



# UNITY<sup>®</sup> XG-100M Mobile Radio

With CH-100 Control Head  
Full-Spectrum Multiband Radio



### MANUAL REVISION HISTORY

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## 1. SAFETY SYMBOL CONVENTIONS

The following conventions are used to alert the user to general safety precautions that must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere violates safety standards of design, manufacture, and intended use of the product. Harris Corporation assumes no liability for the customer's failure to comply with these standards.



The **WARNING** symbol calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** symbol until the conditions identified are fully understood or met.



The **CAUTION** symbol calls attention to an operating procedure, practice, or the like, which, if not performed correctly or adhered to, could result in a risk of danger, damage to the equipment, or severely degrade the equipment performance.



The **NOTE** symbol calls attention to supplemental information, which may improve system performance or clarify a process or procedure.



The **ESD** symbol calls attention to procedures, practices, or the like, which could expose equipment to the effects of Electro-Static Discharge. Proper precautions must be taken to prevent ESD when handling circuit modules.

## 2. RF ENERGY EXPOSURE INFORMATION

### 2.1 RF ENERGY EXPOSURE AWARENESS, CONTROL INFORMATION, AND OPERATION INSTRUCTIONS FOR FCC OCCUPATIONAL USE REQUIREMENTS

Before using your mobile two-way radio, read this important RF energy awareness and control information and operational instructions to ensure compliance with the FCC's RF exposure guidelines.



This radio is intended for use in occupational/controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet FCC limits. This radio device is NOT authorized for general population, consumer, or any other use.



Changes or modifications not expressly approved by Harris Corporation could void the user's authority to operate the equipment.

This two-way radio uses electromagnetic energy in the radio frequency (RF) spectrum to provide communications between two or more users over a distance. It uses RF energy or radio waves to send and receive calls. RF energy is one form of electromagnetic energy. Other forms include, but are not limited to, electric power, sunlight, and x-rays. RF energy, however, should not be confused with these other forms of electromagnetic energy, which, when used improperly, can cause biological damage. Very high levels of x-rays, for example, can damage tissues and genetic material.

Experts in science, engineering, medicine, health, and industry work with organizations to develop standards for exposure to RF energy. These standards provide recommended levels of RF exposure for both workers and the general public. These recommended RF exposure levels include substantial margins of protection. All two-way radios marketed in North America are designed, manufactured, and tested to ensure they meet government established RF exposure levels. In addition, manufacturers also recommend specific operating instructions to users of two-way radios. These instructions are important because they inform users about RF energy exposure and provide simple procedures on how to control it. Please refer to the following websites for more information on what RF energy exposure is and how to control your exposure to assure compliance with established RF exposure limits.

<http://www.fcc.gov/oet/rfsafety/rf-faqs.html>

<http://www.osha.gov/SLTC/radiofrequencyradiation/index.html>

#### 2.1.1 Federal Communications Commission Regulations

Your Harris Corporation Unity mobile two-way radio is designed and tested to comply with the FCC RF energy exposure limits for mobile two-way radios before it can be marketed in the United States. When two-way radios are used as a consequence of employment, the FCC requires users to be fully aware of and able to control their exposure to meet occupational requirements. Exposure awareness can be facilitated by the use of a label directing users to specific user awareness information. Your Harris Corporation Unity two-way radio has an RF exposure product label. Also, your Unity Installation and Operator's Manuals include information and operating instructions required to control your RF exposure and to satisfy compliance requirements.

## 2.2 COMPLIANCE WITH RF EXPOSURE STANDARDS

Your Harris Corporation Unity mobile two-way radio is designed and tested to comply with a number of national and international standards and guidelines (listed below) regarding human exposure to RF electromagnetic energy. This radio complies with the IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environment at duty factors of up to 50% talk-50% listen and is authorized by the FCC for occupational use. In terms of measuring RF energy for compliance with the FCC exposure guidelines, your radio antenna radiates measurable RF energy only while it is transmitting (talking), not when it is receiving (listening) or in standby mode.

Your Harris Corporation Unity mobile two-way radio complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission (FCC), Code of Federal Regulations; 47 CFR §§ 2 sub-part J.
- American National Standards Institute (ANSI)/Institute of Electrical and Electronic Engineers (IEEE) C95.1-2005.
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-2005.
- IC standard RSS-102, Issue 2, 2005: “Spectrum Management and Telecommunications Radio Standards Specification. Radiofrequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).



**Error! Reference source not found.** lists the recommended minimum lateral distance for a controlled environment and for unaware bystanders in an uncontrolled environment, from transmitting types of antennas (i.e., monopoles over a ground plane, or dipoles) at rated radio power for mobile radios installed in a vehicle. Transmit only when unaware bystanders are at least the uncontrolled recommended minimum lateral distance away from the transmitting antenna.

### 2.2.1 Mobile Antennas (Vehicle Installations)

**Table 2-1: Recommended Minimum Safe Lateral Distance from a Transmitting Antenna Connected to a Unity XG-100M Mobile Radio**

RF BAND	ANTENNA PART NUMBERS	RECOMMENDED MINIMUM LATERAL HUMAN BODY DISTANCE FROM TRANSMITTING ANTENNA	
		CONTROLLED ENVIRONMENT	UNCONTROLLED ENVIRONMENT
VHF	AN-125001-002 (mount) with 12099-0310-01 (element)	28.3 inches (72 centimeters)	63.0 inches (160 centimeters)
	AN-125001-004 (mount) with 12099-0310-01 (element)		
	AN-125001-006 (mount) with 12099-0310-01 (element)		
	AN-125001-008 (mount) with 12099-0310-01 (element)		



**Table 2-1: Recommended Minimum Safe Lateral Distance from a Transmitting Antenna Connected to a Unity XG-100M Mobile Radio**

RF BAND	ANTENNA PART NUMBERS	RECOMMENDED MINIMUM LATERAL HUMAN BODY DISTANCE FROM TRANSMITTING ANTENNA	
		CONTROLLED ENVIRONMENT	UNCONTROLLED ENVIRONMENT
UHF	AN-125001-002 (mount) with 12099-0310-01 (element)	24.4 inches (62 centimeters)	54.3 inches (138 centimeters)
	AN-125001-004 (mount) with 12099-0310-01 (element)		
	AN-125001-006 (mount) with 12099-0310-01 (element)		
	AN-125001-008 (mount) with 12099-0310-01 (element)		
700/800 MHz	AN-125001-002 (mount) with 12099-0310-01 (element)	7.9 inches (20 centimeters)	19.7 inches (50 centimeters)
	AN-125001-004 (mount) with 12099-0310-01 (element)		
	AN-125001-006 (mount) with 12099-0310-01 (element)		
	AN-125001-008 (mount) with 12099-0310-01 (element)		

\* Install the radio’s antenna (refer to **Error! Reference source not found.** for applicable antenna part numbers) in the center of the vehicle’s roof. These mobile antenna installation guidelines are limited to metal body motor vehicles or vehicles with appropriate ground planes. The antenna installation should additionally be in accordance with the following:

- The requirements of the antenna manufacturer/supplier included with the antenna.
- Instructions in the Unity Radio Installation Manual, including minimum antenna cable lengths.
- The installation manual providing specific information of how to install the antennas to facilitate recommended operating distances to all potentially exposed persons.

Use only the Harris Corporation approved/supplied antenna(s) or approved replacement antenna. Unauthorized antennas, modifications, or attachments could damage the radio and may violate FCC regulations.

**2.2.2 Approved Accessories**

This radio has been tested and meets the FCC RF guidelines when used with the Harris Corporation accessories supplied or designated for use with this product. Use of other accessories may not ensure compliance with the FCC’s RF exposure guidelines, and may violate FCC regulations.

For a list of approved accessories refer to the product manuals, the Products and Services Catalog, or contact Harris Corporation at 1-800-368-3277.

**2.2.3 Contact Information**

For additional information on exposure requirements or other information, contact Harris Corporation at 1-800-528-7711 or at [www.pspc.harris.com](http://www.pspc.harris.com).

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## 2.3 REGULATORY APPROVALS

### 2.3.1 Part 15

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

### 2.3.2 Industry Canada

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## 3. OPERATION SAFETY RECOMMENDATIONS

### 3.1 TRANSMITTER HAZARDS



The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmitters. A list of several possible hazards is given:

- **Explosive Atmospheres** – Just as it is dangerous to fuel a vehicle with the motor running, similar hazards exist when operating a mobile radio. Be sure to turn the radio off while fueling a vehicle. Do not carry containers of fuel in the trunk of a vehicle if the radio is mounted in the trunk.  
  
Areas with potentially explosive atmosphere are often, but not always, clearly marked. Turn OFF your radio when in any area with a potentially explosive atmosphere. It is rare, but not impossible that the radio or its accessories could generate sparks.
- **Interference to Vehicular Electronics Systems** – Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical electronic systems that can malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer and enlist their aid in determining the expected performance of electronic circuits when the radio is transmitting.
- **Electric Blasting Caps** – To prevent accidental detonation of electric blasting caps, **DO NOT** use two-way radios within 1000 feet of blasting operations. Always obey the “**Turn off Two-Way Radios**” signs posted where electric blasting caps are being used. (OSHA Standard: 1926-900)
- **Liquefied Petroleum (LP) Gas Powered Vehicles** – Mobile radio installations in vehicles powered by liquefied petroleum gas with the LP gas container in the trunk or other sealed-off space within the interior of the vehicle must conform to the **National Fire Protection Association standard NFPA 58** requiring:
  - The LP gas container and its fittings.
  - Outside filling connections shall be used for the LP gas container.
  - The LP gas container shall be vented to the outside of the vehicle.

### 3.2 SAFE DRIVING RECOMMENDATIONS

*(Recommended by AAA)*

- Read the literature on the safe operation of the radio.
- Keep both hands on the steering wheel and the microphone in its hanger whenever the vehicle is in motion.
- Place calls only when the vehicle is stopped.
- When talking from a moving vehicle is unavoidable, drive in the slower lane. Keep conversations brief.
- If a conversation requires taking notes or complex thought, stop the vehicle in a safe place and continue the call.
- Whenever using a mobile radio, exercise caution.

## 4. OPERATING RULES AND REGULATIONS

Two-way FM radio systems must be operated in accordance with the rules and regulations of the local, regional, or national government.

