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때:· RF-7850M-HH MULTIBAND HANDHELD RADIO

OPERATION MANUAL





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RF-7850M-HH MULTIBAND NETWORKING HANDHELD RADIO

OPERATION MANUAL

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This manual is based on Firmware Version 4.2.2.

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HARRIS CORPORATION COMMUNICATION SYSTEMS 1680 University Avenue Rochester, New York 14610-1887 USA Tel: 585-244-5830. Fax: 585-242-4755. http://www.harris.com

IMPORTANT INFORMATION ABOUT USER LEVELS

Screens and menus that appear in the RF-7850M-HH are dependent on four user/security levels. These levels are described in User Levels.

RF-7850M-HH SAFETY GUIDELINES

SAFETY GUIDELINES

WARNING - Do not crush, disassemble, reverse polarity or install incorrectly, incinerate, or mutilate the lithium-ion battery. Do not expose to fire or temperatures above 160 °F (71 °C). The battery can vent, rupture, or explode, releasing toxic material which may cause injury or death to personnel. In case material is released or spilled, evacuate and allow vapors to dissipate. Increase ventilation and do not inhale vapors. Notify safety personnel of release or spills.
WARNING - Use only battery chargers approved by Harris, and never attempt to modify the battery or charger. Doing so may result in damage to the battery, the radio, or cause personal injury to the user.
WARNING - RF shock could occur from coming into contact with the antenna while radio is transmitting.
WARNING - The radio could be transmitting without activating the keyline via Push-To-Talk (PTT). This is possible in data communications and Internet Protocol (IP) connections.
WARNING - Do not dispose of lithium-ion batteries in uncontrolled trash.
WARNING - A damaged lithium-ion battery that is exposed to water could cause a fire or explosion, causing personal injury. Batteries with cracked or damaged cases should be replaced immediately.
WARNING - Extended transmit times and/or insufficient air circulation may cause the surface temperature of the radio to become hot enough to possibly cause a burn. Allow the radio to cool before handling.
WARNING - To avoid damage to hearing, ensure that the handset volume is at a comfortable level before using a handset.

RF-7850M-HH SAFETY GUIDELINES

WARNING - When operating the radio as part of a recommended vehicular system, ensure that proper caution and procedures are exercised in order to avoid loss of control of the vehicle. Failure to comply could result in personal injury or death.
WARNING - Do not extend antennas or drive vehicles under low hanging power lines. Contact with power lines could result in personnel injury or death.
WARNING - Operating RF transmitting devices such as radios and cellular phones in or around fuel, weapons, or ordinance could cause serious injury or death.
Make sure guidelines specified in NAVSEA OP 3565 for Hazard of Electromagnetic Radiation to Ordnance (HERO), Hazard of Electromagnetic Radiation to Fuel (HERF), and Hazard of Electromagnetic Radiation to Personnel (HERP) are followed while operating this radio.
The RF system must be turned off within a Safe Separation Distance (SSD) of the HERO Unsafe or Unreliable Ordnance, HERO Susceptible Ordnance, and HERO Safe Ordnance.
When in the presence of equipment being refueled, the system must be turned off within an SSD of fueling operations involving motor vehicle gasoline (MOGAS), aviation gasoline (AVGAS), or JP-8 fuel. No SSD needs to be maintained for fueling operations involving JP- 5 or diesel fuel.
CAUTION - ACID CONTAMINATES LITHIUM-ION BATTERIES. Every effort must be made to keep lithium-ion batteries isolated from lead-acid batteries because lead-acid batteries contain sulfuric acid. Do not use the same tools and materials such as screwdrivers, wrenches, hydrometers, and gloves for both types of batteries. Any trace of acid or acid fumes will permanently damage lithium-ion batteries on contact.

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INTRODUCTION

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RF-7850M-HH INTRODUCTION

MANUAL PURPOSE

This operation manual provides information required to support operation and operator-level maintenance on the RF-7850M-HH Multiband Networking Handheld Radio, referred to throughout this manual as RF-7850M-HH or the radio.

INFORMATION ABOUT USER LEVELS

Screens and menus that appear in the radio are dependent on user security levels. These levels and the default passwords for each level are provided in User Levels, p75.

By default, the radio is initially delivered set to User Level 3. The optionally purchased Web User Interface requires you to login to the web interface before each use. Refer to Login/Logout Information, p77 for information on checking or revising Persistent Login settings for the Front Panel and ASCII user interfaces.

NOTE

To retain login levels when unit is powered off (front panel and ASCII only), ensure the unit has **PERSISTENT LOGIN** set to **YES**. Select **[PGM] > USER INTERFACES > FRONT PANEL > PERSISTENT LOGIN**.

CONVENTIONS

Conventions used in this manual consist of:

ALL CAPITALS - External radio marking such as connectors or switches.

BOLD CAPITALS - Menu items or items displayed on the Liquid Crystal Display (LCD).

[BOLD CAPITAL IN BRACKETS] - Front panel button such as [APPS] or [PGM].

EQUIPMENT DESCRIPTION

The RF-7850M-HH provides continuous coverage in the 30 to 512 MHz frequency range at up to 10 watts. The radio is interoperable with other radios on common waveforms and frequencies. The radio has the following capabilities.

RF Interface

- Provides Frequency Modulation (FM) and Frequency Shift Keying (FSK) modulation.
- Provides Amplitude Modulation (AM) and Amplitude Shift Keying (ASK) modulation (109 to 512 MHz only).
- Extended Communications Range Using Mixed-Excitation Linear Predictive (MELP) vocoder along with the 2400 bits per second (bps) data rate allows reception of weak signals that are impossible with analog communications.
- Quicklook options include Quicklook 1A, Quicklook 2, Quicklook 3, and Quicklook Wide Electronic Counter-Counter Measures (ECCM) waveforms to protect transmissions from interception and jamming.

User Interface

- Dual Net Push-To-Talk (PTT) This allows maintaining communications with two different nets such as combat and squad nets using PTT1 or PTT2.
- Tactical rotary switch with 13 selectable nets The radio can be programmed with up to 25 nets that can be assigned to any of the 13 rotary switch positions.
- Remote Keypad Display Unit (RKDU) (purchased option) -Allows an operator extended access to the radio's display and keypad.
- Web User Interface (purchased option) Allows a PC to control Tactical Chat (Tac Chat), Global Positioning System (GPS) navigation, file system browsing, and radio programming.

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RF-7850M-HH INTRODUCTION

Data Interface

- Simultaneous Voice/Data (MACA2) Voice can take place on a channel while data communications is present.
- Direct Connect Universal Serial Bus (USB) Interface Any supported USB device such as a camera can be connected in the same manner as connecting to a USB port on a computer.
- High Data Rate Capable of 64 kbps IP data in a 25 or 75 kHz channel or optional 192 kbps IP data in a 75 kHz channel. The IP data format can allow data transmissions to be interrupted by voice communications without data loss in a non-simultaneous voice and data IP net. However, data could be lost if you key the radio too long.
- Point-to-Point Protocol (PPP) data connections can be configured for serial communications.
- The data interface accommodates USB/Ethernet or RS-232 unbalanced interfaces. For messaging, a Tac Chat home screen provides an integrated messaging center.

IP Networking

- Direct Internet Protocol (IP) Network Connection Can be attached to network with a Dynamic Host Configuration Protocol (DHCP) server without configuration of the radio and can be accessed via any network resource such as a computer that has the radio drivers and communications programmed.
- Enhanced IP-based retransmission Allows multiple retransmission hops and multiple retransmission radios connected via Ethernet/Local Area Network (LAN).
- Supports IPv4 Ethernet LAN.
- Remote Network Driver Interface Specification (RNDIS) for Ethernet over USB connectivity and wireless IP data forwarding.
- Multicast IP Support Allows configured User Datagram Protocol (UDP) multicast application data to be forwarded from

one of the radio's wired IP interfaces to its wireless interface (or vice versa). The three wired interfaces supported on the radio are Ethernet, RNDIS, and PPP.

NOTE

The multicast feature does not support Internet Group Management Protocol (IGMP) or Protocol Independent Multicast (PIM) routing protocols. As a result, routers between a radio's wired interface and a multicast client or source device are not supported.

Situational Awareness (SA)

- Equipped with internal Global Positioning System (GPS) receiver to support position display information, SA reporting, or obtaining position reports from other radios. GPS operational modes are internal, external, IP, or none. GPS is also used for time synchronization on Quicklook 3, and Quicklook Wide.
- Keyhole Markup Language (KML) File Server format to display geographic data in a graphical Earth browser. Provides position reporting (Google Earth and other KML-based SA application integration). KML-formatted position data is accessible via the radio's web server or via UDP/IP packets.
- Search And Rescue (SAR) Beacon

Security

- Embedded Harris Citadel® II encryption. Selectable Citadel 128 bit/256 bit or Advanced Encryption Standard (AES) 128 bit/256 bit encryption security for both Over the Air (OTA) voice and data transmissions. Customer Algorithm Modification (CAM) is an available option.
- Encryption is interoperable with Falcon II radios using Citadel I, Citadel II, AES-128, or AES-256. The radio provides storage of 25 128-bit or 256-bit Communications Security (COMSEC) keys and one 128-bit CAM variable.

RF-7850M-HH INTRODUCTION

1

Vehicular Amplifier Adapter (VAA)

External VAA support.

ADVANCED FEATURES

The radio is available with either the Standard (SW001) or Advanced (SW002) firmware feature set. This manual covers features for SW001 and the following Advanced SW002 features (not included with SW001).

- MACA2 192 kbps with 75 kHz channel bandwidth
- Simultaneous Voice and Data (SVD) on 75 kHz channel
- NATO Friendly Force Information (NFFI) GPS support
- Quicklook Wide waveform
- Session Initiation Protocol (SIP) and RF-6010 Base Station support. Allows sending IP data over Ethernet and making phone calls to and from an RF-6010 based system.
- PTT through Wireless IP retransmit and Advanced IP Repeater
- Simple Network Management Protocol (SNMP)

Waveforms provided with SW002 that are not described in this manual are described in a separate operation guide.

NFFI Position Reporting

North Atlantic Treaty Organization (NATO) Friendly Force Information (NFFI) style position reporting (integrated with NFFI-based SA applications) is supported. NFFI Position Reporting is compliant with STANAG 5527 NFFI-IP2 and NATO Battle Management System applications.

BASIC SETUP

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2

ITEMS INCLUDED

Table 1 provides a list of items included with the radio. Figure 1 displays all of the items included with the radio.

Description	Part Number
Radio Assembly, Green (RF-7850M-HH001)	12126-1000-10
Radio Assembly, Black (RF-7850M-HH002)	12126-1000-11
or Radio Assembly, Tan (RF-7850M-HH003)	12126-1000-12
NOTE : Radio includes Global Positioning System (GPS) Antenna (12041-6550-01).	
Side Connector Cover	12041-6680-01
High Capacity Lithium-Ion (Li-ION) Battery, Green	12041-2200-02
High Capacity Li-ION Battery, Black	12041-2200-01
High Capacity Li-ION Battery, Tan	12041-2200-03
Multiband Blade Antenna, 13-inches (0.3 m)	12011-2710-03
Multiband Blade Antenna, 45-inches (1.2 m)	12011-2730-01
CD Assembly, Communications Planning Application (CPA) for RF-7850M-HH	RF-7850MH-CD001
Quick Reference Guide, RF-7850M-HH	10515-0461-4100

Table 1. Items Included with the Radio



Figure 1. Items Included with the Radio

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ASSEMBLE RADIO

See Figure 2 and perform the following:

- a. Place the battery on the base of the radio, then twist the battery into a fully seated position.
- b. Verify the antenna connectors are free of loose metal filings and other debris.
- c. Secure the antenna onto the connector on top of the radio.
- Secure the GPS antenna onto the connector on top of the radio (internal GPS can be disabled or an external device can be used).

Refer to Initial Power-Up, p24 for powering on the radio.

Refer to BASIC OPERATIONS, p27 for operations using voice communications.

Refer to ADVANCED OPERATIONS, p73 for operations such as camera connection, LAN connection, applications menu, etc.

Refer to Optional Accessories, p241 for optional items.





2

INITIAL POWER-UP

Power up the radio as follows.

- 2
- a. Move the rotary switch to one of the 13 net preset positions.
- b. Observe that there are no fault indications and that the battery indicator on the upper left-hand side of the display shows full.

BATTERY LIFE

Battery life is the approximate amount of time a battery can be used before it needs to be recharged or replaced. The battery life is determined by transmission power and duty cycle. To maximize battery life, transmit only when necessary and use the lowest transmit power level required to communicate.

The battery life data is provided as a guideline and is typical at +68 °F (+20 °C) with a 10% transmit, 10% receive, 80% idle (squelched) operating cycle. Actual results may vary. Battery life is dependent upon battery age, temperature, charge times, and amount of back light usage. Battery life will decrease approximately 20-25% at -4 °F (-20 °C).

STORAGE GUIDELINES

Store the radio in a secure location and use local security procedures. Store batteries in a clean, cool (below 70 °F [+21 °C]), dry, and ventilated storage area.

USB DATA

The radio provides a Universal Serial Bus (USB) 2.0 Full Speed compatible interface. This interface supports USB drive capabilities as well as Remote Network Driver Interface Specification (RNDIS) for Ethernet over USB connectivity. Ethernet over USB allows the joining device to act as the RNDIS Host and wireless IP data is forwarded down the RNDIS connection to the host. This forwarding eliminates the need for configuring separate Ethernet/wireless IP addresses.

RNDIS usage with wireless IP forwarding is intended to be a modern alternative to existing PPP connections with wireless bridging enabled.

RNDIS DRIVER

RNDIS driver files are located in a folder on the connected radio. Perform the following procedure to load the drivers on your computer.

- a. Select [PGM].
- b. Navigate to USB MODE and press [ENT].
- c. Configure **USB MODE** as AUTO and **FUNCTION** as STORAGE DEVICE and press **[PGM]** to exit the menu.
- d. Connect the radio to the computer as USB peripheral storage using cable (12067-7220-A006).
- e. Open up My Computer on the PC and locate the removable disk drive that appeared. Its name will be 7850-Axxxxx <drive letter>, where xxxxx is the serial number of the radio, and <drive letter> is the file system drive designator (such as E:).
- f. Browse inside that drive and you will see an **falcon3-exportrndis.inf** file.
- g. Place (copy) this file to your desktop.
- h. Disconnect the USB cable from the computer.
- i. Select [PGM].
- j. Navigate to USB MODE and press [ENT].
- k. Configure USB MODE as AUTO and FUNCTION as RNDIS DEVICE and press [ENT] to set the value. Use PERIPHERAL only if cable connection is not auto sensing.
- I. Select [PGM] to exit out of programming.
- m. Connect the USB cable.
- n. Select the "No, not this time" radio button at the Found New Hardware Wizard on the PC.
- o. Select Next.

- p. Select Install from a list or specific location (Advanced) on the next screen that appears.
- q. Select Next.
- r. Select Search for the best driver in these locations on the next screen.
- s. Select "Include this location in the search".
- t. Select **Browse** to specify a location.
- u. Navigate to the file you previously copied to the desktop and choose it. Ignore any driver warnings that may appear.

Once RNDIS is connected, the radio will have a default Internet Protocol (IP) address of 10.0.1.1, and the PC will have IP address 10.0.1.2. The PC will also have its gateway set to 10.0.1.1. Unless the radio is intended to be used for the Internet gateway, this should be changed.

Change the gateway address as follows.

- a. Select [PGM] > IP CONFIG and press [ENT].
- b. Select RNDIS CONFIG and press [ENT].
- c. Select the value for Remote Gateway and press [ENT].
- d. Change the value to 0.0.0.0 and press [ENT].
- e. Select [PGM] to exit.

BASIC OPERATIONS



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This section contains information on common field operations of the radio. Refer to ADVANCED OPERATIONS, p73 for non-voice operations or the application menu.

RADIO CONTROLS

3

Figure 3 shows the radio controls, indicators, and connectors. Table 2 describes the controls, indicators, and connectors.

The following is a quick summary of key operations.

- Access a highlighted field by pressing [ENT].
- Clear out of a field by pressing [CLR].
- Accept changes by pressing [ENT].
- Change your current user level by pressing **[APPS]** and selecting the **LOGOUT** soft key r+ .

NOTE

Refer to [PGM] > USER INTERFACES, p154 for input language other than English.

- Select the LOCK soft key 🔒 to lock the front panel.
- Unlock the front panel by pressing [CLR] five times quickly.
- Select the speaker soft key to mute
 Speaker.
- Input a space by pressing the [0] button twice quickly.

NOTE

Refer to Symbols, p244 for soft key descriptions.



Figure 3. Controls, Indicators, and Connectors

Table 2. Radio Controls, Indicators, and Connectors

Key	Control/ Indicator	Function
1	Lower PTT	Push-To-Talk switch - Push-To-Talk (PTT) on secondary net when in dual PTT mode.
2	Upper PTT	Push-To-Talk switch - PTT on primary net.
3	Volume Control	▲ increases volume
		▼ decreases volume
4	Microphone	Built-in microphone
5	6-Pin Audio Connector	Provides a connection for an optional headset, handset, lapel microphone.
6	Rotary Switch	
	OFF	Pull-to-turn. Turns radio off. (White arrow and dot mark the off position when viewing top of rotary switch.)
	1 - 13	Selects nets 1 through 13.
	R	Pull-to-turn when placed in Remote (R) position permits the use of the Remote Keypad Display Unit (RKDU).
	Z	Pull-to-turn zeroizes (Z) all programmed variables, including encryption variables and user data.
7	GPS Antenna Connector	Connector for Global Positioning System (GPS) antenna.
8	Transmit/Receive Antenna Connector	Provides a 50-ohm antenna port via the Threaded Neill-Concelman (TNC) connector.
9	Ancillary Connector	Provides interface for various remote data devices.
10	Battery Latch	Slide up to unlock battery for removal.

3

Table 2. Radio Controls, Indicators, and Connectors (Continued)

Key	Control/ Indicator	Function
11	Keypad	 Used to access radio menus and controls. Contains: Top row - Soft keys used for functions listed on bottom edge of LCD display. Remaining three rows - Numbers/letters, up/down, and left/right arrows, [APPS],
		[PGM], [SQL], [LT], [①] (Circular Arrow / Space Symbol on the "0" button), [CLR], and [ENT] buttons.
		NOTE: Numeric keypad buttons have multiple uses depending on what is displayed on the screen. Numbers and letters are used when updating an editable field. These keys cycle through the characters on the key with each press (for example: the "8" key cycles through 8, T, U, V with each press. Buttons with only one label (CLR and ENT) are dedicated to a single purpose.
	(¹))	The Circular Arrow / Space Symbol on the "0" button switches the display between Tac Chat and Status screens for additional information. The Tac Chat home screen provides the following options; Navigation, Messages, Alerts, and Voice Mail.
	[LT] [3]	Provides access to the Keypad/Display back light control menu. Refer to [LT] Menu, p35.
	[SQL]	Toggles squelch (SQL) on and off.
	[APPS] [7]	Provides access to the applications menus. Refer to [APPS] Menu, p79.
	[PGM] [9]	Provides access to radio programming menus. Refer to [PGM] MENU, p97.
	[CLR]	CLEAR. Returns a field to its previous value, and activates the previous menu or screen.
	[ENT]	ENTER. Selects scroll field choices or locks in entry field data.

Table 2. Radio Controls, Indicators, and Connectors (Continued)

Key	Control/ Indicator	Function
	Soft Keys [●]	Soft keys are used for functions listed on bottom of screen. These can vary based on configuration. Refer to Symbols, p244.
	▲ and ▶	Allows the operator to move the cursor to the left or right.
	▲ and ▼	Allows the operator to move the cursor up or down.
12	Display	Displays operational and programming screens.

BEFORE COMMUNICATING

Make sure that the radio has been programmed prior to use. The radio can be programmed via the Communications Planning Application (CPA), front panel or by using the Web User Interface (refer to Web User Interface, p192).

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DISPLAY FEATURES

Basic display features are identified in Figure 4. The top line provides status information. The bottom line shows soft keys that are associated with the Soft Key [•] buttons on the keypad. These keys change depending on what is selected and what function is being used. Refer to Symbols, p244 for a complete symbol reference.

Battery icon is shown on displays throughout manual. VAA is actually displayed when HH is in a VAA.

GPS ACQUIRED (FLASHING IF

NOTE



Figure 4. Display Features

CHANGE VALUES ON DISPLAY

Some values can be changed on the main display without entering the programming menu. Use the **EDIT** soft key to open the **NET MANAGER** programming menu for the currently selected net and change other values.

Change values presented on the front panel as follows. See Figure 5.

- a. Select either ◀ and ▶ or ▲ and ▼ to highlight a field on the display.
- b. Access edit mode for the selected value by pressing [ENT].
- c. Select either ▲ and ▼ to change a value from a list (no soft keys) or use the **DEL**, <-, ->, **CLR** soft keys to change values.
- d. Apply the value by pressing [ENT].
- e. Select the **SAVE** soft key to keep changes through a power cycle.



Figure 5. Change Preset Values on Display

3

[LT] MENU

See Figure 6. Select **[LT]** (button 3) to access the Light menu. Set operation mode and adjust delay, intensity, and contrast for the screen back light. The default values are 5, 7, and 6 respectively. Select **[ENT]** to enter/change a highlighted field or **[CLR]** to back out of the menu.



Figure 6. [LT] Menu

3

REMOTE KDU

A Remote Keypad Display Unit (KDU) allows for full operation of the radio with extended access to the radio's display and keypad. Refer to Optional Accessories, p241 for part number information. Connect the Remote KDU to the radio or the Vehicular Amplifier Adapter (VAA). See Figure 7. Position the alignment key on the cable into the recess on the side connector of the radio for proper connection.

NOTE

The cable connection may be made with the radio either powered on or off.



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Figure 7. Remote KDU Connection
3

Remote KDU Operation

The Remote KDU feature is enabled by placing the radio pull-to-turn rotary switch to the " \mathbf{R} " position.

The handheld radio Remote KDU (12113-1000-0x) contains a USB Type-A connector on top of the Remote KDU. This connector can be used for connection of a camera or other device. Refer to ADVANCED OPERATIONS, p73 for further information.

NOTE

If the USB connection on top of the Remote KDU is being used, the cable length should be limited to 16 ft (5 m) to conform to the USB 2.0 Full Speed standard.

If the Remote KDU is connected to the radio, but the rotary switch is not in the " \mathbf{R} " position, the Remote KDU will display an alert message:

REMOTE KDU DISABLED TURN SWITCH TO R

Remote KDU - VAA Connection

The Vehicular Amplifier Adapter (VAA) Remote KDU (12113-1000-1x) is connected to the **REMOTE KDU** connector as shown in Figure 8. The cable connection may be made with the VAA and radio either powered on or off.

NOTE

The connection from the Remote KDU to the VAA may also be made with the Remote KDU Assembly (12113-1000-0x) if only six feet of extension is required. This shorter cable connects to the J11 DATA/REMOTE VAA connector. If additional cable length is required for the Remote KDU to VAA connection, use cable extensions (refer to Optional Accessories, p241 for part numbers), but not in excess of 140 feet (42.6 meters).

RF-7850M-HH BASIC OPERATIONS



Figure 8. Remote KDU - VAA Connection

Remote KDU Operation in VAA

The Remote KDU feature is enabled by placing the radio rotary switch to the " \mathbf{R} " position.

[PGM] > USER INTERFACES > FRONT PANEL > CONTROL function sets which source controls the radio functions. When the rotary switch is in the "R" (remote) position, the SINGLE setting determines that only the KDU is enabled. The MULTI-MIRRORED setting determines that the KDU and front panel are both enabled. If the Remote KDU is connected to the VAA, but the radio rotary switch is not in the "R" position, the KDU remote will display an alert message.

FF OPERATIONS



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RF-7850M-HH FF OPERATIONS

FIXED FREQUENCY

The radio operates in a frequency range of 30 MHz to 512 MHz in fixed frequency nets.

The radio is capable of AM and FM fixed frequency analog voice in Plain Text (PT) only or in CT.

4 Fixed Frequency Operation

Figure 9 shows a fixed frequency display in Plain Text (PT). Perform basic operation as follows.

- a. Place rotary switch in a fixed frequency net. Encryption keys must be programmed if operating in Cipher Text (CT).
- b. Select any net using the net name field.



Figure 9. Fixed Frequency Page 1

- c. Observe on page 1:
 - FF appears for Fixed Frequency
 - PT or CT is correct
 - POWER level is correct
 - Receive (RX) frequency and Transmit (TX) frequency are correct
 - R displays when idle (ready to receive) or flashes when actively receiving
 - **T** displays when transmitting
- d. Observe that while communicating, the RX/TX meter displays the relative received signal strength and transmit power level (LOW, MED, HIGH, HIGH+). The TX meter also indicates forward/reflected power.
- e. Observe that the soft key selections located on the bottom row of the display can vary based on configuration.
- f. Press [,] (0) to go to the page 2 shown in Figure 10.

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- g. Observe on page 2:
 - Correct VOCODER, MOD, SQUELCH and Bits Per Second (bps) are used. BPS is only applicable to digital voice or data.



