Revision N

Setup and Operating Procedures

ICRI™

Incident Commanders' Radio Interface™

A Rapidly Deployable, Radio Interoperability Solution

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Theory of Operation

In simplest terms, the ICRI performs two 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.

This configuration of the ICRI is design to be quickly set-up, and operate for extended periods without additional power sources or specialized support equipment.

Within each are the interconnect cables to link radios and telephones. Commercial radios---both portable and mobile radios--- can be rapidly linked together to form radio communications "nets" of radios that could not otherwise communicate with one another. Military radios, and satellite "phone" and voice-over-IP devices can be linked to the 2-way radios to extend the command and control capabilities of the personnel on-scene and at remote locations.

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

Two, three, four, five radios can be linked together through the ICRI. Unencrypted radios can be link in one talk group while encrypted can be linked in the second talk group. Talk group selection is controlled by the switches about each radio "port".

Two ICRIs can be rapidly linked together without hand tool and/or adjustments. An interconnect cable may be part of this kit or is readily available.

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 .

The ICRI does not discriminate or evaluate 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).

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).

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:

1.0   Predetermine what the power source will be for the ICRI and verify that the cable or battery pack is available.

2.0   Predetermine what brand and model of radios will be connected to the ICRI and that an "interconnect" cable for each radio is available.

3.0   Advise agencies 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 internal batteries 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 that 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 possible 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)
- BA590 "military"
- Commercial dry-cell battery (12V or greater)
- C-AT 12 volt battery pack (uses 8 "AA" batteries)

The ICRI's internal regulated power supply is both reverse polarity protected, but it is important to check polarity of DC supplies before connecting them to the ICRI. *Note that the ICRI power input connector information appears on the bottom of the ICRI.*

1.0 Set-up and Use Instructions

1.1. Opening the case may require relieving the partial vacuum that forms when the case has been relocated from one altitude to another (more than 1000').   Turn the knob, show in **FIGURE 1,** counter-clockwise; be sure to close the purge valve after the pressure is released (turn clockwise) or the case will not be waterproof even with the lid latched.

FIGURE 1: ICRI CASE (OUTSIDE)

1.2. The Pelican case will appear as in **FIGURE 2** with radio interface cables located in the front recess.

FIGURE 2: ICRI CASE (INSIDE)

1.3. Additional cutouts are provided for the (a) storage of an extra battery pack, and (b) for the positioning of radios during ICRI operations.

1.4. 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.)

1.5. 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. Refer to **Appendices B and C.**

FIGURE 3: PLACEMENT INSIDE CASE

FIGURE 4: ICRI WITH OPTIONAL HANDSET

2.0 ICRI POWER

2.1. To power the ICRI with the optional battery pack (8 "AA" cells), use the following instructions. **FIGURE 5,FIGURE** 6**, FIGURE** 8**, FIGURE** 7 **and FIGURE** 9**.**
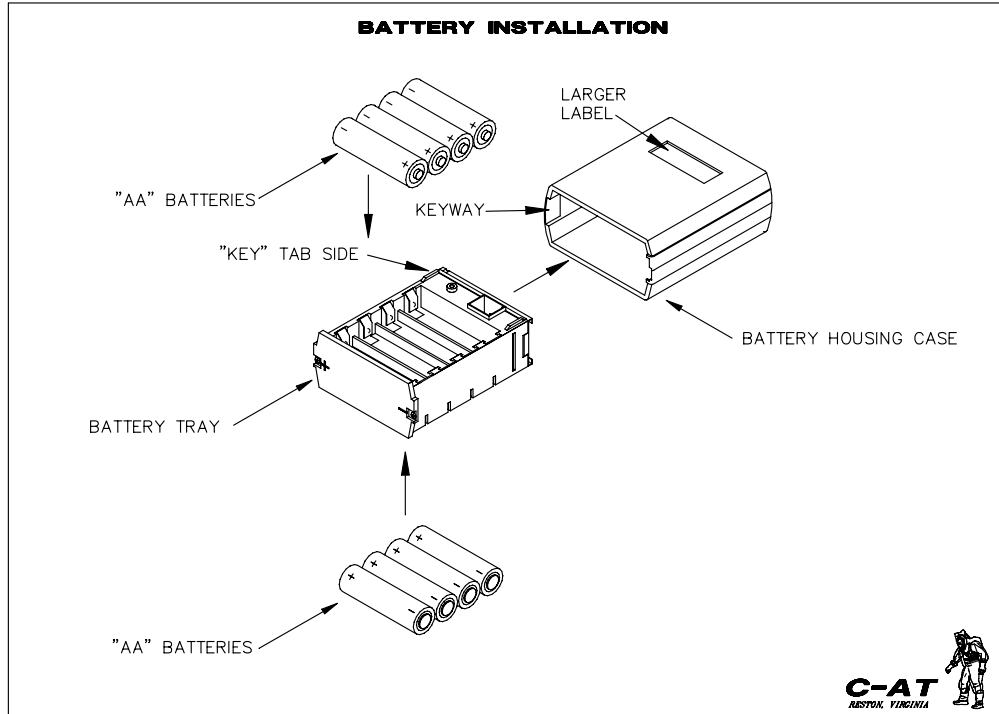
FIGURE 5: BATTERY INSTALLATION (DRAWING)

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 6: OPTIONAL BATTERY CASE AND ADAPTER

2.1.1. 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.

2.1.2. Remove old batteries and discard properly.

2.1.3. 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.

2.1.4. To reinsert the tray, make sure the tray's key goes in the matching slot side of the case, **FIGURE 6** Insert the tray into the housing from the bottom end of the case, pushing the tray until it "locks" into place. **FIGURE 8**.

2.1.5. 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 7: BATTERY ATTACHMENT TO ICRI (VIEW 1)

FIGURE 8: BATTERY CASE (INTERIOR)

FIGURE 9: BATTERY ATTACHMENT TO ICRI (VIEW 2)

2.2.   The ICRI maybe configured so that 8 "AA" batteries are installed inside the ICRI housing. The ICRI can also be powered by several forms of external power through a jack on the front panel of the ICRI.

FIGURE 10: ICRI WITH INTERNAL BATTERIES

2.2.1. The left side of the ICRI is configured with four internal battery housings. Each housing holds two "AA" alkaline batteries to power the ICRI. **Figure 10:** ICRI WITH INTERNAL BATTERIES.

2.2.2. Open the housing, using a quarter or similar "tool" to unscrew the cap and insert the batteries--batteries must be installed with the negative (-) terminal inserted in the housing first.

2.2.3. Be sure that each housing cap is "locked" into place BY TURNING…….

2.2.4. After installing the batteries, verify the batteries are installed correctly by turning on the ICRI---the GREEN LED should be lit.

Please contact C-AT for replacement caps if necessary

NOTE-1: C-AT RECOMMENDS THE USE OF NEW, ALKALINE BATTERIES, SUCH AS DURACELL OR EVEREADY. RECHARGEABLE BATTERIES AND THOSE OF UNKNOWN ORIGIN WILL NOT PROVIDE AS MANY HOURS OF CONTINUOUS USE.

NOTE-2: STORAGE OF BATTERIES IN THE ICRI FOR MORE THAN A WEEK IS STRONGLY DISCOURGED, SINCE A LEAKING BATTERY WILL TAKE THE ICRI OFF INE UNTIL IT CAN BE RETURNED TO C-AT FOR REPAIR..

