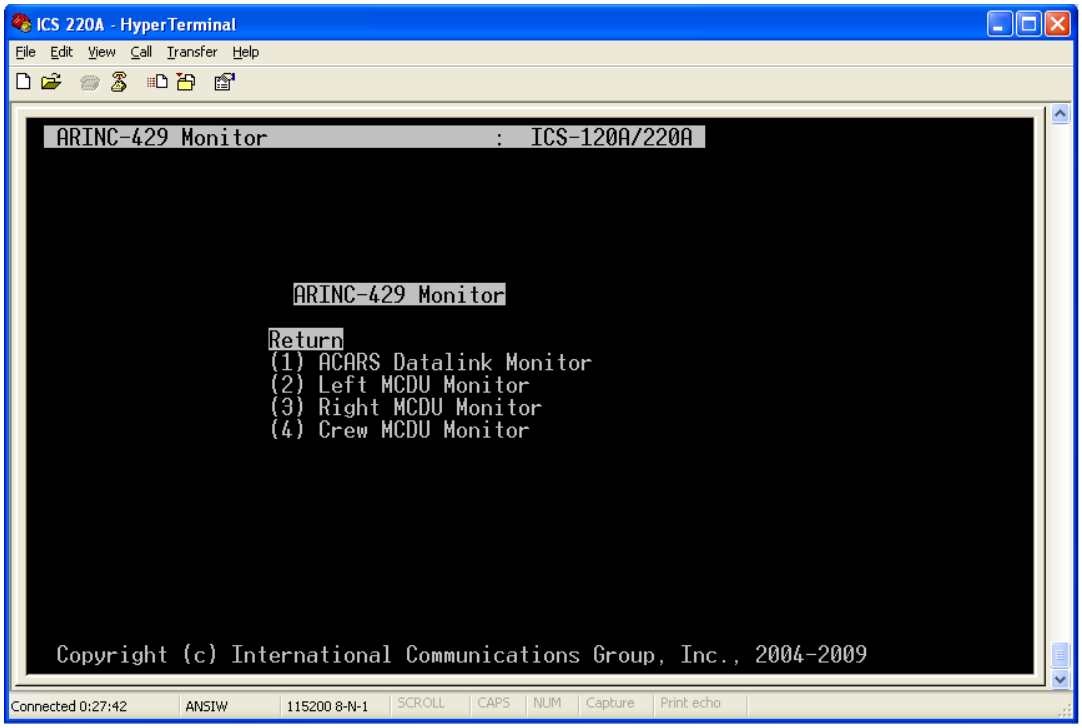

Figure 10-12. ARINC-429 Monitor Menu Screen

10.6.1 ACARS Datalink Monitor

Main Menu > Monitors Menu > ARINC-429 Monitor > ACARS Datalink Information

This screen provides ACARS configuration information and information about the service provider. To access this screen:

STEP	ACTION
1	Use the <↑> and <↓> arrows on the **Monitors Menu** until the **ARINC-429 Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Use the <↑> and <↓> arrow on the **ARINC-429 Monitor Menu** until **ACARS Datalink Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Press the <**Esc**> key to return to the previous screen.

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The following screen will appear:

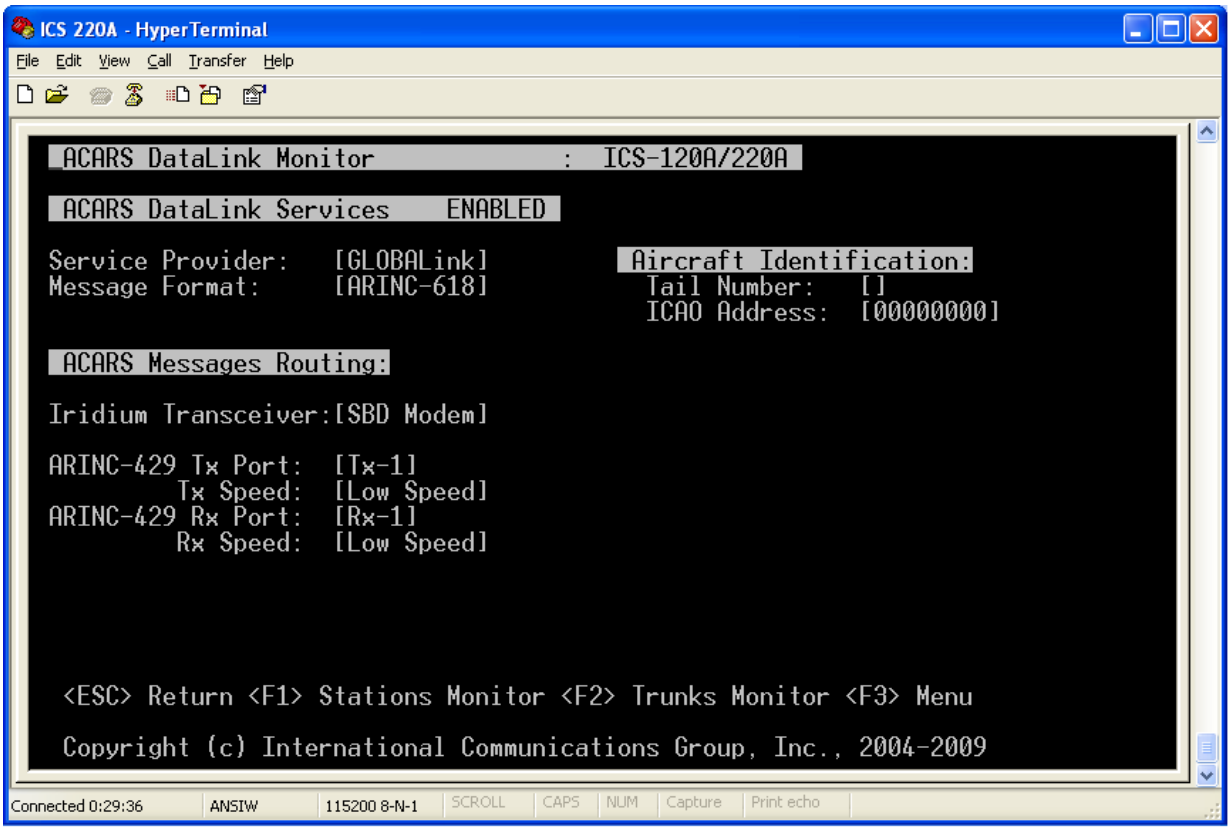

Figure 10-13. The ACARS DataLink Information Screen

The fields on this screen are:

DATA FIELD	DESCRIPTION
Service Provider	Options are GLOBALink, Honeywell GDC, SITA, ARINC Direct, or Other.
Message Format	ARINC-618.
Iridium Transceiver	LBT-02, LBT-01, or SBD Modem.
ARINC-429 TX Port	Tx-1, Tx-2, or Tx-3.
Tx Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).
ARINC-429 RX Port	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6.
Rx Speed	High Speed or Low Speed.
Tail Number	Aircraft identification number.
ICAO Number	International Civilian Aeronautical Organization identification number.

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10.6.2 Left MCDU Monitor Screen

Main Menu > Monitors Menu > ARINC-429 Monitor > Left MCDU Monitor

This screen allows the user to monitor the parameters for the left MCDU. To access the **Left MCDU Monitor** screen:

STEP	ACTION
1	Use the <↑> and <↓> arrow keys on the **Monitors Menu** until the **ARINC-429 Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Use the <↑> and <↓> arrow key on the **ARINC-429 Monitor Menu** until the **Left MCDU Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Press the <**Esc**> key to return to the prior screen.

The following screen will appear:

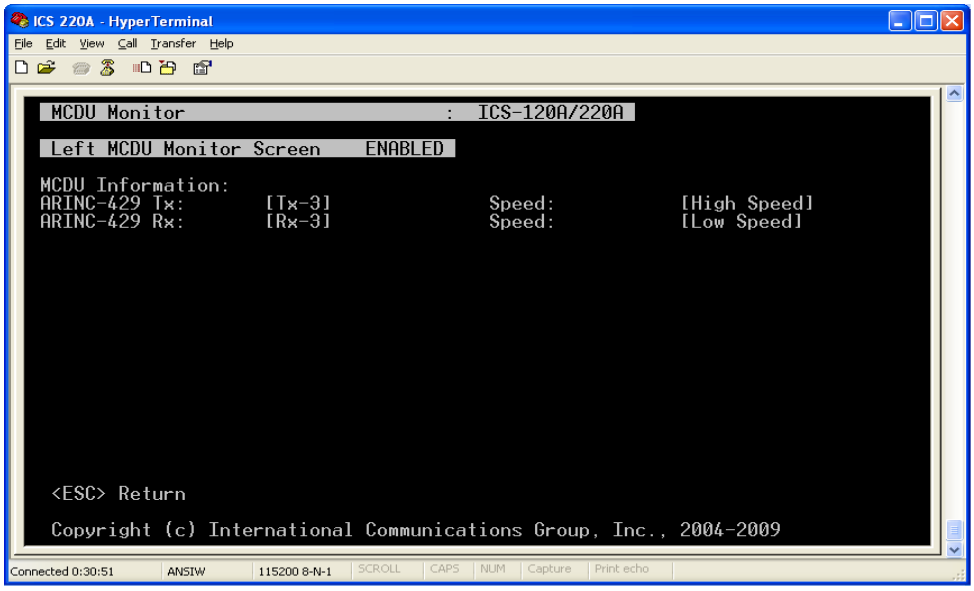

Figure 10-14. Sample Left MCDU Monitor Screen

The data fields are described below.

DATA FIELD	DESCRIPTION
Configuration State	Options: ENABLED or DISABLED (default). If state is changed from DISABLED to ENABLED, then the changes must be saved and the unit must be rebooted.
ARINC-429 Tx	Tx-1, Tx-2, or Tx-3.
Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).

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DATA FIELD	DESCRIPTION
ARINC-429 Rx	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6.
Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).

10.6.3 Right MCDU Monitor Screen

Main Menu > Monitors Menu > ARINC-429 Monitor > Right MCDU Monitor

This screen allows the user to monitor the parameters for the right MCDU. To access the **Right MCDU Editor** screen:

STEP	ACTION
1	Use the <↑> and <↓> arrow keys on the **Monitors Menu** until the **ARINC-429 Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Use the <↑> and <↓> arrow keys on the **ARINC-429 Monitor Menu** until the **Right MCDU Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Press the <**Esc**> key to return to the prior screen.

The following screen will appear:

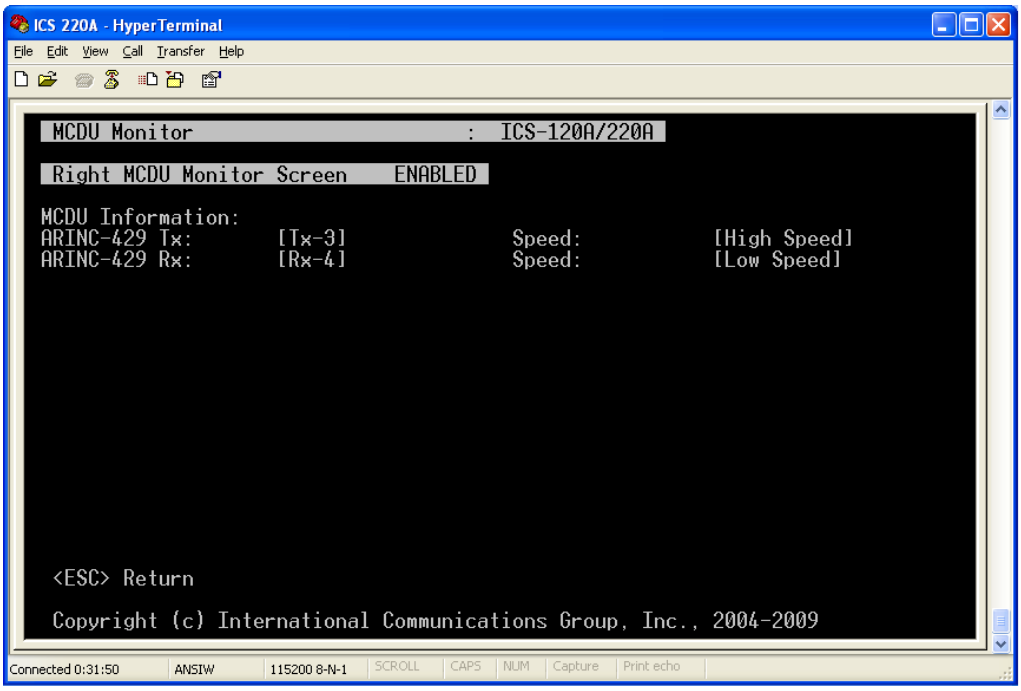

Figure 10-15. Sample Right MCDU Monitor Screen

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The data fields are described below.

