

ICS-100/200 IRIDIUM TRANSCEIVER(S)

By International Communications Group

INTERNATIONAL COMMUNICATIONS GROUP

ICS-100 / 200 IRIDIUM TRANSCIVER(S) UNIT

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200 Enterprise Drive
Newport News, VA 23603

Models Pertinent to this Manual:

ICS-100 Single Channel Iridium System. PN# 500616
ICS-200 Dual Channel Iridium System PN# 500617

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General Information

1.1 Description

Preface: the ICS-100 and ICS-200 Iridium systems are identical in form fit and function, with the exception, that the ICS-200 system offers an additional internal Iridium transceiver(s) providing dual channel capability. In support of the second transceiver(s), the ICS-200 offers external connections for a second serial port, second Motorola handset and second transceiver(s) “On/Off” signal. For ICS-100 installations, these additional signals referenced in this manual can be ignored. For customers wishing to upgrade from an ICS-100 to a ICS-200, the ICS-200 is a direct plug in replacement with the addition of the extra signal connections.

The ICS-100/200 Iridium Transceiver(s) Unit is a combination of a Motorola Sebring Iridium transceiver(s) device and the ICG IIU Iridium CTU device. Integration of these devices provides a single channel (ICS 200 Dual Channel) of global Iridium network service and connections of both 2-wire and 4-wire telephones or flight deck audio systems. Internal to the ICS-100/200, the CTU system connects to the Sebring Iridium transceiver(s) via the Motorola digital DSC bus, permitting use and implementation of many transceiver(s) features and functions not available using simpler audio interconnection methods. The ICS-100/200 provides flexibility in installation, and can be installed inside or outside the pressure envelope of an aircraft. The ICS-100/200 provides six audio circuit connections; four 2-wire circuits for connections of telephones or CTU systems and two 4-wire circuits for connections to WH-10 or ICG Jetphone handsets, or to the flight deck audio system. The ICS-100/200 device provides CTU features such as call transfer, extension to extension calling and 3-party conferencing. Additionally, it provides connections for Iridium handset(s) and a serial data port for data transmissions. The ICS 200 provides the same connectivity for each of the transceiver(s).

The ICS-100/200 is functionally divided into 6 standard components as follows:

- Chassis and Power System

- Iridium Transceiver(s)
- CTU and audio interfaces
- Antenna
- Band pass Filter
- Installation Kit

Chassis and Connectors

The Chassis is the ICG standard 2MCU aeronautical enclosure with Arinc 600 Size 1 chassis connector. The ICS-100/200 is mounted into a 2MCU tray assembly, making the ICS-100/200 a line replaceable unit (LRU) facilitating easy installation or removal. The Arinc 600 connector provides all connections including: power, audio and antenna. Specifications and dimensions of the ICS-100/200 system are listed in Section 5 “Specifications”.

Iridium Transceiver(s)

The ICS-100/200 system includes the Motorola Sebring Iridium Transceiver(s) modules. This device is the latest Iridium transceiver(s) developed by Motorola and supports both voice and low rate data (2400 Bps) communications. Specifications on the Sebring Transceiver(s) and the Iridium network are listed in Section 5 “Specifications”.

CTU and Audio Interfaces

The ICS-100/200 provides up to four 2-wire connections for telephone handsets or CTU systems and up to two 4-wire audio connections with associated discreet “hook” and “incoming-ring” signals. The device utilizes a “SLIC” device for connection of telephony devices. The SLIC provides 48VDC of loop battery to power the telephone circuits and a high voltage ring signal to permit ringing of a handset.

By using a conventional telephone circuit, cable distances and noise are not a concern when planning layout of handsets in the aircraft cabin. Additionally, special cabling or connectors are not required

The device’s internal circuits convert the analog audio signals on the 2-wire or 4-wire audio circuits to a standard PCM digital format and provides connection to Iridium transceiver(s). Under microprocessor control the device performs all the necessary

functions to communicate with the Iridium transceiver(s) and network and provides conventional telephony operations. The device also has a DSP (Digital signal Processor) that provides local dial tone and other telephony progress tones as well as providing features such as conferencing, audio level adjustments and digital echo suppression.

Antenna

The ICS-100/200 system “Installation Kit” PN: 500618 includes as a standard antenna offering, the Comdat Low Profile Iridium antenna. This device when mounted on the top of the aircraft airframe provides minimal drag and surface area while providing a high level of performance. ICG offers other antenna options to include a blade style antenna that provides superior low elevation angle performance and a dual element low profile antenna that permits connections for a GPS receiver as well as the Iridium transceiver(s). Consult ICG for the best choice of Antenna for a particular installation. Dimensions and specifications for the standard low profile antenna are listed in Section 5. The ICS 200 model uses a single antenna for both channels.

Band Pass Filter

For aircraft installations where the aircraft also has an Inmarsat Aero Sat-Com terminal co-resident with an ICS-100/200 Iridium system, an optional Iridium band pass filter should be installed to reduce opportunities for interference between the Inmarsat sat-com 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 operation and communications by the ICS-100/200 system. This is typically evident when the Iridium antenna is in a direct line with the Inmarsat aero antennas transmission beam to the Inmarsat satellite. Though this event is highly unlikely, if this event occurs, any communications currently active 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. The filter is not required on installations where an Inmarsat Aero sat-com is not installed. Specifications on the Iridium band pass filter can be found in Section 5.

Installation Kit

ICG provides an installation kit to support installations for the ICS-100/200 system. The installation kit includes the mounting tray with mating connector, all terminations pins, antenna, RF connector(s) and 50 Ft. of low loss “PFlex” coax with termination on one end.

Operation

2.0 OPERATOR'S GUIDE

2.1 User's Guide

The ICS-100/200 offers many features and configurations designed to make aircraft communications systems convenient, familiar and easy to use.

The following pages describe the ICS-100/200 capabilities and offer examples of their operation. These should assist the user in understanding the operation of the system and make it as easy to use as an office telephone.

Note: the ICS-100/200 can offer basic CTU functions as described below. It can also be connected to a CTU system either through one of its two wire or 4-wire analog ports.

2.2 Dialing Instructions

OUT-GOING CALLS

The ICS-100/200 devices offer simplified dialing so that it is not necessary to dial special codes for differing through the Iridium communication mediums. The ICS-100/200 permits use of the standard North American Dialing Plan (NADP), or the European Dialing plan and the devices automatically convert the dialing scheme to that required by the Iridium communication network. All dialing is continuous and there is no requirement to recognize any special satellite tones or associated special dialing.

2.2.1 DIALING PLANS

The ICS-100/200 is capable of supporting, predominately, two main dialing formats: the North American standard or the European standard. The ICS-100/200 will automatically; add, strip or change digits to accommodate the Iridium network. The caller dials a single format and does not need to change dialing formats required by disparate communications transceiver(s).

2.2.2 ICS-100/200 DIALING MAP, NORTH AMERICAN DIALING PLAN

A) Dialing Air to Ground

Calls to North America

Example: To call ICG

1 + Area Code + Number

1-757-947-1030

Calls to Other Int'l Destinations -

Example: To call the U.K.

011+ CountryCode+ CityCode + Number

011 - 44 - 1703- 123456

B) Dialing Iridium Aircraft to Iridium Aircraft Calls

Air to Air -

011 + 881 + 9 digit Transceiver(s) Telephone Number

C) Dialing Ground to Aircraft Calls

Ground to Air -

011 + 881 + 9 digit Transceiver(s) Telephone Number

2.2.3 ICS-100/200 DIALING MAP, EUROPEAN DIALING PLAN

A) Dialing Air to Ground

Calls to North America -

Example: To call ICG

00+ CountryCode+ Area Code + Number

00 + 1-757-873-7753

Calls to Other Int'l Destinations -

Example: To call the U.K.

00+ CountryCode+ City Code + Number

00 + 44 - 1703- 123456

B) Dialing Iridium Aircraft to Iridium Aircraft Calls

Air to Air -

00 + 881 + 9 Digit Transceiver(s) Telephone Number

C) Dialing Ground to Aircraft Calls

Ground to Air -

00 + 881 + 9 digit Transceiver(s) Telephone Number

2.3 Inbound Calls – when a call is placed either in the ground to air or air to air direction, the ICS-100/200 will ring the default telephone. To answer the call, simply pick up the handset.

2.3.1 DEFAULT PHONE -During in initial configuration at installation, an extension is assigned as the default phone. The default is always Ext. 11 unless changed during configuration.

2.4 Extension Numbering – the extensions circuits are assigned two digit numbers to identify the stations. The numbering is as follows:

- Ext. 11 - 2-wire port #1
- Ext. 12 - 2-wire port #2
- Ext. 13 - 2-wire port #3
- Ext. 14 - 2-Wire port #4
- Ext. 15 - 4-wire port #1
- Ext. 16 - 4-wire port #2

2.5 ENHANCED TELEPHONY FEATURES (ETF) : below is a description of Conventional telephone features available by the ICS-100/200 CTU module.

2.5.1 EXTENSION-TO-EXTENSION DIALING - To call from one onboard extension to another, simply pick up the phone and dial the two-digit extension you wish. You will hear the ring signal on the selected extension or receive a busy signal if it is engaged.

2.5.2 CALL TRANSFERRING - If a call is answered on one extension and must be transferred to another, the party answering the call simply flashes the hook switch (momentarily depress the telephone hook switch for less than 1 second) and upon receiving new dial tone, dials another extension. Hanging up his extension will automatically transfer the call, or he can wait on the line for an answer and announce the call before he hangs up. If he does not hang up and no answer is forthcoming, he can flash the hook switch again to reconnect to the ground side caller.

2.5.3 CONFERENCING

· To conference another party into the conversation with a ground side party, press the Hook-Switch momentarily or press the “Flash” button on the handset. This places the ground party on-hold.

· Dial “*7xx”, where “xx” is the two digit extension to be added to the conference. Pressing the Hook-Switch or “Flash” button again will connect all three parties. A three-way conference has now been established.

Note the ICS-100/200 system offers only 3 party conferencing

2.5.4 Absent Transfer – the ICS-100/200 offers a feature where, if an inbound call to the default extension is not answered within 6 rings, the call will ring another extension that is dedicated as the “Absent Transfer” extension. The “Absent Transfer” handset is selected via the configuration manager at installation.

2.6 ICG TELEPHONE DEVICES- the ICS-100/200 system supports a variety of telephony handsets. Essentially, any 2-wire standard telephone device will operate with the ICS-100/200 system. ICG also provides various styles of telephone handsets that may vary in their operation. To review the operation of the ICG handsets, consult the appropriate handset manual for the handset selected for use.

NOTE:

Though the ICG ICS-100/200 systems support virtually any make and model of commercial telephony device available, standards and designs vary significantly between countries and regulatory agencies. As an example, one of the major variations between handsets is the duration of the flash signal in telephones that have “Flash” buttons. The North American phone system specifies a flash as a momentary on-hook of less than a second, usually around one half second. The European flash is 100ms and a longer on-hook signal will disconnect the call. The ICS-100/200 system supports the North American “Flash” signal. However, when selecting handsets, it is important to notify ICG of the type and manufacturer of the equipment to be installed to insure the configuration in the ICS-100/200 system is correct for the types of devices that will be connected.