NOTE

If Channel Access is set to NONE, the modulation setting (MOD) is Frequency Shift Keying (FSK) or Amplitude Shift Keying (ASK), and the Radio Identification (ID) is not displayed. If Channel Access is set to Legacy Multiple Access Collision Avoidance (MACA) or MACA2, the setting (MOD) is AUTO and the Radio ID is displayed. h. Press [] (0) to go to the Tac Chat IP screen shown in Figure 11.

NOTE

Refer to Radio Tac Chat Operation, p181 for details.



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Figure 11. Tac Chat IP Screen

RF-7850M-HH FF OPERATIONS

DUAL PUSH-TO-TALK (PTT)

The Dual Push-To-Talk (PTT) function allows you to communicate on a secondary net using a second PTT button. Dual PTT is programmed on a per net basis and is only supported on fixed frequency nets not configured for Multiple Access Collision Avoidance generation 2 (MACA2) or Legacy MACA. (Refer to ADVANCED OPERATIONS, p73 for information on MACA2.)

When dual PTT is active, the radio can transmit and receive on either of the two nets. The radio always associates the primary net (i.e., the selected net) with the primary PTT button (upper PTT), and the secondary net with the secondary PTT (lower PTT), regardless of which net is actively being received. For example, if receiving on the secondary net, pressing the PTT1 causes the radio to switch to the primary net and transmit.

Dual PTT Operation

Figure 12 shows a dual display example. For Dual PTT operation:

- a. Place rotary switch in one of two simple fixed frequency nets. Nets must be programmed for Dual PTT operation. Keys must be programmed if operating in CT.
- b. Observe correct encryption setting (PT or CT) for both nets.
- c. Observe that the transmit power level is correct (LOW, MED, HIGH, HIGH+).
- d. Observe that the correct Receive (**RX**) frequency and Transmit (**TX**) frequency are used for both nets.
- e. Observe that **R** displays when idle (ready to receive). Both nets are monitored for Receive traffic. The net name of the specific net you are actively receiving on will flash.
- f. Press upper PTT to transmit using PTT1. Press lower PTT to transmit using PTT2. Observe, when transmitting, the net name will blink. While communicating, the RX/TX meter displays the relative received/transmitted signal strength.
- g. Press [] (0) to go to the page 2 status screen.

- h. Observe crypto status (CT/PT), VOCODER (CLR, MELP, CVSD), and modulation (FSK) are displayed.
- i. Select [(1) again to go to the Tac Chat IP screen shown in Figure 11.



Figure 12. Dual PTT Screen

PT OVERRIDE

The radio is capable of receiving PT analog voice on a net programmed for CT digital voice. While demodulating analog FM voice in fixed frequency CT, periodic warning beeps occur. This is known as PT override. If the net is configured for PT, digital voice (CT) signals are not decrypted.

CHANNEL SCANNING

Channel scanning searches fixed frequency net presets in a scan list (up to 13) for the presence of an RF signal. Net scanning is not available in frequency hopping modes or Channel Access MACA1/MACA2 modes.

A full scan list can be used in PT. Reliable operation in CT requires two procedural modifications because of the preamble synchronization required by encrypted transmissions.

 First, the calling radio should have ROBUST set in the FSK PREAMBLE. This extends the transmitters preamble to give the scanning radio enough time to synchronize after it scans all other nets in the scan list.

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• Second, the number of nets in a CT scan list should be no more than five with a sixth Receive (RX) Priority Net. It is possible to scan more nets in CT, but some calls may be missed.

From the SCANNING programming menu, there are three scan modes; inactive, manual and automatic.

In automatic scan, the radio scans each net in the list for the presence of an RF signal. Hold time determines how long the radio will stay on a net after keying/transmitting. If hold time is zero (default), the radio will immediately resume auto scanning. Hang time determines how long the radio will stay on a net after receiving. The default is 3 seconds.

Change an automatic scan to a manual scan by pressing [CLR] at the SCANNING display. Select either the Up Arrow or Down Arrow to choose a net from the scan list. See Figure 13.



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Figure 13. Manual Scanning

CONFIGURATION REFERENCE (FF)

The following configurations identify some typical FF voice nets.

	РТ	СТ	Long Range
BANDWIDTH	25KHZ	25KHZ	25KHZ
CHANNEL ACCESS	NONE	NONE	NONE
TRANSEC	FF	FF	FF
CRYPTO MODE	PT	CT*	CT*
MODULATION	FSK or ASK	FSK or ASK	FSK
VOCODER	CLR	CVSD	MELP
BIT RATE	16K	16K	2.4 KBPS
TX POWER	HIGH	HIGH	HIGH
*Create an AES or Citadel key using PGM > KEY MANAGER.			

The following configurations identify some typical FF voice/data nets.

	Voice or Data	Voice and Data Advanced Opt.	Legacy MACA
BANDWIDTH	25KHZ	75KHZ	25KHZ
CHANNEL ACCESS	MACA2	MACA2	LEGACY
			MACA
TRANSEC	FF	FF	FF
CRYPTO MODE	PT/CT*	CT*	CT*
MODULATION	AUTO	AUTO	AUTO
VOCODER	MELP	MELP	CVSD
BIT RATE	64K	192K	16K
TX POWER	HIGH	HIGH	HIGH
*Create an AES or Citadel key using PGM > KEY MANAGER.			

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QUICKLOOK OPERATION

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RF-7850M-HH QUICKLOOK OPERATION

QUICKLOOK

Quicklook Electronic Counter-Counter Measures (ECCM) are supported. Transmit and receive operations are performed on either the same frequency hopset, or on different frequency hopsets. However, Quicklook Wide and Quicklook 3 in mixed mode (hop rate is auto) require the same frequency hopset.

The radio operates in a frequency range of 30 MHz to 511.975 MHz for Quicklook 1A/2, 3, and Quicklook Wide.

QUICKLOOK 1A/2

5

Quicklook 1A ECCM supports greater than 100 hops/second.

Quicklook 2 ECCM supports greater than 300 hops/second.

QUICKLOOK 3

Quicklook 3 ECCM supports the following.

- Free Channel Search (FCS) mode. Use this to automatically avoid poor channels.
- Slow hop rate (greater than 100 hops/second) and Medium hop rate (greater than 300 hops/second).
- Requires Time-of-Day (TOD) synchronization, either manually entered (within ±1 minute net wide) or through Global Positioning System (GPS).
- Stored channel condition data allows selection of the best possible frequency. Selection for TX is FCS only.

NOTE

All Quicklook 3 and Quicklook Wide nets require TOD synchronization.

 Quicklook 3 Fast Mode allows frequency hopping rates greater than 1000 hops/second. Uses Mixed-Excitation Linear Predictive Vocoder (MELP) voice and 2.4 kilobits per second (kbps) synchronous data. Compatible with all other Quicklook 3 modes.

• Quicklook 3 Mixed Mode automatically selects between transmitting on a single frequency (FCS mode) and a user-selected hop rate (slow, medium, fast) based on channel conditions. Compatible with all other Quicklook 3 modes.

QUICKLOOK WIDE

Quicklook Wide supports the following features.

- 75 kHz bandwidth channels.
- MACA2 channel access only.
- Data rate of 64 kbps at greater than 100 hops/second.
- Data rates of 48k, 24k, 8k, or 4.8k bps at greater than 300 hops/second.
- Requires Time-of-Day (TOD) synchronization, either manually entered (within ±1 minute net wide) or through GPS.
- · Requires the same hopset for transmit and receive operations.

QUICKLOOK OPERATION

Figure 14 shows an example of Quicklook 1A display. Figure 16 shows an example of Quicklook 3 display. Quicklook Wide is similar. Encryption keys must be programmed if operating in CT. Quicklook 3 and Quicklook Wide additionally require a TRANSEC Key and a Network ID. Quicklook Wide is selectable by changing the bandwidth to 75 kHz, all other QL waveforms are 25 kHz bandwidth. Perform basic operation as follows.

- a. Place rotary switch in a Quicklook net.
- b. Observe:
 - 1. QL1A, QL2, QL3, or QLW is displayed.
 - 2. Correct encryption setting (**PT** or **CT**) and **POWER** are used.

- Correct Receive (RX) hopset, Transmit (TX) hopset are used. Quicklook Wide does not support separate RX and TX hopsets.
- 4. **T** displays when transmitting, **R** displays when idle (ready to receive) or actively receiving.
- Observe the RX/TX meter while communicating to see relative received signal strength and transmit power level (LOW, MED, HIGH).
- d. Select [①] (0) to go to the next pages shown in Figure 15, Figure 17, and Figure 18.
- e. Observe:
 - 1. Correct VOCODER and BPS are used on QL1 and QL2.
 - Correct VOCODER, BPS, RATE, and TIME are used on QL3.
 - 3. Correct VOCODER, BPS, and ID are used on QLW.

Voice traffic is handled by a single (half-duplex) voice channel. This channel is dedicated to either digital voice, IP or Data Terminal Equipment (DTE) data. For Quicklook 3, Free Channel Search (FCS) and slow hopping data is encoded and transmitted at 16 kbps, while medium is sent at 12 kbps, and fast is sent at 2.4 kbps.

NOTE

Radio ID only displays in Quicklook 1A nets (when configured with Channel Access of MACA or MACA2) and Quicklook Wide nets (MACA2). Radio ID is not applicable for Quicklook 2 and Quicklook 3 nets.

RF-7850M-HH QUICKLOOK OPERATION



Figure 14. Quicklook 1A/2 Page 1



Figure 15. Quicklook 1A/2 Page 2







Figure 17. Quicklook 3 Page 2



HOPSET

A Hopset is a predetermined set of frequencies on which a radio transmits and receives. When using a Hopset, the radio switches transmit or receive frequencies in rapid succession. This capability adds a layer of security to transmitted signals and also serves to reduce the effects of signal jamming by enemy forces.

LOCKSET

A Lockset specifies a range of frequencies that will not be used during frequency hopping operations. Locksets are used when local directives prohibit transmission on certain frequencies, or for other operational reasons.

RF-7850M-HH QUICKLOOK OPERATION

CONFIGURATION REFERENCE (QL)

The configurations in Table 3 identify some typical QL hopping nets.

Parameter	QL1/2	QL3	QLW
BANDWIDTH	25KHZ	25KHZ	75KHZ
CHANNEL ACCESS	NONE	NONE	MACA2
TRANSEC	QL1A or QL2	QL3	QLW
NARROWBAND TR.		**	**
NETWORK IDENTIF		***	***
CRYPTO MODE	CT*	CT*	CT*
QL3 HOP RATE		FCS	
MODULATION	HOP	HOP	HOP
BIT RATE	16K	16K	64K
RX HOPSET	+	+	
TX HOPSET	+	+	
HOPSET			+
VOCODER	MELP	MELP	MELP

Table 3. Typical QL Hopping Nets

*Create an AES or Citadel key using PGM > KEY MANAGER. **Create a Narrowband TRANSEC key using PGM > TRANSEC.

***Enter a network identifier.

+Create a hopset key using PGM > TRANSEC > ECCM MANAGER.

CWR OPERATIONS 6



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COUNTRY WIDE REPEATER OVERVIEW

Country Wide Repeater (CWR) is built upon a Fixed Frequency network using the Multiple Access Collision Avoidance (MACA) version 2 (MACA2). MACA2 is an IP protocol for Narrowband waveforms used in International LOS radios.

Functionality

CWR provides the following functionality.

- Channel access algorithm
- Directed calling (no group calls or all calls)
- Broadcast Push-To-Talk (PTT)
- Group PTT
- Internet Protocol (IP) data: unicast, broadcast, and multicast
- Global Positioning System (GPS) Situational Awareness (SA) data

Repeater radios (RF-7800V or RF-7850M) serve as Remote Access Points (RAP), or stages, and are supported by a high speed IP backbone such as a Local Area Network (LAN). The RF-7800W High Capacity Line Of Sight (HCLOS) radio is a backbone that supports up to 100 stages. See Figure 19 for an example CWR system.

Up to 1022 devices are supported across the entire backbone. A device is either an outstation radio or a stage. A stage that consists of a pair of radios supports connectivity to the network and local coverage. A stage with only a single radio has no local coverage.

Data rates are:

- 25 kHz bandwidth at up to 64 kbps
- 75 kHz bandwidth at up to 192 kbps



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Figure 19. Example CWR System

Mobility

Users register to find and connect to a stage. You can move and reregister to connect to a different stage. Your radio always has the same IP address and radio ID for directed calls regardless of where it is connected. 6

Local Coverage

Ability for two outstations at one stage to communicate through the repeater when out of line of sight of each other.

Squad

This is the stage radio that services backbone access requests and is the entry point into CWRs for devices connected to the backbone.

Control Repeater

This is the stage radio that services registration requests and is used for local coverage.

6

TX Operations

You can configure the destination (LOS or backbone) of each type of communication.

- PTT1/PTT2 local, single stage, or multi-stage
- Directed calling local or backbone
- Unicast IP data local or backbone
- GPS local
- Broadcast/Multicast IP data local, single stage, or multi-stage

When set to local, outstations will talk directly to each other. When set to backbone, outstations will use the repeater radios to talk to other outstations even if located at the same stage.

Frequencies

The following identifies how frequencies are used in CWR.

- Squad Frequency (SF) Idle frequency that is used to initiate an action.
- Control/Registration Frequency (CF) Used for registration.
- Origin Frequency (OF) Source of the action switches to this frequency.
- Link Frequency (LF) Destination of the action switches to this frequency.

Configuration

Refer to the Communication Planning Application (CPA) help for examples of CWR system configurations. CPA is required for configuration.

Network Display Settings

Refer to [APPS] > CWR.

CWR OPERATION

Figure 20 shows an example of an outstation display. Perform basic operation as follows.

- a. Place rotary switch in a CWR net. Encryption keys must be programmed if operating in CT.
- b. Observe:
 - 1. **FF** is displayed as the net type.
 - 2. Correct encryption setting (PT or CT) is used.
 - 3. Correct Receive (**RX**), Transmit (**TX**), and **POWER** are used.
 - 4. **T** displays when transmitting, **R** displays when idle (ready to receive) or actively receiving.

 Observe the RX/TX meter while communicating to see relative received signal strength and transmit power level (LOW, MED, HIGH).



- d. Navigate to page 2 by pressing [😋] (0) (Figure 21).
- e. Observe:
 - 1. **FF** is displayed as the net type.
 - 2. Correct encryption setting (PT or CT) is used.
 - 3. Correct VOCODER, BPS, ID, and STAGE ID are used.



Figure 21. CWR Outstation Page 2

- f. Select registration **+ L** to go to the CWR Registration screen shown in Figure 22.
- Observe: g.
 - The Frequency Count ID is displayed for each Control / 1. Registration frequency configured.
 - 2. Correct Control / Registration frequency is used.
- Select registration J to start automatic registration. h.
- Select edit lo enter manual frequency entry registration i. mode.
- Navigate to the main display by pressing [CLR]. j.



Figure 22. CWR Registration

- k. Select PTT to go to the PTT Configuration screen shown in Figure 23.
- I. Observe:
 - 1. Broadcast displays for each PTT.
 - 2. Correct type of stage displays.
- m. Navigate to the main display by pressing [CLR].



Figure 23. CWR PTT Configuration

CWR OPERATION EXAMPLES

The following examples describe how CWR works.

Idle Backbone

This is the state of the backbone when idle.

- All squad repeaters are on their stage squad frequencies SF(x).
- All control repeaters are on their registration/control frequency CF(x).
- All outstations are on their respective squad frequencies SF(x).
- Outstations on the same stage can communicate with each other locally on SF(x).
- Outstations can request backbone access via the squad repeater their respective squad frequency SF(x).

Automatic Registration with Stage

The process to automatically register with a stage is as follows.

- a. User radio roams into range of the stage.
- b. Select registration ➡ ➡ from the status screen to go to the CWR Registration screen.
- c. Select registration 🍱 🛽 to start automatic registration.
- Observe that outstation radio cycles through the list of registration Frequencies (CF1, CF2, CF3) until a response is received.
- e. The stage control repeater responds on it's corresponding registration frequency CF(X).
- f. User radio records the Signal to Noise Ratio (SNR) of the exchange with the stage, and selects the stage with the best SNR. User radio sends data about itself to the stage on CF1.
- g. The stage stores the outstation radio data and sends stage data on CF1.

- h. User radio stores the stage data.
- Observe that if registration is successful, a message displays indicating the Stage ID your radio is connected to as shown in Figure 24.



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Figure 24. Successful Stage Connection

 Observe that if registration is not successful, a message displays indicating that your radio was unable to contact a stage.

Directed Call Data Example Single Stage

The process to place a directed call within a single stage is as follows.

- User 1 radio attempts to call/send IP data to User 2 radio (Tx Ops = backbone).
- b. The call is sent to the squad repeater on SF1.
- c. The squad repeater knows it is responsible for User 2 and forwards the call on SF1.
- User 2 replies to the squad repeater on SF1.
- e. The squad repeater forwards the reply to User 1 radio on SF1.
- f. The squad repeater informs the control repeater of circuit creation.
- g. User 1 and squad repeater switch to origin frequency OF1. User 2 and control repeater switch to link frequency LF1.

h. User 1 or User 2 selects the Constraints soft key to end the call.

Directed Call Data Example Single Stage

Place a directed call as follows.

- a. Select [0] to scroll to the Tac Chat screen.
- b. Select the **soft** key to place a call. See Figure 25.



c. Access the Radio Contact screen by pressing [ENT]. See Figure 26.



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Figure 26. Radio Contact

d. Select the radio you want to connect to and press [ENT]. See Figure 27.



e. Observe that your radio will attempt to make a connection. See Figure 28.



f. Observe that if successful, the screen displays as in Figure 29.



- g. Select [PTT] to make a call to the connected radio.
- h. Observe that the squad radio in the stage you are connected to cannot be used for other calls while the two outstation radios are communicating as shown in Figure 30.



CL-0461-4200-4069 Figure 30. Squad/Leader Radio - Busy

- i. User 1 or User 2 selects the Constraints soft key to end the call.
- j. Observe that the outstation radios will automatically terminate the circuit after being idle for a certain amount of time.

Directed Call/Unicast IP Data Process Multi-Stage

The process to place a directed call within multiple stages is as follows.

- a. User 1 radio attempts to call/send IP data to User 2 radio, which is connected to stage3 (Tx Ops = backbone).
- b. The call is sent to Squad1 on SF1.
- c. Squad 1 forwards the call to Squad 3 over the IP backbone.
- d. Squad 3 knows it is responsible for User 2 and forwards the call on SF3.
- e. User 2 replies to the squad repeater on SF3.
- f. Squad 3 forwards the reply to Squad 1.
- g. Squad1 forwards the reply to User 1 radio on SF1.
- h. Each squad repeater informs the control repeater on the stages of circuit creation.

- i. User 1 and Squad 1 switch to origin frequency OF1. User 2 and squad 3 switch to link frequency LF3.
- j. Select the **CS** soft key to end the call (either user can do this).
ADVANCED OPERATIONS

7

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This section contains information on advanced operations.

SIMULTANEOUS VOICE AND DATA

Simultaneous voice and data communications can take place on a fixed frequency net with CHANNEL ACCESS set to Multiple Access Collision Avoidance Generation 2 (MACA2) and CIRCUIT TYPE set to SIMULTANEOUS. Refer to [PGM] > NET MANAGER, p98 for circuit type descriptions.

VOICE BREAK-IN

A voice break-in results in the radio transmitting over any other radio currently using the channel. Press **[PTT]** for voice transmission. If the channel is in use, a variable hold-off occurs. This happens while attempting to get channel access, or when the channel is in use on a Legacy MACA / MACA2 net. Continue to press **[PTT]** during the hold-off tone (longer than five seconds). A voice break-in occurs.

CONNECTING CAMERA / USB DRIVE

Universal Serial Bus (USB) on radio must be set to AUTO or HOST (**[PGM]** > USB MODE) and the ancillary connector mode (**[PGM]** > MISC) must be set to AUTO or ON to mount a camera (or physical USB thumb drive) as an external USB drive on the radio. Refer to [PGM] > MISC, p144.

Connect a camera or USB drive using one of the USB cables listed in Optional Accessories, p241. Cable depends on camera USB connector.

- a. Connect USB cable between camera and radio.
- Observe that camera appears on radio as EXTUSBDRIVE1 in file browser ([APPS] > FILE BROWSER, p80).
- c. Send files to another radio or Internet Protocol (IP) address (refer to File Transfer Setup, p243).

CONNECTING TO IP NETWORK

Connect to IP network as follows.

- Set radio IP address of radio. Refer to [PGM] > IP CONFIGURATION, p136.
- Connect cable between radio and PC/router/hub. Use USB -Ethernet with RJ-45 cable (12067-5220-01). This cable has internal USB-to-Ethernet converter.

USER LEVELS

User login levels are described in Table 4. Default passwords are shown. Passwords are programmed from **[PGM] > USER INTERFACES** or from the Communication Planning Application (CPA) when the mission plan is downloaded.

User	Password	Intent	User Level Menus
level 1	HH01	Operator	 [APPS] File Browser SAR Beacon Built In Test IP Config Versions Faults Misc Date and Time Power Supply DTE Port CWR [PGM] Can modify SAR Beacon, Audio, and User Interfaces items. View only on most other items No Key Manager, Transec, USB Mode

Table 4. User Levels

User	Password	Intent	User Level Menus
level 2	HH02	COMSEC	Can perform level 1 functions plus: [PGM]
			Net Manager
			Net Assignments
			Key Manager
			• Transec
			Navigation
			USB Mode
			IP Configuration
-			Miscellaneous
			SAR Beacon
			Versions
			Audio
			DTE Port
			Date and Time
			User Interfaces
			Contacts
			VoIP
			Voice Mail
			Scanning
			• CWR
			Reg Service

Table 4. User Levels (Continued)

User	Password	Intent	User Level Menus
level 3	HH03	Comms Officer	Can perform level 2 functions plus: [APPS]
			Fill Radio
			Program Firmware
			[PGM]
			 Customer Algorithm Modification (CAM) settings
			SNMP Agent
			TAC CHAT IP
			User Interfaces, ASCII Remote
level 4	*See Note.	Maintenance	Can perform level 3 functions plus: [APPS]
			Diagnostics - BERT IDLE screen.
			BIT Error Rate Test Screen
			[PGM]
			• BERT
			Calibration

***NOTE:** User Level 4 password is provided with the Intermediate Maintenance Manual and is purchased separately. Refer to the Intermediate Maintenance Manual for BERT and calibration settings.

Login/Logout Information

Change user levels by logging out and logging in. To log out/log in:

- a. Select the [APPS] key to enter the front panel menu.
- b. Select the LOGOUT I soft key.
- c. Observe this prompt: "Are You Sure You Want to Logout"?.
- d. Select the YES ___ soft key to confirm log out or NO Sigma soft key to cancel logging out and press [ENT].
- Move to USER LEVEL and press [ENT].

- f. Enter a user level and press [ENT].
- g. Select ▼ to PASSWORD and press [ENT].
- h. Enter password within the text editor and press [ENT].
- i. Select the LOGIN /- soft key.
- j. Observe display returns to main display.

NOTE

If login fails, try again making sure to enter the correct user level and password with no spaces.

Select whether or not you remain logged in using **[PGM]** > **USER INTERFACES** > **FRONT PANEL** > **PERSISTENT LOGIN**. If persistent is set, you remain logged in after a power cycle. If none is set, you must log in upon every power cycle.

Set up login for the radio's terminal interface using **[PGM] > USER INTERFACES > ASCII REMOTE**. This is persistent along with the front panel.

Configure the embedded web server and session management using **[PGM] > USER INTERFACES > WEB INTERFACE**.

USER MESSAGES

Information messages and warning messages notify you that a certain action or configuration issue needs attention. These messages appear as shown in Figure 31 for example. Refer to Display Messages, p213 for descriptions of these messages.



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[APPS] MENU

See Figure 32. The Applications (**[APPS]**) menu is used for viewing the radio status, running a self-test, or for accessing the radio's internal applications, such as browsing the file system.

NOTE

Change or enter a highlighted field by pressing **[ENT]** or **[CLR]** to back out of a menu.



[APPS] > FILE BROWSER

Figure 33 shows the **FILE BROWSER** top level menu. Figure 34 and Figure 35 show the file browser screen when you are inside a user directory or another drive such as EXTUSBDRIVE1. Table 5 describes the functions available on the soft keys from FILE BROWSER. The MOVE and COPY soft key functions are not valid for FILE BROWSER folders. Management Information Bases (MIBS) are files used with SNMP network setup.

7 APPS PORS	
FILE BROWSER	
-BE CUSTOMAPPS	
I DRIVERS	
- 豳 SENTVOICEMAIL*	*DISPLAYS AFTER SENDING AT
- ^{INTUSBDRIVE}	**DISPLAYS ONLY WITH
- [™] EXTUSBDRIVE**	EXTUSBDRIVE CONNECTION.
SOFT KEYS USED FOR FUNC	TIONS III III
(MKDIR, MOVE, COPY, RENAM	IE, ERASE, AND DETAILS)
	CL-0461-4200-0052
Figure 33. [APPS] FILE BR	OWSER TOP LEVEL Menu







Table 5. File Browser Soft Key Functions

Soft Key	Function
MKDIR • + (MKDIR = Make Directory)	Create directories (folders).
Move 🗙 🗅	Move files (.jpg, .xml, .hcpa, .cpafill, .ruf).
COPY ኴ_ቶቤ	Copy files (.jpg, .xml, .hcpa, .cpafill, .ruf).
RENAME ■ → ■ (Press MORE to access)	Rename child directories and files.
ERASE III (Press MORE to access)	Erase (Delete) empty child directories and files.*
*All files must be removed from a directory before deleting the directory.	