In the United States, the Unity mobile radio must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). As an operator of two-way radio equipment, you must be thoroughly familiar with the rules that apply to your particular type of radio operation. Following these rules helps eliminate confusion, assures the most efficient use of the existing radio channels, and results in a smoothly functioning radio network.

When using your two-way radio, remember these rules:

- It is a violation of FCC rules to interrupt any distress or emergency message. As your radio operates in much the same way as a telephone “**party line**,” always listen to make sure that the channel is clear before transmitting. Emergency calls have priority over all other messages. If someone is sending an emergency message – such as reporting a fire or asking for help in an accident – **KEEP OFF THE AIR!**
- The use of profane or obscene language is prohibited by Federal law.
- It is against the law to send false call letters or false distress or emergency messages. The FCC requires that you keep conversations brief and confine them to business. To save time, use coded messages whenever possible.
- Using your radio to send personal messages (except in an emergency) is a violation of FCC rules. You may send only those messages that are essential for the operation of your business.
- It is against Federal law to repeat or otherwise make known anything you overhear on your radio. Conversations between others sharing your channel must be regarded as confidential.
- The FCC requires that you identify yourself at certain specific times by means of your call letters. Refer to the rules that apply to your particular type of operation for the proper procedure.
- No changes or adjustments shall be made to the equipment except by an authorized or certified electronics technician.



NOTE

Under U.S. law, operation of an unlicensed radio transmitter within the jurisdiction of the United States may be punishable by a fine of up to \$10,000, imprisonment for up to two (2) years, or both.

The following conditions tend to reduce the effective range of two-way radios and should be avoided whenever possible:

- Operating the radio in areas of low terrain, or while under power lines or bridges.
- Obstructions such as mountains and buildings.
- In areas where transmission or reception is poor, some improvement can be obtained by moving a few yards in another direction or moving to a higher elevation.

## 5. INTRODUCTION

Your XG-100M provides full-spectrum multiband coverage:

- 30 to 50 MHz, VHF Low (Transmit requires external power amplifier)
- 136 to 174 MHz, VHF High (5 – 50 W)
- 380 to 520 MHz, UHF-Low, UHF-High (5 – 50 W)
- 762 to 805 MHz, 700 MHz (2 – 30 W)
- 805 to 870 MHz, 800 MHz (2 – 35 W)

The XG-100M has the following capabilities:

- Project 25 (P25) Conventional
- P25 Trunking
- Analog FM
- Advanced Encryption Standard, 256-bit (AES-256)
- Digital Encryption Standard Output Feedback (DES-OFB) Encryption
- Digital Encryption Standard Cipher Feedback (DES-CFB) Encryption
- Global Positioning System (GPS)
- Bluetooth<sup>®</sup>
- Over The Air Rekey (OTAR)
- Preemptive Priority Scanning
- Global Common Key References (CKR)
- Feature Management (Using Radio Personality Manager [RPM] R6A or later)

For optional accessories, refer to Section 9.2. Additional accessories may have been added since publication of this manual; contact Harris for more information.

## 6. BASIC OPERATION

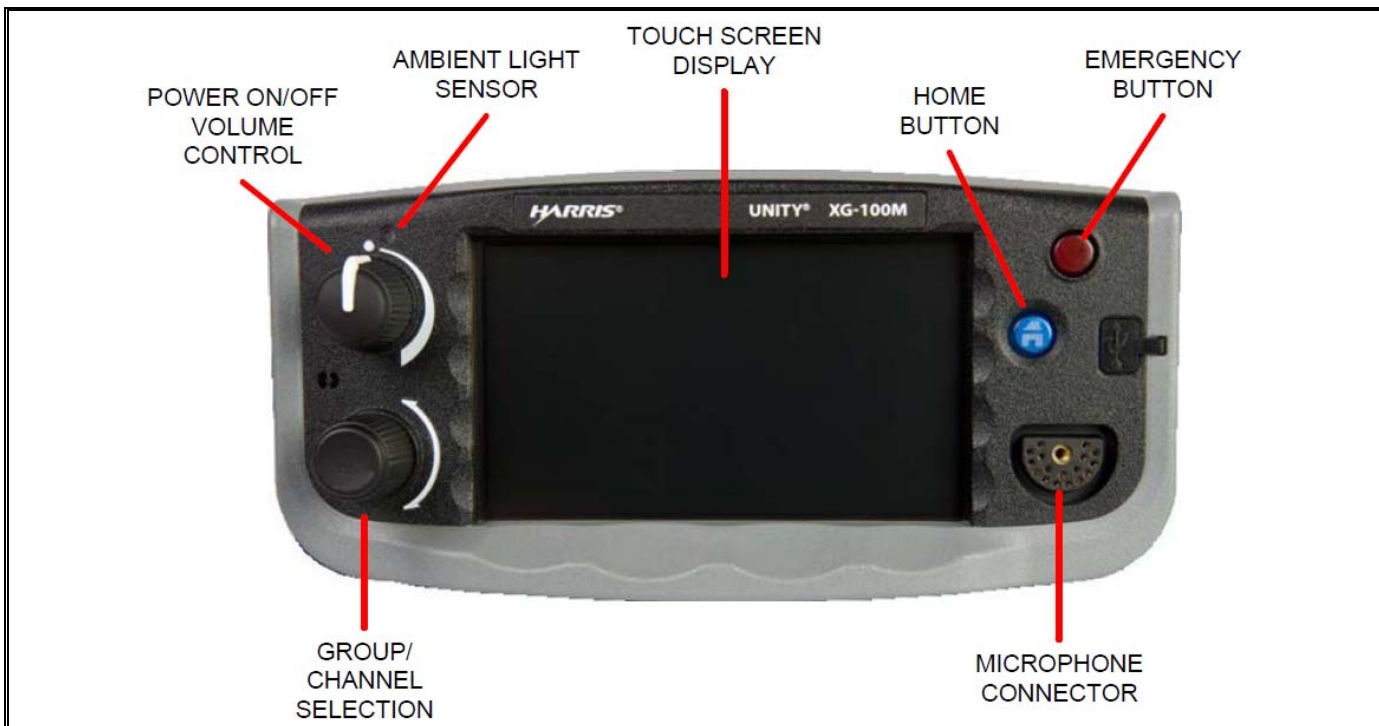
### 6.1 XG-100M CONTROLS

The XG-100M features a full color touch screen display for easy access to all radio features and functions. To select an item, simply touch the desired area of the screen with your finger.




Never touch the screen with any metal or sharp objects, as this can damage the screen.

**Table 6-1: XG-100M Controls and Connectors**

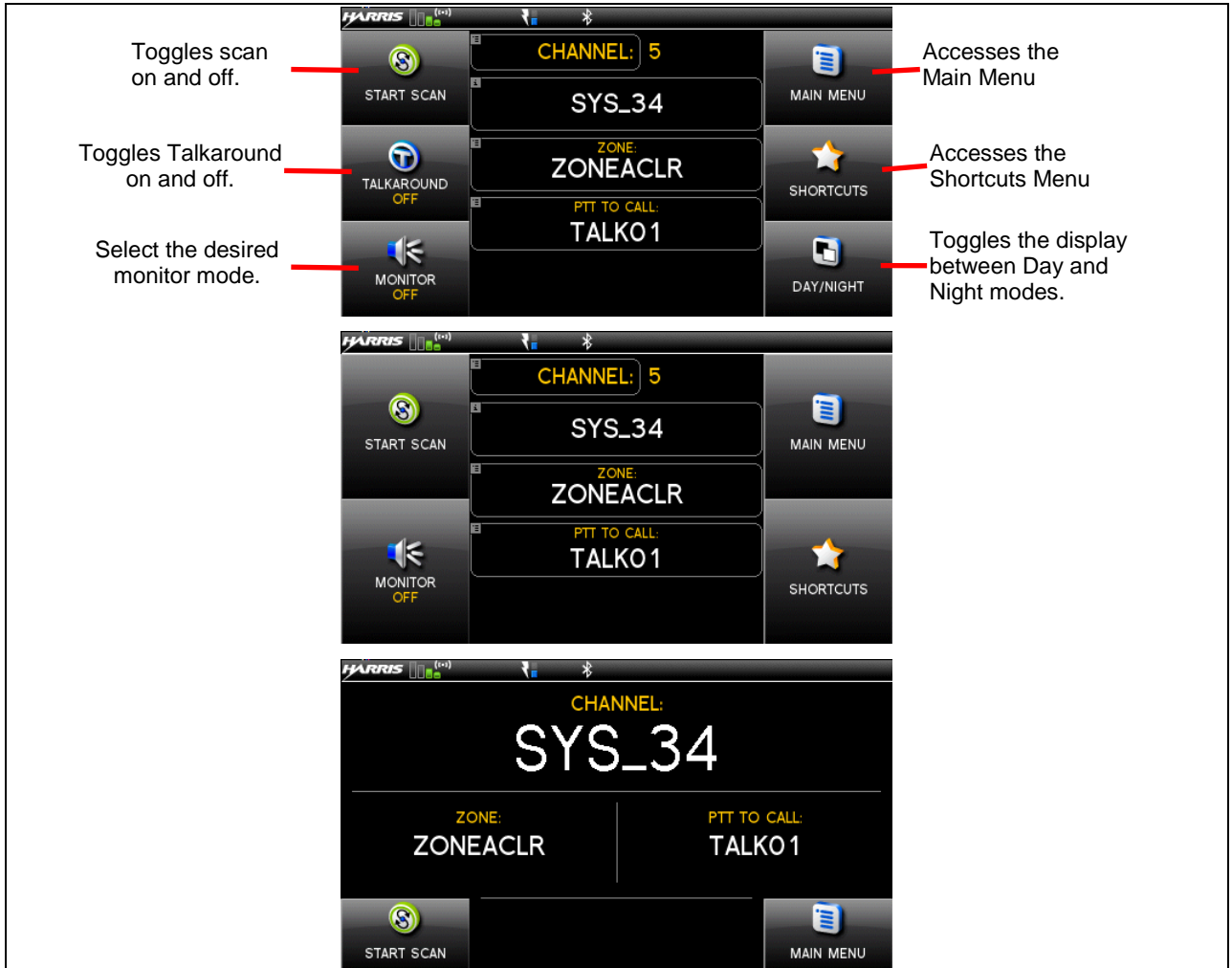


POWER ON/OFF VOLUME CONTROL	Turn knob clockwise to power on the radio and increase volume. Turn counter-clockwise to decrease volume and power off the radio.
GROUP/CHANNEL SELECTION	Selects the available groups or channels.
MICROPHONE CONNECTOR	Connection for hand-held, hands-free, speaker-mic, or headset
AMBIENT LIGHT SENSOR	The radio automatically adjusts the display and button backlight brightness level based on ambient light. Do not block this sensor.
HOME BUTTON	Toggles through three available main screens or allows you to quickly navigate back to the main screen from a submenu.
EMERGENCY BUTTON	Declares an emergency.