“Flash Description”: Depressing the *Hook Switch* on a telephone for a short period, usually less than a second is called a “*Hook Switch Flash*”. In the ICS-100/200 like many PABX systems, this places any existing call “on hold” and provides new dial tone to the handset. The caller can then take some appropriate action like dialing another extension to which to transfer the call or to consult with someone before restoring the call. To reconnect to the call, *Flashing the Hook-Switch* again will reconnect the call.

2.7 SPECIAL FEATURES

The ICS-100/200 device has several special features that may be useful for particular applications. These features are added from time to time as per customer requests and may not be supported in installations, which predate implementation of the feature. Often a simple software upload to a later revision will provide access to the feature or service.

2.7.1 Ring-Down Feature – any extension on the ICS-100/200 can be configured to dial a pre-determined telephone number upon a telephone handset or device being taken off-hook. A different telephone number can be entered for each extension.

Activation of this feature is described in Section “3.4.3.1, Station Configuration”. If this feature is activated a telephone number must be entered for the affected extension. The format of the number is to enter the destination number starting with the country code.

Ring-down Number Format:

Calls to N. America - 1 + Area Code + Number

International - CC + City Code + Number

- i) The “Ring-Down” number cannot contain the DTMF “*,#,A,B,C, or D characters.
- ii) If the Ring-Down number field is empty, the call will not “ring-down” and user will receive dial tone and must dial a number manually.
- iii) Follow on dialing once the call is et-up is not permitted.

3.0 Installation

Installation of the ICS-100/200 is fairly simple. The chassis mounts into a standard 2MCU tray provided in the ICG installation kit. A dimensional drawing defining the hole locations is available in the Appendix.. The ICS-100/200 has been designed to be mounted either inside or outside of the pressure envelope.

3.1 ASSEMBLY MOUNTING LOCATION

The ICS-100/200 requires two or three assemblies be installed, the chassis, the antenna and possibly the Iridium Band Pass filter. Additionally, telephone handsets and data device connections typically are installed but not addressed in this manual.

3.1.1 Chassis Location – the ICS-100/200 system is delivered in a standard 2MCU chassis with a 2MCU installation tray. The ICG-100/200 chassis can be mounted in a equipment bay or the tray can be fastened to the airframe. Considerations should be made to mount the chassis as close to the antenna as practical, and coax runs of longer than 50Ft (16M) should be avoided if possible. The tray has a service coax stub of 1M in length, connected to the tray RF connection and terminated into a TNC Female connector. This service stub permits connection for either the antenna coax or the band pass filter. If the band pass filter is not installed a bracket is provided as part of the installation kit to permit fastening the loose end of the service coax to the airframe and subsequent connection of the antenna coax.

3.1.2 Antenna Location - The antenna must be mounted on top of the fuselage in a convenient location. If the aircraft has an existing Inmarsat Aero sat-com terminal installed the Iridium antenna should be mounted below the Inmarsat antenna and as far away as convenient. If conformal antennas are installed for the Inmarsat sat-com, the Iridium antenna should be mounted as far away as possible. In no instances should the Iridium antenna be mounted on the same linear plane or next to a Inmarsat antenna

3.1.3 Band Pass Filter Location - If a Band Pass filter is required, the filter must be installed in the transmission line between the Iridium transceiver(s) and the antenna.

Typically, the input to the filter is connected to the transceiver(s) via the service coax on the tray and the output is connected to the antenna via the antenna coax. The filter is directional in nature and the transceiver(s) connection must connect to the Male TNC connector on the filter labeled “TRS” and the antenna coax must connect to the filter Female TNC connector labeled “ANT”.

3.2 Aircraft power – standard aeronautical wiring practices should be utilized in connecting power to the ICS-100/200. The ICS-100/200 operates on 28VDC aircraft power, only. The ICS-100/200 also provides power to the Iridium transceiver(s), 28VDC. This power is paralleled within the ICS-100/200 to the transceiver(s) and provided via the J7 connector.

Recommended Circuit Breaker: 2Amps @ 28VDC ICS 100

3Amps @ 28VDC ICS 200

The unit supports two fused (500mA) 28VDC connections for ancillary equipment. If these connections are used you must determine the circuit breaker value based upon the load of the ancillary devices. See the appendix for connection information.

3.2.1 Power Connections:

ARINC 600 CONNECTOR INSERT C

PIN 1	ANTENNA
PIN 2	+ 28 VDC
PIN 3	SHIELD
PIN 4	28VDC RETURN (GROUND)
PIN 5	N/C

3.3 ICS-100/200 Connections – the ICS-100/200 has 6 connections for external audio circuits as well as connections for data signals and an Iridium handset. The ICS 200 model provides connection for data and a handset for each transceiver(s). The ICS 100/200 are designed to be interchangeable. The connections for the ICS 100 are identical to the connections for the ICS 200 with the exception of the additional data port and handset. The appendix section of this manual provides information on the mating connector, signal identifiers and pin-outs for each of the models. The connectors are as follows:

2-WIRE TELEPHONE CIRCUIT CONNECTIONS		
ARINC CONNECTOR TOP INSERT "A"		
ARINC PIN	CIRCUIT DESCRIPTION	SIGNAL
A1	TELEPHONE CIRCUIT 1	TIP 1
A2		RING 1
A3		SHIELD / CHASSIS
B1	TELEPHONE CIRCUIT 2	TIP 2
B2		RING 2
B3		SHIELD / CHASSIS
C1	TELEPHONE CIRCUIT 3	TIP 3
C2		RING 3
C3		SHIELD / CHASSIS
D1	TELEPHONE CIRCUIT 4	TIP 4
D2		RING 4
D3		SHIELD / CHASSIS
4-WIRE AUDIO CIRCUITS		
ARINC 600 CONNECTOR TOP INSERT "A"		
A4	4-WIRE AUDIO 1	MIC HI 1
A5		MIC LO 1
A6		SPEAKER HI 1
A7		SPEAKER LO 1
A8		RING OUTPUT 1
A9		OFF HOOK INPUT 1
A10		SHIELD / CHASSIS

B4	4-WIRE AUDIO 2	MIC HI 2
B5		MIC LO 2
B6		SPEAKER HI 2
B7		SPEAKER LO 2
B8		RING OUTPUT 2
B9		OFF HOOK INPUT 2
B10		SHIELD / CHASSIS
IRIDIUM HANDSET CONNECTION TRANSCEIVER #1		
ARINC 600 CONNECTOR TOP INSERT "A"		
C4		GROUND
C5		+ 12VDC
C6		DOWNLINK
C7		UPLINK
C8		GROUND
C9		EXT ON /OFF
C10		SHIELD / CHASSIS

IRIDIUM HANDSET CONNECTION TRANSCEIVER #2 (ICS-200)		
ARINC 600 CONNECTOR MIDDLE INSERT "B"		
A1		GROUND
A2		GROUND
A3		EXTERNAL ON/OFF 2
A4		+ 12VDC
A5		DOWNLINK 2
A6		UPLINK 2
A7		SHIELD (CHASSIS GND)

SPECIAL SIGNALING OUTPUTS / SYSTEM STATUS INDICATORS (ICS-200)		
ARINC 600 CONNECTOR MIDDLE INSERT "B"		
C1		XCVR 1 ONLINE
C2		RETURN
C3		XCVR 2 ONLINE
C4		RETURN
C5		XCVR 1 IN USE
C6		RETURN
C7		XCVR 2 IN USE
C8		RETURN

SERIAL DATA CONNECTION (RS-232) TRANSCEIVER #1		
ARINC 600 CONNECTOR TOP INSERT "A"		
D4		DCD
D5		RXD
D6		TXD
D7		DTR
D8		SIGNAL GND.
D9		DSR
D10		RTS
D11		CTS
D12		RING INDICATOR
D13		SHIELD / CHASSIS
SERIAL DATA CONNECTION (RS-232) TRANSCEIVER #2		
ARINC 600 CONNECTOR MIDDLE INSERT "B"		
B1		DCD 2
B2		DSR 2
B3		RXD 2
B4		RTS 2
B5		TXD 2
B6		CTS 2
B7		DTR 2
B8		RI 2
B9		GROUND
B10		SHIELD / CHASSIS

MAINTENANCE PORT (RS-232 SERIAL PORT)		
ARINC 600 CONNECTOR TOP INSERT "A"		
A11		TXD
A12		RXD
A13		GROUND
A14		SHIELD

TRANSCEIVER(S) SIGNALS (EXTERNAL ON/OFF CONTROL)		
ARINC 600 CONNECTOR TOP INSERT "A"		
NOTE: SIGNAL ON B11 CONTROLS ON/OFF FOR BOTH TRANSCIEVERS.		
B11	TRANSCEIVER #1 / 2	TRANSCEIVER ON/OFF
B12	TRANSCEIVER #1 / 2	GROUND
B13	TRANSCEIVER #1 / 2	SHIELD

3.4 CONFIGURATION MANAGER

The ICS-100/200 has several configuration attributes that can be modified that change characteristics of operation. ICG provides a configuration manager with the product, that when loaded onto a notebook PC permits access into the device to accomplish configuration changes. Access is gained to the ICS-100/200 from a notebook computer via a serial RS-232 connection connected to the ICS-100/200 via the J4 connector and a serial port on the PC. Any standard pin for pin serial cable can be used to connect the two devices.

3.4.1 Loading the Configuration Manager onto a PC - The first step prior to configuring the ICS-100/200 is to load the configuration utility provided, onto a PC. ICG provides two floppy disks that can be installed onto any PC running a Windows based operating system. The procedure is very simple and automatic, as follows:

Step 1 – Insert the first floppy labeled “Floppy #1 into the 3.5in floppy drive of the target computer.

Step 2 - Run “Setup.exe” from the floppy drive.

Step 3 - Follow installation instructions during the setup procedure.

3.4.2 CONFIGURATION PROGRAMMING

The ICS-100/200 configuration utility provides facilities for modifying some of the basic operations of the ICS-100/200. To gain access to the configuration Utility, Click on the Icon appearing on the desktop labeled “ICS-100/200 Config”. A screen will be displayed that offers several functions as follows:

3.4.2.1 File Button: the “File” button has three options as follows;

Load – permits loading a configuration that has been stored into the editor.

Save – permits saving a configuration to a PC or floppy disk.

Exit - permits exiting the configuration utility.

3.4.2.2 Option Button: this button is used to permit entry of the special key code to activate the “Enhanced Telephone Features” option.

3.4.2.3 Download: this button is used to initiate a download of the configuration of an ICS-100/200 connected to the PC. The utility will automatically try to find the ICS-100/200 by scanning the various serial port options of the PC. If a serial port cannot be found that is connected to the ICS-100/200 or the ICS-100/200 is inactive, a message will appear “Unable to find unit”.

3.4.2.4 Upload: this button permits uploading the configuration that is currently resident in the configuration utility.

3.4.2.5 Version Label / Serial Number Label– once a communication link has been established with the ICS-100/200, the software version and the ICS-100/200s’ electronic serial number will be automatically displayed.

3.4.2.6 Update: this button is reserved for updating the configuration utility on the target PC.

3.4.3 CONFIGURATION CHANGES

Features and functions that can be changed are as follows:

- 1) Enabling or Disabling Stations (Extension Ports)
- 2) Setting Gain or Attenuation per individual Station audio.
- 3) Editing the Class of Service for each extension.
- 4) Enabling or Disabling the Iridium Transceiver(s) Trunk Circuit.
- 5) Setting Trunk circuit audio gain or attenuation.
- 6) Enabling the ‘Enhanced Telephony Features’ option.

