

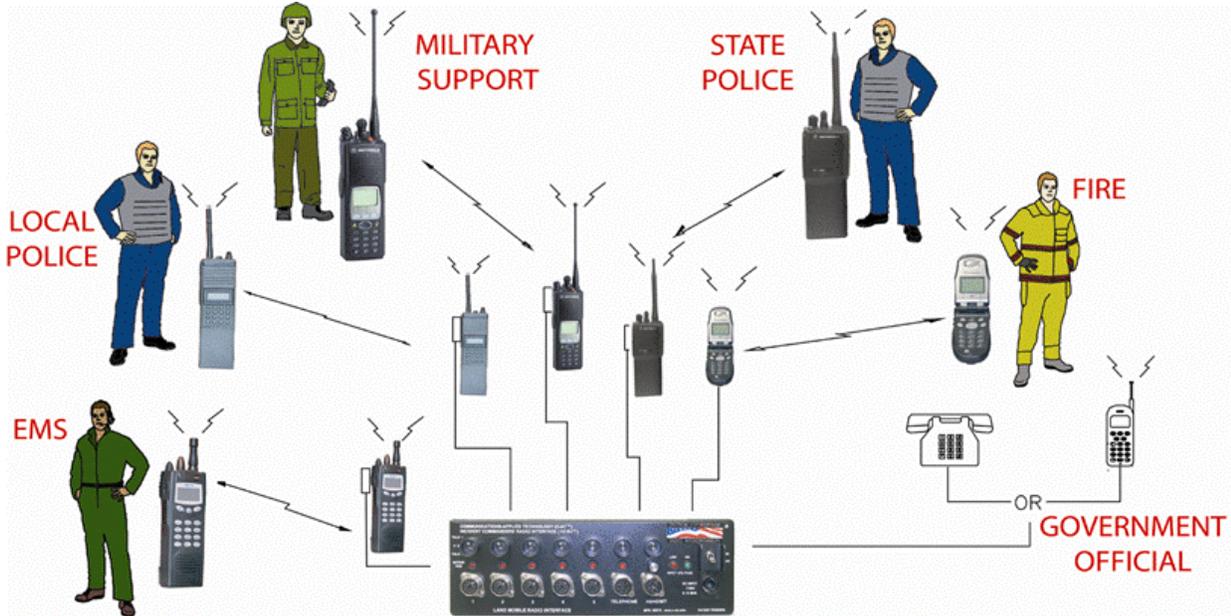
COMMUNICATIONS-APPLIED TECHNOLOGY

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



A Rapidly Deployable, Radio Interoperability Solution

MANUFACTURED BY
COMMUNICATIONS-APPLIED TECHNOLOGY CO., INC.
RESTON, VA.
CAGE CODE: 0EEY2
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Theory of Operation

In simplest terms, the ICRI performs several primary functions:

- Distributes audio received from one two-way radio to other radios, telephone or recording device connected to the ICRI.
- Utilizes this same incoming audio to “key” the other radios connected to the ICRI.
- Permits the connected radios to be placed into one of two “nets”/talk groups. Talk group selection is controlled by the switches about each ICRI radio jack.
- May emit in a specified interval a pre-recorded voice message identifying the unit/ICRI.
- May be remotely controlled for a “all call” messages and to disable the interoperation of the communications devices connected to the unit/ICRI
- May expand number of interconnected agency radios by a physical link between two units/ICRIs

The ICRI is designed to be quickly set-up, and operate for extended periods without additional power sources or specialized support equipment.

Two, three, four, five radios can be linked together through the ICRI. Within each “kit” are the interconnect cables to link radios and telephones. Talk group selection is controlled by the three-position switches above each radio “port”.

- Up to five portable radios, and required interconnect cables will be supplied with the “kit” (other portable and mobile radios can also be connected).
- A cable may be supplied to connect a Nextel ‘phone in “Direct Connect” mode can also be linked to the 2-way radio communications nets.
- A land-line telephone can be connected to the radios; no special cable is required.
- Unencrypted radios can be linked in one talk group, while encrypted can be linked in the second.
- Military radios, and satellite “phone” and voice-over-IP devices can be linked to the 2-way radios with cables that can be supplied.

The ICRI will operate for 24+ hours, with 8 “AA” alkaline batteries (somewhat less in cold weather). It can also be powered by an external battery pack, vehicle-supplied or other DC source, or AC.

A 250’ extension cable for radio interface may be supplied with this kit. The extension cable permits a radio to be placed at this distance from the ICRI. This may useful when connecting to a satellite antenna/radio or when a team enters a structure/tunnel. Multiple extension cable can be connected for even greater distances.

An ICRI contains up to six circuits that key the radios connected to the ICRI; these circuits are commonly referred to as “VOX” or “voice-activated switches.” The ICRI uses these circuits to perform other controlling functions as well. Only the VOX directly connected to the incoming audio is used to key each of the other radios simultaneously (all other are temporarily disabled, preventing a second “voice” from causing a disruption in initial voice being distributed).

There is no discrimination or evaluation of the incoming audio so that delays are not inserted into the audio transfer or “keying” processes. Radios, telephones and/or recording devices connected to the ICRI are provided with the incoming essentially in real-time (an initial delay at keying to preserve the first syllables of incoming audio as the transmitters [including wide area, repeater-based “trunked” radio systems] are keyed up).

INTEROPERABILITY DOs 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).

PRE-OPERATIONAL ACTIVITIES

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

1. Determine what the power source will be for the ICRI and verify that the cable or battery pack is available.
2. Predetermine what brand and model of radios will be connected to the ICRI and that an “interconnect” cable for each radio is available.
3. Agencies must be advised that they will need to supply a “spare” radio, for the radio interoperability, that the radio supplied must be known to operate properly and have at least one fully charged battery.

The ICRI can be powered by the battery pack (8 “AA” batteries) provided or another DC source up to 20 VDC. The LEDs on the ICRI provide information battery status, in particular, a reliable indication of a low voltage condition.

Note: If eight “AA” batteries are used, the ICRI will continue operate to nominally for at least 2 hours after the “OK” LED is extinguished and the “LOW” LED has lit and then extinguished (batteries will provide a reduced duty cycle due to low quality, poor storage conditions before use, and/or low temperature during use).

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

- 12 or 24 volt vehicle battery
- Vehicle cigarette lighter
- 115VAC (with an external adapter)
- Commercial dry-cell battery (12V or greater)
- C-AT 12 volt battery pack (uses 8 “AA” batteries)
- BA590 “military”

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

Note: The ICRI power input connector information appears on the bottom of the ICRI and in the Appendix.

“RAPID DEPLOYMENT” SETUP AND OPERATION OF THE ICRI

Setting up the ICRI for use with portable radios.

1. Place all Talk Group switches in the **TG** position.
2. After connecting a power source to the ICRI, turn on the ICRI so that power up and input voltage can be verified. The green LED, labeled “OK” should be lit.

If you need to use a DC source voltage between 6.5 and 7.4 volts, then neither the OK nor the LOW (voltage) LEDs will be lit, but the ICRI will be working.

3. Connect the handset to the ICRI jack labeled “HANDSET”.
4. Connect the radio interface cables to the ICRI jacks labeled “1” through “5”.

All five ICRI radio interface connections (1-5) are electrically identical, so it is not important which jacks are used for conventional, trunked, repeated, encrypted or mobile radios during ICRI operation.

5. Connect the radio interface cables to the radios.
6. Verify that the radios are on the channels assigned to the interoperability/bridging function.
7. Select the Talk Group assignment for each radio, and place the switch above the associated jack in the designated Talk Group position.

*The **TG** position of the switch places any item connected with the associated port into “NO CONNECTION” conduction without physically disconnecting the device from the ICRI.*

8. Turn on the radio connected to the jack labeled “1” and initially place the radio volume controls at a mid-position between fully counter-clockwise and fully clockwise.
9. Place the handset Talk Group selector switch in the same Talk Group as the radio connect to jack “1” so that you can transmit on that radio. You will also be able to monitor that radio.
10. As a radio connected to the ICRI receives voice for a remote radio user for the first time, adjust the radio’s volume control so that the associated LED, above the jack, flickers as words are spoken. The LED should not remain on continuously as the voice is received.
11. Repeat 9 and 10 for each radio connected to the ICRI
12. Connect the telephone, if it will be used.
13. Select the talk-group the telephone and/or handset will be associated with. Place the telephone in the “OFF HOOK” position.

Refer to Appendix C for detailed telephone interface application.

