

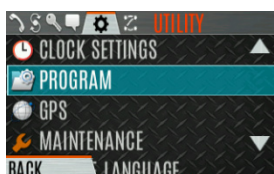
## 6. ADVANCED OPERATIONS

### 6.1 VIEW/CHANGE PERSONALITIES

Personalities contain radio programming information such as frequencies, channels, stations, and talk groups. Up to ten different personalities can be stored in the radio, but only one can be active at a time.

#### 6.1.1 View Personalities

1. At main display, press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **PROGRAM** and press the Menu/Select button. An arrow indicates the currently active personality.



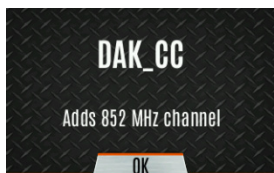
4. Press the **OPTIONS** soft key.



5. Select **VIEW PLAN INFO** to view.



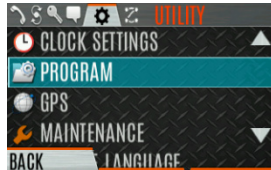
6. The radio displays the plan's filename. Personality information appears if the field was filled out using RPM2.



## 6.1.2 Change Active Personality

To change the active personality:

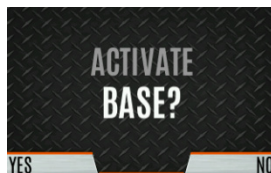
1. At main display, press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **PROGRAM** and press the Menu/Select button.



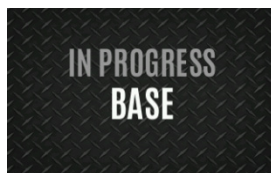
4. Press the up or down navigation buttons to highlight the desired personality and press the Menu/Select button. ➡ indicates the currently active personality.



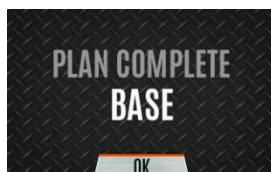
5. Press the **YES** soft key to confirm personality activation. If the personality has a power-up PIN, you are prompted to enter the PIN before activation continues.



6. The **IN PROGRESS** screen is displayed while plan activation is in progress.



7. If personality is activated, the radio displays **PLAN COMPLETE** followed by the name of the personality. Press the **OK** soft key.



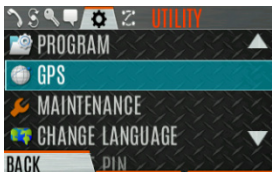
- You cannot activate a personality when the radio is transmitting an emergency.
- A **FAILED** message may be displayed for errors such as invalid syntax in the fill or some other invalid parameter.

## 6.2 SITUATIONAL AWARENESS (SA) – P25 CONVENTIONAL ONLY

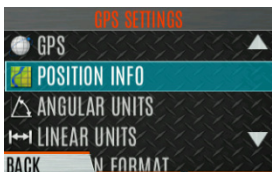
Situational Awareness is a feature in which the radio receives SA position from other units configured to send the SA packets. The SA display shows the positions of the other radios (units) relative to the radio. To make use of SA, all radios need to have a uniquely programmed Unit ID.

To display Situational Awareness Info:

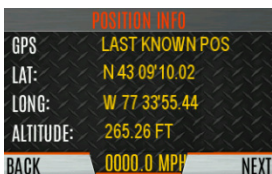
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to select **GPS** and press the Menu/Select button.



4. Press the up or down navigation buttons to select **POSITION INFO** and press the Menu/Select button.



5. Press the **NEXT** soft key.



6. Press the left or right navigation buttons to view the location of each unit. The color of each unit indicates its status as follows. Only one status can be shown at a time and are listed in priority order:
  - Grey – Unselected, no status
  - Red – Unselected, In Emergency
  - Orange – Unselected, Low Battery
  - Blue – Unselected, Scanning
  - Green – Selected, no status
  - Green/Red – Selected, In Emergency
  - Green/Orange – Selected, Low Battery
  - Green/Blue – Selected, Scanning
7. GPS of this radio is shown by the center dot as follows:
  - Green – Tracking
  - Orange – Last known position
  - Red – Searching

8. Press the up or down navigation buttons to zoom the display distance of current unit.



9. Press the **OPTIONS** soft key. From here, select **UNIT INFO** to display details about the selected unit, select **REFRESH** to update information, or select **EXIT**.

## 6.3 USER-DEFINED ZONES/SYSTEMS

### 6.3.1 Command Tactical Zone

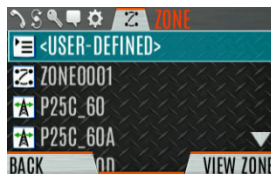
A Command Tactical Zone is defined at the radio.



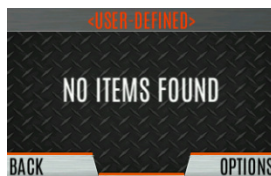
A Command Tactical Zone is reset when a Personality is activated.

To create a Command Tactical Zone:

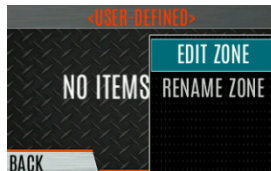
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **ZONE** menu.
3. Press the up or down navigation buttons to highlight **<USER-DEFINED>** and press the **VIEW ZONE** soft key.



4. Press the **OPTIONS** soft key.

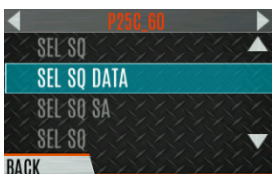


5. Press the up or down navigation buttons to select **EDIT ZONE** to create a zone or select **RENAME ZONE** to rename the Command Tactical Zone (up to 16 characters are allowed).

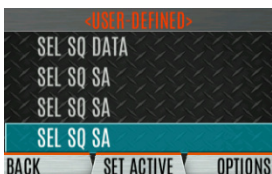


6. Press the left or right navigation buttons to scroll through existing systems. Press the up or down navigation buttons to highlight desired channel/group.
7. Press the Menu/Select button to add or remove channel/group.

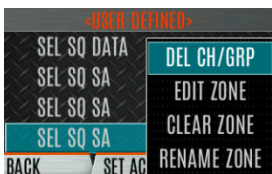
8. After adding all desired channels/groups, press the **BACK** soft key.



9. Activate the Command Tactical Zone by selecting the **SET ACTIVE** soft key on the **USER DEFINED** screen, or by pressing the Menu/Select button when **<USER DEFINED>** is highlighted on the Zone menu.




10. After creating a Command Tactical Zone, select **OPTIONS** to edit the Command Tactical Zone, delete channels/groups, clear the zone, and rename the zone.

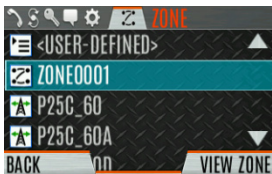


### 6.3.2 Mixed System Zone

Mixed System Zones are defined using RPM2 and cannot be edited on the radio. If a Mixed System Zone is not configured using RPM2, it will not appear on the radio. Up to 250 Mixed System Zones can be defined. You can view details about each channel/group. A user programmable button can be defined to scroll through just the mixed system zones.

To view Mixed System Zones:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **ZONE** menu.
3. Press the up or down navigation buttons to highlight the desired zone (Zones are indicated by the  icon) and select **VIEW ZONE** to view the groups/channels in the zone list.

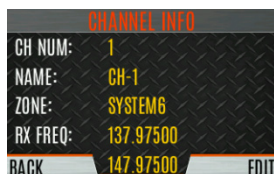


## 6.4 CH INFO MENU

The Channel Information (CH INFO) menu displays information about the currently selected channel. The information displayed varies between conventional and trunked systems. The Channel Information (CH INFO) menu display is only available if a Channel Edit Password has been programmed via RPM2.

To display channel information:

1. Press **◀** while on the idle display.
2. Press the up or down navigation buttons to scroll through the programmed channel settings.



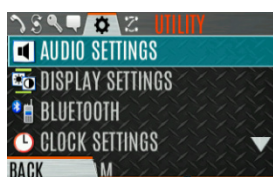
### CONVENTIONAL OR P25 CHANNELS ONLY:

3. Press the **EDIT** soft key.
4. Enter the password. You may now select and change the values of the displayed channel parameters. The password remains active until power cycle. Refer to Section 7.3 for more information.

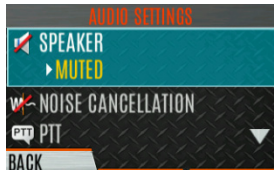
## 6.5 AUDIO SETTINGS

From this menu, you can set audio settings such as speaker mute, noise cancellation, PTT, and tones.

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons highlight **AUDIO SETTINGS** and press the Menu/Select button.



- Press the up or down navigation buttons to scroll through available audio settings. Press the Select/Menu button to change settings as desired:



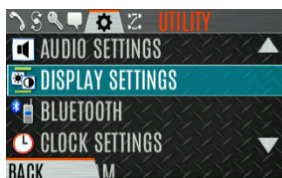
- **SPEAKER** - Mute or Unmute the speaker audio.
- **NOISE CANCELLATION** - Enable or disable noise cancellation. Noise cancellation reduces background noise during transmit.
- **PTT** - Enable or disable Push-To-Talk (PTT). Disable PTT to prevent accidental keying, such as when the radio is in a holster or you are getting into a car.
- **TONES** - Enable or disable alert tones (see Table 5-6).
- **KEYPAD TONES** - Enable or disable keypad tones. When enabled, the radio plays a tone when a button on the keypad is pressed.

- Press the **BACK** soft key to exit menu.

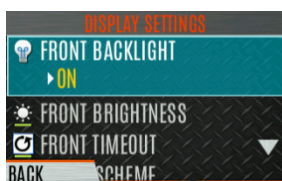
## 6.6 DISPLAY SETTINGS

To change display settings:

- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **UTILITY** Menu.
- Press the up or down navigation buttons to highlight **DISPLAY SETTINGS** and press the Menu/Select button.



- Press the up or down navigation buttons and the Select/Menu button to change settings as desired:



- **COLOR SCHEME** - Change the color scheme of the top and front displays for optimum viewing in day/night conditions.
- **FRONT BACKLIGHT** - Turn front display backlight on, off, momentary, or momentary (off). Momentary (off) is similar to momentary, but the backlight turns off completely and only comes on when the center navigation button is pressed.
- **FRONT BRIGHTNESS** - Set brightness level of front display. A level of 0 has same effect as turning off backlight.

- FRONT TIMEOUT - Specify how long the radio needs to be inactive before the front display's backlight turns off.
- TOP BACKLIGHT - Specify how long the top display's backlight will remain lit: MOMENTARY, ON, or OFF.
- TOP BRIGHTNESS - Set the brightness level of the top display. A level of 0 turns off top display and indicator (TX/RX) LED.
- TOP TIMEOUT - Specify how long the radio needs to be inactive before the top display's backlight turns off.
- FRONT DISPLAY OFF - Turns the front display off completely. Press the Menu/Select button to turn the front display back on. When the front display is turned off, the only button functions that are allowed are:
  - PTT
  - Emergency
  - Toggle Profile
  - Flashlight
  - Toggle Stealth
  - Channel Up
  - Channel Down
  - Volume Up
  - Volume Down

Press the Menu/Select button to disable this feature and turn the front display back on.

- TOP ORIENTATION - Set orientation of top display to be viewed from radio: FRONT, BACK, or AUTO.

When AUTO is selected, the radio changes the top display to be viewed from back if an external microphone or speaker is attached. Otherwise, the display can be viewed from the front.
- INDICATOR LED - Toggle the indicator LED ON/OFF.

5. Press the **BACK** soft key to exit the menu.



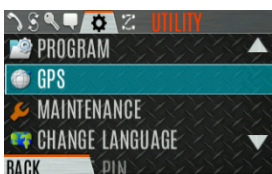
## 6.7 GPS SETTINGS



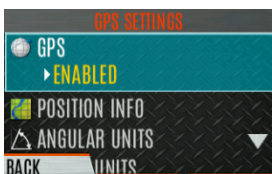
The **GPS SETTINGS** menu item only appears if enabled using RPM2 and the feature is installed.

To access GPS settings:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the UTILITY menu.
3. Press the up or down navigation buttons to highlight GPS and press the Menu/Select button.



4. Use the up or down navigation buttons and the Select/Menu button to change settings as desired:



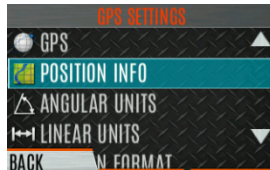
- **GPS** - Enable or disable internal GPS.
  - **POSITION INFO** - See Section 6.8.
  - **ANGULAR UNITS** - Set unit of measurement of displayed angular units: **CARDINAL**, **DEGREES**, or **MILS**.
  - **LINEAR UNITS** - Set unit of measurement of displayed linear units: **STATUTE**, **METRIC**, or **NAUTICAL**.
  - **POSITION FORMAT**- Set format of displayed position information: Latitude/Longitude Decimal Degrees (LAT LONG DD), Latitude/Longitude Degrees Minutes Seconds (**LAT/LONG DMS**), **LAT/LONG DM**, Military Grid Reference System (**MGRS**), or Universal Transverse Mercator (**UTM**).
  - **SA OVER NETWORK** - When Enabled, the radio sends GPS data to an L3Harris-supplied PC client using RNDIS networking.
5. Press the **BACK** soft key to exit the menu.

## 6.8 POSITION INFO

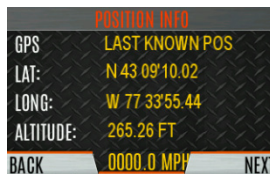
The Position Info screen displays the radio user's location information. GPS must be enabled in the GPS Settings (see Section 6.7).

To display position info:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **POSITION INFO** and press the Menu/Select button.



4. Press the up or down navigation buttons to scroll through available location information.



## 6.9 WI-FI

The XL portable supports programming via Wi-Fi. Refer to Appendix A for information on configuring Wi-Fi.

To enable Wi-Fi programming mode on the radio:

1. Ensure the radio is powered off.
2. Press and hold the bottom side button and PTT button (see Figure 4-1).



Figure 6-1: Enabling Wi-Fi

3. Power on the radio.
4. The WIFI INSTALL ACTIVE screen is displayed (Figure 6-2). The radio displays **DISCONNECTED** if not connected to a wireless network or **CONNECTED** if connected to a wireless network.



Figure 6-2: Wi-Fi Install Active



NOTE

Refer to Section 5.40.2 for more information about Wi-Fi Client selection.

## 6.10 BLUETOOTH



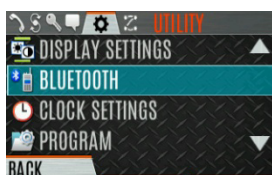
NOTE

The **BLUETOOTH** menu item only appears if enabled using RPM2 and if the feature is installed.

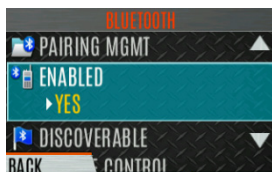
### 6.10.1 Enable Bluetooth

To enable Bluetooth:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **BLUETOOTH** and press the Menu/Select button.



4. Press the up or down navigation buttons to highlight **ENABLED** and press the Menu/Select button to toggle **YES/NO**.



*Or*

A button or switch can be programmed to enable/disable Bluetooth.

### 6.10.2 Pair Devices

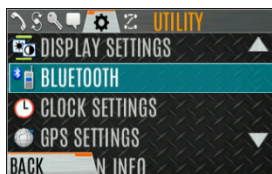


NOTE

Up to 10 pre-paired Bluetooth RSMs with unique IDs can be saved/stored in the radio's memory for automatic reconnection.

To pair devices:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **BLUETOOTH** and press the Menu/Select button.

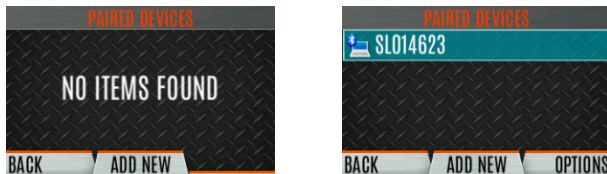


4. Press the up or down navigation buttons to highlight **PAIRING MGMT** and press the Menu/Select button.

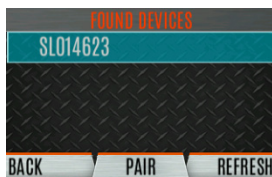


5. Make sure device being paired is powered on and has discovery mode enabled to pair with the radio.

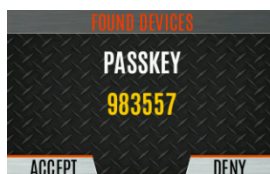
If no devices are found and Bluetooth is enabled, only the **ADD NEW** soft key is available. If devices are paired, the **OPTIONS** soft key appears.



