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Setup and Operating Procedures
ICRI-9575™
Incident Commanders' Radio Interface™

A Rapidly Deployable, Radio Interoperability Solution for Public Safety Personnel



MANUFACTURED BY
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THEORY OF OPERATION

The “9575P” can provide a communications bridge, or link, between the Iridium Extreme® PTT (9575P) handset and a portable or mobile radio; can quickly establish the link as a tactical situation rapidly unfolds; and requires minimal resources to enable it initially, or to maintain its operation over many hours. The 9575P will provide full operational capabilities moments after arrival on-scene, and remain operational for 30+ hours powered by 8 “AA” batteries

The 9575P performs two primary functions:

- Distributes the audio received from one two-way radio, handset/headset or satellite handset to other devices connected to the 9575P.
- Utilizes this same incoming audio to “key” the radio or satellite handset connected to the ICRI. *The radios can be portables or mobiles.*

The ICRI-9575P circuitry does not attempt to modify or digitally process the incoming audio, so that unnecessary delays are not inserted into the audio transfer or “keying” processes. Radios, satellite handsets, and/or recording devices connected to the ICRI are provided with the incoming audio, essentially in real-time. An audio “buffer” preserves the first syllables of incoming audio processed through “trunking” radios or satellite systems.

This version of the ICRI contains two circuits that key the radios connected to the ICRI; these circuits are commonly referred to as “VOX” or “voice-activated switches.” Only the VOX directly connected to the incoming audio is used to key the radio or satellite handset (all others are temporarily disabled, to prevent a second “voice” from causing a disruption of communication). The ICRI uses these circuits to perform other controlling functions as well.

PRE-OPERATIONAL ACTIVITIES

Some pre-planning is necessary to ready the ICRI for rapid deployment. The following should be accounted for before placing the ICRI on-line:

1. Determine what the power source will be for the ICRI. Verify that one of the external power source options is available.
2. Determine what brand and model of radio will be connected to the ICRI and that an “interface” cable for each radio is available. Verify that an Iridium docking station and interface cable are available.
3. If radios are not maintained with the ICRI, advise participating agencies that they will need to supply a “spare” radio, for the radio interoperability.
4. Verify that the radios and satellite handset are known to operate properly and have at least one fully charged battery or other reliable power source.

The “9575P” can be powered by external DC source up to 18 VDC.

Among the power sources that can be used to power the ICRI are:

- 12 volt vehicle battery
- Vehicle cigarette lighter
- 115-220 VAC (with an external adapter)
- BA590 “military”
- Commercial dry-cell or other battery (7.2V or greater)
- C-AT 12 volt battery pack (uses 8 “AA” batteries)

The ICRI’s internal regulated power supply is reverse polarity protected, but it is important to check polarity of DC supplies before connecting them to the ICRI.

INTEROPERABILITY DO'S AND DON'TS

These “universal” rules will help to ensure that the part of communications interoperability will work properly.

1. Maintain COMSEC when forming interoperability bridges. Only connect Red to Red and Black to Black.
2. Verify that only one interoperability bridge in the area is using the radio frequencies that you will be using.
3. Audio and RF cables should be separated from AC power cables by 12” (use an external DC source or batteries when you cannot maintain the separation).
4. When plugging in two or more radios within the same radio band (i.e. VHF) into a radio bridge, like the ICRI, provide as much vertical separation as possible to reduce the chance for interference due to the transmitted signal from one radio reducing the receive sensitivity of the other “in band” radios. Consider using external mobile antennas connected to the radios if necessary. Use only bridge interconnect cables that are well shielded.
5. Some bridge cables contain in-line, audio amplifiers for radios designed with low audio levels. It is best to route those cables away from radio antennas and connectors---high RF fields can distort the audio amplifier’s output to the bridge.
6. Don’t use “SCAN” mode for any radios connected to a radio bridge. This is particularly important when you are using the bridge as a tactical repeater, where two or more radios have similar channel programming. If both radios are capable of hearing the same signal, they will key each other up "Ping-Pong," interfering with the function of the bridge.
7. When using a remote device to control an interoperability bridge, verify configuration of talk groups with on-scene commander. Do not change talk groups settings without confirmation from local personnel to avoid inadvertently removing necessary personnel from radio traffic.
8. Connecting two or more radios operating in the same band (VHF or UHF for example) to a gateway will result in the “desensing” of the radio receiving a signal from a hand-held, or mobile. Desensing may result in distorted audio from the receiving radio to the gateway, and/or reduction of the radio’s ability to received signals from distant radios (reduction in receiver sensitivity due to other radios transmitting very close to the receiving radio).

SET-UP AND USE INSTRUCTIONS

As a minimum, the following will be required for ICRI operation:

- ICRI-9575P assembly
- power supply with interconnect cable to ICRI
- Two radio interface cables (one for the Iridium docking station)
- One radio and one Iridium Extreme® PTT (9575P) handset
- Iridium docking station

Determine power method and connect to ICRI.

Tap the POWER switch to put it into the “ON” position; the green LED above the switch should be lit.

Check the radio’s and satellite handset’s transmit and receive functions, battery and channel or “talk group” selection.

Connect one interface cable to the ICRI and one radio

Connect the handset.

Set the volume controls for the radio and handset to a mid-position, midway between minimum and maximum

NOTE: A radio’s or satellite handset’s internal speaker will be disabled when the interconnect cable has been attached, so you must use the handset, or a second radio on the same channel to verify the communications link.

Active VOX will light when the radio is receiving.

Repeat with the satellite handset to be used.



FIGURE 1: ICRI/9575P FRONT AND REAR PANEL

CONTROLS AND INDICATORS

Front Panel



FIGURE 2: FRONT PANEL

IRIDIUM/RADIO INTERFACE JACKS A

The iridium/radio interface jacks on this unit are 5-pin mini-XLR type jacks. Make sure the interface cable is fully seated before use. The radio's internal speaker and hand mic functions are disabled. Use the ICRI handset to talk/listen if using the ICRI as a base station (a remote speaker jack is an ICRI option).

Pinout:

- 1- Ground
- 2- Audio from radio
- 3- Audio to radio
- 4- P-T-T
- 5- no connection

VOICE ACTIVATED CIRCUIT (VOX) LED INDICATOR: B

When lit (only one at a time) indicates the VOX, of the "inputting" radio, is active. If the VOX stays permanently lit, you may need to turn down the volume of the radios until the light is lit only during input.

HANDSET INTERFACE JACK C

This four pin mini-XLR type jack supports the handset (p/n 280.9575 only; other ICRI handset models are not compatible).

Pinout:

- 1- Ground
- 2- Audio from handset's microphone to the ICRI/radios
- 3- Audio to the handset's speaker from the ICRI/radios (+)
- 4- P-T-T

HANDSET VOLUME CONTROL D

This knob controls the volume to the handset only. Turn clockwise for more volume and counterclockwise for less volume.

To adjust the volume of the radios, use the corresponding radio's volume control.

POWER STATUS INDICATOR LIGHT: E

This green LED is illuminated when the ICRI-9575P is turned ON

POWER SWITCH: F

This Push ON/Push OFF switch is used to turn the ICRI "ON" and "OFF." There is no microprocessor "boot" time. If the unit is turned off, it will immediately resume the bridge link when turned back on.

Rear Panel

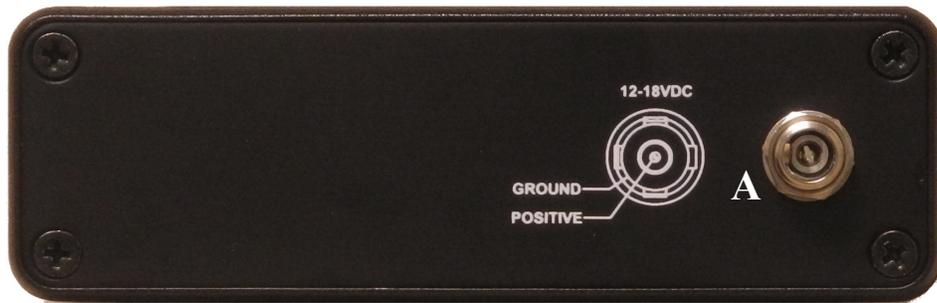


FIGURE 3: REAR PANEL

DC INPUT JACK:

This is a DC input jack. Use the C-AT supplied power supply or contact C-AT for additional power options. An eight “AA” battery pack is available for 30 hours of run time, as well as AC or DC power option.

Pinout:

Center pin - +12 to +18 VDC

Sleeve – Ground

Note: See appendix A for pinout.

ICRI POWER

Select the power source to be used

- C-AT 12 volt battery pack (uses batteries)
- 12 volt vehicle battery
- Vehicle cigarette lighter
- 115v AC (with an external adapter)
- BA590 “military”
- Commercial dry-cell or other battery (7.2V or greater)

Power the ICRI with the optional C-AT battery pack (8 “AA” cells)

The battery housing is comprised of two parts: the exterior case and an internal tray.
NO TOOLS ARE NEEDED TO REMOVE THE TRAY AND REPLACE THE BATTERIES.

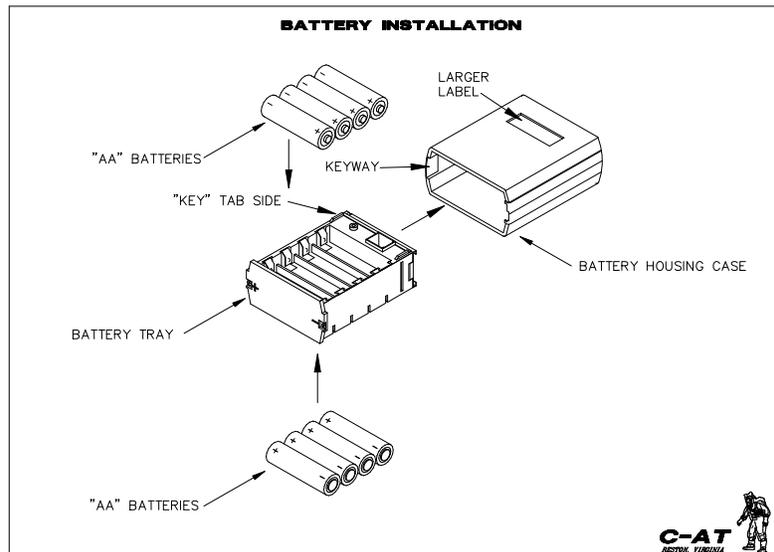


FIGURE 4: BATTERY INSTALLATION (DRAWING)

Hold the battery housing securely in the palm of the hand with metal battery terminal plate facing up. Push firmly on the center of the battery terminal plate, until the battery tray is released.

Remove old batteries and discard properly.

Replace the eight "AA" alkaline batteries, observing polarity markings within the tray.

Note: There is a “key” tab on the side of the tray and a “keyway” inside of case.

To reinsert the tray, make sure the tray’s key goes in the matching slot side of the case. Insert the tray into the housing from the bottom end of the case, pushing the tray until it “locks” into place

To reinstall the assembled battery pack onto the adapter, align the slots on the top of the battery pack with the slide rails on the adapter. Slide the battery pack onto the adaptor until it “locks” in place and the edges of the battery pack are aligned with the edges of the adaptor.

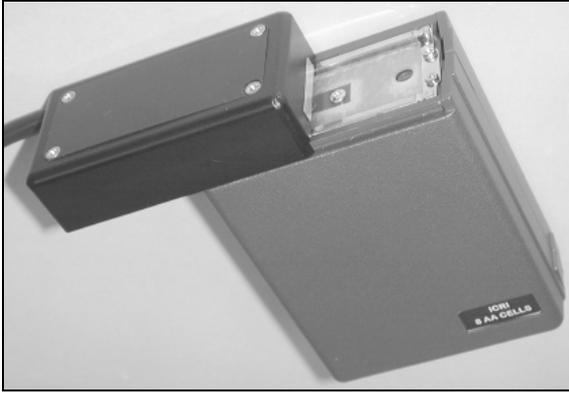


FIGURE 5: BATTERY CASE

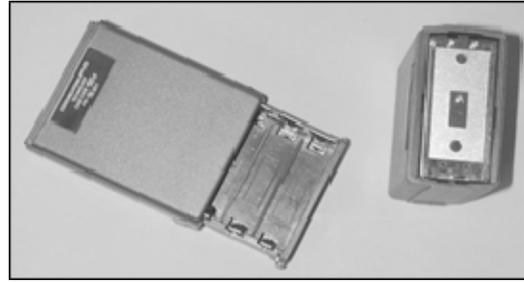


FIGURE 6: BATTERY CASE (INTERIOR)

Power the ICRI-9575P with cigarette lighter or alligator clips cable (P/N 179.0730)

After selecting the power source, connect the appropriate power cable to the DC source.
Connect the other end of the assembled cable to the DC input jack on the ICRI's rear panel.
To remove the plug, hold the plug's barrel and pull straight out.



Using an AC source to power the ICRI.

This power supply consists of two parts:

- (A) country specific plug
- (B) an AC to DC converter

Note: The AC supply must not be used where the cables or converter can become wet.

Insert the selected country specific plug into the AC to DC converter.

Connect the power supply's plug to the jack on the back of the ICRI.

Connect the other end of the power supply to the AC source (110-120V, 60Hz or 220V, 50Hz).

Turn on the ICRI and verify the green LED on the front of the unit is illuminated



FIGURE 7: AC POWER SUPPLY FOR ICRI-9575

NOTE: PLUGS ARE PROVIDED WITH THE AC POWER SUPPLY FOR COMPATIBILITY WITH SOCKETS FOUND IN BRAZIL, EUROPE, THE U.S. AND THE U.K.

PORTABLE RADIO INTERFACE

NOTE: Radio interconnect cables are generally specific to a radio brand and model, although some manufacturer's use the same connector for several radio models. Interconnect cables provided by C-AT have a seven-digit part number label on the cable. Contact C-AT for instructions for your specific mobile radios.

Connecting the portable radio

Connect the radio specific end of the ICRI interconnect cable onto the radio, as you would install a speaker/microphone.

If present, tighten connector's locking screws (optional); it is important that the connector be firmly seated against the electrical terminals on the body of the radio, so that good electrical contact is made.

Connect the other end of the interconnect cable to RADIO INTERFACE jack labeled "Radio"

Note: The interface is connected to the ICRI with a positive-lock connector. Verify that the plug is securely engaged in the jack on the ICRI by pulling on the plug. **NEVER pull on the cable.**



FIGURE 8: ICRI-9575P INTERFACE JACKS



FIGURE 9: RADIO WITH ICRI CABLE ATTACHED

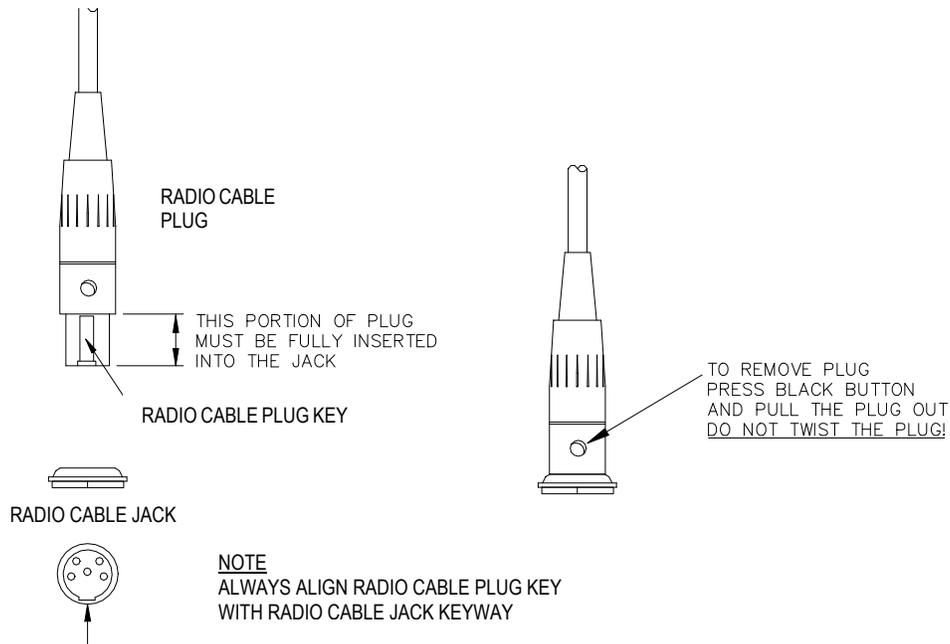


FIGURE 10: JACK ASSEMBLY (DRAWING)

To connect or disconnect the interface cable from the ICRI, use a push/pull motion versus a turning/rotating motion. Be sure that users are aware of this insertion/removal procedure or the connectors may be damaged.

Operating the radio/satellite handset after cable connection

After a radio/satellite handset is connected to the ICRI, its internal speaker and microphone are disabled. The user will be unable to hear any audio or speak from the connected radio/satellite handset.

To verify the connected device is transmitting and receiving properly, use the local handset (*See titled "The Local Handset"*)

SETTING THE RADIO TO BRIDGE THROUGH THE ICRI

Set the volume control on each connected radio/satellite handset to mid position, midway between minimum and maximum

Set each device to its desired channel.

Because the ICRI is connected to the radio/satellite handset via the speaker/headset jack, the audio path on the attached device is disrupted. You will be unable to hear or speak through that device. If you can hear or talk through the radio/satellite handset, the cable may not be properly attached to your radio/satellite handset.

The LED directly above the interface jack will light as audio is transmitted from the radio/satellite handset through the ICRI.

Troubleshooting radio setup

NOTE: See Interoperability DO's and DONT'S in this manual

1. Verify the radio/satellite handset can function normally with a speaker-mic attached.
2. Verify the radio/satellite handset has a charged battery.
3. Verify to the interconnect cable is firmly connected to the radio and the ICRI.

SETTING UP THE ICRI-9575 TO OPERATE WITH THE IRIDIUM 9575 PTT HANDSET

Components required for setup:

- 1) ICRI-9575 (P/N: 500.9575)
- 2) ICRI handset (P/N: 280.9575)
- 3) ICRI power supply (AC or DC)
- 4) radio specific interface cable (P/N: 179.xxxx)
- 5) ASE docking station interface cable (P/N: 179.9575) or BEAM docking station interface cable (P/N: 179.9576)
- 6) two Iridium 9575 PTT handsets, two radios (portable or mobile) and docking station
- 7) docking station power supply, external antenna and speaker/mic

Note: Item # 6 & 7 are not supplied by C-AT.

Note: Some of these steps can be skipped to decrease setup time, but should be performed at least once to familiarize the user with the operation of the equipment.

Setup:

- 1) Verify 2-way voice communications between the radios (audio should be clean, undistorted).

Note: Be sure the radios are on the same channel

- 2) Place the Iridium handsets into PTT mode (see Iridium manual), then verify 2-way communications between the handsets

Note: Be sure the Iridium handsets are in the same talk group

- 3) Connect one end of the C-AT supplied radio interface cable to a radio's speaker/mic jack and the other end to the ICRI jack labeled "radio."
- 4) Connect the C-AT supplied handset and power supply to the ICRI, then turn on the ICRI.

- 5) Verify 2-way communications between the ICRI handset and remote radio (the radio not connected to the ICRI).
- 6) Insert one of the Iridium handsets into the docking station, connect the external antenna, power supply and speaker mic to the docking station. Verify the docking station is turned on (Red LED indicates low, purple indicates fully charged), then reset the power on the Iridium handset. Once reset verify the handset is in PTT mode.*
- 7) Using the docking station's speaker/mic, verify communications between the two Iridium handsets.
- 8) Disconnect the docking station's speaker/mic, then connect the C-AT supplied docking station interface cable to the docking station and the ICRI jack labeled "Iridium." Verify communications between the ICRI handset and remote Iridium handset.
- 9) Then verify communications between the remote radio and the remote Iridium handset

*** Refer to Iridium handset and docking station manufacturer's instructions**



FIGURE 11: ICRI-9575, DOCKING STATION, IRIDIUM PTT HANDSET AND MOTOROLA XTS RADIO

THE LOCAL HANDSET

The handset provides the user with a local interface to the ICRI, without using a radio/satellite handset. It will allow an individual to hear and respond to all audio transmitted through the ICRI from the radio or satellite handset.

Using the handset

Connect the handset to the jack labeled “Handset.”

Make sure to properly align the key on the plug with the keyway in the jack, prior to inserting the connector into the jack.

Verify that the plug is securely engaged in the jack on the ICRI by pulling on the plug. ***NEVER pull on the cable.***

Adjusting the volume

The audio level to the handset speaker can be adjusted by the rotating the volume knob above the jack. Counterclockwise decreases the audio level, and clockwise increases the listening level.

Set the audio level to mid position.

The handset microphone is enabled when the push-to-talk bar in the center of the handset is depressed and held down.



FIGURE 12: LOCAL HANDSET CONNECTED TO ICRI

NOTES ABOUT OPERATING THE ICRI-9757 WITH THE ASE DOCKING STATION

- 1 The ASE docking station needs to be powered on to be used with the handset. It has an internal battery and an AC power supply cable. Red LED indicates docking station is powered but low battery, purple LED is powered and fully charged. The Docking Station and handset should be charged together. Charge for 4 to 5 hours for 15 hours of usage
- 2 Although not always necessary, it is always a good to power cycle the Iridium handset after connecting the dock
- 3 You should not hear audio in the speaker of the Iridium handset that is in the docking station. If you do hear audio, it is a symptom of the dock and phone not being synchronized. Power cycle the phone to solve.
- 4 The ASE docking station has a speaker/mic, so that communications can be verified between the two Iridium handsets before connected them to the ICRI. Verifying this link before connecting the docking station to the ICRI will simplify troubleshooting.
- 5 The ASE docking stations has an external antenna. The Iridium in the docking station needs this antenna. The two cables from the antenna are labeled. They need to be connected to the correct jack in order for the handset to get reception. The Iridium antenna cable has a white label, the corresponding SMA jack has a white washer. The Iridium SMA jack is on the right hand side when looking in. The ASE label is also on this side
- 6 To adjust the audio level output of the handset, connect the docking station's speaker /mic to the docking station. Depress the PTT on the speaker/mic and then adjust volume keys on the Iridium 9575 handset. Do not hold down the PTT while adjusting. Watch the handset display to see the changes in the audio level.
- 7 The Iridium handsets can be locked so that they can only be used in specific geographic areas. If a user takes a handset out of this area, it will not work.

APPENDIX A: CONNECTOR 9575P PIN-OUT DATA

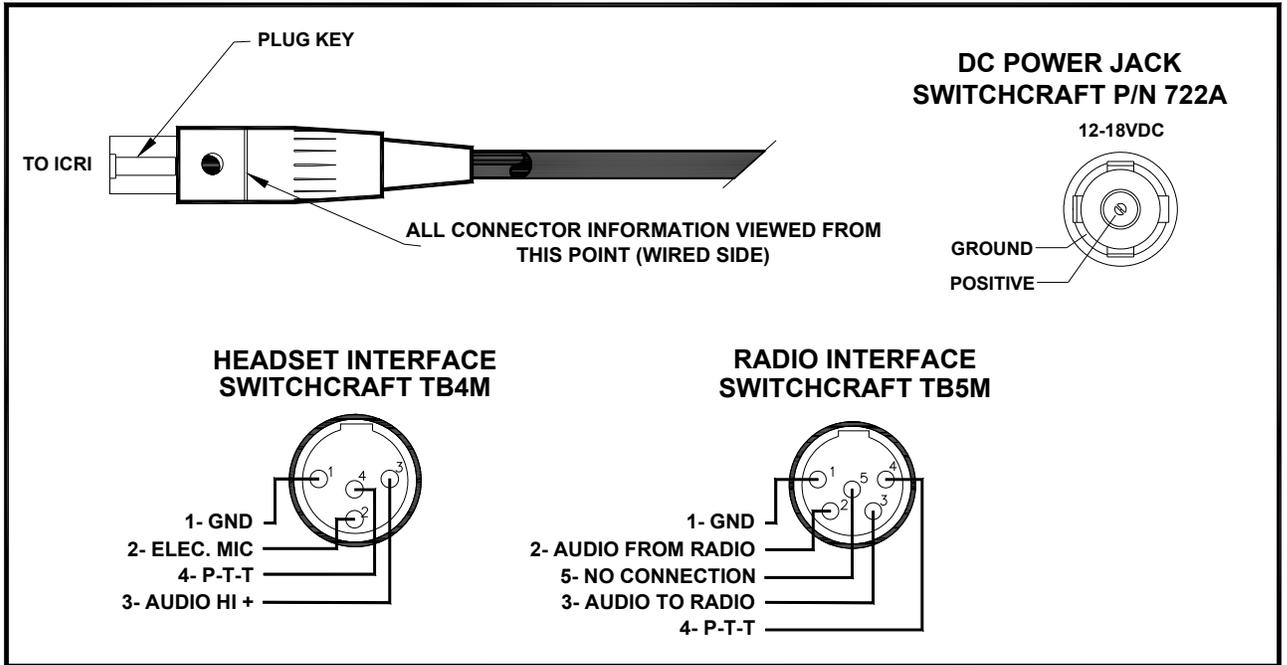


FIGURE 13: ICRI 9575P PIN OUT DATA

APPENDIX B: ICRI-9575 AUDIO BUFFER ADJUSTMENT

To access the board for adjustment to the audio buffer:

- 1) Remove the 4 screws on the back panel of the ICRI
- 2) Lower the back panel. Be sure to avoid breaking or disconnecting any harnesses attached to the panel.
- 3) Slide the top cover back far enough to access the audio buffer

Once the adjustments have been made, slide the cover back into place,

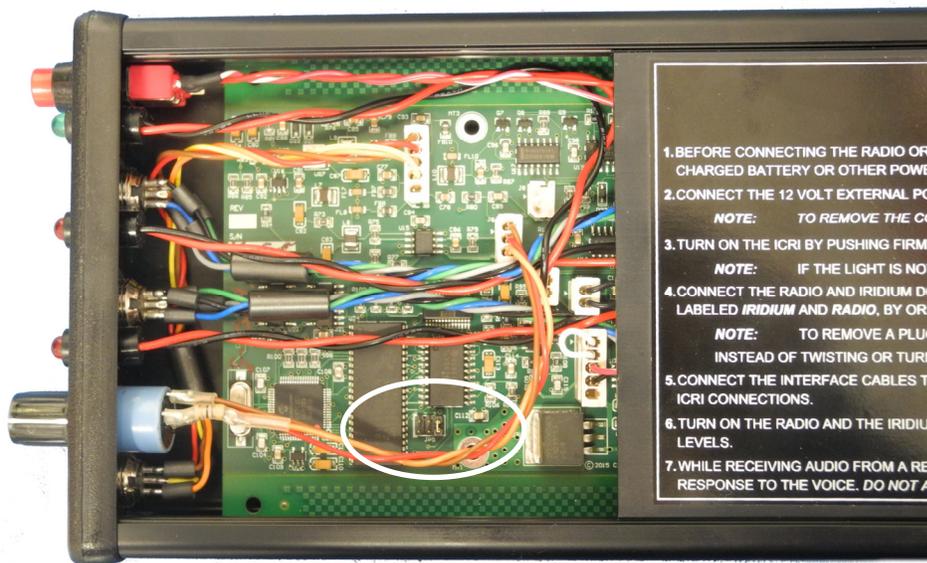


FIGURE 14: ICRI-9575 LOCATION OF AUDIO BUFFER SHOWN

FOR MICROCONTROLLER MARKED:
DELAY1 1SEC MAX

DELAY(mSEC)	JUMPER PINS
1022	1-2, 3-4, 5-6
800	1-2, 3-4
650	1-2, 5-6
550	1-2
450	3-4, 5-6
350	3-4
250	5-6
150	NONE

ICRI-9575P
SELECT JUMPERS
(DELAY AMOUNT)

Jumper pin orientation

2	4	6
1	3	5

APPENDIX C: SETUP INSTRUCTIONS PRINTED ON TOP COVER

- 1 BEFORE CONNECTING THE RADIO OR THE IRIDIUM 9575P/DOCKING STATION TO THE ICRI, VERIFY THAT EACH IS WORKING PROPERLY, AND HAS A FULLY CHARGED BATTERY OR OTHER POWER SOURCE. THEN TURN OFF THE RADIO AND THE IRIDIUM HANDSET.
- 2 CONNECT THE 12 VOLT EXTERNAL POWER SUPPLY (P/N 320.9575) TO THE JACK ON THE REAR PANEL OF THE ICRI.

NOTE: TO REMOVE THE CONNECTOR, PULL ON THE BODY OF THE CONNECTOR, INSTEAD OF PULLING ON THE CABLE.

- 3 TURN ON THE ICRI BY PUSHING FIRMLY ON THE RED BUTTON LABELED POWER. THE GREEN LIGHT BESIDE THE POWER SWITCH SHOULD BE LIT.

NOTE: IF THE LIGHT IS NOT LIT, VERIFY THAT THE POWER SOURCE IS PROPERLY CONNECTED.

- 4 CONNECT THE RADIO AND IRIDIUM DOCKING STATION INTERFACE CABLES TO THE ICRI. ALIGN EACH CIRCULAR PLUG WITH THE "KEYWAY" ON THE JACKS LABELED IRIDIUM AND RADIO, BY ORIENTATING THE BLACK BUTTONS ON THE PLUGS WITH THE SLOTS AT THE TOP OF THE JACKS.

NOTE: TO REMOVE A PLUG FROM A JACK, DEPRESS THE BLACK BUTTON TO UNLOCK THE PLUG, AND THEN PULL ON THE BODY OF THE PLUG, INSTEAD OF TWISTING OR TURNING THE PLUG.

- 5 CONNECT THE INTERFACE CABLES TO THE RADIO AND THE DOCKING STATION. VERIFY THAT THE CABLES ARE SECURE AT THE RADIO, DOCKING STATION, AND ICRI CONNECTIONS.
- 6 TURN ON THE RADIO AND THE IRIDIUM HANDSET. THEN ADJUST THEIR VOLUME CONTROLS TO A MID-POSITION, BETWEEN HIGHEST AND LOWEST VOLUME LEVELS.
- 7 WHILE RECEIVING AUDIO FROM A REMOTE RADIO, ADJUST THE VOLUME CONTROL, OF THE RADIO CONNECTED TO THE ICRI, SO THAT THE RED LED, FLASHES IN RESPONSE TO THE VOICE. DO NOT ADJUST SO HIGH THAT IT STAYS ON. REPEAT THIS STEP FOR THE IRIDIUM HANDSET.