NOTE-3: IT IS NOT NECESSARY TO REMOVE THE "AA" ALKALINE BATTERIES WHEN AN EXTERNAL POWER SOURCE IS USED. INTERNAL PROTECTION IS PROVIDED.

2.3.   Using an alternate DC source to power the ICRI.

2.3.1. 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. **FIGURE 11 and FIGURE 12.**

2.3.2. 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.

2.3.3. Connect the assembled cable to the external DC source.

2.3.4. 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.

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

2.3.6. 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.
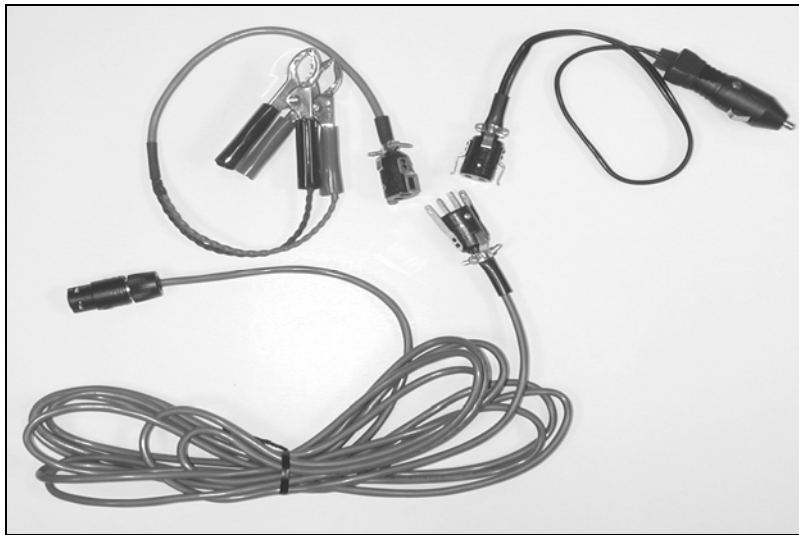
FIGURE 11: DC POWER SUPPLY SUBASSEMBLIES
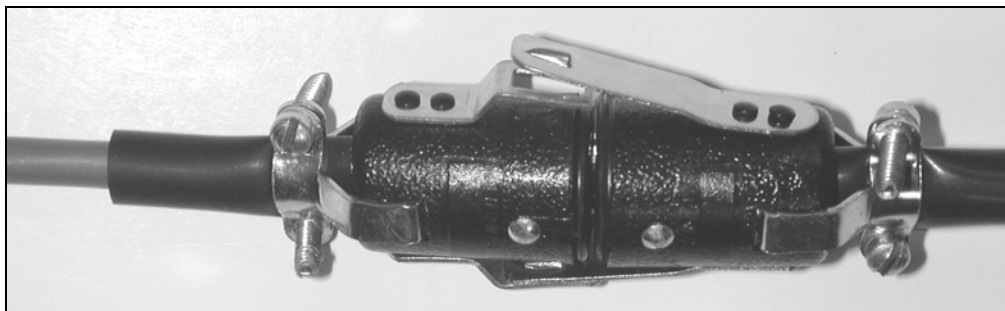
FIGURE 12: IN-LINE PLUG ASSEMBLY

2.4.   Using an AC source to power the ICRI.

2.4.1. 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, **FIGURE 13**.

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

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

2.4.3. 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.***

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

FIGURE 13: ICRI WITH EXTERNAL POWER SUPPLY

3.0   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.

3.1.   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).

3.1.1. 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.

3.1.2. **FIGURE** 15**.**

3.1.3. Attach the other end of the cable to *any* of the **LAND MOBILE RADIO INTERFACE** jacks, labeled 1, 2, 3, 4 and 5**. FIGURE 14** and

3.1.4. **FIGURE** 16**.**

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 damaged.

FIGURE 14: ICRI INTERFACE JACKS AND TALK GROUP SELECTOR

FIGURE 15: RADIO WITH ICRI CABLE ATTATCHED

FIGURE 16: TWO RADIOS CONNECTED TO ICRI

3.1.5. 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 17**.

DIN CONNECTOR

MAKE SURE THE PINS AND THE KEYWAY ARE ALIGNED.
TO INSERT: PUSH STRAIGHT INTO JACK AND TURN LOCKING
RING CLOCKWISE. VERIFY PLUG IS SECURE BY PULLING
ON THE CONNECTOR. **NEVER PULL ON THE CABLE.**

LOCKING RING

KEYWAY & PIN
ORIENTATION
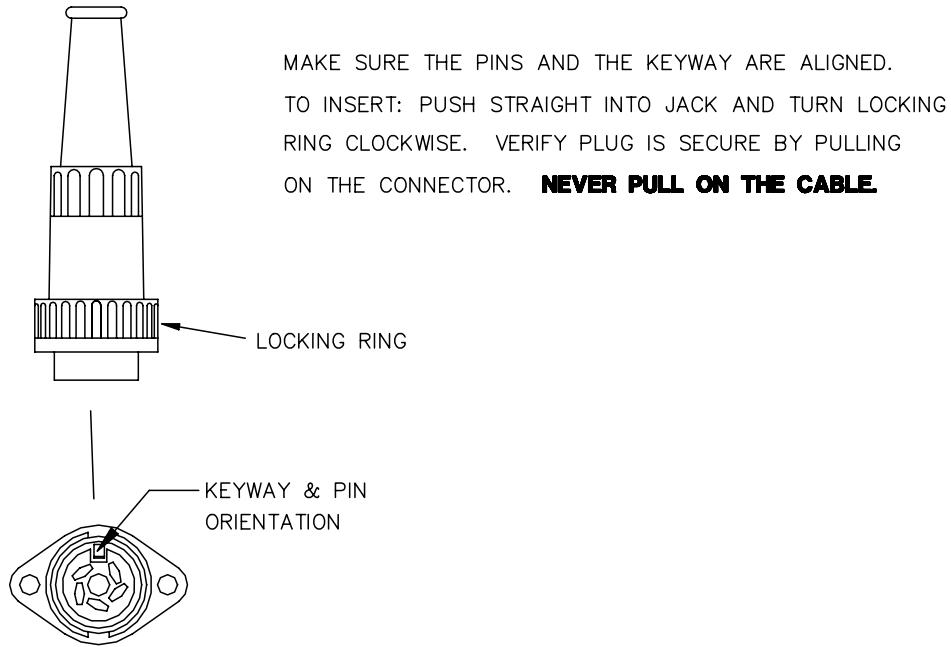
FIGURE 17: JACK ASSEMBLY (DRAWING)

3.1.6. 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.

3.2.   Setting the radio to transmit through the ICRI

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

3.2.2.   Set the radio to the desired channel.

3.2.3.   Set the talk group switch

   3.2.3.1.   Up: Talk Group (TG) One

   3.2.3.2.   Down: TG Two

   3.2.3.3.   Center: no TG connection

3.2.4.   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.

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

3.3.   If the users are having difficulty transmitting between disparate radios/channels, use the local handset to test the audio.

3.3.1.   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.

3.3.2.   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.

3.3.3.   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:

   3.3.3.1.   Slowly increase the volume settings.

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

   3.3.3.3.   Make certain the radio has a charged battery.

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

FIGURE 18: HANDSET INTERFACE JACK

4.0 OPTIONAL SATPHONE, LAND-LINE TELEPHONE, CELLULAR PHONE INTERFACE

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 179.0650) can be used.

If a cellular telephone with a 2.5mm "headset" jack will be linked through the ICRI to the 2-way radios, an interconnect cable (part number 179.0672) with a 2.5mm plug can be used.