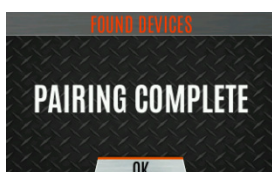
6. Press the **ADD NEW** soft key to select a device to pair.
7. A list of available Bluetooth devices appears.



8. Press the **REFRESH** soft key to refresh the device list if the desired device does not appear.
9. Press the up or down navigation buttons highlight the desired device and press the **PAIR** softkey.
10. Pairing progress is displayed.
  - For Bluetooth 2.0 devices, a pin code screen appears.  
Enter the pin code and select **OK**.
  - For Bluetooth 2.1 devices, a PASSKEY accept/deny screen appears. Select **ACCEPT**.  
Accept the passkey on the Bluetooth 2.1 device as well.



11. A **PAIRING COMPLETE** message appears when pairing is complete. Select **OK**. The paired device is then displayed in the **PAIRED DEVICES** list.



### 6.10.3 Reconnecting to Covert Bluetooth Microphone 12082-0684-01

When powering down, the radio and the microphone should be turned off one at a time, allowing the first device to completely shut down before turning off the second device.

Power Up Sequence:

1. Power up the XL radio. Wait for power up to complete.
2. Power up covert microphone 12082-0684-01.
3. Wait for Bluetooth connection as indicated by the LED. When connected, the LED is on and blue.
4. If the microphone LED indicates Idle or does not connect, press and release the PTT button.

### 6.10.4 Pair with the SCOTT EPIC 3 Radio Direct Interface (RDI) Voice Amplifier

The RDI Voice Amplifier enhances SCBA voice intelligibility when connected to the XL Portable via Bluetooth.

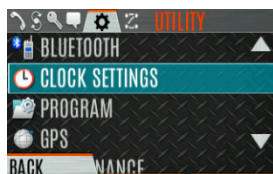
To turn the amplifier on and place into pairing mode:

1. Press and hold the power button until the LED changes from green to red. This happens in about four (4) seconds.
2. Release the power button.
3. The LED starts blinking indicating the amp is in pairing mode.
4. Ensure the LED is the same color blinking on and off indicating pairing mode. The amp will timeout of pairing mode quickly and the blinking will stop. If this happens before successful pairing, power off and restart from Step 1.
5. If the LED is blinking between light red and dark red, then the amp is in programming mode. If you try to pair with the amplifier in this mode, it will identify itself as an RI version. Turn off power and restart from step 1.

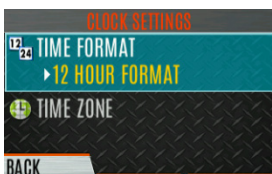
## 6.11 CLOCK SETTINGS

To view/change clock settings:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **CLOCK SETTINGS** and press the Menu/Select button.



- Use the up or down navigation buttons and Menu/Select button to change settings as desired:



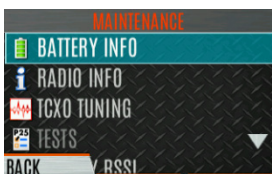
- TIME FORMAT**- Set 12 or 24-hour time display format.
- TIME ZONE** - Set time zone relative to Universal Time Coordinated (UTC).

- Press the **BACK** soft key to exit.

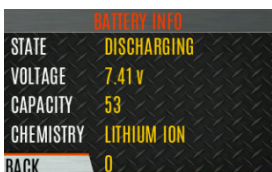
## 6.12 BATTERY INFO

To display battery information:

- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **UTILITY** menu.
- Press the up or down navigation buttons to highlight **MAINTENANCE** and press the Menu/Select button.
- Press the up or down navigation buttons to highlight **BATTERY INFO** and press the Menu/Select button.



- Battery information is displayed (state, voltage, capacity, chemistry, etc.).

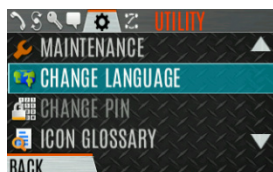


**Use only L3Harris approved batteries. Injury could occur from using an incorrect battery.**

## 6.13 SELECT LANGUAGE

To change the language displayed by the radio:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **CHANGE LANGUAGE** and press the Menu/Select button.



4. Press the up or down navigation buttons to highlight the desired language and press the Menu/Select button.

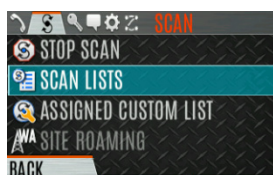


## 6.14 SET UP SCAN

These procedures are used to set up the scan list, home channels, and priority channels.

To access the scan lists:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **SCAN LISTS** and press the Menu/Select button. Refer to the following sections.



NOTE

When using Preemptive Priority Scan, the frequencies in the list need to be unique.

### 6.14.1 Default, Priority 1, and Priority 2 Channels

#### 6.14.1.1 Default Channel

This is the currently selected channel and is the channel you transmit on by default when you press PTT while the radio is actively scanning and is not responding to a just received call. Responding to a call the radio just received while scanning is called hang time. If hang time is set to 0 using RPM2, the radio always transmits on the default channel in scan.



### 6.14.1.2 Priority 1 Channel

This channel will be scanned more often than other channels in the list and will be scanned in between every other channel in the scan list. An example scan sequence would be P1 (priority 1), C2, P1, C3, P1, C4, etc. In addition, the priority channel is scanned even while actively receiving on a non-priority channel. For example, if the radio is actively receiving on C3 and activity is detected on P1, the radio drops C3 and switches to P1.

### 6.14.1.3 Priority 2 Channel

This channel is also scanned more often than others. An example scan sequence is P1, C2, P1, C3, P1, C4, P2, C5, P1, C6, P1, C7, P1, C8, P2, C9, etc. In addition, this channel is scanned even while actively receiving on a non-priority channel. For example, if the radio is actively receiving on C3 and activity is detected on P2, the radio drops C3 and switches to P2. Additionally, activity on P1 can also preempt P2, but P2 cannot preempt P1.

## 6.14.2 Trunked/Conventional Scanning

Trunked/conventional scanning adds the ability to scan multiple conventional and P25 conventional channels while still maintaining trunked radio operation. The radio can scan a conventional scan list while still receiving a trunked control channel and receiving trunked calls. Selection of which conventional scan list is associated with a given trunked system is done using RPM2 and cannot be changed on the radio. However, a user with access to the necessary menu layout (see Section 5.9) can edit the scan list members (both trunked groups and conventional channels on the selected Conventional Priority System). As the number of conventional channels being scanned increases, the time between scanning each channel increases (roughly 250 milliseconds per channel), with the consequent increase in the number of calls that will late-enter. To avoid missing calls, it is recommended to keep the number of conventional channels being scanned to eight (8) or fewer.



NOTE

The trunking site must have roaming set to Enhanced CC.

### 6.14.3 Vote Scan (Analog and P25 Conventional Only)

If vote scan is enabled via RPM2, the radio automatically selects the strongest signal ensuring that the best audio quality is delivered to the user. If vote scan is enabled, the radio is always scanning. You cannot stop scanning, start normal scanning, or monitor the channel. The scanning icon on the idle screen indicates that the radio is vote scanning versus, regular scanning.



NOTE

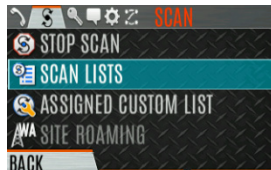
If talkaround is enabled, Vote Scan is disabled until talkaround is disabled again.

#### 6.14.4 Edit Scan List

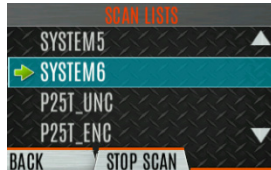
Depending on the scan list options selected via RPM2, you may be able to add or remove channels/groups from the scan list.

To edit the scan list:

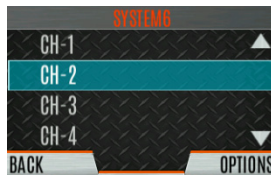
1. Press the Menu/Select button.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to select **SCAN LISTS**.



4. Press the up or down navigation buttons to highlight the scan list and press the Menu/Select button.

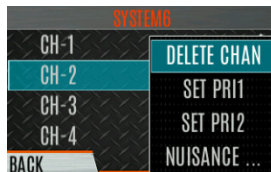


5. Press the up or down navigation buttons to highlight channel/group.
6. Select **OPTIONS**.



7. Press the up or down navigation buttons to select ADD CHAN/DELETE CHAN, SET PRI1, SET PRI2, REMOVE PRI, or NUISANCE/ADD BACK.

When a channel is not grayed out in the list, **DELETE CHAN** appears. When a channel/group is grayed out (not in list), **ADD CHAN** appears.



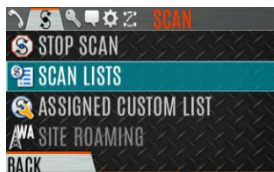
8. Press the Menu/Select button to toggle selection.

### 6.14.5 Set or Remove Priority 1 and Priority 2 Channels

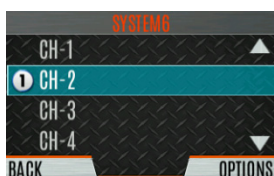
Priority channels are scanned more often than non-priority channels. Note that P1 and P2 can only be set if configured as “Keypad” and the scan list is not set to “Fixed” using RPM2.

To set or remove priority 1 and priority 2 channels:

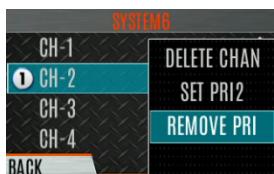
1. Press the Menu/Select button.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **SCAN LISTS** and press the Menu/Select button.



4. Press the up or down navigation buttons to highlight the desired scan list and press the Menu/Select button.
5. Press the up or down navigation buttons to highlight the desired channel/group.



6. Select **OPTIONS**.
7. Press the up or down navigation buttons to highlight **SET PRI1** or **SET PRI2** and press the Menu/Select button. A Priority 1 channel appears with P1; a Priority 2 channel appears with P2.
8. Select **REMOVE PRI** to remove priority.



### 6.14.6 Custom Scan Lists

The Mixed Zone Scan (MZS) feature gives the user the capability to scan based on a custom scan list that is assigned at the system level. The Custom Scan (CS) list can contain System and Channel/Group configurations across P25 Trunked, P25 Conventional, and Analog Systems. When a Custom Scan List is assigned to a P25T system, the radio can scan P25T, P25C and Analog systems. When assigned to a P25C or Analog system, the radio only scans conventional channels. MZS also gives the user the capability to scan beyond the selected system group set.

- **P25T Scan:**

When a custom scan list is assigned to a P25T system, the user can scan P25T, P25C, and Analog groups/channels. All P25T systems must have the same WACN, System ID, and Unit ID to be added to the custom scan list. If P25C and/or analog channels are added to the custom scan list, the radio will scan them using the Trunked/Conventional scan feature described in section 6.14.2, and will override any other conventional scan list that may have been programmed using RPM2.

- **P25C and Analog Scan:**

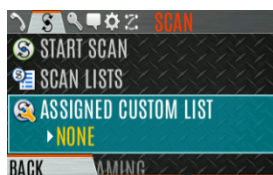
When a custom scan list is assigned to a P25C or Analog System, the user can scan P25C and Analog channels. P25T systems are ignored.

Custom scan list can be created using RPM2 or at the radio. The radio supports up to 10 Custom Scan lists, with up to 100 channels/groups in each.

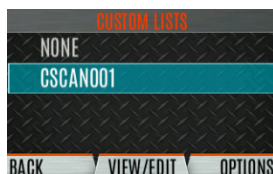
#### 6.14.6.1 Create Custom Scan List

To create a custom scan list at the radio:

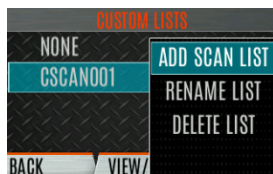
1. Press the Menu/Select button.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **ASSIGNED CUSTOM LIST** and press the Menu/Select button.



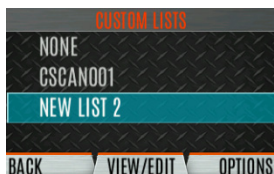
4. Press the **OPTIONS** softkey.



5. Select **ADD SCAN LIST**.



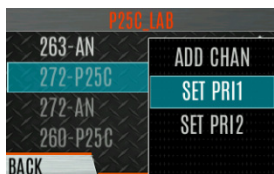
6. Press the up or down navigation buttons to highlight the newly added scan list and press the **VIEW/EDIT** soft key.



7. Press the left or right navigation buttons to display the desired system.



8. Press the up or down navigation buttons to highlight the desired group/channel and press the **OPTIONS** softkey. From here, you can add/delete channels from the scan list and set/remove Priority 1 and Priority 2 channels.



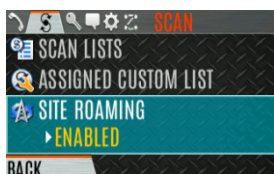
When a custom scan list is selected, that list is scanned any time scanning is enabled for any Trunked, conventional, or P25 Conventional system. To scan only the channels assigned to a system, custom scanning must be turned off.

### 6.14.7 Wide Area System Scan (P25 Trunked and EDACS)

Wide Area System Scan (WASCAN) causes the radio to roam across mobile systems when the currently selected system's control channel is lost. The radio will scan the control channels of other systems.

To enable/disable Wide Area System Scan:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **SITE ROAMING** and press the Menu/Select button to toggle Wide Area System Scan **ENABLED/DISABLED**.



4. Select **BACK** to exit the scan menu.

### 6.14.8 Site Lock

The Site Lock feature provides a list of available, adjacent sites that the user can lock the radio to. This restricts the radio from roaming between sites. Up to 512 sites can be programmed to the radio.

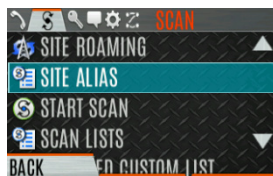


NOTE

Site Lock is only supported on P25 Trunked Systems with Enhanced CC Scan enabled.

A button on the radio can be programmed to access the Site Alias list (see Section 7.5).

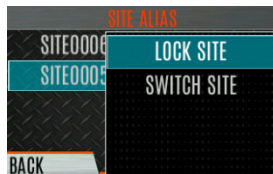
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the SCAN menu.
3. Press the up or down navigation buttons to highlight **SITE ALIAS**.



4. Press the Menu/Select button to display the list of available sites. If a Site Alias is programmed for the available site(s), it is displayed here. Otherwise, the system name is displayed.



5. From the **OPTIONS** menu, select **LOCK SITE** or **SWITCH SITE**.



## 6.15 RADIO STATUS

The status feature allows the radio user to send a status condition to the site without making a voice call. There can be up to 10 status conditions programmed into the radio. For each status defined, there is an ID and an alphanumeric name. The ID is sent to the site and the alphanumeric name appears on the radio display when the ID corresponds with the information programmed at the site.

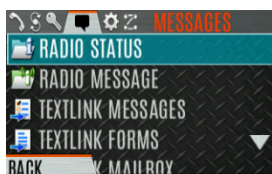


NOTE

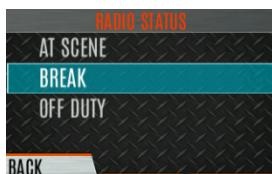
A button on the radio can be programmed to send a radio status (see Section 7.5).

To send a radio status:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **MESSAGES** menu.
3. Press the up or down navigation buttons to highlight **RADIO STATUS** and press the Menu/Select button.



4. Use the up or down navigation buttons and the Menu/Select button to highlight and select desired status.



## 6.16 RADIO MESSAGE

The message feature is used to send a message to the site without making a voice call. There can be up to 10 messages programmed into the radio. For each message defined, there is an ID and an alphanumeric name. The ID is sent to the site and the alphanumeric name appears on the radio display when the ID corresponds with the information programmed at the site.



NOTE

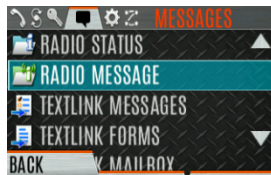
A button on the radio can be programmed to send a radio message (see Section 7.5).

To send a radio message:

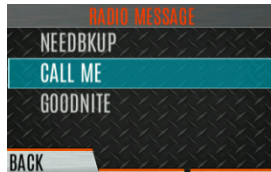
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **MESSAGES** menu.