3.4.3.1 Station Changes: to change attributes on a station, click on the Stations line. This will bring up the Station screen and will default to “Ext. 11” as the first station on the station list. Any station can be selected by clicking on the down arrow next to the station window.

Enabled – this attribute when checked will enable the extension for operation. If an extension is not to be used, it is a good practice to disable this extension by clicking onto the square.

Encoding – This option is reserved for future use. The encoding used by the Iridium network is always “A-Law”.

TX Level - This adjustment permits adding up to 12 db of gain or attenuation to the Transmit audio (microphone level) that is being delivered to the groundside caller. Essentially, it determines the air to ground audio level.

Class of Service – Several options are available to permit restriction levels or perform special functions in the ‘class of Service’ settings. Class of service features and options are accessible by selecting the Extension number to be affected and then clicking on the “EDIT” function next to Class of Service. Selecting a specific feature is a simple matter of checking or un-checking the feature. Choices are:

Extension to Extension Calling – permits extensions to call each other in an intercom operation.

Conference Calling – permits an extension to initiate a conference with another extension on an established Iridium call.

Transfer – permits an extension to transfer an established Iridium call to another extension.

Ring Down – automatically dials a predetermined destination telephone number for an aircraft to ground call. If this feature is selected, a destination telephone number must be entered into the “Ring-down Number” field.

3.4.3.2 Trunk Changes: to change attributes relative to the communications circuit to the Iridium LBT click on the Trunks line. This will bring up a screen similar to the Station screen but with the following options:

Trunk – though the window offers two choices “Trunk-1 and Trunk-2”.

Enabled – like the stations, checking the box will activate the trunk. In all instances, the trunk connected to an Iridium transceiver(s), should be left in the enabled state.

Ring Extension – this is the default extension that will be ring on an inbound call to the Iridium transceiver(s). It can be changed to ring any extension required.

Absent Transfer – This defines which extension is the absent transfer extension for each transceiver. When this attribute is selected, a pull down list will be provided and an extension can be selected. If the same extension is selected as the default extension, incoming calls will not transfer but ring the default phone continuously.

TX Level - This adjustment permits adding up to 12 db of gain or attenuation to the Transmit audio that is being delivered by the Iridium Transceiver(s) to the aircraft handset earpiece. Essentially, it determines the ground to air received audio level.

Specifications

4.0 ICS-100 SYSTEM

ICS-100 PN ICG # 500616

ICS-200 PN ICG # 500617

DIMENSIONS: ICS-100 Unit: Length= 8.33 in. 21.15 cm
 Width= 8.20 in. 20.82 cm
 Height= 3.06 in. 7.78 cm

WEIGHT: ICS-100 6.0 Lbs. 2.73 Kgs.
 ICS-200 8.55 Lbs. 3.89 Kgs.

POWER REQUIREMENTS: ICS-100 - 28VDC 600 ma.
 Surge 1500 ma.
 ICS-200 - 28VDC 1000 ma.
 Surge 2000 ma.

2-WIRE TELEPHONY CIRCUITS (4 EACH)

Loop Battery -48VDC
 Ring signal 20Hz. > 40VAC RMS
 Impedance 600 ohm
 Audio Band Pass 300 -3400 Hz.
 Polarity Sensitivity None

4WIRE TELEPHONY CIRCUITS (2 EACH)

TX Audio (Mic) Pair	600 ohms
RX Audio (Earpiece) Pair	600 ohms
Discreet Hook Signal	+ 5VDC (Opto Isolated)
Discreet Ring Signal	Active Ground (Relay Isolated)
Audio Bandpass	300 –3400 Hz.

OPERATIONAL FEATURES

Digital Echo Suppression
Audio Transmit Gain Adjustments (Air to Ground Audio) -12 to + 25db
Audio Receive Gain Adjustments (Ground to Air Audio) -12 to + 40db
Three Party Conferencing
Intercom Calling with Call Transfer
Serial Data Capabilities up to 2400Bps.
Optional Iridium Handset Connection

OPERATIONAL PARAMETERS:

EMI/RFI	DO-160D	
Vibration	Category S2 DO-160D	
	Temperature	-50 to + 70 C.
	Altitude	50,000 FT.

4.1) IRIDIUM TRANSCIEVER

MODEL: Sebring Model 9522 (dual in ICS 200 model)

Interface Connection: DSC Digital Bus, ICS-100 as Intelligent Peripheral

OPERATIONAL PARAMETERS:

Frequency Range	1616MHz to 1626.5 MHz
Duplexing Method	TDD (Time Domain Duplex)
Oscillator Stability	± 1.5PPM
Input/Output Impedance	50Ω
Multiplexing Method	TDMA / FDMA
Average Power During Transmit Slot (Max)	7W
Average Power during a frame (typical)	0.6W

Receiver Sensitivity at 50Ω	-118.5 dbm
Receiver Spurious Rejection at offsets > 1MHz	60db

4.2) ANTENNA

Model: See appendix Section 5.0

Electrical Specifications:

Frequency 1616-1626.5 Mhz.
VSWR 1.5:1
Polarization RHCP
Impedance 50 Ohms
Power Handling 60 Watts CW
Gain + 3 dBic @ Zenith
Lightning Protection DC Grounded

Mechanical Specifications:

Weight 6 oz. (170.1Grams)
Height .66 in. (1.68 cm)
Diameter 3.5 in. (8.89 cm)
Material 6061-T6 aluminum / thermoset plastic
Finish Skydrol resistant enamel
RF Connector TNC Female

Environmental Specifications:

Temperature -55° C (-67 F) to + 85° C (+ 185 F)

4.3) BAND PASS FILTER

Model: 6FVSP-1622.375/X8.25-TP/T

Part Number: ICG # 500916

Electrical Specifications:

Center Frequency 1622.375 MHz.
Operating Band Width 1618.25 to 1626.5 Mhz
Insertion Loss 1.3db @1622.375Mhz; 3.7db @ Operating B/W

VSWR 1.5:1 @ operating B/W
Attenuation 40db minimum @ 1616.375Mhz; 40db minimum @1628.375 Mhz
Power Handling 20 Watts Max.

Mechanical Specifications:

Length 6.69 in.(17cm)
Width 5.2 in. (13.20 cm)
Height (Includes Tuning Area) 1.89 in.(4.81 cm)
Input Connector TNC Male
Output Connector TNC Female