ICRI Front Panel



FIGURE 1: FRONT PANEL

TALK GROUP SWITCH: A

The talk group switches determine which communications devices will be connected/interoperate each other. Only the radios, telephone, or handset connected to a specific talk group will hear or be able to transmit audio to the other individuals connected to that talk group. The switch corresponds to the interface jacks below it. Radios/interfaces DO NOT need to be turned off or disconnected to switch talk groups.

UP: Talk Group 1

CENTER: Not connected to either talk group

DOWN: Talk Group 2

VOICE ACTIVATED CIRCUIT (VOX) LED INDICATOR: B

Each LED is associated with a voice communications port (radio, telephone). When the port receives audio from the radio or other connected device, the LED will light as the audio is received at the ICRI circuitry. The LED should light as each word is spoken. To adjust the level of the incoming audio, adjust the volume control of the device connected to the ICRI.

RADIO INTERFACE JACK (1 thru 5) C

The five radio interface jacks on this unit are a 5-pin, 180° locking jacks. All radio jacks are compatible with a military and commercial radios and Nextel™ Direct Connect™ phones (except Blackberry and i60/i90 models)

Pinout:

- 1- Ground
- 2- Audio from radio
- 3- Audio to radio
- 4- No Connection
- 5- P-T-T Enable (except Motorola Saber and Motorola P Series Radios)

HANDSET TELEPHONE INTERFACE JACK:

D

This interface jack can be used to connect the ICRI to a satellite telephone, land-line or cellular phone. The 8-pin locking-type jack supports the connection of the ICRI to a telephone through the acoustic coupler (PN 179.0650) or the 2.5mm jack on a cell phone (PN 179.0672)

Pinout:

- | | |
|--|--------------------------------------|
| 1- Audio TO telephone (acoustic coupler) | 5- Ground |
| 2- Audio FROM telephone (acoustic coupler) | 6- Required jumper |
| 3- Audio TO telephone (acoustic coupler) | 7- Audio TO telephone (2.5mm plug) |
| 4- Audio FROM telephone (acoustic coupler) | 8- Audio FROM telephone (2.5mm plug) |

VOLUME ADJUSTMENT

E

Volume knob only adjusts the volume output level at a handset or headset connected to the ICRI at "handset Interface" jack. *To adjust the volume of the radios, use the volume adjustment on the individual radios.*

HANDSET INTERFACE JACK

F

This 5 pin 240 degree connector supports the handset (p/n 280.0125) or C-AT headset.

Pinout:

- | | |
|-----------------|--------------|
| 1- Ground | 4- Audio Hi+ |
| 2- Electret Mic | 5- Audio Hi- |
| 3- PTT | |

RED OK/ LOW VOLTAGE LED:

G

This red LED indicates the input voltage is 7.5 to 8.5 volts. Once this light is illuminated the ICRI will have approximately 2 hours of run time.

Note: If neither is lit, the ICRI will operate on voltage as low as 6.5V Maximum input voltage is 20VDC.

GREEN OK/ LOW VOLTAGE LED:

H

This Green LED indicates the input voltage 8.6 or greater. If battery power option is used, the ICRI will have approximately 24 hours of run time at full duty cycle.

ON-OFF SWITCH – TWO POSITION (when ICRI not equipped with "Bridge ID"):

I

This switch is used to turn the ICRI "ON" and "OFF". There is no delay between "POWER ON" and radio link.

ON-OFF SWITCH - THREE POSITION (when ICRI is equipped with " Bridge ID"):

I

This switch serves three functions. It is used to turn the ICRI "ON" and "OFF" and turn to the BRIDGE ID ON and OFF. There is no delay between "POWER ON" and radio link.

Up: Unit and BRIDGE ID ON

Center: OFF

Down: Unit ON, BRIDGE ID OFF

POWER INPUT JACK:

J

Power jack is used to connect ICRI battery pack, alternative DC power source (vehicle) and AC power. The Power jack is an 8-pin locking jack. Align arrow at top of ICRI to properly insert the power jack. To remove, gently pull on the connector at the base.

Pinout:

- 1 - +7 to +20 VDC
- 2 - Ground
- 3 - thru 8- No connection

NOTE: This connector is not a twist lock. Attempting to twist the connector will result in the disassembly of the connector and not the removal of the connector from the jack.

INITIAL SETUP

The Pelican case will appear as in **FIGURE 2** with radio interface cables located in the front recess. Additional cutouts are provided for the storage of an extra battery pack, and for the positioning of radios during ICRI operations.

A storage compartment for cables and batteries is located at the rear of the pouch. (The internal strap prevents the ICRI from falling through the open zippered compartment.)

Abbreviated set-up instructions are printed onto the top cover of the ICRI assembly. Connector information for radio, telephone, and power interconnect cables is printed on the bottom of the ICRI assembly.



FIGURE 2: ICRI CASE (INSIDE) DRY ERASE COMMAND BOARD LOCATED BEHIND FOAM

ICRI™ Incident Commanders' Radio Interface™
Inter-Agency Communications Status Board • USE DRY ERASE MARKER ONLY!

ICRI Port	Radio 1	Radio 2	Radio 3	Radio 4	Radio 5	Phone
Talk Net	1 2 ƒ⊕	1 2 ƒ⊕				
Agency						
Agency Contact						
Radio Type						
Frequency /Channel						
Notes						



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Link Port Connected? YES NO
 Notes:

FIGURE 3: INTER-AGENCY COMMUNICATIONS STATUS BOARD "WHITE BOARD"

The Inter-Agency Communications Status board is located behind the foam on the top of the Pelican™ case.

This board is to be used only with dry erase markers to indicate which agencies are connected to the ICRI and each other during an incident. A dry erase marker and eraser are included in the ICRI kit.

POWERING THE ICRI

The following instructions provide three different methods of powering the ICRI.

- 8 “AA” batteries
- Alternate DC power source (vehicle)
- AC power

Using “AA” batteries to power the ICRI.

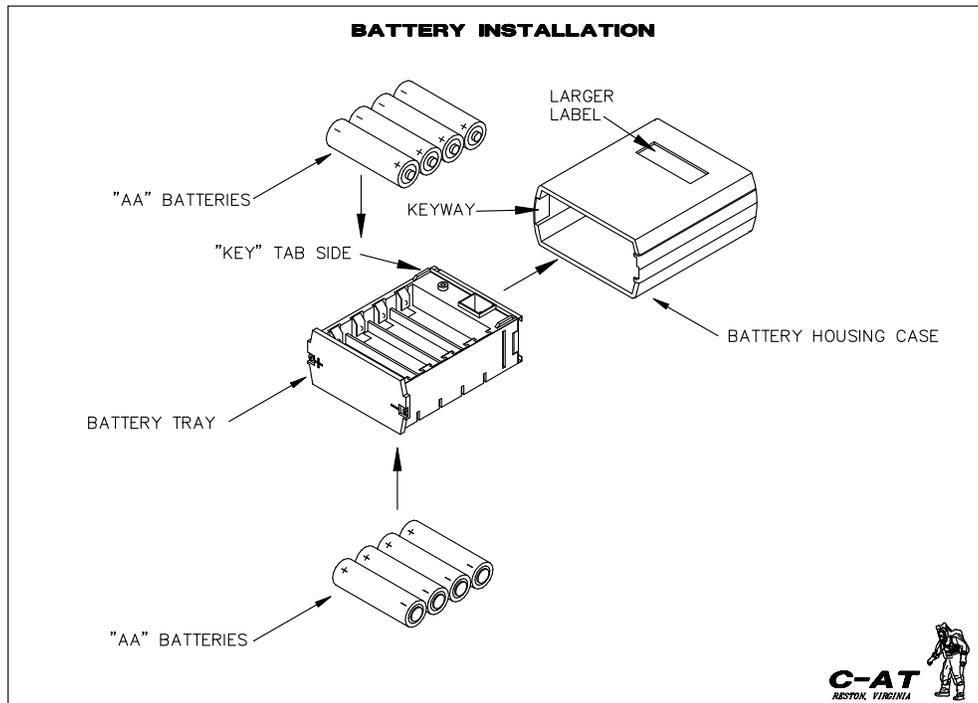


FIGURE 4: BATTERY INSTALLATION

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.

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 8 "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 ATTACHMENT TO ICRI



FIGURE 6: BATTERY CASE (INTERIOR)



FIGURE 7: OPTIONAL BATTERY CASE AND ADAPTER

Using an alternate DC source to power the ICRI.

When powering the ICRI with an alternate DC source or through a vehicle cigarette lighter jack, the cable assembly consists of three subassemblies:

- (A) the universal interconnect cable,
- (B) the cigarette lighter plug/ locking in-line jack and
- (C) the alligator clips/locking in-line jack.