## 6.2 DISPLAY

One of three available main displays (Figure 6-1) appears after power up or after exiting from the menus. While on the main screen, press the  button to toggle through these displays.

To select an item, simply touch the desired area of the screen with your finger.



**Figure 6-1: Main Displays**

Table 6-2 describes the various icons that may be displayed at the top of the display.

**Table 6-2: Icons**

ICON	DESCRIPTION	ICON	DESCRIPTION
	Trunked Signal Strength		Bluetooth Disabled
	Transmitting		Bluetooth Enabled
	Receiving		Encrypted Channel
	Channel Idle		Global Encryption
	Failsoft		GPS
	Nuisance Delete		Monitor
	Receiving Data		OTAR Disabled
	Transmitting Data		OTAR Registered
	Virtual Site		OTAR Registering
	Volte Scanning		OTAR Rekeying
	Scanning Enabled		Talkaround Enabled
	Alert		Transmit Power
	Emergency		RX Only

### 6.3 STATUS MESSAGES

During radio operation, various radio Status Messages may be displayed. The messages are described below.

**Table 6-3: Status Messages**

MESSAGE	DESCRIPTION
PTT DENIED	P25 Trunked only - Indicates the radio or talkgroup is not authorized to operate on the selected system and/or talkgroup.
CALL QUEUED	P25 Trunked only - Indicates the system has placed the call in a request queue.
SYSTEM BUSY	P25 Trunked only - Indicates the system is busy, no channels are currently available, the queue is full, or an individual call is being attempted to a radio that is currently transmitting.
SCANNING	Indicates the radio is scanning.
TX EMERGENCY	P25 modes only - Indicates an emergency call is being transmitted.
RX EMERGENCY	P25 modes only - Indicates an emergency call is being received. If programmed via RPM, the radio will display the unit name or unit ID.
WIDE AREA SCAN	P25 Trunked only - Indicates the radio has entered the Wide Area Scan mode to search for a new system (if enabled through programming).
INVALID TALKGROUP	P25 Trunked only - Indicates the current talkgroup is not valid for the current system. This could happen if the site denies registration due to an unrecognized talkgroup ID.
REGISTERING	P25 Trunked only - Displayed when the radio is performing a registration/affiliation on a P25 trunking site.



MESSAGE	DESCRIPTION
CTRL CHANNEL SCAN	P25 Trunked only - Indicates the control channel is lost and the radio has entered the Control Channel Scan mode to search for the control channel (usually out of range indication).
BAND SCANNING	P25 Trunked only - This message is only displayed if the P25T system is configured for "EnhancedCC" mode of operation. When the radio cannot find a Control Channel in either the trunked frequency set or the list of discovered adjacencies, the radio is able to perform a full spectrum frequency scan to find a new Control Channel.

## 6.4 ALERT TONES

Table 6-4 describes the alert tones that may be played by radio.

**Table 6-4: Alert Tones**


STONE	DESCRIPTION	SOUND/DURATION
Ready To Talk Tone Unencrypted (Analog FM or P25 digital)	After a PTT is pressed, this control enables the radio to produce an audible indication (tone) for you to begin speaking into the microphone.	1000 Hz for 25 ms
Ready to Talk Tone Encrypted P25 digital	After a PTT is pressed, this control enables the radio to produce an audible indication (tone) for you to begin speaking into the microphone.	1200 Hz tone for 25 ms
PTT Denied	PTT not possible. Momentary tone is present: <ul style="list-style-type: none"> <li>• Receive only</li> <li>• Key not found</li> <li>• PTT button disabled</li> <li>• Emergency button disabled</li> <li>• Emergency not supported for current channel</li> <li>• Clear transmit denied</li> </ul>	544 Hz tone for 75 ms
Maximum transmit duration expires	Maximum transmit duration is exceeded.	5 beeps and then a 544 Hz tone for 75 ms
Low Battery Alarm	Alarm sounds upon initial detection of low battery and every 30 seconds thereafter. Tone stops upon detection of a battery charging state.	Sequence of tones: <ul style="list-style-type: none"> <li>• 937 Hz tone for 50 ms</li> <li>• Silence for 60 ms</li> <li>• 1300 Hz tone for 50 ms</li> </ul>
Emergency Call Received	Radio is receiving an emergency call or priority call.	600 Hz tone for 250 ms and 1800 Hz tone for 250 ms
Out of Range	Radio fails to find a local control channel.	Programmable via RPM: <ul style="list-style-type: none"> <li>• Disabled (no tone)</li> <li>• Slow (tone every 15s)</li> <li>• Medium (tone every 10s)</li> <li>• Fast (tone every 5s)</li> </ul>

## 6.5 BEFORE FIRST USE

Make sure the XG-100M has:

- Mission plan and radio programmed using the RPM
- Encryption keys loaded if using encrypted channels
- Mission plan activated

## 6.6 POWER ON AND SET VOLUME

The power switch and volume control are within the same control. Turn  clockwise to power on XG-100M and to set to desired volume level.

## 6.7 TURN ENCRYPTION ON OR OFF

1. Select **SHORTCUTS** from the main display.
2. Select **ENCRYPTION** to toggle encryption on and off.
  - A key appears on the display when encryption is enabled. The channel must also be programmed to be encrypted.
  - When encryption is turned on and you use any channel not configured for encryption, the radio allows PTT. The signal is transmitted unencrypted.
  - Channels configured for Global Encryption display a Global Encryption icon instead of key icon (Section 7.8) if Global Encryption is enabled.

## 6.8 USER INTERFACE PRIVILEGE LEVEL

Depending on radio programming, some of the menu options described in this manual may not be available. The following table details the menus available for the different levels of User Interface Privilege:

**Figure 6-2: User Interface Privilege**

	FULL ACCESS	LIMITED ACCESS	RESTRICTED ACCESS
Audio Settings	✓		
GPS Settings	✓		
Clock Settings	✓		
Battery Setting	✓		
Bluetooth Settings	✓	✓	
View/Edit Softkey (System List)	✓	✓	✓
View/Edit (Zone List)	✓	✓	✓
Zeroize	✓		
Keypad Changeover	✓	✓	
Global Encryption	✓	✓	
Global Key	✓		
Program Menu only in Active Mission Plan	✓	✓	
Self-test on Utility Menu	✓	✓	

	FULL ACCESS	LIMITED ACCESS	RESTRICTED ACCESS
TCXO Tuning on Utility Menu	✓		
P25 Test Selection on Utility Menu	✓		

## 6.9 SELECT ZONE/SYSTEM USING MENUS

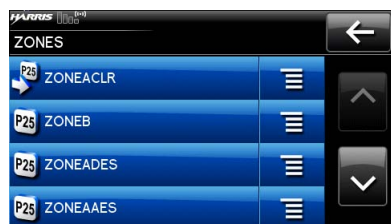
A zone/system is a group of channels that can be programmed by agency or geographical region. For example, a zone/system could be for fire, police, New York, Los Angeles, etc.




1. At main display, select **MAIN MENU**.



2. Select **ZONES**.



3. Select the desired zone from the list.

If  is selected, a screen appears allowing you to view the channels in the zone/system.


A mission plan could have up to 512 zones/systems.

## 6.10 USE TALKAROUND TO BYPASS REPEATER (CONVENTIONAL ONLY)

You can bypass the repeater system to communicate directly with other radios on your current channel's receive frequency. This is useful if you are out of range of a repeater or if a repeater is busy. You will need to be in range of the other radio.



1. At main display, select **TALKAROUND** to toggle talkaround on.

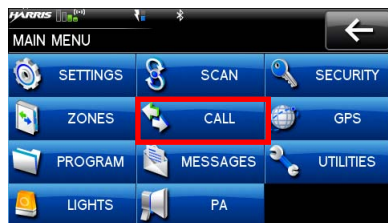
2. The Talkaround icon  appears. Calls are now made on the receive frequency until you disable talkaround mode via the **CALL**

menu. Power cycling the radio does not disable talkaround.

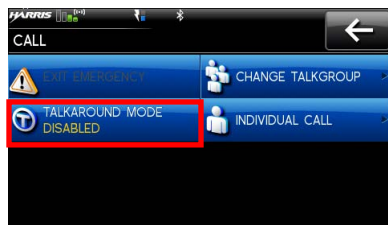
*Or*




1. At main display, select **MAIN MENU**.



2. Select **CALL**.



3. Select **TALKAROUND MODE** to toggle talkaround on.

4. The  icon appears. Calls are now made on the receive frequency until you disable talkaround mode. Power cycling the radio does not disable talkaround.

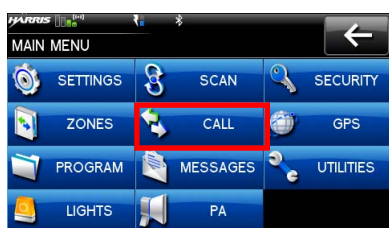
## 6.11 INDIVIDUAL CALLS

An individual call is used to make a call to one radio as opposed to a group of radios. An individual call can only be made on a digital channel.

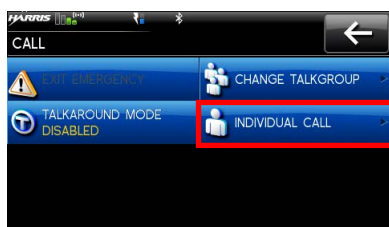
### 6.11.1 Transmit an Individual Call



1. At main display, select **MAIN MENU**.



2. Select **CALL**.



3. Select **INDIVIDUAL CALL**.

4. Select the unit to call.

5. Press PTT to make the call.

6. To end call, select **END CALL**.

### 6.11.2 Receiving an Individual Call



1. When receiving an Individual Call, the radio displays the calling radio's name or Unit ID.
2. Press the PTT button to respond. The amount of time the radio will remain in the Individual Call mode with no activity is programmable via RPM.



3. The radio rings and indicates a missed call if you do not respond to an incoming Individual Call. The ring sounds continuously until you press PTT, select the missed call indication, or power cycle radio.