4.1.   Using the acoustic coupler.

4.1.1.   The acoustic coupler, **FIGURE 19**, is installed on a telephone handset or cellular telephone by positioning the transducers over the speaker and microphone of the telephone.

4.1.2.   **FIGURE** 20 **and**

4.1.3.   **FIGURE 21.**

4.1.4.   Position the BLACK pad directly over the speaker (labeled **TO EARPIECE** on its cable) and secure by stretching the elastic strap over the handset/cell phone.

4.1.5.   Position the RED pad directly over the microphone (labeled **TO MOUTH-PIECE** on its cable) and secure by stretching the elastic strap over the handset/cell phone. Based on the design of the cellular telephone, to place an out-going call may require moving the transducers in order to access the cell phone's keypad.

FIGURE 19: ACOUSTIC COUPLER

FIGURE 20: ACOUSTIC COUPLER TO CELLULAR PHONE

4.1.6.   Lastly, plug into ICRI at jack labeled "Telephone Interface (Coupler)", **FIGURE 22.**

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 damaged.

4.1.7.   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 23.**

4.1.8.   Set telephone's earphone audio to a mid-level setting following the telephone's instructions.

4.1.9.   After the interconnect cable from the ICRI is connected to the telephone

handset, a dial tone should be heard in the earphones of the portable radio and in the earpiece of the "local" handset.

4.1.10. Dial the telephone number of another telephone.

FIGURE 21: ACOUSTIC COUPLER TO CORDED PHONE

FIGURE 22: TELEPHONE INTERFACE JACK

4.1.11. When the called party answers, use the portable radio's throat mic or a headset and begin to converse with called party.

4.1.12. 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.

DIN CONNECTOR
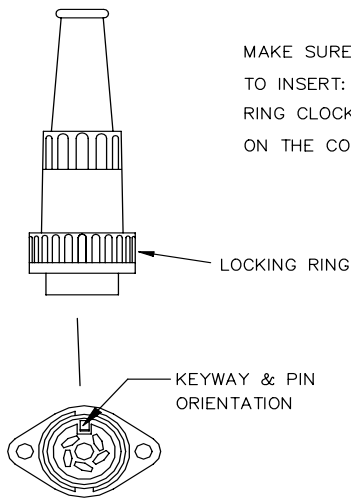
MAKE SURE THE PINS AND THE KEYWAY ARE ALIGNED.
TO INSERT: PUSH STRAIGHT INTO JACK AND TURN LOCKING
RING CLOCKWISE. VERIFY PLUG IS SECURE BY PULLING
ON THE CONNECTOR. **NEVER PULL ON THE CABLE.**

LOCKING RING

KEYWAY & PIN
ORIENTATION

FIGURE 23: TELELPHONE CONNECTOR ASSEMBLY (DRAWING)

4.2. Using a cellular telephone.

4.2.1. When connecting to a cellular telephone connect the small, single shaft connector to the headset jack on the cellular telephone. Be sure it is firmly seated in the telephone. Error! Reference source not found. **and FIGURE** 25: CELLULAR PHONE CONNECTOR (VIEW 2)

4.2.2. . Plug into ICRI at jack labeled "Telephone Interface (Coupler)", **FIGURE 22**.

4.2.3. When connecting to a cellular telephone connect the small, single shaft connector to the headset jack on the cellular telephone. Be sure it is firmly seated in the telephone. Error! Reference source not found. **and FIGURE** 25: CELLULAR PHONE CONNECTOR (VIEW 2)

4.2.4. . Plug into ICRI at jack labeled "Telephone Interface (Coupler)", **FIGURE 22**.

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 damaged.

4.2.5. 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 23.**

4.2.6. Set telephone's earphone audio to a mid-level setting following the telephone's instructions.

4.2.7. After the interconnect cable from the repeater is connected to the telephone handset, a dial tone should be heard in the earphones of the portable radio and in the earpiece of the "local" handset.

4.2.8. Dial the telephone number of another telephone.

4.2.9. When the called party answers, use the portable radio's throat mic or a headset and begin to converse with called party.

4.2.10. 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 24: CELLULAR PHONE CONNECTOR (VIEW 1)

FIGURE 25: CELLULAR PHONE CONNECTOR (VIEW 2)

4.3. Using the local handset.

4.3.1. 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. Then handset maybe replace with a C-AT provided headset.

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

4.3.3. 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.

FIGURE 26: HEADET ON CABLE REEL

4.4. ICRI phone link in optional (RJ-10 connection)

4.4.1. The ICRI can be configured with an optional RJ-10 jack built into the unit. This jack will provide the user the ability connect a standard telephone handset without using the standard telephone port on the front of the ICRI.
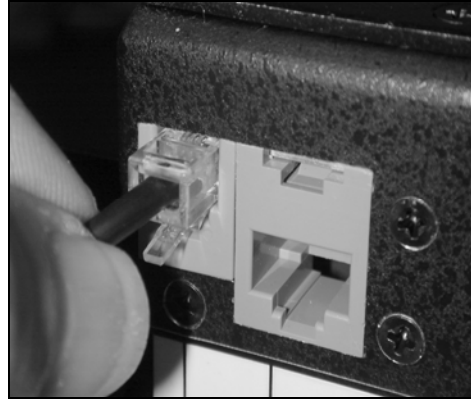
FIGURE 27: RJ-10 JACK

NOTE: The RJ-10 jack and the telephone interface jack on the front of the unit will not function simultaneously. Use only one at a time.

4.4.2. To use the RJ-10 jack with a land-line, on your standard phone, disconnect the cable from the handset of the phone while leaving it connected to the base. Plug the cable directly into the RJ-10 jack on the side of the ICRI.

FIGURE 28: RJ-10 CABLE FOR NOKIA™

4.4.3. When connecting a phone with a 2.5mm connection or a Nokia^{TM} brand connector, use the C-AT supplied cable with the appropriate 2.5, (or Nokia^{TM}) connector and RJ-10 connector.

4.5. Using a Nextel^{TM} phone in DirectConnect^{TM} mode.

4.5.1. When connecting a Nextel^{TM} connect the phone as you would an L-M-R.

FIGURE 29: CONNECT TO NEXTEL^{TM} DIRECT CONNECT^{TM}

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

4.5.3. Attach the other end of the cable to *any* of the **LAND MOBILE RADIO INTERFACE jacks**.

NOTE: The Nextel speaker and mic will be disabled while the phone is connected to the ICRI.

5.0   LINKING ICRIs

FIGURE 30: TWO LINKED ICRIs

FIGURE 31: INTERFACE JACK
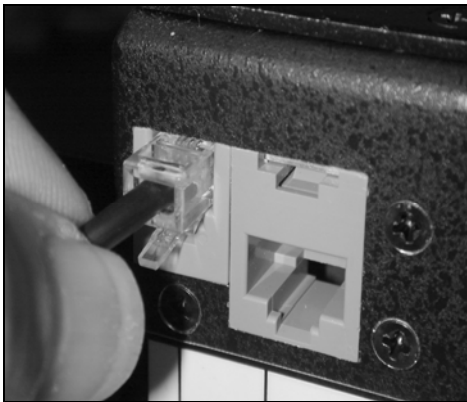
FIGURE 32: INTERNAL RJ-45 CONNECTION

5.1.   Connecting an interface cable, PN 179.0656, to the Telephone Interface jacks of two ICRIs will permit interoperability of more than five radios,

5.2.   **FIGURE** 30**.**

5.2.1. Plug into ICRI at jack labeled "Telephone."

5.2.2. **FIGURE** 31**.**

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 damaged.