- Press the up or down navigation buttons to highlight **RADIO MESSAGE** and press the Menu/Select button.



- Use the up or down navigation buttons and the Menu/Select button to highlight and select the desired message.



## 6.17 RADIO TEXTLINK

Radio TextLink provides short text messaging functionality for radios. Due to the difficulty of entering text messages on a radio, predefined "canned" messages and predefined replies can be stored in the radio. To facilitate sending messages where information must be provided at send time, text message forms can also be stored in the radio. A form can contain up to four (4) text prompts, for which the operator enters alphanumeric values before sending the message.

### 6.17.1 Radio TextLink Messages

To send a canned Radio TextLink message:

- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **MESSAGES** menu.
- Press the up or down navigation buttons to highlight **TEXTLINK MESSAGES** and press the Menu/Select button.



- Press the left or right navigation buttons to display the desired message.
  - Press the Menu/Select button to send the message.
  - Select **CHG CALLEE** to change the destination for the message.
  - Select **TOD QUERY** to get the time of day.

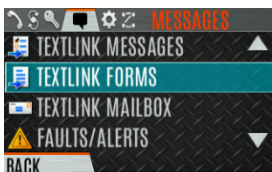


### 6.17.2 Radio TextLink Forms

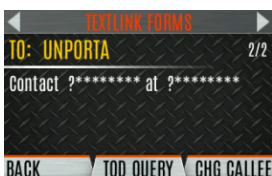
Form messages are displayed and stored in the radio as a message in which each field to be filled is indicated by a question mark (?) followed by one or more asterisks (\*). The number of asterisks indicates the maximum number of alphanumeric characters allowed for that field.

To send a Radio TextLink form:

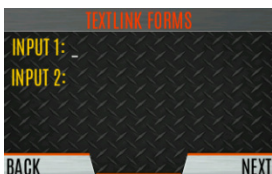
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **MESSAGES** menu.
3. Press the up or down navigation buttons to highlight **TEXTLINK FORMS** and press the Menu/Select button.



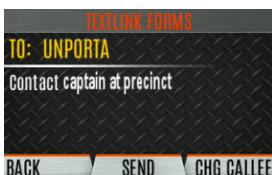
4. Press the left or right navigation buttons to display the desired message and press the Menu/Select button.




5. Enter text into blank field(s) (up to eight alphanumeric characters) and press the **NEXT** soft key.



6. Select **SEND** to send the message. Select **CHG CALLEE** to change the destination for the message. Select **TOD QUERY** to get the time of day.



### 6.17.3 View Received Messages

When the  icon appears on the idle display, there are Radio TextLink messages waiting to be read.


To view received Radio TextLink messages:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **MESSAGES** menu.

3. Press the up or down navigation buttons to highlight **TEXTLINK MAILBOX** and press the Menu/Select button. From the mailbox, select **OPTIONS** to delete messages, view details of messages, and reply to messages.

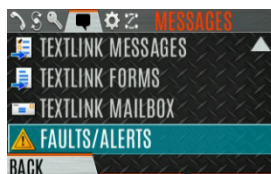


## 6.18 FAULTS/ALERTS

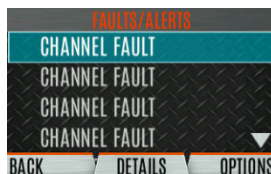
 is displayed on the idle display when there is a fault.

To view and clear faults/alerts:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **MESSAGES** menu.
3. Press the up or down navigation buttons to highlight **FAULTS/ALERTS** and press the Menu/Select button.



4. Fault messages are displayed. Press the up or down navigation buttons to highlight the desired fault. Press the **OPTIONS** soft key delete faults. Press the **DETAILS** soft key to view details for the highlighted fault.



Possible faults include:

- **BATTERY FAULT**- Replace battery.
  - **EEPROM FAULT** - Contact L3Harris.
  - **RF FAULT** - Contact L3Harris.
  - **OVERCURRENT** - Check antenna and antenna connection. Try replacing antenna.
  - **INVALID SYSTEM** - Feature not installed.
  - **CHANNEL FAULT** - Channel frequency programmed is not valid for this radio.
5. If you view but do not delete the fault, the alert icon goes away on the idle display.
  6. Contact L3Harris for assistance with diagnosing a fault.

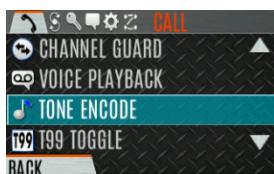
## 6.19 TONE ENCODE

Tone Encode is a generic tone encoding scheme for call identification when transmitting on a conventional system. It supports generic user-definable tone encode (up to 15 tones), Type 99 (up to 2 tones) and 5/1 Tone (up to 5 tones) encoding formats.

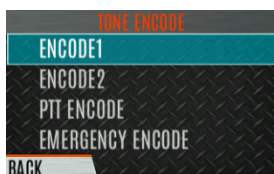
Tone encoding schemes are used to transmit calls to one or more target radios that have been programmed with the correct tone decode sequence. When the receiving radio detects its tone decode sequence, it unmutes on the call.

To select a Tone Encode option:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **CALL** menu.
3. Press the up or down navigation buttons to highlight **TONE ENCODE** and press the Menu/Select button.



4. Select the desired Tone Encode option from the list.



## 6.20 ENCRYPTION

### 6.20.1 Zeroize Keys from Radio

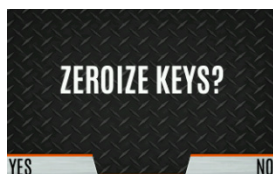
It may be necessary to remove keys because of compromise or expiration.

To zeroize keys from the radio:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SECURITY** menu.
3. Press the up or down navigation buttons highlight **ZEROIZE KEYS** and press the Menu/Select button.



4. Press the **YES** softkey to remove the keys. This will also remove the keysets.



### 6.20.2 Protected Keys

The Protected Keys feature transfers P25 Voice Keys, from L3Harris Key Loader to the radio, that have been wrapped (AES) or encrypted (DES) with Key Protection Keys (KPKs). KPKs are nothing more than unprotected Key Encryption Keys (KEKs). The KPKs need to be loaded into the radio before the Protected Keys are loaded. Once loaded into the radio, the KPKs are used to unwrap (AES) or decrypt (DES) the Protected Keys.

### 6.20.3 Global Encryption

Global Encryption can be enabled when encryption keys are loaded on the radio and the selected Zone/System is encrypted. When Global Encryption is enabled on the radio, a Global Key is used for all encrypted transmissions until:

- Global Encryption is disabled.
- A new personality is activated.
- The active keyset is changed.
- The system is changed.

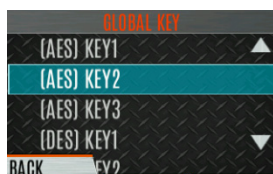
Global Encryption behavior is available on all channels that support encrypted communications.

To enable Global Encryption and/or change Global Encryption Key:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SECURITY** menu.
3. Press the up or down navigation buttons to highlight **GLOBAL ENCRYPTION**. Press the Menu/Select button.



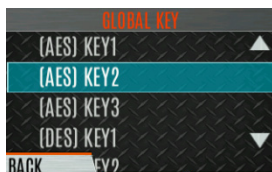
4. Press the up or down navigation buttons to highlight the desired Global Key and press the Menu/Select button to enable Global Encryption.




- To change the selected global key, press the up or down navigation buttons to highlight **GLOBAL KEY** on the **SECURITY** menu. Press the Menu/Select key.



- Press the up or down navigation buttons to highlight the global key and press the Menu/Select button.

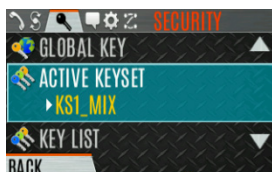


- RPM2 allows Key Numbers to be given Key Names.
- The optional global key icon  is displayed on the main display.

#### 6.20.4 Select Keyset

To select a keyset:

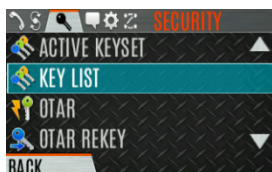
- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **SECURITY** menu.
- Press the up or down navigation buttons to select **ACTIVE KEYSSET**. Press the Menu/Select button to toggle to the inactive keyset.



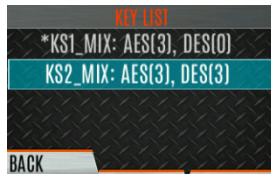
#### 6.20.5 View Key List

To view the key list:

- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **SECURITY** menu.
- Press the up or down navigation buttons to select **KEY LIST** and press the Menu/Select button.



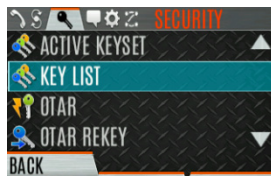
- The available key lists are displayed.



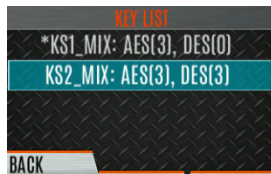
### 6.20.6 Delete Individual Keys

To delete individual keys from a keyset:

- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **SECURITY** menu.
- Press the up or down navigation buttons to select **KEY LIST** and press the Menu/Select button.



- The available key lists are displayed.



- Select the desired keyset and press the Menu/Select button to display the individual keys. Highlight the desired key and press the **DELETE** softkey.



### 6.20.7 OTAR Configuration

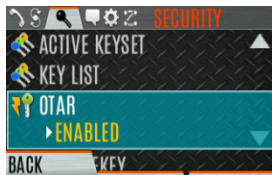
OTAR is the over-the-air-rekeying from a KMF and must be enabled for the digital only channel using RPM2. For OTAR operation, the appropriate KEKs must be loaded into the radio using the L3Harris Key Loader or a KVL device.

The KMF Configuration must include the RSI of the KMF and the appropriate Message Number Period.

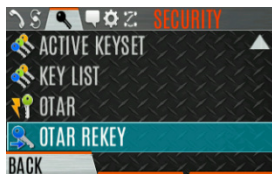
To enable OTAR and request rekey:

- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **SECURITY** menu.

- Press the up or down navigation buttons to highlight **OTAR** and press the Menu/Select button to toggle **ENABLED/DISABLED**.



- Press the up or down navigation buttons to select **OTAR REKEY** and press the Menu/Select button to request that the KMF updates the keys in the radio. **OTAR REKEY** is only enabled if the radio has successfully registered for data operations. If enabled via programming, the radio plays an audible confirmation tone to indicate successful OTAR rekey.



## 6.21 P25 CONVENTIONAL FALLBACK

When P25 Conventional Fallback is enabled, a P25 trunking site responds to failures by allowing one or more channels to operate as conventional repeaters. Terminals which are properly configured can then communicate using the conventional P25 channel(s).

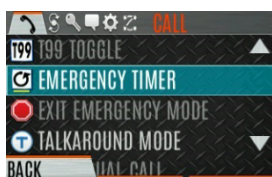
The radio provides an audible and visual indication when operating in P25 Conventional Fallback.

## 6.22 EMERGENCY CHECK-IN TIMER

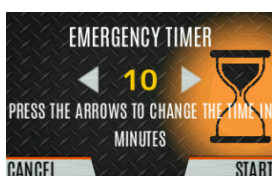
The Emergency Check In Timer is an added safety feature for a radio user who may be in a dangerous environment. If this timer expires before being cancelled by the radio operator, an emergency is declared.

To enable the Emergency-Check In Timer via the radio menu:

- Press the Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **CALL** menu.
- Press the up or down navigation buttons to highlight **EMERGENCY TIMER** and press the Menu/Select button.

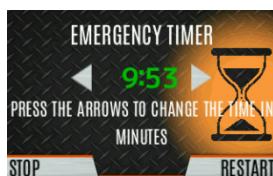


- Set the Emergency Check-In Timer using the left or right navigation buttons. The minimum and maximum allowable values are programmed via RPM2. Default is 10 minutes.





5. Press **RESTART** to restart the timer or **STOP** to stop the timer and return to the **CALL** menu. If enabled via RPM2, pressing the PTT button will also restart the timer.



NOTE

Power cycling the radio stops the Emergency Check-In Timer.

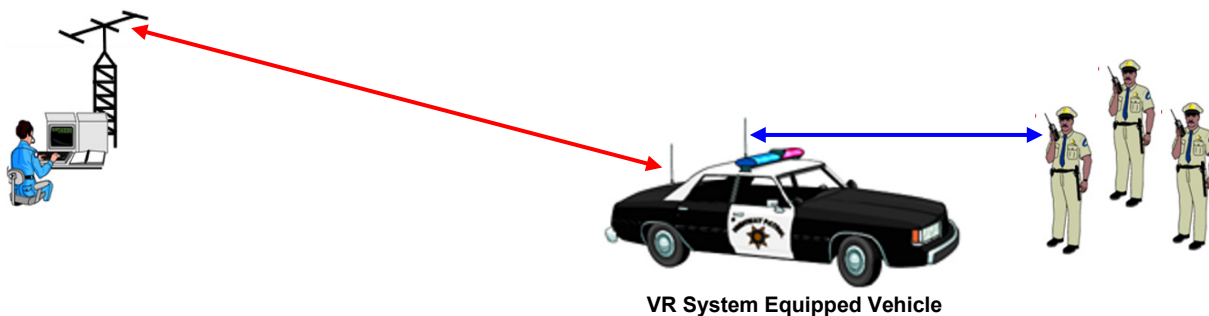
If the **EMERGENCY TIMER** menu is not available to the radio user, a button can be programmed to enable/disable the Emergency Check-In Timer. In this case, the timer value is set in RPM2 and cannot be changed at the radio.

## 6.23 VEHICULAR REPEATER (VR) OPERATION THROUGH A PYRAMID VR

### 6.23.1 VR System Overview

An XL portable radio can operate through a Vehicular Repeater (VR) System which consists of a Vehicular Repeater Radio connected to an XL Mobile Radio in a vehicle. A portable radio using the VR System is called a VR Client Radio.

VR Client Radio transmissions are received by the VR System's VR radio and retransmitted on the VR System's XL Mobile. This is called "Portable To Base" operation. Likewise, the VR System's VR Radio retransmits transmissions received by the VR System's XL Mobile to the VR Client Radios. This is called "Base To Portable" operation.



A VR System can extend the coverage of a Portable Radio. A VR Client Radio communicating through a VR System, utilizing a higher power mobile and a more efficient mobile radio antenna, allows the VR Client Radio to access a Radio Network through the VR System's XL Mobile Radio that the VR Client Radio may not be able to access directly.

VR operation is supported with the XL Mobile when set to a P25 Trunked, a P25 Conventional, or an Analog Conventional System.



### 6.23.2 VR Modes of Operation

A VR System supports System Repeat Mode and Local Repeat Mode.

- System Repeat Mode (Extended Coverage) provides network extension that enables nearby VR Client Portable Radios operating on a vehicular repeater radio frequency channel to access a radio network through the XL Mobile radio. Portable radio coverage is extended due to the XL Mobile's high-performance mobile antenna system and higher transmitter output power used to access the radio network. In this mode, the Vehicular Repeater can significantly enhance in-building penetration for portable radios that can operate on the same radio frequency band as the vehicular repeater. Typical operational scenarios include in-building tactical operations, joint training exercises, and search-and-rescue operations in remote (i.e., RF-fringe-area) areas.
- Local Repeat Mode (Scene Of Incident) enables nearby radios operating on a vehicular repeater radio frequency channel to communicate with each other using the Vehicular Repeater as a base station repeater. This mode is advantageous for use during any operational scenario where network communications (including communications with console dispatchers) is not required and/or not possible. This mode does not provide access to any of the XL Mobile Radio's radio systems.

### 6.23.3 Software Requirements

- XLP R12K or later
- RPM2 R12D or later

### 6.23.4 Selecting a VR System

Select the desired VR System. See Section 5.12. If necessary, consult with your radio system's network administration personnel as necessary and obtain the name of the required system.

After the VR System is selected, the radio shows the VR Display. This is indicated by the Display's VR Backdrop. In the following image, the System is "VR SYSTEM" and the P25C Channel is "BATTALION 2 VR."



### 6.23.5 VR Availability Indications

When the VR System is selected, the VR Client Radio waits up to 12 seconds to determine if a VR is available. A VR transmits periodic Beacon Transmissions to announce its presence. A VR Client goes into its normal Operational Mode after hearing one of these Beacon Transmissions.



Attempting a transmission during this initial twelve second period immediately sets the VR Client Radio in its Normal Operating Mode and the VR Client Radio will attempt to transmit through the VR.

Receiving a transmission from the VR during this initial twelve Second Period also sets the VR Client Radio in its Normal Operating Mode.