4.4) INSTALLATION KIT

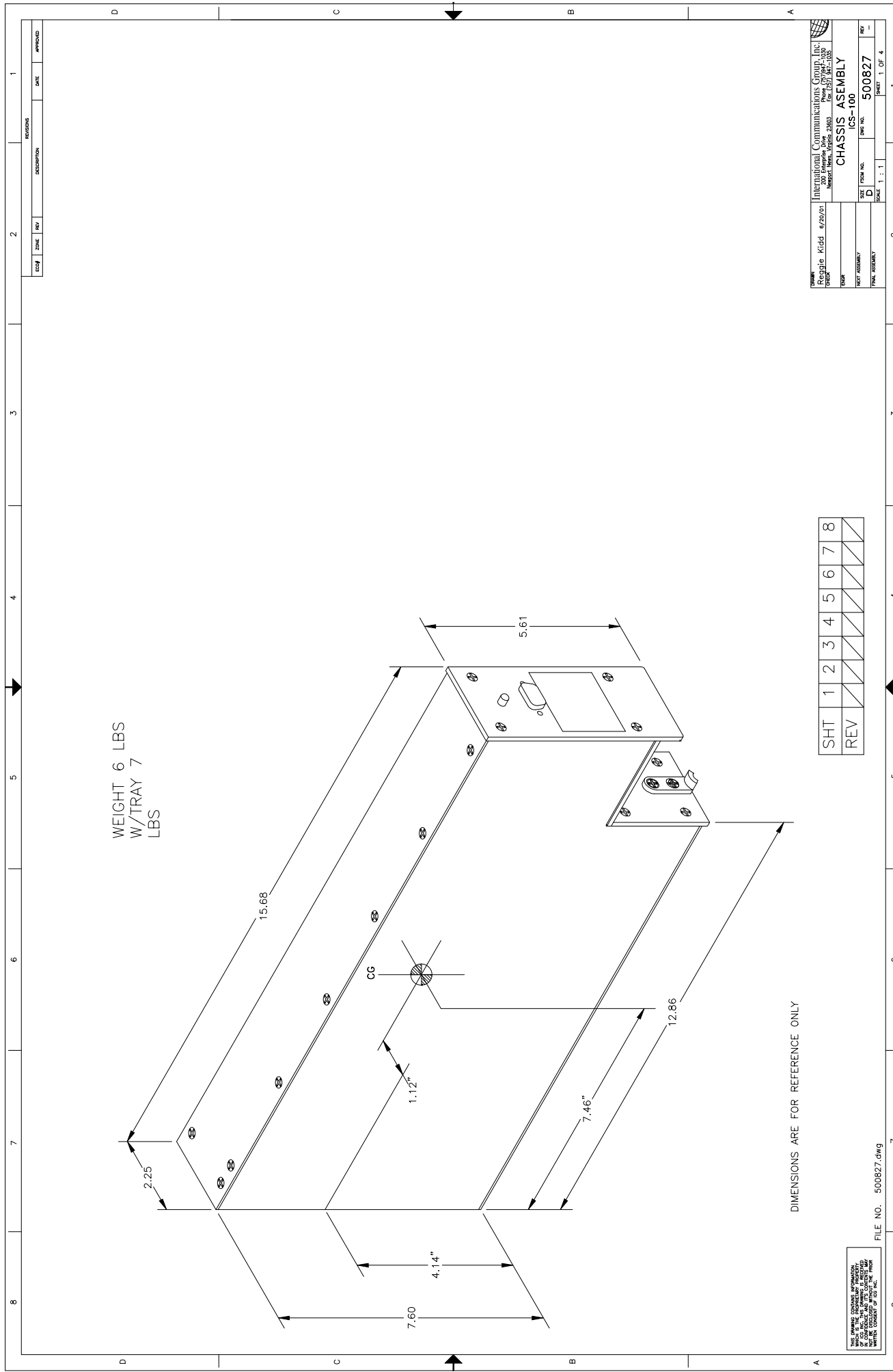
Part Number: ICG # 500618

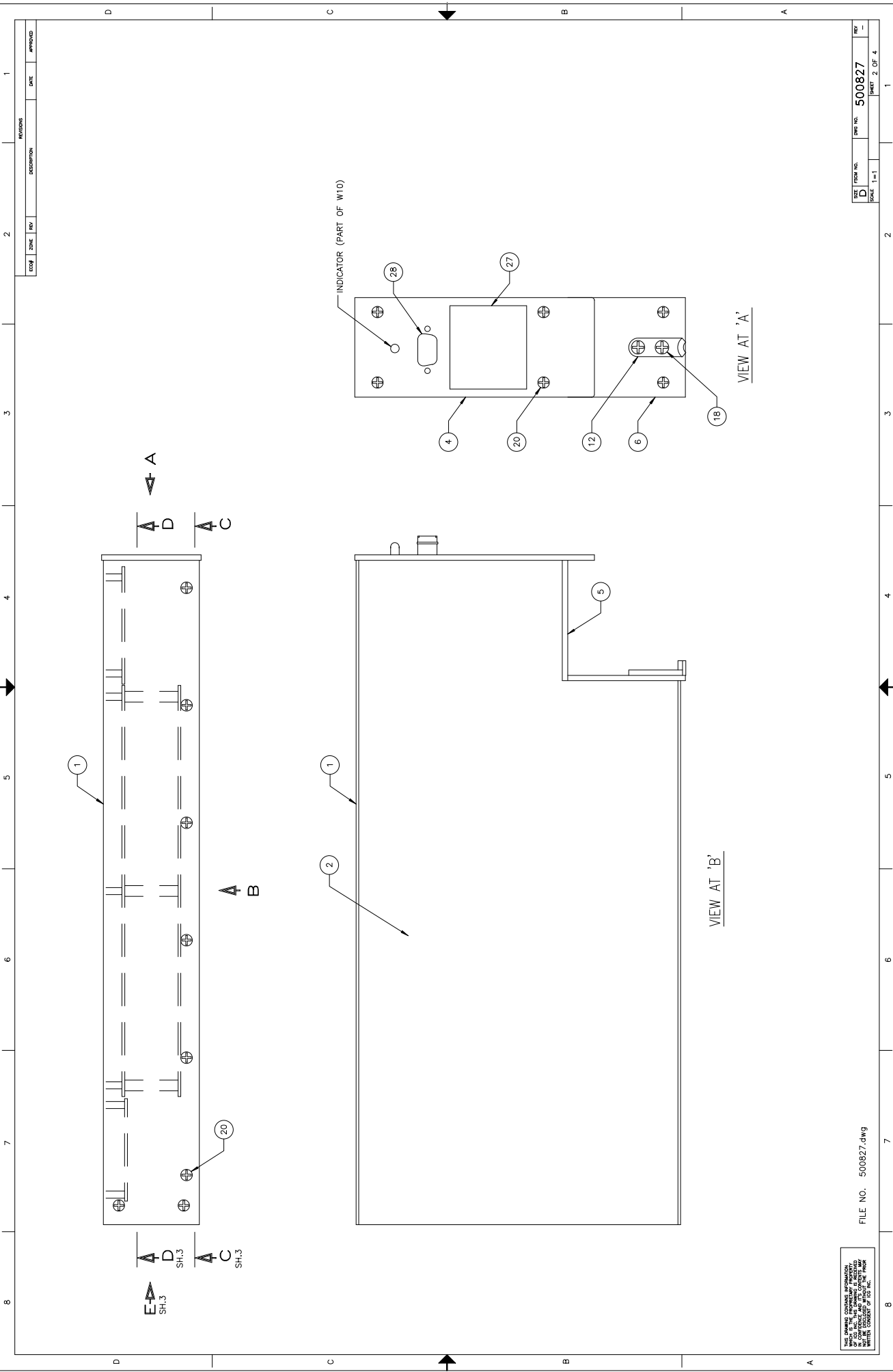
COMPONENT	DESCRIPTION	ICG PART NUMBER
2-MCU Tray	Standard Short Tray	935200-00
Arinc 600 Size 1 Connector / Pins	Arinc Connector / Pins / 1M Coax Service Stub	500801-1
Antenna (Low Profile)	Iridium antenna	500644, 500644-1, 500644-2
Coax 50 Ft (15M) Kit	500-91962-01	500990

APPENDIX

Following are drawings and wiring definitions for the ICS-200/100 device.

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REV	DATE	BY	CHK	APP
1				

REV	DATE	BY	CHK	APP
1				

REV	DATE	BY	CHK	APP
1				

REV	DATE	BY	CHK	APP
1				

REV	DATE	BY	CHK	APP
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REV	DATE	BY	CHK	APP
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REV	DATE	BY	CHK	APP
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REV	DATE	BY	CHK	APP
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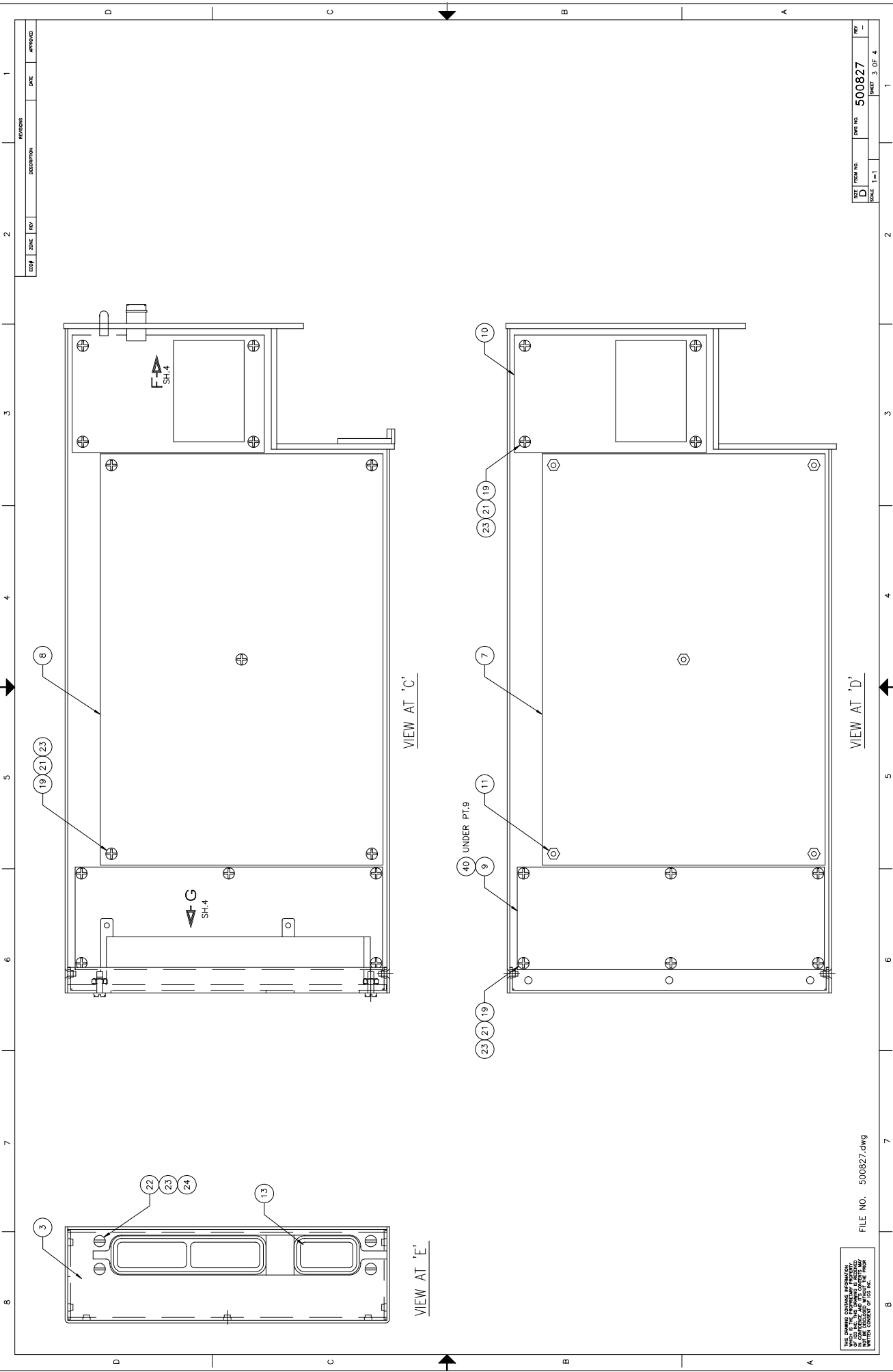
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FILE NO. 500827.dwg

DWG NO. 500827

SCALE 1=1

SHEET 2 OF 4



REV	DATE	BY	CHK	APP

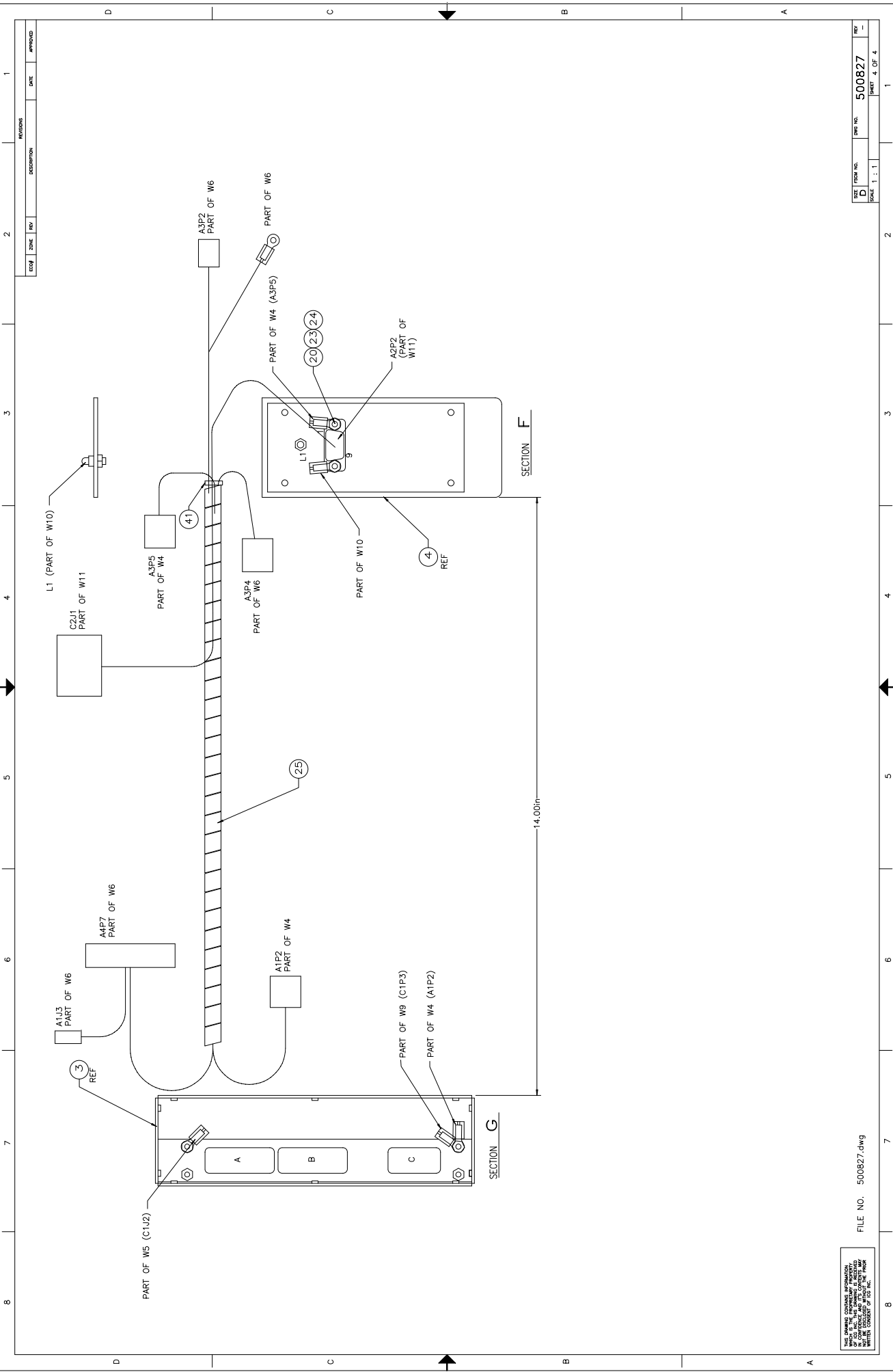
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FILE NO. 500827.dwg