5.2.3. 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. **.**

5.2.4. 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.

5.3.   The ICRI may also be configured to link ICRIs without relinquishing the use of the telephone port.

5.3.1. If your unit has been configured for this application, connect the supplied RJ-45 cable between the two units. **FIGURE 32.**

5.3.2. To separate the units beyond the length of the enclosed cable, use the supplied cable attached to ANY generic CAT5 cable up to 100 ft. in length.

5.3.3. Operate the units as normal. It is not necessary to power off or restart the units after connecting/disconnecting the

link cable.

6.0   OPERATION OF THE ICRI

6.1.1.   After connecting a power source to the ICRI (A), turn on the ICRI at (B) so that power up and input voltage can be verified. If you need to use a DC source voltage between 6.5 and 7.4 volts, then neither the OK (C) nor the LOW (D) voltage LEDs will be lit, but the ICRI will be working.

6.1.2.   Connect the radio interface cables to the ICRI. All five ICRI radio interface connections (E1-5) are electrically identical, so it is not important which jacks are used during ICRI operation.

6.1.3.   Connect the radio interface cables to the radios.

6.1.4.   Be sure the radios are on the channels assigned to the interoperability function.

6.1.5.   Select the talk-group the radio will be assigned to and place the switch above the associated post in the designated position.

NOTE: The center position of the switch places any item connected with the associated port into a "NO CONNECTION" conduction without physically disconnecting the device from the ICRI.

6.1.6.   Turn the radios on; initially place the radio volume controls at a mid-position between fully counter-clockwise and fully clockwise. 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 flickers as words are spoken. The LED should not remain on continuously as the voice is received.

6.1.7.   Connect the telephone and handset, if they will be used.

NOTE: For initial setup and troubleshooting purposes, C-AT recommends the use of the local handset or headset

6.1.8.   Select the talk-group the telephone and/or handset will be associated with.

6.1.9.   Turn on the telephone.

6.2. FRONT PANEL:
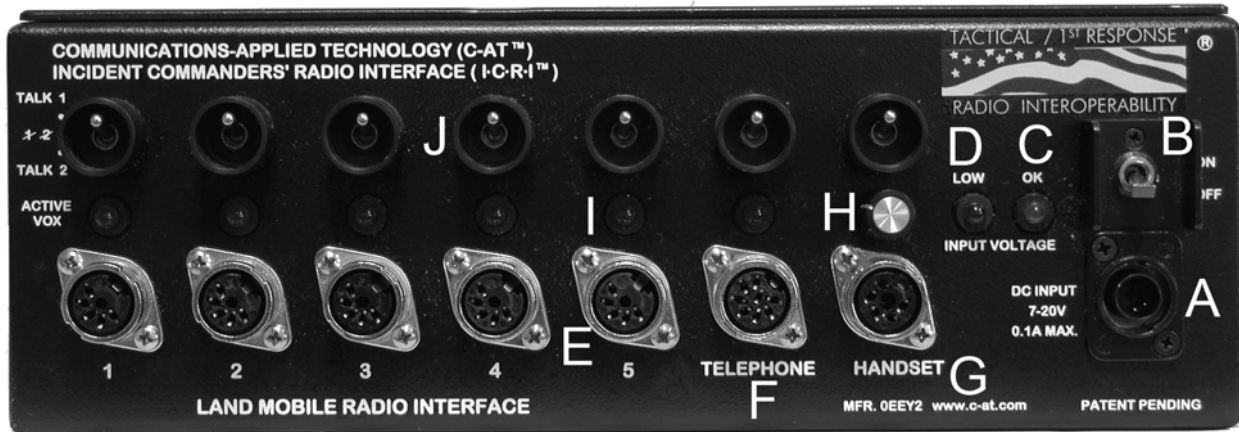
FIGURE 33: FRONT PANEL

6.2.1. DC INPUT JACK: A

This 8-pin locking-type jack is the input.
Pinout:
> 1 - +7 to +20 VDC
> 2 - Gnd
> 3 - thru 8- No connection

6.2.2. ON-OFF SWITCH: B

This switch is used to turn the ICRI "ON" and "OFF".

6.2.3. OK/ LOW VOLTAGE LED: C

This LED indicates the following:
"Green" lit: input voltage 8.6 or greater

6.2.4. OK/ LOW VOLTAGE LED: D

This LED indicates the following:
"Red" lit: input voltage 7.5 to 8.5 volts

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

6.2.5. RADIO INTERFACE JACK (1 thru 5)   E

This 5-pin locking-type jack is
Pinout:
> 1- Gnd
> 2- Audio from radio
> 3- Audio to radio
> 4- Motorola® Saber/AstroSaber P-T-T enable
> 5- P-T-T Enable (except Motorola Saber and Motorola P Series Radios)

6.2.6. TELEPHONE INTERFACE JACK: F
      This 8-pin locking-type jack supports the connection of the ICRI to a telephone
      through the acoustic coupler (PN 1790.650) or the 2.5mm jack on a cell phone (PN
      179.0672)
      Pinout:
          1- Audio TO telephone (acoustic coupler)
          2- Audio FROM telephone (acoustic coupler)
          3- Audio TO telephone (acoustic coupler)
          4- Audio FROM telephone (acoustic coupler)
          5- Ground
          6- Required jumper
          7- Audio TO telephone (2.5mm plug)
          8- Audio FROM telephone (2.5mm plug)

6.2.7. HANDSET INTERFACE JACK   G
      This 5 pin 240 degree connector supports the handset (p/n 280.0125)
      Pinout:
          1- Ground
          2- Electret Mic
          3- PTT
          4- Audio Hi+
          5- Audio Hi-

6.2.8. HANDSET VOLUME ADJUSTMENT   H
      Volume knob adjusts the volume output level of the attached radios to the local
      handset. To adjust the volume of the radios, use the volume adjustment on the
      individual radios.

6.2.9. VOICE ACTIVATED CIRCUIT (VOX) LED INDICATOR: I
      When lit (only one at a time) indicates the VOX, of the "inputting" radio is active.

6.2.10. TALK GROUP SWITCH: J
      UP: Talk Group 1
      CENTER: Not connected to either talk group
      DOWN: Talk Group 2