DATA FIELD	DESCRIPTION
Configuration State	Options: ENABLED or DISABLED (default). If state is changed from DISABLED to ENABLED, then the changes must be saved and the unit must be rebooted.
ARINC-429 Tx	Tx-1, Tx-2, or Tx-3.
Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).
ARINC-429 Rx	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6.
Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).

10.6.4 Crew MCDU Monitor Screen

Main Menu > Monitors Menu > ARINC-429 Monitor > Left MCDU Monitor

This screen allows the user to monitor the crew MCDU. To access the **Crew MCDU Editor** screen:

STEP	ACTION
1	Use the <↑> and <↓> arrow keys on the **Monitors Menu** until the **ARINC-429 Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Use the <↑> and <↓> arrow keys on the **ARINC-429 Monitor Menu** until **Crew MCDU Monitor** option is highlighted.
2	Press the <**Enter**> key.
3	Press the <**Esc**> key to return to the prior screen.

The following screen will appear:

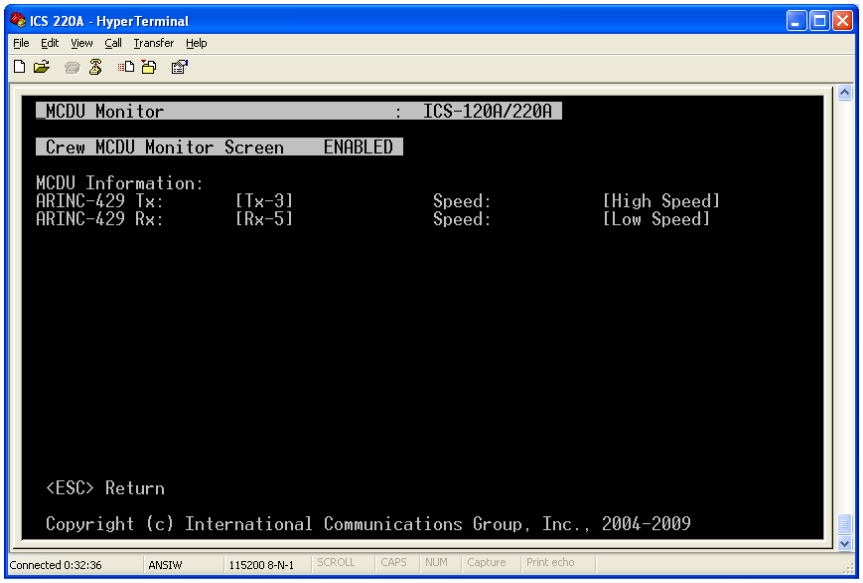

Figure 10-16. Sample Crew MCDU Monitor Screen

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The data fields are described below.

DATA FIELD	DESCRIPTION
Configuration State	Options: ENABLED or DISABLED (default). If state is changed from DISABLED to ENABLED, then the changes must be saved and the unit must be rebooted.
ARINC-429 Tx	Tx-1, Tx-2, or Tx-3.
Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).
ARINC-429 Rx	RX-1, RX-2, RX-3, RX-4, RX-5, or RX-6.
Speed	High Speed (100 Kbs) or Low Speed (12.5 Kbs).

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11. DATA LOGGING

11.1 External Logging

The logging screens display detailed messages and information which can be used to help troubleshoot problems that cannot be resolved from the other screens. There are seven logging screens to choose from, depending on the type of message:

- **General Log:** All messages.
- **Iridium Log.**
- **ARINC-429 Log:** Messages received and transmitted across the ARINC-429 dual-channel data bus.
- **ACARS Log:** ACARS messages received and transmitted.
- **SBD Log**: Information about message blocks received and transmitted.
- **MCDU Log:** Information about the messages received and transmitted**.**
- **Problem Log:** Error messages only.

To access the logging screens:

STEP	ACTION
1	Press <**F3**> to return to the **Main Menu**.
2	Use the <↑> and <↓> keys to highlight **Logging Options**.
3	Press <**Enter**>.

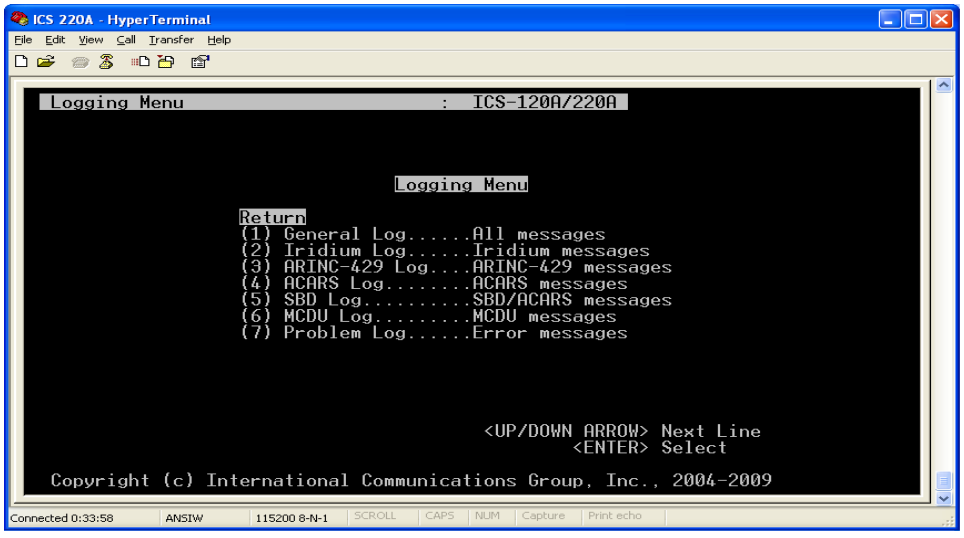

Figure 11-1. Sample Logging Menu Screen

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11.1.1 Log Time Stamp Format

All of the logs use the same time stamp format at the beginning of each line:

Current date, followed by the time in Hours:Minutes:Seconds.

The “G” indicates Greenwich Mean Time or GMT. If the system time is not synchronized with GMT an ‘*’ is displayed following the time-stamp, to indicate that the system’s ‘power-up’ timer is shown and not GMT.

11.1.2 Working with Log Files

All of the logging options function the same way for all the log types. The **General Log Screen** will be used as an example.

To display the **General Log Screen**:

STEP	ACTION
1	Highlight the **General Log** option in the **Logging Menu** using the <↑> and <↓> keys.
2	Press <**Enter**>.

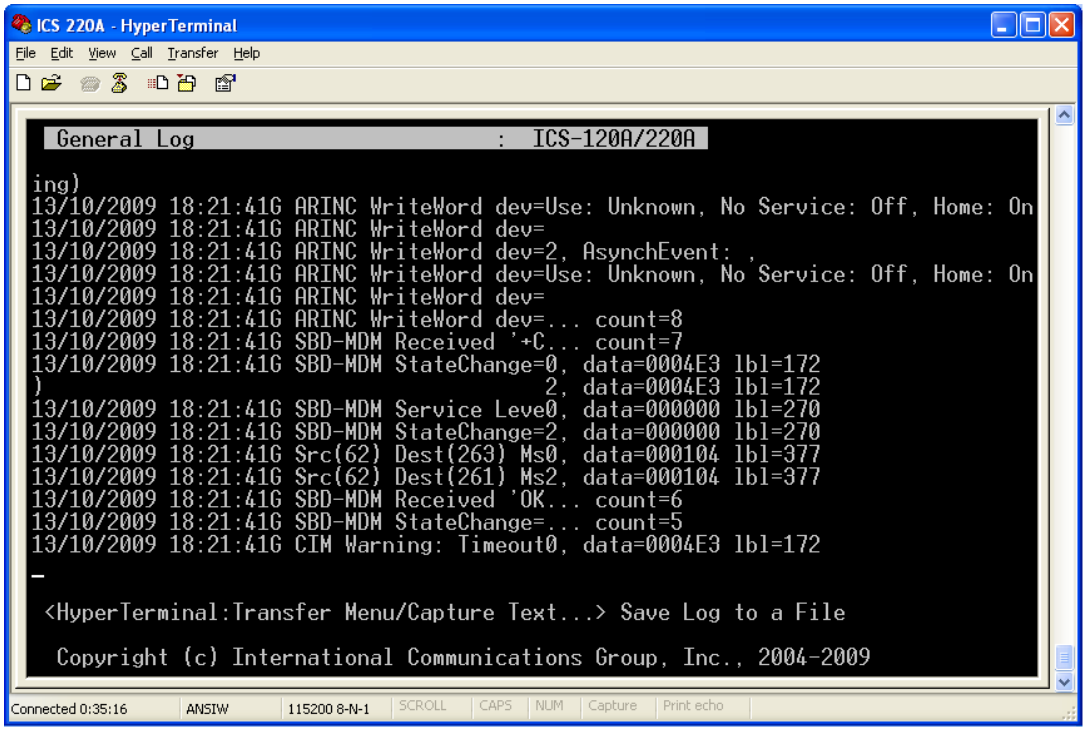

Figure 11-2. Sample General Log Screen

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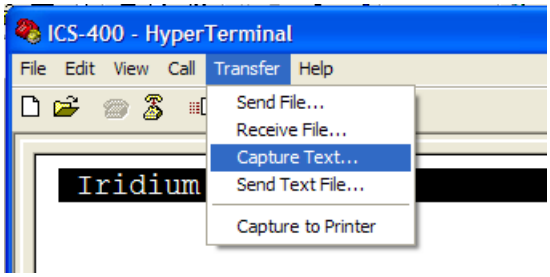
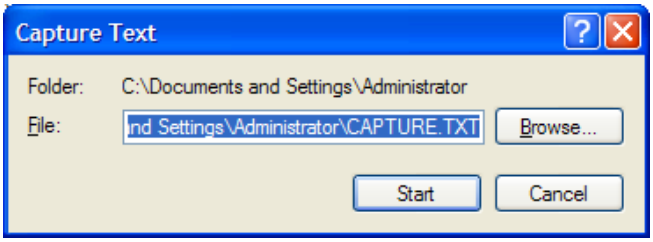
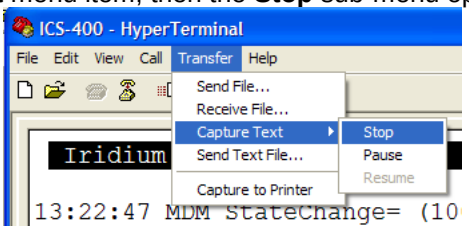
11.1.3 Saving a Log to a File

To capture the log as it scrolls on the screen:

STEP	ACTION
1	Navigate to the screen displaying the log to be captured.
2	Click on **Transfer** on the HyperTerminal menu bar at the top of the screen.
3	Select the **Capture Text** menu option. 
4	Enter the full path and file name when prompted. 
5	Click **Start**.

To stop the text capture:

STEP	ACTION
1	Click on **Transfer** on the HyperTerminal menu bar at the top of the screen.
2	Select the **Capture Text** menu item, then the **Stop** sub-menu option on the right. 
3	Press <**Esc**> to return to the **Logging Menu**.

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NOTE: ***Do not change screens while logging to a file. Otherwise, you will not get the messages that are displayed on the screen.***

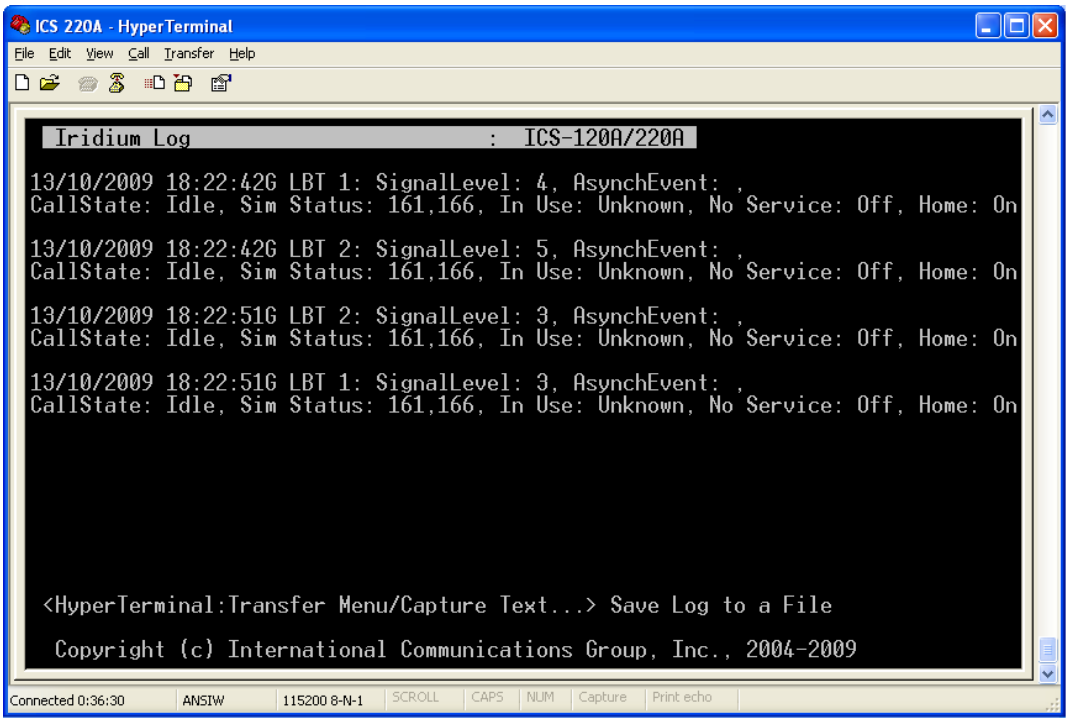

Figure 11-3. Sample Iridium Log

The Iridium Log captures activity on the data and voice transceivers (ISU 9522A). The ICS-120A product contains one data and voice transceiver, while the ICS-220A contains two data and voice transceivers.

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The ARINC-429 Log includes a label number at the end of each line.

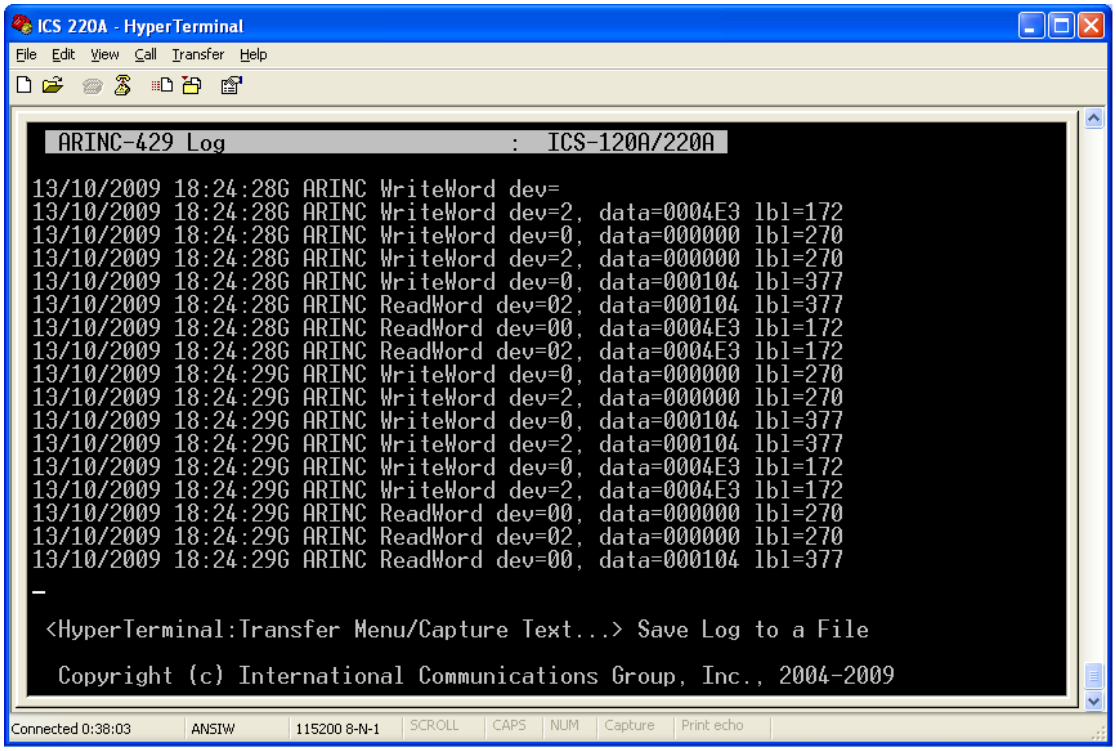

Figure 11-4. Sample ARINC-429 Log

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The Iridium SBD Log captures activity on the Short Burst Data (or SBD) Iridium transceiver (ISU 9601). The ICS-120A and ICS-220A products both contain an SBD transciever.

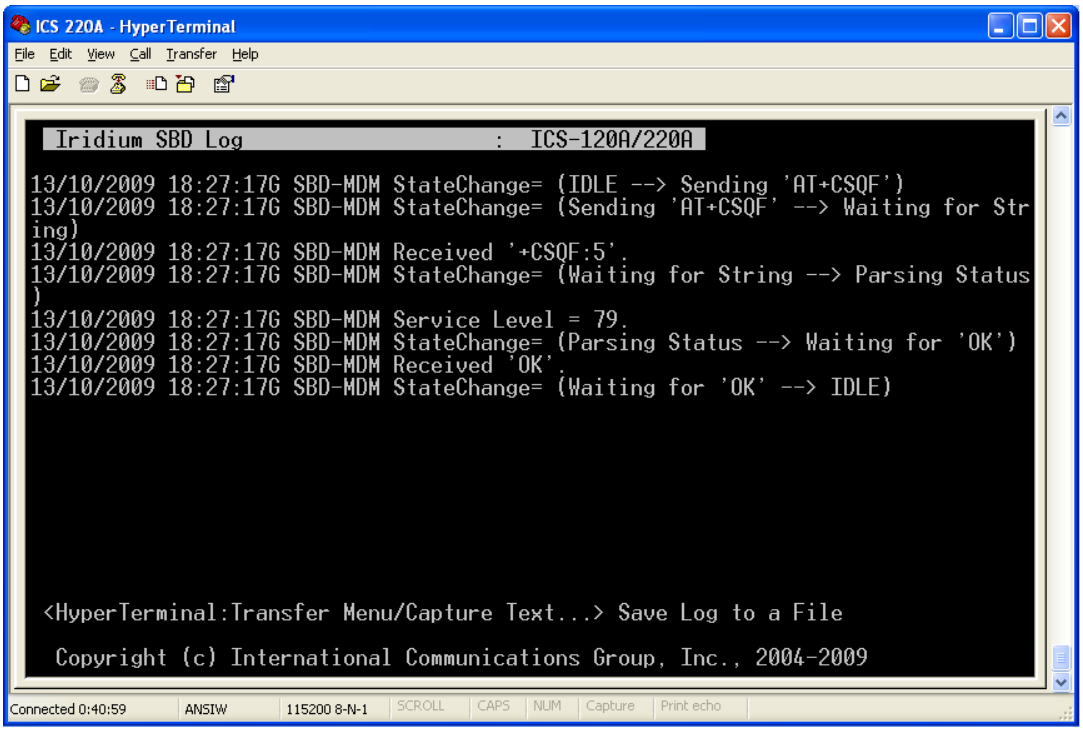

Figure 11-5. Sample Iridium SBD Log

11.1.4 ACARS Log

The ACARS logging utilizes the ARINC-618 message format.

An Example of ACARS Logging output would be:

"ACARS[0] DMU → SDU mode(2) tack(⌂) lbl(Q0) blkid(0) bcs(01B3) data[1231234124234AB7D]."

- mode: type of ACARS message (e.g. currently #2, Type-A)
- tack: technical acknowledgement character (e.g. 0-9, A-Z, ⌂)
- lbl: ARINC-618 message label
- blkid: ARINC-618 block ID (e.g. 0-9, A-Z)
- bcs: ARINC-618 block check sequence (e.g. 01FE)
- data: ARINC-618 message data

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11.2 Internal Logging

The internal data logging feature records device operation status to internal Flash memory. The data recorded includes Iridium transceivers' health information, signal levels, voice and data call activities, ACARS operation, and other key operational data. The data captured is extractable via the USB maintenance interface, and is formatted in an easy to read format to help troubleshoot or evaluate device operation status and/or isolate faults. The data logging feature is configurable to run once, run continuously, or stop to permit collection of the device operation status as needed.

11.2.1 Accessing the Internal Log

To access the internal log, type “show log” at the Command line interface and press <Enter>.

To erase the internal log, type “erase log” at the Command line interface and press <Enter>.

11.2.2 System Logging

The system information is stored in the log every hour and contains static information on collectable version information, serial numbers and other information. In most cases this information is static and should not change.

Example: 21/10/2009 14:49:38 G,System,S/W Ver:0.1.31,H/W Ver:,LBT1 Ver:,LBT1 IMEI:300224010927963,LBT1 ICCID:8988169312002496937,LBT2 Ver:,LBT2 IMEI:300224010038068,LBT2 ICCID:8988169312002496929,SBD Ver:TD06002,SBD IMEI:300034012040880

11.2.3 LBT Logging

The LBT information is unpacked into the log every minute, if there are no updates to the information.

Example LBT 1: 21/10/2009 14:49:38 G,LBT:1,SigLvl:5,Asynch Event:,Call State:Idle,SIM Status:SIM OK,SIM Inserted,InUse:UNKNOWN,NoSvc:Off,HomeZone:On

Example LBT 2: 21/10/2009 14:49:38 G,LBT:2,SigLvl:5,Asynch Event:,Call State:Idle,SIM Status:SIM OK,SIM Init,InUse:UNKNOWN,NoSvc:Off,HomeZone:On

11.2.4 SBD Logging

The SBD information is also unpacked to the log every minute, if there are no changes. Otherwise, entries will be more frequent.

Example: 21/10/2009 14:49:38 G,SBD,SigLvl:4,Last Status:Successful,MO SN:50612,MO Size:36,MT SN:65535,MT Size:0,Msg Waiting:0

11.2.5 ACARS Logging

After the ACARS message – represented below with the placeholder “TXT” - comma separated fields indicate the destination device: SDU for downlink traffic, ATG; DMU for uplink traffic, GTA; mode; technical ACK; message label; block ID; and block check sequence (CRC) for the ACARS message.

Example: 22/10/2009 16:07:26 G,TXT:ACARS,SDU,2,,Q0,0,16C8

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Blank Page

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12. MCDU OPERATIONS

Some aircraft may be equipped with MCDU (Multipurpose Control Display Unit) terminals. These MCDUs provide the flight crew with access to a number of avionic subsystems, such as a SATCOM (e.g. ICS-120A/220A), or an ACARS MU (Management Unit).

This section describes the operations of the ICS-120A/220A via the MCDU terminals, including how to make a voice call, answer a call, and monitor the SATCOM availability status.

12.1 Main Menu Page

The **<SAT** page is used by the flight crew to control the satellite communications system. Controls for placing or ending calls and entering manual dial numbers are accessed on the SAT-PHONE Page (see Figure 12-2 below).

NOTE:

The following screens may not directly represent your system. The identification label "SAT," is customizable within the ConfigurationEditor. For example, your system may have the MCDU Menu Label "IRDM" which woud replace "SAT" in all the following screenshots.

Figure 12-1. MCDU Main Menu Page

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12.2 SAT-PHONE Page

To access the Phone Page, press the <**SAT** button on the MCDU Main Menu page.

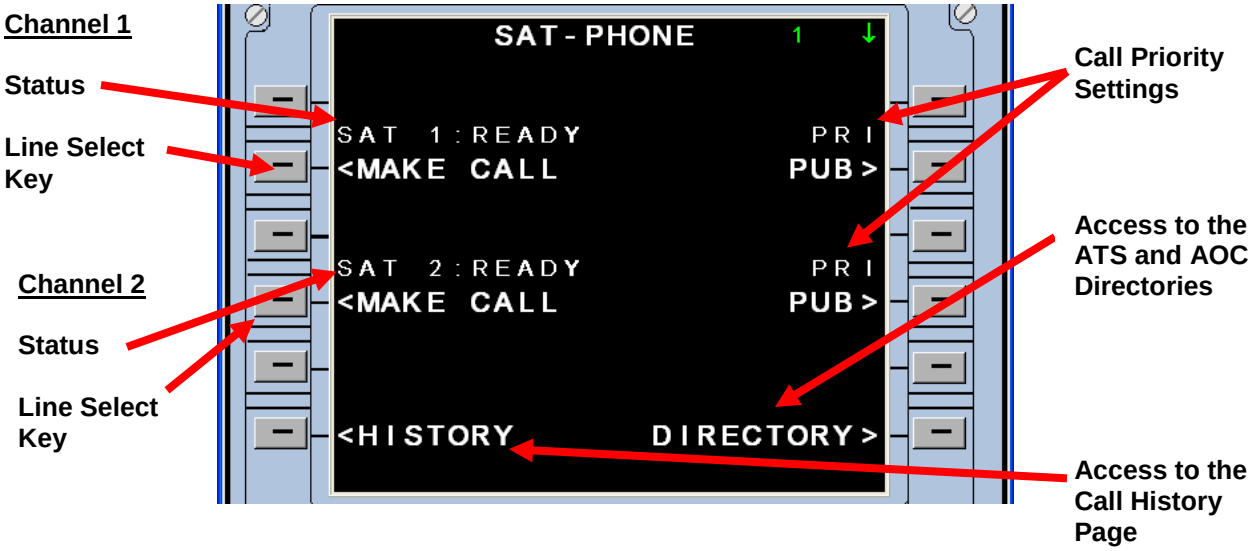

Figure 12-2. SAT-PHONE Page: 2 Channels (ICS-220A)

12.2.1 The Channel Status Field

The Channel Status field can have the following values:

Table 12-1. SATCOM Phone Page Fields

FIELD	DESCRIPTION
CHANNEL STATUS	

CHANNEL STATUS	DEFINITION
READY	The SAT Channel is registered onto the Network and is available for making a voice call.
CABIN USE	The SAT Channel is In Use by one of the cabin station ports.
DIALING	The SDU is processing the call.
RINGING	The call has been passed through to the PSTN, is ringing, and is waiting for the remote party to pick up.
ACTIVE	The placed call was answered and the call is active.
CALL FAIL	The call has failed.
INCOMING	Incoming Call – Awaiting ANSWER.
UNAVAILABLE	The SAT Channel is not available; insufficient signal level.
CALL ENDED	The call has been terminated.

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12.3 Manual Dialing

Manual dialing is always enabled for 6-digit short code ATS phone numbers. However manual dialing of full internationally based phone numbers are enabled at the discretion of the airline's policies.

Table 12-2. LINE SELECT KEY Functions

FIELD	DESCRIPTION
LINE SELECT KEY	Multi-function button depending on SAT Channel Status.

LINE SELECT KEY	FUNCTION DEFINITION
<MAKE CALL	Make a call to the dialed Phone Number displayed below the Line Select Key text
<CLR STATUS	Clear the CALL FAIL Channel Status
<ANSWER	Answer Incoming Call
<END CALL	Terminate current active call

To manually dial a phone number:

STEP	DESCRIPTION
1	Enter the number using the MCDU scratchpad.
2	Press the Line Select Key (LSK) for Channel 1 or Channel 2. This will transfer the scratchpad number to the correct channel for the call to be dialed through. The SATCOM software version information is shown on the first row, and the unit configuration checksum is shown on the second row.
3	Press < **MAKE CALL**. This extra step allows the pilot to change the priority level of the manually dialed number or to check that it has been entered correctly before making the call.

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12.4 Making a Call

To make a call:

STEP	DESCRIPTION
1	Push the **<SAT** LSK on the MCDU Main Menu. The SAT-PHONE Page will appear.
2	Enter the phone number as described in the previous section. See Figure 12-3.
3	Push the **<MAKE CALL** LSK on the SAT-PHONE Page. Once the call is in progress, the **<MAKE CALL** prompt changes to <**END CALL**.
4	Push the <**END CALL** LSK to cancel the existing call and return the prompt to **<MAKE CALL**.

Figure 12-3. Outgoing Call. Enter Number on Scratchpad.

Figure 12-4. Outgoing Call from Channel 1. Press <MAKE CALL LSK.

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Figure 12-5. Outgoing Call from Channel 1: Status is RINGING

Figure 12-6. Outgoing Call from Channel 1: Status is ACTIVE

If a call fails for some reason, the channel status will change to **CALL FAIL** and the **<CLR STATUS** prompt will appear. After a short period of time, the **CALL FAIL** status will clear automatically as re-order tones are heard. Alternatively, **<CLR STATUS** may be pressed to revert back to the **READY** state.

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12.5 Credit Card Calls

The **Credit Card Restriction** feature provides a system configuration setting to restrict a user extension port to credit card calls only. Individual systems may or may not have the necessary Credit Card SIM required for Credit Card Calling. This feature operates on a per-extension port basis. During Outbound Hunting (call routing process), the system software determines if the transceiver's SIM card is provisioned for credit card calling.

Once the call is connected, the user will be prompted by the Iridium Credit Card Platform to enter their credit card number and expiration date. The credit card information is then validated and the call succeeds. If the SIM card is not provisioned for credit card calling, re-order tones are played back to the user to indicate call processing failed.

To make a credit card call:

STEP	DESCRIPTION
1	Push the **<SAT** LSK on the MCDU Main Menu. The SAT-PHONE Page will appear.
2	Enter the phone number as described in Section 12.4. See Figure 12-3.
3	Press the **<MAKE CALL** LSK to initiate the call. The prompt changes to <**END CALL**.
4	Wait for the voice prompt to instruct you to enter your Credit Card information.
5	Enter the first digit of your credit card number and press **<SEND.** Enter the second digit of your credit card number and press **<SEND.** Repeat until you have entered the entire credit card number.
6	Enter the first digit of your credit card expiration date and press **<SEND.** Enter the second digit of your credit card expiration date and press **<SEND.** Repeat until you have entered the entire credit card expiration date.
7	Push the <**END CALL** LSK to cancel the existing call and return the prompt to **<MAKE CALL**.

NOTE: ***Credit Card Calls can only be made if the Credit Card SIM is installed and configured.***

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12.6 Credit Card PIN Dial-Around Calls

The *Credit Card PIN Dial-Around* feature operates in conjunction with the Credit Card Restriction feature. When both features are enabled for a given extension port, the user is allowed to dial a PIN prefix before the number. The PIN number is 4 digits in length. If the dialed PIN is valid, the ICS-220A will bypass the Iridium Credit Card Platform and charge the call to the associated post-paid account. If the PIN number is invalid, the ICS-120A/220A system software redirects the call through the credit card platform.

When PIN Restriction or Credit Card PIN Dial-Around is enabled, the PIN entry voice prompt is played back when the extension is taken off-hook.

STEP	DESCRIPTION
1	Push the **<SAT** LSK on the MCDU Main Menu. The SAT-PHONE Page will appear.
2	Enter the phone number as described in Section 12.4. See Figure 12-3.
3	Push the **<MAKE CALL** LSK. The prompt changes to <**END CALL.**
4	At the voice prompt, “Please enter your PIN”, enter the PIN number.
5	Push the <**END CALL** LSK to cancel the existing call and return the prompt to **<MAKE CALL**.

12.7 Pin-Restricted Calls

The PIN number is 4 digits in length. The ICS-220A system software supports a single PIN number per extension port.

The dialed number is processed only when the PIN number matches that stored in the port configuration of the extension in use. If the PIN number does not match, the ICS-120A/220A system software plays back re-order tones to indicate call failure.

When PIN Restriction or Credit Card PIN Dial-Around is enabled, the Pin Entry voice prompt is played back when the extension is taken off-hook.

STEP	DESCRIPTION
1	Push the **<SAT** LSK on the MCDU Main Menu. The SAT-PHONE Page will appear.
2	Enter the phone number as described in Section 12.3. See Figure 12-3.
3	Push the **<MAKE CALL** LSK on the SAT-PHONE Page.
4	At the voice prompt, “Please enter your PIN”, enter the PIN number. Once the call is in progress, the **<MAKE CALL** prompt changes to <**END CALL**.
5	Push the <**END CALL** LSK to cancel the existing call and return the prompt to **<MAKE CALL**.

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12.8 Incoming Call

When there is an incoming call, the SAT channel status will change to **INCOMING**. The **<ANSWER** prompt will appear on the left and the **<REJECT** prompt will appear beneath the **<ANSWER** prompt. See Figure12-7.

STEP	DESCRIPTION
1	Push the **<ANSWER** LSK.
2	Push the **<END CALL** LSK to cancel existing call and return prompt to **<MAKE CALL**.

Figure12-7. Incoming Call

12.9 Air/Ground Initiated Call Termination

When a call ends, initiated by either air or ground, the SAT channel status displays CALL ENDED, and the prompt **<CLR STATUS** appears. After a short period of time, the SAT channel status reverts back to READY and the prompt **<MAKE CALL** re-appears.

Figure 12-8. CALL ENDED Screen

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12.10 Cabin Use

A status of “CABIN USE” indicates that the SAT Channel is in use by one of the cabin station ports.

Figure 12-9. CABIN USE Screen

12.11 MCDU Interface - ARINC 739A Call Annunciation

ARINC 739A Call Annunciation alerts MCDU users that there is an incoming call. The SATCOM communicates with the MCDU, per ARINC 739A spec., for Inactive System Call Annunciation. The MCDU will light up the "CALL" light and display "REQ" next to the **<SAT** option on the MCDU Main Menu page.

NOTE:

The CALL light is physically located on the MCDU front panel, and is not the same as a “CALL” light on the ACP or elsewhere in the cockpit.

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12.12 The Directory Page

The ICS-120A/220A supports directory dialing. The following section details using the directory in its default hierarchy. This default hierarchy is not permanent and can be modified. The directories within the ICS-120A/220A are customizable, flexible and, allow users to modify any or all of the entries and hierarchies as needed.

For example, the following pages show a directory hierarchy with individual countries as the top level followed by entries. This could be modified to include countries followed by provinces or states, followed by entries, for a more detailed organizational hierarchy.

NOTE: **The following figures show one of many, possible directory hierarchy configurations. The actual MCDU directory pages may appear slightly different than the following examples.**

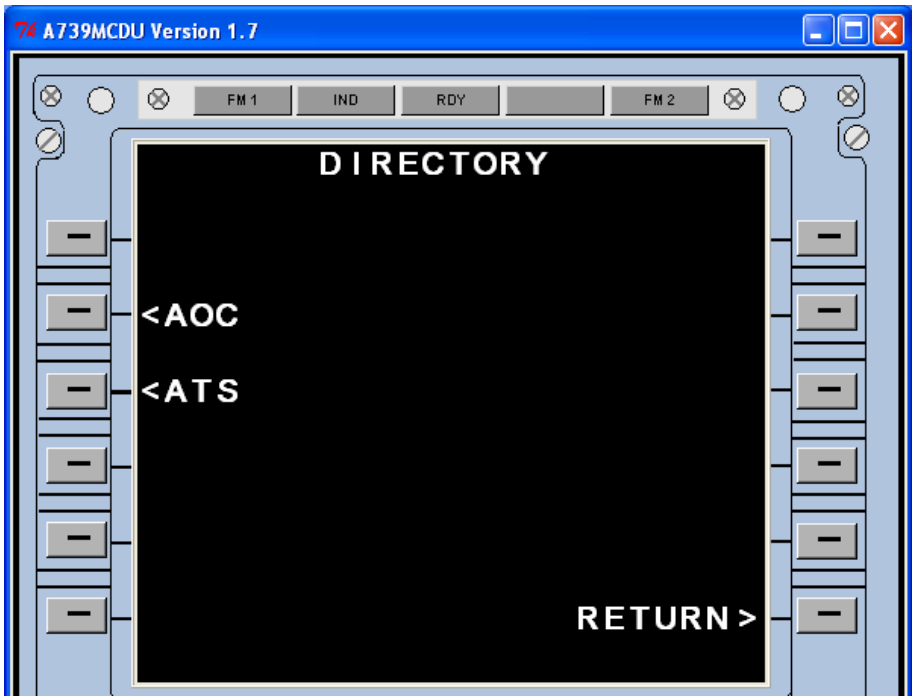

Figure 12-10. The MCDU Directory Page

To access the Directory Page:

STEP	DESCRIPTION
1	Press the DIRECTORY LSK (Line Select Key) on the SAT-PHONE page.

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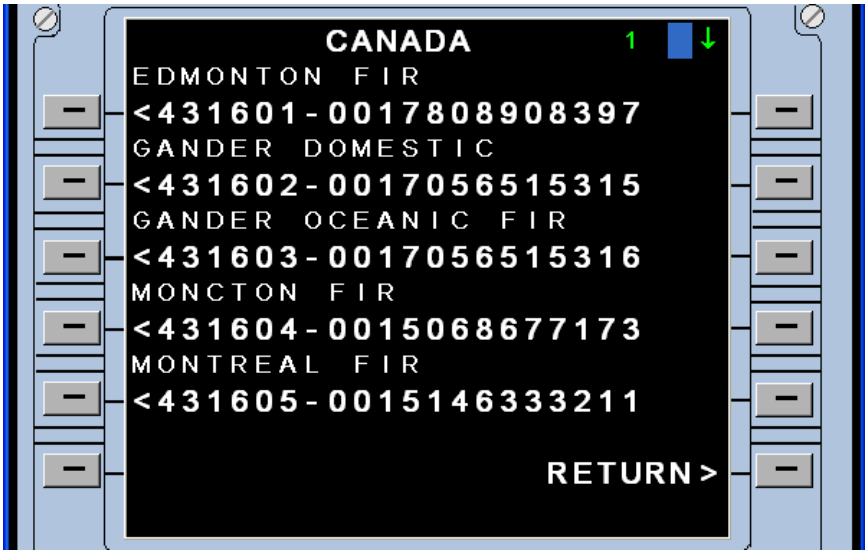
12.12.1 The ATS Directory

To use the ATS Directory to make a call:

STEP	DESCRIPTION
1	Press the ATS LSK on the DIRECTORY page.
2	Continue to press the NEXT PAGE button until the desired country is displayed on the screen and then press the corresponding LSK. In this example, CANADA will be selected.
2	Select the desired region and press the corresponding LSK. 

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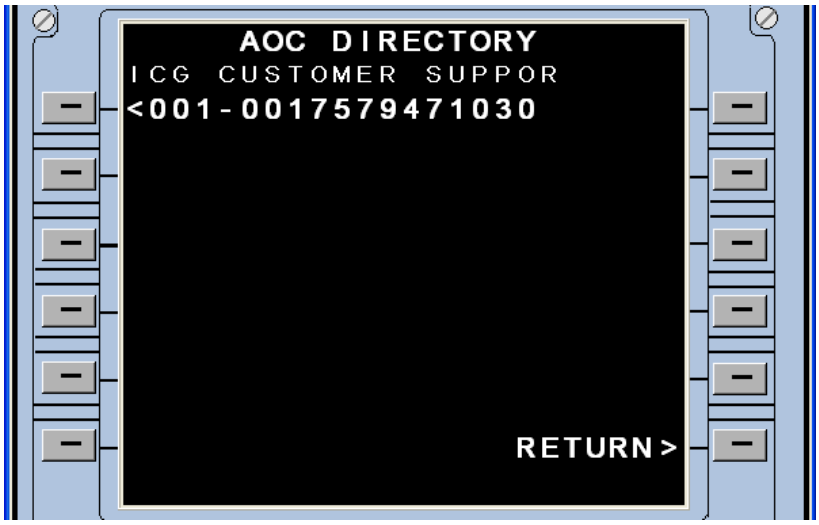
12.12.2 The AOC Directory

To use the AOC Directory to make a call:

STEP	DESCRIPTION
1	Continue to press the NEXT PAGE button until the desired entry is displayed on the screen and then press the corresponding LSK.
2	Press the corresponding LSK to make the call. 

12.12.3 Editing the AOC or ATS Directory

The following fields can be modified by a user with direct access to the information in these files, from an MCDU terminal:

- Short code (6-digit) or speed-dialing code (3-digit)
- Description (max length of 19 characters)
- Phone number

These files are password-protected. The password must first be entered before the editing screen will be displayed. The default password is 123456.

To modify any or all of these fields for a given directory entry:

STEP	DESCRIPTION
1	Navigate to page 2, enter the password on the scratchpad, and press the PASSWORD LSK.

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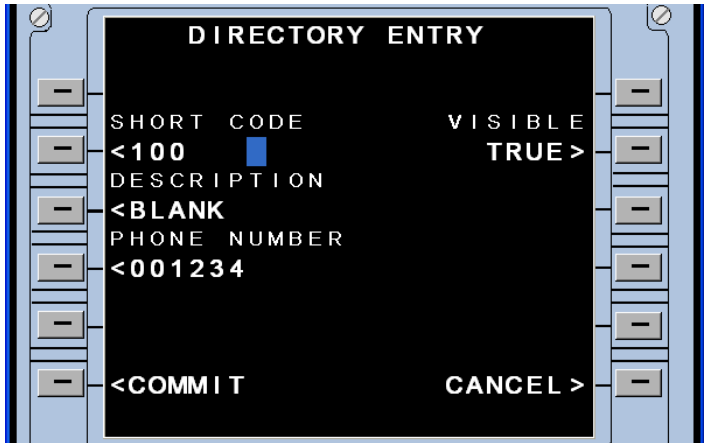
STEP	DESCRIPTION
2	Press the EDIT DIRECTORY LSK
3	Display the DIRECTORY ENTRY to be modified. 
4	Enter the new information using the scratch pad.

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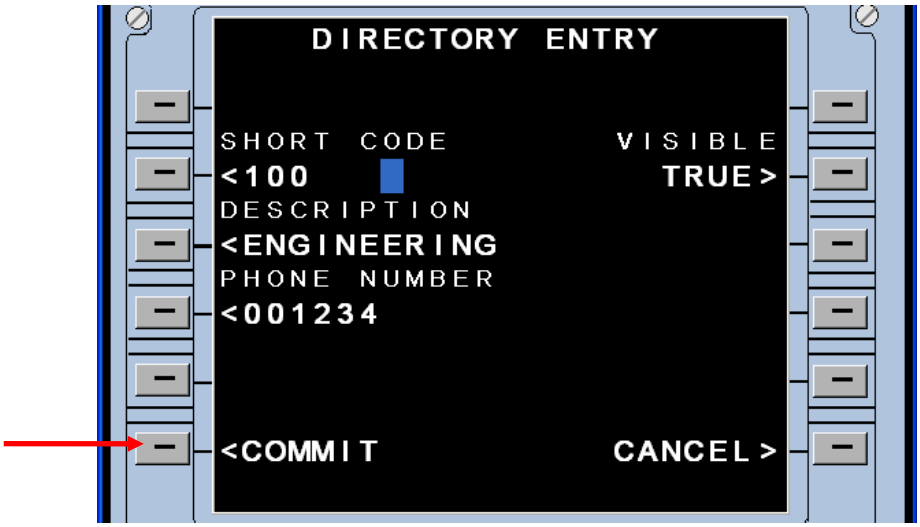
STEP	DESCRIPTION
	 In this example, the description field is being updated and the new information, ENGINEERING, appears at the bottom of the screen as it is typed in.
5	Press the LSK next to the field being updated (in the example above, the field is DESCRIPTION.)
6	Press the COMMIT LSK to make the change permanent. This step will update the changes made to the directory file stored in the CIM memory space. 
7	Press the RETURN LSK.

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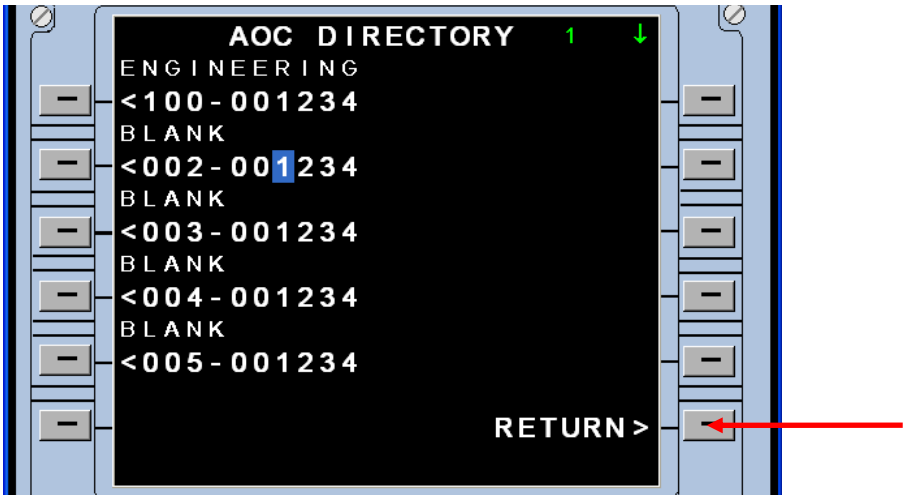
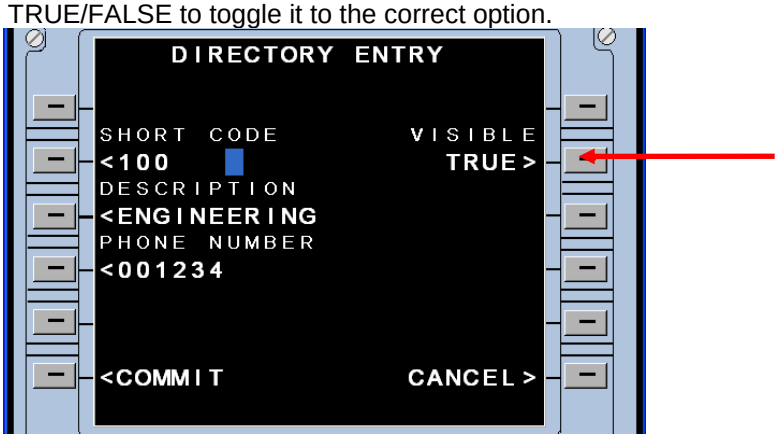
STEP	DESCRIPTION
	
8	Press the SAVE LSK.

NOTE:

The short code and the speed-dialing code must be unique. If a non-unique number is entered by mistake, it will not be accepted and no message will be displayed.

12.12.4 The (Phone Number) Visible Parameter

Use this parameter to prevent individual phone numbers in the AOC and ATS Directories from being displayed on the History screen. If set to true, the phone number will be visible. If set to false, the number will be hidden. All other numbers will not be affected. The user must be in EDIT mode to change the setting of this parameter.

STEP	DESCRIPTION
1	Select a directory entry.
2	Press the LSK next to TRUE/FALSE to toggle it to the correct option. 

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STEP	DESCRIPTION
3	Press the COMMIT LSK.
4	Press the RETURN LSK.
5	Press the SAVE LSK.

12.13 The SAT LOG

The SAT LOG gives the current status of the transceivers and the current signal strength.

To access the SAT LOG:

STEP	DESCRIPTION
1	Navigate to page 2 and press the SAT LOG LSK.
2	The SATCOM software version information is shown on the first row. Note SAT1/SAT2 status and signal strength. The signal strength can range from 0 (no signal) to 5 (strong signal)

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12.14 Flight Deck Voice Channel Redundancy

The Flight Deck Voice Channel Redundancy feature provides the capability to reserve a second Iridium channel (LBT2) in an ICS-220A unit as a backup, in case of hardware failure occurring in the first Iridium channel (LBT1). The ICS-120A does not support this capability. Redundancy is achieved by setting ports 60 (LBT1) and 61 (LBT2) in the routing (outbound huntgroup) for the desired 4-wire port (station 15 configured as MCDU device type).

If LBT1 becomes unavailable, the MCDU SAT status will display the LBT2 state (backup channel), and the call will be processed on LBT2. If a user goes to the SAT-LOG page (by pressing Next Page on SAT-PHONE page), they will see the individual channel states.

12.15 Follow-on Dialing from the MCDU

After a call has been placed, the user will have the option to enter a follow-on number to send on the active channel as DTMF digits. This allows users to dial extension numbers or other prompts to get access to the desired ground party.

After a call is completed, any DTMF characters typed on the scratchpad can be dialed on an active channel by pressing the **SEND>** LSK entry on the screen associated with the appropriate SATCOM channel. This action allows the MCDU to also dial a second call on the second SATCOM without interfering with the current call setup.

When the **SEND>** LSK is pressed; the scratchpad entry will be used and the DTMF digits dialed on the active call over the Iridium network. The user will be allowed to satisfy any prompts to enter information such as extension number, call billing information, etc as long as the call is active.

NOTE:

The information on this feature will need to be outlined clearly in any pilot user's guide; since there is NO EQUIVALENT function supported by existing SATCOM devices.

Figure 12-11. Follow-on Dialing Example

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12.16 EICAS Interface

An EICAS (Engine Indicating and Crew Alerting System) interface is supported by the ICS-120A/220A unit. All active ARINC 429 transmit buses out of the ICS-120A/220A set the appropriate bits to indicate the following EICAS display messages:

- Incoming SATCOM Call (SELCAL – Selective Calling)
- Failed (or failing) SATCOM – Iridium Availability

The

NOTE: **The exact EICAS text messages are dependent on the EICAS model and configuration.**

12.17 MCDU Calls with Priority

When placing a call, the user has the opportunity to assign the call a priority level on the MCDU screen before the MAKE CALL button is pressed.

Once placed, the call priority cannot be changed without dialing a new call. A lower priority call will be bumped (terminated) if currently active.

Figure 12-12. MCDU Priority

The MCDU User can set the *Call Priority* level for air-to-ground calls on a call-by-call basis. There are four *Call Priority* levels, as outlined in the following table.

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PRIORITY LEVEL	MCDU INTERFACE	DESCRIPTION
1	EMG	Emergency Highest priority level
2	HGH	Operational High
3	LOW	Operational Low
4	PUB	Public

When the MCDU User places a call with a higher priority level, the system pre-empts an existing lower-priority call occupying a given Iridium SATCOM channel. A call placed via the MCDU terminal with a priority level of PUB (level 4) does not pre-empt a call in progress with a priority level of 4.

12.18 The MCDU History Page

The HISTORY page shows the last five calls placed by this MCDU for easy access to frequently dialed numbers. Pressing any of the LSKs associated with the number dialed will cause the unit to return you to the SAT-PHONE page with the number in the scratchpad area in preparation for selecting the SATCOM channel for the number. The MCDU will display an array of previously dialed numbers held by the ICS-120A/220A unit's volatile memory. Power cycling the ICS unit will clear this HISTORY.

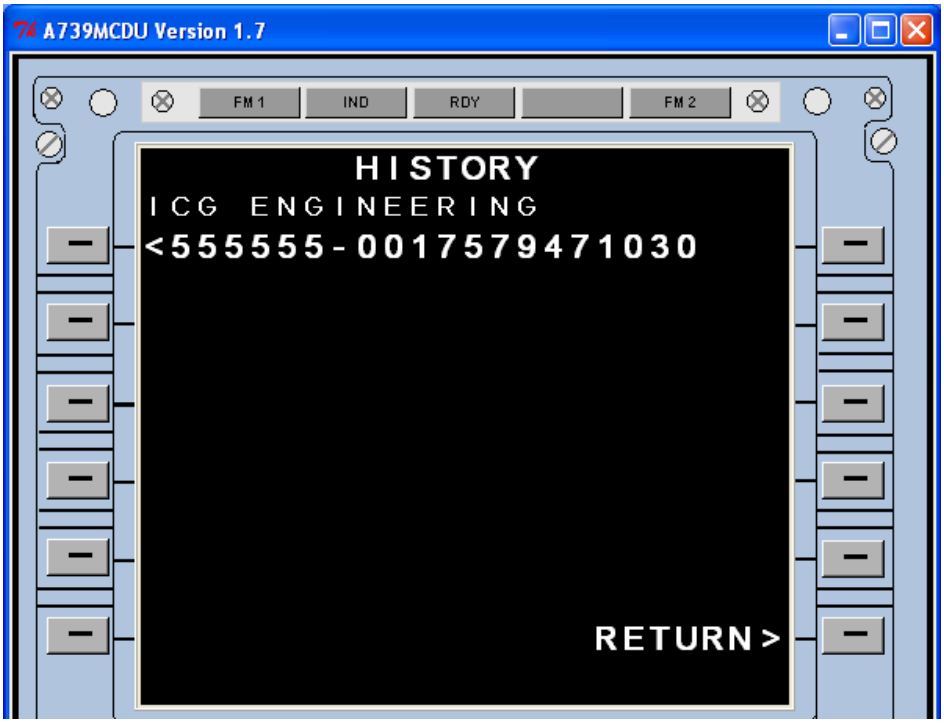

Figure 12-13. Sample History Page

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To access the MCDU History page:

STEP	DESCRIPTION
1	Navigate to the SAT-PHONE page by pressing the SAT LSK on the MCDU MAIN MENU page.
2	Press the HISTORY LSK.

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13. VOICE PROMPTS

13.1 Overview

Systems are shipped pre-packaged with voice prompts in English. It is possible to customize the verbiage of the voice prompts as needed. However, the function must be maintained. For example, Voice Prompt 02 must involve PIN entry since that function is associated to that VP ID in the system.

Table 13-1 below lists the Default Voice Prompts, and provides a usage description for each Voice Prompt.

Table 13-1. Default Voice Prompts

ID	VOICE PROMPT LABEL	VOICE PROMPT DESCRIPTION
0	*Unused*	*Reserved for future*
1	Service not Available	During outbound call processing, if there are no channels available to complete the call, the Service not Available voice prompt is played back. Voice Prompt: “Service not available; please try your call again.”
2	PIN Entry	When PIN Restriction or Credit Card PIN Dial-Around is enabled, the Pin Entry voice prompt is played back whenever the extension is taken off-hook. Voice Prompt: “Please enter your PIN”
3	Number not Found	When a short-code or speed-dial code is dialed by the User, and not found in the ATS or AOC directories, the Number not Found voice promt is played back. Voice Prompt: “The number you have entered is not present in the directory; please check the number and try your call again.”
4	Call Preemption	When a lower priority call is pre-empted by a higher priority call, the party that was pre-empted will hear the Call Preemption voice prompt. Voice Prompt: “Your call has been disconnected for a higher priority call; please try your call again later.”
5	DISA (Direct Inward System Access)	When a trunk is configured with DISA enabled, incoming calls are automatically answered and the caller is asked for the destination extension number. Voice Prompt: “Please enter the party’s extension you wish to reach.”
6	*Unused*	*Reserved for future*

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13.2 Lower Priority Call Pre-Emption Voice Prompt

The system plays back a voice prompt to a lower priority call in progress when pre-empted to process a higher priority call. See Voice Prompt ID 04 in the table above. If Voice Prompts are disabled for a particular station, a Bong Tone is played back instead.

13.3 Customizing a Voice Prompt

To customize a voice prompt:

STEP	DESCRIPTION
1	Pick up a handset and enter <#5xx>, where xx is the VP ID to be recorded. (Note: Valid message numbers are from 02 through 05. See Table 13-1 for the complete list of customizable voice prompts.)
2	Dial # to start the recording.
3	Begin speaking and press * at any time when the recording is complete. (Note: It is better to press * than just hanging up because the act of hanging up the handset receiver can cause noise which will be recorded in the message.)

13.4 Playing Back a Voice Prompt

To play back a pre-recorded prompt:

STEP	DESCRIPTION
1	Pick up a handset and enter <#6xx>, where xx is the message number.
2	Listen to the message then hang up when the message is completed.

13.5 Saving all Prompts to Flash

Saving prompts to flash will take some time and will disable all other functions until this operation is complete. When complete, the unit will resume normal operation.

To save all messages to flash:

STEP	DESCRIPTION
1	Pick up a handset and enter <#*777#>.

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14. DIRECT INWARD STATION ACCESS

14.1 Overview

Direct Inward Station Access (DISA) allows groundside callers to directly call an extension or device onboard. The groundside caller should:

STEP	ACTION
1	Call the desired number.
2	Listen for the three ring-back tones from the communications system.
3	Listen for either a new dial tone or the DISA voice prompt produced by the system. (Note: it is not necessary to wait for the prompts or the dial tone to complete.)
4	Select the desired extension number.

Once the call is answered by an extension there is no further selection available. The answering party must now transfer the call to another extension if necessary.

14.2 The DISA Voice Prompt

DISA is accessible from any station port. The ICS-120A/220A supports the customizing and playback of a DISA voice prompt. See Class of Service section to enable this feature.

The ICS-120A/220A is shipped with a pre-recorded greeting. The procedure for customizing this prompt is outlined below.

See Section 13 for instructions on customizing this prompt, playing it back, and saving it to flash.

NOTE: ***Saving messages to flash will take some time and will disable all other functions until this operation is complete. When complete, the unit will resume normal operation.***

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Blank Page

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15. TROUBLESHOOTING

The information in this section is intended to help you troubleshoot possible installation problems. The information featured here will ultimately help you determine simple installation errors and correct them. If you are in need of further assistance please contact ICG Technical Support.

OBSERVE STANDARD SAFETY PRECAUTIONS AND WEAR SAFETY GLASSES AND OTHER PROPER SAFETY GEAR TO PREVENT PERSONAL INJURY DURING INSTALLATIONS.

TURN OFF POWER BEFORE DISCONNECTING ANY COMPONENT FROM WIRING. DISCONNECTING THE COMPONENT WITHOUT TURNING POWER OFF MAY CAUSE VOLTAGE TRANSIENTS THAT CAN DAMAGE THE COMPONENT.

WHILE THE ICS-120A AND THE ICS-220A ARE NOT CLASSIFIED AS STATIC SENSITIVE DEVICES, GOOD SHOP PRACTICES SHOULD BE FOLLOWED WHEN HANDLING AND INSTALLING ALL EQUIPMENT. USE OF GROUNDED CONDUCTIVE SURFACES AND ANTISTATIC MATERIALS IS RECOMMENDED

IF THE ISC-120A/220A CHASSIS IS OPENED ITS WARRANTY IS VOIDED. UNDER NO CIRCUMSTANCES SHOULD THE ICS-120A/220A CHASSIS BE OPENED BY ANYONE OTHER THAN A CERTIFIED REPAIR TECHNICIAN IN A CERTIFIED REPAIR ENVIRONMENT WITH THE EXPRESS CONSENT OF ICG.

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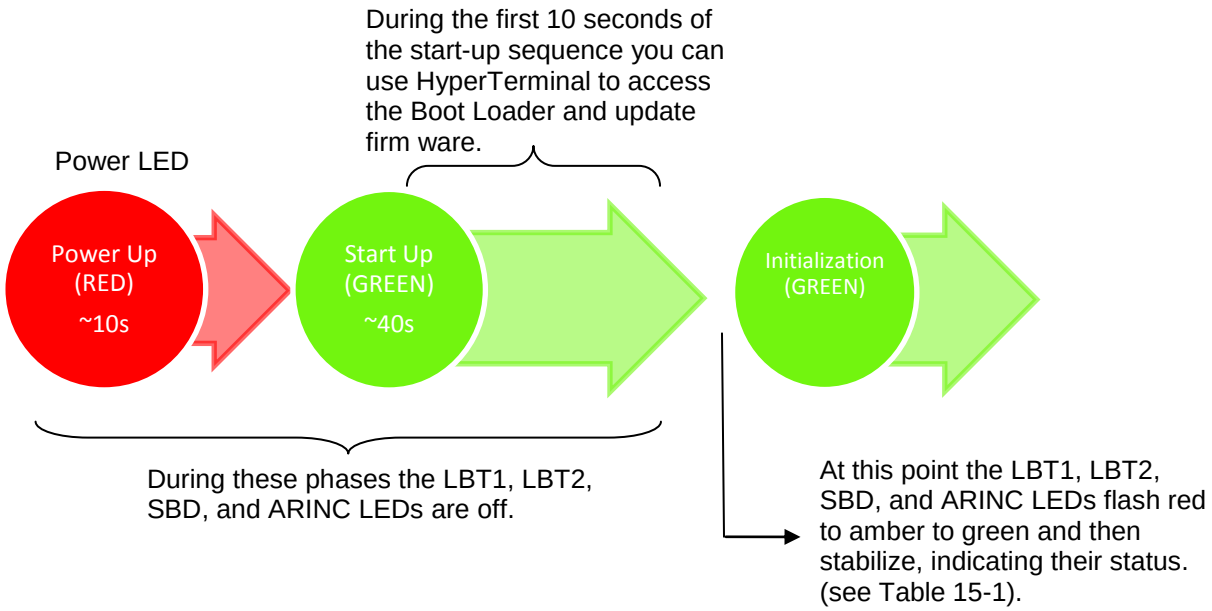
15.1 LED Behavior during Boot Up

When the ICS-120A/220A is first powered up the Power LED behaves in a defined pattern. It is important to understand this pattern because it will give you opportunities to access the bootloader and will help you begin troubleshooting if necessary. There are two distinct behaviors, detailed below, that occur during different boot-up scenarios: one when the ICS-120A/220A is powered up while connected to a PC via USB, and the other when it is not connected to a PC.

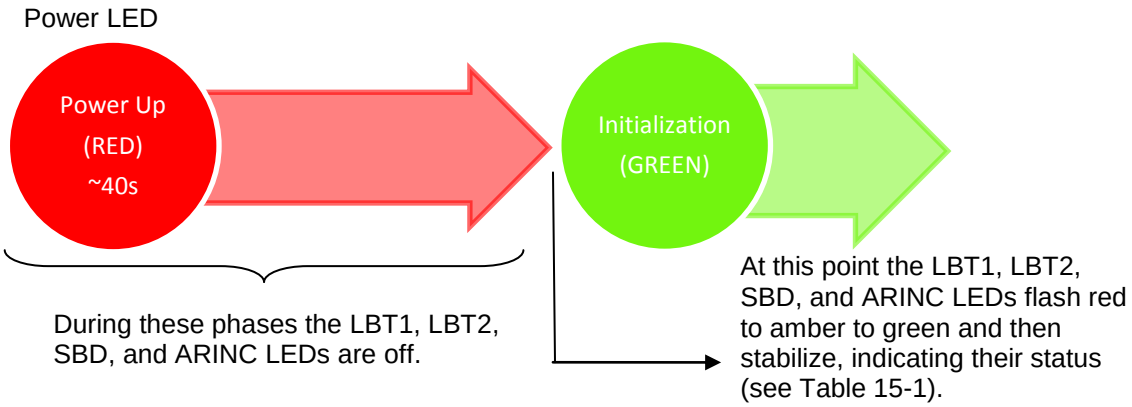
15.1.1 Power LED during Boot UP when the Unit is Connected to a PC via USB

The total time for this start-up procedure is approximately 50 seconds.



15.1.2 Power LED during Boot Up

The total time for this start-up procedure is approximately 40 seconds.



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15.2 Understanding and Using the LEDs

The ICS-120A/220A's primary diagnostic tools are the five LEDs on the front panel. Each LED can emit different colors which correspond to particular states. The table below lists all the possible configurations of the LEDs and the states they indicate.

NOTE: ***The LEDs are best used as a diagnostic tool after the Boot-Up behavior, detailed in Section 15.1 is completed. Do not attempt to troubleshoot using the LEDs until after that process is complete.***

Table 15-1. LED Status Indicators

LED INDICATOR	COLOR	POSSIBLE PROBLEMS	ACTION
POWER	Off	DC Power is not present.	Power up the device.
	Green	DC Power is present.	N/A.
	Red	DC Power present; BIST system failure.	
	Red w/ red ARINC LED	Main PCB failure.	Contact ICG Technical Support.
	Red w/ red SBD LED	Main PCB failure.	Contact ICG Technical Support .
	Flashing Red / Green	No CIM configuration present or No CIM connected.	See Section 4.2.
LBT 1	Amber	Transceiver is trying to register on to Iridium network.	Wait one minute for the device to connect.
		No SIM card installed (CIM interface).	See Section 4.2.
		No Signal – poor antenna source.	Make sure that you have a clear view of the sky.
	Flashing Green	Transceiver in use; data or voice call is active.	N/A.
	Green	Transceiver is operational; installed and in IDLE state.	N/A.
	Red	Hardware failure, DPL communication failure.	See Section 16.

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LED INDICATOR	COLOR	POSSIBLE PROBLEMS	ACTION
LBT 2	Off	Transceiver is not installed ICS-120A.	See Section 3.5.
	Amber	Transceiver is trying to register on to Iridium network.	Wait one minute for the device to connect.
		No SIM card installed (CIM interface).	See Section 4.2.
		No Signal – poor antenna source.	Make sure that you have a clear view of the sky.
	Flashing Green	Transceiver in use; data or voice call is active.	N/A.
	Green	Transceiver operational; installed and registered IDLE state.	N/A.
	Red	Hardware failure, DPL communication failure.	See Section 16.
SBD	Amber	Transceiver is trying to register on to Iridium network.	Wait one minute while the device connects.
	Flashing Green	Transceiver in use; data call is active.	N/A.
	Green	Transceiver is operational; installed and registered IDLE state.	N/A.
	Red	Hardware failure, serial communication failure.	See Section 16.
ARINC	Off	All ARINC 429 ports disabled in configuration.	See Section 9.10.
	Flashing Green	Data activity on any of the ARINC 429 ports.	N/A.
	Green	ARINC 429 ports enabled and idle; no data activity.	N/A.

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If the LEDs indicate a hardware failure or DPL communication failure, follow the steps below.

STEP	ACTION
1	Check all the connections made to and from the ICS-120A/220A.
2	Check that the SIM cards are installed in the CIM module correctly.
3	Check that the CIM is configured and that the ICS-120A/220A is configured properly to your system. • Make sure that transmit and receive speeds are correct.
4	After checking and correcting any potential problems mentioned in the above above steps, if your system is still indicating a fault, contact ICG technical support for additional assistance before determining the need to enact an RMA procedure.

15.3 Frequently Asked Questions

The following are some of the most frequent installation problems handled by our customer support office.

15.3.1 No Dial Tone presented at a given Extension

If a given telephone extension does not present a dial tone when taken off-hook there are several possible problems to consider: the extension is not correctly configured; the extension is not correctly installed; and/or the ICS-120A/220A is not receiving adequate power. To determine the possible problem and correct it, follow the table below.

Step	Action	Check
1	Check to see if there is dial tone present on all of the other installed handsets.	If there is a dial tone at any other installed handset go to step 2. If there is no dial tone present on any handset go to step 3.
2	Open HyperTerminal and confirm the original extension goes off-hook and confirm that the station is not configured for CTU connection COS.	If the extension does not go off hook, enable the station and save the configuration. If the station is configured for CTU Connection COS then it is working as intended. If the extenstion still does not present a dial tone go to step 4.
3	Connect a POTS to the service jack on the front of the unit. Check for dial tone.	If there is a dial tone go to step 5. If there is no dial tone present go to step 4.
4	Confirm adequate power is supplied to the unit.	If adequate power is not being supplied to the unit, correct any wiring issues.
5	Place an ATG call.	If the call is successful continue to step 6. If the call is unsuccessful go to step 8.
6	Place a GTA call.	If the call is successful continue to step 7. . If the call is unsuccessful go to step 8.
7	Check the wiring of all handsets not presenting a dial tone.	
8	Confirm the LBTs signal by checking for a solid green LED on the front of the unit. Confirm that service is active with service provider.	If the LED is not solid green and service is active, see section 16 and contact ICG Customer support.

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15.3.2 Extension does not ring

If a given telephone station does not ring when called there are several possible problems to consider: the extension is not correctly configured or the extension is not correctly installed. To determine the possible problem and correct it, follow the table below.

STEP	ACTION	CHECK
1	Open the Hyper Terminal	
2	Press <F3> for the Main Menu	
3	Press <3> for the Configuration Editor	
4	Press <2> for the Stations Editor	
5	Verify that the extension is Enabled.	If the extension is enabled continue to step 6. If the extension is not enabled continue to step 7.
6	Verify that the station does not have No_Ring_Flaps_COS enabled and the flaps input is not grounded.	If the station has No_Ring_Flaps_COS and the flaps input is grounded the station is working as intended.
7	Check the handset wiring and correct any issues.	
8	Change the configuration state to “Enabled”	
9	Verify the hunt group name, class of service and features of the extension.	
10	Save any configuration changes.	

15.3.3 Unable to place an Extension-to-Extension call

If a given telephone station can not complete an extension-to-extension call there are several possible problems to consider: the extension is not correctly configured; the extension is not correctly installed; and/or there are similar issues with the extension you are trying to contact. To determine the possible problem and correct it, follow the table below.

STEP	ACTION	CHECK
1	Open the Hyper Terminal	
2	Press <F3> for the Main Menu	
3	Press <1> for the Monitor Menu	
4	Press <2> for the Stations Monitor	
5	Is the station going off-hook when you pick it up.	If the station does not go off-hook, go to step 6. If the station does go off-hook go to step 7.
6	Check the handset wiring and correct any issues.	
7	Press <F3> for the Main Menu	
8	Press <3> for the Configuration Editor	
9	Press <2> for the Stations Editor	
10	Confirm that the COS Station-to-Station is enabled.	If the Station-to-station COS is enabled go to step 11. If the Station-to-station COS is not enabled go to step 12.
11	Repeat the steps above for the extension you are placing a call too.	
12	Enabled the Station-to-station COS.	
13	Save any configuration changes.	

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15.3.4 Unable to place a GTA call.

If a given telephone station can not complete a Ground-to-Air call (i.e. receive a call from a ground-based caller) there are several possible problems to consider: the extension is not correctly configured or the extension is not correctly installed. To determine the possible problem and correct it, follow the table below.

STEP	ACTION	CHECK
1	Open the Hyper Terminal	
2	Press <F3> for the Main Menu	
3	Press <1> for the Monitor Menu	
4	Press <2> for the Stations Monitor	
5	Verify the station is ringing when it receives a GTA call.	If the Monitor shows that the station is ringing go to step 6. If the Monitor shows that the station is not ringing go to step 7.
6	Check the handset wiring.	
7	Press <F3> for the Main Menu	
8	Press <3> for the Configuration Editor	
9	Press <2> for the Stations Editor	
10	Confirm that the COS Station-to-Station is enabled.	
12	Enabled the Station-to-station COS.	
13	Save any configuration changes.	
14	Press <F3> for the Main Menu	
15	Press <3> for the Configuration Editor	
16	Press <4> for Hunt Groups Editor	
17	Confirm that the Station is included in the Inbound Hunt Group you are calling.	If the station is included in the Inbound Hunt Group go to step 18. If it is not included go to step 19.
18	Check handset wiring.	
19	Change the Inbound Hunt Group to include the station.	
20	Save configuration changes.	

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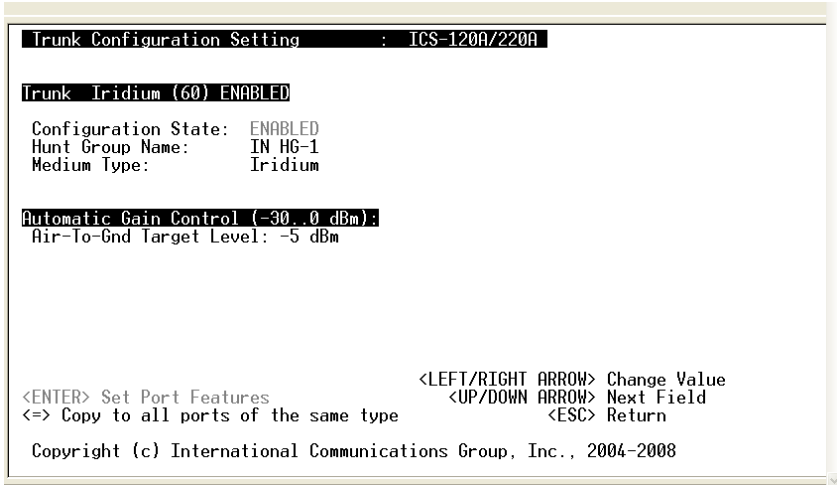
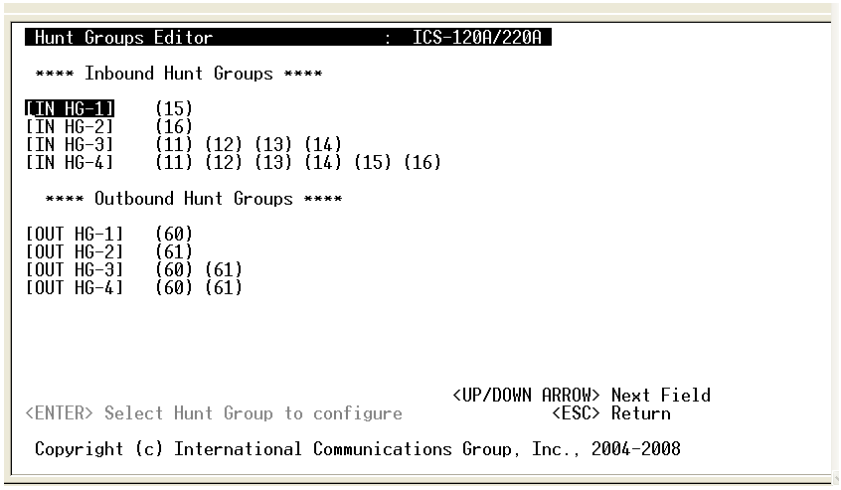
15.3.5 Not Receiving Incoming Calls via Extensions or MCDU

STEP	ACTION
1	Make sure calls are routing to the correct extensions by checking the Trunk Configuration Settings. 
2	Check the configuration of the Inbound Hunt Groups editor using the **Hunt Groups Editor** screen. 
3	Connect a 2-wire POTS telephone to the Service Jack on the front of the unit.
4	Check station-to-station calls and determine whether or not they ring.
5	Connect the HyperTerminal and view the current status via the Monitor screens, as in the screenshot below.

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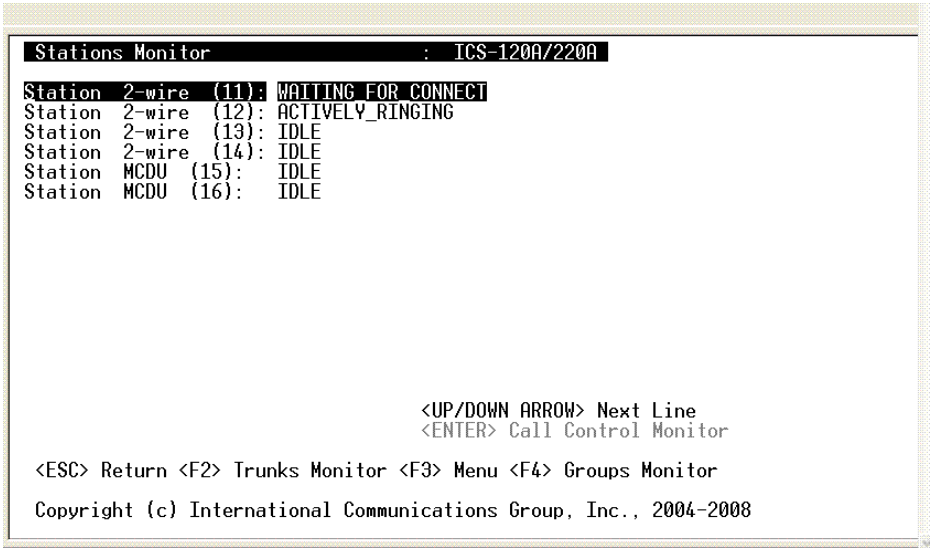
STEP	ACTION
	
6	Check each extension's configuration and wiring. • Correct any possible configuration and/or wiring errors.
7	Contact ICG Technical Support for further assistance.

15.3.6 ACARS is not Incomming and Unable to Send and Receive Messages

STEP	ACTION
1	Check if the service is activated with the service provider. • If the service is not activated, contact your Service Provider for more information.
2	Using the HyperTerminal Utility, check to see that you have the: • correct Service Provider selected • ports matched to the wiring • correct speed (High or Low) of the MU/DMU/CMU
3	Check to see if ACARS goes into a logged-on state. • Reconfigure ACARS to correctly enter a logged-on state.
4	Contact ICG Technical Support for further assistance.

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15.3.7 No SAT Display on the MCDU

STEP	ACTION
1	Confirm configuration. • Check that the 4-wire ports 15 and/or 16 are enabled and wired per Hyperterminal configuration utility. Enable them if they are disabled. • Check that the ARINC-429 bus for the MCDU is configured properly via the NxtLink utility per the MCDU specification for speed (high or low).
2	Contact ICG Technical Support for further assistance.

15.3.8 Exiting the Bootloader

If the HyperTerminal shows the bootloader and you wish to exit:

STEP	ACTION
1	Type “exit” and press <**ENTER**>.
2	Disconnect the HyperTerminal session by clicking the <**Disconnect**> button.
3	Wait for 30 to 60 seconds.
4	Reconnect to HyperTerminal session by clicking the <**Call**> button; the Utility Main Menu will appear.

15.4 ARINC 429 Data Words

The ARINC-429 interface provides information for both troubleshooting multiple systems and troubleshooting connections. The ARINC 429 interface sends and receives 32-bit data words to and from the ACARS C/MU or MCDU equipment connected to the ICS-120A/220A unit. These words contain information specific to a device. Communication with MCDU and ACARS C/MU equipment follows ARINC 739A and ARINC 741 specifications, respectively. The system logging interface provides a real-time view of the data words transmitted and received on all active ARINC 429 ports.

Every second, the ICS-120A/220A broadcasts three ARINC 429 words on the active transmitters, specifically labels 270, 172, and 377. These data words indicate system operation status and report dynamic events, which may provide assistance in troubleshooting an installation. The following are samples of system log entries with these broadcast data words.

NOTE: **The ICS-120A/220A does not attempt to determine status of other equipment on the ARINC-429 bus by monitoring the 270 status words from other equipment. The minimum requirement is that any MCDU connected should be transmitting a periodic word at least once every 1-second to keep the link active. There is no requirement for the connected DMU.**

NOTE: **Received ARINC-429 words need to be referenced to the appropriate ARINC document describing the communications and status information. Information contained here only applies to the transmitting SDU (ICS-220A).**

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15.4.1 Hexadecimal Conversions

ARINC-429 uses Hexadecimal notation to represent binary digits. Below is a useful table for converting from the more compact HEX format of the ARINC-429 data to bits and octal digits.

Table 15-2. Hexadecimal Conversion Chart

HEX	BINARY	OCTAL
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	
9	1001	
A	1010	
B	1011	
C	1100	
D	1101	
E	1110	
F	1111	

NOTE: **HEX is normally grouped in 4 binary bits and Octal is grouped in 3 binary bits (with the leading 0 removed from the 4-bits displayed in the table).**

15.4.2 ARINC-429 Log Format

The following table represents the fields of an ARINC-429 message and explains each field's meaning.

ARINC-429 FIELD	DATA
15/06/2006	Date in day/month/year format
00:01:15*	Time in UTC (with valid identifier)
ARINC WriteWord	This indicates ARINC write/send command
dev=0,	Device number 0-first ARINC interface, etc. Transmitters are from 0 to 2 and receivers are from 0 to 5.
data=0004E3	This is the data portion of the ARINC-429 word and represents bits 9-32 of the word.
lbl=172	This represents bits 1-8 of the ARINC-429 word and signifies the content of the ARINC-429 word.

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15.4.3 Octal Label 172 (Subsystem Identifier word)

This ARINC-429 word is described in the ARINC-761 document and allows other equipment to be told of the SAL (sub-address label) to use when communicating with the ICS-220A unit. This label has two fields:

1. Bits 9-16 represent the octal SAL number to use and are in the same format as the ARINC-429 label. (hex E3 = 1110 0011 = 11 000 111 = octal 307)
2. Bit 19 is set to indicate an Iridium interface

The ARINC-429 bits for the label field are transmitted MSB (Most Significant Bit) first on the ARINC-429 interface. This means the bits are transmitted from the device to the ARINC-429 interface in reverse order; since, the LSB (Least Significant Bit) on the 32-bit word is transmitted first.

To translate octal bits to hexadecimal bits:

STEP	ACTION
1	Write out the octal label in bit format. E.g., 172 in octal would translate to 01 111 010 in binary.
2	Reverse the bits. Therefore as in the above example 01 111 010 would be written as 01 011 110.
3	Convert the binary code to hexadecimal. E.g., 01 011 110 in binary becomes 5E in hexadecimal.

From the examples above we can tell that label 172 is displayed as 5E on the physical interface by most computers today. The ICS-220A is doing this conversion to display the more meaningful octal labels used in the ARINC-429 and other ARINC documents referencing the octal labels on the physical interface

15.4.4 Label-270 Word

ARINC-429 word label 270 contains the status information on the SDU and is completely described in the ARINC-741 document. The following is a System Log example showing label 270.

System Log example >> 08/04/2009 16:49:09G ARINC WriteWord dev=0, data=000000 lbl=270

Description: Indication of Label-270 (lbl=270) transmission (WriteWord) on TX-1 (dev=0) reporting service availability and system status.

The bits below represent the information the ICS-220A currently broadcasts to all equipment connected to the enabled ARINC-429 interfaces. Bits not described below will be transmitted with a 0 value indicating no problems.

The following 270 word bits are implemented by the ICS-120A/220A:

- Bits 10-9 (SDI) : 00 - Sole SDU, 01 - SDU#1, 10 - SDU#2
- Bit 11: DataLink not Available
- Bit 13: SATCOM Voice Unavailable
- Bit 14: SELCAL (incoming call)
- Bit 17: SATCOM not Logged-On
- Bit 18: Slave Bit (Master = 0)

Note the remaining bits of the 270 word are set to 0.

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15.4.5 Label-172 Word

The following is a System Log example showing label 172 and a description.

System Log example >> 08/04/2009 16:49:09G ARINC WriteWord dev=0, data=0004E3 lbl=172

Description: Indication of Label-172 (lb=172) transmission (WriteWord) on TX-1 port (dev=0) containing System Address Label 307 (data=0004E3).

Note that the System Address Label will be 307 only when the ICS-120A/220A is configured as Sole SDU or SDU#1; see section 9.10.1 for more information regarding the IRDM Identity configuration setting.

15.4.6 Label-377 Word

The data words below are displayed in hexadecimal format. For more information on the data bit definitions, refer to ARINC 741 and ARINC 429 specifications. The following is a System Log example showing label 377 and a description.

System Log example >> 08/04/2009 16:49:09G ARINC WriteWord dev=0, data=000104 lbl=377

Bits 10-9 (SDI) : 00 - Sole SDU, 01 - SDU#1, 10 - SDU#2
Bits 11-22 (Equipment ID code) : 041 refers to the Hexadecimal value of the equipment ID.

NOTE:

Other ARINC-429 words are used to follow a protocol or file transfer method. For transfers to/from a DMU refer to ARINC-429 Part 3, and for MCDU transfers refer to ARINC-739A. These transfer protocols are outside the normal troubleshooting and should not normally need troubleshooting unless there is an incompatibility problem. If this is the case, please contact ICG.

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16. AIR WORTHINESS AND THE RMA PROCEDURE

16.1 Airworthiness

The ICS-120A/220A is not flight critical and has no airworthiness limitations for Part 23 or Part 25 aircraft. FAR 25.1529 Instructions for "Continued Airworthiness" are met with the following instructions:

The ICS-120A/220A should only be removed on the condition of failure. There is no required maintenance. If the ICS-120A/220A is removed, due to a catastrophic failure, return it to ICG or to an ICG-approved repair facility for repair or replacement.

16.2 Return Procedure

Use the following information and instructions to arrange for the unit's return to ICG for repair.

STEP	ACTION
1	Obtain the following information about the unit: • Product Model Number • Product part Number • Product Serial Number • Installation location (aircraft tail number or other identifier) • Problem description • Technical contact name with contact information • Return address for repaired/refurbished unit • Original installation date and installing agent, if known
2	Contact ICG Technical Support to obtain a Return Material Authorization (RMA) number. Technical Support International Communications Group, Inc. 230 Pickett's Line Newport News, Virginia 23603 USA • Normal Business Hours: 8:00 AM to 6:00 PM (EST), Monday through Friday • After Hours Telephone Support: 6:00 PM to 8:00 PM (EST), Monday through Sunday. **TELEPHONE:** Within the U.S. 1-800-279-1991 Press "5" for Technical Support when prompted by the Automated Attendant. Outside the U.S. 1-757-947-1030 Press "5" for Technical Support when prompted by the Automated Attendant. **FAX:** 1-757-947-1036 **E-Mail:** techsupport@icg.aero

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STEP	ACTION
	Calls received outside of normal business hours will be routed to an automated message and paging system. Please leave a detailed message including Contract information, Aircraft details, and problem description. The on-call Support Representative will be notified of the situation and will return the call as soon as possible during posted support hours. Calls received outside of posted hours will be returned once Support resumes at 8:30 AM (EST).
3	Prepare the unit for shipping. If the original packaging is available, please return the defective device in its original container and packaging materials. When this is not possible, internal packaging material should be of a type that guards against static accumulation. The shipping container or carton should have a specification level that permits a gross weight limit of up to 100 lbs (45.4 Kg) and will not burst with less than 275 lbs (124.7 Kg) per square inch of pressure. **DISCLAIMER**: ICG is not responsible for damage during shipping or for freight charges for returned equipment.
4	Display the RMA number on the outside of the shipping container.
5	Display the RMA number on the packing slip along with any special instructions, purchase order information, etc.
6	Ship the unit back to ICG. Note: The customer is responsible for selecting the courier or freight transport service and is responsible for all freight charges, customs clearance fees, taxes, duties, insurance, etc.
7	Notify ICG Technical Support as soon as the device is shipped and provide the following information: freight forwarder, airway bill, anticipated arrival at ICG, etc.

16.3 Certification History

The ICS-120A/220A is certified when shipped. Any modification to the unit beyond firmware configuration will require re-certification. ICG performs this certification when units are returned for SIM card insertion or replacement.

The following chart may be used to document any re-certifications performed for this unit.

CERTIFICATION HISTORY

DATE	REASON FOR RECERTIFICATION	BY

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