If the VR Client Radio does not hear a VR Beacon Transmissions within this 12 seconds period, the VR Client indicates a VR is not available with its "VRS OOR" (VR Out Of Range") Display. This is shown below. The VR Client Radio is now in its "VRS OOR" Mode.



A "VRS OOR" VR Client Radio continues to listen for VR Beacon Transmissions. When it receives a VR Beacon Transmission, the VR Client Radio returns to its Normal Operating Mode and replaces its "VRS OOR" display with its Normal VR display.

Likewise, if a VR Client Radio in Normal VR Operating Mode goes over 12 seconds without hearing a VR Beacon Transmission, the VR Client will go into its "VRS OOR" Mode. The VR Client concludes that the VR is no longer available and displays "VRS OOR."

A VR Client Radio can go into "VRS OOR" Mode when a VR is not on the scene or has left the scene. A VR Client Radio can go into "VRS OOR" Mode when the VR Client Radio too far away from and out of range of the VR.

A VR Client Radio cannot transmit while it is in its "VRS OOR" Mode. PTT attempts are denied by the VR Client Radio.

If so programmed, a "VR Client in its "VRS OOR" Mode will play its "Out Of Range" Alert Tone.

## **6.23.6 VR Client Transmit operation**

### **6.23.6.1 Local Repeat Mode**

1. Press and hold PTT to initiate a transmission.
2. The VR Client transmits a "Request To Transmit" to the VR.
3. The VR transmits a Grant or Denied Response to the VR Client.  
If the VR Client does not receive a response from the VR, the VR Client retries its Request Transmission.
4. If VR Client's Request is granted:
  - The VR Client starts transmitting with its Mic Audio.
  - The VR repeats the transmitting VR Client Radio's Mic Audio to other VR Client Radios.
  - Other VR Client Radios display the transmitting Radio's Caller ID Information and the VR's Group Information.
5. If VR Client's Request is denied:  
The VR Client plays the Denied Alert Tone. The VR Client displays the "Call Denied" Display.
6. Release PTT to end the transmission.

### 6.23.6.2 System Repeat Mode

A VR Client initiated transmission is called a VR "Portable To Base" Transmission.

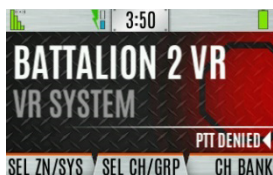
1. Press and hold PTT to initiate a transmission.
2. The VR Client transmits a "Request To Transmit" to the VR.  
If the VR Client does not receive a response from the VR, the VR Client retries its transmission.
3. The VR initiates a transmission on its XL Mobile Radio on the XL Mobile Radio's Selected System and Group.
4. If the XL Mobile's Transmission is granted, the VR sends a Grant Response to the VR Client.
  - The VR Client starts transmitting with its Mic Audio.
  - The VR repeats the transmitting VR Client Radio's Mic Audio to other VR Client Radios.
  - Other VR Client Radios display the transmitting Radio's Caller ID Information and the VR's Group Information.
  - The XL-Mobile transmits VR Client Radio's Mic Audio from the VR.
  - In an EVRS VR System, XL Mobile Network Side Radios sees the XL-Mobile Radio's Caller ID Information. In an EVRS+ VR System, XL Mobile Network Side Radios see the Transmitting VR Client Radio's Caller ID Information.
5. If the XL-Mobile's Transmission is denied, the VR sends a denied Response to the VR Client.  
The VR Client plays a Denied Alert Tone. The VR Client displays "Call Denied."
6. Release PTT to end the transmission.

### 6.23.6.3 VR Denied Transmissions

A VR Client transmission attempt may be denied when the VR or the XL-Mobile is not available to transmit. These situations can include:

- The VR Client Radio is out of range of the VR. A VR Client Radio denies a transmission attempt while the VR Client Radio is in its "VRS OOR" Mode.
- The XL-Mobile is transmitting from its Control Unit.
- All Channels on a P25T Site are in use and the Site cannot assign a Channel for the XL Mobile's transmission.

When a VR Client transmission attempt is denied, the VR Client plays its Denied Alert Tone. The VR Client displays its "Call Denied" Display. This is shown below:



After a VR Client transmission attempt has been denied, the VR Client Radio's PTT must be released before the VR Client Radio will allow another transmission attempt. Pressing the VR Client Radio's PTT again causes a new transmission attempt.

#### 6.23.6.4 VR Client Radio and XL-Mobile Control Unit Transmit Conflicts

The XL-Mobile is a fully functional Mobile Radio while the VR is in System Repeat Mode. Consequently, it is possible for a VR Client Radio and the XL Mobile's Control Unit to conflict with one another when attempting to transmit.

Normally, access to the XL-Mobile is on a "first come, first served" basis. If the XL-Mobile is currently transmitting locally from its Control Unit, VR Client Radio transmit attempts are denied. Likewise, if the XL-Mobile is transmitting from a VR Client Radio, attempts to transmit from the XL Mobile's Control Unit are denied.

On an EVRS+ VR, a local Control Unit XL Mobile Transmission appear to a VR Client Radio as an XL Mobile Receive "Base To Portable" Transmission. In this case, the VR Client Radios display the VR's Caller ID Information.

#### 6.23.6.5 Courtesy Beeps

The VR can be programmed to transmit a "Courtesy Beep" after a VR Client Transmission. A "Courtesy Beep" serves three purposes:

- Indicates to the transmitting VR Client Radio that its transmission has been transmitted.
- Informs other VR Client Radios that the transmission is over and that the VR is now available for other activity.
- Indicates the current VR Mode:
  - System Repeat Mode - One Beep.
  - Local Repeat Mode - Two Beeps.

### 6.23.7 VR Client Receive operation

#### 6.23.7.1 Local Repeat Mode

- The VR repeats the transmitting VR Client's transmission to other VR Client Radios.
- The Display on Receive VR Client Radios is the standard XL Portable Receive Display.

The Radio displays its Receive Backdrop. The Second Display Line may be the transmitting VR Client's Caller ID Information. The Banner Line alternates the transmitting VR Client's Caller ID Information and the VR Group Information. In Figure 6-3 and Figure 6-4, Radio "UNIT 715-1905" is the transmitting VR Client Radio.

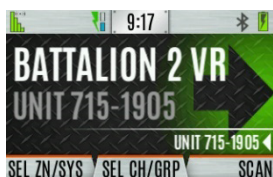


Figure 6-3: VR Client Display



Figure 6-4: VR Client Display

### 6.23.7.2 System Repeat Mode

VR Client Receive Operation is different between an EVRS Mode VR and an EVRS+ Mode VR. The main difference in operation is in the display of Caller ID Information.

#### EVRS VR:

- The Display on Receive VR Client Radios is the standard XL Portable Receive Display. The Radio displays its Receive Backdrop. The Second Display Line can be the transmitting VR's Caller ID Information. The Banner Line alternates the transmitting VR's Caller ID Information and the VR Group Information. A Receive Call with the VR's "BATTALION 2 VR" Caller ID information is shown below:



Figure 6-5: VR Client Display



Figure 6-6: VR Client Display

#### EVRS+ VR:

- The Display on Receive VR Client Radios is the standard XL Portable Receive Display. The Radio displays its Receive Backdrop. The Second Display Line can be the transmitting XL-Mobile Side Radio's Caller ID Information. The Banner Line alternates the transmitting XL-Mobile Side Radio's Caller ID Information and the VR Group Information. In the following displays, "CONSOLE 10" is the Caller ID Information for a P25 Trunked System Radio Transmission being received by the XL Mobile.



Figure 6-7: VR Client Display



Figure 6-8: VR Client Display

### 6.23.8 VR Client Declare Emergency Operation

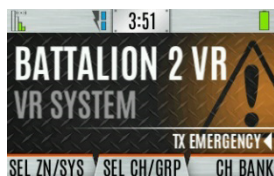
A VR Client Radio can be programmed to declare an Emergency. This is done by using the XL Portable Radio's methods for declaring an Emergency (see Section 5.36.1). One method for declaring an Emergency is to press the radio's top Emergency Button.



NOTE

The Emergency Button can be programmed with a "Key Down" period to prevent inadvertent Emergencies. This requires the Emergency Button to be pressed and held for this period before the radio declares an Emergency.

An Emergency declaring VR Client displays its Emergency Display. This is shown below:



Subsequent transmissions from the Emergency declaring VR Client Radio from its PTT will be Emergency Transmissions.

The VR receives Client Radio Emergency Transmission. However, the VR repeats the Emergency declaring VR Client's Transmission as a Non-Emergency Transmission. Other VRS Client Radios in the VR's area receiving the VR's transmission do not display "RX EMERGENCY" and are not aware that the Emergency declaring VR Client Radio has declared an Emergency.

The VR's further actions when a VR Client Radio declares an Emergency depends on the VR's Mode and whether the VR is an EVRS or EVRS+ VR.

#### **6.23.8.1 Local Repeat Mode**

##### **EVRS Operation:**

The VR declares an Emergency on the XL Mobile and retransmits the VR Client Radio's transmission on the XL Mobile. The XL Mobile transmits as long as the VR Client Radio is transmitting. The XL Mobile does not transmit a "Hot Mic" Transmission when a VR Client Radio declares an Emergency.

Users on the XL Mobile's Radio System cannot respond to the VRS Client Radio's Emergency. The XL Mobile continues to hold the VR "Disabled" and the VR continues to be in Local Repeat Mode.

The VR cannot change into System Repeat Mode in response to a VR Client Radio Emergency.

VR Client Radios do not indicate that the XL Mobile has received an Emergency Call. The VR does not retransmit an XL Mobile received Emergency transmission when the VR is in Local Repeat Mode.

##### **EVRS+ Operation:**

The VR does not declare an Emergency on the XL Mobile in response to a VR Client Emergency.

The VR cannot change into System Repeat Mode in response to a VR Client Radio Emergency.

VR Client Radios do not indicate that the XL Mobile has received an Emergency Call. The VR does not retransmit an XL Mobile received Emergency transmission when the VR is in Local Repeat Mode.

#### **6.23.8.2 System Repeat Mode**

##### **EVRS Operation:**

The VR declares an Emergency on the XL-Mobile and retransmits the VR Client Radio's transmission on the XL Mobile. The XL Mobile transmits as long as the VR Client Radio is transmitting. The XL-Mobile does not transmit a "Hot Mic" Transmission when a VR Client Radio declares an Emergency.

The XL Mobile transmits its Emergency Call with its Caller ID Information.

The XL Mobile displays "TX Emergency."



When the XL Mobile receives an Emergency Call, the VR retransmits the XL-Mobile's Emergency Transmission to the VR Client Radios. However, the VR retransmits the XL Mobile's Transmission as a non-Emergency Call. VR Client Radios are not aware that the XL Mobile is in its RX Emergency Mode.

#### **EVRS+ Operation:**

The VR declares an Emergency on the XL-Mobile and retransmits the VR Client Radio's transmission on the XL-Mobile. The XL-Mobile transmits as long as the VR Client Radio is transmitting. The XL-Mobile does not transmit a "Hot Mic" Transmission when a VR Client Radio declares an Emergency.

The XL Mobile transmits its Emergency Call with transmitting VR Client Radio's Caller ID Information.

The XL Mobile displays "RX Emergency," since it is the VR Client Radio declaring the Emergency.

When the XL Mobile receives an Emergency Call, the VR retransmits the XL Mobile's Emergency Transmission. However, the VR retransmits the XL Mobile's Transmission as a non-Emergency Call. VR Client Radios are not aware that the XL Mobile is in its RX Emergency Mode.

#### **6.23.9 VR Client Clear Emergency operation**

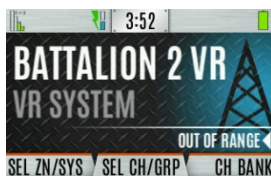
A VR Client Radio can be programmed to clear its Emergency. See Section 5.36.

Clearing an Emergency on a VR Client Radio does not clear the Emergency on the XL-Mobile Radio when the VR is in System Repeat Mode.

Clearing an Emergency on the XL Mobile or clearing the Emergency on another Radio on the XL Mobile's System does not clear an Emergency on a VR Client Radio.

#### **6.23.10 XL Mobile P25T "Out Of Range" Operation**

A VR can report a P25 Trunked System XL Mobile's Registration Status to the VR Client Radios. An XL Mobile reports to the VR when it goes out of range and begins CCSCANNING. The VR, in turn, reports this status to the VR Client Radios. The VR Client Radios then Display "OUT OF RANGE" on their Banner Line. This is shown below:



If so programmed, a VR Client in its "OUT OF RANGE" Mode plays its "Out Of Range" Alert Tone. The VR automatically changes to Local Repeat Mode while the XL Mobile is out of range. VR Client Radios can communicate among themselves through the VR, but do not have access to the XL Mobile's System.

An Out Of Range XL Mobile also reports to the VR when it stops CCSCANNING and reregisters on its P25 Trunked System. The VR, in turn, reports this status to the VR Client Radios. The VR Client Radios then return to Normal Operation.

The VR automatically reverts to System Repeat Mode after the XL Mobile comes back in range. VR Client Radios can now communicate through the XL Mobile through the VR. The VR only reports "OUT OF RANGE" when the XL Mobile is on a P25T System. The VR is not capable of reporting "OUT OF RANGE" when the XL Mobile is on a P25 Conventional System nor when the XL Mobile is on an Analog Conventional System.

## 7. PROGRAMMING

This section provides information on front panel programming. Programming can also be accomplished by creating a plan using a computer with RPM2 installed.

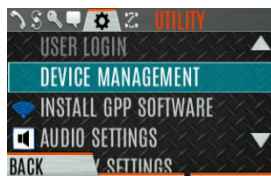
### 7.1 L3HARRIS DEVICE MANAGEMENT

L3Harris Device Management is a web-based application that allows the user to collect basic status and version information, read and program personalities, and program firmware in XL radios over LTE or secure Wi-Fi. Refer to L3Harris Device Management User's Manual 14221-2100-2010 for information about using the application.

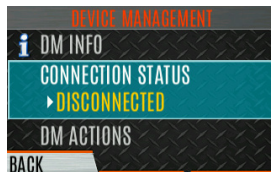
To initiate Device Management Actions from the radio:

The radio only communicates with L3Harris Device Management when initiated by the user as shown in the following steps:

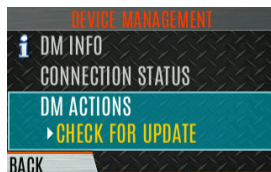
1. From the radio menu select **UTILITY → DEVICE MANAGEMENT**.



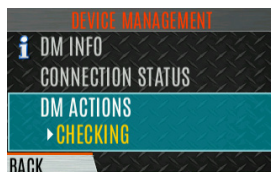
2. Verify the **CONNECTION STATUS** is **CONNECTED**.



3. Highlight and select **DM ACTIONS** to check for available updates.



4. The **DM ACTIONS** menu displays **CHECKING** while searching for updates. This will change to **UPDATE AVAILABLE** if there are available updates.



5. Select **DOWNLOAD & INSTALL** to install available updates.



## 7.2 PROGRAMMING VIA RPM2

Radio Personality Manager2 (RPM2) is used to program the XL portable. With RPM2, you can fully program the radio using cable 12082-0410-A1.



Removing power during radio programming or programming the radio with low battery power could corrupt installation of firmware.



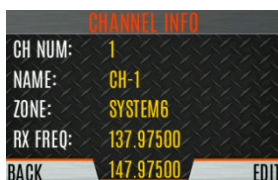
Ensure that the radio is turned off before connecting the programming cable. After the cable is connected, then power on the radio.

## 7.3 EDIT CHANNEL (ANALOG AND P25 CONVENTIONAL ONLY)

Channels can be edited from the Channel Information (CH INFO) menu display. Most of the displayed channel parameters can be modified here. Channel edits persist across a power cycle. Loading a personality clears any channel edits. Available parameters vary depending on whether the channel is a P25 or analog channel. The Channel Information (CH INFO) menu display is only available if a Channel Edit Password has been programmed via RPM2.

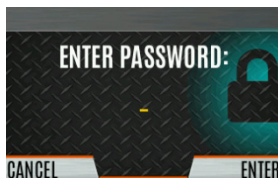
To edit a channel:

1. From the main display, press **◀** to access the **CH INFO** screen.
2. Press the up or down navigation buttons to scroll through the programmed channel settings.
3. Press the **EDIT** soft key.



Only authorized users should attempt channel editing.