## 6.12 SELECT A NEW TALKGROUP

A talkgroup is a group of radios that you would want to have private conversations with. These groups could be divided into areas such as state, region, county, or large special events. A talkgroup call can only be made on digital channels. On the receiving radio, the calling station name appears in the activity area.



1. At main display, touch the currently displayed talkgroup.

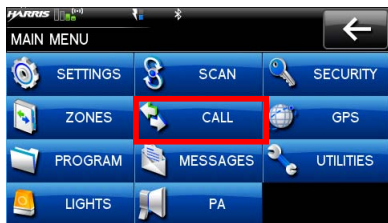


2. Select the desired talkgroup. After selecting the new talkgroup, the radio returns to the main display.
3. Press PTT to make the call.

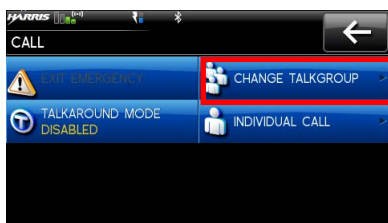
OR



1. At main display, **MAIN MENU**.



2. Select **CALL**.



3. Select **CHANGE TALKGROUP**.



4. Select the talkgroup from the list. After selecting the new talkgroup, the radio returns to the main display.
5. Press PTT to make the call.

## 6.13 SCAN OPERATION

### 6.13.1 Start Scan

This procedure assumes that the scan list has been added and is not in active scan. Refer to Section 7.14 for scan setup or Section 6.13.2 for stopping scan. Refer to Section 7.14.1.1, Section 7.14.1.2, and Section 7.14.1.3 for home and priority channel descriptions.



1. At main display, select **START SCAN**.

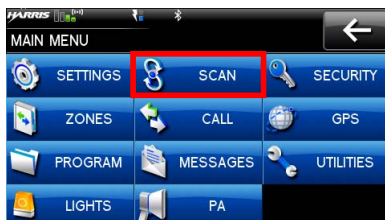


2. The green **START SCAN** text changes to red **STOP SCAN**.

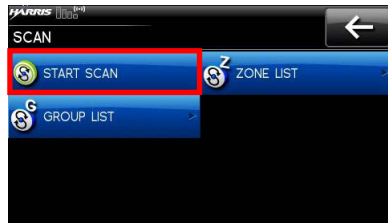
*OR*



1. At main display, select **MAIN MENU**.



2. Select **SCAN**.



3. Select **START SCAN**. The green **START SCAN** text changes to red **STOP SCAN**.

### 6.13.2 Stop Scan

Perform the following to stop an active scan.



1. At main display, select **STOP SCAN**.

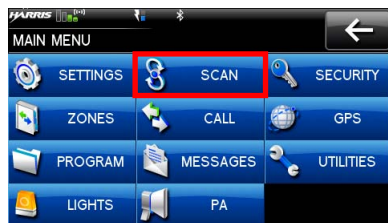


2. The red **STOP SCAN** text changes to green **START SCAN**.

*OR*



1. At main display, select **MAIN MENU**.



2. Select **SCAN**.

3. Select **STOP SCAN**. The red **STOP SCAN** text changes to green **START SCAN**.



### 6.13.3 Nuisance Delete

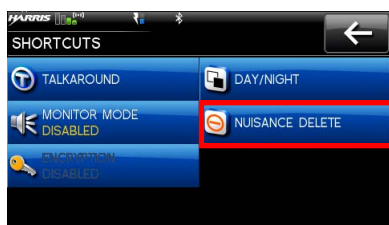
A channel can temporarily be deleted from the scan list. Priority 1 and priority 2 channels cannot be nuisance deleted.



Nuisance delete can only be performed on the active scan list.



1. At main display, select **SHORTCUTS**.



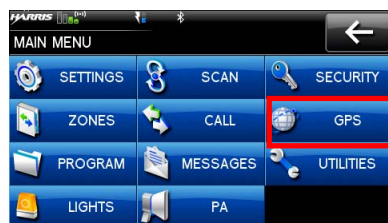
2. Select **NUISANCE DELETE**.

### 6.14 VIEW GPS INFORMATION

You can use the internal Global Positioning System (GPS) receiver to view your position and satellite information. Remember, GPS requires an unobstructed view of the sky and the signal is greatly diminished inside buildings, tunnels, heavily forested areas, etc. GPS may not work at all under some materials, especially metal.



1. At main display, select **MAIN MENU**.





2. Select **GPS**.



You can observe GPS status:

- **DISABLED** - GPS is disabled via programming.
- **TRACKING** - GPS has acquired satellite signal. GPS time appears on top of display.
- **SEARCHING** - GPS has not acquired. Harris logo appears on top of display if GPS has not tracked after last power up of the radio.
- **LAST KNOWN POS** - Radio was tracking and then lost GPS signal. The information displayed is from the last known position.




3. Select  to view satellite information.
4. Select  to exit GPS screens.

## 6.15 EMERGENCY OPERATION

The XG-100M can be programmed to enable emergency mode. Unit name displays on dispatcher console if an emergency signal is received from another XG-100M on a digital channel.

### 6.15.1 Declaring an Emergency Call

1. Press and hold the  button on the front of the control head. The length of time you need to hold the button is configured in RPM.

For digital channels, the radio transmits the talkgroup or radio ID to the dispatch console or receiving radio.

The radio will go through transmit and receive cycles if configured.

Speak into the microphone while the radio is transmitting or press PTT to talk.

2. To exit emergency, power cycle the radio or select **EXIT EMERGENCY**.

### 6.15.2 Receiving an Emergency Call

When receiving an Emergency Call, an alert beep sounds (if tones are enabled) and an emergency indication is displayed.




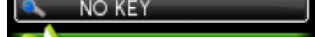

Depending on options selected in RPM, the unit ID or unit name may be displayed.

While the emergency display is active, press PTT to respond to the emergency caller.

## 6.16 ENCRYPTION BAR

The encryption bar is shown in Table 6-5. Encryption keys must be loaded (Section 7.2 or Section 7.3) for these indications to be displayed.

**Table 6-5: Encryption Bar Indications**

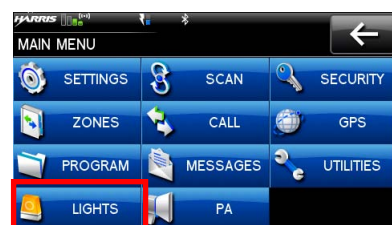
DISPLAY	DESCRIPTION
	This is an example of a key name of an AES and a DES key being transmitted or received.
	
	Encryption key assigned to channel was not found.
	This message appears on receive radios. Encryption key assigned to channel was not used on transmitting radio.
	

## 6.17 LIGHTS AND SIRENS

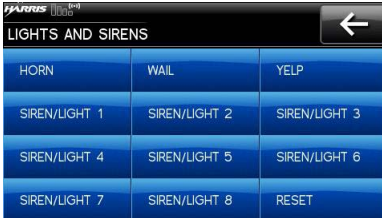
The lights and sirens feature allows you to activate the siren/light combination defined for the corresponding button. The siren and light functions are programmable for any combination of siren and lights.



1. At main display, select **MAIN MENU**.



2. Select **LIGHTS**.



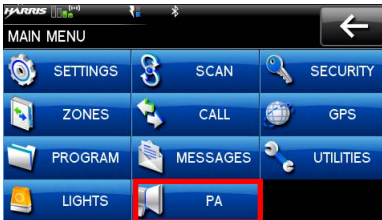
3. Select the desired option.

## 6.18 PUBLIC ADDRESS (PA)

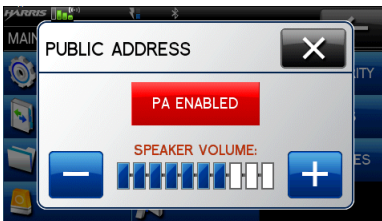
To turn Public Address (PA) feature on/off and adjust the volume of the PA speaker:



1. At main display, select **MAIN MENU**.



2. Select **PA**.

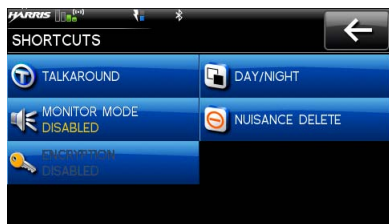


3. Select **PA ENABLED** to disable PA or select **PA DISABLED** to enable PA.
4. Use (+) or (-) to set the volume.

## 6.19 SHORTCUT MENU



1. At main display, select **SHORTCUTS**.



2. Select the desired task:

- **TALKAROUND** – (Conventional only) toggles talkaround on and off.
- **MONITOR MODE** – (P25 Conventional and Analog Conventional) Monitor and squelch types. This is grayed out if radio is scanning.

For analog channels, there is:

- Noise squelch - any received signal breaks squelch.
- Continuous Tone Coded Squelch (CTCSS) - squelch is selective based on tone code.
- Continuous Digital Coded Squelch (CDCSS) - squelch is selective based on digital code.

For digital channels, there is:

- Monitor squelch - any received digital signal breaks squelch.
- Normal squelch - Received Network Access Code (NAC) breaks squelch.
- Selective squelch - Received NAC and talkgroup Identification (ID) or unit ID breaks squelch.



**NOTE**

During encrypted operations, the radio only unmutes if receiving with the same key.

- **NUISANCE DEL** – Nuisance delete. This is grayed out if not scanning or if the radio has declared an emergency.
- **DAY/NIGHT** – Toggles the display between day and night modes.
- **ENCRYPTION** – Enables or disables encryption.

## 7. ADVANCED OPERATIONS

### 7.1 CREATE KEYS

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

- Motorola® KVL 3000 Plus Key Variable Loader (KVL) User's Guide
- Harris OTAR Overview Manual - MM-008069-001
- Network Key Manager Installation and Configuration Manual - MM-008070-001
- Harris UAS Key Management Application Manual - MM-008068-001
- Harris Key Manager Key Admin Overview and Operation Manual - MM1000019423
- Harris Key Manager Key Loader Overview and Operation Manual - MM1000019424



NOTE

If using Key Manager to create and load keys, ensure that you have version R5A or later installed. Versions prior to R5A do not support the Unity radio.

#### 7.1.1 Create Keys using Harris Key Admin

Harris Key Admin is part of the Harris Key Manager and is for use 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 onto Distribution Security Devices to transport these keys to technicians for use in radios.