7

[APPS] > FILL RADIO

See Figure 36. FILL RADIO launches a file browser that filters out anything that is not a .hcpa/.cpafill file or directory. When you select a corresponding .hcpa/.cpafill file, the radio will load with that fill file.

7 APPS PQRS	
CUSTOMAPPS	
-B DRIVERS	
-m INBOX	
- B SENTVOICEMAIL*	*DISPLAYS AFTER SENDING AT
	LEAST ONE VOICEMAIL FILE.
- CERTUSBDRIVE**	**DISPLAYS ONLY WITH EXTUSED RIVE CONNECTION
MIBS	CL-0461-4200-0084
Figure 36 [APPS]	

Load a mission plan fill using EXTUSBDRIVE1 as an example.

- a. Connect an external Universal Serial Bus (USB) flash drive.
- b. Mount the drive as EXTUSBDRIVE1.
- c. Access [APPS] > FILL RADIO.
- d. Navigate to the fill file and press [ENT].
- Select YES at the prompt "ARE YOU SURE YOU WANT TO LOAD A NEW CONFIG".
- f. Observe that the plan will load to the radio.

[APPS] > PGM FIRMWARE

See Figure 37. **PGM FIRMWARE** launches a file browser that filters out anything that is not a .ruf file or directory. When you select a firmware .ruf file, the radio will load with that firmware.

7 APPS PORS PGM FIRMWARE B ROOT B CUSTOMAPPS B INBOX B INBOX B INTUSBDRIVE B EXTUSBDRIVE* *DISPLAYS ONLY WITH B MIBS EXTUSBDRIVE CONNECTION.

CL-0461-4200-0083

Figure 37. [APPS] > PROGRAM FIRMWARE Menu

Load firmware using INTUSBDRIVE as an example.

- a. Obtain the firmware upgrade file from Harris (.ruf file type).
- b. Connect the USB Field Programming Cable (12164-0710-A006) using STORAGE DEVICE as the [PGM] > USB MODE.
- c. Place the **.ruf** file into the AutoLoad directory of the radio's USB drive xxxxx <drive letter>, where xxxxx is the serial number of the radio.
- d. Disconnect the cable.
- e. Observe a voice prompt for Firmware Updated.
- f. Place the radio in OFF and then back to a preset to power cycle the radio and complete the firmware reset.
- g. Select the Clear All soft key to go to the main preset screen.

[APPS] > SAR BEACON

See Figure 38. Search And Rescue (SAR) BEACON displays the beacon operating screen. Press soft key CFG to go to the programming menu (refer to [PGM] > SAR BEACON, p145). Press soft key ON to start beacon transmissions. Once started, press soft key OFF to stop transmission.



CL-0461-4200-4073

Figure 38. [APPS] > SAR BEACON

[APPS] > BUILT IN TEST

See Figure 39. **BUILT IN TEST** is used to run a radio self-test. Refer to Table 6 for descriptions of the menu items.



Figure 39. [APPS] > BUILT IN TEST Menu

Table 6. [APPS] > BUILT IN TEST Menu Items

ltem	Description
INTERACTIVE> BACKLIGHT	Runs test on LCD for backlight. User observes display for backlight changes.
INTERACTIVE> LCD CONTRAST	Runs test on LCD for contrast. User observes display for contrast changes.
INTERACTIVE> KEYPAD	Runs keypad test. Test displays keys pressed by user.
INTERACTIVE> KNOB	Runs test on radio knob positions. Test displays knob positions (1-13, R and Z) selected by user.
INTERACTIVE > MIC	Runs tests on circuits used for the internal microphone.
INTERACTIVE > AUX MIC	Runs tests on circuits used for headset microphone.
INTERACTIVE >ANC MIC	Runs tests on circuits used for ancillary microphone.
INTERACTIVE >SPEAKER	Runs tests on circuits used for internal speaker.
INTERACTIVE > AUX SPEAKER	Runs tests on circuits used for headset speaker.
INTERACTIVE > ANC SPEAKER	Runs tests on circuits used for ancillary speaker.
NON-INTERACTIVE (NI)	Runs communication test.
RUN ALL	Run all non-interactive tests and provides details for number passed, failed, tested and percent done.
STOP ALL	Stops all tests.
RESET RESULTS	Reset and all test results.
₲+₫	
RESULTS	Displays all test results.
Ū	

Table 6. [APPS] > BUILT IN TEST Menu Items (Continued)

ltem	Description
(NI) > FP COMMS	Tests front panel communications.
(NI) > CRYPTO KNOWN ANS	Runs the application crypto test.
(NI) > EXT RAM	Runs the modem external RAM test.
(NI) > IFS CS	Checks Image File System (IFS) Check Sum (CS) on modem.
(NI) > DSP PING	Checks if the modem side Digital Signal Processor (DSP) can be reached.
(NI) > DISP MEM.	Tests modem side DSP memory.
(NI) > TEST USB COMMS	Runs USB port communication test.
(NI) > VAA TESTS	Vehicular Amplifier Adapter (VAA) tests.
(NI) > IGPS	Checks communication with the internal Global Positioning System (GPS) module.
(NI) > SYNTH LOCK	Tests for Synthesizer (Synth) out of lock and other synthesizer faults.

[APPS] > IP CONFIG

See Figure 40. IP CONFIG displays the IP settings in the radio. Refer to Table 7 for descriptions of the menu items. ADD, DELETE, and FLUSH commands are displayed as soft key options in the IP CONFIG menu. Use ADD to add routes. Use DELETE to remove a route. Use FLUSH to remove all user added routes.



Figure 40. [APPS] > IP CONFIGURATION

Table 7. [APPS] > IP CONFIGURATION Menu Items

Item	Description
LAN > LAN MAC ADDRESS	Radio's current Media Access Control (MAC) address.
LAN > LAN IP ADDRESS	Radio's current wired IP address.
LAN > SUBNET MASK	Radio's current subnet mask.
WIRELESS > MAC ADDRESS	Radio's current wireless MAC address.
WIRELESS > IP ADDRESS	Radio's current wireless IP address.
WIRELESS > SUBNET MASK	Radio's current wireless subnet mask.
WIRELESS > NETWORK ADDRESS	Radio's current wireless network address.
WIRELESS > BROADCAST ADDR	Radio's current wireless broadcast address.
ACTIVE ROUTES > DESTINATION	Route's IP destination.
ACTIVE ROUTES > NETMASK	Route's net mask.
ACTIVE ROUTES > GATEWAY	Route's gateway IP address.

[APPS] > VERSIONS

See Figure 41. **VERSIONS** is used to view firmware versions and software options in the radio. Refer to Table 8 for descriptions of the menu items.



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Figure 41. [APPS] > VERSIONS

Table 8. [APPS] > VERSIONS Menu Items

Item	Description
SERIAL NO	Displays the radio's serial number.
FIRMWARE	Displays the radio's firmware version number.
SW OPTION	Displays the radio's installed software SW001, or SW002 for example.
ENG. REL	Displays the radio's engineering release level if installed.
BASELINE	Identifies if the installed version is a baseline version.
WEB CLIENT	Displays the radio's Web Client version if installed.

[APPS] > FAULTS

See Figure 42. Faults provide information related to a fault present in the radio. Refer to Table 40 for radio faults and applicable descriptions. See Figure 43 for a sample fault message. If a fault message is displayed, try clearing the fault and power cycle the radio. If fault persists, send the radio to maintenance.

NOTE

Fault messages related to VAA use are listed in the VAA Operation Manual.

NOTE

Faults will be retained after the radio is power cycled. They must be cleared manually by pressing the Delete Message soft key.



CL-0461-4200-0086

Figure 42. [APPS] > FAULTS



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[APPS] > MISC

See Figure 44. Miscellaneous **(MISC)** displays cable connection and retransmit state settings. Refer to Table 9 for descriptions of the menu items.



CL-0461-4200-0089

Figure 44. [APPS] > MISC Menu

Table 9. [A	PPS] >	> MISC	Menu	Items
-------------	--------	--------	------	-------

ltem	Description
CABLE CONNECTED	(Display only) YES if cable detected and NO if no cable connection is detected. Dependent on ANC Connector Mode setting to AUTO.
SIMPLE RETRANS > STATE	(Display only) Indicates CONNECTED when radio can communicate with other retransmit site radio; NOT CONNECTED may indicate connection or configuration problem.
RADIO STARTED	(Display only) Indicates the status of the basic radio startup. READY when radio has completed startup. BOOTING indicates radio is not ready for normal operation yet.

[APPS] > DATE AND TIME

See Figure 45. Use to view and edit the radio's date and time settings. Change time and date by pressing **[ENT]** and entering information. Select SET **s** soft key to confirm change. Select Universal Time Coordinated (UTC) soft key to change settings (time format, offset).



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Figure 45. [APPS] > DATE AND TIME

[APPS] > POWER SUPPLY

See Figure 46. Use to view the radio (and VAA, if attached) source power status. The display includes the type of battery, current voltage, temperature, relative charge, absolute charge and voltage sourced by a Vehicular Amplifier (if any). A bar graph also shows the current charge status.



Figure 46. [APPS] > POWER SUPPLY

[APPS] > DTE PORT

Use to view information about the current Data Terminal Equipment (DTE) connection to the radio. The display is blank with no connection.

[APPS] > CWR

Country Wide Repeater **(CWR)** displays settings for the network. See Figure 47. Refer to Table 10 for descriptions of the menu items. Select **A.**. to auto register or **M.**. to manually register. Enter a manual register frequency. Select **M.**. again to initiate the manual registration.

Item	Description
BACKBONE RADIO	(Display only) Indicates if radio is on backbone (True, False).
FREQUENCIES > LAST ENT FREQ	(Display only) Indicates value of last manual frequency.
ACTIVE FREQUENCY	(Display only) Indicates value of active frequency.
STAGE NAME	(Display only) Indicates stage name.
STAGE MAC ADDRESS	(Display only) Indicates value of stage MAC address.
STAGE PAIRED	(Display only) Indicates paired state of stage (True, False).
STAGE STATE	(Display only) Indicates state of CWR net (IDLE, CONNECTING, CONNECTED, BROADCAST).
OUTSTATION STATE	(Display only) Indicates state of CWR net (IDLE, MULTI- STAGE, SINGLE-STAGE, BACKBONE DATA).

Table 10. [APPS] > CWR Menu Items



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Figure 47. [APPS] > CWR

PROGRAMMING

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PROGRAMMING OVERVIEW

This section provides information on front panel programming. Programming is also accomplished using the Communications Planning Application (CPA) or using the Web User Interface.

Some programming functions may not be available because of your User Level. Refer to User Levels, p75 for more information.

Select the **SAVE** Soft key to save changes made from the front panel programming functions.

Restore factory defaults by pressing **[APPS]** and selecting the **ZERO** soft key or place the rotary switch in the **Z** position. Refer to Radio Controls, p28 for basic operations.

Program the radio from a CPA mission plan while logged in as user level 3. Use the following methods to transfer the plan.

- 8
- Connect the USB Field Programming Cable (12067-7220-A006) and use the CPA Programming screen to load the fill file. Disconnect the cable to initiate programming.
- Connect an external Universal Serial Bus (USB) flash drive (12067-5600-01). Mount the drive as EXTUSBDRIVE1.
- Connect a USB to Ethernet adapter cable (12067-5220-01) and use File Transfer Protocol (FTP) and copy the fill to the radio's Autoload directory.
- Upload the plan using the Web User Interface File Browser.
- Connect the PC and radio on the same network using direct Ethernet or Remote Network Driver Interface Specification (RNDIS) for USB. Fill the radio directly through the CPA by specifying the IP address.

Fill the radio as follows.

- a. Access [APPS] > FILL RADIO.
- b. Navigate to the fill file and press [ENT].
- c. Select YES at the prompt "ARE YOU SURE YOU WANT TO LOAD A NEW CONFIG". The plan will load to the radio.

[PGM] MENU

See Figure 48. Select **[PGM]** to access the program menu. Configure radio functions such as nets, IP address, crypto keys, Global Positioning System (GPS), hopsets, radio interface, and so forth.

NOTE

Some settings are only visible based on other settings. Refer to Table 12 for supported modes of operation for modulation, frequency, channel access, data rates, etc.



[PGM] > NET MANAGER

Use **NET MANAGER** to program up to 25 nets. Assigned nets are accessible using the rotary switch (1-13) positions. Refer to [PGM] > NET ASSIGNMENTS, p125. The predefined nets can be numbered or named using any alphanumeric character up to 20 English characters in length (or 10 Arabic).

See Figure 49 for NET MANAGER programming tree structure for Fixed Frequency (FF) net specific menu structure.

See Figure 50 for the Quicklook 1A (QL1A), and Quicklook 2 (QL2) nets specific menu structure.

See Figure 51 for the Quicklook 3 (QL3) net specific menu structure.

See Figure 52 for the Quicklook Wide (QLW) net specific menu structure.

See Figure 53 for the Country Wide Repeater (CWR) net specific menu structure.

See Figure 54 for the APPS portion of the net structure.

Refer to Table 11 for descriptions of the menu items for each net.

Refer to Table 12 for supported modes of operation for modulation, frequency, channel access, data rates, etc.







Figure 49. [PGM] > NET MANAGER, FF (Sheet 2 of 3)

(B)

── RX CTCSS USER ENTRY* └── <enter 254.1="" 67="" hz="" to=""> ── TX CTCSS USER ENTRY*</enter>					
└── <enter 254.1="" 67="" hz="" to=""> └── CTCSS RX/TX PRIORITY* └── TX, RX</enter>					
	* ONLY APPEARS FOR USER.				
└── 8.0 KHZ, 6.5 KHZ, 5.0 KHZ └── VOCODER └── CLR**, CVSD, MELP	**SIMPLE FIXED FREQUENCY NETS (CHANNEL ACCESS NONE).				
- RX ONLY	***LEGACY MACA AND				
	MACA2 NETS.				
	AHIGH+ DOES NOT APPLY				
LOW, MED, HIGH, HIGH+ ^	TO V5XX RADIOS.				
EMPTY, <net name=""></net>	^^MACA2 NETS.				
INFO TYPE	TATUS, TAC CHAT IP				
- ADDRESS MODE					
EIGHT_BIT					
MAC ADDRESS***					
└── 1 - 254					
BROADCAST ADDRESS					
BASE ADDRESS***					
0 - 254					
MACA2 TALK GROUPS ^^					
	IATION IATION				
└─ APPS (SEE SEPARATE FIGURE)				
	CL-0461-4200-0030-3				

Figure 49. [PGM] > NET MANAGER, FF (Sheet 3 of 3)

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NOTE: USE THIS FIGURE FOR QL1A, AND QL2 NETS ONLY.

NAMED NETS CAN BE ADDED** USING CPA OR THE ADD SOFT KEY. *QL2 REQUIRES CHANNEL** ***LEGACY MACA AND MACA2 NETS. **^HIGH+ DOES NOT APPLY**





Figure 50. [PGM] > NET MANAGER, QL1A, QL2 Menu







Figure 52. [PGM] > NET MANAGER, QLW Menu

8





Figure 53. [PGM] > NET MANAGER, CWR Menu (Sheet 1 of 3)

(A)	
TONE, NOISE, NONE, DIGITAL, CTCS	S
- RX CTCSS FREQUENCY	
└─ <select from="" list,="" or="" user=""></select>	
RX CTCSS USER ENTRY	
└── <enter 254.1="" 67="" hz="" to=""></enter>	
CTCSS RX/TX PRIORITY	
└── TX, RX	
- FM DEVIATION	
🖵 8.0 KHZ, 6.5 KHZ, 5.0 KHZ	
CVSD, MELP	
LOW, MED, HIGH, HIGH	
└── PAGE 1 STATUS, PAGE 2 STATUS, TAC CHAT IP	
- INFO_TYPE	
└── D/V, DATA, VOICE	
- MAC ADDRESS	
└── 1 - 254	
- BROADCAST ADDRESS	
PTT2 TALK GROUP DESTINATION, TALK GROUP	
(B)	CI -0461-4200-4084-2
	22 0 101 1200 1001 2

Figure 53. [PGM] > NET MANAGER, CWR Menu (Sheet 2 of 3)



CL-0461-4200-4084-3

Figure 53. [PGM] > NET MANAGER, CWR Menu (Sheet 3 of 3)



Figure 54. [PGM] > NET MANAGER, APPS Menu (Sheet 1 of 3)

8


Figure 54. [PGM] > NET MANAGER, APPS Menu (Sheet 2 of 3)



Figure 54. [PGM] > NET MANAGER, APPS Menu (Sheet 3 of 3)

NOTE

Some settings are only visible based on other settings. For example, if the net is set to Cipher Text (CT), then AUTO REPORT is visible (select EDIT **then** APPS > NAVIGATION).

Refer to Table 12 for supported modes of operation for modulation, frequency, channel access, and data rates.

Table 11. [PGM] > NET MANAGER Menu Items

Item	Description				
Net Name (or Number) can be any net, 1 - 25.					
Net Name > FSK PREAMBLE	Select Frequency Shift Keying (FSK) Preamble length depending on channel conditions. Only available on fixed frequency simple nets (CHANNEL ACCESS = NONE). Preamble must be the same in all radios in the net:				
	 DEFAULT - Appropriate for all modes except as described for ROBUST and SHORT. 				
	 ROBUST - Use for poor channel conditions, when transmitting to a radio that is scanning, or when transmitting through an RF-5800V retransmit site. 				
	 SHORT - Can be used if power management is disabled and channel conditions are good. 				
Net Name > ALLOW 75KHZ FM	Displayed as YES, NO.				
Net Name > BANDWIDTH	Select 25 kHz or 75 kHz bandwidth. Higher bandwidths allow higher data rates, lower bandwidth is compatible with legacy radios.				
	The 25 kHz channels support data rates up to 64 kbps in fixed frequency. The 75 kHz channels support data rates up to 192 kbps in fixed frequency. These data rates have the advantage of reducing transmission time and bringing advanced functionality to the combat net radio. A 25 kHz channel block provides flexibility to the communication plan development by allowing the planner to use channels spaced in tight 25 kHz increments.				
Net Name > CHANNEL ACCESS	Select None, Multiple Access Collision Avoidance generation 2 (MACA2), or Legacy MACA.				

Item	Description			
Net Name > TRANSEC	Select TRANSEC to correspond to type of channel being used such as Fixed Frequency and Quicklook 1A, 2, 3, and Quicklook Wide.			
Net Name > TRANSEC KEY NAME	Select TRANSEC KEY to correspond to TRANSEC channel being used for Quicklook 3, and Quicklook Wide.			
Net Name > NB TRANSEC KEY	Select programmed Narrowband TRANSEC key.			
Net Name > NETWORK IDENTIFIER	Specify a unique network identifier for Quicklook 3 and Quicklook Wide.			
Net Name > CRYPTO MODE	Select Plain Text (PT) (unencrypted) or Cipher Text (CT) (encrypted).			
Net Name > CRYPTO KEY NAME	If crypto is CT, select name for key programmed per [PGM] > KEY MANAGER, p126.			

ltem	Description			
Net Name > CIRCUIT TYPE	For MACA2, select: NONE - A setting of NONE makes the radios on the net use MACA2 for channel access. Data transmission is limited to an on-air time up to four seconds for the channel access probability and data throughput. DATA CIRCUITS - A setting of DATA CIRCUITS reserves the channel for point-to- point data transfer for two radios. Data Circuits is the preferred mode for streaming video. While the two radios are transferring data, all other channel activity is held off, including voice. If you want voice communications while a data circuit is active, you must perform a voice break-in (refer to Voice Break-In, p74). SIMULTANEOUS - A setting of SIMULTANEOUS allows you to transmit voice and data at the same time. With this type of network, the data is limited to a channel access window of two seconds maximum and is subject to the standard MACA2 channel access requests. This setting allows you to send Mixed- Excitation Linear Predictive Vocoder (MELP) voice without interrupting IP data and Situational Awareness (SA) reports on the net (with limited data throughput).			
Net Name > QL3 HOP RATE	For Quicklook 3 (QL3), Free Channel Search (FCS) and slow hopping is encoded and transmitted at 16 kbps, while medium is sent at 12 kbps, and fast is sent at 2.4 kbps. AUTO will choose between FCS and the configured QL3 Preferred Hop Rate.			
Net Name > MIXED MODE HOP	For Quicklook 3 if AUTO is selected above, select a preferred hop rate of Slow, Med, or Fast.			

Item	Description				
Net Name > MODULATION	User can select between FSK and Amplitude Shift Keying (ASK), if 25 kHz Bandwidth, Channel Access (None), and Fixed Frequency selected. Also frequency must be in allowed range. Refer to Table 12.				
Net Name > DEMODULATION	Not user selectable. Refer to Table 12.				
Net Name > AM BANDWIDTH	(ASK modulation only). Select AM bandwidth of 25 kHz, 12.5 kHz, or 8.33 kHz.				
Net Name > BIT RATE	Select bit rate for data operations. Data rates range from 1600 bps to 192000 bps. For 75 kHz bandwidth, use 4800 to 192000 rate indicated as wide bandwidth (WIDE BW). Refer to Table 12.				
Net Name > CRYPTO SYNC MODE	 If crypto mode is CT, select crypto Synchronization (Sync) mode. MINERR (default mode) - in this mode, a sync signal must be received before encrypted transmission can take place. Supported on Simple and Wireless Internet Protocol (WIP) nets. RESYNC - allows a radio on simple voice/data nets to receive an encrypted transmission already in progress. More susceptible to noise than MINERR. 				
Net Name > HOPSET	Empty, or hopset name. Used for Quicklook Wide, where separate Rx and Tx hopsets are not supported. [PGM] > TRANSEC, p127.				
Net Name > RX HOPSET	Enter receive hopset that was previously configured per [PGM] > TRANSEC, p127.				
Net Name > TX HOPSET	Enter transmit hopset that was previously configured per [PGM] > TRANSEC, p127.				
Net Name > RX FREQUENCY	Enter receive frequency from 30 - 512 MHz.				
Net Name > TX FREQUENCY	Enter transmit frequency from 30 - 512 MHz.				

Item	Description				
Net Name > RX SQUELCH	Select CTCSS, noise, tone, digital or none. All radios in the net must use the same squelch for transmit and receive.				
Net Name > TX SQUELCH	Select CTCSS, tone or none when in PT and channel access is none.				
Net Name > TX CTCSS FREQUENCY	When using CTCSS, select squelch frequency or User. User allows selections other than in the standard table.				
Net Name > TX CTCSS USER ENTRY	When User is selected, choose a squelch frequency from 67.00 Hz to 254.10 Hz.				
Net Name > CTCSS RX/TX PRIORITY	This field becomes active if TX Squelch Type and RX Squelch Type have both been set to CTCSS. Designate either TX or RX as the Priority.				
Net Name > FM DEVIATION	Select FM deviation of 5 kHz, 6.5 kHz, or 8 kHz. All radios in the net must use the same deviation.				
Net Name > VOCODER	Select voice encoder/decoder: Continuously Variable Slope Delta (CVSD), Mixed- Excitation Linear Predictive Vocoder (MELP) or analog (clear).				
Net Name > RX ONLY	Select whether net is receive only or not. Transmission is not allowed on this net when RX only is selected.				
Net Name > TX POWER	Select transmit power level of LOW, MED, HIGH, or HIGH+.				
Net Name > HOME SCREEN	Set which screen will be displayed as the first screen shown for the net: PAGE 1 STATUS, PAGE 2 STATUS, or the TAC CHAT IP home screen. Note that all three can always be accessed by pressing the Circular Arrow button.				

Item	Description				
Net Name > SECONDARY NET ID	Select net to use as secondary net in dual Push-To-Talk (PTT). Use EMPTY to disable secondary net PTT. When empty, lower PTT or upper PTT keys primary net. Secondary Net ID is not displayed when using Quicklook.				
Net Name > INFO TYPE	Specifies the type of information to send over the air. Data and Voice (D/V), Data, or Voice.				
Net Name > MAC ADDRESS	Enter Media Access Control (MAC) address of radio (used when configuring a Legacy MACA, or MACA2 wireless IP net). Valid entries are 1 - 254. Use the same number as the last octet of the IP address.				
Net Name > BROADCAST ADDRESS	For CWR nets, this is fixed at 1023.				
Net Name > BASE ADDRESS	Base station MAC address (radio ID) when channel access is set to MACA or MACA2. This is normally used for telephony to specify the radio connected to an RF-6010 or Private Branch Exchange (PBX). Also used to enable all radio directed calls in MACA/MACA2 nets.				
Net Name > MACA2 TALK GROUPS	Set talk group destination on MACA2 nets for up to 10 talk groups. Select PTT1 TALK GROUP DEST or PTT2 TALK GROUP DEST and scroll to the proper talk group to assign PTT1 or PTT2 to a talk group. Refer to Group Calling, p177.				
Net Name > DUAL PTT ON	Select whether DUAL PTT will be enabled. TRUE or FALSE.				
Net Name > CWR TX OP	Refer to CPA help.				
Net Name > APPS > VOICE > ALLOW	If YES, voice communications functions are allowed.				
Net Name > APPS > NAVIGATION > ALLOW	If YES, GPS functions are allowed.				

Item	Description				
Net Name > APPS > NAVIGATION > AUTO REPORT	Select the type of GPS reports to send (CT only). Report selections are: NEVER, and PTT. Additions for MACA nets are: POSITION, TIMED, or TIMED + POSITION.				
Net Name > APPS > NAVIGATION > REPORT FORMAT	Select NORMAL, or COMPATIBILITY. This item is shown for non-MACA nets.				
Net Name > APPS > NAVIGATION > REPORT INTERVAL	 Send GPS reports (Interval): REPORT INTERVAL applies to TIMED or TIMED + POSITION auto reporting. Values can be 1 - 9999 seconds. 				
Net Name > APPS > NAVIGATION > POSITION REPORT DISTANCE	 Send GPS reports (Distance): POS. REPORT DISTANCE applies to POSITION or TIMED + POSITION auto reporting. Values can be 1 - 99,999 meters. 				
Net Name > APPS > NAVIGATION > POSITION SERVER	Disable (OFF) or set CUSTOM IP address, or WEB FILE for a position server that gathers the radio positions. WEB FILE is case sensitive: <u>https://<ip< u=""> Address of radio>/ SituationalAwareness.kml Note: If Secure Socket Layer (SSL) is disabled on the PC, use http://<ip address<br="">of radio>/ SituationalAwareness.kml</ip></ip<></u>				
Net Name > APPS > NAVIGATION > POSITION SERVER IP	Enter the IP address of the position server to forward reports.				
Net Name > APPS > NAVIGATION > POSITION SERVER PORT	Enter a 4-digit port number on the position server to access (1001).				
Net Name > APPS > NAVIGATION > IP REPORT INTERVAL	Enter an interval in seconds between forwarding each report. Default is 30.				

Item	Description		
Net Name > APPS > NAVIGATION > IP FORMAT	Enter the format of the reports that will be sent to the position server. Choices are HARRIS SA, Keyhole Markup language (KML), or North Atlantic Treaty Organization (NATO) Friendly Force Information (NFFI). If NFFI is selected, the following properties become active: Source Country, Source System, Source Subsystem, Destination Country, Destination System, Destination Subsystem, Data Priority. Select the country from the list of all countries.		
	For Source and Destination System/Subsystem, enter a value between 0 and 255. For Data Priority, select Routine, Priority, Immediate, or Flash Data priority.		
Net Name > APPS > NAVIGATION > SOURCE COUNTRY	For NFFI IP Format only. Enter a value between 0 and 1023 representing the source country. 0, the default, means the source country is unspecified.		
Net Name > APPS > NAVIGATION > SOURCE SYSTEM	For NFFI IP Format only. Enter a value between 0 and 255 to specify the numeric representation of the Force Tracking System(s) sending/receiving tracking data. 0 represents any system and 255 represents all systems.		
Net Name > APPS > NAVIGATION > SOURCE SUBSYSTEM	For NFFI IP Format only. Enter a value between 0 and 255 to specify the numeric representation of the Force Tracking System(s) sending/receiving tracking data. 0 represents any subsystem and 255 represents all subsystems.		
Net Name > APPS > NAVIGATION > DEST COUNTRY	For NFFI IP Format only. Enter a value between 0 and 1023 representing the destination country. 0, the default, means the destination country is unspecified.		

Item	Description
Net Name > APPS > NAVIGATION > DEST SYSTEM	For NFFI IP Format only. Enter a value between 0 and 255 to specify the numeric representation of the Force Tracking System(s) sending/receiving tracking data. 0 represents any system and 255 represents all systems.
Net Name > APPS > NAVIGATION > DEST SUBSYSTEM	For NFFI IP Format only. Enter a value between 0 and 255 to specify the numeric representation of the Force Tracking System(s) sending/receiving tracking data. 0 represents any subsystem and 255 represents all subsystems.
Name > APPS > NAVIGATION > DATA PRIORITY	For NFFI IP Format only. Select Routine, Priority, Immediate, or Flash Data priority.
Net Name > APPS > DTE/PPP > ALLOW	If YES, Data Terminal Equipment (DTE) or Point-to-Point Protocol (PPP) functions are allowed. DTE is used for data communications. Use the RS-232 DTE data port to send and receive up to 64 kbps synchronous digital data in PT or CT over fixed frequency, or up to 64 kbps for Quicklook Wide ECCM.
Net Name > APPS > DTE/PPP > SERIAL COMMUNICATION	Select DTE or PPP. DTE mode is SYNC for most channel access types. ASYNC is used for advanced channel access options.
Net Name > APPS > RETRANSMIT	Enable or disable radio retransmit mode. If Enabled, configure MODE, MUTE AUDIO, TRANSMIT IP, and RECEIVE IP. SIMPLE RETRANSM is false for Advanced and is limited to red retransmit mode. Advanced dynamically transcodes audio on networks with differently configured retransmit radios. Simple provides red/black retransmit on FF nets with retrans configured the same way.
Net Name > APPS > WIRELESS IP > ALLOW	If YES, IP functions are allowed.

Item	Description				
Net Name > APPS > WIRELESS IP > IP FORWARDING	Select No Forwarding, Remote Network Driver Interface Specification (RNDIS) Peer, or PPP Peer.				
Net Name > APPS > WIRELESS IP > NETWORK ADDRESS	Enter IP address of radio for net being programmed (MACA or MACA2).				
Net Name > APPS > WIRELESS IP > GATEWAY	Enter the gateway IP address (MACA or MACA2). This typically would connect to another subnet or domain.				
Net Name > APPS > WIRELESS IP > BROADCAST GATEWAY	Enter the broadcast gateway IP address (MACA or MACA2). This tells the radio where to send the broadcast IP packets.				
Net Name > APPS > WIRELESS IP > SUBNET MASK	Enter the subnet mask (MACA or MACA2).				
Net Name > APPS > WIRELESS IP > AUTO TX RATE	 Select ENABLED to enable automatic transmit rate. When configured for MACA or MACA2 (not applicable to Quicklook Wide nets) on a per burst basis, the radio will select the most suitable data rate based on current channel conditions. Available data rates include: 25 kHz channel: 1.6K, 2.6K, 8K, 16K, 21.3K, 42.6K, 64K 75 kHz channel: 4.8K, 8K, 24K, 48K, 64K, 128K, 192K 				
Net Name > APPS > FILE TRANSFER > CONFIG MODE	Select automatic or manual (available with LEGACY MACA or MACA2). NOTE: Manual template only appears if configuration mode is set to manual.				
Net Name > APPS > FILE TRANSFER > TX MODE	Select the transmission mode: Normal, Aggressive, or Robust.				
Net Name > APPS > FILE TRANSFER > TX RETRIES	Specify the number of burst retries.				
Net Name > APPS > FILE TRANSFER > BURST TIMEOUT	Enter number of seconds (sec) timeout before a retry occurs. NOTE: Only available at user level 4 login.				

Table 11. [PGM] > NET MANAGER Menu Items (Continued)

Item	Description			
Net Name > APPS > LEGACY SMS > ALLOW	Set YES to allow Legacy SMS on this network.			
Net Name > APPS > UDP PROXY > ALLOW	Set YES to allow User Datagram Protocol/Internet Protocol (UDP/IP) Proxy on this network.			
Net Name > APPS > UDP PROXY > LOCAL PORT	The UDP port number on which to receive data that is to be forwarded across the wireless interface.			
Net Name > APPS > UDP PROXY > REMOTE IP	Enter destination IP address to forward received data [0.0.0.0 to 255.255.255.255].			
Net Name > APPS > UDP PROXY > REMOTE PORT	Enter destination UDP port to forward received data [0-9999].			
Net Name > APPS > VOICE OVER IP	Select the Real Time Transport Protocol (RTP) channels on which primary and secondary net traffic is forwarded.			

Table 12 shows supported modes of operation for the radio. The shaded background areas indicate compatibility with the RF-5800V-HH radio. The RF-5800V-MP radio is compatible with the shaded areas as well as QL2 and all baud rates of Legacy MACA.

Bandwidth	Channel Access	TRANSEC	Crypto	Circuit Type	Modulation	Selected Bit Rate	Vocoder
25 kHz	None	QL1a	PT or	N/A	Hopping	16K	CVSD
			CI		(HUP)		MELP
	QL2	PT or CT	N/A	HOP	12K	CVSD or MELP	
		FF	PT	NONE	FSK/ASK	16K	CLR
			СТ	N/A	FSK/ASK	16K	CVSD
25 kHz	Iz None FF	FF	СТ	N/A	FSK/ASK	16K	MELP*
			PT or CT	N/A	FSK/ASK	2.4K	MELP/ CLR**
25 kHz None	QL3	PT or CT	N/A	FCS / SLOW	16K	CVSDor MELP	
					MEDIUM	12K	CVSDor MELP
					FAST	2.4 K	MELP

Table 12. Supported Modes of Operation

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Bandwidth	Channel Access	TRANSEC	Crypto	Circuit Type	Modulation	Selected Bit Rate	Vocoder
kHz	Legacy	QL1a	PT or	None	HOP	1.6 K	CVS
	MACA	U			2.6 K		
						8 K	

Table 12. Supported Modes of Operation (Continued)

	Ċ					Se	
25 kHz	Legacy	QL1a	PT or	None	HOP	1.6 K	CVSD
	MACA		CI			2.6 K	
						8 K	
						16 K	
		FF	PT or	None	FSK /	1.6K	CVSD
			CI		Trellis Coded Modulati on (TCM)	2.6K	
						8K	
						16K	
						21.3K	
						42.6K	
						64K	
25 kHz	MACA2	QL1a	PT or	None/	HOP	1.6K	CVSDor
				Dala		2.6K	WELP
						8K	
						16K	
		FF	PT or	None/	FSK	1.6K	CVSDor
			CI	SVD		2.6K	(MELP
						8K	only on SVD)
						16K	,
						21.3K	
						42.6K	
						64K	

Table 12. Supported Modes of Operation (Continued)

Bandwidth	Channel Access	TRANSEC	Crypto	Circuit Type	Modulation	Selected Bit Rate	Vocoder			
75 kHz	MACA2	FF	PT or	None/	FSK	4.8K	CVSDor			
						CI	SVD		8K	(MELP
								24K	only on SVD)	
						48K	, ,			
						64K				
						128K				
						192K				
75 kHz	MACA2	QLW	PT or	None/	QL Wide	4.8K	MELPor			
						Data		8K	CVSD	
						24K				
						48K				
						64K	1			

* ASK supports MELP in CT only when AM Bandwidth is 25 kHz. ** CLR only for ASK using PT.

[PGM] > NET ASSIGNMENTS

See Figure 55. **NET ASSIGNMENTS** is used to set up the rotary switch on top of the radio. Refer to Table 13 for descriptions of the menu items. Up to 25 nets can be configured and 13 of them can be selected using the rotary switch.



Figure 55. [PGM] > NET ASSIGNMENTS Menu

Table 13. [PGM] > NET ASSIGNMENTS Menu Items

Item	Description
PHYSICAL POSITION	Displays current knob position.
VIRTUAL POSITION	Enter a Virtual Position value (0 to 12).
POSITION MODE	Displays mode as physical mode or virtual mode.
MODE SWITCH	Select which of the (up to) 25 nets is assigned to preset 1 - 13. Select DEFAULT, EMPTY, or any net name.

[PGM] > KEY MANAGER

See Figure 56. **KEY MANAGER** is used to program crypto keys. This menu is used to assign a name to each user-entered key. The Encryption Type selected determines the length in bits of a user-entered key (for example, CITADEL_128 uses 32 hexadecimal characters, CITADEL_256 uses 64 hexadecimal characters). Refer to Table 14 for descriptions of the menu items.



*USE THE ADD
SOFT KEY TO ADD NEW USER KEY NAMES **TEK TYPE CHANGES AUTOMATICALLY DEPENDING UPON USER-SELECTED ENCRYPTION TYPE. ***DISPLAY ONLY. CLONEL 4200 0011

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Figure 56. [PGM] > KEY MANAGER Menu

Table 14. [PGM] > KEY MANAGER Menu Items

ltem	Description
KEY	Program keys. Select ADD, DEL, or RENAME.
KEY> Key Name	Use ADD to add a key or DEL to remove a user named key.
KEY > Key Name > ENCRYPTION TYPE	Encryption type is assigned to user named key.
KEY > Key Name > TEK_128_BIT	Use to add/change Traffic Encryption Key (TEK). AES_128 and CITADEL_128. NOTE : This field is displayed as all ****** characters after first entry. Enter the key again to make a change.
KEY > Key Name > TEK_256_BIT	Use to add/change TEK. AES_256 and CITADEL_256. NOTE : This field is displayed as all ******* characters after first entry. Enter the key again to make a change.
KEY > Key Name > 128 BIT TEK.HASH or 256 BIT TEK.HASH	This is the SHA1 hash of the key.
CURRENT CRYPTO > ENCRYPTION TYPE	Change encryption type of key being currently used. For example, if K1 is assigned CITADEL_128, you can change it here.

[PGM] > TRANSEC

See Figure 57. Transmission Security (**TRANSEC**) is used to program TRANSEC keys. Use Electronic Counter-Counter Measures (ECCM) Manager to set up Quicklook hopset/lockset parameters. Refer to Table 15 for descriptions of the menu items.



Figure 57. [PGM] > TRANSEC Menu

Table 15. [PGM] > TRANSEC Menu Items

ltem	Description
NB TRANSEC KEY	Program Narrowband TRANSEC keys. Select ADD, DEL, or RENAME.
NB TRANSEC KEY> Key Name	Select a key and press [ENT] to set and view key.
NB TRANSEC KEY > *	Input a hexadecimal key.
NB TRANSEC KEY > NB TRANSEC KEY.HASH	This is the SHA1 hash of the key.
ECCM MANAGER	Use to set up Quicklook hopping and lockset parameters.
HOPSET	Select ADD or DEL . Selecting ADD causes ENTER NEW ITEM NAME to appear, allowing hopset and parameters to be entered.
HOPSET > ID	Enter number that determines pseudo-random hopping algorithm. This number must be identical for all radios in a net.
HOPSET > TYPE	Select wideband or list hopset type.
	Wideband - In this type of hopset, a starting and ending frequency is defined. Hopping occurs between these frequencies with the frequency order and time duration controlled by the Quicklook algorithm.
	List - In this type of hopset, a specific list of frequencies are defined. Hopping occurs on the frequencies with the frequency order and time duration controlled by the Quicklook algorithm.
	Banded - In this type of hopset, a specific list of frequency bands are defined. Hopping occurs between these frequencies with the frequency order and time duration controlled by the Quicklook algorithm.
HOPSET > START FREQUENCY	(Wideband) Enter the start frequency for the beginning of the hopset.
HOPSET > STOP FREQUENCY	(Wideband) Enter the stop frequency for the end of the hopset.

Table 15. [PGM] > TRANSEC Menu Items (Continued)

ltem	Description
HOPSET > LIST	(List or Banded) Add list frequencies. These are named via ADD , then assigned a frequency.
HOPSET > LIST > [LISTNAME] > FREQUENCY	(List or Banded) Add list frequencies. These are named via ADD , then assigned a frequency.
	NOTE: In List, this is the list frequency. In Banded, this is the start of a frequency band.
HOPSET > LIST > [LISTNAME] > STOP FREQUENCY	(Banded) Enter the stop frequency for the end of the frequency band being defined.
LOCKSET	Select ADD or DEL. Selecting ADD causes ENTER NEW ITEM NAME to appear, allowing lockset and parameters to be entered.
LOCKSET > START FREQUENCY	Enter the start frequency for the beginning of the lockset.
LOCKSET > STOP FREQUENCY	Enter the stop frequency for the end of the lockset.
CURRENT RX HOPS	Set RX hopset parameters (ID, TYPE, START FREQUENCY, STOP FREQUENCY) for current net.
CURRENT TX HOPS	Set TX hopset parameters (ID, TYPE, START FREQUENCY, STOP FREQUENCY) for current net.

[PGM] > NAVIGATION

See Figure 58. **NAVIGATION** is used to set Global Positioning System (GPS) properties such as internal/external, sleep, or position format. Refer to Table 16 for descriptions of the menu items.



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Figure 58. [PGM] > NAVIGATION Menu (Sheet 1 of 2)



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Figure 58. [PGM] > NAVIGATION Menu (Sheet 2 of 2)

Table 16. [PGM] > NAVIGATION Menu Items

Item	Description
OPERATIONAL MODE	Select GPS input from none, internal GPS, external GPS or IP.
SLEEP MODE	Select AUTO or NONE. Sleep mode is a cycle that conserves power on the radio (Internal Operational mode only).
POSITION FORMAT	Select GPS position format of: Military Grid Reference System (MGRS), Latitude/ Longitude (degrees and minutes or degrees, minutes and seconds), Universal Transverse Mercator (UTM) /Universal Polar Stereographic (UPS) and Netherlands East Indies (NEI).
DATUM	Select GPS datum to correspond with maps being used. World Geodetic System 1984 (WGS 84) Work Group Edition (WGE) choices start at Adindan Ethiopia (ADI-A) and go through Zandej (ZAN).
LINEAR UNITS	Select unit of measurement used by GPS: Metric, Nautical, or Statute units.
ELEVATION FORMAT	Select whether elevation format is based off of datum or mean sea level.
ANGLE FORMAT	Select the GPS angle format in true or magnetic North mils or degrees.
IP GPS PORT	Select IP GPS port. Range is 1 - 65535. Default is 61000.
CUSTOM DATUMS > 1	Create and edit custom datum attributes. Semi Major Axis: Range of 6300000.0000 to 6400000.0000 (meters) with a maximum precision of 4. Inverse Flattening: Range of 280.00000000 to 320.000000000 (meters) with a maximum precision of 9. Delta X, Delta Y, and Delta Z: Range of 0 - 9999 (meters from WGS 84).

Table 16. [PGM] > NAVIGATION Menu Items (Continued)

Item	Description
CUSTOM DATUMS > 2	Create and edit custom datum 2. Refer to Custom Datum 1.
CUSTOM DATUMS > 3	Create and edit custom datum 3. Refer to Custom Datum 1.
CUSTOM DATUMS > 4	Create and edit custom datum 4. Refer to Custom Datum 1.

[PGM] > USB MODE

See Figure 59. **USB MODE** is used to configure the radio Universal Serial Bus (USB). Refer to Table 17 for descriptions of the menu items.



Figure 59. [PGM] > USB MODE MENU

Table 17. [PGM] > USB MODE MENU Items

Item	Description
USB MODE	Select a USB Mode. AUTO - This setting allows the radio to query the USB adapter/cable/device and automatically select the appropriate USB mode - Host or Peripheral. This setting is preferred and works with supported auto sensing devices.
	PERIPHERAL - Auto configuration is overridden and Peripheral mode is forced. Peripheral mode allows the radio to be used as a USB device plugged into a host such as PC or tablet. The radio is configured to be a USB mass storage device (thumb drive). It can be mounted/accessed, and files can be copied to/from it.
	HOST - Auto configuration is overridden and Host mode is forced. Host mode configures the radio as a USB host. This mode will automatically mount supported external USB peripherals such as Ethernet adapters, cameras, and flash drives.
FUNCTION	If USB Mode is AUTO or PERIPHERAL, select how the USB device will be used: as a storage device or an RNDIS device.

[PGM] > IP CONFIGURATION

See Figure 60. **IP CONFIGURATION** is used to configure IP address, subnet mask, multicast groups, and whether the radio uses a static or dynamic address. These parameters need to be configured using the CPA. Refer to the CPA help and Table 18 for parameter descriptions.



Figure 60. [PGM] > IP CONFIGURATION Menu (Sheet 1 of 5)





Figure 60. [PGM] > IP CONFIGURATION Menu (Sheet 2 of 5)



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Table 18. [PGM] > IP CONFIGURATION Menu Items

Item	Description
ADDRESS TYPE	Select whether static or dynamic address is used. For dynamic, radio must be connected to a Dynamic Host Configuration Protocol (DHCP) server.
STATIC IP	If static Internet Protocol (IP) address type is selected, enter the IP address.
STATIC NET MASK	If static IP address type is selected, enter the net mask.
STATIC GATEWAY	If static IP address type is selected, enter the gateway address.
ETHERNET	Enable (YES) or disable (NO) the radio Ethernet port.
MULTICAST GROUP	Define Multicast Group name(s) and the IP address(es) to be forwarded. If configured to forward multicast data only, one wired interface will be used to forward data. The Ethernet and RNDIS interfaces are preferred over the PPP interface. Ethernet and RNDIS are mutually exclusive due to the USB mode each uses. The radio must be configured for wireless IP operation for this feature to function. To forward UDP multicast data for a particular multicast group address, the address must be configured on each radio that bridges the networks between the multicast server and clients. The multicast address configuration is part of the radio's existing IP configuration group.
MULTICAST TTL	Set Multicast Time To Live value (0 - 255 seconds).
LAN	Read only values. Displays the current Local Area network (LAN) IP ADDRESS, LAN Media Access Control (MAC) ADDRESS and SUBNET MASK.

Table 18. [PGM] > IP CONFIGURATION Menu Items (Continued)

Item	Description
WIRELESS	Read only value. Displays the current Wireless Internet Protocol (WIP) MAC ADDRESS, IP ADDRESS, SUBNET MASK, NETWORK ADDRESS, and BROADCAST ADDRESS.
ACTIVE ROUTES	Active Route Name - read only value. Displays the currently active routes. Enter the DESTINATION IP address, NETMASK, GATEWAY.
RNDIS CONFIG	RNDIS allows the use of existing software with the radio's drop-in connectivity and networking using wireless IP bridging or a DHCP server. RNDIS is supported over USB as a peripheral device. A RNDIS driver is required to be installed on the computer. RNDIS is also used with the RF-7400E- VP001 Tactical Video Processor (TVP), a streaming video processor. Enter the LOCAL ADDRESS, and NETMASK of the local interface when CONFIGURE PEER is Disabled. Enter the REMOTE ADDRESS and the REMOTE GATEWAY (PC) when using DHCP server. NOTE: If the remote gateway address is set to 0.0.0.0, then no change is made to the remote gateway address.
ROUTES	Select ADD, DEL, or RENAME IP config routes. Route names are selected using arrow keys. Enter the DESTINATION IP address, NETMASK, GATEWAY, and APPLICABLE NETS for the route.

Table 18. [PGM] > IP CONFIGURATION Menu Items (Continued)

Item	Description
OSPF	Set as TRUE or FALSE. Enter the following when TRUE: LAN IP IS ROUTER ID, INTERFACES, and AREAS. Ethernet settings for Interfaces are: METRIC, RETRANS DELAY, TX DELAY, ROUTER PRIORITY, HELLO INTERVAL, and DEAD INTERVAL. Areas settings are: AREA ID, and AREA TYPE which can be set as STANDARD, STUBBY, or NSSA.
IPSEC TUNNELS	Select ADD, DEL, or RENAME IP Security Tunnels. Names are selected using arrow keys. Enter the TUNNEL INTerface (LAN of WIRELESS), PEER IP Address, RADIO SPI, PEER SPI, RADIO KEY, RADIO KEY HASH, PEER KEY, PEER KEY HASH, SRCNETORHOSTIP, SOURCE_NETMASK, DESTINATION_IP, and DEST_NETMASK.
RED INE CONFIG	Refer to the CPA help for PEP table configuration.

[PGM] > MISC

See Figure 61. Miscellaneous (**MISC**) is used for setting antenna port DC bias, ancillary connector mode, power management, and radio name. Refer to Table 19 for descriptions of the menu items.


Table 19. [PGM] > MISC Menu Items

Item	Description	
ANTENNA PORT DC BIAS	Set DC bias on antenna port to on, off, or automatic:	
	 ON - DC bias is always on. Not normally used. 	
	• AUTO - Use with RF-3162-AT001 antenna and other antennas that need bias.	
	 OFF - DC bias is not enabled (Default setting). Used with standard antennas and RF-3162DB-AT001. 	
CID	Enter a numeric ID of 0 to 524287.	
ANC MODE	Set side connector settings to on, off, or automatic:	
	• ON - Side connector is fully enabled.	
	 AUTO - Side connector is fully enabled when a cable is detected; otherwise, side connector is disabled. 	
	OFF - Disables all inputs and outputs; use to avoid possible connector corrosion or erroneous cable detection under adverse environmental conditions such as exposure to salt water.	
CABLE CONNECTED	Indicates YES or NO to show state of cable connection when ANC MODE is AUTO.	
RADIO NAME	Enter the radio's name (up to 20 characters).	
POWER MGT	Enable or disable radio power management. When enabled, power management conserves battery power.	
RADIO STARTED	Indicates if radio is started.	

[PGM] > SAR BEACON

See Figure 62. Search And Rescue (SAR) BEACON is used to set up how the emergency beacon will operate. These settings will only affect the Beacon transmission (does not affect normal waveform transmissions). Refer to Table 20 for descriptions of the menu items.



Figure 62. [PGM] > SAR BEACON Menu

Table 20. [PGM] > SAR BEACON Menu Items

Item	Description	
ENABLED	Select ENABLED or DISABLED to operate the Beacon function.	
TONE TYPE	Choose SWEPT for a whooping audio sound.	
	 Choose CONSTANT for one steady audio tone. 	
SWEPT TONE PARAMETERS	Enter the audio STARTING FREQUENCY , ENDING FREQUENCY , and the SWEEP RATE (amount of time for one sweep cycle) in seconds.	
CONSTANT TONE PARAMETERS	Enter the FREQUENCY for the audio tone.	
BEACON TX FREQUENCY	Enter the Beacon transmit frequency. Range is 30 - 512 MHz.	
BEACON TX POWER	Enter the Beacon output power level. Choices are Low, Medium, High. Lower levels will provide longer battery life, higher levels will provide better coverage.	
BEACON MODULATION	Select Beacon transmission on FM or AM.	
OUTPUT MODE	Select whether the Beacon will send Continuous or Intermittent transmissions.	
INTERMITTENT PARAMS	If intermittent beacon operation was selected, set ACTIVE TIME for the number of seconds spent transmitting, and set IDLE time for the number of seconds the beacon is idle between transmissions.	

[PGM] > VERSIONS

See Figure 63. VERSIONS is used to view the serial number along with software and hardware module versions in the radio. Refer to Table 21 for descriptions of the menu items.



Figure 63. [PGM] > VERSIONS Menu

Table 21.	. [PGM] >	VERSIONS	Menu	Items
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Item	Description
PRODUCT TYPE	Displays type of product being used.
RADIO RF TYPE	Displays type of radio being used.
DEVICE > RADIO > SERIAL NUMBER	Displays the radio's serial number.
DEVICE > RADIO > SOFTWARE	Displays the radio's software MODULE information. Typical modules are: APPLICATIONGPP, U-IPL, INTERNALGPS, and WEBCLIENT. Typical information includes: PART NUMBER, and VERSION.
DEVICE > RADIO > HARDWARE	Displays the radio's hardware MODULE information. Typical modules are: DIGITALBOARD, and INTERNALGPS. Typical information includes: PART NUMBER, and BOARD SER NUM.

Table 21. [PGM] > VERSIONS Menu Items (Continued)

Item	Description
DEVICE > KDU	View the serial number of the optional remote Keypad Display Unit (KDU) as well as the SOFTWARE and HARDWARE information.
DEVICE > VAA	View the serial number of the optional remote Vehicular Amplifier Adapter (VAA).

[PGM] > AUDIO

See Figure 64. **AUDIO** is used to configure the audio circuitry. Refer to Table 22 for descriptions of the menu items.



Figure 64. [PGM] > AUDIO Menu

Table 22. [PGM] > AUDIO Menu Items

Item	Description	
VOLUME	Set audio level.	
ALC	Select whether or not Automatic Level Control (ALC) is used in the audio. ALC applies to TX Audio, also known as whisper mode. When ALC is enabled, Volume up/down keys are disabled.	
SPEAKER	Select whether or not audio can be heard on the front panel speaker.	
HEADSET ENABLED	Select whether or not audio can be heard on a headset.	
HEADSET VOLTAGE	Select voltage characteristic of headset (3.3 V, or 5.0 V).	
HEADSET MIC BIAS	Select whether or not microphone bias is enabled on the radio.	
HEADSET SIDETONE	Select whether or not sidetone can be heard in a headset connected to the radio.	
ANC SIDETONE	Enable Ancillary (Anc) Sidetone - Select whether or not some transmit audio is heard in headset while speaking.	
AUDIBLE INDICATORS	Select whether or not audio indicators are set. Select DEFAULT , HANDS FREE , or NONE .	

[PGM] > DTE PORT

See Figure 65. **DTE PORT** is used to set up the DTE port. Refer to Table 23 for descriptions of the menu items. When the current net is configured for PPP instead of DTE, additional PPP settings appear.



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Figure 65. [PGM] > DTE PORT Menu

Table 23. [PGM] > DTE PORT Menu Items

Item	Description
PPP LOCAL ADDRESS	Enter the PPP local IP address.
PPP REMOTE ADDRESS	Enter the PPP remote IP address.
RX DATA POLARITY	Data is inverted. Normally, 1 is a low and a 0 is a logic high. Settings are normal or inverted.
TX DATA POLARITY	Data is inverted. Normally, a 1 is a low and a 0 is a logic high. Settings are normal or inverted.
TX CLOCK POLARITY	Changes the clock's polarity on transmitting data. Non-inverted is a rising edge clock. Settings are normal or inverted.
TX CLOCK SOURCE	Radio's clock (internal) is used on transmitting data. DTE port clock is used if external.
CLOCK GATING	Radio's clock for transmitting data can be set to Free Running or Gated.
ASYNC BAUD RATE	ASYNC baud settings are 2400, 9600, and 115200. Default setting is 115200. Valid for ASYNC DTE only (advanced option).
PPP BAUD RATE	PPP baud settings are 19200 and 115200. Default setting is 115200.

[PGM] > DATE/TIME

See Figure 66. **DATE/TIME** is used to set the actual time and date as well as the date format and time offset from Universal Time Coordinated (UTC). Refer to Table 24 for descriptions of the menu items.



Figure 66. [PGM] > DATE/TIME Menu

Table 24.	[PGM]	> DATE/TIME	Menu Items
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Item	Description
DATE FORMAT	Select date format. Choose Year-Month-Day (YYYY-MM-DD), ZULU, Month-Day-Year (MM-DD-YY), Day-Month-Year (DD-MM-YY).
UTC HOUR OFFSET	Enter local time difference from UTC.
UTC MINUTE OFFSET	Enter local time difference from UTC.
UTC SECOND OFFSET	Enter local time difference from UTC.

[PGM] > USER INTERFACES

See Figure 67. **USER INTERFACES** is used for ASCII remote, front panel, web interface, and user level password settings. Refer to Table 25 for parameter descriptions. Refer to User Levels, p75 for user level descriptions. Refer to Login/Logout Information, p77 for instructions on login and logout.





Figure 67. [PGM] > USER INTERFACES Menu (Sheet 2 of 2)

Table 25. [PGM] > USER INTERFACES Menu Items

Item	Description
WEB INTERFACE > WEB SERVER	Select whether or not web server is enabled.
WEB INTERFACE > SSL	Select whether or not Secure Socket Layer (SSL) web security protocol is enabled.
WEB INTERFACE > SESSION INACTIVITY LOGOUT	Select whether or not inactivity logout is enabled.
WEB INTERFACE > SESSION INACTIVITY TIMEOUT	Enter a value for the web server session timeout. Default is 20 seconds.
WEB INTERFACE > PUBLIC PORT	Enter a value for the public port. Default is 80.
WEB INTERFACE > SECURE PORT	Enter a value for the secure port. Default is 443.
WEB INTERFACE > MAP URL TEMPLATE	Add URL Template and configure URL.
DISP LANGUAGE	Select ENGLISH, ARABIC, or CUSTOM TRANSLATION as the display language. Custom firmware is required for custom translation.
TEXT DIRECTOIN	LEFT TO RIGHT is standard for English. Select RIGHT TO LEFT as required.
INPUT LANGUAGE	Select ENGLISH, or ARABIC.
L1 PASSWORD	Enter password* for user level 1.
L2 PASSWORD	Enter password* for user level 2.
L3 PASSWORD	Enter password* for user level 3. Not available when logged in below level 3.
L4 PASSWORD (MAINTENANCE LEVEL ONLY)	Enter password* for user level 4 (Maintenance level only - purchased separately).
ASCII REMOTE > PERSISTENT LOGIN	Select whether or not you remain logged in using ASCII remote during radio boot.

* Passwords up to 22 characters.

Table 25. [PGM] > USER INTERFACES Menu Items (Continued)

Item	Description
FRONT PANEL > RADIO LOCKED	Select if front panel for the radio is locked or unlocked.
FRONT PANEL > KEEP LOGIN	Select whether or not you remain logged in using front panel. If set, you remain logged in after a power cycle. If not set, you must log in upon every power up or power cycle.
FRONT PANEL >BACKLIGHT LEVEL	Enter backlight level for front panel.
FRONT PANEL > CONTRAST	Enter contrast for front panel.
FRONT PANEL > BACKLIGHT MODE	Select backlight mode for front panel: off, on, or momentary.
FRONT PANEL > BACKLIGHT TIME	Enter backlight time for front panel. This is time backlight remains on when momentary.
FRONT PANEL > CONTROL	Sets which source controls the radio functions. SINGLE - Radio functions are controlled from the front panel by default. When the rotary switch is in the "R" (remote) position, SINGLE allows radio operation only the Keypad Display Unit (KDU).
	MULTI MIRRORED - Radio functions are controlled from the front panel keypad. When the rotary switch is in the "R" (remote) position, MULTI MIRRORED allows both the KDU and front panel.

[PGM] > CONTACTS

See Figure 68. **CONTACTS** is used to set up contacts for the radio, phone, and computer. Refer to Table 26 for descriptions of the menu items.



Figure 68. [PGM] > CONTACTS Menu

Table 26. [PGM] > CONTACTS Menu Items

ltem	Description
PHONE NUMBER	Select ADD , DEL , or RENAME for phone contact (up to 25 maximum). Enter a phone name and number for each phone contact.
COMPUTER IP ADDRESS	Select ADD , DEL , or RENAME for computer IP address (up to 25 maximum). Enter a name and an address for each computer IP address.
CWR CONTACTS	 Select ADD, DEL, or RENAME for CWR contact (up to 255 maximum). Enter a name and the following for each contact. Media Access Control Identification (MAC ID) - The Station ID corresponding to this radio on this net. Phone Number - The phone number corresponding to this radio contact. IP Address - The Wireless IP address corresponding to this radio on this net. SIP Prefix - The 4-digit prefix used to call phones through this radio.
RADIO CONTACTS	 Select ADD, DEL, or RENAME for radio contact net (up to 255 maximum). Enter a name and the following for each contact. Media Access Control Identification (MAC ID) - The Station ID corresponding to this radio on this net. Phone Number - The phone number corresponding to this radio contact. IP Address - The Wireless IP address corresponding to this radio on this net.
SHOW ALL	Enable or disable show all contacts.

[PGM] > TAC CHAT IP

See Figure 69. TAC CHAT IP sets file transfer properties such as protocol and identification. Tac Chat IP is used to send files and text messages to another radio. Refer to Table 27 for parameter descriptions.



Figure 69. [PGM] > TAC CHAT IP Menu (Sheet 1 of 2)



Figure 69. [PGM] > TAC CHAT IP Menu (Sheet 2 of 2)

Table 27. [PGM] > TAC CHAT IP Menu Items

Item	Description
RECIEVED FILES 	Information about files includes: RECIEVED FILES PARTIAL FILES MAX PARTIAL FILE DIRECTORY SIZE PARTIAL FILE EXTENSION PORT NUMBER DESTINATION
PREDICTIVE TEXT	Enable or disable predictive text.
CANNED MESSAGE	Enter a new canned message or edit one of your existing messages. Define both message name and content.
MAILBOX	View information about incoming and outgoing messages for alerts, chats, and voicemail. Information provided includes the following: NET, SOURCE NAME, SOURCE ADDRESS, DESTINATION NAME, DESTINATION ADDRESS, READ STATUS, IDENTIFIED TYPE, STATE, CREATION DATE, MODIFIED DATE, MESSAGE SIZE, BYTES TRANSFERRED, TRANSFER TIME, PENDING TRANSMIT, ACTIVELY TRANSMITTING, ATTACHMENT LOCATION, VOICEMAIL LOCATION, and RETRY COUNT.
ALERTS > KEYWORDS	Enable or disable keywords.
ALERTS > ALERT MESSAGE	Enter a new alert message or edit one of your existing messages. Define both message name and content.
PROT TEMPLATE	Select to create a new protocol template for manual configuration of file transfers or use an existing template: TEMPLATE1, CWR_<_16KBPS, CWR_>_16KBPS, and other templates for advanced options.
NUMBER OF RETRIES	Enter a number,1 to 10, for number of file transfer retries. 4 is default for TEMPLATE1.

Table 27. [PGM] > TAC CHAT IP Menu Items (Continued)

ltem	Description
PACKET SIZE - BYTE	Enter a number, 128 to 2048 bytes, for file transfer packet size. 1024 is default for TEMPLATE1.
PACKETS PER BURST	Enter a number, 1 to 64, for packets sent per transmission burst. 8 is default for TEMPLATE1.
MAX PACKETS PENDING	Enter a number, 1 to 128, that represents the size of the transmission window. This is the maximum number of sent packets that have not been fully acknowledged. 16 is default for TEMPLATE1.
RETRY TIMEOUT (SEC)	Enter a number, 1 to 300 seconds, for the time before a retry occurs. 50 is default for TEMPLATE1.
ARQ TIMEOUT (MS)	Enter a number, 1 to 10000 milliseconds, for the time between Automatic Repeat reQuest (ARQ) bursts. 0 is default for TEMPLATE1.
NONARQ TIMEOUT (MS)	Enter a number, 1 to 120000, for the Non- ARQ timeout in ms. This is the time between Non-ARQ bursts. Non-ARQ bursts are used for sending files to a broadcast address from the radio to another device running the Tac Chat IP protocol (another radio, computer, or PDA). 9000 is default for TEMPLATE1.

[PGM] > VOIP

See Figure 70. Voice over IP (VoIP) is used to set up Session Initiation Protocol (SIP) gateway address, IP and MAC address entries, and Real Time Transfer Protocol (RTP) packet information for delivering audio/video over IP networks. Refer to Table 28 for descriptions of the menu items. Phone calls to and from IP base phones are supported when connected to an Asterisk or Cisco Call Manager using a VoIP Private Branch Exchange (PBX) system.





Table 28. [PGM] > VOIP Menu Items

ltem	Description
SIP GATEWAY	Enter the SIP gateway address. This is the default IP address for routing phone numbers.
PHONE NUMBER	Enter the four-digit phone number.
SIP PREFIX	Enter the four-digit SIP prefix.
PHONEBOOK > IP ENTRIES	Select ADD , DEL , or RENAME for IP entries. Maximum of 255. Phone number can have up to 25 digits.
PHONEBOOK > RADIO ENTRIES	Select ADD , DEL , or RENAME for radio entries. Maximum of 255 radio entry names with 1 net association each. Set Phone Number and Net Association.
PHONEBOOK > GROUP ENTRIES	Select ADD , DEL , or RENAME for group entries. Maximum of 255 group entry names with 1 net association each. Set Phone Number and Net Association.
G.711 MAX PACKET	Real Time Transfer Protocol (RTP) is used to set up the maximum amount in bytes of RTP data to send at once. Default value is 160. Possible values are 100 - 800.
CHANNEL > Channel Name > TRANSMIT IP	Enter the remote IP address.
CHANNEL > Channel Name > TRANSMIT PORT	Enter the remote port. Possible values are 1025 - 65535. The default is 5000.
CHANNEL > Channel Name > RECEIVE IP	Enter the local IP address.
CHANNEL > Channel Name > RECEIVE PORT	Enter the local IP port. Possible values are 1025 - 65535. The default is 5000.
CHANNEL > Channel Name > CODEC	Select Pulse-Coded Modulation Alaw (PCMA) or Pulse-Coded Modulation Ulaw (PCMU).
CHANNEL > Channel Name > USE DTMF	Enable Dual-Tone Multi-Frequency (DTMF) signaling controls.

Table 28. [PGM] > VOIP Menu Items (Continued)

ltem	Description
CHANNEL > Channel Name > RX ONLY	Select whether the channel is receive only or not. Transmission is not allowed on this channel when RX only is selected.
CHANNEL > Channel Name > MUTE AUDIO	Select whether or not audio can be heard on the front panel speaker.
PAYLOAD TYPE	Select an RTP payload type for encoding: DTMF (default value 96), CVSD (default value 98), or MELP (default value 99). Possible values are 96 - 127.

[PGM] > VOICEMAIL

See Figure 71. **VOICEMAIL** is used for Voice Mail number of retries and retry timeout. Refer to Table 29 for descriptions of the menu items.



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Figure 71. [PGM] > VOICEMAIL Menu

Table 29.	[PGM] >	VOICEMAIL	Menu Items
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Item	Description
NUM OF RETRIES	Enter a value (0 - 5) for the number of retries that the radio will attempt to send a voicemail message to its destination before it reports a failure to the sender.
RETRY TIMEOUT	Set the retry timeout value (0 - 300 seconds) that the radio will wait between a failed transmission and the next attempt.
OPERATION MODE	Read only - Indicates the current state of the voice mail application (for example: Recording Active, Recording Paused, Recording Review).
FILE SEEK NFO	Read only - Indicates the duration of a voice mail message and the current position within the message during recording, review, or playback.

[PGM] > SCANNING

See Figure 72. The SCANNING menu screen displays SCAN settings. Refer to Table 30 for descriptions of the menu items.





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Table 30. [PGM] > SCANNING Menu Items

ltem	Description
SCAN MODE	Select SCAN Mode: INACTIVE SCAN (default), MANUAL SCAN or AUTO SCAN. NOTE: Nets have to be selected in Scan List for Scan Mode to become active.
DUAL PTT ENABLE	Select whether DUAL PTT will be enabled for Scan Mode. YES or NO .
RX HANG TIME	Specify how long the radio will monitor the RX Priority Network every scan cycle. If signal presence is lost during the hold time, the radio will wait the programmed hang time before it returns to scanning. Enter a hang time from 0 - 99 seconds . The default is 3.
TX HOLD TIME	Specify how long the radio will stay on the current network after the last received transmission before it returns to scanning. If a signal is present on a net, the radio stops scanning and holds on that net for the programmed hold time. Enter a hold time from $0 - 99$ seconds. The default is 0 (which means that the radio remains on that net until signal presence is lost or you press [CLR] to continue Auto Scan.
PRIORITY TX NET	Select the TX Priority Network from the list.
PRIORITY RX NET	Select the RX Priority Network from the list.
SCAN LIST	Displays list of all available nets for scanning. NOTE: Available nets will have a black box to the left of the net for scan selection. These include only simple nets with Allow Wireless IP set to disabled and Channel Access is not set to MACA.

[PGM] > SNMP AGENT

See Figure 73. Simple Network Management Protocol (SNMP) Agent screen displays SNMP settings. Refer to Table 31 for descriptions of the menu items.



Figure 73. [PGM] > SNMP AGENT Menu

Table 31. [PGM] > SNMP AGENT Menu Items

ltem	Description
PROTOCOL VERSION	Select SNMP protocol version: DISABLED, V1/V2C or V3.
COMMUNITY STRING	Enter the SNMP V1/V2C Community String name (defaults to PRIVATE).
V3 AUTH PROTOCOL	Select whether the SNMP V3 authentication privacy is MD5 AUTHENTICATION or SHA AUTHENTICATION .
V3 DATA PRIV PROTOCOL	Select whether the SNMP V3 data privacy is DES or AES 128 .
V3 AUTH PASSWORD	Enter the SNMP V3 authentication password (defaults to HARRISRF)
V3 DATA PRIV PASSWORD	Enter the SNMP V3 data privacy password (defaults to HARRISRF).
ALLOW TRAPS	Select whether to allow traps to be sent is set to FALSE or TRUE .
TRAP DESTINATION IP	The IP address of the Trap Destination address.
M-TNW CONTROLS	Press [ENT] to view the trap conditions for an M-TNW network.
M-TNW CONTROLS > SEND HOST JOINED TRAP	Set to TRUE if this node should send a trap when a node joins the M-TNW network.
M-TNW CONTROLS > SEND HOST LEFT TRAP	Set to TRUE if this node should send a trap when a node leaves the M-TNW network.

[PGM] > CAM

See Figure 74. **CAM** displays the settings of Customer Algorithm Modification (CAM). A CAM can be used to customize a radio's encryption capabilities by adding a user-selectable layer of encryption. Refer to the CPA Online Help topics for more information.

Refer to Table 32 for descriptions of the menu items. Use the ON soft key to set ENABLED **TRUE** (the OFF soft key sets it **FALSE**). Press the SET soft key to enter settings such as label and data.



ltem	Description	
ENABLED	(Display only) When true, CAM is enabled.	
LABEL	LABEL (Display only) Displays user entered label for the CAM.	
DATA	(Display only) Displays * to hide user entered data or encryption key.	

[PGM] > CWR

See Figure 75. **CWR** configuration options are available when the current net is a CWR net. Refer to Table 33 for descriptions of the menu items.



Table 33. [PGM] > CWR Menu Items

ltem	Description
BACKBONE RADIO	Displays if the radio is a backbone radio, TRUE, or FALSE.
FREQUENCIES	Set the list of registration frequencies. Add, delete and edit the list as required.
FREQUENCIES > REGISTRATION	Set the outstation registration frequency for CWR.
FREQUENCIES > SQUAD FREQUENCY	Set the squad frequency for CWR.
FREQUENCIES > CONTROL	Set the control frequency for CWR.
FREQUENCIES > LINK FREQUENCY	Set the link frequency for CWR.
FREQUENCIES > ORGIN	Set the origin frequency for CWR.
ROLE	Set the role of the radio as OUTSTATION, SQUAD, or CONTROL.
NETWORK TYPE	Displayed value. IP BACKBONE for example.
PRIVATE AUDIO	Select IGNORE or MONITOR.
PROTOCOL	Press [ENT] to set the Maximum IP latency.
PROTOCOL > MAX IP LATENCY	Set the maximum value, 200 to 20000, of the IP BACKBONE.
PARTNER IP	Set the IP ADDRESS of the backbone partner. The IP address of the other repeater radio for the current site.
BACKBONE IP	Set the IP ADDRESS of the backbone. The IP multicast address of the CWR IP backbone. This must be the same at all repeater sites. The range of addresses between 224.0.0.0 and 224.0.0.255, inclusive, are reserved for the use of routing protocols and other low-level topology discovery or maintenance protocols, such as gateway discovery and group membership reporting. Multicast routers should not forward any multicast datagram with destination addresses in this range, regardless of its Time To Live (TTL).

Table 33. [PGM] > CWR Menu Items (Continued)

ltem	Description
BACKBONE KEY	Set the 256 bit backbone cover key. This is 32 bytes specified in hex format (e.g. 4-bytes could be 0x1234abcd).
BACKBONE KEY.HASH	View the SHA1 hash of the backbone cover key.

[PGM] > REG SERVICE

See Figure 76. **REG SERVICE** sets. Refer to Table 34 for descriptions of the menu items.



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Figure 76. [PGM] > REG SERVICE Menu

Table 34. [PGM] > REG SERVICE Items

ltem	Description
TRANSMIT IP	Enter an IP address for the registration service.
ANNOUNCE TIME	Enter a number in seconds, 10 to 300, for the announce time.

GROUP CALLING

Up to 10 Talk Groups may be configured to allow designated net members to communicate between themselves without involving other members. Channel Access must be set to MACA2 to allow Group Calling. Each Talk Group on a net has a defined name and address (similar to a MAC address). Telephony is supported, but only when calling from a phone into a radio network.

To make a Group Call, press the **Call** soft key from the Radio TacChat home screen. Go to the **Talk Group** choice and select from a list of talk groups on that net.

PTT2 Talk Group Destination

This feature allows you to assign one Talk Group to either PTT key. When PTT is keyed with a Talk Group assigned, the voice key will be transmitted to just the members of that group (as opposed to broadcast). This will still hold off voice and data from all other stations like a normal broadcast PTT or a call.

Configure Talk Groups from the Front Panel

Configure Talk Groups from the front panel as follows. Talk Groups can also be configured from CPA.

- a. Select [PGM] > NET MANAGER and press [ENT].
- b. Select the correct net name and press [ENT].
- c. Verify CHANNEL ACCESS is set to MACA2.
- d. Select MACA2 TALK GROUP and press [ENT].
- e. Select TALK GROUP and press [ENT].
- f. Select ADD soft key.
- g. Enter a new talk group name and press [ENT].
- h. Select DONE soft key when complete.
- i. Enter a unique address number (1 to 254) for the talk group and press **[ENT]**. Each radio in the talk group should be configured with the same talk group name and address.

- j. Enter up to 10 talk groups repeating the process as needed.
- k. Select PTT1 TALK GROUP DEST or PTT2 TALK GROUP DEST and scroll to the proper talk group to assign PTT1 or PTT2 to a talk group and press [ENT].
- I. Navigate to exit out of the programming menu by pressing [CLR].
- m. Select the SAVE soft key.

Configure Talk Groups from the Web Interface

Refer to Web User Interface, p192 for setting up the Web Interface application. To configure Talk Groups from the Web Interface:

- a. Open the Radio Configuration application using the (gear) icon.
- b. Select NET MANAGER > NET.
- c. Select the <net name> to open it.
- d. Open MACA2 TALK GROUPS.
- e. Open TALK GROUP under TALK GROUPS.
- f. Select [+] to add a talk group under TALK GROUP
- g. Enter a new group name from the configuration pane.
- h. Select ADD.
- i. Enter up to 10 talk groups.
- j. Move to the menu pane after talk groups are added.
- k. Select a talk group.
- I. Enter a new group address (1-254) from the configuration pane.
- m. (Optional) Select PTT1 Talk Group Destination or PTT2 Talk Group Destination and scroll to the proper talk group to assign PTT1 or PTT2 to a talk group.
- Select the Save icon at the bottom of the screen to save the changes to the radio. The radio will now contain talk groups for the network.

TAC CHAT AND MESSAGES

9

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TAC CHAT IP

The following Tac Chat features are provided.

- Tac Chat home screen for access to Messages, Navigation, Alerts, and Voice Mail
- Short Message Service (SMS) interoperability with Harris Tac Chat IP software running on Microsoft[®] Windows
- Station table/contact list
- Messages (file and/or text)
- Alerts
- Voice mail
- · Message entry screens and destination settings

RADIO TAC CHAT HOME SCREEN

See Figure 77. The radio Tac Chat home screen is used to access related applications and to view user messages.

9 Select [O] (0) to access/exit the Tac Chat home screen. Refer to Table 35 for descriptions of the related applications. Also refer to Radio Tac Chat Operation, p181.



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Figure 77. Tac Chat Home Screen Tree
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Table 35. Tac Chat Home Screen Applications

Application	Description		
NAVIGATION	View navigation reports (a Global Positioning System [GPS] position report).		
	This screen displays LOCAL Navigation data: status (DISABLED/ENABLED/SLEEPING), number of satellites (SAT), heading (HDG), velocity (VEL), altitude (ALT), datum, MGRS, Date, and Time.		
	Select the \bigcirc (0) to display the Situational Awareness (SA) reports screen.		
	Select the \bigcirc (0) again to return to the previous screen (LOCAL).		
MESSAGES	View received messages, Short Messaging Service (SMS) and File. Also reply, forward, and delete messages.		
ALERTS	Use Alerts to view, reply, forward, and delete alerts.		
VOICE MAIL	Use Voice Mail to listen to, reply, forward, and delete voice mails.		

RADIO TAC CHAT OPERATION

See Figure 78 for the Tac Chat home screen. The home screen summarizes received messages into mailboxes for browsing and viewing. The number in parenthesis indicates the number of items that have not been viewed. No count is provided in parenthesis for navigation.



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Figure 78. Tac Chat Home Screen

Select an application and press **[ENT]** to go to the application. Refer to Table 36 for descriptions of the soft key actions.

Table	36.	Radio	Тас	Chat	Home	Screen	Soft	Keys
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Soft Key	Description
ſ	Place a directed call. Refer to Call Wizard, p188.
e +	Send a GPS report. This is only available if GPS is enabled, GPS is tracking, and the current net is CT.
*=+	Verify file transfer progress and status. Perform ABORT, DEL, or RETRY for selected transfers. Refer to Status Display, p190.
N	Send a message using a New Message Wizard, p185.

NAVIGATION

Select NAVIGATION from the radio Tac Chat home screen and press **[ENT]**. See Figure 79 for an example of the local Navigation screen. Select [\bigcirc] **(0)** to toggle between Situational Awareness (SA) reports screen and Local. Select the up and down arrow buttons to view additional lines.

RF-78XXX_C02107 SEARCHING SAT : 8 HDG: 246' VEL : 0.5 KPH ALT : 154 M Ø FOR REPORTS	RF-78XXX_C02107 ALT: 154 M 18TTN9129781047 MGRS NEW 02/24/15 20:01:10 © FOR REPORTS
	CL-0461-4200-0107A

Figure 79. Navigation

MESSAGES INBOX

Select MESSAGES from the radio Tac Chat home screen and press **[ENT]**. See Figure 80. View received text messages and attachments.

Messages are displayed by their source address and are ordered by time and date of reception. Unread messages are indicated by an envelope icon to the left of the source address. Select a message and press **[ENT]** to get more detailed information (the first part of the message is shown below the address). Details include the source address, date and time of reception, file attachments (if any), and the message's content. Soft keys for replying, forwarding, and deleting the message are provided. Figure 80 also shows a sample message that was received with a file attachment.

For outgoing messages, refer to New Message Wizard, p185.









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ALERTS INBOX

Select ALERTS from the radio Tac Chat home screen and press [ENT]. See Figure 81. Alerts are high priority text messages received over IP. Select an alert and press [ENT] to view the message. [CLR] returns to Alert inbox from message. For outgoing alerts, refer to New Message Wizard, p185.



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Figure 81. Alerts

VOICE MAIL INBOX

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Select VOICE MAIL from the radio Tac Chat home screen and press [ENT]. See Figure 82. This screen allows you to review and listen to received audio messages, of up to one (1) minute in duration. Select a voice message and press **[ENT]** to go to the voice mail details screen. [CLR] returns to voice mail inbox. While in the voice mail details view. use the soft keys to play/stop the message. For outgoing voice messages, refer to New Message Wizard, p185.





NEW MESSAGE WIZARD

Select the **MSG** soft key from the radio Tac Chat home screen. The New Message Wizard, Figure 83 for example, guides you through the process of creating an alert, message, or a voice mail message by showing only those parameters related to your selections. **NOTE:** Legacy SMS (TXT) is only available in Legacy MACA nets.

Send an Alert Message

- a. Select ALERT and press [ENT]. See Figure 83.
- b. Select an alert message for broadcast over the subnet.
- c. Select the SEND = soft key.
- d. Observe that ALERT TRANSFER COMPLETE is displayed.

Alerts are a set of common text messages that can be quickly sent to all radios on the current wireless IP subnet.



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Send a Tac Chat Message

- a. Select TAC CHAT and press [ENT]. See Figure 84.
- b. Select ATTACH FILE to attach a file (optional).
- Select EDIT TEXT to create a message. Refer to Edit Text, p186.
- d. Select the SEND = soft key.

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- e. Enter an IP Address of the radio to be contacted and press [ENT].
- f. Observe TEXT FILE MESSAGE COMPLETE is displayed.



CL-0461-4200-0113



Edit Text

The text editor, Figure 85, includes an enhanced interface for text input with non-alphanumeric character support. In addition, text prediction and text keywords are supported for use in composing text messages. Refer to Enhanced Text Editing, p189. Also refer to Keywords, p190.



CL-0461-4200-4090

Figure 85. Edit Text Message

Send a Voice Mail

- a. Select VOICE MAIL and press [ENT]. See Figure 86.
- b. Record a message by pressing **[PTT]** to record and releasing to stop.
- Check the voice message using the soft keys (optional). Soft key << goes back 10 seconds, >> goes forward 10 seconds, PLAY) reviews the audio, and ERASE clears the recorded message.
- d. Send the message by pressing [ENT].
- e. Enter an IP Address of the radio to be contacted and press **[ENT]**.
- f. Observe VOICE MAIL TRANSFER STARTED is displayed.
- g. Observe VOICE MAIL MESSAGE COMPLETE is displayed.



Figure 86. Edit Voice Message

RF-7850M-HH TAC CHAT AND MESSAGES

CALL WIZARD

Select **CALL** from the radio Tac Chat home screen. The CALL Wizard guides you through the process of selecting a destination type and address. Figure 87 shows a destination type call list. Figure 88 shows contact selection. TYPE allows manual address entry. LAST takes you to the last selected address as shown in Figure 89.



CL-0461-4200-0049A

Figure 87. CALL Wizard Destination Types



CL-0461-4200-0065

Figure 88. CALL Wizard Contacts



CL-0461-4200-0046

Figure 89. CALL Wizard Detailed / Manual Address Entry

ENHANCED TEXT EDITING

Enhanced text editing extends text entry to include punctuation and all other special characters. From a total of 68 printable characters, 36 alphanumeric and white space (press the **[0]** button twice quickly) are entered through the keypad. The remaining 31 symbols are selectable from a shortcut menu accessed via the Symbol $\langle ", # \rangle$ soft key. The symbols screen includes space, line feed, and tab soft keys. See Figure 90.



CL-0461-4200-0045

Figure 90. Symbol Insertion Menu

In order to support vertical navigation, multi-line text fields have a navigation mode and an editing mode. When in navigation mode, use the arrow keys to move up, down, back, and forward. When in editing mode, the traditional alphanumeric entry keypad is active for character insertion.

Text prediction is another feature of the enhanced text editing. When active, this feature will attempt to make intelligent predictions about which of the available characters to cycle through first. For example, when the letters "MA" are entered followed by pressing 6 on the keypad, the options are: M, N, O, or 6. If the word "MAN" was previously used, text prediction would first put "N" in place, repetitive presses to 6 would cycle through the remaining options. Only text entered with the feature turned on will affect the predictions performance.

RF-7850M-HH TAC CHAT AND MESSAGES

KEYWORDS

Alert messages have the capability of including keywords at any point in the message. Actual insertion of this dynamic information is done after the command to send the message and before the message is sent. Keyword substitution is configurable. Substituting multiple keywords in one message is supported. If the substituted text is larger than the keyword, the overall message may be truncated if it would otherwise exceed the maximum message size. Keywords are:

- {LOC} = Radio's current GPS location (CT nets only). PT nets are sent {LOC}. If the radio has no GPS fix, "UNKNOWN" is sent. If the radio's GPS position is not current, then the location string is preceded by the words "LAST KNOWN".
- {NAME} = Radio's name.

STATUS DISPLAY

The Status (STAT) soft key is a send-in-progress screen that includes an ABORT soft key to stop a message being sent and a RETRY soft key to retry a failed or aborted transfer. The DEL soft key removes the selected transfer from the list if it is not currently in progress.

WEB USER 10

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WEB USER INTERFACE

Harris **RF-7850AP-SW101** is a purchasable option that provides the user with a Web-based User Interface (Web UI). The option is loaded on the radio as a .RUF file. Access to the interface is via your local IP network. Connect your radio using either direct ethernet, Remote Network Driver Interface Specification (RNDIS), or to a local network. Either Dynamic Host Configuration Protocol (DHCP) or Static addressing is used to the local network. A browser supporting HTML5 can be used:

- Google Chrome (latest version)
- Mozilla Firefox (latest version)
- Internet Explorer (IE10 or higher)

You may need to adjust your browser settings for Trusted Sites. The Web UI can automatically adapt to and take advantage of device-specific properties such as screen size, graphics capabilities, and touch screen support.

NOTE

For voicemail playback support, an audio plugin (such as QuickTime) is required.

10

The applications available on the Web UI mimic some of the APPs in the radio's menu structure. The following available Web UI applications include Ground Force Tracker and Configuration as standard.

- **GPS Force Tracker** view local position, along with any received Situational Awareness (SA) reports. Allows you to place friendly forces on a map. Refer to the Net Manager menu under Radio Configuration Application, p206 for setting the Position Server and IP Format.
- Configuration Access radio configuration features. User level password restrictions apply to the Web UI the same as for front panel programming.
- File System Browsing Access all internal radio files in a convenient browser arrangement.
- TacChat provides access to chat features.

USER INTERFACE SETUP

The Web UI uses a Secure Socket Layer (SSL) protocol which is turned on by default. The Web UI requires correct operator authentication with a security level and password before allowing a management session. The Web UI has four security levels with different amounts of access. The following examples show User Level 4, which is the highest level. Lower levels may not show all features and functions. Refer to Table 4 for security level information. Set up the Ethernet connection as follows:

 Connect your computer to the radio side connector using Ethernet cable (12067-5220-01) to make a Local Area Network (LAN) connection or via RNDIS using a USB connection (12067-7220-A006).

NOTE

The PC and radio must be on the same subnet to communicate with each other.

- b. Configure the PC for an IP address within the same subnet as the radio. Refer to [PGM] > IP CONFIGURATION, p136 for information.
- c. Set the USB Mode on the radio to AUTO ([PGM] > USB MODE 10 > AUTO).

USER INTERFACE LOGIN

Log into the Web Interface as follows:

- a. Open a web browser on the PC.
- b. Enter the IP address of the radio using a secure format (https://xxx.xxx.xxx). For RNDIS, use https://10.0.1.1.
- c. Observe that a login screen is displayed. See Figure 91.

NOTE

If wrong passwords/levels are entered, an error message is displayed.



Figure 91. Web User Interface Login

- d. Enter your login information (use lower case).
- Observe the Web Interface Home screen. See Figure 92 for an example of one of the demo mode screens when the Web UI option is not enabled.



Figure 92. User Interface Home Screen (Preview Mode)

APPLICATIONS

The home screen of the enabled Web UI has linked application icons. See Figure 93. The Log Out link (padlock) terminates the current web interface management session and returns you to the login screen.



Figure 93. Application lcons

The applications accessible from the Web Interface are described below.

NOTE

The Web Interface will force a logout and return to the login screen if it is inactive for 20 minutes (default). From the Web UI, select **Config > User Interfaces > Web Interface** and set **Session inactivity timeout**.

Tac Chat Application

The Tactical Chat application can be operated directly from the radio as described in Radio Tac Chat Operation, p181, or it may be run from the Web Interface for more versatility. Select the Tac Chat icon to open the application. See Figure 94.

(III) A	pplications	Radio Tac Chat	🛛 💽 🕒 Logout
	Messages	Details	
@ Fill Wedn	ter Messages.	ALPHA	Wednesday, March 27, 2013 - 5:53:00 PM
•••	ALPHA 17:55 See attached file for your instructions	Attachment: WolceMsg_2013Mar-27_17-53-44.wav	
-0	ALPHA 17:54 this is only a test		
-	ALPHA 17:53 No message content	New Message	() (P)
ŵ	ALPHA 17:53 USB RNDIS driver for your window p	Add attachment_	Browse
•	ALPHA 17:52 Fill your station with the attached co	Add message	
۵	ALPHA 17:51 Mayday - instructions will follow		
		Canned Messages	Cancel Send
			۵,

Figure 94. Tac Chat Screen - View Voice Message

From the Tac Chat main screen, all operations are started for the application.

- Received messages are shown on the left of the main screen. Use the list for browsing and viewing. Filter messages by entering keywords at the **Filter items...** prompt.
- A summary of the selected message is shown in the right pane. The complete message is displayed when opened.
- Send an Alert message using the lower center icon to view a stored list. Select from the stored list of Alert messages. Select send to issue the alert message as a subnet broadcast.

- Select the lower right icon to open the radio configuration application. This opens your current net configuration (this is similar to [PGM] > NET MANAGER > CURRENT NET).
- The battery icon in the upper right corner indicates the radio battery charge level.
- Select the lower left icon to create and send a new message. See Figure 95. Add canned messages and attachments to the new message as required. Send SMS messages by selecting the switch in the upper right corner of the New Message field. It will change from IP to SMS.



Figure 95. Tac Chat Screen - Reply To Message

GPS Force Tracker

Select the Navigation icon (globe) to open the Force Tracker application. See Figure 96. Force Tracker is used to check position information from the GPS. Controls and tools include zoom in, zoom out, view full screen, draw a polyline, edit and delete layers, and show me where I am.

- Info Provides status of current radio such as location as formatted based on your navigation configuration; heading, velocity, altitude and acquired satellites. Information can be sent to other radios using SEND on applicable CT nets.
- Reports Displays position information received from GPS reports of other radios.

Reports can be saved on the PC for up to 64 radios maximum, however, they are discarded when the browser closes. Only the last report for each station is saved on the radio. SA Reports are not stored across radio power cycles and are deleted after they exceed 24 hour period.

 Settings - Allows you to configure GPS parameters of attached radio. Settings are similar to radio settings in [PGM] > NAVIGATION, p131.



Figure 96. Radio Navigation Screen - Local Position

File Browser Application

Select the File Browser (folder) icon to open the application. See Figure 97. The File Browser provides a convenient way to manage and access files stored in the radio. Functions include: move, copy, rename, add and delete files. See Figure 98. All files must be removed from a folder before deleting that folder. Upload and download file screens are shown in Figure 99 and Figure 100.



Figure 97. File Browser Screen - Fill File

E Applications	Radio File Browser			E Logout
/UserRoot				
CustomApps mibs	Drøjeeg3-export-m dis.int	Inbox fa	icon3-export-rn dis.inf	intusbdrive

Figure 98. File Browser Screen - Move File



Figure 99. File Browser Screen - Upload File



Figure 100. File Browser Screen - Download File

10

Soft KDU Application

See Figure 101. The Soft KDU application provides a way to operate the radio through the web interface. This is useful in a classroom or when configuring the radio. Field operation is provided using the Remote KDU.

i≡ Applications	Soft KDU	E Logout
	- € PULT PT CLR CLR CLR CLR CLR CLR DT CLR DT CLR DT CLR DT DT DT DT DT DT DT DT DT DT	
• 1 sc 4 GHI 7 APP	• • • • • • • • • • • • • • • • • • •	

Figure 101. Soft KDU

Video Application

Video Control must be set to remote when the Web UI video player is being used. This is the only requirement. No other settings are used for maximization. See Figure 102.

Enter a Video URL using the IP address of the Tactical Video Processor (TVP), for example, in place of X. Typically this might be 192.168.1.2.



rtsp://XXX.XXX.XXX.XXX:554/livevideo

Figure 102. Video Control URL

Custom Applications

The custom applications interface provides a tool for constructing and invoking custom applications or commands. See Figure 103. The help icon provides a sample demonstration. Contact Harris for additional help on using this application.

		E Logout
	Create Application	
Zip File:	Browse	
App Name:		
Main Html:	0	
Main Icon:	Default Icon	
User Level:	1 📀	
Cancel	Save	

Figure 103. Custom Applications

PROGRAMMING FIRMWARE UPGRADES

Radio firmware can be upgraded easily by installing the firmware file using the Web Interface File Browser.

NOTE

The firmware upgrade process will reset the radio to factory default settings. Any custom applications or settings (such as IP addresses), crypto keys, and network plans will need to be re-installed.

- a. Obtain the firmware upgrade file from Harris (.ruf file type).
- b. Connect the radio and open the Web Interface File Browser.
- c. Place the .ruf file into any folder using drag and drop.
- d. Select the file.
- e. Select the Program icon right of the file browser.
- f. Select YES (both on the radio and at the Web UI) at the installation will prompt "Are you sure you want to load a new firmware".
- g. Observe that firmware is updated and press [CLR].
- h. Set the radio to Off and then back to a preset to power cycle the radio and complete the firmware installation.
- i. Select the Clear All soft key to go to the main preset screen.

01010111 10101101

(binary digits) at the bottom



LOADING CPA FILES

Load Communications Planning Application (CPA) fill files using the File Browser Application. The process is the same as loading firmware updates. See Figure 97.

- a. Obtain the correct CPA programming file (.cpafill file type).
- b. Connect the radio and open the Web Interface File Browser.
- c. Place the .cpafill file into the file browser using drag and drop.
- d. Select the file.
- e. Select the configuration icon.



- f. Select **YES** (both on the radio and at the Web UI) at the installation will prompt "Are you sure you want to load a new config".
- g. Observe that the radio installs the file and if the fill file has multiple stations, the Web Interface prompts for a station name to fill.
- h. Observe that the radio will announce an audible indication if loaded properly: "Fill Updated". This may take a few seconds.
- i. Complete the action by pressing the [CLR] button.
- j. Verify radio communications and proceed with normal operation.

RADIO CONFIGURATION APPLICATION

Select the Configuration (gear) icon from the Web Interface main screen to open the application. See Figure 104. Radio Configuration provides a convenient way to add, delete, or edit radio presets in the radio. These functions can also performed from the radio front panel or via the CPA. All changes made from the Web Interface can be saved in the radio.

E Applications	Config		E Logout
Q Filter items	٩		RELEVANT
> Built In Test	Radio Name	RF-7850S_E01149	
> Contacts			
> Key Manager	Radio Started	BOOTING	۲
> File Router	Soft Reset	Soft Reset	
> Navigation			
> IP Configuration			
> Net Manager			
> NNW			
> Position Server			
> Versions	W		

Figure 104. Radio Configuration Screen

The Radio Configuration screen mimics the programming menu structure in the radio. Configuration categories are listed on the left pane, and individual categories are displayed by clicking the (+) to open each pull-down menu. See Figure 105.

E Applications	RNDIS Con	E Logout	
Q Filter items	٩		RELEVANT
> Multicast Group 🕂	Configure Peer		
> Active Routes +			
> Routes +	Local Address	10.0.1.1	
> OSPF	Remote Address	10.0.1.2	
> IPSec Tunnels +		(10.0.1.2	
LocalAreaNetwork	Netmask	255.255.255.0	
III Wireless Network			
# RNDIS Config	Remote Gateway	10.0.1.1	

Figure 105. Configuration Pull-Downs

When the Radio Configuration screen is opened, it shows the current configuration of the attached radio. Changes can be made in any order. However, some changes will affect how other parameters become available or relevant. With the switch (top right corner) in the RELEVANT position, only the applicable choices are made available. Clicking on the switch will change to SHOW ALL, and all parameters are shown, whether they are applicable to the configuration or not.

Find a specific setting by typing a keyword in the Search box at the top of the column. This will filter your choices. For example, type **IP** to see all parameters that affect the radio's Internet Protocol configuration.

See Figure 106. Select these control icons to make changes.

- Use the (+) icon to ADD an item.
- Use the (-) icon to DELETE an item.
- Use the PENCIL icon to EDIT an item.

E Applications	Phone N	umber	E Logout
Q Filter items	٩		RELEVANT
Contacts	Contact01	888,555,0001	
✓ Phone Number +	Contact02	888,555,0002	
III Contact01 🗕 🖌		<u></u>	
III Contact02 🗕 🖌	2		
> Computer IP Address			
> Radio Contacts			

Figure 106. Configuration Modifications

The right pane shows the individual parameters for the category chosen on the left. See Figure 107.

Select in any field to make changes.

Filter choices in this specific category by typing a keyword (or just letters) in the Search box at the top.

Q Filter items		Front Panel	RELEVANT
Front Panel	Q Filter items		
> Voice Mail			
> VolP	Radio Locked		•
Щ САМ	Persistent Login	YES	
III DTE Port			
₩ EP	Backlight Level	71	
III Power Supply	Contrast	6	
III Receiver			
III Registration Service	Backlight Mode	Momentary	

Figure 107. Sample Parameters

SAVING CONFIGURATION CHANGES

Any updates to configuration settings are performed immediately. However, they will not be saved through a power cycle. Save places configuration changes in flash memory so they remain across power cycles of the radio. Perform a save as follows.

- Select the **Save** (floppy disk) icon at the bottom of the Configuration screen
- Select CTRL+S on the keyboard

ZEROIZE

Select the Zeroize (trash can) icon at the bottom of the Configuration screen to zeroize the radio. When the radio is zeroized, all custom settings, nets, and crypto keys are erased.

You may lose Web Interface access after a radio zeroize.

TROUBLESHOOTING

Problem	Action	
Radio is connected but no information is displayed in the Web Interface panes.	 Manually clear the web browsers cache: Firefox: Tools > Options > Advanced > Network > Cached Web Content > Clear Now 	
	 Chrome: Customize ('wrench icon') > Settings > 'Show advanced settings' > Clear browsing data 	
	Alternatively, use the 'private' browsing mode in the browser. This will prevent any data from being persistently cached across sessions, and clear the browser when it is closed.	
Radio does not connect to PC.	• Verify radio's USB Mode is set to HOST or AUTO.	
	• Verify radio's LAN IP Address is in the same subnet as PC.	
	 Check Ethernet cable connection. 	
	Check browser version.	

OPERATOR MAINTENANCE

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BUILT IN TEST

BUILT IN TEST is run by the user, and is used to test the keypad, Liquid Crystal Display (LCD), battery, audio, and internal circuits of the radio. Refer to [APPS] > BUILT IN TEST, p85 for more information.

PREVENTIVE MAINTENANCE

Preventive maintenance is of primary importance in order to avoid equipment failures. Preventive maintenance is the systematic, scheduled care and inspection of equipment to prevent equipment failure and to reduce downtime. Preventive maintenance consists of keeping the equipment clean, dry, and dust-free. Use a soft brush, a moist sponge, and a cloth to keep equipment clean.

Table 37 contains the checks and services that should be performed either on a daily basis when the equipment is in use, or on a weekly basis when the equipment is in standby condition. Table 38 contains the checks and services that should be performed on a weekly basis with the equipment in use. Table 39 contains checks and services for battery maintenance.

Table	37.	Daily	Preventive	Maintenance	Checks and	Services
-------	-----	-------	------------	-------------	------------	----------

Check No.	Item to Be Inspected	Procedure
1	Operation	Perform Self Test per [APPS] > BUILT IN TEST, p85.

Table 38. Weekly Pr	eventive Maintenance	Checks and Services
---------------------	----------------------	----------------------------

Check No.	Item to Be Inspected	Procedure
1	Antenna	Check for breaks or strains; repair or replace as required.
2	Connectors	Inspect for dirt, corrosion, or damage.
3	Protective Caps	Ensure protective caps are in place if connectors are not in use.

Table 39. Preventive Maintenance Checks and Services

Check No.	Item to Be Inspected	Procedure
1	Battery (as needed)	After exposure to fresh or salt water, detach battery from the radio. Rinse battery with fresh, clean water and thoroughly dry with a soft cloth to prevent corrosion. Do not use heat to dry the battery. In the event corrosion does occur, clean the battery terminals using a Nylon Mesh Abrasive Pad (3M Scotchbrite 7447 or equivalent).

CORRECTIVE MAINTENANCE

The radio may require Level III maintenance if you observe the following:

- The operator has run the Built In Test application and a fault has been identified by the radio.
- A run-time fault message is displayed by the radio.
- The operator has observed degraded operation that suggests the system is faulty.

DISPLAY MESSAGES

This section describes message indications which may display during run-time. Message types are:

- Fault Table 40 provides information due to a fault present in one or more of the radio's circuits. Faults will be retained after the radio is power cycled. They must be cleared manually by pressing the CLEAR soft key. Refer to [APPS] > FAULTS, p91.
- Information Table 41 provides information such as when a save is complete.
- Warning Table 42 provides information on operational errors such as no crypto keys or low battery.

Table 40. Fault Messages

Message	Action/Description
* EEPROM ITEM ** INVALID	Problem getting a data item from the lookup table * is which EEPROM should have been accessed. ** is 0 for PA, 1 for Receiver/Exciter/Synthesizer (RES), 2 for DIGITAL. Requires Level III maintenance.
* EEPROM LOOKUP TABLE INVALID	Problem getting data from EEPROM; Empty lookup table. * is which EEPROM should have been accessed. Requires Level III maintenance.
* NOT READ OR NOT CORRECT FORMAT	Not read or not correct format.
24 VOLT REGULATOR VOLTAGE * (MV) ABOVE ** (MV)	RX 24-Volt RX regulator is out of bounds. * indicates current regulator voltage. ** indicates maximum regulator voltage. Requires Level III maintenance.
24 VOLT REGULATOR VOLTAGE * (MV) BELOW ** (MV)	RX 24-Volt RX regulator is out of bounds. * indicates current regulator voltage. ** indicates minimum regulator voltage. Requires Level III maintenance.
85 VOLT REGULATOR* (MV) ABOVE ** (MV)	85-Volt regulator is out of bounds. * indicates current regulator voltage. ** indicates maximum regulator voltage. Requires Level III maintenance.
85 VOLT REGULATOR * (MV) BELOW ** (MV)	85-Volt regulator is out of bounds. * indicates current regulator voltage. ** indicates minimum regulator voltage. Requires Level III maintenance.
BIAS TABLE CORRUPT - USING DEFAULTS	Problem occurred getting bias table information. Requires Level III maintenance.
CITADEL CONFIG INVALID	There was a problem getting cryptographic data from EEPROM. Reload firmware. Requires Level III maintenance.
CITADEL CONFIGURATION FAILED (*)	There was a problem loading the CITADEL configuration data.
CODEC THERMAL LIMIT EXCEEDED	Codec thermal limit exceeded.

Table 40. Fault Messages (Continued)

Message	Action/Description
CRYPTO CONFIG INVALID	Configuration is not valid for this radio. Reload configuration file. Requires Level III maintenance.
CRYPTO INITIALIZATION	Initialization of the Citadel® chip failed. Requires Level III maintenance.
CRYPTO KNOWN ANSWER TEST FAILED	During initialization, the CITADEL failed its encryption/decryption known answer test. Requires Level III maintenance.
DDR2 TEMPERATURE TOO HIGH TO OPERATE SAFELY	RAM temperature is too hot for safe radio operation, user should power off immediately.
DDR2 TEMPERATURE TOO LOW TO OPERATE SAFELY	RAM temperature is too COLD for safe radio operation, user should power off immediately.
DETECTED RELEASE ONLY U-IPL - FACTORY FEATURES DISABLED	Detected release only U-IPL - factory features disabled.
DETECTED UN- RELEASED U-IPL	Detected un-released U-IPL.
DIGITAL BOARD EEPROM CHECKSUM FAILURE	There was a problem getting data from digital board EEPROM. Requires Level III maintenance.
DIGITAL BOARD RCM DATA INVALID	Problem occurred getting software version data from EEPROM. Requires Level III maintenance.
DPOT TABLE CORRUPT - USING DEFAULTS	There was a problem getting digital potentiometer (DPOT) table information. Requires Level III maintenance.
FPGA CONFIGURATION	Initialization of the Field Programmable Gate Array (FPGA) has failed. Requires Level III maintenance.
FPP TEMPERATURE INVALID: *C	FPP temperature invalid: *C.
GPP TEMPERATURE TOO HIGH TO OPERATE SAFELY	Processor temperature is too hot for safe radio operation. User should power off immediately.

Table 40. Fault Messages (Continued)

Message	Action/Description
INTERNAL GPS	Could not communicate with internal GPS module.
MISC CONFIG DATA INVALID	Misc config data invalid.
PA BOARD RCM DATA INVALID	Initialization of the Field Programmable Gate Array (FPGA) has failed. Requires Level III maintenance.
PA EEPROM CHECKSUM FAILURE	Initialization of the Field Programmable Gate Array (FPGA) has failed. Requires Level III maintenance.
PA HIGH+ TABLE INVALID SIZE *	Radio will be unable to use HIGH+ Power.
PA RES HW MISMATCH PERSISTENT UNKEY	This fault is caused by a hardware incompatibility between internal boards which renders the system unusable. Only likely to occur in an unmanaged hardware upgrade or spares issue. Requires Level III maintenance.
PA TEMP TOO HIGH TX DISABLED	Transmit was disabled due to excessive heat. Allow radio to cool down and retry.
PRESEL TUNE TABLE CORRUPT - USING DEFAULTS	Problem occurred getting tune table information. Requires Level III maintenance.
RADIO SERIAL NUMBER INVALID	There was a problem getting serial number from EEPROM. Requires Level III maintenance.
RADIO UNKEYED TX SYNTH 1 OUT OF LOCK	Synth out of lock fault condition was detected during TX. Requires Level III maintenance.
RADIO UNKEYED TX SYNTH 2 OUT OF LOCK	Synth out of lock fault condition was detected during TX. Requires Level III maintenance.
RES BOARD RCM DATA INVALID	There was a problem getting RF board version information from EEPROM. Requires Level III maintenance.
RES EEPROM CHECKSUM FAILURE	There was a problem getting data from RF board EEPROM. Requires Level III maintenance.
Table 40. Fault Messages (Continued)

Message	Action/Description
RX 40 KHZ FILTER EEPROM DATA CORRUPT	Radio could not load 40 kHz filter file. Requires Level III maintenance.
RX FILTER EEPROM DATA CORRUPT	Radio could not load RX filter file. Requires Level III maintenance.
SYNTH 1 OUT OF LOCK	Synthesizer (Synth) out of lock fault condition was detected. Requires Level III maintenance.
SYNTH 2 OUT OF LOCK	Synthesizer (Synth) out of lock fault condition was detected. Requires Level III maintenance.
TX FILTER EEPROM DATA CORRUPT	Radio could not load TX filter file. Requires Level III maintenance.
TX SYNTH 1 OUT OF LOCK	Attempting to key up the radio failed because synthesizer 1 was out of lock. Requires Level III maintenance.
TX SYNTH 2 OUT OF LOCK	Attempting to key up the radio failed because synthesizer 2 was out of lock. Requires Level III maintenance.
U-IPL VERSION MISMATCH	U-IPL version mismatch.
UNABLE TO START AUDIO HARDWARE	Communication with audio codec driver failed. Requires Level III maintenance.
USB HUB 1 OVER-CURRENT CONDITION POWER CYCLE RADIO	USB HUB 1 over-current condition power cycle radio.
USB HUB 2 OVER-CURRENT CONDITION POWER CYCLE RADIO	USB HUB 2 over-current condition power cycle radio.
VAA -3V SUPPLY	-3 V Supply voltage fault. Refer to applicable VAA Maintenance Manual.
VAA 12V SUPPLY	12 V Supply outside the range of 10.8 V - 13.2 V. Refer to applicable VAA Maintenance Manual.

Table 40. Fault Messages (Continued)

Message	Action/Description
VAA 200V SUPPLY	200 V Supply outside the range of 189.0 V - 231.0
	v. Refer to applicable VAA Maintenance Manual.
VAA 24V SUPPLY	24 V Supply voltage fault. Refer to applicable VAA Maintenance Manual.
VAA AMBIENT TEMP	Ambient temperature inside the VAA >= 85° C. Refer to applicable VAA Maintenance Manual.
VAA CHARGER	Battery Charger was disabled because the battery temperature is outside range of -30 °C to 80 °C. Can also be caused by the battery not being properly installed in the charger. Refer to applicable VAA Maintenance Manual.
VAA DRAIN VOLTAGE	Power drain voltage is outside the range of 17.0 V to 35.0 V. Refer to applicable VAA Maintenance Manual.
VAA FPGA	VAA FPGA.
VAA HUB LOW	VAA HUB low.
VAA INPUT DETECT	Failed to detect RF input to the VAA from the HH. Check RF connection from HH to VAA. Refer to applicable VAA Maintenance Manual.
VAA RX OVERLOAD	Rx input to the VAA is above upper limit. Check for proper antenna separation. Refer to applicable VAA Maintenance Manual.
VAA TEMP	PA over-temperature fault. Refer to applicable VAA Maintenance Manual.
VAA UHF PA CURRENT	PA Current Level is over 10.3 A. Refer to applicable VAA Maintenance Manual.
VAA UNKEYED	VAA was unkeyed because of -3 V Supply or 200 V Supply Fault. Refer to applicable VAA Maintenance Manual.
WIDEBAND DSP REPORTED TRANSCEIVER FAULT -*	Wideband DSP reported transceiver fault - *.

Table 41. Information Messages

Message	Action/Description
* EXECUTED	This indicates that the user attempted to execute an application, and the radio successfully executed it. "*" will indicate which application executed.
STARTING EMI TEST	Starting EMI test.
ADD COMMAND FAILED	Displays when an add command has failed.
ALREADY KEYED.	Voice transmit was attempted when a previous voice transmit was still in progress.
ALREADY RUNNING TEST [*]	Selected Built In Test is currently running.
AN ELEMENT WITH NAME [*] ALREADY EXISTS IN YOUR CURRENT DIRECTORY	The chosen file or directory name already exists.
AN INTERACTIVE TEST IS ALREADY RUNNING.	An interactive Built In Test was attempted while another was running.
BUILT IN TEST STOPPED RUN ALL	Built In Test has been successfully stopped.
CALL FAILED	Displays when the call has failed.
CALL FAILED NOT IN GROUP	User tried to call a talk group this radio was not a member of.
CALLS NOT SUPPORTED ON THIS NET	Calls not supported on this net.
CANCELED: ZIP * CANNOT SEND GPS REPORT OLDER THAN * MIN	This indicates that the user attempted to force a GPS report to the network while the last generated GPS report is too old. An old GPS report indicates the radio hasn't been in contact with GPS for some time and at this point, the report would be unreliable. "*" will indicate the maximum age of a GPS report in minutes that can be reported to the network.

Message	Action/Description
CANNOT SET POWER TO HIGH+ POWER	Displays when the radio power level can not be set to HIGH+.
CONFIGURATION CLEARED	The radio configuration checksum does not match; the configuration is zeroized.
CONNECTED TO *	Displays name of radio contact or talk group that the radio has connected to in a directed call.
COULD NOT EXECUTE	This indicates that the user attempted to execute an application, and even though the radio successfully found the application, it failed to execute. "*" will indicate which application failed.
CTCSS CHANNEL BUSY TRANSMIT DISABLED	Continuous Tone Coded Squelch System (CTCSS) is configured for RX priority and the channel is busy.
DDR2 TEMPERATURE RETURNED TO SAFE RANGE	RAM temperature has returned to a safe range to resume radio operation.
DEBUG LOGS DELETED	Debug logs deleted.
DELAYING * SECONDS BEFORE STARTING EMI TEST	Delaying * seconds before starting EMI test.
DELETE NOT AVAILABLE FOR A COMPLETE TRANSFER	The mailbox message delete operation is not allowed.
DELETE NOT AVAILABLE FOR AN ACTIVE TRANSFER	The mailbox message delete operation is not allowed.
DELETION OF * FAILED	Displays when a deletion failed.
EMI TEST COMPLETE	EMI test complete.
EMPTY RECORDING	User tried to play an empty voice mail message.
ERROR SENDING REPORT	Error - unable to send report.
FAILED: ZIP *	Failed: ZIP *.

Message	Action/Description
FILL FAILED	FILL operation has failed.
FILL FILE INVALID	FILL file is empty or invalid.
HIGH+ TX POWER LEVEL DISABLED	System hardware does not support 10 watt mode. This does not apply to -V5XX radios.
INACTIVE TRANSFER SPECIFIED	Attempted to abort a transfer not in progress (for example, already complete).
INCOMING FILE TOO LARGE	Displays when File Transfer incoming file has exceeded size limit.
INCOMPATIBLE NETWORK	Incompatible Network.
INCOMPATIBLE NETWORK NEIGHBOR MAX RADIOS=*	Incompatible network neighbor max radios=*.
INVALID FORMAT	When entering data in to the front panel, certain formatting is required based on the type of data being entered. For instance, an IP address must consist of four, three-digit integers separated by periods. This warning indicates that the most recently entered data has violated its intended formatting.
LOGIN TO FRONTPANEL TO RUN INTERACTIVE TEST	User must be logged in to perform interactive Built In Tests.
LOGIN TO RUN TESTS	User must be logged in to perform interactive Built In Tests.
MESSAGE WITH ID(*) NO LONGER EXISTS	Message with ID(*) no longer exists.
MESSAGES NOT SUPPORTED ON THIS NET	Messages not supported on this net.
NEED TO ENTER A VALID NAME	Displays when attempting to ADD a group without specifying a group name.
NET FORMING	Net forming.

Message	Action/Description
NO CURRENT POSITION FIX	Displays when attempting to manually send a Global Positioning System (GPS) report before a location fix has been obtained.
NOT IN CT MODE	Displays when radio is not in CT mode when attempting to manually send a GPS report.
NOT REGISTERED WITH BACKBONE	Not registered with backbone.
NOTHING SELECTED TO DELETE	Delete is attempted with nothing selected.
NOTHING SELECTED TO RENAME	Attempt to rename with nothing selected.
PERFORMING FACTORY RESET	Displays to inform user that a Factory Reset is being performed on the radio.
POSITION TIMESTAMP INVALID	The GPS position report time stamp is invalid.
PRESS CLR 5 TIMES WITHIN 1 SECOND INTERVALS	Displays to prompt user to unlock the radio if they press a button other than [CLR].
RECOMMEND KEY RELOAD	Recommend key reload.
REPEATER BREAK-IN DISABLED	Repeater break-in disabled.
REPORT SENT	Report has been sent.
RETRANSMIT: DESTINATION RADIO NOT FOUND	Problem with connection between retransmit site radios.
RETRY NOT AVAILABLE FOR THIS TRANSFER	The transfer is not in a state where the message can be retried.
SAVE COMPLETE	The save operation has completed.
SCAN LIST EMPTY	Scan list empty.
SCANNING DISABLED	Channel Scanning is disabled.
SCANNING ENABLED	Channel Scanning is enabled.

Message	Action/Description
SENT TO *	Sent to *
SET DATE AND TIME SUCCESSFUL	The radio successfully set the time and date that the user provided.
STARTING AUTOMATIC REGISTRATION	Starting automatic registration.
STARTING MANUAL REGISTRATION ON * MHZ	Starting manual registration on * MHz.
SUCCESS: COPY DIRECTORY	Success: copy directory
SUCCESS: COPY FILE	Success: copy file
SUCCESS: DELETE DIRECTORY	Success: delete directory
SUCCESS: DELETE FILE	Success: delete file
SUCCESS: MAKE DIRECTORY	Make Directory (MKDIR) operation was successful.
SUCCESS: MOVE DIRECTORY	Success: Move Directory
SUCCESS: MOVE FILE	Success: Move File
SUCCESS: RENAME	Success: Rename
SUCCESS: UNZIP *	Success: UNZIP *
SUCCESS: ZIP *	Success: ZIP *
SUCCESSFULLY REGISTERED - STAGE *	Successfully Registered - Stage *
TERMINATE FAILED	Displays upon call terminate operation failure.
TEXT TRANSFER COMPLETE	The text message was successfully sent to the desired destination.

Message	Action/Description
TEXT TRANSFER FAILED	The text message failed to be sent to the desired destination.
THERE ARE NO TAC CHAT FILES OR MESSAGES TO BE RESENT.	There are no tac chat files or messages to be resent.
TRANSEC MISMATCH DETECTED	TRANSEC mismatch detected.
TRANSFER ALREADY ABORTED	Displays when Abort attempt is for a previously aborted transfer.
TRANSFER NO LONGER ACTIVE	The user attempted to abort a transfer that is no longer active.
TRANSMIT DISABLED	Transmit was attempted when not allowed. Transmit is disabled if you do not have Bit Error Rate Test (BERT) enabled for the current net.
VAA DETECTED	Displays upon radio insertion into VAA or upon boot with radio in VAA.
VAA INPUT DETECT	Failed to detect RF input to the VAA from the HH. Check RF connection from HH to VAA.
VOICE UNKEYED NET FORMING	Voice unkeyed net forming.
YOU CANNOT CHANGE THE BASE FOLDER	You cannot change the base folder.
ZEROIZE COMPLETE	Zeroize operation is complete.

Table 42. Warning Messages

Message	Action/Description
FAILED BATTERY IS TOO LOW TO UPDATE FIRMWARE.	Change battery.
A SUBNET CONFLICT EXISTS BETWEEN WIP AND LAN INTERFACES. PLEASE RECONFIGURE TO AVOID UNEXPECTED BEHAVIOR.	The LAN and Wireless IP (WIP) networks overlap. This may lead to problems with IP routing. In order to avoid the problems, configure the networks so they do not overlap.
CANNOT USE QL3 WITH CURRENT VAA FW VERSION	Cannot use QL3 with current VAA FW version.
CORRUPT RUF FILE	The .RUF file being loaded is not valid.
COULD NOT FILL - FILL FILE TOO BIG	Displays to inform user that fill operation could not be completed because fill file size is too large.
DC VOLTAGE HIGH	The voltage is too high; a regulator may need repair or replacement. Requires Level III maintenance.
DDR2 TEMPERATURE RANGE INVALID	The RAM has reported a temperature range that can't be interpreted so the user should use their best judgment to decide if it is safe to continue using the radio risking hardware damage.
DUPLICATE IP ON NET VOICE OPERATIONAL	Duplicate IP on net voice operational.
EXISTING WEB CLIENT IS NOT COMPATIBLE WITH RADIO FIRMWARE	User has update the radio firmware without a compatible web client, radio will uninstall existing web client package.
FAILED: COPY "*", DOES NOT EXIST	COPY operation has failed.
FAILED: COPY DIRECTORY	The file browser app could not COPY the directory. Check that the file, directories exist and check file permissions.
FAILED: COPY FILE	The file browser app could not COPY the file. Check that the file, directories exist and check file permissions.

Table 42. Warning Messages (Continued)

Message	Action/Description
FAILED: DELETE "*", DOES NOT EXIST	DELETE operation has failed.
FAILED: DELETE DIRECTORY	DELETE operation has failed. Retry and contact Harris if failure reoccurs.
FAILED: DELETE FILE	DELETE operation has failed. Retry and contact Harris if failure reoccurs.
FAILED: MAKE DIRECTORY	MKDIR operation has failed. Retry and contact Harris if failure reoccurs.
FAILED: MOVE "*", DOES NOT EXIST	MOVE operation has failed.
FAILED: MOVE DIRECTORY	The file browser app could not MOVE the directory. Check that the file directories exist and check file permissions.
FAILED: MOVE FILE	The file browser app could not MOVE the file. Check that the file, directories exist and check file permissions.
FAILED: RENAME	The file browser app could not rename the file. Check that the file, and directory exist and check file permissions.
FAILED: UNZIP *	Failed to unzip file.
FILL FAILED: VALID CONFIGURATION NOT FOUND	Displays to inform user that version of Communications Planning Application (CPA) being used is not supported.
FILL RADIO FAILED	FILL operation has failed. Reprogram fill file and retry.
FILLING WITH PREVIOUS VERSION OF THE CPA MAY RESULT IN A PARTIALLY CONFIGURED RADIO	If the CPA version does not match the radio version then the radio may not be filled accurately.
FULL DUPLEX TALK GROUPS MUST HAVE TWO VOIP CHANNELS CONFIGURED, WAVE DISABLED FOR GROUP *	Full duplex talk groups must have two voip channels configured, wave disabled for group *.

Table 42. Warning Messages (Continued)

Message	Action/Description
HOPSET FREQUENCIES OVERLAP AT 75KHZ.	75 kHz hopping waveforms must have properly spaced frequencies in their hopsets. This indicates that some frequencies that are a part of the current hopset are overlapping.
INCOMPATIBLE RUF FILE	The RUF file being loaded is not compatible with this platform.
INVALID FORMAT	When entering data in to the front panel, certain formatting is required based on the type of data being entered. For instance, an IP address must consist of four, three-digit integers separated by periods. This warning indicates that the most recently entered data has violated its intended formatting.
INVALID POSITION MODE	This occurs when the user attempts to change the net assigned to the current net switch position when the current net switch position is not able to be changed. This could mean that the rotary knob is physically in a position that cannot be reassigned, for instance, the Zeroize position. Or, it can mean that the rotary knob has been set to the remote position, and the current virtual position of the radio is not allowed to be changed.
INVALID STATIC NETMASK = *	Invalid static netmask = *
LOW BATTERY	Battery voltage is low and should be replaced soon. Replace with known good battery.
LOW BATTERY - TEMPERATURE	Radio is cold and should be warmed if possible; battery life may be reduced.
LOW VOLTAGE - TX POWER = HIGH	Transmit power level setting is high+, but actual TX power setting is reduced to high. This does not apply to -V5XX radios.
LOW VOLTAGE - TX POWER = MED	Transmit power level setting is high, but actual TX power setting is reduced to medium. Battery voltage may be too low to supply power at the level requested. Change the battery as soon as possible.
NO FILL RADIOS ARE COMPATIBLE	None of the radio configurations found on the FILL file are compatible with the radio.

Table 42. Warning Messages (Continued)

Message	Action/Description
NO HOPSET	This indicates that the current net requires a hopset and one has not been assigned to it.
NO NETWORK ID FILLED	Network ID was not configured on a net that requires one.
NO RECEIVE HOPSET	Hopping net selected with no receive Hopset. Reprogram adding receive Hopset.
NO TEK FILLED	Cipher Text (CT) net has no encryption key. Reprogram plan adding CT keys.
NO TRANSEC KEY FILLED	QUICKLOOK 3 net with no Transmission Security (TRANSEC) KEY selected.
NO TRANSMIT HOPSET	Hopping net selected with no transmit hopset. Reprogram adding transmit Hopset.
NO TRANSMIT OR RECEIVE HOPSET	Hopping net selected with no hopset. Reprogram adding Hopset(s).
NO VAA DETECTED	Displays to inform user that radio does not detect VAA.
OVERCURRENT CLEARED ON *	An external device connection is no longer drawing too much current and power will be supplied again.
OVERCURRENT DETECTED ON *	An external device is drawing too much current and power is no longer being supplied. There could be a short circuit.
PERSISTENT_UNKEY	A hardware problem is preventing the radio from transmitting.
REACHED THE MAX MSG ID(*)	Reached the max msg ID(*)
REGISTRATION FAILED - NO REGISTRATION FREQUENCIES CONFIGURED	Registration failed - no registration frequencies configured.
REGISTRATION FAILED - UNABLE TO CONFIRM REGISTRATION	Registration failed - unable to confirm registration.

Table 42. Warning Messages (Continued)

Message	Action/Description	
REGISTRATION FAILED - UNABLE TO CONTACT STAGE	Registration failed - unable to contact stage.	
REGISTRATION FAILED - UNABLE TO REGISTER IN THE CURRENT STATE	Registration failed - unable to register in the current state.	
RUF FILE PERMISSION DENIED	The RUF file may have a serial/part number exclusion which is not compatible with the radio.	
RUF FILE PROGRAMMING FAILED	The RUF file could not be loaded. The Radio may have been disconnected during RUF file load.	
SET DATE AND TIME FAILED	Set date and time failed.	
SMS SEND FAILED	Displays to inform user that Short Message Service (SMS) message failed to be sent.	
START IGNORED - ALREADY KEYED	Start is ignored if you attempted to start BERT while it is still keyed due to a prior start call.	
TAC CHAT MESSAGE IS BEING TRUNCATED TO (*) CHARACTERS	TAC CHAT message is being truncated to (*) characters.	
THERE WAS AN ISSUE VERIFING THE COMPATIBILITY OF WEB CLIENT INSTALL	Due to an issue with the web client package provided, the radio failed to install the package.	
THIS NET DOES NOT CONTAIN ANY TALK GROUPS.	No talk groups filled for the current net.	
TRANSEC NOT READY KEY IGNORED	User keyed before net was fully loaded.	
UNABLE TO READ SYSTEM VOLTAGE	There was a problem reading the battery voltage; current status is unknown. Replace with known good battery.	
UNSUPPORTED FILE TYPE IGNORED	File type is ignored - not supported.	
UNSUPPORTED FILE TYPE IGNORED: *	File type * is the file extension that was ignored - not supported.	

Table 42. Warning Messages (Continued)

Message	Action/Description
VAA COMM FAULT ID	Displays upon lost communications from VAA.
VAA DISCONNECTED	Displays upon dismount from VAA, or upon first boot outside of VAA if last power down was in VAA.
VAA NOT ALLOWED	Displays upon connection to VAA that is not allowed.
VAA SUPPLY VOLTAGE	Displays upon connection to VAA - supply voltage.
VOICE MAIL MESSAGE FULL	Voice mail recording was cut off at the maximum message time limit of 1 minute.
WEB CLIENT IS NOT COMPATIBLE WITH RADIO FIRMWARE.	The web client provided is not compatible with the current radio firmware.

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SPECIFICATIONS

Table 43 lists the specifications for the RF-7850M-HH.

	Function	unction Specification			
	GENERAL				
	Frequency Range	30 - 512 MHz			
	Net Presets	25 (13 selectable from rotary switch positions)			
1	Transmission	FM/AM Analog Voice			
	Mode	Amplitude Shift Keying (ASK), 109 - 512 MHz only			
		 Frequency Shift Keying (FSK) 2.4 kilobits per second (kbps) 			
		Mixed-Excitation Linear Predictive (MELP) Vocoder Voice			
		 ASK / FSK 16 kbps Continuously Variable Slope Delta (CVSD) Voice 			
		FSK / Trellis Coded Modulation (TCM) up to 64 kbps (standard)			
		 Internet Protocol (IP) and Data Terminal Equipment (DTE) Data 			
		• Wideband FSK / TCM data up to 192 kbps (Option)			
	RF Input/Output Impedance	50 ohms			
	Co-location	9% frequency and 1.5 m antenna separation			
1	Color/Finish	• Green (RF-7850M-HH001)			
		• Black (RF-7850M-HH002)			
		• Tan (RF-7850M-HH003)			
	with Chemical Agent Resistant Coating (CARC)				

Table 43. Specifications

Table 43. Specifications (Continued)

Function	Specification			
	TRANSMITTER SPECIFICATIONS			
Output Power	Non-linear: 0.25, 2, 5, 10 Watts Linear: 1, 2, 5, 10 Watts			
Frequency Stability	+/-1 parts per million (ppm)			
Harmonics	-50 Decibels relative to carrier (dBc)			
Spurious Noise	-50 dBc			
	RECEIVER SPECIFICATIONS			
FM Sensitivity	-116 dBm @ 12 dB (Signal + Noise + Distortion)/Noise + Distortion (SINAD)			
Adjacent Channel Rejection	50 dB			
Squelch	Selectable: off/noise/tone/digital			
Intermediate Frequency (IF) Rejection	>60 dB			
	ENVIRONMENTAL (PER MIL-STD-810)			
Operating Temperature	-22 °F to 140 °F (-30 °C to +60 °C) -4 °F to 140 °F (-20 °C to +60 °C) with battery			
Immersion	16 feet (5 meter)			
Humidity	95% per MIL-STD-810			
FEATURES				
Electronic	Quicklook 1A			
Measures	Quicklook 2			
(ECCM)	Quicklook 3			
	Quicklook Wide			
	• CWRS			

Table 43. Specifications (Continued)

Function	Specification		
Data	Up to 64 kbps IP and DTE		
Communications	Up to 192 kbps IP (option)		
Bandwidth	• 25 kHz		
	Selectable 25 kHz, 75 kHz (option)		
Communications Security (COMSEC)	Citadel [®] II and Advanced Encryption Standard (AES) Citadel II is backwards compatible and Interoperable with Citadel I		
Vocoder (MELP)	Mixed-Excitation Linear Predictive Vocoder (MELP). At 2400 bps, MELP provides better digital voice audio compared to Continuously Variable Slope Delta (CVSD) and greater range compared to FM analog voice. Greater range occurs due to the ability of the radio to receive signals that would be below the noise floor in analog FM.		
Vocoder (CVSD)	Interoperable with MIL-STD-188-113 compliant CVSD equipment, and is capable of the following. 16 kbps CVSD: • PT/CT simple fixed frequency.		
	 PT/CT Quicklook 1A/Quicklook 3 (FCS mode and slow hopping) 		
	All Legacy MACA nets		
	 All MACA2 nets except Simultaneous Voice and Data (SVD) 		
	12 kbps CVSD: • PT/CT Quicklook 2		
	PT/CT Quicklook 3 (medium hopping)		
GPS	Internal Global Positioning System (GPS).		
Data Interface	Universal Serial Bus (USB) 2.0, Synchronous, and Asynchronous		

Table 43. Specifications (Continued)

Function	Specification
SVD	Simultaneous Voice and Data (SVD) support allows you to send MELP voice without interrupting IP data and SA reports on the net (with limited data throughput). Voice is sent in two second bursts, and the data rates are the same as other MACA2 nets. SVD is only available when using MACA2 channel access. Rates will be reduced significantly during voice traffic. Waveform data rate remains the same, but throughput is decreased due to time slots taken for voice.
Dual PTT	Dual Net Push-To-Talk (PTT) is supported
LAN	Direct Connection to Local Area Network (LAN) and USB Devices.
SNMP	Support for V1, 2, and 3 Simple Network Management Protocol (SNMP).
Digital Data	Narrowband Frequency Shift Keying (FSK) in hopping modes (QL1A/QL2/QL3). FSK in PT and Cipher Text (CT) fixed frequency. Wideband FSK used for Quicklook (QL) Wide hopping nets. Trellis Coded Modulation (TCM) in CT and PT fixed frequency.
MACA2	Multiple Access Collision Avoidance generation 2 (MACA2). A wireless network node (or station) makes an announcement before it sends the data frame to inform other nodes to keep silent. When a node wants to transmit, it sends a Request-To-Send (RTS) with the length of the data frame to send. If the receiver allows the transmission, it replies to the sender with a Clear-To-Send (CTS) with the length of the frame that is about to receive. A node that hears RTS would remain silent to avoid conflict with CTS. A node that hears CTS should keep silent until the data transmission is complete.
Legacy MACA	Support for interoperability with RF-5800V-MP, RF- 5800M-HH, and RF-5800V-HH in Wireless IP and Directed nets is provided.

Table 43. Specifications (Continued)

Function	Specification		
	MECHANICAL		
Dimensions with battery	9.71 H x 2.94 W x 2.43 D in. (24.6 H x 7.4 W x 6.1 D cm)		
Weight	1.5 lbs (0.68 kg) without battery 2.0 lbs (0.91 kg) with battery		

CONNECTOR PINOUT DATA

Table 44 and Table 45 provide pinout data for the interface connectors mounted on the RF-7850M-HH chassis. See Figure 108 for connector pinouts.

Pin	Mode	Direction	Description	Specification	
А	Audio	N/A	Analog Ground	Ground	
В	Audio	Out	Variable Audio Out	Maximum of 3.0 Vrms into 1 Kohm.	
С	LVTTL	In	Handset Push-To-Talk (PTT1)	Open circuit to receive. Short to Ground to transmit. Internal 15 Kohm pulled- up to 3.3 V.	
D	Audio	In	Audio In	2.6 mVrms Z in = 150 ohms	
E	LVTTL	In	Handset PTT2	Open circuit to receive, Short to Ground to transmit. Internal 15 Kohm pull-up to 3.3 V.	
F	Power	Out	Electret Microphone Bias / Handset Power	When used as an electret microphone bias, output is +3.3 V through a 1 Kohm pull-up resistor. When selected as handset power, output is +5.4 V at a maximum of 400 mA.	

Table 44. 6-Pin Audio Connector Specifications

Table 45. ANCILLARY CONNECTOR

PIN	DIRECTION	SIGNAL NAME	DESCRIPTION	NOTES
1	I/O	RUSB_OTG_VBUS	Application Universal Serial Bus (USB) On The Go (OTG) - +VBUS Power Signal	USB
2	0	RUSB_OTG_ID	Application USB - Identification (ID) Signal For USB OTG	USB
3	I	/CABLE_SENSE	Cable Attached Indicator Signal For Ancillary Connector Open = No connection (Short to GND to indicate connection)	LVTTL
4	I/O	/ANC_KDU_DET	"KDU Attached" indicator signal. Open = N/C GND = KDU connected	LVTTL
5	I/O	RUSB_OTG_DM	Application USB - Data(-) Signal	USB
6	I/O	RUSB_OTG_DP	_DP Application USB - Data(+) Signal	
7	-	RESERVED	D Reserved for future use.	
8	-	GND	Reserved for Ground (GND)	-
9	I	ANC_BCON_TXD	BCON_TXD Modem - Console Transmit Data	
10	0	ANC_BCON_RXD	Modem - Console Receive Data	RS-232
11	0	HOP_CLOCK	Hop Clock Signal For Frequency Hopping	LVTTL
12	0	/RETRANS	Retransmit Output Signal	
13	0	ANC_PWR_OUT	Ancillary Power Output (Power can be turned on or off as required)	Power (+5.2 V)
14	I	ANC_RMT_OFF	Ancillary Remote Power Off (This input must be driven to +10 V to turn off the radio)	
15	0	ANC_DTE_DCD	Application Data Terminal Equipment (DTE) - Data Carrier Detect Signal	

Table 45. ANCILLARY CONNECTOR (Continued)

PIN	DIRECTION	SIGNAL NAME	DESCRIPTION	NOTES
16	I	ANC_DTE_TXC	C Application DTE - Synchronous Transmit Clock	
17	I	ANC_DTE_RTS	Application DTE - Request- to-send	RS-232
18	0	ANC_DTE_RXD	Application DTE - Receive Data	RS-232
19	I	ANC_DTE_TXD	Application DTE - Transmit Data	RS-232
20	0	ANC_DTE_RXC	Application DTE - Synchronous Receive Clock	RS-232
21	I	ANC_REXT_EVNT	External Event Input To FPGA	LVTTL
22	0	ANC_RCON_RXD	Application - Console Receive Data	RS-232
23	I	ANC_RCON_TXD	Application - Console Transmit Data	RS-232
24	0	ANC_DTE_CTS	Application DTE - Clear-to- send	RS-232
25	-	GND	Reserved for GND	-
26	-	RESERVED	Reserved for future use.	-
27	-	RESERVED	Reserved for future use.	-
28	-	ANC_AGND	Reserved for Analog Ground	-
29	I	/ANC_PTT2	Ancillary Push-To-Talk Signal (when enabled, short to ground for transmit, open for receive)	-
30	I	/ANC_PTT1	Ancillary Push-To-Talk Signal (when enabled, short to ground for transmit, open for receive)	-
31	0	ANC_FL_OUT	Ancillary Fixed Level Audio Output (0 dBm output into 1k ohm load)	
32	I	ANC_FL_IN	Ancillary Fixed Level Audio Input (0 dBm input with internal 1k ohm load) Audio	

MATING CONNECTORS

Table 46 provides part numbers for the cable connectors that mate to the radio.

Figure 108 shows connector pins for 6-pin audio/fill and side connectors.

Table 46. Connectors and Mating Connector Part Numbers

Chassis Connector	Mating Connector Part Number	
6-Pin Audio	J69-0001-623	
Ancillary Connector	J98-0100-001	



CL-0461-4200-0088

Figure 108. Connector Pins

SUPPORT KITS

Contact Harris for assistance.

OPTIONAL ACCESSORIES

The following optional items are available for the radio.

- Remote Keypad Display Unit (KDU) Devices:
 - Handheld radio Remote KDU, Green (12113-1000-01)
 - Handheld radio Remote KDU, Black (12113-1000-02)
 - Handheld radio Remote KDU, Tan (12113-1000-03)
 - VAA Remote KDU, Green (12113-1000-11)
 - VAA Remote KDU, Black (12113-1000-12)
 - VAA Remote KDU, Tan (12113-1000-13)
- Headsets/Handsets, Single PTT
 - Lightweight Handset, H-250/U (10075-1399)
 - Lapel Speaker-Microphone with Audio Jack (12041-3100-01)
 - Lightweight Headset, RF-3020-HSXXX
 - Lightweight Padded Earpiece Headset, RF-3021-HSXXX
- Handsets, Dual PTT
 - RF-3023-HS005 Dual PTT Handset
- Data Cables:
 - Ethernet with RJ-45 (12067-5220-01)
 - Re-Transmission Cable (12067-5250-01)
 - PPP Cable (12067-7180-A006)
 - USB Field Programming Cable (12067-7220-A006)
 - Async (RS-232) / Sync (DTE) Y Cable (12067-7110-A66)
 - Sync/Async Data Cable, 25-pin (12067-7210-A006)

- Data Adapters:
 - 32-pin Data/Remote to USB Type A (12067-5600-01)
 - 32-pin Data/Remote to USB Type Mini A-B (12067-5700-01)
- Antennas:
 - RF-3162DB-AT001, Multiband Dipole
 - Whip Antenna, 30-512 MHz (12011-2710-03)
 - Blade Antenna, 30-512 MHz (12011-2730-01)
 - Soldier Antenna, VHF Dismount (RF-3161-AT001)
 - Antenna, VHF Handheld Blade (12011-2700-01)
 - External GPS Antenna Kit, magnetic mount (10511-0400-XX)
- Power Adapters/Batteries:
 - Rechargeable Lithium-Ion rechargeable battery (Li-ION) battery pack, 4.8A-HR (12041-2100-02)
 - Rechargeable Lithium-Ion rechargeable battery (Li-ION) battery pack, 5.8A-HR (12041-2200-02)
 - Single-Bay Li-ION charger (RF-5853-CH101)
 - Two-Bay Li-ION charger (RF-5853-CH102)
 - Six-bay Li-ION charger (RF-5853-CH106)
 - Battery Holder (RF-5911-PS002); uses non-rechargeable L123 Lithium Manganese Dioxide cells
 - Battery Holder (RF-5911-PS001); uses AA cells
 - DC Power Adapter/battery charger (RF-5912-PS001)
 - Amplifier Speaker (RF-5982-SA001)
- Optional Software
 - Web User Interface (RF-7850AP-SW101)
 - Radio Firmware updates Contact Harris

FILE TRANSFER SETUP

Data files are sent from the radio's internal memory or directly from attached USB devices. File transfers use the same protocol as the RF-6705 Tactical Chat IP application. Transfers between radios or between a radio and PC running Tactical Chat IP are supported.

See Figure 109 for a radio setup example. This example uses Wireless Internet Protocol (IP) for transfer between two radios as well as a physical Ethernet connection. Only the wireless IP connection is required for transfer between two radios. To support file transfer:

- Physical:
 - Use cables as listed in Optional Accessories, p241.
- Net settings:
 - Channel Access = Multiple Access Collision Avoidance gen2 (MACA2)
 - Circuit Type = NONE
- In the example shown in Figure 109, radio 1 must have an added route of:
 - Destination: 192.168.101.0
 - Mask: 255.255.255.0
 - Gateway: 192.168.0.2

NOTE

Refer to [APPS] > IP CONFIG, p88 for instructions on adding a route.

- USB mode ([PGM] > USB MODE) must be set to AUTO or HOST.
- Ancillary side connector mode ([PGM] > MISC > ANC CONNECTOR MODE) must be set to AUTO or ON.





SYMBOLS

The following symbols represent the functions identified in Table 47.

Table 47	. S	ymbol	Cross	Reference
----------	-----	-------	-------	-----------

Function	Symbol
Abort, Cancel, No	0
Add	+
All, Select All	■ *
Auto	-mo

Table 47. Symbol Cross Reference (Continued)

Function	Symbol
Beacon Off	٧
Beacon On	¥∾≫
Call	ſ
Canned Message	
Cancel, Abort, No	0
Configure	Y
Clear, Erase	Ē
Clear All	ն≁₫
Сору	0+ዑ
Control the cursor position	* +++
Cursor Left	ļ
Cursor Right	1
Delete, Backspace	
Delete, Message	⊡+⊡

Table 47. Symbol Cross Reference (Continued)

Function	Symbol
Deselect All (Clear)	
Done, Set, Yes	>
Edit, Type	Î
End	K on
Erase, Clear	申
Forward Message	† ⊠
GPS	⇔→
Information, Details	G
Insert Mode	A 6 C
Last (Redial)	467
If, Line Feed	╞
Lock	a
Login	R.
Logout	Γ , +

Table 47. Symbol Cross Reference (Continued)

Function	Symbol
Manual Selection	എ
Make Directory (MKDIR)	🖻 +
More	→ →→
Move	¥ D
Message, msg	M
No, Abort, Cancel	0
Overwrite Mode	A 🛛 C
Pause	II
Play, Start	•
PTT	PTT
Registration	+ 1
Rename	A → B
Reply	⊠t⊃
Reset	Ċ

Function	Symbol
Retry	¢
Run All Bite	▶ *
Run Digital Bite	▶ 010
Save	Í
Scan	Ŷ
Select, Paste for Copy/Move	Ċ
Send	X
Set, Done, Yes	>
Space)
Speaker On	見る
Speaker Off	A Ø
Start	•
Status, Show information about transfer progress	↓
Stop	

Table 47. Symbol Cross Reference (Continued)

Table	47.	Symbol	Cross	Reference	(Continued)
-------	-----	--------	-------	-----------	-------------

Function	Symbol
Symbol	(",#)
Tab	⋕
Time	Ð
Type, Edit	Î
Unlock	Ċ
Users	***
UTC	UTC
Yes, Done, Set	>
Zero, Zeroize	€×

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RF-7850M-HH GLOSSARY

-Menus/Controls-

[APPS] [CLR] [ENT] [LT] [PGM] [SQL]	Application menu Clear Enter Light Programming menu Squelch		
	-A-		
A ADDR ADI-A AES ALC AM ANC AM ANC APP, APPS ARQ ASCII ASK ASYNC AUTO AUX AVG AVGAS	Ampere Address Adindan Ethiopia Advanced Encryption Standard Automatic Level Control Amplitude Modulation Ancillary Application(s) Automatic Repeat reQuest American Standard Code for Information Interchange Amplitude Shift Keying Asynchronous Automatic Auxiliary Average Aviation Gasoline		
	-B-		
BER BERT BIT bps, BPS BW	Bit Error Rate Bit Error Rate Test Built-In Test Bits per second Bandwidth		
	-C-		
C CAM CARC	Celsius Customer Algorithm Modification - CAM can be used to customize radio encryption capabilities Chemical Agent Resistant Coating		
CD	Compact Disk		


CFG CLR cm COMSEC CONFIG CPA CRC CS CT CTCSS CTS CVSD	Configuration Clear Centimeter or 1 x 10 ⁻² meter Communications Security Configuration - The process of setting parameter values that define the current hardware setup and/or operational modes. Also, a collection of all such values. Communications Planning Application Cyclic Redundancy Check Check Sum Cipher Text, encrypted voice or data Continuous Tone Coded Squelch System. Tone frequencies used to break squelch on a radio. Clear-to-Send Continuously Variable Slope Delta. A method of digitizing typically encrypted voice.	
	-D-	
D D/V dB dBc dBm DC DD_MM_YY	Depth Data and Voice Decibel Decibels relative to carrier Decibel level referenced to 1 milliwatt (0.001 watt) power level Direct Current Dav-Month-Year calendar	
DEL DHCP dpot DSP DTE DTMF	Delete Dynamic Host Configuration Protocol Digital Potentiometer Digital Signal Processor Data Terminal Equipment Dual-Tone-Multi-Frequency	
-Е-		
ECCM EEPROM	Electronic Counter-Counter Measures Electrically Erasable Programmable Read-Only Memory	
ENT	Enter	

-	F	-
---	---	---

F	Fahrenheit		
FCS	Free Channel Search		
FF	Fixed Frequency		
FM	Frequency Modulation. Varying the frequency of the RF carrier in proportion to the modulating signal.		
FPGA	Field Programmable Gate Array		
FSK	Frequency Shift Keying		
ft	Feet		
FTP	File Transfer Protocol		
FW	Firmware		
FWD	Forward		
	-G-		
GND	Ground		
GPS	Global Positioning System. A system using satellites to provide position location, system clock.		
	-Н-		
H HERF HERO HERP HF HH HOP HTTP(S)	Height Hazard of Electromagnetic Radiation to Fuel Hazard of Electromagnetic Radiation to Ordnance Hazard of Electromagnetic Radiation to Personnel High Frequency Handheld (radio) Hopping HyperText Transfer Protocol, (S) signifies Secure		
-l-			
I I/O ID IF IFS IGMP in. IP IPL	Internal (I GPS) Input/Output Identification Intermediate Frequency Image File System Internet Group Management Protocol (Inches Internet Protocol Initial Program Loader		
HAR	International Traffic In Arms Regulations		

-K-

k	kilo or 1 x 10 ³	
kbps	kilobits per second	
KDU	Keypad Display Unit	
kg	Kilogram or 1 x 10 ³ gram	
kHz	Kilohertz	
KML	Keyhole Markup Language	
	-L-	
L	Length	
LAN	Local Area Network	
Ibs	Pounds	
LCD	Liquid Crystal Display	
LF	Line Feed	
Li-ION	Lithium-Ion rechargeable battery	
LOC	Location	
LT	Light	
LVTTL	Low Voltage Transistor-Transistor Logic	
-M-		
m ma MAC MACA2 MAX MED MELP MGRS MHz, MHZ	Meter Milliampere Media Access Control Multiple Access Collision Avoidance generation 2. Maximum Medium Mixed-Excitation Linear Predictive Vocoder Military Grid Reference System Abbreviation for megahertz, or millions of cycles per second.	
MIBS	Management Information Bases	
Mic	Microphone	
MIL	Military	
MIL-STD	Military Standard	
MISC	Miscellaneous	

RF-7850M-HH GLOSSARY

MKDIR MM-DD-YY MOD MOGAS ms MSG mV	Make Directory Month-Day-Year (calendar) Modulation Type Motor Vehicle Gasoline Milli-Second Message Millivolt
mVrms	Millivolt root-mean-square
	-N-
N/A NATO NAVSEA NEI Net	Not Applicable North Atlantic Treaty Organization Naval Sea Systems Command Netherlands East Indies A group of radios that share common communications parameters, such as frequencies, etc. NATO Friendly Force Information
	-0-
OTA OTG	Over The Air On The Go
	-P-
PA PBX PC PCM PCMA PCMU PDA PGM, PROG PIM ppm PPP PS PT	Power Amplifier Private Branch Exchange Personal Computer Pulse-Coded Modulation Pulse-Coded Modulation G.711 Alaw Pulse-Coded Modulation G.711 Ulaw Personal Digital Assistant Program Protocol Independent Multicast Part per million Point-to-Point Protocol Power Supply Plain Text
PTT	Push-to-Talk

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QL	Quicklook
QL1a	Quicklook 1a
QL2	Quicklook 2
QL3	Quicklook 3
	-R-
R	Receive or Remote
RAM	Random Access Memory
RCM	Radio Configuration Module
RES	Receiver/Exciter/Synthesizer
RF	Radio Frequency
RKDU	Remote Keypad Display Unit
RNDIS	Remote Network Driver Interface Specification
ROM	Read Only Memory
RPLY	Reply
RIC	
RIP	Real Time Transport Protocol
	Request-10-Send
R, RUV, RA	Receive
	Retransmit
	-S-
SA	Situational Awareness
SAR	Search And Rescue
SEC, sec	Second
SINAD	(Signal + Noise +Distortion)/(Noise +Distortion)
SIP	Session Initiation Protocol
SMS	Short Message Service
SNMP	Simple Network Management Protocol
SNR	Signal to Noise Ratio
SP	Space
SQL	Squelch
Squelch	The ability to mute the receive audio until the radio
	squelch tone squelch or noise squelch
SSD	Safe Senaration Distance
SSL	Secure Socket Laver - web security protocol

RF-7850M-HH GLOSSARY

STAT STD SVD SW SYM Sync Synth	Status Standard Simultaneous Voice and Data Software Symbol Synchronous, synchronization Synthesizer	
	-Т-	
TAC CHAT TCM TCXO TEK TM TNC TOD TRANSEC TVP TX, T	Tactical Chat Trellis Coded Modulation Temperature Compensated Crystal Oscillator Transmission Encryption Key Time Master Threaded N-Connector Time Of Day Transmission Security Tactical Video Processor Transmit	
	-U-	
UDP UI UN U.S. USA USB UTC UTM/UPS	User Datagram Protocol User Interface User Nodes United States United States of America Universal Serial Bus Universal Time Coordinated or Universal Coordinated Time, same as time zone ZULU or GMT Universal Transverse Mercator/Universal Polar Stereographic (coordinate systems)	
-V-		
V VAA VBUS VHF	Volts Vehicular Amplifier Adapter Voltage pin connection on a USB interface Very High Frequency	

A circuit that converts analog voice to digital Voice over IP

G

Vocoder VoIP

VR Vrms	Voice Repeater Volts root mean square		
	-W-		
W Web UI WGE WGS 84 WIP	Width A user interface designed to connect via HTTP(S) Work Group Edition World Geodetic System (WGS 84 is the reference coordinate system used by the Global Positioning System) Wireless Internet Protocol		
	-X-		
XML XMT XOFF XON	Extensible Markup Language Transmit Transmitter Off Transmitter On		
-Y-			
YYYY-MM-DD	Year-Month-Day (calendar)		
-Z-			
Z, Zero, Zeroize ZAN	A command sequence which erases all programmed channel parameters, option settings, frequency hopping data and COMSEC keys. Zandej		

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