4. Enter the password programmed via RPM2. You do not have to re-enter the password until you power cycle the radio.
5. Press the **ENTER** soft key.



6. Highlight and select the parameter to edit. For P25 channels, modify remaining channel settings:
- **CHANNEL NAME** - The Channel Name cannot be changed from this screen; RPM2 is required to change the Channel Name.
  - **RX FREQUENCY** - Receive frequency. Note that if the new frequency is invalid, the display reverts to the old frequency (Table 7-1).
  - **TX FREQUENCY** - Transmit frequency.
  - **TX POWER** - Transmit power. Toggle between LOW and HIGH.
  - **TALKGROUP** - Select a talkgroup for the channel. Talkgroup name cannot be set here.
  - **RX NAC** - Network Access Code (NAC) radio uses for Normal squelch in receive.
  - **TX NAC** - NAC radio transmits to break Normal squelch on receiving radio.
  - **P25 SQUELCH** - Select type the radio uses in receive. Select NORMAL, SELECTIVE, or MONITOR.
  - **RX CHAN GUARD** – Squelch type radio uses in receive. Select Noise, CTCSS, or CDCSS. For a digital channel, the RX CHAN GUARD is used to receive from a Conventional analog channel that is on the same frequency and uses the selected Channel Guard.
    - **RX CODE** - Code radio looks to unmute the speaker on the receiving radio when CDCSS squelch is used in conventional mode.
    - **RX TONE** - Tone radio looks to unmute the speaker on the receiving radio when CTCSS squelch is used in conventional mode.
7. For analog channel, modify remaining channel settings:
- **CHANNEL NAME** - The Channel Name cannot be changed from this screen; RPM2 is required to change the Channel Name.
  - **TX FREQUENCY** - Transmit frequency.
  - **TX POWER** - Transmit power. Toggle between HIGH and LOW.
  - **RX CHAN GUARD** - Squelch type radio uses in receive. Select Noise, CTCSS, or CDCSS.
    - **RX TONE** - Tone radio uses to break selective squelch on receiving radio. This is available when RX squelch is set to CTCSS.
    - **RX CODE** - Code radio uses to break selective squelch on receiving radio. This is available when RX squelch is set to CDCSS.



**RX CHAN GUARD** is not available on this screen if it was enabled from the CALL menu as per Section 5.24.

- **TX CHAN GUARD** - Squelch type radio uses in transmit. Select None, CTCSS, or CDCSS.
  - **TX TONE** - Tone sent by transmitting radio to allow receiving radio to unmute when CTCSS squelch is used in conventional mode.
  - **TX CODE** - Code sent by transmitting radio to allow receiving radio to unmute when CDCSS squelch is used in conventional mode.



NOTE

**TX CHAN GUARD** is not available on this screen if it was enabled from the CALL menu as per Section 5.24.

8. An asterisk is displayed in front of the **CHANNEL** label on the main display when a channel has been edited. The asterisk is NOT shown for TX Power or Talkgroup changes.



NOTE

When the only item edited is the TX or **RX CHAN GUARD** values, and then **CHAN GUARD** edit is Disabled, the asterisk goes away and the channel is no longer considered edited. This is the only editable item for which this is true.

**Table 7-1: Valid Frequency Ranges**

INTERNATIONAL (NON-REBANDED)	US (REBANDED)	FREQUENCY RESOLUTION
136 - 174 MHz	136 - 174 MHz	2500, 5000, or 6250 Hz
378 - 522 MHz	378-522 MHz	2500, 5000, or 6250 Hz
763 - 776 MHz	768 - 776 MHz	6250 kHz
793 - 806 MHz	798 - 806 MHz	6250 kHz
806 - 825 MHz	806 - 817 MHz	6250 kHz
851 - 870 MHz	851 - 862 MHz	6250 kHz

## 7.4 OTAP

The radio supports Over-the-Air-Programming (OTAP) via ProFile Manager. RPM2 creates, modifies and stores personality information while ProFile Manager delivers the personality over the network to the desired radios. ProFile Manager also contains the ability to read personality information over-the-air and save the files, so that RPM2 can modify the information if necessary.

You can interrupt the programming process, if necessary, by depressing the Push-to-Talk (PTT) button or declaring an emergency. Once a radio personality update is successfully completed, the radio automatically resets itself, switches to the new personality, and returns to normal operation. For more information on using ProFile Manager, refer to *Software Release Notes* 14221-1100-8250.

## 7.5 PROGRAMMABLE BUTTONS AND SWITCHES

### 7.5.1 Programmable Buttons

Press the down navigation button while on the main display to view the functions assigned to the programmable buttons. The programmable buttons are programmed using RPM2. A delay of 0 to 10 seconds can be defined using RPM2 for the programmable buttons. Table 7-2 lists and describes the functions that can be programmed to the buttons:

**Table 7-2: Programmable Button Options**

FUNCTION	DESCRIPTION
No Operation	
Active Emergency Display	The radio can display up to 20 active emergency alerts. This functionality is only available if the Extreme Radio Feature is enabled.
Adjust Squelch	Allows the user to adjust the analog squelch level.
Advanced P25 User Login	Allows the user to login. This is only enabled on P25 Trunked systems that support Advanced P25 User Login. See Section 5.5.1.
Audio Playback	Accesses the AUDIO PLAYBACK menu. See Section 5.30.
Bluetooth Enable/Disable	Enable/disable Bluetooth. See Section 6.10.
Button Info	Opens the Programmable Button Info Menu. Button Info is assigned to the Key Down button by default.
Caller ID	Opens the Caller ID menu. When a Missed Call Alert is shown on the radio display, pressing the Key Up button on the radio opens the CALLER ID menu irrespective of the functionality assigned to the Key Up button.
Channel Guard Override	Allow user to pick a different Channel Guard setting for the current channel.
CMD Mute	Mutes all audio. Audio remains muted until this button is pushed again or until an I-Call is received by the radio.
Direct System/Zone Entry	Allow user to select system/zone.
Drop Call	Drop or terminate any group call that the radio receives.
Echo Reduction	Toggles Echo Reduction On/Off.
Editable Preset	When this button is pressed and held for four (4) seconds, the radio saves the currently selected system/group or zone/channel to this button. When this button is pressed and released in less than four (4) seconds, the radio changes to the user-saved system/group or zone/channel if already saved by the user. If system/group or zone/channel is not configured for this button, when user defined preset button is pressed and released in less than four (4) seconds, the radio displays "Preset Empty."
Emergency Check In Timer	When this button is pressed, the Emergency Check In Timer is activated. See Section 6.22 for more information.
Fixed Preset	When this button is pressed and released, the radio changes to the system/group or zone/channel specified in RPM2.
Flashlight Mode	Press and hold to turn on the front and top display backlights. Release the button to turn off both displays.
Flip Top Display Orientation	Toggles the top display Front/Back.
Front Backlight	Toggles front display's backlight On/Off/Momentary.
Group/Channel Down	Scrolls down through the list of available groups/channels.

FUNCTION	DESCRIPTION
Group/Channel Up	Scrolls up through the list of available groups/channels.
Home	Goes to home channel.
Individual Call	Initiate an Individual Call.
Lock Keypad	Locks the DTMF keypad, programmable function keys and navigation keys.
Monitor Toggle	Toggles Monitor On/Off.
Monitor/Clear	Temporarily turn off selected squelch to monitor for traffic that may not normally break squelch. Also, press this button followed by the emergency button to clear an emergency.
Noise Cancellation Toggle	Toggles Noise Cancellation On/Off on XL Portables.
Nuisance Delete	Performs a Nuisance Delete. See Section 5.34 for more information.
Numeric Channel Entry	Allows number channel entry.
Option 1	Defines this button as Portable Radio Option 1. The option buttons are used to toggle a feature ON and OFF and are defined on a per system basis.
Option 2	Defines this button as Portable Radio Option 2. The option buttons are used to toggle a feature ON and OFF and are defined on a per system basis.
OTAR Rekey	Initiate an OTAR rekey. See Section 6.20.6.
PAR Response	Activates a response from a PAR when used with Incident Command Features.
Phone Call	Initiate a telephone interconnect call. See Section 5.28.
Profile Toggle	Toggles between the currently active profile (if one has been selected) and no profile.
Program Menu	Puts the radio into a program mode.
Priority Talk Group	Assigns Priority Talk Group functionality in trunked systems. Assigns the button to UNASSIGNED and plays boop tone in Conventional systems.
Scan Enable	Enable/disable scan.
Secure Enable Toggle	Toggles Encryption Mode On/Off. See Sections 5.22 and 6.20 for information on Encryption.
Send Message	Sends a preconfigured message. See Section 6.16 for more information.
Send Status	Sends a preconfigured status. See Section 6.15 for more information.
Site Alias	Accesses the Site Alias list. See Section 6.14.8 for more information.
Site Roaming	Enable/disable Site roaming. Site Roaming allows the radio to roam to another site.
Speaker Mute Toggle	Toggles Speaker Muted/Unmuted.
Stealth Mode	Enable/disable Stealth Mode. See Section 5.41.
System Down	Scrolls down through the list of available systems, stopping when the end of the list is reached.
System Down Wrap	Scrolls down through the list of available systems, wrapping to the top when the bottom of the list is reached.
System Up	Scrolls up through the list of available systems, stopping at the top of the list.
System Up Wrap	Scrolls up through the list of available systems, wrapping to the end when the beginning of the list is reached.
Talkaround/Repeater Toggle	Toggles talkaround On/Off in conventional systems. Assigns the button to UNASSIGNED and plays boop tone in Trunked systems. See Section 5.25.
Top Backlight	Toggles the top display's backlight On/Off/Momentary.
Two Action Power Off	When Two Action Power Off is enabled, this button must be pressed while the Power/Volume Knob is rotated to power off the radio. See Section 5.4 for more information.
TX Power High/Low	Toggle TX Power between LOW and HIGH.

FUNCTION	DESCRIPTION
View SA Display	Displays the Situational Awareness (SA) Screen. See Section 6.2.
Voice Announce	Enable/disable Voice Annunciation. See Section 5.21.
Zone Down	Scrolls down through the list of available mixed system zones, stopping when the end of the list is reached. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.
Zone Down Wrap	Scrolls down through the list of available mixed system zones, wrapping to the top when the bottom of the list is reached. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.
Zone Up	Scrolls up through the list of available mixed system zones, stopping at the top of the list. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.
Zone Up Wrap	Scrolls up through the list of available mixed system zones, wrapping to the end when the beginning of the list is reached. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.

### 7.5.2 Programmable A/B (Ø/O) Switch

The programmable A/B switch can be programmed for multiple functions, including:

**Table 7-3: Programmable Ø/O Switch Options**

FUNCTION	DESCRIPTION
Clear/Secure	Enable/disable encryption.
Scan	Turn scan operation on/off.
Stealth Mode	Enable/disable Stealth Mode.
Talkaround	Enable/disable talkaround.
Keypad Lock/Unlock	Locks/unlocks the keypad.
TX Enable/Disable	Enable/disable transmit.
Bluetooth	Enable/disable Bluetooth.
Emergency Check In Timer	Activates the Emergency Check In Timer. See Section 6.22.



**NOTE**

Switch position Ø is ON. Switch position O is OFF.

### 7.5.3 Programmable A/B/C/D Switch

Sections 7.5.3.1 and 7.5.3.2 describe the various functions that can be programmed to the A/B/C/D switch.

### 7.5.3.1 Single-Instance Features

Single-instance features can only be assigned to one switch position at a time. If one of these features is programmed to the A/B/C/D switch, other means of accessing that feature are disabled (i.e., two-position switch, programmable buttons, call menu, etc.).

**Table 7-4: Single-Instance Features**

FUNCTION	DESCRIPTION
No Function	No function programmed to switch.
Talkaround	See Section 5.25.
Scan	Enables scanning.
Bluetooth	Enable Bluetooth.
TX Power High	Sets transmission power level to High. <ul style="list-style-type: none"> <li>Changing to a Tx Power High position overrides the current personality or user setting for TX Power.</li> <li>Changing from a Tx Power High position restores the personality-configured Tx Power Level.</li> </ul>
TX Power Low	Sets transmission power level to Low. <ul style="list-style-type: none"> <li>Changing to a Tx Power Low position overrides the current personality or user setting for TX Power.</li> <li>Changing <b>from</b> a Tx Power Low position restores the personality-configured Tx Power Level.</li> </ul>
Keypad Lock	Locks DTMF, programmable, and navigation soft keys.
Radio Lock	When set, prevents the radio software from responding to the following physical inputs on the radio: <ul style="list-style-type: none"> <li>Volume Knob Change (power off is <b>not</b> prevented)</li> <li>2-Position Switch</li> <li>Channel Knob</li> <li>Side User-Programmable Buttons and Keypad (DTMF, programmable, and navigation/soft keys)</li> </ul> Exception is the emergency button and if any key is programmed for Monitor/Clear, it can be used with the emergency button to clear emergency, if so programmed.
Channel Bank	Selects channels 1-16 in position A; 17-32 in position B; 33-48 in position C; and 49-64 in position D. If Channel Bank is selected for any single position, all 4 positions (A, B, C, and D) will be set to Channel Bank.



### 7.5.3.2 Indexed Features

These features can be assigned to any number of positions if each index value selected for it is unique across multiple assignments of the same feature; for example, you cannot assign a Zone with an index (e.g., "ZONE A") to both positions A and B.

**Table 7-5: Indexed Features**

FUNCTION	DESCRIPTION
Zone Selection	<p>Sets to the Zone index value.</p> <ul style="list-style-type: none"> <li>When setting the A/B/C/D switch to an indexed zone assigned position, the radio sets, but does not "hold," that zone. This has the resulting effects: <ul style="list-style-type: none"> <li>This sets the channel knob to be zone-based system/channel selection just like selecting a zone from the main "Zone" menu or ramping up/down using the side user-programmable buttons.</li> <li>If a user then changes to a different system or zone via another method (menu, button, etc.), it will override the Zone selection switch setting accordingly and not require it to remain in the zone where the switch assignment is set.</li> </ul> </li> <li>When changing away from a Zone assigned position, no actions/changes will be taken by the radio.</li> </ul>
System Selection	<p>Sets to the System index value.</p> <ul style="list-style-type: none"> <li>When setting the A/B/C/D switch to an indexed System assigned position, the radio sets, but does not "hold," that System. This has the resulting effects: <ul style="list-style-type: none"> <li>This sets the channel knob to be system-based channel selection, just like selecting a system from the main "Zone" menu or ramping up/down using the side user-programmable buttons.</li> <li>If a user then changes to a different system or zone via another method (menu, button, etc.), it will override the System selection switch setting accordingly and not require it to remain in the system where the switch assignment is set.</li> </ul> </li> <li>When changing away from a System assigned position, no actions/changes will be taken by the radio.</li> </ul>

## 7.6 PROGRAMMABLE ICONS

### 7.6.1 Top Display

The top display has space for up to seven configurable icons, which can be programmed to display any of the following:

- Blank
- Signal Strength
- Battery Status
- Bluetooth enabled
- Encryption enabled
- Scan/Vote Scan enabled
- Talkaround enabled
- Emergency mode active
- Wi-Fi

### **7.6.2    Front Display**

The front display has space for up to 10 configurable icons, which can be programmed to display any of the following:

- Blank
- Signal Strength
- Battery Status
- Bluetooth enabled
- Encryption enabled
- Global Encryption
- Talkaround enabled
- TX Disabled
- Tones Disabled
- PTT Disabled
- Speaker Muted
- Monitor
- OTAR Status (Disabled, Registering, Registered, Rekeying)
- TX Power level (Low/High/RX Only)
- GPS Status
- VDOC
- Failsoft
- Data Status (TX/RX)
- Alert(s)
- RX Mail
- Noise Cancellation Enabled
- Type 99 Enabled
- Conventional Site Status (Unregistered/Registered)
- Wi-Fi
- Wi-Fi AP

## 8. REFERENCE

### 8.1 MARINE FREQUENCIES

Refer to Table 8-1 for a list of maritime frequencies per United States Coast Guard (USCG), National Oceanic and Atmospheric Administration (NOAA), and Canadian Department Fisheries and Oceans, August 2009:

- United States (US)
- International (Intl)
- Canada (CA)

**Table 8-1: Marine Frequencies**

US CH.	INTL CH.	CA CH.	SHIP (MHZ)	SHORE (MHZ)	CHANNEL USAGE
	1	1	T: 156.05 R: 160.65	T: 160.65 R: 156.05	International: Public Correspondence, Port Operations
1a			T/R: 156.05	T/R: 156.05	US: Port Operations and Commercial, Vessel Traffic Service (VTS). New Orleans/Lower Mississippi area.
	2	2	T: 156.10 R: 160.70	T: 160.70 R: 156.10	International: Public Correspondence, Port Operations
	3	3	T: 156.15 R: 160.75	T: 160.75 R: 156.15	International: Public Correspondence, Port Operations
	4		T: 156.20 R: 160.80	T: 160.80 R: 156.20	International: Public Correspondence, Port Operations
		4a	T/R: 156.20	T/R: 156.20	Canada: Department Fisheries Ocean (DFO)/Canadian Coast Guard only in British Columbia coast area. Commercial fishing in east coast area
	5		T: 156.25 R: 160.85	T: 160.85 R: 156.25	International: Public Correspondence, Port Operations
5a		5a	T/R: 156.25	T/R: 156.25	US: Port Operations or VTS in Houston, New Orleans and Seattle areas.
6	6	6	T/R: 156.30	T/R: 156.30	US: Intership Safety International: Intership Canada: May be used for search and rescue communications between ships and aircraft.
	7		T: 156.35 R: 160.95	T: 160.95 R: 156.35	International: Public Correspondence, Port Operations
7a		7a	T/R: 156.35	T/R: 156.35	US: Commercial
8	8	8	T/R: 156.40	T/R: 156.40	US: Commercial (Intership only) International: Intership Canada: Also assigned for intership in the Lake Winnipeg area.
9	9	9	T/R: 156.45	T/R: 156.45	US: Boater Calling. Commercial and Non-Commercial. International: Intership, Port Operations Canada: Commercial - British Columbia coast area. May be used to communicate with aircraft and helicopters in predominantly maritime support operations.