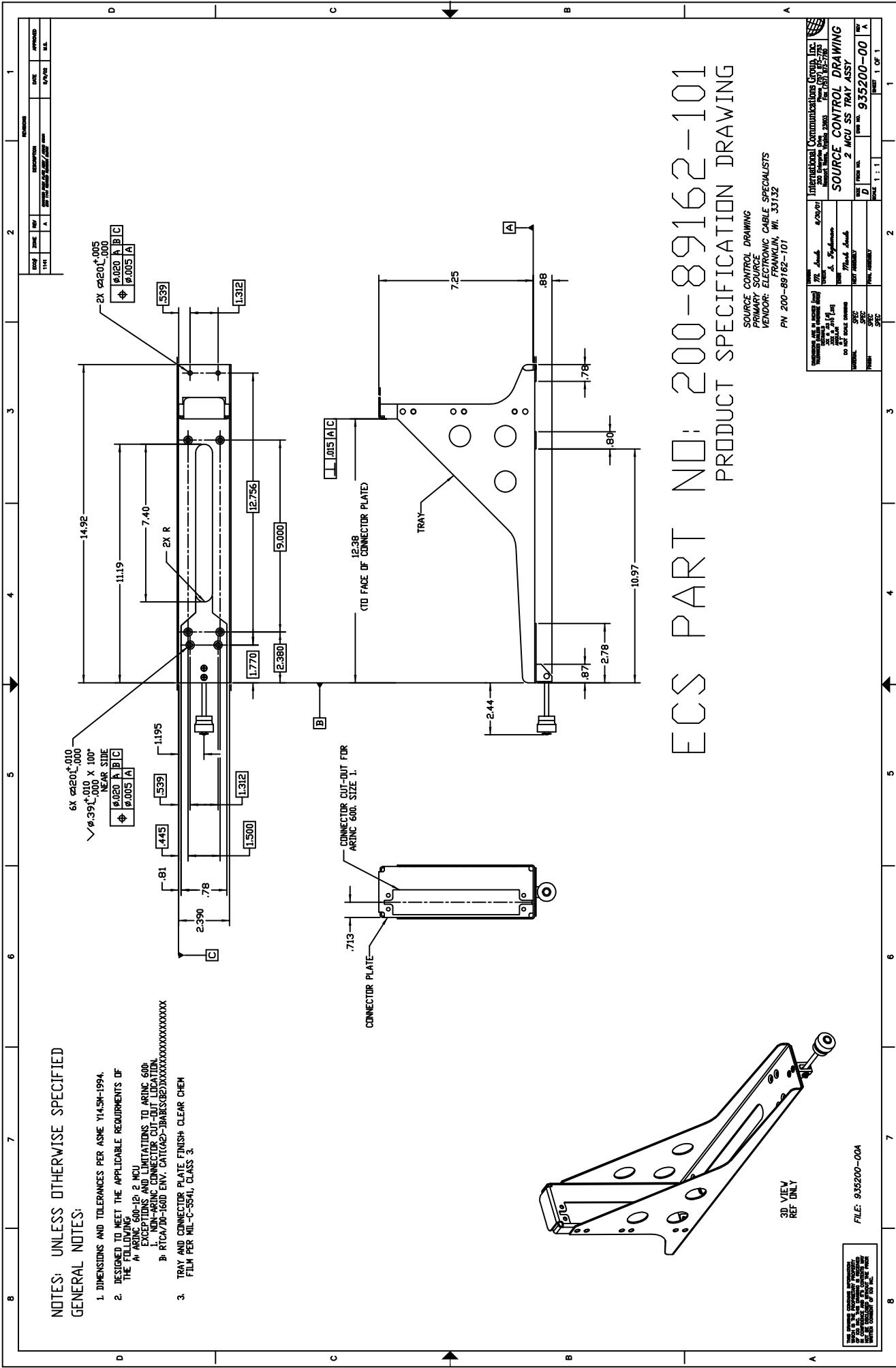
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500827

3 OF 4



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NOTES: UNLESS OTHERWISE SPECIFIED
GENERAL 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
 - B. NON-ARINC CONNECTOR CUT-OUT LOCATION.
3. TRAY AND CONNECTOR PLATE FINISH CLEAR CHEM FILM PER MIL-C-3541, CLASS 3.

ECS PART NO: 200-89162-101

PRODUCT SPECIFICATION DRAWING

SOURCE CONTROL DRAWING
 PRIMARY SOURCE
 VENDOR: ELECTRONIC CABLE SPECIALISTS
 FRANKLIN, WI. 53132
 PN 200-89162-101

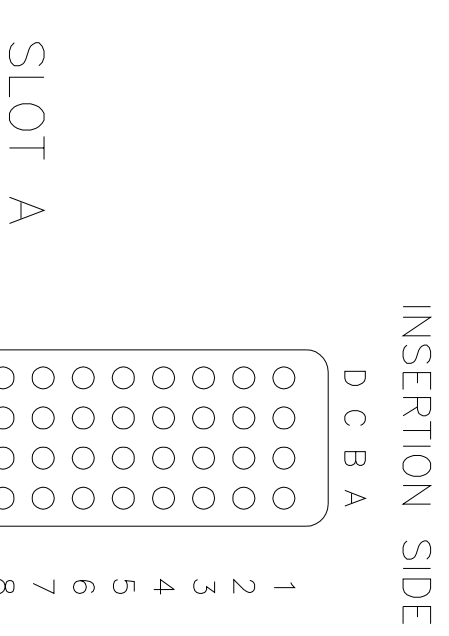
DATE	1/14	BY	A	DESCRIPTION	ISSUE	DATE	APPROVED
International Communications Group, Inc. 200 Industrial Drive, Suite 200 Franklin, WI 53132 PHONE: 414-762-7272 FAX: 414-762-7273 WWW: WWW.ICG.COM							
SOURCE CONTROL DRAWING 2 MCU SS TRAY ASST							
FILE NAME	200-89162-101		DATE	1/14		ISSUE	1 OF 1

3D VIEW
 REF ONLY

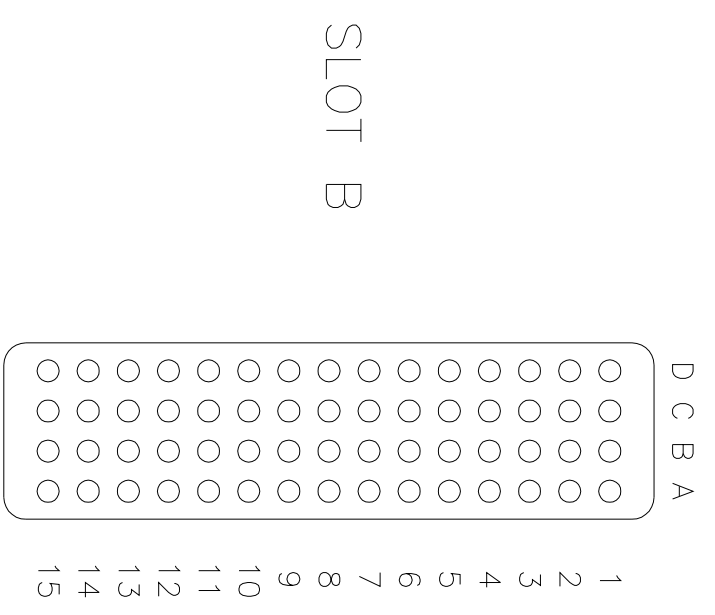
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REVISIONS					
ECO#	ZONE	REV	DESCRIPTION	DATE	APPROVED
1475		A	changed insert A and B to a 4x15	9/29/03	<i>M. Kassin</i>
1528		B	Added 28v aux Pwr insert B	1/14/04	<i>M. Bowle</i>

CAVITY SLOT C		JP2	POWER SUPPLY
PIN	DESCRIPTION	PIN	
1	ANTENNA		
2	+28V DC	2	
3	SHIELD	CG	
4	GROUND	1	
5	N/C		



CAVITY SLOT B		JP5	POWER SUPPLY
PIN	DESCRIPTION	PIN	
A15	AUX +28V /1	1	
B15	AUX 28V /1 RET	2	
C15	AUX +28V /2	3	
D15	AUX 28V /2 RET	4	



CAVITY SLOT A		JP3	JP15	JP4	JP6
PIN	DESCRIPTION	PIN	PIN	PIN	PIN
A1	TTP1	1			
A2	RING1	2			
A3	SHIELD	CHASIS GROUND			
B1	TTP2	3			
B2	RING2	4			
B3	SHIELD	CHASIS GROUND			
C1	TTP3	5			
C2	RING3	6			
C3	SHIELD	CHASIS GROUND			
D1	TTP4	7			
D2	RING4	8			
D3	SHIELD	CHASIS GROUND			
A4	MIC HI 1	9			
A5	MIC LO 1	10			
A6	SPEAKER HI 1	11			
A7	SPEAKER LO 1	12			
A8	RING OUTPUT 1	13			
A9	OFF HOOK INPUT 1	14			
A10	SHIELD	CHASIS GROUND			
B4	MIC HI 2	15			
B5	MIC LO 2	16			
B6	SPEAKER HI 2	17			
B7	SPEAKER LO 2	18			
B8	RING OUTPUT 2	19			
B9	OFF HOOK INPUT 2	20			
B10	SHIELD	CHASIS GROUND			
C4	GROUND	1			
C5	+12V	5			
C6	DOWNLINK	7			
C7	UPLINK	9			
C8	GROUND	2			
C9	EXT ON OFF	4			
C10	SHIELD	CHASIS GROUND			
D4	DCD	1			
D5	RD	3			
D6	TD	5			
D7	DTR	7			
D8	GROUND	9			
D9	DSR	2			
D10	RTS	4			
D11	CTS	6			
D12	RI	8			
D13	SHIELD	CHASIS GROUND			
A11	TD	3			
A12	RD	5			
A13	GROUND	9			
A14	SHIELD	CHASIS GROUND			
B11	TRANSCIEVER ON OFF	21			
B12	GROUND	22			
B13	SHIELD	CHASIS GROUND			