After selecting the DC source connect the in-line jack to the in-line plug. Note that the pins are polarized and the connection is made so that the jack's locking "blades" slide between the "blades" on the plug and the body of the plug.

Connect the assembled cable to the external DC source.

Connect the adapter's plug to the jack labeled **DC INPUT**.

Note: *Align the plug's "key" with the jack's "keyway" before attempting to insert the plug.*

To remove the plug, hold the fluted part of the plug's barrel and pull straight out.

To separate the in-line socket, gently lift one of the blades from the plug so that the locking mechanism is released. Then pull the plug and socket apart.



FIGURE 8: DC POWER SUPPLY SUBASSEMBLIES

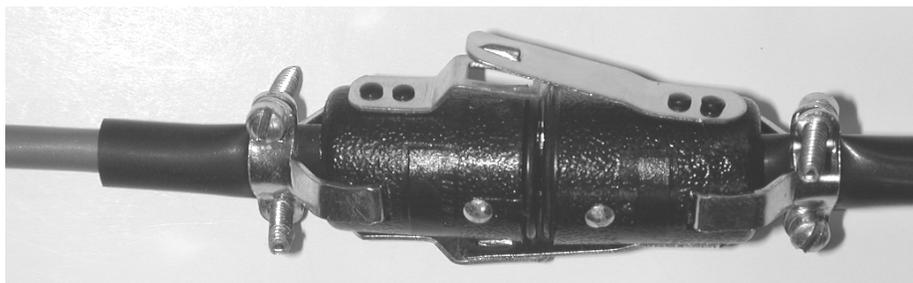


FIGURE 9: IN-LINE PLUG ASSEMBLY

Using an AC source to power the ICRI.

This power supply consists of two parts:

- (A) the three-prong AC power cable and
- (B) an AC to DC converter with an interconnect cable.

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

Connect the power cord to the converter and to the AC source (110-120V, 60Hz).

Connect the adapter's plug to the jack labeled DC INPUT.

Note: *Align the plug's "key" with the jack's "keyway" before attempting to insert the plug.*

To remove the plug, hold the fluted part of the plug's barrel and pull straight out.



FIGURE 10: ICRI WITH EXTERNAL POWER SUPPLY

ICRI LOCAL HANDSET

This handset can be used as a local incident command radio or a troubleshooting device. Up to 250' of cable maybe added to the cable length. The handset may also be replaced with a C-AT provided headset and connected in the same manner.

Setting up the handset

Plug the handset into the jack labeled "HANDSET". Make sure to properly align the pins of the connector before inserting into the jack.

After the plug is fully seated on the jack, the locking ring on the plug should be turned clockwise until the ring cannot be turned further.

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.

Select the talk group you will be listening/talking to and set three-position-switch above the handset. The handset microphone is enabled when the push-to-talk bar in the center of the handset is depressed and held down.

To remove the connector for cable storage, push inward on the locking ring and turn the ring counter clockwise to release the locking mechanism. Then pull the connector straight out of the jack. Hold the chrome barrel of the connector rather than the cable.



FIGURE 11: ICRI AND HANDSET

LAND MOBILE 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.

Connecting the interface cable to the LMR.

NOTE: Once the interface cable is connected to the radio, you will be unable to hear audio from that radio or use the mic.

Install the radio-end of the ICRI interconnect cable onto the radio, as you would install any radio accessory (i.e.: a shoulder speaker / microphone).

Tightening any locking screws is optional; but it is important that the connector be firmly seated against the radio so that good electrical contact is made.

Attach the other end of the cable to any of the LAND MOBILE RADIO INTERFACE jacks, labeled 1, 2, 3, 4 or 5.

NOTE: The plug on the cable and the jack are "keyed". Be sure to align the key before inserting the plug on to the connector or the connection may be damage



FIGURE 12: ICRI INTERFACE JACKS AND TALK GROUP SELECTOR SWITCHES



FIGURE 13: RADIO WITH ICRI INTERFACE CABLE

After the plug is fully seated on the jack, the locking ring on the plug should be turned clockwise until the ring cannot be turned further.

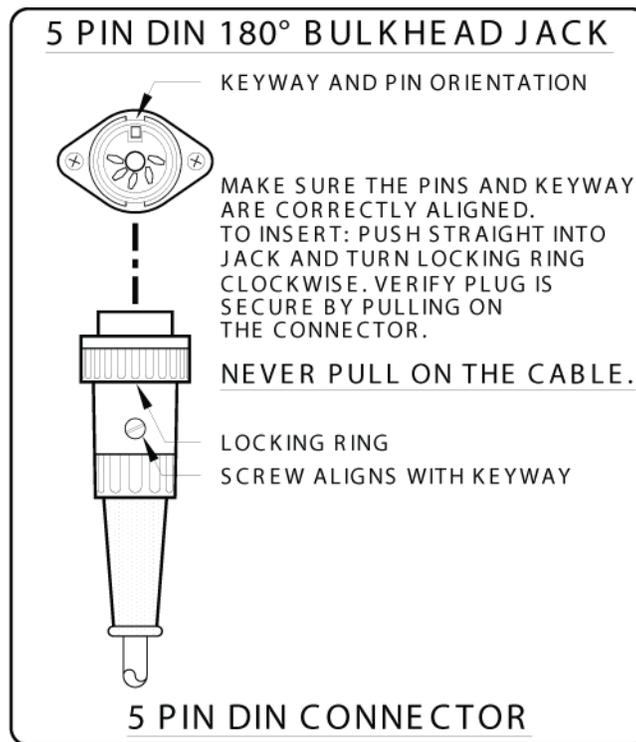


FIGURE 14: JACK ASSEMBLY

To remove the connector for cable storage, push inward on the locking ring and turn the ring counter clockwise to release the locking mechanism. Then pull the connector straight out of the jack. Hold the chrome barrel of the connector rather than the cable.

The Universal Radio Interface can provide a connection to the ICRI when a cable with the correct radio connector is not available.



A speaker-microphone assembly for the radio must be available for this effort to be successful, as the speaker-microphone's cable will be needed.

Generally, the only tool required is a multi-function Leatherman or Gerber carried by most 1st responders. If this is not available, then a small Phillips Head screwdriver and a small, sharp knife will be needed. ***Do not cut the speaker-mic off the cable until you know the function of each color wire in the cable, and have written the information down.***

The screws holding the “head” of the speaker-microphone should be removed. With is done the wires leading from the cable can be viewed. There should be four wires.

In most speaker-microphone assemblies, three wires will have colored insulation, and one wire without insulation. It is not critical if this is not what you observe.

One wire will be connected to the microphone. Note the color of the insulation and cut the wire as close to the microphone as possible. Be sure to note what the insulator color of this microphone wire is.

One or two wires will be connected to the speaker. Note the insulation color and cut this wire(s) as close to the speaker as possible.

One wire will be connected to the Push-to-Talk button/bar. Note the color of the wire's insulation and cut it close to the connection point.

Open the latches on the universal radio interface. Then insert the wires from the speaker-microphone cable into the holes beneath each latch, making sure that the latch label and the wire functions match.

As each wire is inserted in the associated hole, close the latch to secure the wire.

Connect the circular, 5-pin plug on the Universal Radio Interface cable into a radio jack on the ICRI. Be sure the connection is secure.

Connect the speaker-microphone cable's radio connector into the radio's speaker-microphone jack. Be sure the connection is secure.

The radio is now ready to participate in the ICRI interoperability network.

Solderless connections for radio interface cable leads →



Setting the radio to transmit through the ICRI.

Set the audio level on each connected radios to mid-position.

NOTE: Some adjustment of volume position may be necessary to clarify radio sound, after mid-position is established.

Set the radio to the desired channel.

Select the talk group you will be listening/talking to and set the rotary switch above the handset

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

The LED directly above the radio will light as audio is transmitted from the radio through the ICRI.

Troubleshooting radio setup.

NOTE: See Page 5, INTEROPERABILITY DOs AND DON'Ts.

Connect the local handset to the jack on the front of the ICRI labeled, HANDSET. The jack on the handset is similar to those provided for the radio cables. The handset connector contains more pins and is designed to be the only cable used in the HANDSET jack.

After connecting the handset, set the volume knob to mid position, set the talk group switches (located directly above the corresponding radio connection) to the same position as the other radios being used.

Depress the P-T-T bar on the inside of the handset to speak. The LEDs directly above the radio ports in use should light. If they remain solidly lit, turn down the volume. If the LEDs do not light:

Slowly increase the volume settings.