1. Connect the Master Security Device to the PC.
2. Select **Start → Programs → Harris Key Manager → Harris Key Admin**.
3. Select **New Master Set** or **Load Existing Set**. Refer to the Key Admin online help for more information on creating keys.
4. When finished, create a Distribution Security Device. A Distribution Security Device is used with the 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 Security Device.

#### 7.1.2 Create Key in the KVL 3000 Plus

You can generate a single Type-3 key in the KVL 3000 Plus key loading device:

1. Turn on the KVL 3000 Plus.
2. Select **KEYS**.
3. Select **NEW**.
4. Enter a number between **00001** and **04095** or between **61440** and **65535** at Common Key References (CKR) prompt. The number must be unique on the KVL 3000 Plus.
5. Choose **DES-OFB** or **AES-256** as the algorithm.
6. Select **ACCEPT**.
7. Enter Key Identification (KID) from **0001** to **FFFF**. The number must be different for each key of a particular algorithm in the KVL 3000 Plus.



**NOTE**

The XG-100 does not support KID 0000. Attempting to load a key with KID 0000 from the KVL will result in the failure **UNKNOWN ERRICHECK TARGETALGORITHM!** displayed on the KVL. KID 0000 is reserved for the Suppressed Key feature.

8. Enter a hexadecimal number as the Key value. DES-OFB keys are 16 digits while AES keys are 64 digits (32 bytes [256 bits]). Odd parity checks are made between every two digits for DES-OFB keys. Parity checks are not made for AES-256 keys.
9. KVL 3000 Plus will display **SLOT FILLED**, press **ENTER**.
10. A message is displayed when complete: **KEY WAS CREATED SUCCESSFULLY**.
11. Refer to Section 7.2 for loading a key into the radio.

### 7.1.3 Create Keygroup in the KVL 3000 Plus

You can generate a group of Type-3 keys in the KVL 3000 Plus:

1. Turn on the KVL 3000 Plus.
2. Select **Esc**.
3. Select **GROUPS**.
4. Select **NEW**.
5. Enter a Group Name (up to seven characters).
6. Select CKRs from the programmed list until all desired CKRs are selected.
7. Select **DONE**. Refer to Section 7.2 for loading a keyset into the radio.

## 7.2 LOAD KEYS

### 7.2.1.1 Load UKEKs with UKEK Loader and RPM (for OTAR-Enabled Systems)

UKEKs are loaded into Harris OTAR radios using the UKEK Loader application. UKEK 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).



**NOTE**

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

2. If not already on, power-up the PC that has RPM and the UKEK Loader applications installed on it, and start Windows.
3. Connect the radio to the PC using programming cable 12082-0410-A1.



**NOTE**

The Unity drivers must be installed before UKEKs can be loaded into the radio. The Unity drivers may be found on the Key Loader CD (“unity setup.exe”) or on the Key Admin CD (“unity setup.exe”).

4. Load the UKEK file from the Crypto Officer onto the PC.
5. Run the RPM 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. Select **Options** → **P25 OTAR Options** and set the following:
  - a. The OTAR Message Number Period (MNP) as defined by the System Administrator.
  - b. The radio's Individual RSI (from the SLN Bindings Report).
  - c. The KMF's RSI (from the SLN Bindings Report).
8. Select **Radio** → **Program** or click on the **Program** icon and write the personality to the radio.
9. Run the UKEK Loader application.
10. Open the UKEK file loaded in step 4.
11. Select the Target Device type (Auto-Detect is preferred) and click the **Load** button.
12. When prompted, enter your user name and password and click **OK**.

The UKEK 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 **Finish** button to exit the Key Loader application. New UKEKs have are loaded and the radio is now ready to accept TEKs via OTAR with the trunked radio network.

### **7.2.2 Load Keys using Harris Key Loader**

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

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

1. Connect the Distribution Security Device to the PC.
2. Connect the radio to the PC using the 12082-0410-A1 programming cable.
3. Power on the radio, if not already.
4. Select **Start** → **Programs** → **Harris Key Manager** → **Harris Key Loader**.
5. At the Key Loader Welcome screen, click **Next**.
6. Enter the User Password for your Distribution Security Device and click **Authenticate**.
7. Click **Next** and click **Next** again.
8. Wait while the Key Loader reads the Distribution Set and click **Next**.
9. Select **USB** from the drop-down and click **Next**.





10. Select the Unity radio from the drop-down and click **Load**.



11. Click **Finish**.

### 7.2.3 Load Keys using Motorola KVL 3000 Plus

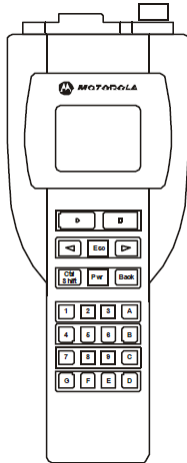
Type 3 Digital Encryption Standard Output Feedback (DES-OFB) and Advanced Encryption Standard, 256-bit (AES-256), encryption methods are supported. The Type 3 Encryption keys are loaded via a Motorola KVL 3000 Plus device using Telecommunications Industry Association (TIA)/Project 25 (P25) key fill device protocol. Make sure that valid keys have been created and stored in the KVL 3000 Plus before proceeding.

***Insert graphic cable connected to mobile.***

1. Power on KVL 3000 Plus.
2. Connect KVL 3000 Plus to XG-100M using a 12082-0400-A1 cable.

**NOTE:** Once the KVL 3000 Plus is connected, a keyset is established whether the keys are loaded or not. You will need to zeroize to bring the XG-100M to a fully zeroized state (Section 7.4).

3. The key fill in progress screen will be displayed and the radio can accept keys from the KVL.



At the KVL 3000 Plus:

4. Select **TARGET**.
5. Select **LOAD**.
6. Select **KEY**.
7. Using ◀ or ▶, select:
  - DES-OFB key
  - AES-256 key
8. Press **LOAD**.
9. Verify that the KVL 3000 Plus screen displays **LOADED SUCCESSFULLY OK**.
10. Select **OK** on the KVL 3000 Plus.
11. Repeat for additional keys.
12. Remove the KVL 3000 Plus cable from the radio.

### 7.3 LOAD KEYGROUPS

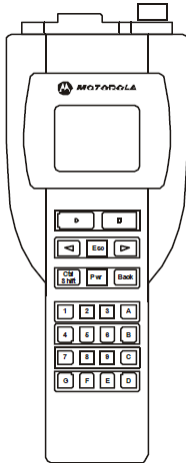
Make sure that valid keygroups have been created and stored in the KVL 3000 Plus before proceeding.

***Insert graphic cable connected to mobile.***

1. Power on KVL 3000 Plus.
2. Connect KVL 3000 Plus to XG-100M connector using 12082-0400-A1 cable.

**NOTE:** Once the KVL 3000 Plus is connected, a keyset is established whether the keys are loaded or not. You will need to zeroize to bring the XG-100M to a fully zeroized state (Section 7.4).

3. The key fill in progress screen will be displayed and the radio can accept keys from the KVL



At the KVL 3000 Plus:

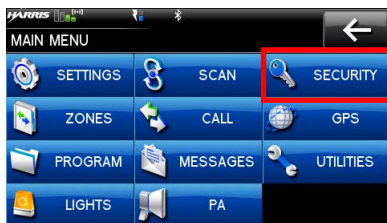
4. Select **TARGET**.
5. Select **LOAD**.
6. Select **GROUP**.
7. Using ◀ or ▶, select:
  - DES-OFB keygroups
  - AES-256 keygroups
8. Press **LOAD**.
9. Verify that the KVL 3000 Plus screen displays **LOADED SUCCESSFULLY OK**.
10. Select **OK** on the KVL 3000 Plus.
11. Repeat for additional groups.
12. Remove the KVL 3000 Plus cable from the radio.

## 7.4 ZEROIZE ALL FROM RADIO

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



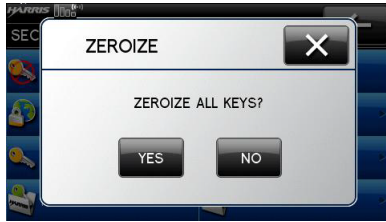
1. At main display, select **MAIN MENU**.



2. Select **SECURITY**.



3. Select **ZEROIZE KEYS**.



4. Select **YES** if you want to remove the keys.

**NOTE:** This will also remove the keysets.

## 7.5 ZEROIZE KEYS USING KVL 3000 PLUS

Refer to the KVL 3000 Plus User's Guide for advanced instructions.

**Insert graphic cable connected to mobile.**

1. Power on KVL 3000 Plus.
2. Connect KVL 3000 Plus to side XG-100M using 12082-0400-A1 cable.



At the KVL 3000 Plus:

3. Select **TARGET**.
4. Select **ZERO**.
5. Select **KEY**.
6. Using ◀ or ▶, select the key to remove from the radio.
7. Press **ZERO**.
8. Verify that the KVL 3000 Plus screen displays **ZEROIZED SUCCESSFULLY OK**.
9. Select **OK** on the KVL 3000 Plus.
10. Repeat for additional keys.
11. Remove the KVL 3000 Plus cable from the radio.

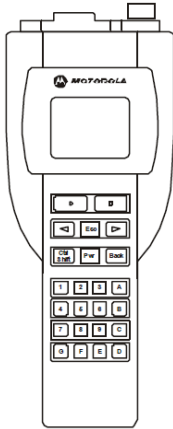
**NOTE: THE SELECTED KEY TO ZEROIZE IS DELETED FROM ALL KEYSSETS.**

## 7.6 ZEROIZE KEYGROUPS USING KVL 3000 PLUS

Refer to the Motorola KVL 3000 Plus User's Guide for advanced instructions.

**Insert graphic cable connected to mobile.**

1. Power on KVL 3000 Plus.
2. Connect KVL 3000 Plus to XG-100M using 12082-0400-A1 cable.



At the KVL 3000 Plus:

3. Select **TARGET**.
4. Select **ZERO**.
5. Select **GROUP**.
6. Using ◀ or ▶, select the key to remove from the radio.
7. Press **ZERO**.
8. Verify that the KVL 3000 Plus screen displays **ZEROIZED SUCCESSFULLY OK**.
9. Select **OK** on the KVL 3000 Plus.
10. Repeat for additional keys.
11. Remove the KVL 3000 Plus cable from the radio.

**NOTE: THE SELECTED KEY TO ZEROIZE IS DELETED FROM ALL KEYSSETS.**

## 7.7 ZEROIZE ALL FROM KVL 3000 PLUS

Refer to the KVL 3000 Plus User's Guide for advanced programming and setup instructions.