US CH.	INTL CH.	CA CH.	SHIP (MHZ)	SHORE (MHZ)	CHANNEL USAGE
10	10	10	T/R: 156.50	T/R: 156.50	US: Commercial International: Intership, Port Operations Canada: Commercial - British Columbia coast area. May also be used for communications with aircraft engaged in coordinated search and rescue and antipollution operations.
11	11	11	T/R: 156.55	T/R: 156.55	US: Commercial. VTS in selected areas. International: Port Operations Canada: VTS - British Columbia coast area. Also used for pilotage purposes.
12	12	12	T/R: 156.60	T/R: 156.60	US: Port Operations. VTS in selected areas. International: Port Operations Canada: VTS - British Columbia coast area. Also used for pilotage purposes.
13	13	13	T/R: 156.65	T/R: 156.65	US: Intership Navigation Safety (Bridge-to-bridge). Ships >20m length maintain a listening watch on this channel in US waters. International: Intership, Port Operations Canada: VTS - British Columbia coast area. Also used for pilotage purposes.
14	14	14	T/R: 156.70	T/R: 156.70	US: Port Operations. VTS in selected areas. International: Port Operations Canada: VTS - British Columbia coast area. Also used for pilotage purposes.
15	15	15	T/R: 156.75	T/R: 156.75	US: Environmental (Receive only). Used by Class C Emergency Position-Indicating Radio Beacons (EPIRBs). International: Intership, Port Operations Canada: Port operations and Ship Movement - British Columbia coast area. All operations limited to 1-watt maximum power. May also be used for on-board communications.
16	16	16	T/R: 156.80	T/R: 156.80	US: International Distress, Safety and Calling. Ships required to carry radio, US Coast Guard (USCG), and most coast stations maintain a listening watch on this channel. International: International Distress, Safety and Calling Canada: International Distress, Safety and Calling
17	17	17	T/R: 156.85	T/R: 156.85	US: State Control International: Intership, Port Operations Canada: Port operations and Ship Movement - British Columbia coast area. All operations limited to 1-watt maximum power. May also be used for on-board communications.
	18		T: 156.90 R: 161.50	T: 161.50 R: 156.90	International: Public Correspondence, Port Operations
18a		18a	T/R: 156.90	T/R: 156.90	US: Commercial Canada: Towing - British Columbia coast area.
	19		T: 156.95 R: 161.55*	T: 161.55* R: 156.95	International: Public Correspondence, Port Operations
19a		19a	T/R: 156.95	T/R: 156.95	US: Commercial Canada: DFO/Canadian Coast Guard. Pacific Pilots - British Columbia coast area.

US CH.	INTL CH.	CA CH.	SHIP (MHZ)	SHORE (MHZ)	CHANNEL USAGE
20	20	20	T: 157.00 R: 161.60	T: 161.60 R: 157.00	US: Port Operations (Duplex) International: Public Correspondence, Port Operations Canada: Port operations only with 1-watt maximum power.
20a			T/R: 157.00	T/R: 157.00	US: Port Operations
	21		T: 157.05 R: 161.65*	T: 161.65* R: 157.05	International: Public Correspondence, Port Operations
21a		21a	T/R: 157.05	T/R: 157.05	US: US Coast Guard only Canada: DFO/Canadian Coast Guard only.
		21b	--	T/R: 161.65	
	22		T: 157.10 R: 161.70	T: 161.70 R: 157.10	International: Public Correspondence, Port Operations
22a		22a	T/R: 157.10	T/R: 157.10	US: Coast Guard Liaison and Maritime Safety Information Broadcasts. Broadcasts announced on channel 16. Canada: For communications between Canadian Coast Guard and non-Canadian Coast Guard stations only.
	23	23	T: 157.15 R: 161.75	T: 161.75 R: 157.15	International: Public Correspondence, Port Operations
23a			T/R: 157.15	T/R: 157.15	US: US Coast Guard only
		23b	--	T/R: 161.75	Canada: Continuous Marine Broadcast (CMB) service.
24	24	24	T: 157.20 R: 161.80	T: 161.80 R: 157.20	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations
25	25	25	T: 157.25 R: 161.85	T: 161.85 R: 157.25	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations Canada: Also assigned for operations in the Lake Winnipeg area.
		25b		T/R: 161.85	
26	26	26	T: 157.30 R: 161.90	T: 161.90 R: 157.30	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations
27	27	27	T: 157.35 R: 161.95	T: 161.95 R: 157.35	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations
28	28	28	T: 157.40 R: 162.00	T: 162.00 R: 157.40	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations
		28b	--	T/R: 162.00	Canada: Continuous Marine Broadcast (CMB) service.
	60	60	T: 156.025 R: 160.625	T: 160.625 R: 156.025	International: Public Correspondence, Port Operations
	61		T: 156.075 R: 160.675	T: 160.675 R: 156.075	International: Public Correspondence, Port Operations
61a		61a	T/R: 156.075	T/R: 156.075	Canada: DFO/Canadian Coast Guard only in British Columbia coast area.
	62		T: 156.125 R: 160.725	T: 160.725 R: 156.125	International: Public Correspondence, Port Operations
		62a	T/R: 156.125	T/R: 156.125	Canada: DFO/Canadian Coast Guard only in British Columbia coast area.
	63		T: 156.175 R: 160.775	T: 160.775 R: 156.175	International: Public Correspondence, Port Operations

US CH.	INTL CH.	CA CH.	SHIP (MHZ)	SHORE (MHZ)	CHANNEL USAGE
63a		63a	T/R: 156.175	T/R: 156.175	US: Port Operations and Commercial, VTS. New Orleans/Lower Mississippi area. Canada: Tow Boats - British Columbia coast area.
	64	64	T: 156.225 R: 160.825	T: 160.825 R: 156.225	International: Public Correspondence, Port Operations
64a		64a	T/R: 156.225	T/R: 156.225	Canada: Commercial fishing only.
	65		T: 156.275 R: 160.875	T: 160.875 R: 156.225	International: Public Correspondence, Port Operations
65a		65a	T/R: 156.275	T/R: 156.275	US: Port Operations Canada: Search and rescue and antipollution operations on the Great Lakes. Towing on the Pacific Coast. Port operations only in the St. Lawrence River areas with 1-watt maximum power. Intership in inland Manitoba, Saskatchewan, and Alberta areas.
	66		T: 156.325 R: 160.925	T: 160.925 R: 156.325	International: Public Correspondence, Port Operations
66a		66a	T/R: 156.325	T/R: 156.325	US: Port Operations Canada: Port operations only in the St. Lawrence River/Great Lakes areas with 1-watt maximum power. 1-watt marina channel - British Columbia coast area.
67	67	67	T/R: 156.375	T/R: 156.375	US: Commercial. Used for Bridge-to-bridge communications in lower Miss. River. Intership only. International: Intership, Port Operations Canada: May also be used for communications with aircraft engaged in coordinated search and rescue and antipollution operations. Commercial fishing only in east coast and inland Manitoba, Saskatchewan, and Alberta areas. Pleasure craft - British Columbia coast area.
68	68	68	T/R: 156.425	T/R: 156.425	US: Non-Commercial International: Port Operations Canada: For marinas, yacht clubs and pleasure craft.
69	69	69	T/R: 156.475	T/R: 156.475	US: Non-Commercial International: Intership, Port Operations Canada: Commercial fishing only - east coast area. Pleasure craft - British Columbia coast area.
70	70	70	T/R: 156.525	T/R: 156.525	US: Digital Selective Calling (voice communications not allowed) International: Digital selective calling for distress, safety and calling Canada: Digital selective calling for distress, safety and calling
71	71	71	T/R: 156.575	T/R: 156.575	US: Non-Commercial International: Port Operations Canada: Ship Movement - British Columbia coast area. Marinas and yacht clubs - east coast and on Lake Winnipeg.
72	72	72	T/R: 156.625	T/R: 156.625	US: Non-Commercial (Intership only) International: Intership Canada: May be used to communicate with aircraft and helicopters in predominantly maritime support operations. Pleasure craft - British Columbia coast area

US CH.	INTL CH.	CA CH.	SHIP (MHZ)	SHORE (MHZ)	CHANNEL USAGE
73	73	73	T/R: 156.675	T/R: 156.675	US: Port Operations International: Intership, Port Operations Canada: May also be used for communications with aircraft engaged in coordinated search and rescue and antipollution operations. Commercial fishing only in east coast and inland Manitoba, Saskatchewan, and Alberta areas.
74	74	74	T/R: 156.725	T/R: 156.725	US: Port Operations International: Port Operations Canada: VTS and Ship Movement British Columbia coast area.
75	75	75	T/R: 156.775	T/R: 156.775	International: Port Operations Canada: Simplex port operation, ship movement and navigation related communication only. 1 watt maximum.
76	76	76	T/R: 156.825	T/R: 156.825	International: Port Operations Canada: Simplex port operation, ship movement and navigation related communication only. 1 watt maximum.
77	77	77	T/R: 156.875	T/R: 156.875	US: Port Operations (Intership only) International: Intership Canada: Pilotage - British Columbia coast area; 25 watts. Port operations only in the St. Lawrence River/Great Lakes areas with 1-watt maximum power.
	78		T: 156.925 R: 161.525	T: 161.525 R: 156.925	International: Public Correspondence, Port Operations
78a		78a	T/R: 156.925	T/R: 156.925	US: Non-Commercial Canada: Fishing Industry - British Columbia coast area.
	79		T: 156.975 R: 161.575	T: 161.575 R: 156.975	International: Public Correspondence, Port Operations
79a		79a	T/R: 156.975	T/R: 156.975	US: Commercial. Non-Commercial in Great Lakes only Canada: Fishing Industry - British Columbia coast area.
	80		T: 157.025 R: 161.625	T: 161.625 R: 157.025	International: Public Correspondence, Port Operations
80a		80a	T/R: 157.025	T/R: 157.025	US: Commercial. Non-Commercial in Great Lakes only Canada: Fishing Industry - British Columbia coast area.
	81		T: 157.075 R: 161.675	T: 161.675 R: 157.075	International: Public Correspondence, Port Operations
81a		81a	T/R: 157.075	T/R: 157.075	US: US Government only - Environmental protection operations Canada: DFO/Canadian Coast Guard use only.
	82		T: 157.125 R: 161.725	T: 161.725 R: 157.125	International: Public Correspondence, Port Operations
82a		82a	T/R: 157.125	T/R: 157.125	US: US. Government only Canada: DFO/Canadian Coast Guard use only.
	83		T: 157.175 R: 161.775	T: 161.775 R: 157.175	International: Public Correspondence, Port Operations
83a		83a	T/R: 157.175	T/R: 157.175	US: US Coast Guard only Canada: DFO/Canadian Coast Guard and other Government agencies.
		83b	- -	T/R: 161.775	



US CH.	INTL CH.	CA CH.	SHIP (MHZ)	SHORE (MHZ)	CHANNEL USAGE
84	84	84	T: 157.225 R: 161.825	T: 161.825 R: 157.225	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations
85	85	85	T: 157.275 R: 161.875	T: 161.875 R: 157.275	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations
86	86	86	T: 157.325 R: 161.925	T: 161.925 R: 157.325	US: Public Correspondence (Marine Operator) International: Public Correspondence, Port Operations
87	87	87	T: 157.375 R: 161.975	T: 161.975 R: 157.375	US: Automatic Identification System duplex repeater International: Port Operations Canada: Port operation and ship movement - east coast area. Pleasure craft - British Columbia coast area.
87a			T/R: 157.375	T/R: 157.375	US: Public Correspondence (Marine Operator)
		87b	T/R: 161.975	T/R: 161.975	Canada: Automatic Ship Identification and Surveillance System.
	88	88	T: 157.425 R: 162.025	T: 162.025 R: 157.425	US: Commercial, Intership only. International: Port Operations Canada: Port operation and ship movement - British Columbia coast area.
88a			T/R: 157.425	T/R: 157.425	US: Commercial, Intership only. Canada: Automatic Ship Identification and Surveillance System.
		88b	T/R: 162.025	T/R: 162.025	
WX1		WX1		R: 162.55	
WX2		WX2		R: 162.4	
WX3		WX3		R: 162.475	
WX4				R: 162.425	
WX5				R: 162.45	
WX6				R: 162.5	
WX7				R: 162.525	

## 8.2 NARROWBANDING

The FCC has mandated that all public safety radios manufactured after January 1, 2013 comply with narrowbanding restrictions. Radios manufactured after the above date will comply with these restrictions. Existing radio personalities that contain frequencies that violate these FCC rules will cause an invalid channel error indication on the radio display. The user will need to change the radio personality to comply with the new rules. Note that there are multiple exceptions to the narrowbanding mandate, including the Marine Frequencies listed in Section 8.1.