APPENDIX A: Part Numbers for ICRI, Accessories and Radio Cables

ICRI WORKSHEET	Part Number
PORTABLE ICRI	
ICRI, 5 radio I/O ports + 1 handset I/O port + and 1 telephone I/O port, with padded carrying case	500.9250
ICRI, 5 radio + 1 handset I/O port + 1 telephone I/O port, supplied with padded carrying case. TWO TALK GROUP SELECTION FOR PORTS	500.9260
ICRI, 5 radio I/O ports + 1 handset I/O port + and 1 telephone I/O port, BACKPACKABLE VERSION. TWO TALK GROUP SELECTION	500.9280
RACK MOUNTABLE ICRI	
ICRI, 5 radio + 1 handset + 1 telephone I/O port in 19", 2 U high, rack mount configuration. TWO TALK GROUP SELECTION FOR PORTS	500.9261
ICRI, 10 radio + 1 handset + 1 telephone I/O port in 19", 2 U high, rack mount configuration (includes audio buffer delays P/N 500.9311). TWO TALK GROUP SELECTION FOR PORTS	500.9265
POWER OPTIONS	
ICRI to 8 "AA" battery pack adaptor cable (use with 160.3611)	180.0450
8 "AA" battery pack (requires 180.0450)	160.3611
DC input cable, dual mode (alligator clips and vehicle cigarette lighter plug)	179.0730
115V AC adaptor (in-line switching power supply)	320.0431
Internal 8 "AA" battery pack (for use with 500.9250 or 500.9260 only)	160.3613
Internal rechargable LiIon battery (use with 500.9280)	500.9281
TRANSIT/STORAGE CASES OPTIONS	
Waterproof case (Pelican 1550) with fitted foam insert	990.0602
Waterproof case (Pelican 1600) with fitted foam insert	990.0601
TELEPHONE OPTIONS	
Telephone handset, SAT phone, INMARSAT (generic, acoustic coupler) interface cable	179.0655
Direct connection cable to Nokia™ cellular telephone headset jack	179.0802
Direct connection cable to generic, 2.5 mm plug cellular telephone headset jack	179.0672
Direct connection modular telephone handset jack (RJ series)	179.0801
OTHER OPTIONS	
250' universal extension cable on cable reel with radio "holder" (used in conjunction with any radio interface cable)	179.6206
Audio buffer delay for all radio ports (C-AT will contact you for delay period) *Select this option if you are going to connect to a trunked radio system*	500.9311
Speaker port for use with amplified speakers or recording devices (3.5mm jack)	500.9312
ICRI-to-ICRI link port (RJ-45 bulkhead connector)	179.0800
ICRI-to-ICRI link cable to expand # of linked radios (note: requires use of both telephone interface ports)	179.0656
Radio interface extension cable (10 feet)	179.6206-10
Lightweight headset with supra aural speaker and boom-mounted microphone	281.9137
Remote headset jack with push-to-talk switch/hot mic-ptt switch 20' coiled cord	295.0150
Four talk group configuration switch (*for 500.9265 ICRI only*)	179.0810

RADIO INTERFACE CABLES *(RF ISOLATED VERSIONS)*

Kenwood ^{TM} 280/290/380/390/480/481 radio interface cable	179.0136
Bendix King^{TM} EP series, LP series and GP series interface cable	179.0671
Com-Net Ericsson^{TM} Jaguar radio interface cable/amplifier	179.0733
Com-Net Ericsson^{TM} LPE 200 radio interface cable/amplifier	179.0662
Com-Net Ericsson^{TM} MPA radio interface cable/amplifier	179.0660
Com-Net Ericsson^{TM} MRK radio interface cable/amplifier	179.0661
Com-Net Ericsson^{TM} Panther 500 & KPC radio interface cable/amplifier	179.0732
Com-Net Ericsson^{TM} Panther 600 radio interface cable	179.0738
Com-Net Ericsson^{TM} Orion mobile interface cable ("Y" cable/box so normal function of radio is not affected by ICRI link) 37 pin	179.0743
Motorola^{TM} models MT-2000, JT-1000, HT-1000, MTS-2000, MTX-6000, MTX-838, XTS-3000 & EF Johnson 5100 interface cable	179.0630
Motorola^{TM} models GTX, LTS2000, GP300, P1225 interface cable	179.0634
Motorola^{TM} models HT750, HT1250 interface cable	179.0735
Motorola^{TM} models Astro/Saber, Saber I, II, and III interface cable	179.0710
Motorola^{TM} models MT-1000, HT-600, HT-2000, MT-300, MTX-800, MTX-820S, MTX-900 & Radius P-200 interface cable	179.0640
Motorola^{TM} Spectra interface cable ("Y" cable/box so normal function of radio is not affected by ICRI link)	179.0636
Motorola^{TM} MCS-2000 interface cable ("Y" cable/box so normal function of radio is not affected by ICRI link)	179.0635
Motorola^{TM} Maxtrac interface cable-20 pin ("Y" cable/box so normal function of radio is not affected by ICRI link)	179.0739
Motorola^{TM} CDM-1250, Maxtrac-16 pin Interface cable	179.0690
Nextel^{TM} i55, i85, i90 cell phone/radio interface cable for radio mode	179.0677
Nextel^{TM} i1000 and r750 cell phone/radio interface cable for radio mode	179.0678
Nextel^{TM} i205, i305, i530, i730 cell phone/radio interface cable for radio mode	179.0681
SINCGARS, PRC-117, and other "green gear" radio interface cable (U-229/U connector works with radio having 5 or 6 pin handset jack connectors	179.0600
PRC-127 radio interface cable	179.0740
ICOM^{TM} models F3, F4, F43 interface cable	179.0737
ICOM^{TM} models F50 interface cable	179.0160
Handset with noise-canceling microphone, P-T-T bar, and coiled cord *recommended for use with all units purchased*	280.0125
Universal radio interface cable (requires radio speaker/mic assembly to be provided for disassembly)	179.0734
NOTE: Please contact C-AT if you require an interface cable for a radio not listed	

APPENDIX B: ICRI Chassis: Set-up Instructions

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 ICRIs 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 SYALLABLES.

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

ATTACH CABLE MARKED "TO EARPIECE"

TO ICRI

ATTACH CABLE MARKED "TO MOUTHPIECE"
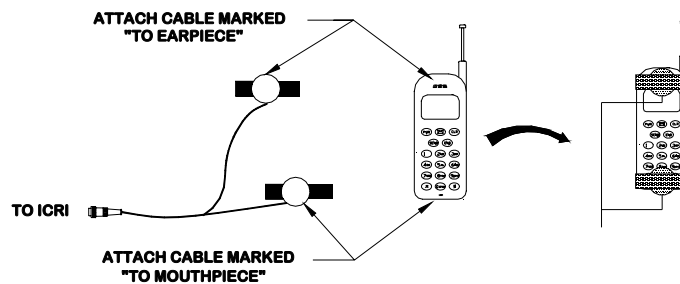
NOTE: CONNECTOR PIN-OUT INFORMATION IS LOCATED ON THE BOTTOM OF THE CHASSIS OF THE ICRI.

FIGURE 34: TOP COVER OF THE ICRI

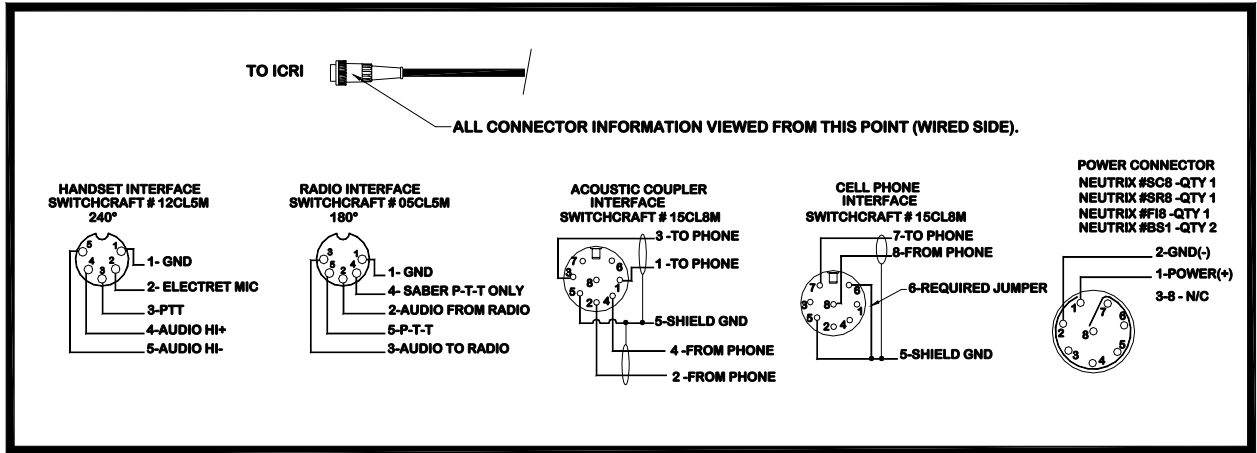# APPENDIX C: Connector Pin-out Data

FIGURE 35: BOTTOM OF ICRI CHASSIS

APPENDIX D: Pictorials of Applications

ICRI ALTERNATE APPLICATIONS

BELOW GRADE OR IN-BUILDING LINK TO TRUNKED REPEATER
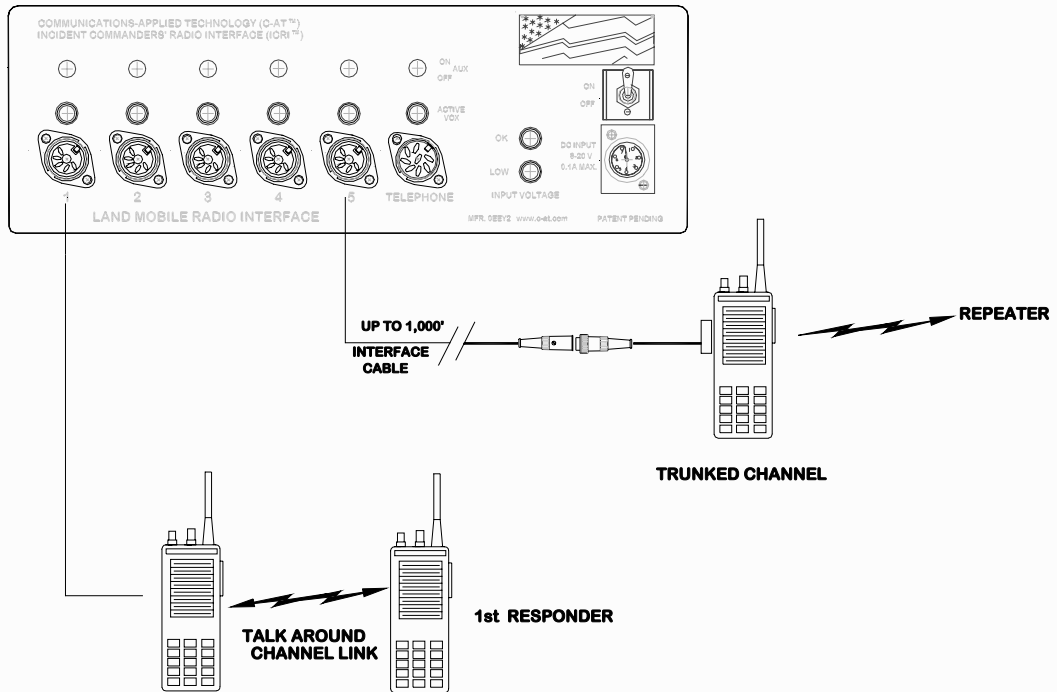
REPEATING BODY WIRE SIGNAL
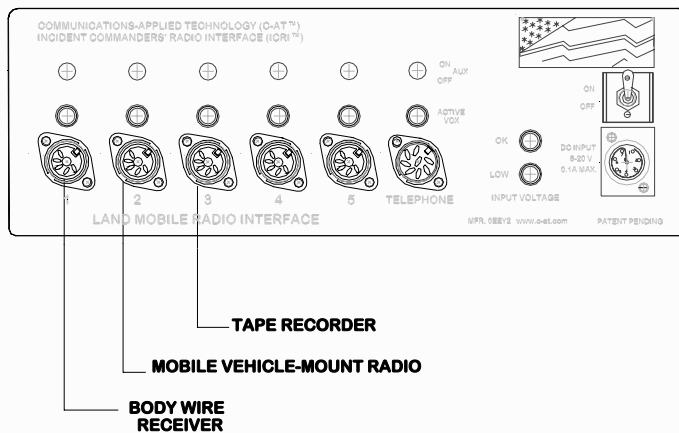
ICRI WITH ATTACHMENTS

(NOTE: NOT TO SCALE)

△2

COMMUNICATIONS-APPLIED TECHNOLOGY (C-AT™)
INCIDENT COMMANDERS' RADIO INTERFACE (ICRI™)

TALK 1
▶◀
TALK 2

ACTIVE
VOX

LOW   OK

INPUT VOLTAGE

ON
OFF

DC INPUT
7-30V
0.4A MAX.

1   2   3   4   5   TELEPHONE   HANDSET

LAND MOBILE RADIO INTERFACE

MFR. DATE www.c-at.com   PATENT PENDING

△3

(+) RED   ALLIGATOR CLIPS

OR

(-) BLACK

OR   CIGARETTE LIGHTER

8 "AA" BATTERY PACK

△1   △1   △1   △1   △1

UP TO 1,000'

INTERFACE CABLE
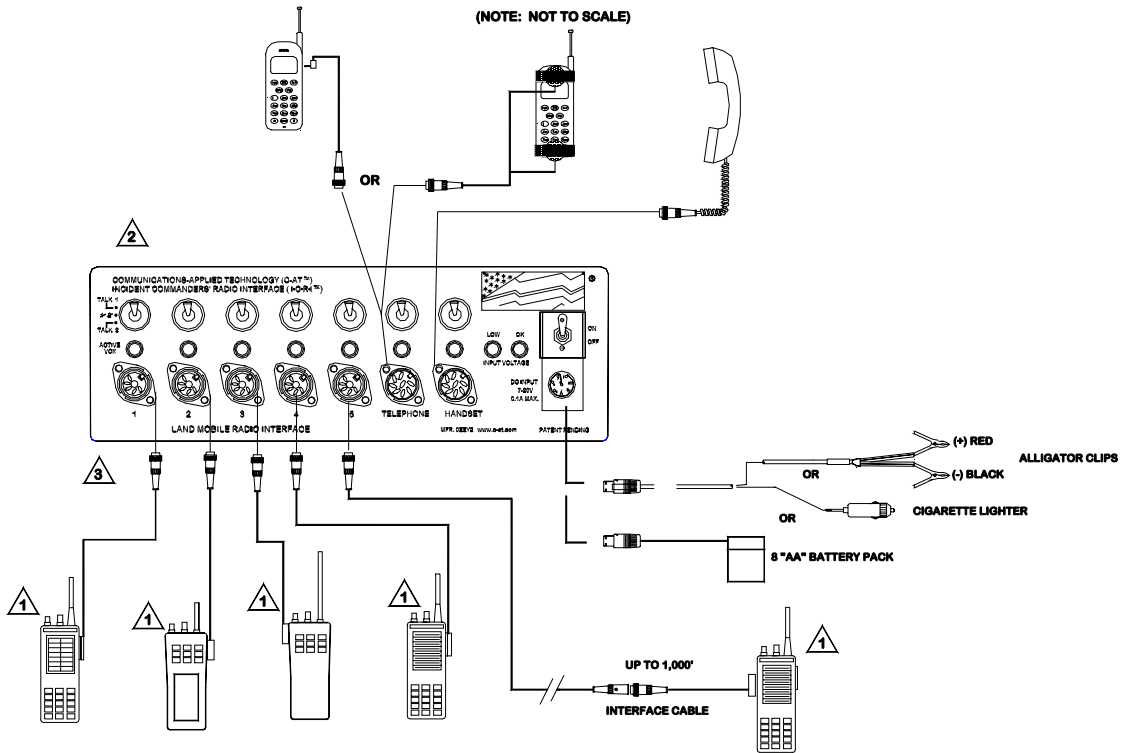
△1 **PORTS ARE NOT RADIO SPECIFIC**
    (PORTABLE OR MOBILE RADIO CAN BE USED.)

△3 **INTERCONNECT CABLE TECHNICAL NOTES ON BOTTOM SIDE.**

△2 **USER INSTRUCTIONS ON TOP COVER.**

APPENDIX E: Pictorials of Board Adjustments

ICRI GEN 3

LOCATION OF ADJUSTMENTS

DELAY

AUDIO DELAY ENABLE/DISABLE

AUDIO DELAY PROGRAMMING

TELEPHONE TIME OUT TIMER DEFEAT

AUDIO DELAY POWER CONTROL (NORMALLY INSTALLED)

TEST POINT (NORMALLY INSTALLED)

TEST POINT DO NOT USE

INPUT BLOCKING TIME

HANDSET POWER CONTROL (NORMALLY INSTALLED)

HANDSET

PHONE

JP17 1 2 11 12

JP18 4 8 1 5

JP16

R350 TOT ADJ

R339 TAIL

JP15

R129 WIRED IN

R135 WIRED OUT

JP2 JP1

R188 IN

JP5

R334 SENS.

R106 AC IN

R126 AC OUT

TC6

JP14

JP23 R318 JP13 TC5 R303

JP22 R286 JP11 TC4 R270
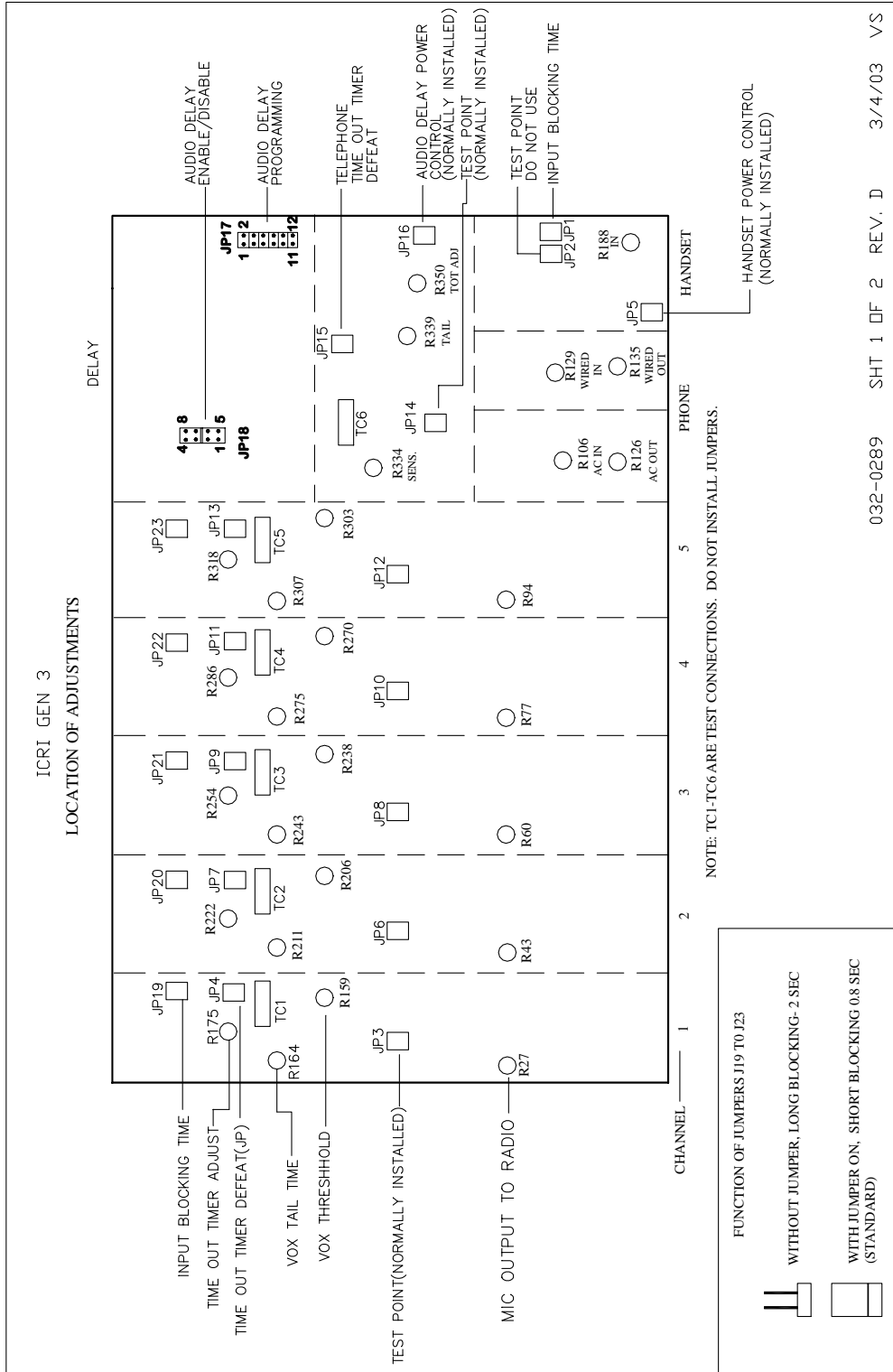
JP21 R254 JP9 TC3 R238

JP20 R222 JP7 TC2 R206

JP19 R175 JP4 TC1 R164 R159

JP12 R307 R94

JP10 R275 R77

JP8 R243 R60

JP6 R211 R43

JP3 R27

CHANNEL 1 2 3 4 5

INPUT BLOCKING TIME

TIME OUT TIMER ADJUST

TIME OUT TIMER DEFEAT(JP)

VOX TAIL TIME

VOX THRESHHOLD

TEST POINT(NORMALLY INSTALLED)

MIC OUTPUT TO RADIO

NOTE: TC1-TC6 ARE TEST CONNECTIONS. DO NOT INSTALL JUMPERS.

FUNCTION OF JUMPERS J19 TO J23

WITHOUT JUMPER, LONG BLOCKING- 2 SEC

WITH JUMPER ON, SHORT BLOCKING 0.8 SEC (STANDARD)

032-0289   SHT 1 OF 2   REV. D   3/4/03   VS

FOR MICROCONTROLLER MARKED: DELAY1 1SEC MAX

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
	150	NONE
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 DELAY
SELECT JUMPERS
(DELAY AMOUNT)

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

JP17

FOR MICROCONTROLLER MARKED: DELAY. HEX

CHANNEL	DELAY(mSEC)	JUMPER PINS
TALK GROUP 1 (DELAY 1)	500	1-2, 3-4, 5-6
	400	1-2, 3-4
	350	1-2, 5-6
	300	1-2
	250	3-4, 5-6
	200	3-4
	150	5-6
	100	NONE
TALK GROUP 2 (DELAY 2)	500	7-8, 9-10, 11-12
	400	7-8, 9-10
	350	7-8, 11-12
	300	7-8
	250	9-10, 11-12
	200	9-10
	150	11-12
	100	NONE

ICRI GEN 3 DELAY
SELECT JUMPERS
(DELAY AMOUNT)

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

JP17

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

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

4	8
3	7
2	6
1	5

JP18

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.

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 than the programming jumpers on JP18 must also be set to the bypass for the unit to work properly with the delay disabled.

032-0289 SHT 2 OF 2 REV. D 9/12/03 VS

APPENDIX F: Connecting External Speakers (Optional not standard)

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. **FIGURE 36**.

To utilize the speaker function, connect the supplied speaker cable to one of the speaker jacks and the input jack of your amplified speaker. **FIGURE 37.** 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.
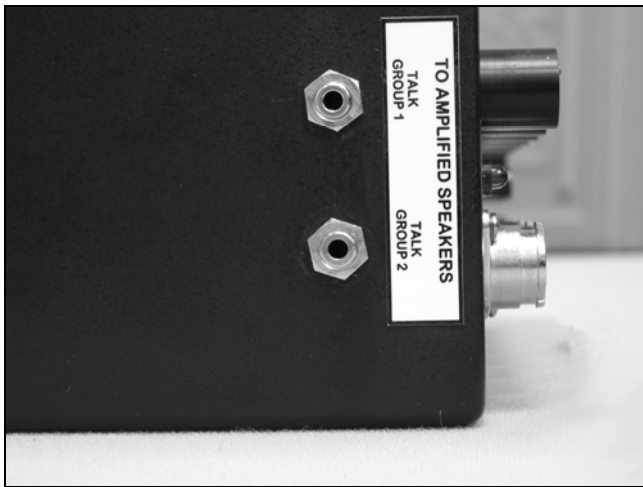
FIGURE 36: ICRI SPEAKER JACKS
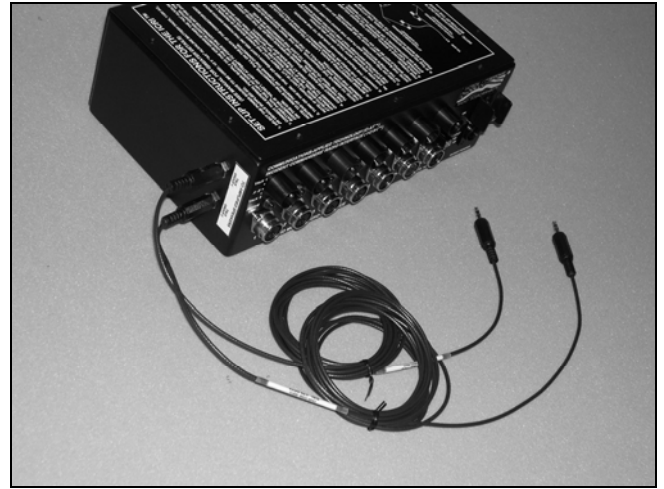
FIGURE 37: ICRI SPEAKER CABLE CONNECTED TO SPEAKER JACKS

FIGURE 38: ICRI CONNECTED TO AMPLIFIED SPEAKERS

§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:

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

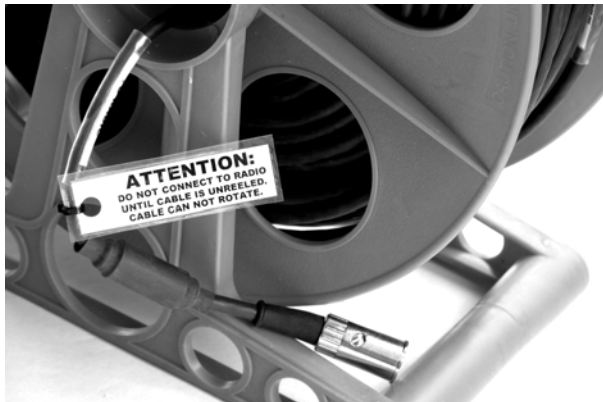## ICRI radio interface 250' cable extension (cable-reel)

Positioning one or more of the radios, to be connected to the ICRI, may be desirable for one of several operational reasons:

- The personnel associated with a radio will be located inside a building for which there is poor RF coverage from the ICRI's location.
- 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.
- Radios operating in very close proximity to one another, negatively effect the performance of other another, such as receiver desensing.
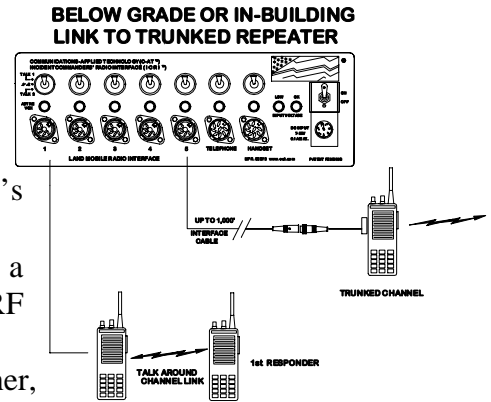
The personnel—equipped with compatible radios—in the same general location of the reel-mounted radio, will be able to communicate with those operating radios or the handset also connected to the ICRI. See Figure X

The extension cable is inserted between the ICRI and the radio interconnect cable, that is usually connected directly to one of the radio ports on the ICRI front panel. See Figures Y and Z.
Figure XXXX

It is important to note that the cable must be unspooled from the reel BEFORE the radio interface cable is connected, as the rotation of the reel---otherwise the cable will twist and damage the cable. See Figure XX

Multiple extension cables can be connected together to extend the distance between the radio and the ICRI, without effecting the performance of the radio link.

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.
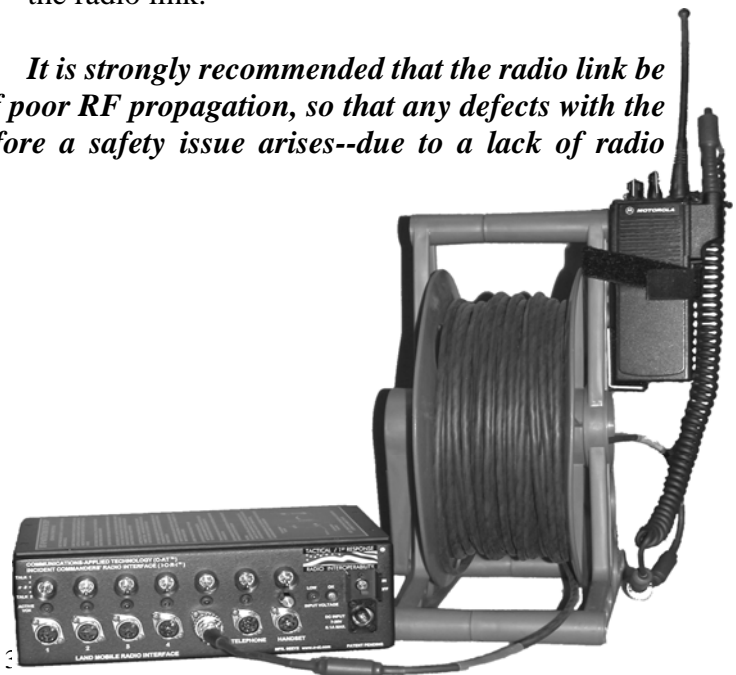
Figure XXXXX

Set-up of the cable-reel

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

      1.1   Unreel the needed length of cable—this may be all the cable if the distance is unknown.

      1.2   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.

      1.3   Connect the unspooled 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.

      1.4   Place the radio on the right angle support and secure it in-place with the Velcro^{TM} strap.

NOTE: If the cable will be used to place a radio at a high point, on a building roof, hill or tree top to enhance the operating range of the radio to a remote location, then the it may be preferable to have the cable reel located beside the ICRI and the radio connected to the unspooled end of the cable.

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 2000 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.