**Insert graphic cable connected to mobile.**

1. Power on KVL 3000 Plus.
2. Connect KVL 3000 Plus to XG-100M using 12082-0400-A1 cable.



At the KVL 3000 Plus:

3. Select **TARGET**.
4. Select **ZERO**.
5. Select **ALL**.
6. Select **YES**.
7. Verify that the KVL 3000 Plus screen displays **ZEROIZED SUCCESSFULLY OK**.
8. Select **OK** on the KVL 3000 Plus.
9. Remove the KVL 3000 Plus cable from the radio.

**NOTE:** This removes all keys but the keysets remain. You will need to perform a zeroize from the radio to bring the XG-100M to a fully zeroized state (Section 7.4).

## 7.8 GLOBAL ENCRYPTION

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

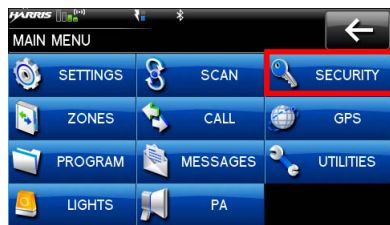
- Global Encryption is disabled
- A new mission fill is activated

- The active keyset is changed
- The system is changed

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



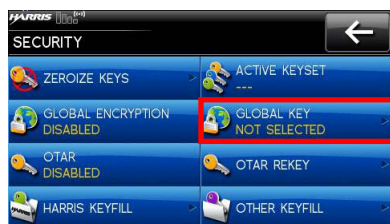
1. At main display, select **MAIN MENU**.




2. Select **SECURITY**.



3. Select **GLOBAL ENCRYPTION** to toggle to **ENABLED**.



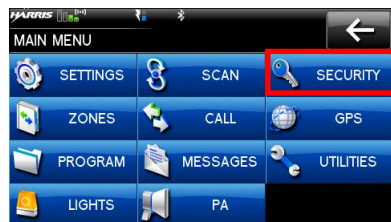
4. Select **GLOBAL KEY**.
5. Select the global key.
6. The numbered keys are assigned in RPM.

7. The global key icon  is displayed on the main display.

## 7.9 SELECT KEYSSET



1. At main display, select **MAIN MENU**.



2. Select **SECURITY**.



3. Select **ACTIVE KEYSSET** to toggle to the inactive keyset.

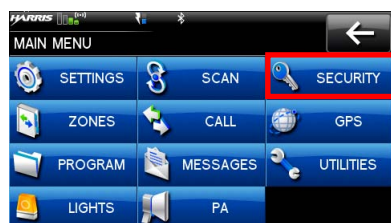
## 7.10 OTAR CONFIGURATION

OTAR is the over the air rekeying from a KMF and must be enabled for the digital only channel using RPM. For OTAR operation, the appropriate KEKs must be loaded into the radio using the Harris UKEK Loader or a KVL 3000.

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



1. At main display, select **MAIN MENU**.



2. Select **SECURITY**.



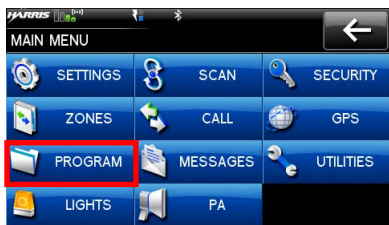
3. Select **OTAR** to toggle between **ENABLED** or **DISABLED**.
4. Select **OTAR REKEY** to request that the KMF updates the keys in the radio.

## 7.11 ACTIVATE/VIEW MISSION PLAN

Mission plans contain radio programming information such as frequencies, channels, stations, and talk groups. Up to 10 different mission plans can be stored in the radio, but only one can be activated at a time.



1. At main display, use for main menu.



2. Select **PROGRAM**.



3. Select the desired mission plan. indicates the active mission plan.

If a plan is activated, the radio displays series of screens indicating status, ending with a **PLAN COMPLETE** followed by name of plan.

**NOTE:** You cannot activate a plan when the radio is transmitting an emergency.

A **MISSION PLAN FAILED** message may be displayed for errors such as invalid syntax in the fill or some other invalid parameter.



4. Select to view mission plan information.



## 7.12 CH INFO MENU

The Channel Information (CH INFO) menu displays information about the currently selected channel. Note that the information displayed varies between conventional and trunked systems.



1. At main display, select the channel to display the available channels.



2. Select a channel to view the channel info.



3. Additional settings can be found by scrolling down.



### CONVENTIONAL ONLY:

4. Select **EDIT CHAN**.
5. Enter password.

**NOTE:** Password remains active until power cycle.

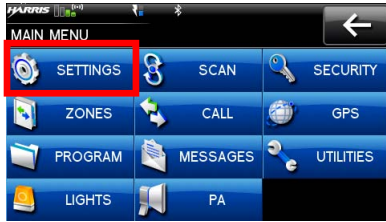
Refer to Section 8.2.

## 7.13 SETTINGS MENU

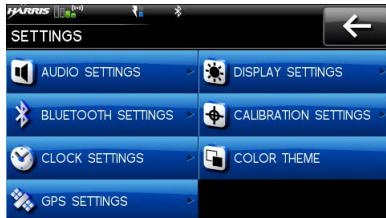
The settings menu allows you to change global radio settings such as audio, display, GPS, bluetooth, clock, and battery settings.



1. At main display, select **MAIN MENU**.



2. Select **SETTINGS**.

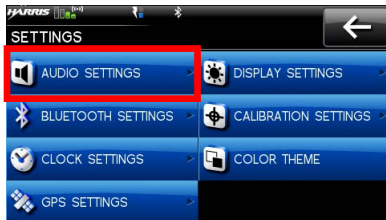


Refer to the Sections 7.13.1 for more information on the available settings.

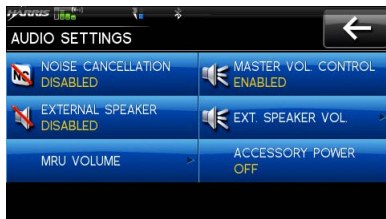
### 7.13.1 Audio Settings

Set audio settings such as speaker mute, noise cancellation, PTT, and tones.

1. Enter the Settings Menu.



2. Select **AUDIO SETTINGS**.

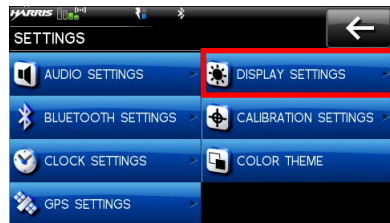


3. Select and change settings as desired:

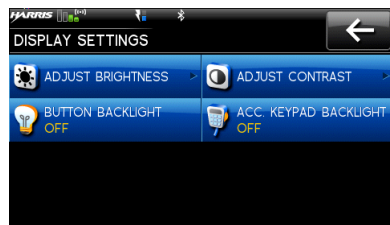
- **NOISE CANCELLATION** - Enable or disable noise cancellation. Noise cancellation reduces background noise during transmit.
  - **EXTERNAL SPEAKER** - Enable or disable the external speaker.
  - **MRU VOLUME** – Adjust the radio volume.
  - **MASTER VOL CONTROL** – Enable or disable the master volume control.
  - **EXT. SPEAKER VOL** – Adjust the external speaker volume.
  - **ACCESSORY POWER** – Turn accessory power on or off.
4. Use to exit menu.

## 7.13.2 Display Settings

1. Enter Settings Menu.



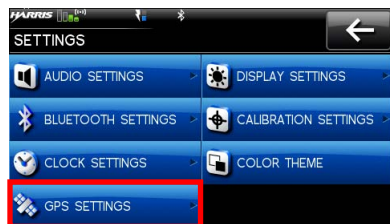
2. Select **DISPLAY SETTINGS**.



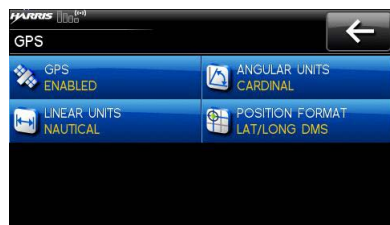
3. Select and change settings as desired.

## 7.13.3 GPS Settings

1. Enter Settings Menu.



2. Select **GPS SETTINGS**.



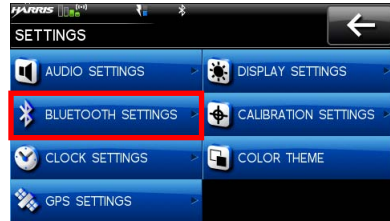
3. Select and change settings as desired:

- **GPS** - Enable or disable internal GPS.
- **LINEAR UNITS** - Set unit of measurement of displayed linear units: **STATUTE**, **METRIC**, or **NAUTICAL**.
- **ANGULAR UNITS** - Set unit of measurement of displayed angular units: **CARDINAL**, **DEGREES**, or **MILS**.
- **POSITION FORMAT**- Set format of displayed position information: Latitude/Longitude Degrees Minutes Seconds (**LAT/LONG DMS**), **LAT/LONG DM**, Military Grid Reference System (**MGRS**), or Universal Transverse Mercator (**UTM**).

### 7.13.4 Bluetooth

Bluetooth settings only appear if enabled in RPM.

1. Enter Settings Menu.



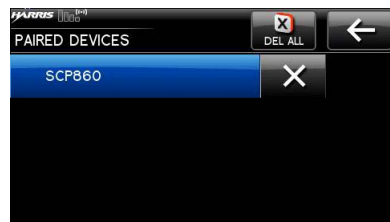
2. Select **BLUETOOTH SETTINGS**.





3. Select **STATUS** to toggle between **ENABLED** and **DISABLED**.



4. Select **PAIRED DEVICES** to view all Bluetooth devices currently paired with the radio.



5. Select  to delete a device. Select  to delete all paired devices.




6. Select **FIND DEVICE**. This is used to pair the radio with another Bluetooth device.



7. Make sure device being paired is powered on and has discovery mode enabled in order to pair with the XG-100M.
8. Select the desired device.



For Bluetooth 2.0 devices, a pin code screen appears.

9. Enter pin code.
10. Use  to select **OK**.

For Bluetooth 2.1 devices, an accept/deny screen appears.

11. Select **ACCEPT**.

**NOTE:** You will also need to accept the passkey on the Bluetooth® 2.1 device as well.

A message appears when pairing is complete.

12. Select **OK**.

The paired device is then displayed under the paired devices list.