Check to make sure the cable is solidly connected to the radio and the ICRI.

Make certain the radio has a charged battery.

Check if the radio can function normally with a speaker mic attached.



FIGURE 15: HANDSET INTERFACE JACK

Using a Sprint™ phone in DirectConnect™ mode.

When connecting a Sprint™, connect the phone as you would an L-M-R. Install the radio-end of the ICRI interconnect cable onto the accessory jack at the bottom of the phone, as you would install any accessory (i.e.: a shoulder speaker / microphone).

NOTE: At this point, the speaker and mic of the Sprint phone have been disabled, you will be able to communicate through the handset if both are connected to the ICRI and on the same talk-net.

Attach the other end of the cable to any of the LAND MOBILE RADIO INTERFACE jacks. Set the Sprint into “DirectConnect” mode and program the desired Sprint “talk group” or DirectConnect number.

Program the phone to stay in DirectConnect™ mode (See Sprint™ manual for directions). Audio received from the other connected radios/accessories, will be retransmitted through the Sprint™ DirectConnect™ to the selected “talk group” and any DirectConnect’s will be retransmitted to the other connected radios/accessories.

NOTE: Some adjustment of volume position may be necessary to clarify radio sound, after mid-position is established



FIGURE 16: ICRI CABLE FOR SPRINT™



FIGURE 17: RADIO JACK CONNECTION FOR SPRINT™ DIRECT CONNECT™

ICRI PHONE “PATCH”

The ICRI is configured with a small modular jack (RJ22) installed on the side of the ICRI. This jack will provide the user the ability quickly, and without additional cables, to a standard telephone handset station, or a cell phone.

NOTE: Do not remove the telephone’s handset from its cradle

Phone Patch

This interface permits the ICRI and any of the communications devices connected to the ICRI to be “patched” to a telephone (cell, land-line, unsecure/secure) with a detach-able handset. The ICRI’s “RJ22” jack accepts the male end of an analog or digital handset coil cord.

Land-line phone “patch” setup

NOTE: Initially, do not remove the telephone’s handset from its cradle

During initial setup, place the Talk Group select switches for both the TELEPHONE and HANDSET in a Talk Group not being used by any radios.

Disconnect the coiled cable from the telephone’s handset; *do not disconnect the cable from the base of the telephone.*

Plug the cable directly into the jack on the side of the ICRI; the jack is labeled “TELEPHONE”

After the plug is fully seated on the jack, set telephone’s earphone audio to a mid-level setting following the telephone’s instructions---*this function is not available on all telephones.*

After the interconnect cable from the ICRI is connected to the telephone handset, remove the telephone’s handset from its cradle. A dial tone should be heard in the earpiece of the "local" handset.



FIGURE 18: RJ22 PORT ON RIGHT SIDE OF ICRI

Dial the telephone number of another telephone.

When the called party answers, use the ICRI handset and begin to converse with called party.

When the connections is deemed to be working properly, then place the TELEPHONE Talk Group switch in a group with the radios needing this radio-telephone “patch”.

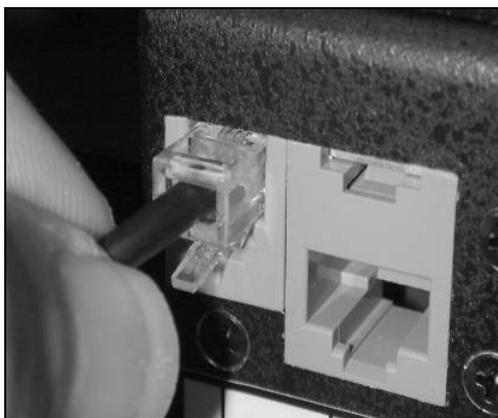


FIGURE 19: RJ22 AND RJ45 PORTS ON RIGHT SIDE OF ICRI

NOTE: *The RJ22 jack and the 8-pin telephone interface jack on the front of the unit will not function simultaneously. Use only one at a time.*

NOTE: *If a land-line, cellular telephone or satellite telephone will be linked through the ICRI to the 2-way radios, the “acoustic coupler” interconnect cable (part number 179.9940) can be used.*

Using a cellular telephone.

NOTE: *If a cellular telephone with a 3.5mm “headset” jack will be linked through the ICRI to the 2-way radios, an interconnect cable (C-AT cable 179.0717) with a 3.5mm plug can be used.*

To connect a cellular telephone to the ICRI

1. Plug the RJ22 connector on the cellular telephone interface cable into ICRI at jack labeled “Telephone Port”
2. Plug the small, single shaft 3.5mm connector to the cellular telephone’s headset jack.
3. After connecting the cellular telephone, set the volume on the cellular telephone to mid-level and set the talk group switch (located directly above the port labeled CELL PHONE/POTS HANDSET) to the desired talk group

Figure 20 depicts an example of a cellular telephone connected to the ICRI.

NOTE: *Some adjustment of the telephone speaker volume may be necessary to clarify telephone audio heard through the radios’ speaker.*



FIGURE 20: ICRI CONNECTED TO CELLULAR PHONE THROUGH RJ22

SETUP AND OPERATION OF MSAT G2 TO LMR INTERFACE

1. Verify the MSAT equipment is connected to a talk group and functioning properly.
2. Connect the MSAT interface cable to the MSAT receiver and handset using two regular CAT5 cables.
3. Connect the C-AT interface cable with DB-9 connector to the MSV G2 serial port.
4. Using the MSAT handset keypad, place the G2 in “cross-band” mode (see the MSV manual for further instructions).
5. Connect the DIN cable to any ICRI radio port.
6. To create a patch, turn the ICRI ON, if necessary, set the ICRI talk group to match other connected radios.

NOTE: The LED of the selected ICRI radio port should flash as each word is spoken by MSAT user. If the LED remains lit between spoken words, the volume control of the LMR connected to the C-AT interface should be lowered until the LED flashes with each spoken work. If LED does not flash with each spoken word, the volume control of the radio connected to the C-AT interface should be raised until the LED flashes with each spoken word.



ICRI TO ICRI LINK

Connect the supplied “cross-over” RJ-45 cable, p/n 179.0692, between the two units. Cable drawing is located in Appendix C.

Operate the ICRI as normal. It is not necessary to power off or restart the ICRI after connecting/disconnecting the link cable.

All radios on a particular “Talk Group” (1 or 2) regardless of ICRI will be linked together when the link cable is connected.

The distance between ICRI cable can be extended by connecting a commercially availability CAT5 cable between one end of the “cross-over” cable and one of the two ICRI to be linked.



FIGURE 21: EXTERNAL RJ45 CONNECTION TALK GROUP 1 AND 2

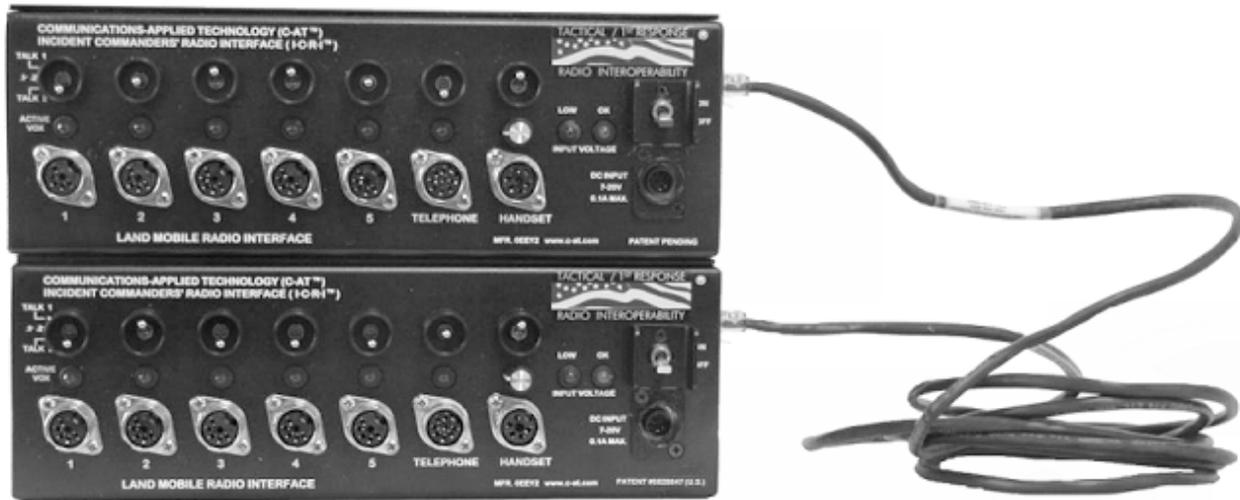


FIGURE 22: RJ45 “X” CABLE LINK

APPENDIX A: ICRI Options

Connecting External Speakers

Connecting the ICRI to external speakers via the optional speaker assembly and cables permits the user to continuously monitor all radio traffic crossing the ICRI. The two separate speaker jacks allow the user to monitor both talk groups simultaneously.

To utilize the speaker function, connect the supplied speaker cable to one of the speaker jacks and the input jack of your amplified speaker. Operate your speakers as normal, using their external power source and on/off function to control volume level and output. The ICRI will function as normal and does not require any modifications.

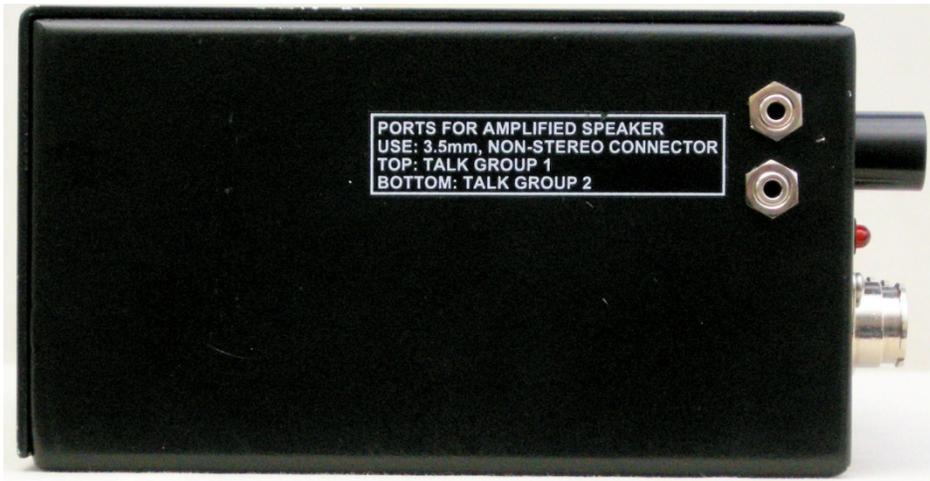


FIGURE 23: ICRI SPEAKER JACKS



FIGURE 24: ICRI SPEAKER CABLE CONNECTED TO SPEAKER JACKS

250' and 500' Radio Extension Interface (Cable Reel) P/N: 179.6213 and 179.6210

Positioning one or more of the radios, to be connected to the ICRI at a distance greater than the length of the interface cable may be desirable for one of several operational reasons:

1. The personnel associated with a radio will be located inside a building for which there is poor RF coverage from the ICRI's location.
2. The personnel associated with a radio will be located inside a tunnel or other below grade area for which there is poor RF coverage from the ICRI's location.
3. Radios operating in very close proximity to one another, negatively affect the performance of other another, such as receiver desensing.

The personnel—equipped with compatible radios—in the same general location of the reel-mounted radio, will be able to communicate with those operating radios or the handset also connected to the ICRI.

The extension cable is inserted between the ICRI and the radio interconnects cable that is usually connected directly to one of the radio ports on the ICRI front panel.

NOTE: Multiple reels of cable can be linked together for requirement of greater distance than 250 feet. There will be no degradation of the communications link for up to 5000 feet of cable, BUT it is important to note that if the cable is run near a source of high electrical energy, “noise” from such a device can be expected to be induced into the cable and reduce---possibly significantly---the quality of the communications.

It is strongly recommended that the radio link be tested before the personnel enter the area of poor RF propagation, so that any defects with the cable or the connections will be noted before a safety issue arises--due to a lack of radio communications



FIGURE 25: 500' EXTENSION CABLE



FIGURE 26: “GANGED” EXTENSION CABLES

Set-up of the cable-reel

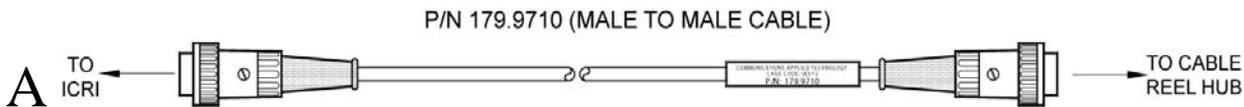
Equipment required: ICRI, cable-reel, radio interface cable for radio to be placed in the area of poor RF coverage.

1. Place the radio on the hub/support and secure it in-place with the Velcro™ strap.
2. Connect the cable end that exits from the side of the reel to the radio interface cable. Be sure to align the keyway and secure the connectors together with the locking ring on the male connector.
3. Connect the other end of the cable to a radio port on the ICRI. Be sure to align the keyway and secure the connectors together with the locking ring on the male connector.
4. Before entering the confined space, verify that the radio link between the entry team and the radio connected directly to the ICRI is operating properly.
5. If needed, connect additional cable reels between the ICRI and the first reel (up to a total distance of 5000' feet).

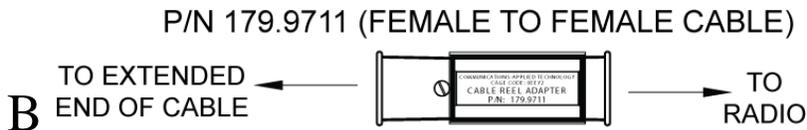
NOTE: *If the cable will be used to place a radio in a stairwell, or on a building roof, hill or tree top to enhance the operating range of the radio, then it may be preferable to have the cable reel located beside the ICRI and the radio connected to the unspooled end of the cable. In this case reversal cables are needed.*

Set-up of the cable-reel with reversal cables:

Attach one end of cable “A” to the male connector located near the center hub on the reel. Attach the other end of cable “A” to an ICRI radio port.



Attach one end of adapter “B” to the female connector at the “free” end of the cable. Attach the other end of adapter “B” to a radio interface cable.

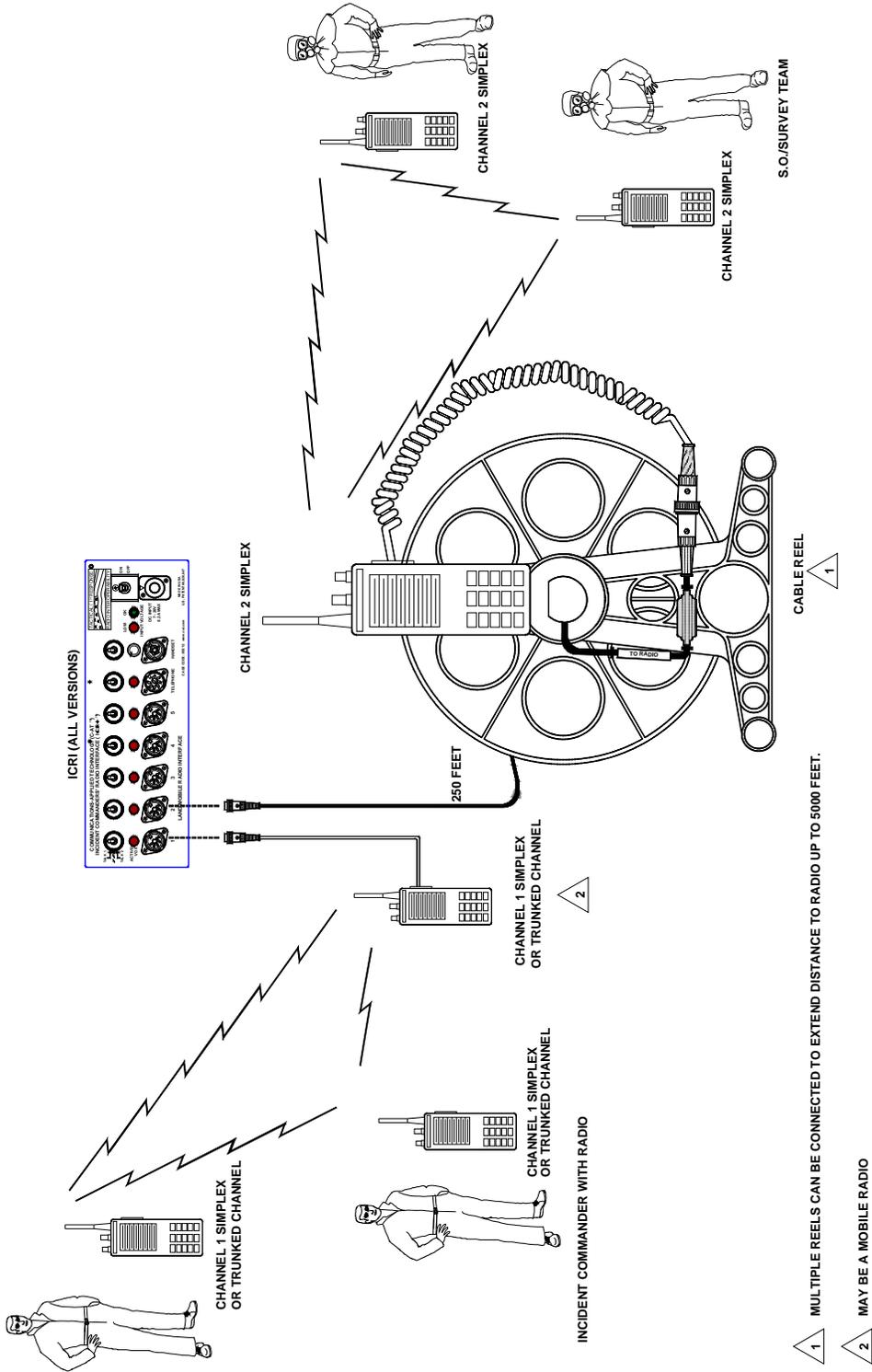


With this configuration, the cable reel will remain with the ICRI unit and the radio would travel to the incident site or remote location for better operating range of the radio.

FIGURE 27: EXTENSION CABLE

ICRI with Attachments

(NOT TO SCALE)

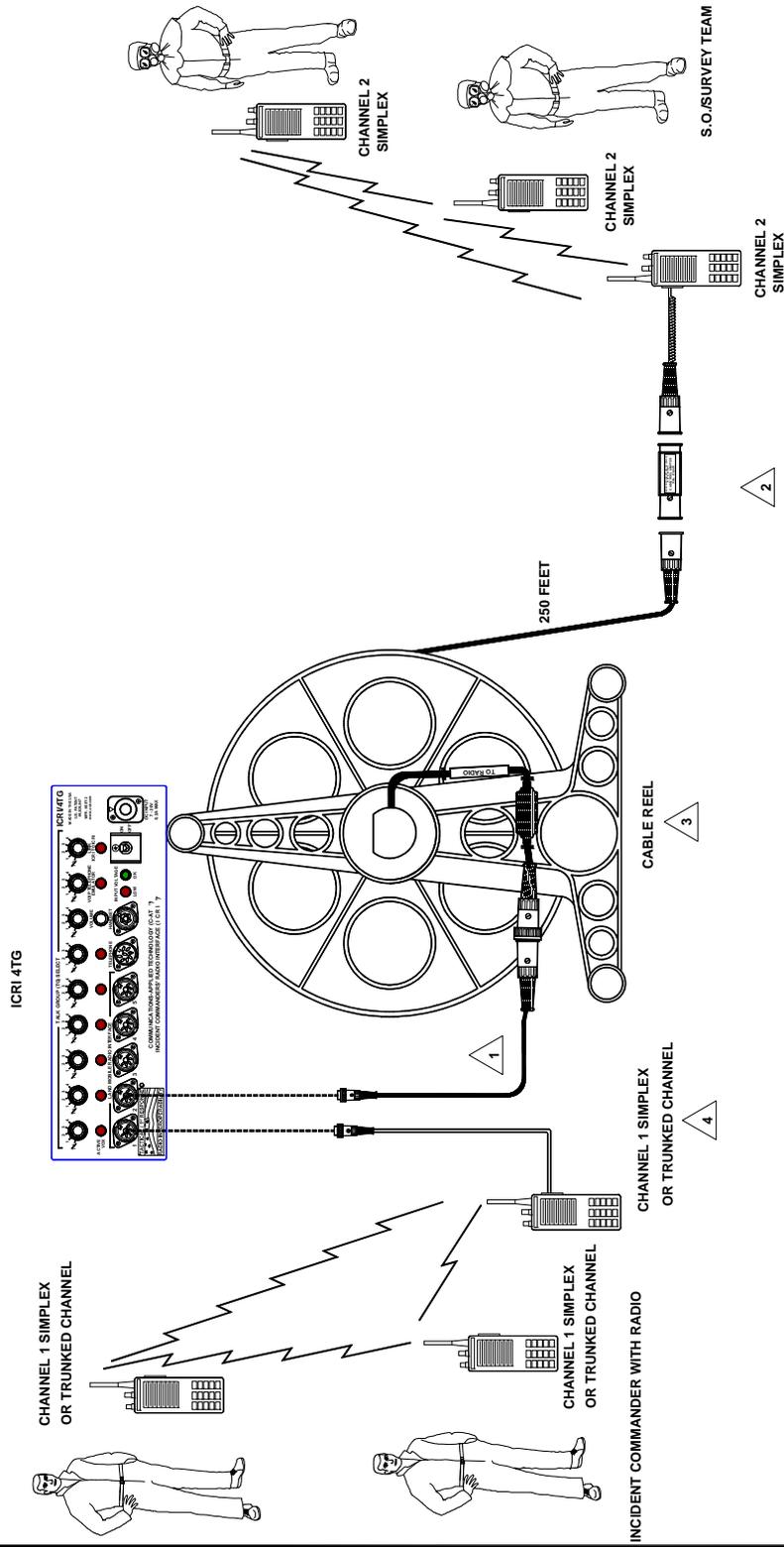


COMMUNICATIONS - APPLIED TECHNOLOGY

001-0692 SPECIAL OPS RADIOS AT REEL CONFIGURATION

ICRI with Attachments

(NOT TO SCALE)



- 1 P/N 179.9710 REVERSAL ADAPTER "A"
- 2 P/N 179.9711 REVERSAL ADAPTER "B"
- 3 MULTIPLE REELS CAN BE CONNECTED TO EXTEND DISTANCE TO RADIO UP TO 5000 FEET. (ONLY 1 SET OF REVERSAL ADAPTORS REQUIRED)
- 4 MAY BE A MOBILE RADIO

COMMUNICATIONS - APPLIED TECHNOLOGY

001-0692-2 SPECIAL OPS REEL AT ICRI CONFIGURATION

APPENDIX B: Connector Pin-out Data

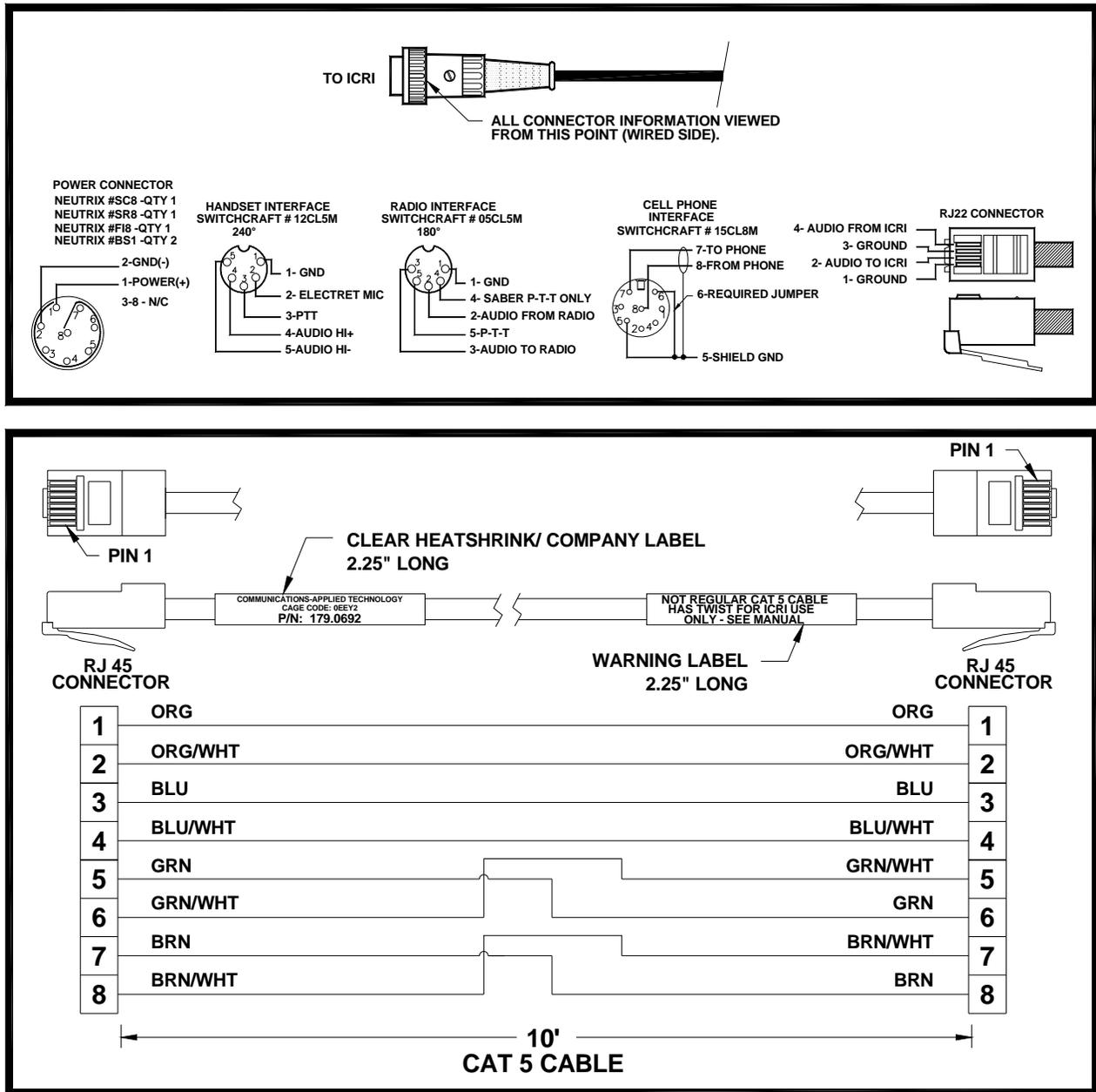


FIGURE 28: ICRI PIN OUT DATA

APPENDIX C: ICRI APPLICATIONS

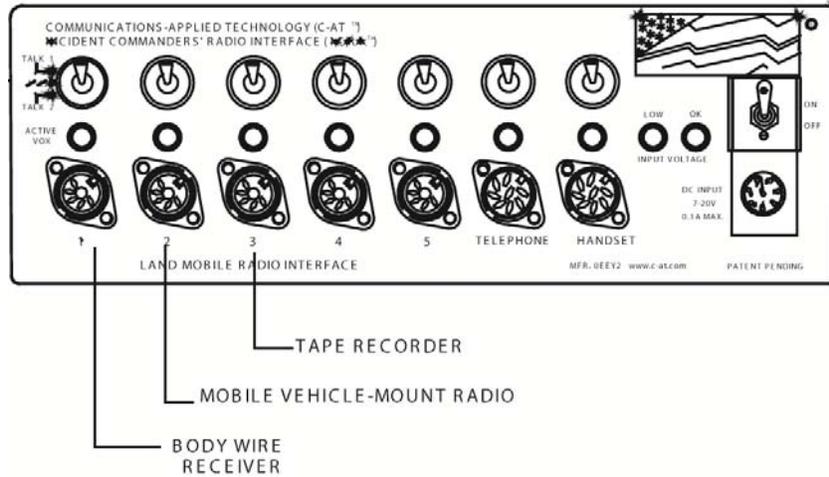


FIGURE 29: REPEATING BODY WIRE SIGNAL

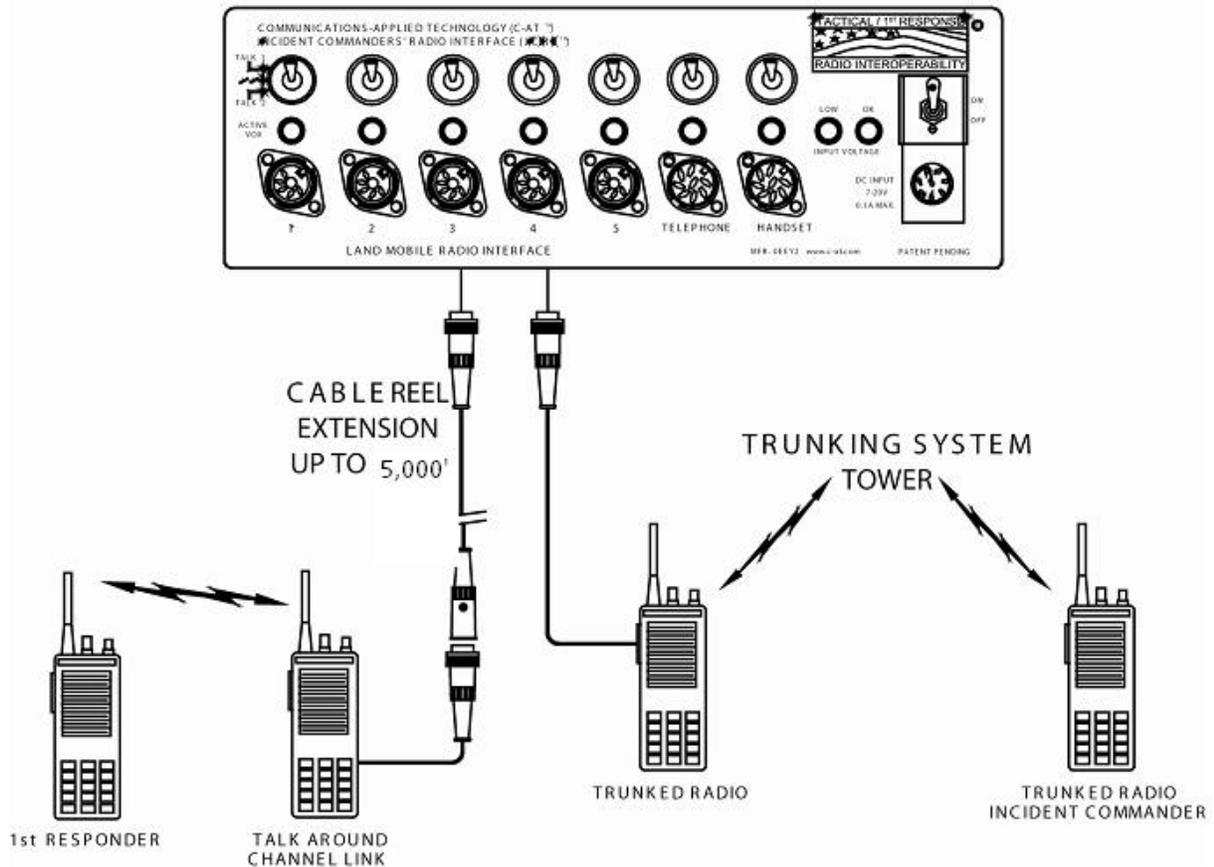


FIGURE 30: BELOW GRADE OR IN-BUILDING LINK TO TRUNKED REPEATER

ICRI with Attachments (Not To Scale)

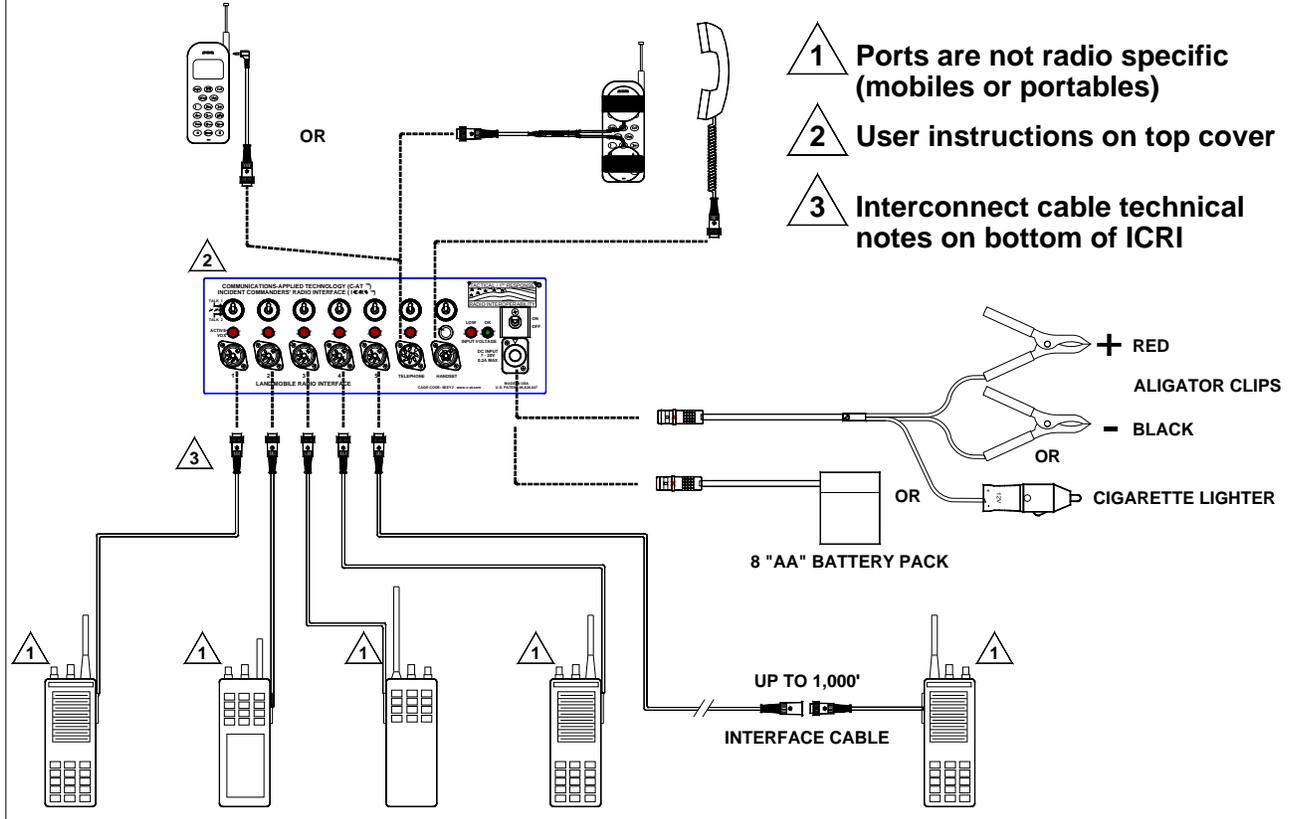


FIGURE 31: ICRI WITH ATTACHMENTS (NOT TO SCALE)

APPENDIX D: ICRI Chassis

SET-UP INSTRUCTIONS FOR THE ICRI™

(SEE MANUAL FOR GREATER DETAILS)

1. SELECT THE POWER SOURCE TO BE USED: 12 V "AA" ALKALINE BATTERY PACK, 115V AC, OR VEHICLE SUPPLIED DC.

2. CONNECT THE EXTERNAL POWER SUPPLY TO THE ICRI USING EITHER THE "AA" ALKALINE BATTERY PACK, THE 115V AC CONVERTER, OR THE CIGARETTE LIGHTER ADAPTOR. THE CONNECTOR IS "KEYED"; DO NOT ATTEMPT TO FORCE THE CONNECTOR INTO THE JACK ON THE ICRI.

NOTE: TO REMOVE THE CONNECTOR, PULL ON THE BACK OF THE CONNECTOR BODY INSTEAD OF TWISTING OR TURNING THE CONNECTOR.

3. TURN ON THE ICRI. THE RED OR GREEN LIGHT BELOW THE POWER SWITCH SHOULD BE LIT.

NOTE: IF NEITHER LIGHT IS LIT, VERIFY THAT THE POWER SOURCE IS PROPERLY CONNECTED AT BOTH ENDS. THE RED LIGHT INDICATES THAT THE SOURCE VOLTAGE IS ENOUGH TO OPERATE THE ICRI, BUT IF THE SOURCE IS "AA" BATTERIES THEN THEY SHOULD BE CHANGED TO FRESH ONES AT THE EARLIEST OPPORTUNITY.

4. CONNECT THE RADIO, TELEPHONE INTERFACE CABLES TO THE ICRI; CONNECT THE HANDSET TO THE ICRI. WHEN THE CONNECTORS ARE SEATED ON THE JACKS, TURN THE "RING" CLOCKWISE TO LOCK THE CONNECTOR IN-PLACE.

NOTE: TO REMOVE THE CONNECTOR, TURN THE "RING" COUNTER-CLOCKWISE TO UNLOCK THE CONNECTOR, AND THEN PULL ON THE CONNECTOR BODY INSTEAD OF TWISTING OR TURNING THE CONNECTOR.

5. BEFORE CONNECTING A RADIO, LANDLINE TELEPHONE OR CELLULAR TELEPHONE TO THE ICRI VERIFY THAT IT IS WORKING NORMALLY AND HAS A FULLY CHARGED BATTERY. THEN TURN OFF THE RADIO OR TELEPHONE.

6. CONNECT THE RADIO INTERFACE CABLE(S) TO THE RADIO(S).

6a. FOR ICRI'S EQUIPPED WITH TALK GROUP SELECTION:
SELECT TALK GROUP ASSIGNMENT FOR EACH CONNECTED DEVICE UTILIZING THE 3-POSITION SWITCHES THAT ARE LOCATED ABOVE EACH PORT.

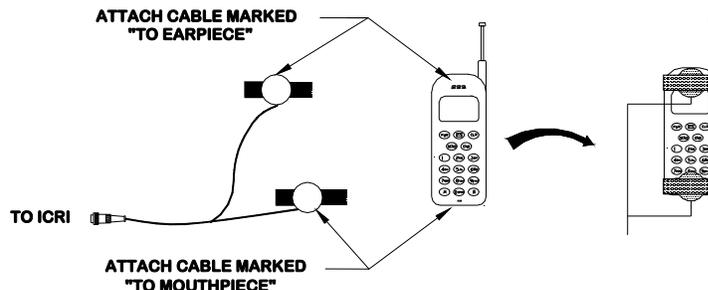
7. TURN ON THE RADIO(S) AND PLACE THE RADIO VOLUME CONTROL(S) IN A MID POSITION OF THE KNOB'S ROTATION.

NOTE: THE RADIOS DO NOT HAVE TO BE SEPARATED BY ANY PARTICULAR DISTANCE, BUT THEY SHOULD NOT BE SET ON TOP OF ONE ANOTHER.

FINE TUNING:

8. WHILE RECEIVING A SIGNAL, ADJUST THE RADIO VOLUME CONTROL SO THAT THE CHANNEL "LED" FLASHES IN RESPONSE TO THE VOICE. DO NOT ADJUST SO HIGH THAT IT STAYS ON CONTINUOUSLY, OR SO LOW THAT IT MISSES SYLLABLES.

9. IF THE TELEPHONE INTERFACE IS USED, THE ATTACHMENT OF THE ACOUSTIC COUPLER SHOULD BE MADE ACCORDING TO THE FOLLOWING DIAGRAM:



NOTE: CONNECTOR PIN-OUT INFORMATION IS LOCATED ON THE BOTTOM OF THE CHASSIS OF THE ICRI.

FIGURE 32: TOP COVER OF THE ICRI

ICRI GEN 3 DELAY
SELECT JUMPERS
(DELAY AMOUNT)

1	2
3	4
5	6
7	8
9	10
11	12

JP17

NOTES FOR ICRI GEN 3 CONFIGURATION DRAWING:

INPUT BLOCKING TIME JUMPERS: With jumpers "on", the ICRI will respond to a new voice signal approximately 0.8 seconds after the last transmission has ended. This is the standard configuration. With the jumper removed, this time is extended to approximately 2 seconds. During this time, no new PTT can be initiated by any input except the handset. (JP19 to JP23-See sheet 1 of 2)

TIME OUT TIMER DEFEAT: With this jumper "off", the telephone or radio input channel will be temporarily disabled after a timed period of continuous activity. The timing range is approximately 30 seconds to 2 minutes, as set by time out timer adjust controls. If the input signal is removed for approximately 5 seconds, the time out timer resets and operation returns to normal. Installation of defeat jumper turns off the time out timer and the channel will never be disabled.

HANDSET CIRCUIT POWER CONTROL: If the handset circuit will not be used, JP5 can be removed to turn off power to the circuit and extend battery life.

AUDIO BUFFER DELAY CIRCUIT POWER CONTROL: If the audio delay will not be used, JP16 can be removed to extend battery life. Note that the programming jumpers on JP18 must also be set to the bypass for the unit to work properly with the delay disabled.

CHANNEL	DELAY(msec)	JUMPER PINS
TALK GROUP 1 (DELAY 1)	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
TALK GROUP 2 (DELAY 2)	1022	7-8, 9-10, 11-12
	800	7-8, 9-10
	650	7-8, 11-12
	550	7-8
	450	9-10, 11-12
	350	9-10
	250	11-12
	150	NONE

ICRI GEN 3 AUDIO BUFFER DELAY
SELECT JUMPERS
(ACTIVATE/BYPASS)

4	8
3	7
2	6
1	5

JP18

CHANNEL	MODE	JUMPER PINS
TALK GROUP 1	DELAY	1-2, 5-6
	BYPASS	1-5
TALK GROUP 2	DELAY	3-4, 7-8
	BYPASS	3-7

APPENDIX F: FCC 15.21 Information to User:

Caution! Change or modification not expressly approved by the party Communications-Applied Technology could void the user's authority to operate the equipment.

15.105(b) Information to User:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.