## 9. GLOSSARY

### -A-

<b>AES</b>	Advanced Encryption Standard
<b>AES-256</b>	Advanced Encryption Standard, 256-bit
<b>AMBE+2</b>	Advanced Multi-Band Excitation implementation 2
<b>ANSI</b>	American National Standards Institute
<b>ASCII</b>	American Standard Code for Information Interchange

### -B-

### -C-

<b>C</b>	Celsius
<b>CA</b>	Canada
<b>CDCSS</b>	Continuous Digital Coded Squelch System
<b>CH INFO</b>	Channel Information
<b>CKR</b>	Common Key References
<b>CMB</b>	Continuous Marine Broadcast
<b>CTCSS</b>	Continuous Tone Coded Squelch System

### -D-

<b>DES</b>	Digital Encryption Standard
<b>DES-OFB</b>	Digital Encryption Standard Output Feedback
<b>DFO</b>	Department Fisheries Ocean
<b>DMS</b>	Degrees Minutes Seconds

### -E-

<b>EPIRB</b>	Emergency Position-Indicating Radio Beacons
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### -F-

<b>F</b>	Fahrenheit
<b>FCC</b>	Federal Communications Commission
<b>FM</b>	Frequency Modulation

### -G-

<b>GHz</b>	Giga (10 <sup>9</sup> ) Hertz
<b>GEOTRANS</b>	Geographic Translator
<b>GPS</b>	Global Positioning System

### -H-

<b>Hz</b>	Hertz
<b>HKL</b>	Harris Key Loader

### -I-

<b>ID</b>	Identification
<b>IEEE</b>	Institute of Electrical & Electronics Engineers
<b>INTL</b>	International

### -J-

**-K-**

<b>KEK</b>	Key Encryption Key
<b>kHz</b>	kilo (10 <sup>3</sup> ) Hertz
<b>KID</b>	Key Identification
<b>KMF</b>	Key Management Facility
<b>KMS</b>	Key Management System
<b>KS</b>	Key Set
<b>KVL</b>	Key Variable Loader (Motorola KVL Device)

**-L-**

<b>LAT/LONG DMS</b>	Latitude/Longitude Degrees Minutes Seconds
<b>LAT LONG DD</b>	Latitude/Longitude Decimal Degrees
<b>LED</b>	Light Emitting Diode
<b>Li-ION</b>	Lithium-ION

**-M-**

<b>MHz</b>	Megahertz
<b>mm</b>	Millimeter
<b>MR</b>	Mobile Radio
<b>ms</b>	milli (10 <sup>-3</sup> ) seconds

**-N-**

<b>NAC</b>	Network Access Code
<b>Ni-MH</b>	Nickel Metal Hydride
<b>NOAA</b>	National Oceanic and Atmospheric Administration

**-O-**

<b>OET</b>	Office of Engineering and Technology
<b>OTAR</b>	Over-The-Air Rekey

**-P-**

<b>P25</b>	Project 25
<b>POS</b>	Position
<b>PRI</b>	Priority (Channel)
<b>PTT</b>	Push-to-Talk

**-Q-**

**-R-**

<b>RF</b>	Radio Frequency
<b>RPM2</b>	Radio Personality Manager 2
<b>RSI</b>	Radio Set Identifier
<b>RSM</b>	Remote Speaker Microphone
<b>RX</b>	Receive

**-S-**

<b>SA</b>	Situational Awareness
<b>SMA</b>	Subminiature Version A

**-T-**

<b>TIA</b>	Telecommunications Industry Association
<b>TX</b>	Transmit

**-U-**

<b>UHF</b>	Ultra High Frequency
<b>UKEK</b>	Unique Key Encryption Key
<b>US</b>	United States
<b>USCG</b>	United States Coast Guard
<b>UTC</b>	Universal Time Coordinated
<b>UTM</b>	Universal Transverse Mercator

**-V-**


<b>VDC</b>	Volts, Direct Current
<b>VHF</b>	Very High Frequency
<b>VIDA</b>	Voice Interoperability Data Access
<b>VTS</b>	Vessel Traffic Service


**-W-**

<b>WEEE</b>	Waste from Electric and Electronic Equipment
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**-X-****-Y-****-Z-**

## 10. BASIC TROUBLESHOOTING

When upgrading from XLP R1A/C to R1D/E, the radio displays . XLP R1D installs an image that can install future software releases and is required prior to upgrading to R2. **Do not power cycle when this screen is displayed on the radio or R1D must be reinstalled prior to upgrading to R2.**

When installing XLP R2A and later, if the upgrade is interrupted by a power cycle, the radio displays . This indicates a partial install occurred and a reinstall is required. The radio should be connected via USB and the software should be installed again.

For radios with XLP R3A and later, if  is displayed, the radio has lost its factory information and needs to be returned for updating.

### 10.1 ERROR MESSAGES

This section provides a list of error messages, as well as possible causes and solutions.

**Table 10-1: Displayed Error Messages, Reasons, and Resolutions**

SCREEN/ MENU	DISPLAYED ERROR MESSAGE	REASON	RESOLUTION
Top-Level Screen	<b>INVALID KEYSTORE ZEROIZE NEEDED</b>	Corrupt key database or incorrect database configuration.	Zeroize database.
Bluetooth Pairing Screen	<b>PAIRING FAILED</b>	Bluetooth pairing failed.	Ensure device is discoverable and attempt to re-pair the device.
Channel Edit Screen	<b>EDIT FAILED</b>	Unable to modify P25 Channel.	Power cycle and try again--contact L3Harris if problem persists.
Channel Edit Screen	<b>INVALID RX FREQUENCY</b>	Entered Rx frequency is invalid.	Ensure frequency follows band spacing rules.
Channel Edit Screen	<b>INVALID TX FREQUENCY</b>	Entered Tx frequency is invalid.	Ensure frequency follows band spacing rules.
Install Operations	<b>INSTALL FAILED</b>	Error during install process.	Transfer file again and reattempt install. Contact L3Harris if problem persists.
Install Operations	<b>INSTALL FAILED</b>	Extraction of compressed file failed.	Transfer file again and reattempt install. Contact L3Harris if problem persists.
Install Operations	<b>INSTALL FAILED</b>	Removal of existing SW failed.	Attempt install again and contact L3Harris if problem persists.
Mission Plan In Progress Screen		Mission plan activation failed.	Use RPM2 to ensure plan validity. Contact L3Harris if failures persist.
Security Menu	<b>ZEROIZE FAILED</b>	Radio could not zeroize.	Radio problem—power cycle and contact L3Harris if problem persists.
Security Menu	<b>NO KEYS TO ZEROIZE</b>	Key database empty.	Nothing to zeroize.
Utilities Menu	<b>INCORRECT PASSWORD</b>	Maintenance password invalid.	Enter valid maintenance password.
Channel Info Screen	<b>INCORRECT PASSWORD</b>	Channel edit password invalid.	Enter valid channel edit password.

SCREEN/ MENU	DISPLAYED ERROR MESSAGE	REASON	RESOLUTION
Top-Level Screen	<b>USER REGISTRATION FAILED FOR...</b>	The user has either entered the wrong values or the user is not in the UAS database.	Check the System ID and User ID. If they are correct, contact your network administrator.
Top-Level Screen	<b>USER PASSWORD FAILED FOR...</b>	The user has entered a different password than what is in the UAS when password is required.	Re-enter the password. If the error persists, contact your network administrator.
Top-Level Screen	<b>RADIO ESN INVALID FOR...</b>		Contact your network administrator.
Top-Level Screen	<b>EXCEED ALLOWED USERS FOR...</b>	There are already three radios registered with the same User ID.	Turn off one of these radios or register with a different ID.
Top-Level Screen	<b>PROVISIONING FAILED</b>	This failure could be due to bad password or a network issue.	Re-enter the password. If the error persists, contact your network administrator.
Top-Level Screen	<b>OVER TMP</b>	With an Extreme Speaker Mic (ESM) attached, the ESM detects when the internal ESM temperature exceeds the hardware temperature threshold for 30 seconds. The radio also displays "OVER TMP" and plays a voice annunciation alert "Over Temp" at max volume.	

## 10.2 OTAR ERRORS/INFORMATION

### **WORKAROUNDS:**

1. Zeroize.
2. Load proper KEK from the L3Harris Key Loader or Motorola KVL.

### **IF RADIO INDICATES:**

1. INVALID KEYSTORE ZEROIZE NEEDED - This occurs if the radio's keys were loaded by the L3Harris Key Loader followed by an attempt to load UKEKs with the Key Loader or keys with the Motorola KVL.
  - Fix by performing workaround 1, followed by 2.
2. NO UKEK – Displayed during a zeroize performed from the radio or a zeroize initiated from the KMF.
  - Fix by performing workaround 2.
3. Zeroize Complete – KMF has zeroized the radio.
  - Fix by performing workaround 2.
4. Disabled OTAR Icon (red slash) – OTAR is disabled while in scan, talkaround, emergency, and monitor.
  - Fix by disabling these features. Icon will be corrected (no red slash).
5. Gray OTAR Icon (no red slash) – OTAR has not registered with tower (Conventional or Trunked system).
  - Fix by verifying proper frequencies.
  - If the radio is turned to the OTAR channel out of range of a conventional tower, and then comes in range after 3 minutes, fix by issuing an OTAR. Rekey, leaving and re-enter the OTAR channel.
6. Green OTAR Icon – OTAR is registered, all is well.
  - If update fails, verify you are in range of the tower and the KEK is correct.
7. Blue OTAR Icon – OTAR is attempting to rekey.
  - If rekey fails, verify you are in range of the tower and the KEK is correct.



## 11. TECHNICAL ASSISTANCE

The Technical Assistance Center's (TAC) resources are available to help with overall system operation, maintenance, upgrades and product support. TAC is the point of contact when answers are needed to technical questions.

Product specialists, with detailed knowledge of product operation, maintenance and repair provide technical support via a toll-free (in North America) telephone number. Support is also available through mail, fax and e-mail.

For more information about technical assistance services, contact your sales representative, or contact the Technical Assistance Center directly:

North America:	1-800-528-7711
International:	1-434-385-2400
Fax:	1-434-455-6712
E-mail:	<a href="mailto:PSPC_tac@l3harris.com">PSPC_tac@l3harris.com</a>

## 12. WARRANTY

Register this product within 10 days of purchase. Registration validates the warranty coverage and enables L3Harris to contact you in case of any safety notifications issued for this product.

Register on-line at the Customer Care center webpage <https://www.l3harris.com/all-capabilities/pspc-customer-care>. While on the webpage, review the applicable battery and/or product warranty literature.

## APPENDIX A WI-FI PROGRAMMING



Due to numerous issues with discovering and programming radios connected to Enterprise Wireless networks, it is **strongly** suggested that a single Access Point Wireless network be used for programming radios with RPM2. See Section A.7 for more information.



These instructions assume the user has a basic familiarity with Wireless (Wi-Fi) networks, their configuration, and how to connect devices. If you are unfamiliar with the terms and/or procedures mentioned in these instructions, please contact your IT department for help before attempting to configure Wi-Fi programming.



For radios to be discoverable on the Wi-Fi network, your wireless router must be configured to allow Multicast (mDNS). This varies by router manufacturer; refer to your router's documentation for specific settings needed to enable Multicast (mDNS).

### A.1 OVERVIEW

Perform the following to program a radio over Wi-Fi. For first time setup, see Section A.8.1.

1. Configure the Access Point (Section A.2).
2. Configure the personality (Section A.3).
3. Configure the RPM2 application (Section A.4).
4. Put the radio in Wi-Fi Programming Mode (Section A.5).
5. Discovery and programming in the RPM2 application (Section A.6).
6. Support for Enterprise Wireless Networks (Section A.7).
7. Helpful Hints (Section A.8).

### A.2 CONFIGURE THE ACCESS POINT

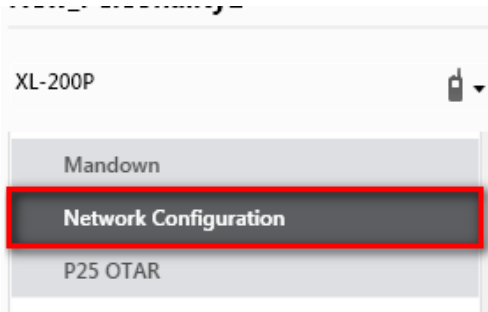
- Setup an Access Point (wireless router) as follows. The **bold** values provided below are the default values in the personality.
  - Wireless Networking Name (SSID): **harrisradios**
  - Shared Key (Network Password): **password**
  - Wireless Authentication/Security Mode (Encryption Type): **WPA**

**WPA** and **WPA2-PSK** are the available Encryption Types in the RPM2 application
- Ensure that the Access Point has Multicast (mDNS) enabled. See the second note at the top of Appendix A for more information.

## A.3 CONFIGURE THE PERSONALITY

For a radio to be programmed over Wi-Fi, the active personality on the radio must be configured for connecting with the values that were set in Section A.2. The following steps detail how to configure an existing radio personality.

1. In the personality, navigate to **OPTIONS → Network Configuration**.



**Figure 12-1: Options → Network Configuration**

2. Under the Wi-Fi Configuration section, set the Encryption Type, Network (SSID), and Network Password.



**NOTE**

XL radios support up to 24 different Wi-Fi networks (SSIDs). These 24 Wi-Fi networks are considered radio administrator approved and Trusted Wi-Fi Networks (TWiN) on which the radios can operate.

 A screenshot of the 'Wi-Fi Configuration' screen. At the top, it says 'Wi-Fi Configuration' with a 'Collapse' button on the right. Below this, there is a toggle for 'Wi-Fi Enabled' which is checked. Underneath is a table with four columns: '#', 'Encryption Type', 'Network (SSID)', and 'Network Password'. The table contains one row with the following values: '1', 'WPA', 'harrisradios', and 'password'.
 

#	Encryption Type	Network (SSID)	Network Password
1	WPA	harrisradios	password

**Figure 12-2: Wi-Fi Configuration**

3. Under Network Service Configuration, the default values can remain the same. If the wireless network is managed by another department, please coordinate with them to get it setup correctly.

The **Network Discovery Configuration → Service Name** is a Unique name used by RPM2 and radios to communicate with each other. There is more information about this in Section A.8.2.

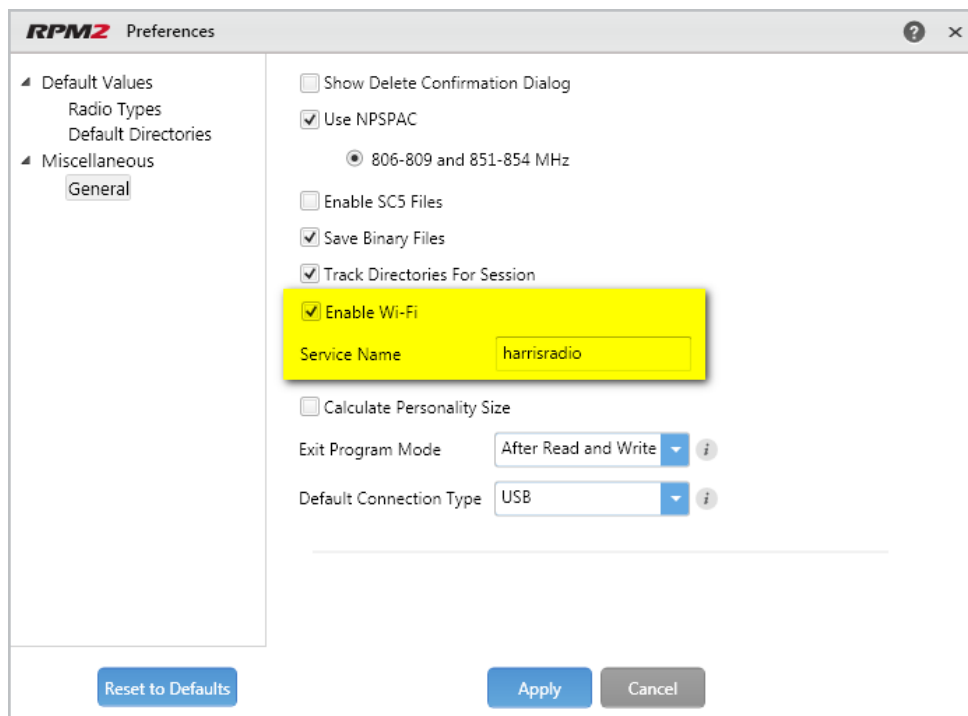
 A screenshot of the 'Network Service Configuration' screen. It has a title bar 'Network Service Configuration'. Below it is a section titled 'Network Discovery Configuration'. Inside this section, there is a label 'Service Name' followed by a text input field containing the value 'harrisradio'. The input field is highlighted with a red rectangular box.

**Figure 12-3: Service Name**

4. After the personality is configured and saved, write it to the radio over USB and then activate it.

## A.4 CONFIGURE THE RPM2 APPLICATION

To ensure that RPM2 can discover radios over Wi-Fi, ensure that the **Enable Wi-Fi** checkbox is checked on the RPM2 Preferences screen as shown in Figure 12-4. This checkbox is unchecked by default.



**Figure 12-4: Enable Wi-Fi in RPM2**

Also, as shown in Figure 12-4, the **Service Name** must be updated to reference the value in the active personalities for the radios you need to discover. See #3 in Section A.3 and Section A.8.2 for more information.

For default operation using the network as described in Section A.2, no other configuration of the radio or RPM2 is required.

## A.5 PUT THE RADIO IN WI-FI PROGRAMMING MODE

To put the radio in Wi-Fi programming mode:

1. Turn the radio off and remove the USB cable (optional).
2. Press and hold the bottom side and PTT buttons.
3. Power on the radio while continuing to hold the buttons.
4. Release the buttons when the WIFI INSTALL ACTIVE screen appears on the radio.
5. Initially, the radio displays DISCONNECTED. When the IP address is displayed, the radio is available to be programmed.





Figure 12-5: Enable Wi-Fi Programming Mode on Radio



NOTE

Refer to Section 5.40.2 for Wi-Fi Client selection information.

## A.6 DISCOVERY AND PROGRAMMING IN THE RPM2 APPLICATION

1. Start RPM2.
2. Disconnect the radio from the programming cable.
3. Select the Radio tab  and click the Wi-Fi connection button .
4. When the Wi-Fi connection button is pressed, a “Discovering Wi-Fi Radios” message is displayed for several seconds and the radios connected to that access point with that Service Name populate the connection list.



NOTE

To connect over Wi-Fi, the currently active personality MUST have the correct Wi-Fi parameters. Therefore, care must be taken that all personalities on a given radio have the correct Wi-Fi parameters for the desired network. Otherwise, activation of another personality on the radio will result in the inability to establish a Wi-Fi connection.