**NOTE:** Names containing extended ASCII characters may not display correctly.



13. Select **FRIENDLY NAME**. This is the Bluetooth® name assigned to the radio. The friendly name used by RPM will overwrite this setting.



14. Enter the name from the keypad displayed on the touch screen and select **DONE** when finished.



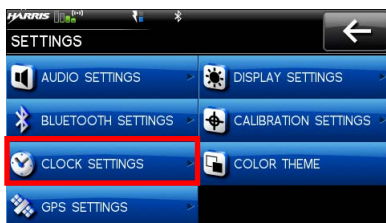
15. Select **BE FOUND** to turn on discovery mode so other Bluetooth devices can discover the XG-100M.



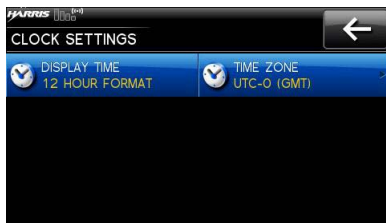
16. Discovery mode will be enabled for one minute.

### 7.13.5 Clock Settings

1. Enter Settings Menu.

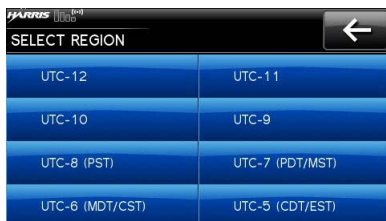


2. Select **CLOCK SETTINGS**.



3. Select the setting to change.

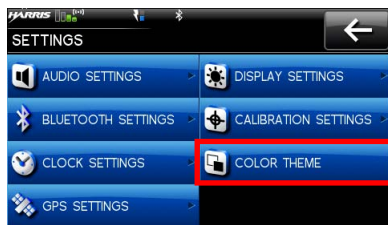
- **DISPLAY TIME** - Set 12 or 24 hour time display format.



- **TIME ZONE** - Set time zone relative to Universal Time Coordinated (UTC).

### 7.13.6 Color Theme

1. Enter Settings Menu (see Section 7.13).



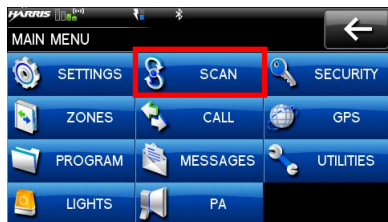
2. Select **COLOR THEME**.

## 7.14 SET UP SCAN

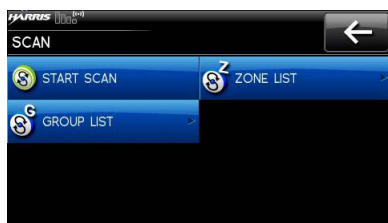
These procedures are used to set up the scan list, home channels, and priority channels. Refer to 6.13.




1. At main display, select **MAIN MENU**.



2. Select **SCAN**.



3. Use  to highlight and select **ZONE LISTS** or **GROUP LISTS** and refer to the following sections.



**NOTE**

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

### 7.14.1 Home, Priority 1, and Priority 2 Channels

#### 7.14.1.1 Home Channel

This 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 in RPM, the radio always transmits on the home channel in scan.

### 7.14.1.2 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. Also, the priority channel will be 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 will drop C3 and switch to P1.

### 7.14.1.3 Priority 2 Channel

This channel will also be scanned more often than others. An example scan sequence would be P1, C2, P1, C3, P1, C4, P2, C5, P1, C6, P1, C7, P1, C8, P2, C9 etc. Also, this channel will be 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 will drop C3 and switch to P2. Additionally, activity on P1 can also preempt P2, but P2 cannot preempt P1.

### 7.14.2 Zone Scan

Zone scan is conventional only and consists of all channels in a zone that are selected as scan channels when generating a mission plan with RPM. Depending on scan options selected in RPM, zone scan lists may be modified to include or exclude channels.

Analog channels using different receive frequencies may be added in any combination of squelch type up to the limits of the size of the scan list.

### 7.14.3 Group Scan

Group scan is trunked only and allows the radio to monitor many groups simultaneously, permitting the user to both monitor and receive calls from these groups. Depending on scan options selected in RPM, group scan lists may be modified to include or exclude groups.

### 7.14.4 Vote Scan

If vote scan is enabled via RPM, 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. There is an icon in the upper status bar indicating that the radio is vote scanning.



NOTE

If Talkaround is enabled, Vote Scan is turned off.

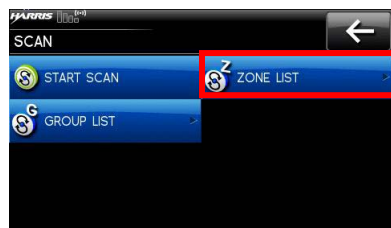


## 7.14.5 Set or Remove Priority 1 and Priority 2 Channels

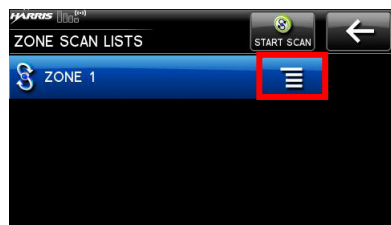
Priority channels are scanned more often than non-priority channels. Note that P1 and P2 can only be set if configured as “Keypad” and the scan list is not set to “Fixed” in RPM.


Zone scan configuration screens are shown below. Group scan configuration is similar.

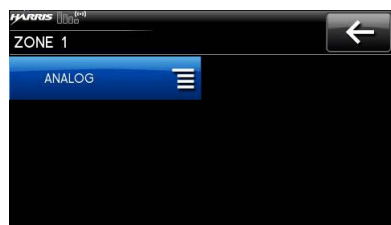
1. Enter Set up Scan (see Section 7.14) and select group lists or zone list.



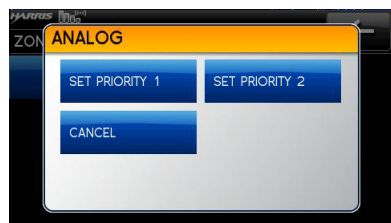
2. Select the scan list.



3. Select .



4. Select  next to the channel.



5. Select **SET PRIORITY 1**, **SET PRIORITY 2**, or **CANCEL**.

### 7.14.6 Wide Area System Scan (P25 Trunked Only)

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.

1. At main display, select **MAIN MENU**.

2. select **SCAN**.

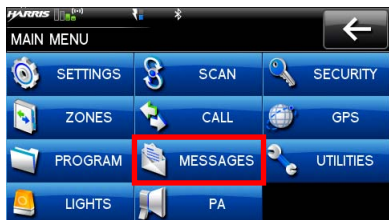
3. Select **SITE ROAMING**.

## 7.15 MESSAGE MENU

If the alert icon  is displayed on the main display, you can view details about the alert from the MESSAGES MENU:



1. At main display, select **MAIN MENU**.



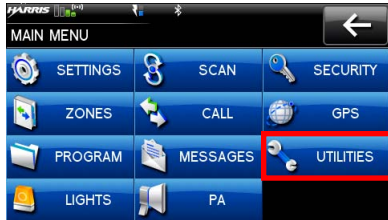
2. Select **MESSAGES**. Observe messages in display.

**NOTE:** The alert icon goes away when you go to the message display (unless a new fault occurs).

## 7.16 UTILITIES MENU



1. At main display, select **MAIN MENU**.

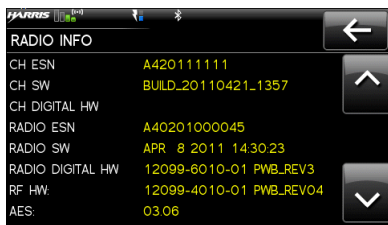
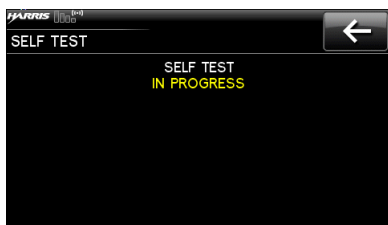


2. Select **UTILITIES**.



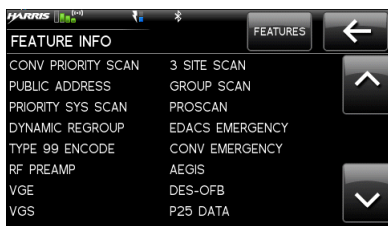
3. Select **SELF TEST** to run a series of internal radio tests.

Status screen appears while testing followed by a screen with passed or failed results.



4. Select **RADIO INFO** to view radio information such as software and firmware revisions.

5. Observe radio information display.



6. Select **FEATURE INFO** to view the features enabled on the radio.

7. Select **SERIAL PORT MODE** to specify the serial port.



8. Select **ICON GLOSSARY** to view descriptions of the icons displayed by the radio.

## 8. PROGRAMMING

This section provides information on front panel programming. Programming can also be accomplished by creating a plan using a computer with RPM version R6A or later installed.

### 8.1 PROGRAMMING VIA RPM

Radio Personality Manager (RPM) or is used for the bulk of programming the XG-100M. With RPM, you can fully program the XG-100M using cable 12082-0410-A1.

### 8.2 EDIT CHANNEL (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 mission plan clears any channel edits.

Available parameters vary depending on whether the channel is a digital or analog channel. A digital channel allows you to receive digital or analog signals. When transmitting on a digital channel, you can transmit either a digital or analog signal, depending on how the channel is programmed.



1. At main display, select the channel to display the available channels.

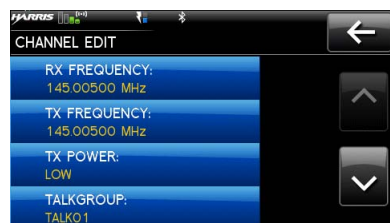


2. Select a channel to view the channel info.



3. Select **EDIT CHAN.**
4. Enter password.

**NOTE:** Password remains active until power cycle.



5. For digital channel, modify remaining channel settings:
  - **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 for to unmute the speaker on the receiving radio when CDCSS squelch is used in conventional mode.
  - **RX TONE** - Tone radio looks for to unmute the speaker on the receiving radio when CDCSS squelch is used in conventional mode.

6. For analog channel, modify remaining channel settings:

- **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.
- **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 CDCSS 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.

**Table 8-1: Valid Frequencies**

FREQUENCY RANGE	FREQUENCY RESOLUTION
136 - 174 MHz	2500, 5000, or 6250 Hz
380 - 520 MHz	2500, 5000, or 6250 Hz
764 - 870 MHz	6250 kHz

## 9. REFERENCE

### 9.1 MARINE FREQUENCIES

Refer to Table 9-1: Marine Frequencies 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 9-1: Marine Frequencies**

CHANNEL			FREQUENCY		CHANNEL USAGE
US	INTL	CA	SHIP (MHZ)	SHORE (MHZ)	
	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.

**Table 9-1: Marine Frequencies**

CHANNEL			FREQUENCY		CHANNEL USAGE
US	INTL	CA	SHIP (MHZ)	SHORE (MHZ)	
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.

Table 9-1: Marine Frequencies

CHANNEL			FREQUENCY		CHANNEL USAGE
US	INTL	CA	SHIP (MHZ)	SHORE (MHZ)	
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.



**Table 9-1: Marine Frequencies**

CHANNEL			FREQUENCY		CHANNEL USAGE
US	INTL	CA	SHIP (MHZ)	SHORE (MHZ)	
	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
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.

Table 9-1: Marine Frequencies

CHANNEL			FREQUENCY		CHANNEL USAGE
US	INTL	CA	SHIP (MHZ)	SHORE (MHZ)	
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
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.

Table 9-1: Marine Frequencies

CHANNEL			FREQUENCY		CHANNEL USAGE
US	INTL	CA	SHIP (MHZ)	SHORE (MHZ)	
	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	
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	

## 9.2 ACCESSORIES

Only use Harris approved accessories. Contact Harris for requirements not contained in this list:

**Standard Remote Speaker Microphone (RSM)** - Rugged, submersible, 6 ft. (stretch length) coil cord, swivel clip, 3.5 mm earpiece interface, high/low volume control.

**Belt Clip** - Supports carrying of the XG-100M on a belt.

**1-Bay Charger** - Multi-chemistry battery charger, supports radio operation while charging.

**6-Bay Charger** - Multi-chemistry, multi-bay battery charge, 12 VDC.

**Leather Carry Cases** - Durable radio carry-cases selectable with swivel D-clip belt-loops or T-straps. Various styles available.

**Nylon Carry Cases** - Nylon radio carry cases available in various styles and configurations.

**USB Cable** - USB computer interface cable for use with RPM and for Key Loading using Harris Key Loader for the XG-100M.

**KVL Cable** - Adapter cable supports loading encryption keys with the Motorola KVL 3000 Plus.

**AA Clamshell** - Battery pack for use with AA-sized batteries.

**Lithium Battery** - Rechargeable Lithium-ION (Li-ION) battery pack (12082-0308-01).

**Antenna** - Full-Spectrum, 136-870 MHz frequency coverage.

## 10. 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 3000 Plus)

**-L-**

<b>LAT/LONG DMS</b>	Latitude/Longitude Degrees Minutes Seconds
<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>RPM</b>	Radio Personality Manager
<b>RSI</b>	Radio Set Identifier
<b>RSM</b>	Remote Speaker Microphone
<b>RX</b>	Receive

**-S-**

<b>SMA</b>	Subminiature version A
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**-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>VTS</b>	Vessel Traffic Service

**-W-**

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

## 11. BASIC TROUBLESHOOTING

### 11.1 ERROR MESSAGES

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

SCREEN	TEXT	REASON	RESOLUTION
Top Level Display	DELETE NOT ALLOWED	Nuisance delete not allowed on current channel.	Requires new personality configuration (either Limited/Programmable scan lists or Keypad P1/P2 channels).
	EMERGENCY ACTIVE SCAN DISABLED	Cannot scan when transmitting an emergency.	Exit emergency to start scanning.
	OTAR REKEY FAILED	Self-explanatory	Attempt OTAR operation again.
	OTAR ZEROIZE FAILED		Attempt OTAR operation again.
	NO OTAR KEK LOADED		Load valid KEK before attempting OTAR.
	INVALID OTAR KEYSETS	OTAR configuration failed because keysets were improperly configured.	Zeroize keys and reload KEK(s) before attempting OTAR.
	INVALID KEYSTORE ZEROIZE NEEDED	Corrupt key database.	Zeroize database.
	SYNTH OUT OF LOCK	DSP synthesizer out of lock.	Channel will reselect automatically to attempt to obtain synth lock.
	SYNTH OUT OF LOCK POWER CYCLE RADIO	DSP synthesizer out of lock - unable to restore by reselecting channel.	Unable to obtain synthesizer lock. Power cycle radio and contact Harris if problem persists.
Bluetooth Pairing Screen	PAIRING FAILED	Bluetooth pairing failed.	Ensure device is discoverable and attempt to re-pair the device.
	PIN CODE MUST HAVE AT LEAST 4 DIGITS	The PIN entered is too short.	Enter at least four digits.
Channel Edit Screen	EDIT FAILED	Unable to modify P25 Channel	Power cycle and try again--contact Harris if problem persists
	INVALID RX FREQUENCY	Entered Rx frequency is invalid.	Ensure frequency follows band spacing rules.
	INVALID TX FREQUENCY	Entered Tx frequency is invalid.	Ensure frequency follows band spacing rules.
	INVALID CODE	Code entered is not a valid CDCSS code.	Ensure code is valid.
Mission Plan List Screen	EMERGENCY ACTIVE FILL DISABLED	Cannot activate mission plans when transmitting an emergency.	Exit emergency to activate a new mission plan.



SCREEN	TEXT	REASON	RESOLUTION
Install Operations	INSTALL NOT ALLOWED	Error during install process.	Transfer the file again and reattempt install. Contact Harris if problem persists.
	EXTRACTION FAILED	Extraction of compressed file failed.	Transfer file again and reattempt install. Contact Harris if problem persists
	REMOVE FAILED	Removal of existing software failed	Attempt to install again and contact Harris if problem persists.
Mission Plan In Progress Screen	PLAN FAILED	Mission plan activation failed.	Use RPM to ensure plan validity. Contact Harris if failures persist.
Security Menu	ZEROIZE FAILED	DSP could not zeroize	DSP problem — power cycle the radio and contact Harris if problem persists.
	NO KEYS TO ZEROIZE	Key database empty.	Nothing to zeroize.
Utilities Menu	INCORRECT PASSWORD	Maintenance password invalid.	Enter a valid maintenance password.
Channel Info Screen	INCORRECT PASSWORD	Channel edit password invalid.	Enter valid channel edit password.

## 11.2 OTAR ERRORS/INFORMATION

### WORKAROUNDS:

1. Zeroize.
2. Load proper KEK from the Motorola KVL or Harris UKEK Loader.

### IF RADIO INDICATES:

1. INVALID KEYSTORE ZEROIZE NEEDED:

This occurs if the radio's keys were loaded by the Harris Key Loader followed by an attempt to load UKEKs with the UKEK 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.

## 12. 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 at:

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

## 13. WARRANTY

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

Registration can be made on-line at [www.pspc.harris.com/CustomerService](http://www.pspc.harris.com/CustomerService) or by contacting Harris Warranty Administration at the following:

**U.S. & Canada:**

Phone Number: 1-800-368-3277, Option 4 (toll free)  
 Fax Number: 1-434-455-6821  
 E-mail: <mailto:WarrantyClaims@Harris.com>

**International:**

Phone Number: 1-434-455-6403  
 Fax Number: 1-434-455-6676  
 E-mail: <mailto:WarrantyClaims@Harris.com>

- A. Harris Corporation, a Delaware Corporation, through its RF Communications Division (hereinafter "Seller") warrants to the original purchaser for use (hereinafter "Buyer") that Equipment manufactured by or for the Seller shall be free from defects in material and workmanship, and shall conform to its published specifications. With respect to all non-Seller Equipment, Seller gives no warranty, and only the warranty, if any, given by the manufacturer shall apply. Rechargeable batteries are excluded from this warranty but are warranted under a separate Rechargeable Battery Warranty (ECR-7048).
- B. Seller's obligations set forth in Paragraph C below shall apply only to failures to meet the above warranties occurring within the following periods of time from date of sale to the Buyer and are conditioned on Buyer's giving written notice to Seller within thirty (30) days of such occurrence:
1. for fuses and non-rechargeable batteries, operable on arrival only.
  1. for parts and accessories (except as noted in B.1), ninety (90) days.
  2. for P7300, P7200, P7100<sup>IP</sup>, P5400, P5300, P5200, P5100, P3300, M7300, M7200 (including V-TAC), M7100<sup>IP</sup>, M5300 and M3300 radios, two (2) years, effective 10/01/2007.
  3. for Unity<sup>®</sup> XG-100M, three (3) years.
  5. for all other equipment of Seller's manufacture, one (1) year.
- C. If any Equipment fails to meet the foregoing warranties, Seller shall correct the failure at its option (i) by repairing any defective or damaged part or parts thereof, (ii) by making available at Seller's factory any necessary repaired or replacement parts, or (iii) by replacing the failed Equipment with equivalent new or refurbished Equipment. Any repaired or replacement part furnished hereunder shall be warranted for the remainder of the warranty period of the Equipment in which it is installed. Where such failure cannot be corrected by Seller's reasonable efforts, the parties will negotiate an equitable adjustment in price. Labor to perform warranty service will be provided at no charge during the warranty period only for the Equipment covered under Paragraph B.3 and B.4. To be eligible for no-charge labor, service must be performed at Seller's factory, by an Authorized Service Center (ASC) or other Servicer approved for these purposes either at its place of business during normal business hours, for mobile or personal equipment, or at the Buyer's location, for fixed location equipment. Service on fixed location equipment more than thirty (30) miles from the Service Center or other approved Servicer's place of business will include a charge for transportation.
- D. Seller's obligations under Paragraph C shall not apply to any Equipment, or part thereof, which (i) has been modified or otherwise altered other than pursuant to Seller's written instructions or written approval or, (ii) is normally consumed in operation or, (iii) has a normal life inherently shorter than the warranty periods specified in Paragraph B, or (iv) is not properly stored, installed, used, maintained or repaired, or, (v) has been subjected to any other kind of misuse or detrimental exposure, or has been involved in an accident.
- E. The preceding paragraphs set forth the exclusive remedies for claims based upon defects in or nonconformity of the Equipment, whether the claim is in contract, warranty, tort (including negligence), strict liability or otherwise, and however instituted. Upon the expiration of the warranty period, all such liability shall terminate. The foregoing warranties are exclusive and in lieu of all other warranties, whether oral, written, expressed, implied or statutory. NO IMPLIED OR STATUTORY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES.

This warranty applies only within the United States.

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