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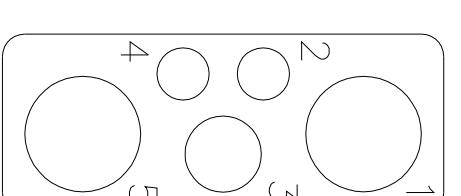
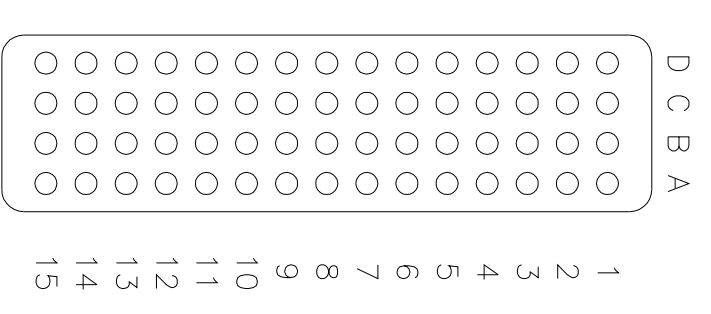
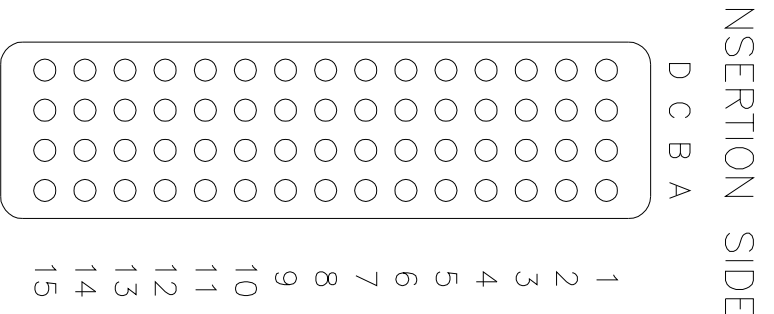
DIMENSIONS ARE IN INCHES [mm] TOLERANCES (UNLESS OTHERWISE NOTED) DECIMALS ANGULAR \pm DO NOT SCALE DRAWING		DRAWN <i>M. Kassin</i> CHECK ENGR	12/23/02 NEXT ASSEMBLY FINAL ASSEMBLY
MATERIAL FINISH		International Communications Group, Inc. 200 Enterprise Drive Newport News, Virginia 23603 Phone (757) 947-1030 Fax (757) 947-1035	
SIZE B		FSCM NO.	DWG NO. 500646
SCALE 1 : 1		SHEET 1 OF 1	
ICS-100 PINOUTS		REV B	

REVISIONS					
ECO#	ZONE	REV	DESCRIPTION	DATE	APPROVED
1475		A	changed Insert A and B to 4x15	9/29/03	J. Maxim
1490		B	changed voltages on C5, A4 to +11VDC changed names on D5, D6 and B3, B5 to RXD(2), TXD(2)	11/06/03	J. Maxim
1528		C	ADDED B INSERT CHANGES FOR AUX PWR AND NEW DIAGNOSTIC SIGNALS	1/14/04	M. Soule

CAVITY SLOT A					
PIN	DESCRIPTION	JP8	JP6	JP9	JP12
A1	TIP1	1			
A2	RING1	2			
A3	SHIELD			CHASSIS GROUND	
B1	TIP2	3			
B2	RING2	4			
B3	SHIELD			CHASSIS GROUND	
C1	TIP3	5			
C2	RING3	6			
C3	SHIELD			CHASSIS GROUND	
D1	TIP4	7			
D2	RING4	8			
D3	SHIELD			CHASSIS GROUND	
A4	MIC HI 1	9			
A5	MIC LO 1	10			
A6	SPEAKER HI 1	11			
A7	SPEAKER LO 1	12			
A8	RING OUTPUT 1	13			
A9	OFF HOOK INPUT 1	14			
A10	SHIELD			CHASSIS GROUND	
B4	MIC HI 2	15			
B5	MIC LO 2	16			
B6	SPEAKER HI 2	17			
B7	SPEAKER LO 2	18			
B8	RING OUTPUT 2	19			
B9	OFF HOOK INPUT 2	20			
B10	SHIELD			CHASSIS GROUND	
C4	GROUND		1		
C5	+11VDC		5		
C6	DOWNLINK		7		
C7	UPLINK		9		
C8	GROUND		2		
C9	EXT ON OFF		4		
C10	SHIELD			CHASSIS GROUND	
D4	DCD			1	
D5	RXD			3	
D6	TXD			5	
D7	DTR			7	
D8	GROUND			9	
D9	DSR			2	
D10	RTS			4	
D11	CTS			6	
D12	RI			8	
D13	SHIELD			CHASSIS GROUND	
A11	TD			3	
A12	RD			5	
A13	GROUND			9	
A14	SHIELD			CHASSIS GROUND	
B11	TRANSCIEVER ON OFF	21			
B12	GROUND	22			
B13	SHIELD			CHASSIS GROUND	

CAVITY SLOT B		MAIN BOARD				P.S.
PIN	DESCRIPTION	JP7	JP13	JP15	JP10	JP5
A1	GROUND	1				
A2	GROUND	2				
A3	EXT_ON_OFF2	4				
A4	+11VDC	5				
A5	DOWNLINK2	7				
A6	UPLINK2	9				
A7	SHIELD				CHASSIS GND	
A15	AUX +28V /1					1
B15	AUX 28V /1 RET					2
C15	AUX +28V /2					3
D15	AUX 28V /2 RET					4
B1	DCD2		1			
B2	DSR2		2			
B3	RXD2		3			
B4	RTS2		4			
B5	TXD2		5			
B6	CTS2		6			
B7	DTR2		7			
B8	RI2		8			
B9	GROUND		9			
B10	SHIELD				CHASSIS GND	
C1	XCVR 1 ONLINE	**		1		
C2	DISCRETE 1 RET	**		2		
C3	XCVR 2 ONLINE	**		3		
C4	DISCRETE 2 RET	**		4		
C5	XCVR 1 IN USE	**		5		
C6	DISCRETE 3 RET	**		6		
C7	XCVR 2 IN USE	**		7		
C8	DISCRETE 4 RET	**		8		
D1	TXA				1	
D2	TXB				2	
D3	GROUND				3	
D4	RXA				4	
D5	RXB				5	
D6	GROUND				6	

** FUTURE USE

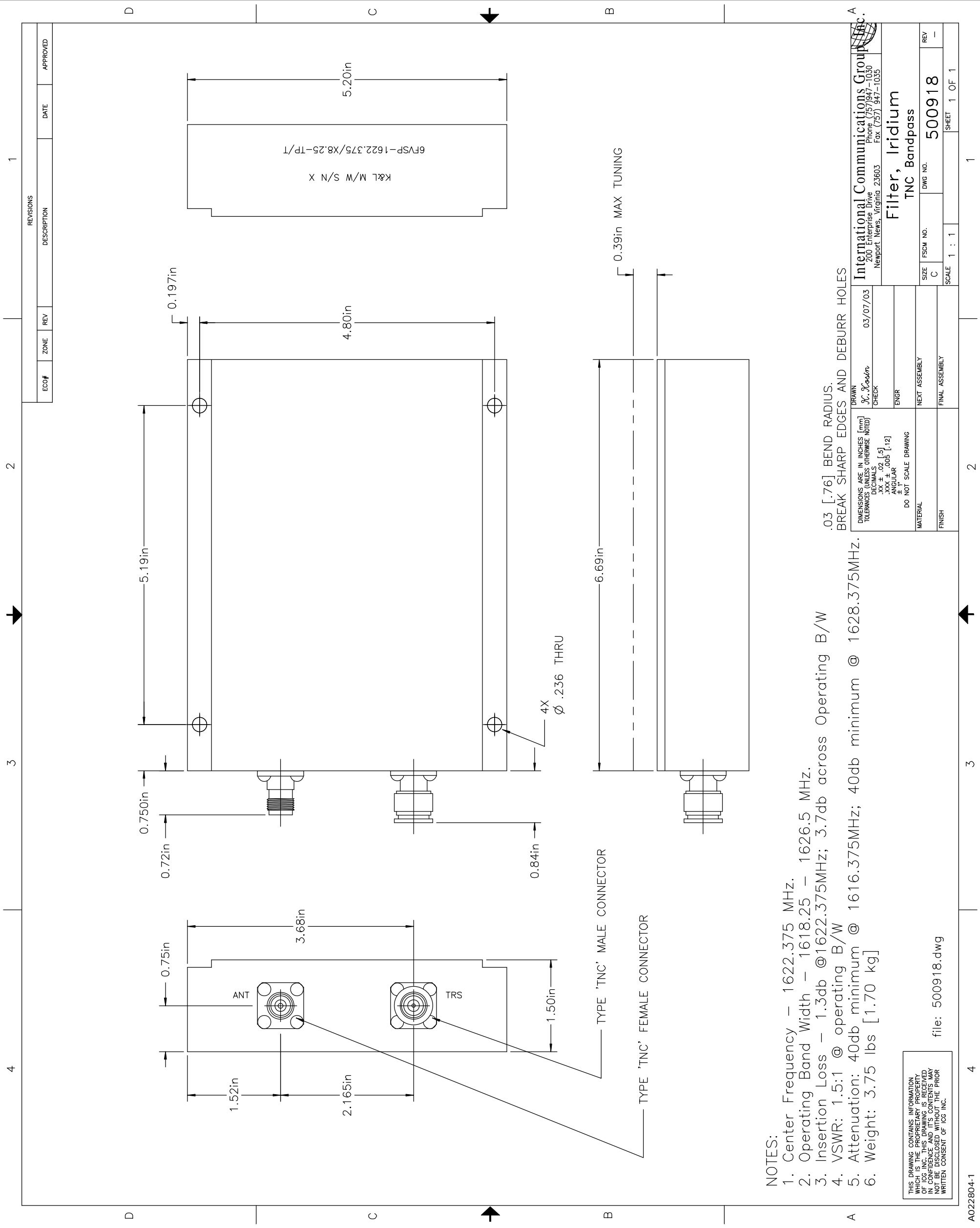


CAVITY SLOT C	JP2	POWER SUPPLY
PIN	DESCRIPTION	PIN
1	ANTENNA	
2	+28V/DC	2
3	SHIELD	CG
4	GROUND	
5	N/C	

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DRAWN <i>J. Maxim</i> August 13, 2003		200 Enterprise Drive Newport News, Virginia 23603		International Communications Group, Inc.		Phone (757) 947-1030 Fox (757) 947-1035	
CHECK		ENGR		ICCS-200 PINOUTS		501500	
NEXT ASSEMBLY		FINAL ASSEMBLY		SIZE B		FSCM NO.	
MATERIAL		FINISH		SCALE 1 : 1		DWG NO.	
				SHEET 1 OF 1		REV C	



NOTES:

1. Center Frequency – 1622.375 MHz.
2. Operating Band Width – 1618.25 – 1626.5 MHz.
3. Insertion Loss – 1.3db @1622.375MHz; 3.7db across Operating B/W
4. VSWR: 1.5:1 @ operating B/W
5. Attenuation: 40db minimum @ 1616.375MHz; 40db minimum @ 1628.375MHz.
6. Weight: 3.75 lbs [1.70 kg]

.03 [.76] BEND RADIUS.
BREAK SHARP EDGES AND DEBURR HOLES

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Newport News, Virginia 23603
Phone (757) 947-1030
Fax (757) 947-1035

SIZE	FSCM NO.	DWG NO.	REV
C		500918	-
SCALE	1 : 1	SHEET 1 OF 1	

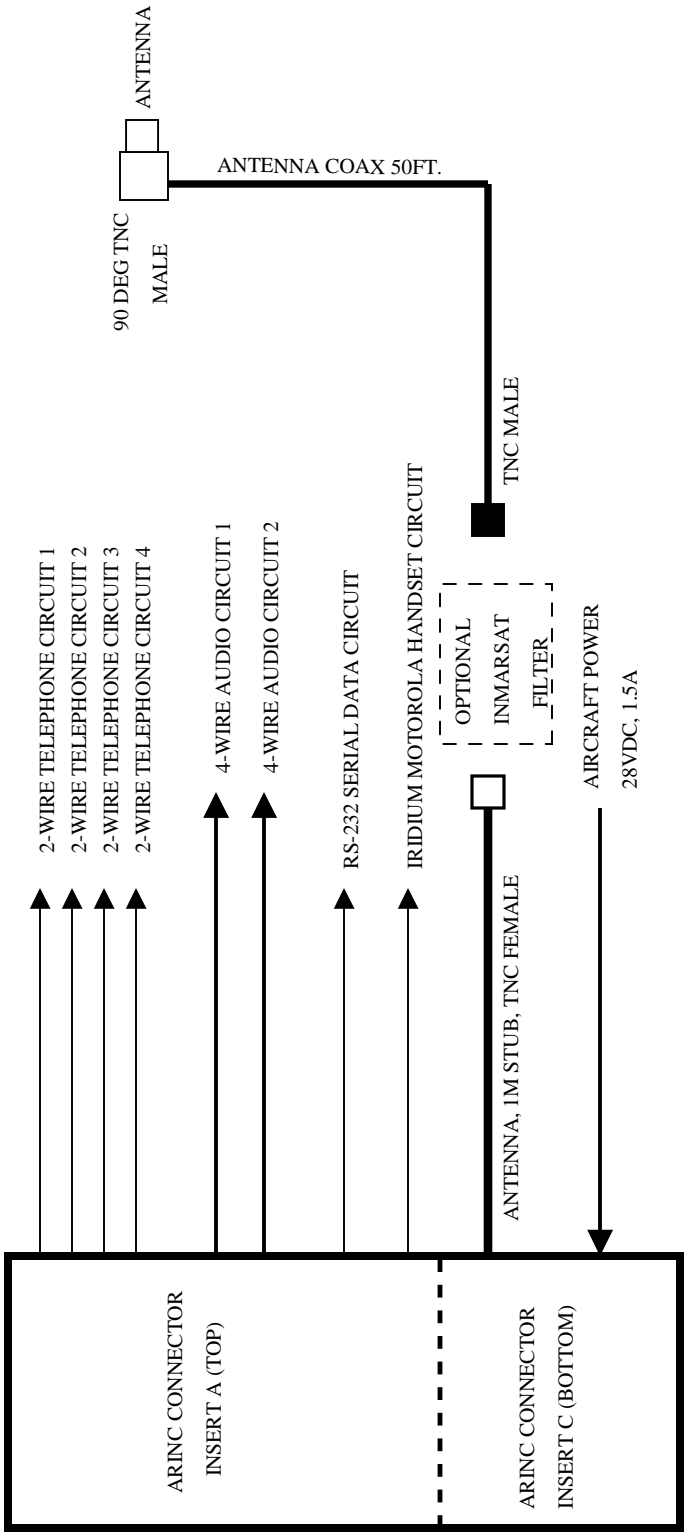
DRAWN	03/07/03
CHECK	
ENGR	
NEXT ASSEMBLY	
FINAL ASSEMBLY	
MATERIAL	
FINISH	

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REVISIONS			
ECO#	ZONE	REV	DESCRIPTION
			DATE
			APPROVED

ICS-100 TRAY



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ICS-100 Block Diagram	
SIZE A	FSCM NO.
SCALE	DWG NO. 501329
	REV 1
	SHEET 1 OF 1

DRAWN	05/13/03
<i>A. Jabs</i>	
CHECK	
ENGR	

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501329.PDF

REVISIONS

ECC#	ZONE	REV	DESCRIPTION	DATE	APPROVED
1460		A	ADDED 2ND SERIAL PORT	8/26/03	M.S.

Serial Data Connection

INSERT A	SIGNAL	9-PIN SERIAL PORT CONNECTOR	2ND XCVR SIGNAL	INSERT B
D4	DCD	PIN 1	DCD2	B1
D5	RXD	PIN 2	RXD2	B3
D6	TXD	PIN 3	TXD2	B5
D7	DTR	PIN 4	DTR2	B7
D8	GND	PIN 5	GND2	B9
D9	DSR	PIN 6	DSR2	B2
D10	RTS	PIN 7	RTS2	B4
D11	CTS	PIN 8	CTS2	B6
D12	RI	PIN 9	RI2	B8
D13	SHIELD	AIRFRAME	SHIELD	B10

NOTE: ICS 100 SERIAL CONNECTIONS ARE MADE IN INSERT A ONLY. ICS 200 CONNECTIONS ARE MADE IN INSERT A AND B



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ICS 100 / 200
 Serial Data Connection

DRAWN	<i>M. Soule</i>	8/26/03
CHECK		
ENGR		

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SIZE	FSCM NO.	DWG NO.	REV
A		501326	A
SCALE		SHEET	1 OF 1

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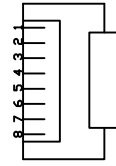
REVISIONS

ECC#	ZONE	REV	DESCRIPTION	DATE	APPROVED
1460		A	ADDED 2ND HANDSET PORT	8/26/03	M.S.

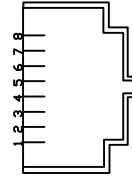
IRIDIUM Motorola Handset Connection

INSERT A	SIGNAL	RJ-45 HANDSET	2ND XCVR SIGNAL	INSERT B
C4	GROUND	PIN 8	GROUND	A2
C5	+ 12 VDC	PIN 6	+ 12 VDC	A4
C6	DOWNLINK	PIN 5	DOWNLINK	A5
C7	UPLINK	PIN 4	UPLINK	A6
C8	GROUND	PIN 3	GROUND	A1
C9	EXT ON/OFF	PIN 2	EXT ON/OFF	A3
C10	SHIELD	PIN 7	SHIELD	A7

NOTE: ICS 100 HANDSET CONNECTIONS ARE MADE IN INSERT A ONLY. ICS 200 CONNECTIONS ARE MADE IN INSERT A AND B



END VIEW OF RJ-11 PLUG



LOOKING INTO RJ-11 JACK

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file:501328A.dwg

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 Newport News, Virginia 23603 Fax (757) 947-1035

ICS 100 / 200
IRIDIUM Digital Handset Connection

DRAWN	<i>M. Soule</i>	8/26/03
CHECK		
ENGR		
SIZE	FSCM NO.	DWG NO.
A		501328
SCALE		SHEET 1 OF 1
		REV A

REVISIONS

ECO#	ZONE	REV	DESCRIPTION	DATE	APPROVED

PROGRAMMING PORT CONNECTION			
ICS-100 CHASSIS DB-9 CONNECTOR	SIGNAL	PC 9-PIN SERIAL PORT CONNECTOR	SIGNAL
PIN 1	DCD	PIN 1	DCD
PIN 2	RXD	PIN 2	RXD
PIN 3	TXD	PIN 3	TXD
PIN 4	DTR	PIN 4	DTR
PIN 5	SIG. GND.	PIN 5	SIG. GND.
PIN 6	DSR	PIN 6	DSR
PIN 7	RTS	PIN 7	RTS
PIN 8	CTS	PIN 8	CTS
PIN 9	RI	PIN 9	RI

NOTE: ONLY TXD (PIN 2), RXD (PIN 3) AND SIG. GND (PIN 5) CONNECTIONS ARE REQUIRED BY THE ICS-100 PROGRAMMING PORT.

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 Newport News, Virginia 23603 Fax (757) 947-1035

ICS-100

DRAWN <i>A. Jabs</i>		05/13/03	
CHECK		FSCM NO.	DWG NO. 501327
ENGR		SIZE A	REV -
501327.PDF		SCALE	SHEET 1 OF 1

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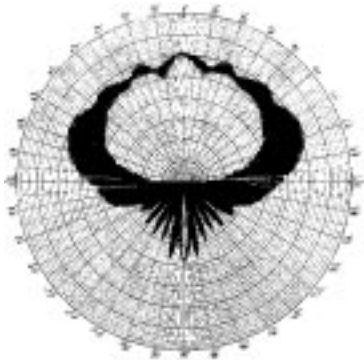
IRIDIUM / GPS S67-1575-109



DESCRIPTION

S67-1575-109: Low profile Iridium/GPS antenna provides continuous coverage from 1565MHz to 1626.5 MHz for excellent Iridium operation as well as GPS L1 applications. Mechanical configuration is a spherical-radius molded radome which provides enhanced protection against rain, ice, and lightning strikes. Qualified for high-speed military aircraft as well as ARINC applications.

DESIGNED TO: DO-160, MIL-C-5541, MIL-E-5400, MIL-STD-810, TSO-C129



RADIATION PATTERN
1565 - 1626.5 MHz

SPECIFICATIONS

IRIDIUM/GPS

S67-1575-109

ELECTRICAL

Frequency

GPS 1575 +/-10MHz

Iridium 1616 -1626.5 MHz

VSWR 1.5:1

Polarization RHCP

Impedance 50 ohms

Power Handling 60 watts CW

Gain +3 dBic @ Zenith

Lightning Protection ... DC grounded

MECHANICAL

Weight 6 oz.

Height66 in.

Diameter 3.5 in.

Material 6061-T6 aluminum / thermoset plastic

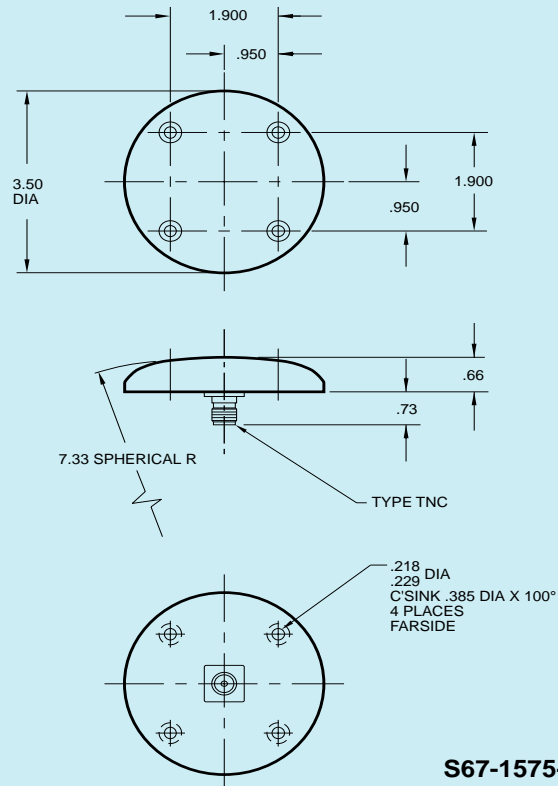
Finish Skydrol resistant enamel

Connector TNC Female

ENVIRONMENTAL

Temperature -55 C (-67 F) to +85 C (+185 F)

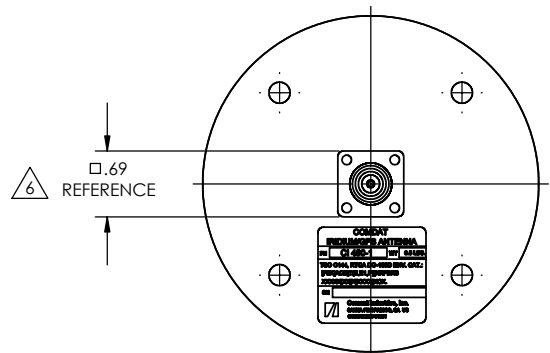
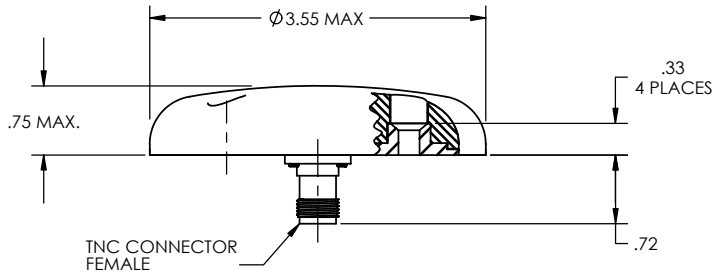
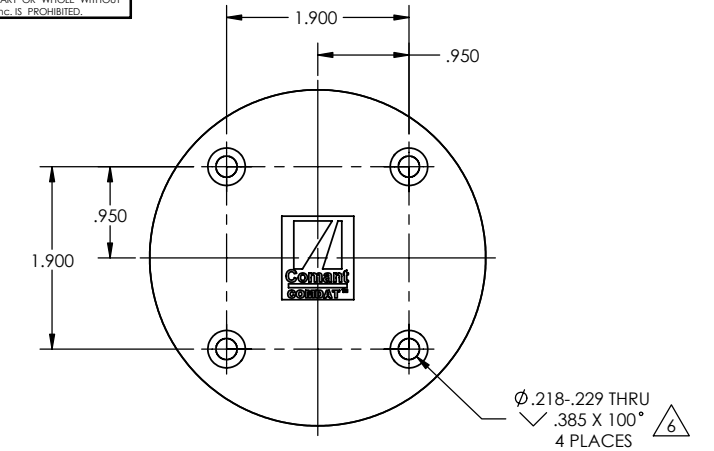
OUTLINE DRAWING



S67-1575-109

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REVISIONS			
LTR	DESCRIPTION	DATE	APPROVAL
A	RELEASED DRAWING	JF 05/17/03	DH 05/17/03
B	REF ECN 03-178	JF 07/18/03	DH 07/18/03



NOTES:

- SPECIFICATIONS:
 - RF CHARACTERISTICS

FREQUENCY	GPS 1575 ± 10MHz IRIDIUM 1616 - 1626.5 MHz
VSWR	1.5 : 1 MAX.
R/L	-14.0dB MAX.
POLARIZATION	RIGHT HAND CIRCULAR POLARIZATION
RADIATION PATTERN	HEMISPHERICAL
IMPEDANCE	50 OHMS
GAIN	LESS THAN OR EQUAL TO 3.0 dBic @ ZENITH
POWER HANDLING	60 WATTS
LIGHTNING PROTECTION	DC GROUNDED
 - WEIGHT .5 LB
 - SPEED RATING 600 KNOTS @ 55,000 FT
 - FINISH GLOSS WHITE PAINT. MOUNTING SURFACE, MOUNTING HOLES AND CONNECTOR ARE FREE OF PAINT.
 - TSO C144
RTCA DO-160D ENV. CAT.: [F2X]ACB[T(E,E1,P)]XRFDXSXXXX[XX]X[XXXX]XCX.
- CLEARANCE HOLES Ø 15/64 FOR MOUNTING SCREWS AND Ø 1.00 FOR CONNECTOR INSTALLATION.
- A49011 INSTALLATION INSTRUCTIONS SUPPLIED WITH ANTENNA.

INSTALLATION DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS .XX ± .03 .XXX ± .010 FRACTIONS ± 1/16 ANGLES ± 1° MACHINE FINISH 125✓ PER ANSI-B46.1 REMOVE BURRS AND SHARP EDGES .015 MAX MEET DIMENSIONS BEFORE PLATING DIMENSIONS ARE PER ASME Y14.5M	CONTRACT NO.			
	APPROVALS DRAWN J FRANKS 04/15/03 CHECK J GOMEZ 06/17/03 ENGR D HOLLOWAY 06/17/03		DATE	COMDAT IRIDIUM/GPS ANTENNA
MATERIAL :	QC P BOSNEANU 06/17/03	DWG SIZE C	CODE IDENT 51351	
DO NOT SCALE DRAWING	APPD D HOLLOWAY 06/17/03	SCALE: 1:1	CAD FILE: --	REV. B
			SHEET : 1 OF 1	

DWG NO CI 490-1 REV B

8

7

6

5

4

3

2

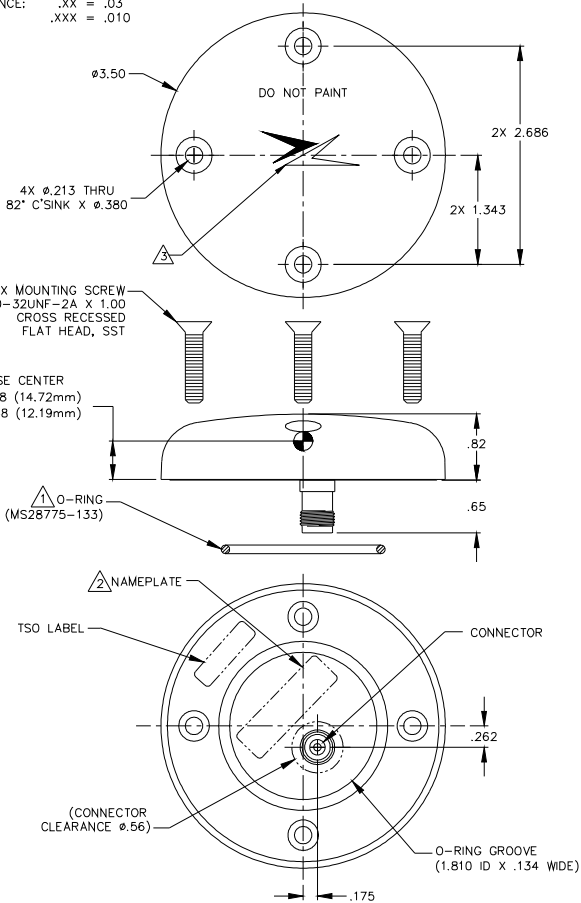
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
A	PRODUCTION RELEASED	08/13/01	

NOTES: UNLESS OTHERWISE SPECIFIED.

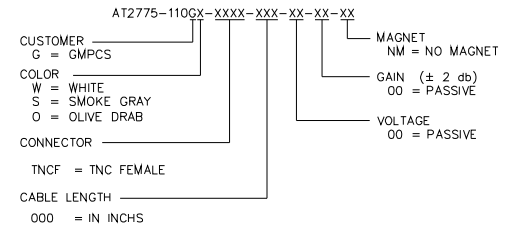
- △ O-RING AND MOUNTING SCREWS, SUPPLIED BY AEROANTENNA.
- △ SIZE, SHAPE AND CONTENTS OF NAMEPLATE ARE SUBJECT TO CHANGE WITHOUT NOTICE.
- △ AAT LOGO OPTIONAL.
- 4. TOLERANCE: .XX = .03
.XXX = .010



SPECIFICATION:

FREQUENCY: 1621 ±5 MHz &
 POLARIZATION: RIGHT HAND CIRCULAR
 AXIAL RATIO: 3.0 dB MAX
 RADIATION COVERAGE: 4.0 dBic $\theta = 0^\circ$
 -1.0 dBic $0^\circ < \theta < 75^\circ$
 -2.5 dBic $75^\circ \leq \theta < 80^\circ$
 -4.5 dBic $80^\circ \leq \theta < 85^\circ$
 -7.5 dBic $\theta = 90^\circ$
 IMPEDANCE: 50 OHMS
 VSWR: $\leq 2.0:1$
 CONNECTOR: TNCF
 WEIGHT: 8.0 OZ MAX
 MATERIAL: A380 ALUMINUM ALLOY-CASTING
 ULTEM 2200 RADOME
 FINISH: WEATHERABLE POLYMER
 ALTITUDE: 70,000'
 OPERATING TEMP: -55°C TO +85°C
 DESIGNED TO: DO-160D
 ENV CAT: E1-ABB[CLMY]XSFDFSAZAAZYH[A3][2A]CX
 TSO C-144

PART NO. DESIGNATION:



STANDARD MODEL = AT2775-110GW-TNCF-000-00-00-NM

DO NOT SCALE THIS DRAWING	DRAWN K.RERKSAWAT 08/13/01				
ALL DIMENSIONS ARE IN INCHES DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982	CHECKED				
TOLERANCES: .XXX = ±.01 .XXX = ±.005 FRACT = 1/32 ANG. = 1/2°	ENGR T.JEENSALUTE 08/16/01	TITLE ANTENNA			
✓ SURFACE ROUGHNESS PER ANSI B46.1 REMOVE BURRS AND BREAK SHARP EDGES: PART TO BE CLEAN AND OIL FREE	MFG G.A. APPROVED	SIZE B	CAGE CODE OUVG2	DRAWING NO. AT2775-110G	REV A
USED ON UNLESS OTHERWISE SPECIFIED	DRAWN IN CAD	SCALE NONE	AT2775-110GA	SHEET 1 OF 1	

6.0 TROUBLESHOOTING

6.1 Troubleshooting Guide

6.1.1 Power indicator not illuminated

- a. Check Circuit breaker
- b. Check connections to pins 2 and 4 of ARINC Connector Cavity slot C.
- c. Verify +28VDC between pins 2 and 4 of ARINC Connector Cavity slot C.

6.1.2 No dial tone when phone is off hook

- a. The extension is not enabled in the configuration. See section 3.4 for enabling the extension.
- b. The ring down feature is enabled with phone number on that extension. See section 3.4 for turning the feature off.
- c. Check wiring to the transceiver.
- d. Power is not on. Check the power indicator on the transceiver.
- e. Phone attached to transceiver is defective. Replace or repair phone.
- f. Transceiver is defective. Contact manufacturer for repair.

6.1.3 Active call is dropped

- a. Low signal strength. Check for any obstructions to the antenna.
- b. Executive override is enabled. See section 3.4 for changing or disabling this feature.

6.1.4 Not able to make outgoing call

- a. Trunks are not enabled. See section 3.4 for enabling Trunks.
- b. Antenna is obstructed. Clear all obstructions to the antenna.
- c. Not using the proper dialing plan.
- d. Bad antenna wiring.
- e. 3 beeps are heard. Service is not available.
- f. SIM cards are not activated with service provider. Contact an IRIDIUM service provider to activate cards.

6.1.5 Not able to dial another extension

- a. Extension to extension dialing not enabled. See section 3.4 for enabling extension to extension dialing.

6.1.6 Not able to setup conference call

- a. Conference calling not enabled for that extension. See section 3.4 for enabling conference calling.
- b. Wrong key sequence is being used. See section 2.5.3 for setting up a conference call.

6.1.7 Incoming calls ring the wrong extension

- a. The ring extension option for the trunk is set to the wrong extension. See section 3.4 for changing this option.

6.1.8 Not able to transfer call

- a. Call transfer is not enabled for the extension. See section 3.4 for enabling call transfer.
- b. Wrong key sequence is being used. See section 2.5.2 for using this feature.

6.1.9 Can only make one outgoing call

- a. An ICS-100 transceiver is installed. Contact manufacturer for an upgrade to an ICS-200 dual transceiver model.
- b. Only one trunk is enabled. See section 3.4 for enabling trunks.
- c. Defective Transceiver. Contact manufacturer for repair.