5. Select a radio or radios and perform the desired action. Only Read Personality, Write Personality, and Load Code are supported over Wi-Fi. See the table below for the supported combinations.

**Table 12-1: Wi-Fi Feature Support**

	SINGLE RADIO	MULTIPLE RADIOS (UP TO 16)
Read Single Personality	Yes	No
Read Multiple Personalities	Yes	No
Write Single Personality	Yes	Yes
Write Multiple Personalities	No	No
Load Single Code File	Yes	Yes
Load Multiple Code Files	Yes	Yes
Voice Annunciation	No	No
Feature Data	Yes	Yes
Radio Name	Yes	No
Install Splash Screen	Yes	Yes

6. In the Status Panel, all Wi-Fi related actions will have the prefix of “WIFI.”

To help in displaying the radios, the “Connection” and “IP Address” columns are sortable.



NOTE

If the Access Point is not configured to the default values from Section A.2 and the active personality in the radio is removed, the radio loses connection to the Access Point and must be connected over USB to write/activate a personality to reconnect to the Access Point.

## A.7 RPM2 WI-FI SUPPORT FOR ENTERPRISE NETWORKS.

Enterprise Networks have certain limitations when it comes to Discovering/Programming Radios in RPM2. There is a 4500 second (75 minute) caching affect inherent to implementation with the Cisco® Wi-Fi solution that utilizes the Access Point (AP)/Wireless LAN Controller (WLC) components. Radios remain 'seen' in RPM2 even after the radio leaves Wi-Fi or is turned off. It is cached in RPM2 for 4500 seconds. This issue has only been observed with the Cisco AP and WLC solution; however, other enterprise wireless solutions may observe this caching affect. Operation with a lower tiered Wi-Fi router that does not operate with a WLC will likely not observe this behavior. Please see the Software Release Notes for Media Kit SK-019007-001 (14221-3100-8110) for more information.

## A.8 HELPFUL HINTS

### A.8.1 Initial Setup and Configuration

Since radio discovery is dependent on if Multicast (mDNS) messages are being received by RPM2, it is best to keep things as simple as possible. Here are the suggested steps if this is being setup and configured for the first time.

1. Configure the Access Point with the default personality values provided in Section A.2.
2. Create a basic personality with a single system, set and channel, write it to the radio and activate it over USB.
3. Complete Sections A.4 through A.6.

If the radio was not discovered in RPM2 but an IP address is displayed on the radio screen as seen in Figure 12-5, this may mean that the Multicast (mDNS) messages are not making it through the Access Point. Consult the Access Point's manual and make sure that those messages are not being filtered out.

### A.8.2 Grouping Radios by Service Name

One benefit of using a unique **Service Name** is that it allows the user to create logical groupings of radios to reduce the number of radios discovered in RPM2 and help reduce the overhead of keeping track of which radios have been configured.

For example, if there are 100 radios in Wi-Fi programming mode (see Section A.5) with the same **Service Name**, all 100 radios are displayed in the Radio tab after discovery has been completed. This makes it difficult to select and program multiple radios simultaneously. However, if the **Service Name** in the active personality on 16 of the radios are set to something unique like "fire1" and the RPM2 application **Service Name** (see Section A.4) is also updated to "fire1," only those radios with a **Service Name** of "fire1" are discovered and displayed in the Radio tab.


## APPENDIX B SCBA BLUETOOTH CONFIGURATION

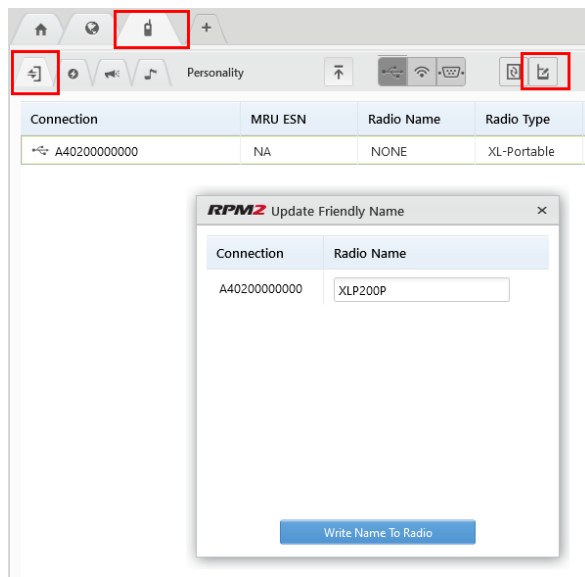


Refer to the vendor documentation for your SCBA for device-specific programming and configuration instructions.

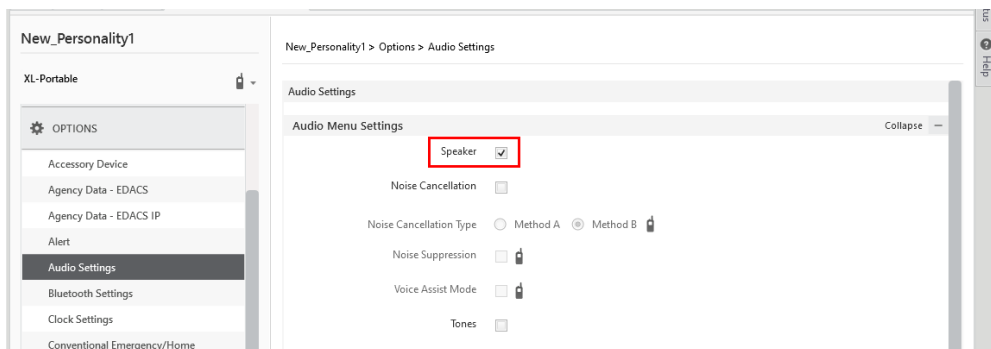
This appendix provides radio configuration instructions to enable Bluetooth pairing with SCBA.

Refer to *RPM2 User's Manual* 14221-1100-2060 as necessary when performing the steps in this section.

1. Open RPM2.
2. Ensure a Radio Name is programmed.
  - a. Select the Radio Tab → Personality Tab.
  - b. Click the  button and enter the radio name. The radio name can be up to 16 characters long.

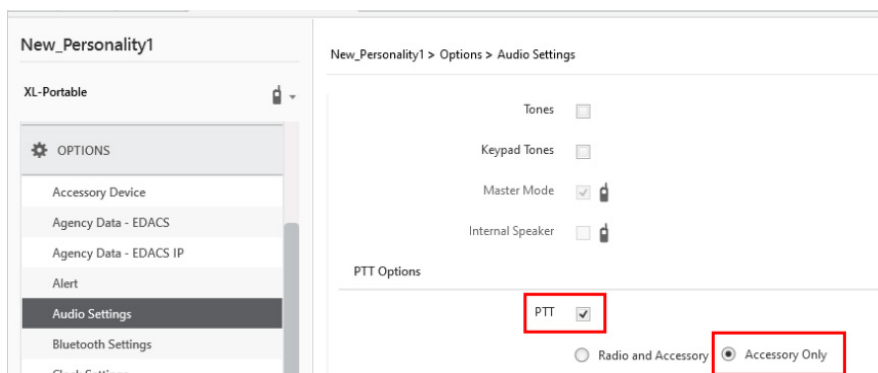


3. Select **Audio Settings** from the Personality Rail.
4. Under **Audio Menu Settings**, ensure **Speaker** is checked.





5. Under **OPTIONS** → **Audio Settings** → **PTT Options**, check **PTT** and select **Accessory Only**.

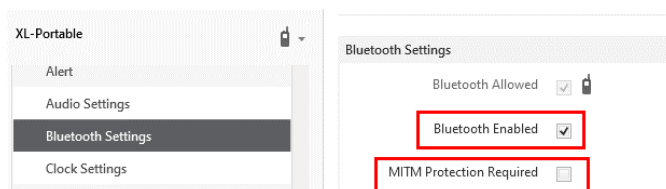


6. (Optional) Configure Automatic Level Control (ALC). Enabling ALC uses proprietary L3Harris algorithms to adjust and level audio to compensate for users who speak loudly or speak softly to be heard at nearly the same level.

**NOTE**

Requires RPM2 R6A or later and XLP R6A or later. Consult with your L3Harris radio technician before adjusting any of these settings.

- a. Select **OPTIONS** → **Audio Settings** → **Bluetooth Microphone**.
  - b. Check (enable) **ALC**.
  - c. Set ALC Max Gain to desired level (Default = 6 dB; Range = 0 dB to +12 dB in 1 dB increments). This setting allows the user to set the maximum gain applied by the ALC feature for transmitted voice. Higher gain settings increase the chance for acoustic feedback.
  - d. Set Mic Gain to desired level (Default = 16 dB; Range = -16 dB to +16 dB in 1 dB increments). This setting allows the user to set the Mic Gain for the Bluetooth External Microphone (baseline before ALC).
7. Select **OPTIONS** → **Bluetooth Settings** and check **Bluetooth Enabled**. Ensure **MITM Protection Required** is unchecked.



8. Program a radio button or switch for Bluetooth Enable/Disable:
  - a. Select **OPTIONS** → **Portable Programmable Buttons or Programmable Switches**.
  - b. Select Bluetooth Enable/Disable from the drop-down of the desired button/switch.
9. Write the personality to the radio.

## APPENDIX C CONFIGURING ENCRYPTION

Refer to the following documentation for advanced programming and setup instructions:

- *OTAR Overview Manual* - MM-008069-001
- *Network Key Manager Installation and Configuration Manual* - MM-008070-001
- *UAS Key Management Application Manual* - MM-008068-001
- *Key Manager Key Admin Overview and Operation Manual* - MM1000019423
- *Key Manager Key Loader Overview and Operation Manual* - MM1000019424
- *Motorola® KVL User's Guide*

### C.1 CREATE KEYS USING L3HARRIS KEY ADMIN

L3Harris Key Admin is part of the L3Harris Key Manager and is used by the Crypto Officer (CO). The CO creates a Master Set of keys from which a Distribution Set is produced. Using the Key Admin software, the CO can save keys into Distribution key files for technicians to use in radios.

1. Select **Start → Harris Key Manager → Harris Key Admin**.
2. Select **New Master Set, Open, or Import from Security Device**. Refer to the Key Admin online help for more information on creating keys.
3. When finished, create a Distribution Key File. A Distribution Key File is used with Key Loader to load key sets into the radio and cannot be edited. Refer to the Key Admin online help for more information on creating the Distribution Key File.

### C.2 LOAD ENCRYPTION KEYS

#### C.2.1 Load UKEKS with Key Loader and RPM2 (for OTAR-Enabled Systems)

UKEKs are loaded into L3Harris OTAR-enabled radios using the Key Loader application. Key Loader is a part of Key Manager.

To load encryption keys:

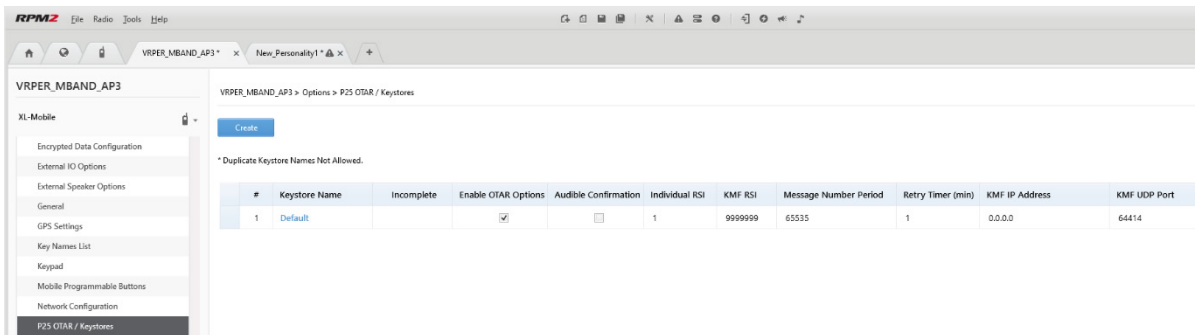
1. Obtain the UKEK file and Storage Location Number (SLN) Binding Report information from the Crypto Officer (CO).



AES and DES UKEKs can be contained within the same UKEK file.

2. If not already on, power-up the PC on which RPM2 and Key Loader are installed.
3. Connect the radio to the PC using the USB programming cable.
4. Load the UKEK file from the Crypto Officer onto the PC.
5. Run the RPM2 application and setup the radio's Personality according the SLN Binding Report information.
6. Setup the talk groups and the SLN mappings (Talk Group ID to SLN). This includes mapping SLNs to the "System" keys (PSTN, All Call, etc.).

7. In RPM2, select **P25 OPTIONS → P25 OTAR/Keystores** and set the following, referring to the RPM2 online help as necessary:
  - a. Click **Create** to add a Keystore or edit the Default Keystore.
  - b. Check **Enable OTAR Options**.
  - c. Enter the OTAR Message Number Period (MNP) as defined by the System Administrator.
  - d. Enter the radio's Individual RSI (from the SLN Bindings Report).
  - e. Enter the KMF's RSI (from the SLN Bindings Report).



8. Program the Personality to the radio.
9. Run the Key Loader application.
10. Open the UKEK file loaded in step 4.
11. Select the Target Device type and click the **Load** button.
12. The Key Loader reads the target device's identifying information, retrieves a UKEK of the proper algorithm type from the UKEK file, and downloads the UKEK to the target device at the proper SLN and keyset with the proper key ID.
13. Click the button to exit the Key Loader application. New UKEKs are loaded and the radio is now ready to accept TEKs via OTAR with the trunked radio network.

### C.2.2 Load Keys Using Key Loader

Key Loader is part of Key Manager and can be used by the Crypto Officer or Technician to load the keys into the radio.

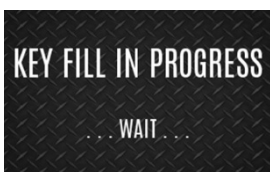
Refer to the Key Loader online help if additional information is required when performing this procedure.

1. Connect the radio to the PC using the USB programming cable.
2. Power on the radio, if not already.
3. Select **Start → Harris Key Manager → Harris Key Loader**.
4. At the Key Loader Welcome screen, click **Next**.
5. Select **Load a Distribution Set into one or more devices**.
6. Click **Next**.
7. Browse to the Key File and enter the password.

8. Click **Next** to validate the password and continue. If the password is incorrect, the screen will display an error message.
9. Ensure USB is selected in the drop-down and click **Next**.
10. Select the radio from the drop-down and click **Load**.
11. Click **Finish**.

### C.2.3 Load Keys with Motorola KVL

1. Connect the KVL cable to the UDC Connector.
2. The radio automatically goes into key fill mode.



3. Success and failure messages are shown on the KVL device's screen.
4. Disconnect the KVL cable. The XL portable will automatically exit keyload mode when the KVL is disconnected.

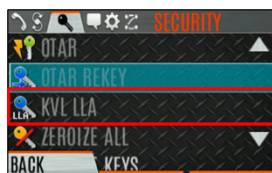
### C.2.4 Link-Layer Authentication (LLA) Keyloading



LLA keyloading and ARC4 keyloading via a KVL-4000 or KVL-5000 requires XLP R16A or later.

In XLP R16A and later, LLA Keys (i.e., Radio Authentication Keys) can be loaded using a KVL-5000 or KVL-4000. The LLA feature must be enabled to utilize this feature.

1. Connect the radio to the KVL device using cable 12082-0400-A1.
2. Put the radio into KVL LLA Mode:
  - a. Press the Menu/Select button to access the main menu.
  - b. Press the left or right navigation buttons to display the SECURITY menu.
  - c. Press the up or down navigation buttons to highlight **KVL LLA** and press the Menu/Select button.



or

Press the button programmed for KVL LLA.

3. The Radio will indicate that KVL LLA Mode is active.



4. Once KVL LLA Mode is activated, the KVL-5000 can be used to provision the radio with LLA keys. The radio will remain in KVL LLA Mode until the user exits this state.

### **C.3 PROTECTED KEYS**

The Protected Keys feature transfers P25 Voice Keys, from Key Loader to the radio, that have been wrapped (AES) or encrypted (DES) with Key Protection Keys (KPKs). KPKs are unprotected Key Encryption Keys (KEKs). The KPKs need to be loaded into the radio before the Protected Keys are loaded. Once loaded into the radio, the KPKs are used to unwrap (AES) or decrypt (DES) the Protected Keys.

The radio must be placed into the key loading mode (see Section C.2.2) in order to accept the KPKs and P25 Voice Keys.

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### **About L3Harris Technologies**

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains.