

Operator's Manual

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PRELIMINARY

XL Series Mobile Radios



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ACKNOWLEDGEMENT

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1. REGULATORY AND SAFETY INFORMATION

1.1 SAFETY SYMBOL CONVENTIONS

The following conventions are used in this manual to alert the user to general safety precautions that must be observed during all phases of operation, installation, 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 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 damage to the equipment or severely degrade equipment performance.



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

1.2 RF ENERGY EXPOSURE AWARENESS AND CONTROL INFORMATION FOR FCC OCCUPATIONAL USE REQUIREMENTS

Before using the two-way mobile radio, review the following important RF energy awareness and control information and operational instructions. Comply with this information and instructions to ensure compliance with 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 remain below RF exposure limits. This radio is **NOT** authorized for general population, consumer, or any other use.



Changes or modifications not expressly approved by Harris 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. Refer to the following websites for more information on what RF energy exposure is and how to control 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>

1.2.1 Federal Communications Commission Regulations

Before it was marketed in the United States, the XL Series mobile radio was tested to ensure compliance with FCC RF energy exposure limits for two-way mobile radios. 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 using a label directing users to specific user awareness information. The radio has an RF exposure product label. Also, this manual includes information and operating instructions required to control RF exposure and to satisfy compliance requirements.

1.3 COMPLIANCE WITH RF EXPOSURE STANDARDS

The XL Series mobile radio is designed and tested to comply with a number of national and international standards and guidelines 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-cycle times of up to 50% (50% transmit, 50% receive), and it is authorized by the FCC for occupational use. In terms of measuring RF energy for compliance with the FCC exposure guidelines, the radio's antenna radiates measurable RF energy only while it is transmitting (talking), not when it is receiving (listening), or in a standby mode.



Table 1-1 lists the recommended minimum safe lateral distances for a controlled environment and for unaware bystanders in an uncontrolled environment, from transmitting 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 safe lateral distance away from the transmitting antenna.

The XL Series mobile 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 5, 2015: Spectrum Management and Telecommunications Radio Standards Specification. Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).

Based on the highest radiated RF power and the highest antenna gain in antennas to be used with the XL Series mobile radio, the distances listed are considered as safe distances for controlled and uncontrolled environments with the XL Series mobile radio transmitting at a maximum 50% duty cycle.

1.3.1 Mobile Antennas

The antenna(s) for the radio must be installed in accordance with the antenna installation procedures presented in the radio's *Installation Manual*. Installation guidelines presented in the *Installation Manual* are limited to metal-body motor vehicles or vehicles with appropriate ground planes.

Use only approved/supplied antenna(s) or an approved replacement antenna. Unauthorized antennas, modifications, or attachments can cause the FCC RF exposure limits to be exceeded. Refer to Section 3.3 for the list of approved antennas.

Table 1-1: Recommended Minimum Safe Lateral Distance from a Transmitting Antenna Connected to an XL Mobile Radio

TRANSMIT FREQUENCY	RECOMMENDED MINIMUM LATERAL HUMAN BODY DISTANCE FROM TRANSMITTING ANTENNA			
	U.S.		CANADA	
	CONTROLLED ENVIRONMENT	UNCONTROLLED ENVIRONMENT	CONTROLLED ENVIRONMENT	UNCONTROLLED ENVIRONMENT
763 – 806 MHz	17 in (43 cm)	37 in (94 cm)	20 in (50 cm)	54 in (137 cm)
806 – 944 MHz	17 in (44 cm)	39 in (99 cm)	20 in (50 cm)	57 in (145 cm)

1.3.2 Approved Accessories

The radio has been tested and meets FCC RF guidelines when used with accessories supplied or designated for use with it. 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 radio's *Installation Manual* and/or the *Products and Services Catalog*.

1.3.3 Contact Information

For additional information on RF exposure and other information, contact Harris using one of the contact links listed in Section 10.

1.4 REGULATORY APPROVALS

1.4.1 Applicable Type Acceptance/Certification Numbers

FCC Type Acceptance:

XL-185M:

OWDTR-0160-E

Applicable FCC Rules:

Part 2, Part 15B, Part 15.247, Part 15.407, Part 24, Part 90 and Part 101

Industry Canada Certification:

XL-185M:

3636B-0160

Applicable Industry Canada Rules:

RSS-247, RSS-119, ICES-003 Issue 6

1.4.2 FCC 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.

1.4.3 Industry Canada

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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.

1.5 OCCUPATIONAL SAFETY GUIDELINES AND SAFETY TRAINING INFORMATION

To ensure bodily exposure to RF electromagnetic energy is within the FCC allowable limits for occupational use. Always adhere to the following basic guidelines:

- The push-to-talk button should only be depressed when intending to send a voice message.
- The radio should only be used for necessary work-related communications.
- The radio should only be used by authorized and trained personnel. It should never be operated by children.
- Do not attempt any unauthorized modification to the radio. Changes or modifications to the radio may cause harmful interference and/or cause it to exceed FCC RF exposure limits. Only qualified personnel should service the radio.
- Always use only authorized accessories (antennas, control heads, speakers/mics, etc.). Use of unauthorized accessories can cause the FCC RF exposure compliance requirements to be exceeded.

The information listed above provides the user with information needed to make him or her aware of a RF exposure, and what to do to assure that this radio operates within the FCC exposure limits of this radio.

1.6 COMMON HAZARDS



WARNING

The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmissions. Possible hazards include but are not limited to the following:

- **Explosive Atmospheres** - Just as it is dangerous to fuel a vehicle while its engine is running, be sure to turn the radio **OFF** while fueling the vehicle. If the radio is mounted in the trunk of the vehicle, **DO NOT** carry containers of fuel in the trunk.
Areas with potentially explosive atmosphere are often, but not always, clearly marked. Turn the radio **OFF** 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 Electronic Systems** - Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical of the types of electronic devices that can malfunction due to the lack of protection from radio frequency (RF) energy present when transmitting. If the vehicle contains such equipment, consult the dealer for the make of vehicle and enlist his aid in determining if such electronic circuits perform normally 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 (305 meters) of blasting operations. Always obey the “**Turn Off Two-Way Radios**” (or equivalent) signs posted where electric blasting caps are being used. (OSHA Standard: 1926.900).
- **Radio Frequency Energy** - To prevent burns or related physical injury from radio frequency energy, do not operate the transmitter when anyone outside of the vehicle is within the minimum safe distance from the antenna as specified in Table 1-1. Refer to Section 1.2 for additional information.
- **Vehicles Powered by Liquefied Petroleum (LP) Gas** - Radio installation in vehicles powered by liquefied petroleum gas, where the LP gas container is 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**. This requires:
 - The space containing the radio equipment must be isolated by a seal from the space containing the LP gas container and its fittings.
 - Outside filling connections must be used for the LP gas container.
 - The LP gas container space shall be vented to the outside of the vehicle.
- **Vehicles Equipped with Airbags** - For driver and passenger safety, avoid mounting the radio's control head (or any other component) above or near airbag deployment areas. In addition to driver-side and passenger-side front-impact airbags, some vehicles may also be equipped with side-impact airbags. For occupant safety, verify the location of all airbags within the vehicle before installing the radio equipment.

1.7 SAFE DRIVING RECOMMENDATIONS

The American Automobile Association (AAA) advocates the following key safe driving recommendations:

- 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.

1.8 OPERATING RULES AND REGULATIONS

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

In the United States, the XL mobile radio must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). Operators of two-way radio equipment must be thoroughly familiar with the rules that apply to the 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 a two-way radio, remember these rules:

- It is a violation of FCC rules to interrupt any distress or emergency message. The radio operates in much the same way as a telephone “party line.” Therefore, always listen to make sure 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, do not transmit unless assistance can be offered.
- 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 keeping conversations brief and confined to business. Use coded messages whenever possible to save time.
- Using the radio to send personal messages (except in an emergency) is a violation of FCC rules. Send only essential messages.
- It is against Federal law to repeat or otherwise make known anything overheard on the radio. Conversations between others sharing the channel must be regarded as confidential.
- The FCC requires self-identification at certain specific times by means of call letters. Refer to the rules that apply to the 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.



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.

1.9 OPERATING TIPS

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, communication improvement may sometimes be obtained by moving a few yards in another direction, or moving to a higher elevation.

2. RENSEIGNEMENTS SUR LA RÉGLEMENTATION ET SÉCURITÉ

2.1 CONVENTIONS SUR LES SYMBOLES DE SÉCURITÉ

Les conventions suivantes sont utilisées dans le présent manuel pour avertir l'utilisateur des précautions générales de sécurité qui doivent être observées pendant toutes les phases d'opération, d'entretien et de réparation de ce produit. Le non-respect de ces précautions ou d'avertissements précisés ailleurs enfreint les normes de sécurité de la conception, de la fabrication et de l'utilisation prévue du produit. Harris n'assume aucune responsabilité pour le non-respect de ces normes par le client.



Le symbole **MISE EN GARDE** attire l'attention sur une procédure ou une pratique qui, si elle n'est pas correctement effectuée ou observée, pourrait entraîner une blessure personnelle. Ne pas poursuivre au-delà d'un symbole de MISE EN GARDE avant que les conditions identifiées soient complètement comprises ou satisfaites.



Le symbole **AVERTISSEMENT** attire l'attention sur une procédure ou une pratique opérationnelle qui, si elle n'est pas correctement effectuée ou observée, pourrait entraîner un bris d'équipement ou une importante baisse de rendement de l'équipement.



Le symbole **REMARQUE** attire l'attention sur des renseignements supplémentaires qui peuvent améliorer le rendement du système ou clarifier un processus ou une procédure.

2.2 RENSEIGNEMENTS SUR UNE EXPOSITION À L'ÉNERGIE DES RF

2.2.1 Renseignements Sur Le Contrôle Et La Sensibilisation À L'énergie Des RF Pour Les Exigences D'une Utilisation Professionnelle De La FCC

Avant d'utiliser les radios mobiles bidirectionnelles, passez en revue les renseignements et les instructions opérationnelles importants suivants sur le contrôle et la sensibilisation à l'énergie des RF. Se conformer à ces renseignements et instructions pour assurer la conformité aux directives d'exposition aux RF.



Cette radio est destinée à être utilisée dans des conditions professionnelles/contrôlées, où les utilisateurs ont une pleine connaissance de leur exposition et peuvent exercer un contrôle sur leur exposition pour rester sous les limites d'exposition aux RF. Cette radio N'est PAS autorisée pour la population générale, les consommateurs ou toute autre utilisation.



Des changements ou modifications non expressément approuvés par Harris pourraient annuler le droit d'utilisation de l'équipement pour l'utilisateur.

Cette radio bidirectionnelle utilise une énergie électromagnétique dans le spectre des radiofréquences (RF) pour permettre une communication à distance entre deux utilisateurs ou plus. Elle utilise l'énergie des RF ou les ondes radio pour envoyer et recevoir des appels. L'énergie des RF est une forme d'énergie électromagnétique. D'autres formes comprennent, entre autres, l'énergie électrique, la lumière du soleil et les rayons X. Toutefois, l'énergie des RF ne doit pas être confondue avec ces autres formes d'énergie électromagnétique qui, lorsque mal utilisées, peuvent causer des dommages biologiques. Par exemple, des niveaux très élevés de rayons X peuvent endommager les tissus et le matériel génétique.

Des experts en science, en ingénierie, en médecine, en santé et de l'industrie travaillent avec des organismes pour établir des normes pour l'exposition à l'énergie des RF. Ces normes procurent des niveaux recommandés d'exposition aux RF autant aux travailleurs qu'au grand public. Ces niveaux d'exposition aux RF recommandés comprennent d'importantes marges de protection. Toutes les radios bidirectionnelles commercialisées en Amérique du Nord sont conçues, fabriquées et testées pour s'assurer qu'elles satisfont les niveaux d'exposition aux RF établis par le gouvernement. Les fabricants recommandent également des consignes d'utilisation particulières aux utilisateurs de radios bidirectionnelles. Ces instructions sont importantes, car elles informent les utilisateurs sur l'exposition à l'énergie des RF et donnent des procédures simples sur la manière de contrôler cette exposition. Consultez les sites Web suivants (en anglais) pour de plus amples renseignements sur ce qu'est l'exposition à l'énergie des RF et comment contrôler l'exposition pour assurer la conformité aux limites d'exposition établies :

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

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

2.2.2 Règlements de la Federal Communications Commission (« Commission fédérale des communications » aux États-Unis)

Avant d'être mise sur le marché aux États-Unis, la radio mobile bidirectionnelle XL a été testée pour s'assurer de sa conformité aux limites d'exposition à l'énergie des RF de la FCC pour les radios mobiles bidirectionnelles. Lorsque les radios bidirectionnelles sont utilisées à la suite d'une embauche, la FCC demande aux utilisateurs de bien connaître et de pouvoir contrôler leur exposition pour satisfaire les exigences professionnelles. La sensibilisation à l'exposition peut être facilitée par l'utilisation d'une étiquette qui dirige les utilisateurs vers des renseignements particuliers sur la sensibilisation de l'utilisateur. La radio possède une étiquette de produit sur l'exposition aux RF. De plus, le *Manuel sur la sécurité du produit* et le présent *Manuel de l'opérateur* comprennent des renseignements et les consignes d'utilisation nécessaires pour contrôler l'exposition aux RF et pour satisfaire les exigences de conformité.

d'utilisation nécessaires pour contrôler l'exposition aux RF et pour satisfaire les exigences de conformité.

2.3 CONFORMITÉ AUX NORMES D'EXPOSITION AUX RF

La radio mobile bidirectionnelle XL est conçue et testée pour être conforme à un certain nombre de normes et directives nationales et internationales quant à l'exposition humaine à l'énergie électromagnétique des RF. Cette radio est conforme aux limites d'exposition de l'IEEE et de la Commission internationale de protection contre les rayonnements non ionisants pour un environnement professionnel/contrôlé d'exposition aux RF à des périodes de cycle de service allant jusqu'à 50 % (50 % de transmission, 50 % de réception) et elle est autorisée par la FCC pour une utilisation professionnelle. Sur le plan de la mesure de l'énergie des RF pour la conformité aux directives d'exposition de la FCC, l'antenne de la radio irradie une énergie des RF mesurable seulement lorsqu'elle transmet (parler), et non lorsqu'elle reçoit (écouter) ou en mode d'attente.



Tableau 2-1 indiquent les distances latérales sécuritaires minimales recommandées pour un environnement contrôlé et pour les spectateurs ignorants dans un environnement non contrôlé, d'antennes de transmission (c.-à-d., des monopôles sur un plan de sol, ou des dipôles) à une puissance de radio évaluée pour les radios mobiles installées dans un véhicule. Ils ne transmettent que lorsque les spectateurs ignorants sont au moins à la distance latérale sécuritaire minimale recommandée non contrôlée de l'antenne de transmission.

La radio mobile bidirectionnelle XL est conforme aux normes et directives d'exposition à l'énergie des RF suivantes :

- Federal Communications Commission (FCC) américaine, le Code of Federal Regulations; 47 CFR § 2 sous-partie 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, numéro 5, 2015: Spectrum Management and Telecommunications Radio Standards Specification. Radiofrequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).

Basées sur la puissance des RF irradiées la plus élevée et le gain d'antenne le plus élevé dans les antennes à utiliser avec le radio mobile bidirectionnelle XL, les distances indiquées dans les Tableau 2-1 sont considérées comme des distances sécuritaires pour des environnements contrôlés et non contrôlés avec la radio mobile XL qui transmet à un cycle de service maximal de 50 % :

Tableau 2-1: Distance latérale sécuritaire minimale recommandée d'une antenne de transmission branchée sur une radio mobile XL

FRÉQUENCE DE TRANSMISSION	DISTANCE MINIMALE RECOMMANDÉE DE L'ANTENNE DE TRANSMISSION POUR LE CORPS HUMAIN			
	U.S.		CANADA	
	ENVIRONNEMENT CONTRÔLÉ	ENVIRONNEMENT NON CONTRÔLÉ	ENVIRONNEMENT CONTRÔLÉ	ENVIRONNEMENT NON CONTRÔLÉ
763 – 806 MHz	17 po (43 cm)	37 po (94 cm)	20 po (50 cm)	54 po (137 cm)
806 – 944 MHz	17 po (44 cm)	39 po (99 cm)	20 po (50 cm)	57 po (145 cm)

2.3.1 Antennes Mobiles

Les antennes pour la radio doivent être installées conformément aux procédures présentées dans le *Manuel sur la sécurité du produit* et dans le *Manuel d'installation*. L'installation est limitée à un ou des véhicules motorisés en métal avec des plans au sol appropriés.

Utilisez uniquement les antennes approuvées/fournies ou une antenne de remplacement approuvée (voir la Section 3.3). Des antennes, des modifications ou des accessoires non autorisés peuvent causer un dépassement des limites d'exposition aux RF de la FCC.

2.3.2 Accessoires Approuvés

La radio a été testée et satisfait les directives de RF de la FCC lorsqu'elle est utilisée avec les accessoires fournis ou conçus pour être utilisés avec elle. L'utilisation d'autres accessoires peut ne pas garantir la conformité aux directives d'exposition de la FCC et peut enfreindre la réglementation de la FCC. Pour une liste d'accessoires approuvés, consultez le *Manuel d'installation* ou le *Catalogue de produits et services* de Harris.



Utilisez toujours des accessoires autorisés Harris (antennes, haut-parleurs/micros, etc.). L'utilisation d'accessoires non autorisés peut entraîner un dépassement des exigences de conformité pour une exposition aux RF professionnelle ou contrôlée de la FCC.

2.3.3 Coordonnées

Pour de plus amples renseignements sur l'exposition aux RF ou d'autres renseignements, contactez Harris en utilisant l'un des liens apparaissant à la Section 10.

2.4 INTERFÉRENCE DES RADIOFRÉQUENCES

2.4.1 Partie 15 de la FCC

Cet appareil est conforme à la Partie 15 de la réglementation de la FCC. Le fonctionnement est soumis aux deux conditions suivantes :

1. Cet appareil ne doit pas causer une interférence nuisible; et
2. Cet appareil doit accepter toute interférence reçue, y compris une interférence qui peut causer un fonctionnement non souhaité.

2.4.2 Industrie Canada

Cet appareil est conforme aux normes RSS exemptées de licence d'Industrie Canada. Le fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, y compris une interférence qui peut causer un fonctionnement non souhaité de l'appareil.

2.5 RENSEIGNEMENTS SUR LA FORMATION SUR LA SANTÉ ET LA SÉCURITÉ AU TRAVAIL

S'assurer que l'exposition physique à l'énergie électromagnétique des RF se situe dans les limites acceptables de la FCC pour l'utilisation professionnelle. Toujours se conformer aux directives de base suivantes :

- Le bouton de microphone doit être abaissé seulement lorsque l'on souhaite envoyer un message vocal.
- La radio doit être utilisée seulement pour les communications nécessaires liées au travail.
- La radio doit être utilisée seulement par du personnel autorisé et formé. Elle ne doit jamais être utilisée par des enfants.
- Ne tentez pas d'apporter une modification non autorisée à la radio. Des changements ou des modifications à la radio peuvent causer une interférence nocive ou entraîner un dépassement des limites d'exposition aux RF de la FCC. Seul le personnel qualifié doit utiliser la radio.
- Utilisez toujours seulement des accessoires autorisés (antennes, haut-parleurs/micros, etc.). L'utilisation d'accessoires non autorisés peut entraîner un dépassement des exigences de conformité pour une exposition aux RF de la FCC.

Les renseignements donnés ci-dessus donnent à l'utilisateur les renseignements nécessaires pour le sensibiliser à l'exposition aux RF et sur ce qu'il faut faire pour s'assurer que cette radio fonctionne dans les limites d'exposition de la FCC de cette radio.

3. INTRODUCTION

3.1 DESCRIPTION

The XL Series mobile radio provides the advanced connectivity that first responders require while addressing evolving voice and data communications. It meets MIL-STD-810G for durability. XL Mobile radios support P25 Trunking, P25 Conventional, and analog conventional.

The XL Mobile is a P25 converged, *multiband* Land Mobile Radio with an option to include LTE capability. Designed for anyone who needs to communicate with multiple agencies or across multiple bands, the XL Mobile delivers mission-critical connectivity.

For options and accessories, refer to Section 3.3. Additional accessories may have been added since publication of this manual; contact Harris for more information.

The XL Mobile installation includes a control head and the Vehicle Communications Hub (VCH), which are described in the following sections.

3.1.1 Vehicle Communications Hub (VCH)

The XL Vehicle Communications Hub (VCH) is the main LMR radio unit in a vehicular (mobile) radio system. A major feature of the VCH design is the use of IP networks for tethering multiple radio control heads. With respect to the audio systems, this feature allows the VCH to support approximately eight IP devices as audio sources and destinations.



Figure 3-1: Vehicle Communications Hub (VCH)

3.1.2 XL Control Head

The XL Mobile supports the addition of an XL control head to the VCH in a front mount or remote mount configuration. In the front mount configuration, the VCH and control head are physically mounted together, while in the remote mount configuration, the control head is located in a separate location.



Figure 3-2: XL Control Head

The XL Control Head is a networked device that uses a wired Ethernet connection to provide remote control of the VCH. It includes a color LCD graphical user interface and physical knobs and buttons to allow a user to view status and control other devices. The control head also provides multiple audio interfaces to capture and play real-time audio.

The XL Control Head's mission-critical design provides a tactile interface optimized for tactile operation. Controls and display are laid out to give instant access to primary use cases.

Standard Control Head Features include:

- Wi-Fi (802.11B, G, N)
- Bluetooth 4.0
- Built-in Speaker
- Hi-visibility Color Display

3.2 CLEANING

Keep the exterior of the radio equipment clean. This includes the radio, control head, microphone, and speaker. Periodically clean them using either the Light-duty cleaning procedure or in extreme cases the Heavy-duty cleaning procedure as described in the maintenance manual.

3.3 OPTIONS AND ACCESSORIES

Only use Harris approved accessories. Refer to Harris' Product and Services catalog for the complete list of options and accessories available.



CAUTION

Always use the correct options and accessories for the radio.

PART NUMBER	DESCRIPTION
XM-AN7G	USB Mobile Mic
XMAN6H	Remote Speaker
AN-125001-002	Analog Deskmic
AN-125001-004	CH mounting kit
AN-125001-006	VCH mounting kit
12099-0300-01	Antenna, Flex, Heavy-Duty, 136-870 MHz
12099-0310-01	Antenna, Element, Multiband, 136-870 MHz, 0 dB
AN-125001-002	Antenna, Base, Standard Roof Mount Low Loss
AN-125001-004	Antenna, Base, Thick Roof Mount Low Loss
AN-125001-006	Antenna, Base, Standard Roof Mount Low Loss GPS
AN-125001-008	Antenna, Base, Magnetic Mount Low Loss
12099-0370-01	Mount, NMO Antenna, Magnetic, Heavy-Duty
AN-225001-001	Antenna, Element, 700/800 3dB
AN-225005-001	Antenna, Element, 900, 3 dB
AN-025187-001	Antenna, GPS, Roof Mount
AN-025187-003	Antenna, GPS, Magnet Mount
AN-125001-006	Antenna, Base, Standard Roof Mount Low Loss GPS
12099-0380-01	Antenna 3 dB 700/800/900 MHz, 12099-0380-01
14002-0174-50	Squid cable (HD44)
14050-6300-01	Ethernet Cable, overmold, 45 cm
14050-6300-02	Ethernet Cable, overmold, 9 m
CA-012616-001	DC power cables (CH)
CA-012365-001	DC power cables (VCH)

3.4 RELATED PUBLICATIONS

The following publications contain additional information about the radio and related products:

MANUAL NUMBER	DESCRIPTION
14221-1850-2010	XL Mobile Product Safety Manual
14221-1850-1000	XL Mobile Quick Guide
14221-1850-4000	XL Mobile Installation Manual
14221-1850-5000	XL Mobile Maintenance Manual
14221-1800-8000	XLP Software Release Notes
MM1000019423	Key Manager and Key Admin Overview and Operation Manual
MM1000019424	Key Manager and Key Loader Overview and Operation Manual
14221-7200-6110	Voice Annunciation Feature Manual
14221-2100-3000	Advanced Access Control/Radio Personality Manager Overview Manual
14221-1100-8170	Radio Personality Manager 2 (RPM2) Software Release Notes
14221-1100-2060	RPM2 User's Manual
14221-7200-6130	BeOn Configuration and Use Feature Manual
14221-7200-6140	Noise Cancellation Feature Manual
14221-1800-4000	Nano SIM Card Install/Replacement Accessory Kit Installation Manual

The product safety manual and the quick guide are included with the radio equipment package when the radio ships from the factory. All publications listed above are available at www.pspc.harris.com via an Information Center login and Tech-Link.

4. BASIC OPERATION

4.1 RADIO CONTROLS

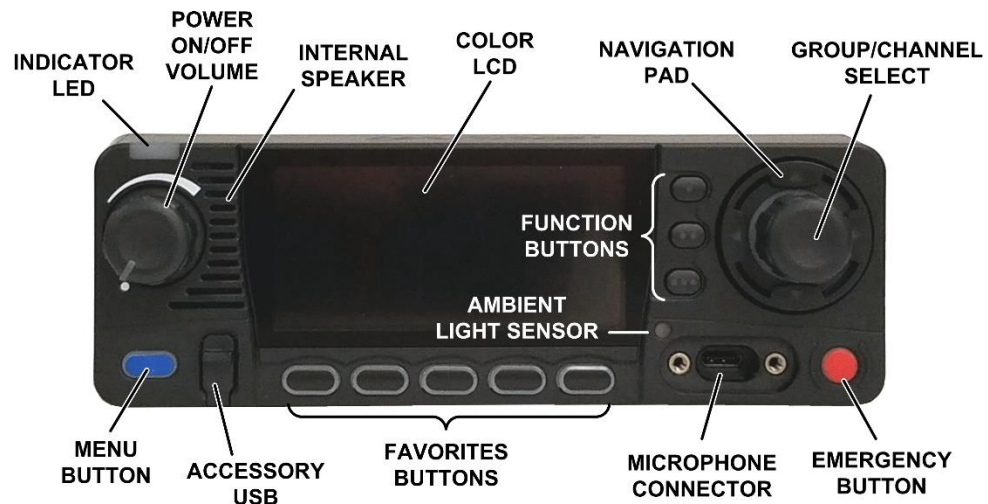


Figure 4-1: Radio Controls



Table 4-1 describes the default functions of buttons, knobs, and controls. Some can be programmed for different functions; see Section 6.4 for more information.

Table 4-1: Radio Controls, Indicators, and Connectors

CONTROL/INDICATOR	FUNCTION
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. Minimum volume levels can be programmed into the radio to prevent missed calls due to a low volume setting.
Group/Channel Selection	Selects the available groups or channels.
Microphone Connector	Connection for hand-held microphones.
Emergency Button	Declares an emergency.
Navigation Pad	Navigates menu items. In addition: - Press the left navigation button while on the idle display to access Channel Information. - Press the down navigation button while on the idle display to display the functions assigned to programmable buttons. - Press the up navigation button to display Missed Call info. - Press the right navigation button to end or reject an I-Call.

CONTROL/INDICATOR	FUNCTION
Menu Button	From the Main Display, press this button to access the menu. Press this button while in a menu to return to the idle screen.
USB Connector	Connection for USB accessory (e.g., Programming Cable or USB accessory).
Function Buttons	Programmable dynamic keys that have their function labeled on the radio display beside each button.
Favorites Buttons	User-programmable dynamic keys that can be assigned to a favorite Group or Channel. Alternatively, the button may have a function assigned to it. The label appears on the radio display above each button.
Indicator LED	Indicates radio status: • Red = actively transmitting. • Green = actively receiving. • Orange = actively transmitting encrypted.

4.2 BEFORE FIRST USE

Make sure the XL Mobile has:

- Personality and radio programmed using RPM2
- Encryption keys loaded if using encrypted channels
- Personality activated

4.3 POWER ON AND SET VOLUME

The power switch and volume control are the same knob on the radio (see Figure 4-1). Turn the Power/Volume Knob clockwise to power on radio and increase the volume.



NOTE

A minimum volume level can be programmed into the radio to prevent missed calls due to a low volume setting.

4.4 USER LOGIN (VIDA PROVISIONING)

VIDA Provisioning provides the capability to provision the VIDA User Personality configured in the UAS to VIDA units operating on P25 networks via a User Login. Each personality can contain up to 16 profiles and each profile can contain up to sixteen Talk Groups.

User Login enables multiple radio users to pick a radio from a fleet pool and enter unique credentials to log into the P25 system as themselves. Upon successful login, the Alias associated with the radio user is displayed at various end points in the P25 system.

A user can login on up to three (3) devices simultaneously. For example, if the “same user” is logged into a portable radio and mobile radio, the P25 system can differentiate the subscribers while transparently displaying the alias to other users.

Login can be initiated by a menu option, a button programmed for user login, or by selecting a P25 system that requires login. To login manually:

1. From the **UTILITY** radio menu, select **USER LOGIN**, or press the button programmed for User Login.
2. Enter the **System ID**, **User ID**, and **Password**, as required.
3. Select **Login**.

4.5 RADIO DISPLAYS

Figure 4-2 shows a sample front display while on the idle screen. The idle screen appears after power up or after exiting from the menus.



Figure 4-2: Sample Idle Front Display



The radio can be programmed to display the User ID on the System line of the display.

Table 4-2 describes some of the icons that may be displayed by the radio. The radio menu also contains an icon glossary in the Utility Menu (see Section 4.7). Icons and their location can be customized using RPM2.

Table 4-2: Radio Icons

ICON	DESCRIPTION	ICON	DESCRIPTION	ICON	DESCRIPTION
	(Blue) Trunked Signal Strength		Bluetooth Enabled		Monitor On
	(Red) TX Power		(Blue) Bluetooth Connected		VDOC
	(Green) Receive Signal Strength		Encryption Enabled		Receiving Data
	(No Color) Channel Idle		Global Encryption		Transmitting Data
	(Orange) Transmitting Encrypted		OTAR Disabled		Alert(s) Present
	Talkaround Enabled		OTAR Registered		Vote Scanning
	Failsoft		OTAR Registering		Scanning Enabled
	LTE – Registered Foreign Network		OTAR Rekeying		Emergency
	LTE – Registered Home		Transmit Power Level High		RX Mail
	Wi-Fi Signal Strength Indicator		Transmit Power Level Low		Noise Cancellation Enabled
	Wi-Fi Network Currently Connected		RX Only		Fire Speaker Mic Attached
	LTE – No Signal		Speaker Muted		Nuisance Channel
	Wi-Fi Network in Process of Connecting		TX Disabled		Conventional Site Unregistered
	LTE – Denied or Unknown Registration Status		Tones Disabled		Conventional Site Registered
	Add New Wi-Fi Client		PTT Disabled		Type 99 Enabled
	Wi-Fi Clients Connected		GPS Tracking		A wearable Bluetooth device is attached (e.g., SCBA)

4.6 STATUS MESSAGES

The radio may display various radio Status Messages during operation. These messages are described in Table 4-3.

Table 4-3: Status Messages

MESSAGE	DESCRIPTION
PTT DENIED	P25 Trunked and EDACS - The radio or talkgroup is not authorized to operate on the selected system and/or talkgroup.
CALL QUEUED	P25 Trunked and EDACS - The system has placed the call in a request queue.
SYSTEM BUSY	P25 Trunked and EDACS - 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	The radio is scanning.
TX EMERGENCY	An emergency call is being transmitted.
RX EMERGENCY	An emergency call is being received. The radio displays the unit name or unit ID.
WIDE AREA SCAN	P25 Trunked and EDACS - The radio has entered the Wide Area Scan mode to search for a new system.
INVALID TALKGROUP	P25 Trunked and EDACS - The current talkgroup is not valid for the current system. This could happen if the site denies registration due to an unrecognized talkgroup ID.
INVALID UNIT	P25 Trunked and EDACS - The current unit is not valid for the current system.
REGISTERING	P25 Trunked only - Displayed when the radio is performing a registration/affiliation on a P25 trunking site.
CTRL CHANNEL SCAN	P25 Trunked and EDACS - 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 displayed if the 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 can perform a full spectrum frequency scan to find a new Control Channel.
MISSED CALL	P25 Modes and EDACS - Another user has tried to call or page this radio. The user can view who the caller was by pressing the up navigation button.
OTAR REKEY COMPLETE	OTAR Rekey operation completed successfully.

4.7 PREDEFINED MENU LAYOUTS

Depending on radio programming, some menu options described in this manual may not be available. The radio supports three predefined menu layouts: Full, Custom, and Restricted. Table 4-4 details what is available in each layout:



NOTE

The Custom predefined menu layout allows the administrator to customize the list of menu items that are available to the radio user. Table 4-4 lists the default settings.

Table 4-4: Predefined Menu Layouts

MENU	FULL	CUSTOM (Default Settings)	RESTRICTED
Call Menu	Yes	Yes	Yes
Exit Emergency	Yes	Yes	Yes
Talkaround	Yes	Yes	Yes
Individual Call	Yes	Yes	Yes
Change Talkgroup	Yes	Yes	Yes
Call Alert/Page	Yes	Yes	Yes

MENU	FULL	CUSTOM (Default Settings)	RESTRICTED
Channel Guard	Yes	Yes	Yes
Audio Playback	Yes	Yes	No
Tone Encode	Yes	Yes	Yes
T99	Yes	Yes	Yes
Scan Menu	Yes	Yes	Yes
Enable/Disable Scan	Yes	Yes	Yes
View Scan List	Yes	Yes	No
Edit Zone Scan List	Yes	No	No
View Custom Channels	Yes	Yes	No
Edit Custom Scan List	Yes	No	No
Custom Scan	Yes	Yes	No
Site Roam	Yes	Yes	No
Site Alias	Yes	Yes	No
Security Menu	Yes	Yes	Yes
Encryption Enable	Yes	Yes	Yes
Zeroize	Yes	No	No
Global CKR Enable	Yes	No	No
GCKR Key Select	Yes	No	No
Active Key Set	Yes	Yes	Yes
Key List	Yes	Yes	No
OTAR Enable	Yes	Yes	No
OTAR Rekey	Yes	Yes	Yes
Message Menu	Yes	Yes	Yes
Radio Status	Yes	Yes	No
Radio Message	Yes	Yes	No
Textlink Messages	Yes	Yes	No
Textlink Forms	Yes	Yes	No
Textlink Mailbox	Yes	Yes	No
Faults	Yes	Yes	Yes
Audio Settings	Yes	No	No
Display Settings	Yes	Yes	Yes
Bluetooth Settings	Yes	Yes	No
Clock Settings	Yes	Yes	No
Program Menu	Yes	Yes	No
Activate Plan	Yes	Yes	No
Activate Profile	Yes	Yes	No
GPS Settings	Yes	No	No
Maintenance Menu	Yes	Yes	Yes
Radio Info	Yes	Yes	No
TCXO Tuning	Yes	No	No
P25 Tests	Yes	No	No
RSSI Display	Yes	Yes	Yes
Phase II Display	Yes	Yes	No
Feature Info	Yes	Yes	No
Change Language	Yes	No	No

MENU	FULL	CUSTOM (Default Settings)	RESTRICTED
Change PIN	Yes	Yes	Yes
WiFi Access Point	Yes	Yes	Yes
WiFi Client	Yes	Yes	No
Install GPP Software x	Yes	Yes	Yes
Icon Glossary	Yes	Yes	Yes
Zone	Yes	Yes	No
LTE	Yes	Yes	No

4.8 MENU

Press the Menu/Select button while on the idle display to access the menu. Press the left or right navigation buttons to scroll through the top-level menus, and press the up or down navigation buttons to scroll through the sub-menus. Refer to Figure 4-1 for button location. While in a menu, press the Menu/Select button to choose, activate, or toggle the selected item; similar to an enter key. Table 4-5 provides a high-level overview of the menu layout.

Depending on radio programming, some menu options described in Table 4-5 may not be available. Three predefined menu options are available: Full, Custom, and Restricted. Refer to the RPM2 online help for what menu items are visible for each selection.

Table 4-5: Menu Navigation

MENUS	DESCRIPTION
CALL MENU:	
EXIT EMERGENCY MODE	Exits emergency. See Section 4.28 for more information.
TALKAROUND MODE	Enable/disable talkaround. See Section 4.19 for more information.
TONE ENCODE	Analog conventional only - Transmits a programmed tone sequence on the current radio system and channel. See Section 5.17 for more information.
INDIVIDUAL CALL	Allows you to select an individual for an individual call. See Section 4.13 for more information.
PHONE CALL	Allows the user to initiate a telephone interconnect call. See Section 4.21 for more information.
CHANGE TLKGRP	Change the selected talkgroup. See Section 4.12.
CALL ALERT	Select a group for Call Alert transmission. See Section 4.20.
CHANNEL GUARD	Select the Transmit and/or Receive Channel Guard tone. See Section 4.18.
AUDIO PLAYBACK	Replays the last recorded call. See Section 4.23 for more information.
SCAN MENU:	
START SCAN/STOP SCAN	Start or stop scan operation. See Sections 4.24 and 4.25.
SCAN LISTS	View/Edit available scan lists. See Section 5.12.
ASSIGNED CUSTOM LIST	Create, View, and Edit Custom Scan Lists. See Section 5.12.6.
SITE ROAMING	Enable/Disable Wide Area System Scan. See Section 5.12.7.
SITE ALIAS	Select an available site from this list to lock the radio to; i.e., prevent the radio from roaming. This is also known as Site Lock. See Section 5.12.8 for more information.
SECURITY MENU:	
ZEROIZE KEYS	Removes all encryption keys from the radio. See Section 5.18.2.
ENCRYPTION	Enable/Disable encryption. See Section 4.17.
GLOBAL ENCRYPTION	Enable/Disable Global Encryption. See Section 5.18.4.
GLOBAL KEY	Select the Global Key. Only available if Global Encryption is Enabled. See Section 5.18.4.
ACTIVE KEYSET	Select the Active Keyset. See Section 5.18.5.
KEY LIST	View available key lists. See Section 5.18.6.
OTAR	Enable/disable Over-the-Air Rekeying (OTAR). See Section 5.18.7.
OTAR REKEY	Request that the KMF updates the keys in the radio. See Section 5.18.7.
MESSAGES MENU:	
RADIO STATUS	Used to send a status condition to the site without making a voice call. See Section 5.12.8.
RADIO MESSAGE	Used to send a message to the site without making a voice call. See Section 5.14.
TEXTLINK MESSAGES	Allows the user to send a Radio TextLink message. See Section 5.15.
TEXTLINK FORMS	Allows the user to send a Radio TextLink form. See Section 5.15.
TEXTLINK MAILBOX	Contains received Radio TextLink messages. See Section 5.15.
FAULTS/ALERTS	Displays radio faults and alerts. See Section 5.16.
UTILITY MENU:	
AUDIO SETTINGS:	
• MASTER	Allows the user to enable or disable the master volume control. When enabled, it allows remote control heads to control the volume of the speaker attached to the back of the radio. When disabled, the volume knob on a remote mount control head only controls the volume of the speaker attached to the control head.
• SPEAKER	Mute or unmute the speaker audio.
• NOISE CANCELLATION	Enable or disable Noise Cancellation. See Section 4.15.
• PTT	Enable or disable Push-To-Talk (PTT). Disable PTT to prevent accidental keying, such as when radio is in the holster or you are getting into a car.

MENUS	DESCRIPTION
• TONES • KEYPAD TONES	Enable or disable radio side tones. Enable or disable tones that sound when the radio's keypad buttons are pressed.
DISPLAY SETTINGS: • COLOR SCHEME • FRONT BACKLIGHT • FRONT BRIGHTNESS • FRONT TIMEOUT • FRONT DISPLAY OFF • DAY/NIGHT • LEDs	Press the Menu/Select button to toggle the front and top display's COLOR SCHEME for optimum visibility in day or night conditions (NORMAL or INVERTED). Press the Menu/Select button to toggle the front display backlighting between ON/OFF/MOMENTARY/MOMENTARY (OFF). Press the left or right navigation buttons to dim or brighten the display. When the FRONT BACKLIGHT setting is MOMENTARY, this value specifies how long the radio needs to be inactive before the front display's backlight turns off. Press the left or right navigation buttons to change the time in 0.5 second increments. Turns the front display off completely. Press the Menu/Select button to turn the front display back on. Toggles between the Day and Night display modes. Toggle indicator LEDs ON or OFF.
BLUETOOTH: • ENABLED (YES/NO) • DISCOVERABLE (YES/NO) • VOLUME CONTROL (YES/NO) • BLUETOOTH SPEAKER • EXTERNAL SPEAKER • PAIRING MGMT	Enable/disable Bluetooth. See Section 5.9 for more information. If YES, the radio knob can be used to adjust Bluetooth speaker volume (if the Bluetooth device supports it). Mute/Unmute Bluetooth Speaker. Mute/Unmute External Speaker. Pair Bluetooth devices with the radio. See Section 5.9 for more information.
CLOCK SETTINGS: • TIME FORMAT • TIME ZONE	Select 12 or 24-hour time display format. Set time zone relative to Universal Time Coordinated (UTC).
GPS SETTINGS: • GPS (ENABLED/DISABLED) • POSITION INFO • ANGULAR UNITS • LINEAR UNITS • POSITION FORMAT • SITUATION AWARENESS INFORMATION • SITUATION AWARENESS NETWORKING	Enable/disable GPS. Displays GPS, Latitude, Longitude, and Altitude information. From this menu, click NEXT to access SA INFO (see Section 5.2). Set unit of measurement of displayed angular units: CARDINAL, DEGREES, or MILS. Set unit of measurement of displayed linear units: STATUTE, METRIC, or NAUTICAL. Set format of displayed position information: Latitude/Longitude Decimal Degrees (LAT LONG DD), Latitude/Longitude Degrees Minutes Seconds (LAT/LONG DMS), LAT/LONG DM, Military Grid Reference System (MGRS), or Universal Transverse Mercator (UTM). When Enabled, the radio sends GPS data to a Harris-supplied PC client using RNDIS networking.
PROGRAM: • ACTIVATE PLAN • PROFILES	View/Activate a personality. See Section 5.1. Change current profile. See Section 4.14.
MAINTENANCE: • RADIO INFO • TESTS • PH2 LC DISPLAY	Displays radio information, i.e., ESN, software revisions, and firmware revisions. Allows service personnel to run radio tests. For field service use only.

MENUS	DESCRIPTION
• DISPLAY RSSI • TCXO TUNING • FEATURE INFO	When enabled, RSSI is displayed on the RSSI screen and in the bottom of the idle display. -130 dBm is displayed when there is no received signal. For field service personnel only. Improper adjustment will result in loss of communications. Displays what features are enabled on your radio.
WIFI CLIENT: • POWER ON • ADD NEW	Displays the list of available Wi-Fi clients and the status of Wi-Fi Connection (a question mark indicates the Wi-Fi network is in the process of connecting; a check mark indicates the Wi-Fi Network is connected). Turn Wi-Fi on/off. Displays the list of Trusted Wi-Fi Networks and is populated when Wi-Fi is powered on. You can view, add, modify, and remove a Wi-Fi Network.
WIFI ACCESS POINT: • POWER • CLIENT COUNT	Power Wi-Fi On/Off. When the radio is configured as a Wi-Fi access point, displays the number of connected clients.
ICON GLOSSARY	Defines icons displayed by the radio.
USER LOGIN	Allows the user to enter a User ID and or Password to log into the P25 system (see Section 4.4).
INSTALL GPP SOFTWARE:	Select a GPP package to install.
CHANGE LANGUAGE	Press the up or down navigation buttons until the desired language is highlighted and then press Menu/Select button.
CHANGE PIN	Allows you to change your PIN.
ZONE MENU:	View or change zones/systems (see Sections 4.10 and 5.3.1).

4.9 ALERT TONES

The radio provides audible Alert Tones or “beeps” to indicate various operating conditions. Some of the most common tones are described in Table 4-6.

Table 4-6: Alert Tones

TONE	DESCRIPTION	SOUND/DURATION
Ready to Talk Tone Unencrypted (Analog FM or P25 digital)	After a PTT is pressed, this is an audible indication (tone) for you to begin speaking into the microphone.	1000 Hz tone for 25 ms
Ready to Talk Tone Encrypted P25 digital	After a PTT is pressed, this is 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: • Receive only • Key not found • PTT button disabled • Emergency button disabled • Emergency not supported for current channel • Clear transmit denied • Trunking Channel unavailable	544 Hz tone for 75 ms
Maximum transmit duration expires	Maximum transmit duration is exceeded.	5 beeps of 2400 Hz tone and then a 544 Hz tone for as long as PTT is pressed

STONE	DESCRIPTION	SOUND/DURATION
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 RPM2: • Disabled (no tone) • Slow (tone every 15s) • Medium (tone every 10s) • Fast (tone every 5s) • Tones is 544 Hz tone for 75 ms

4.10 SELECT ZONE/SYSTEM

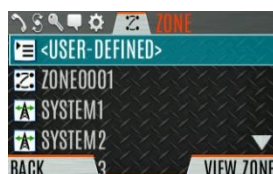
A System is a group of channels or talkgroups that share a common set of parameters as programmed using RPM2. For example, a Trunking system defines the parameters needed to communicate on an infrastructure by agency or geographical region, such as WACN, System ID, Talkgroups, etc. A conventional system defines the channel set used and any specific signaling attributes (See RPM2 for more information on System attributes). Systems are designated by the XX icon in the Zone/System menu.

A Zone is an *OPTIONAL container* that can hold channels or talkgroups from a variety of systems (see Section 5.3.2). In other words, each member of a Zone belongs to an underlying system. (See RPM2 for more information on Zone attributes). Zones are always listed first in the Zone/System menu and are designated by the  icon. A button on the control head can be programmed to scroll through available zones/systems (see Section 6.4).

Or

To select a zone/system via the menu:

1. Press the Menu/Select button to access the menus.
2. Use the left or right navigation buttons to display the **ZONE** menu. The currently selected zone/system will be highlighted. A personality can have up to 512 systems and up to 50 Zones, independent of banks or channels.
3. Use the up or down navigation buttons to highlight the desired zone/system. The  and  buttons may be held to scroll repetitively, and the menu will wrap to allow quick access to a zone/system,
4. Press the **VIEW ZONE** soft key to view channels in the zone/system, or select the desired zone/system using the Menu/Select button.



4.11 SELECT GROUP/CHANNEL

The radio can be programmed with 1,250 talkgroups or 1000 channels per personality. Use the Group/Channel knob to select groups/channels.

Direct Channel Entry

A button on the control head can be programmed for Direct Channel Entry, which allows the user to enter the talkgroup/channel number directly from the keypad.

The radio can be programmed for one of the following Direct Channel Entry options:

- When a Zone is selected on the radio, Direct Channel Entry performs a lookup using the currently selected system's group list
- Or
- When a Zone is selected on the radio, Direct Channel Entry performs a lookup using the currently selected Zone's system/group list.

4.12 GROUP CALLS

4.12.1 Transmit a Group Call

A talkgroup is a group of radios that you want to have private conversations with. These groups can be divided into areas such as state, region, county, or large special events.

Turn the Channel/Group knob to select the desired group (see Figure 4-1). Press PTT to transmit.

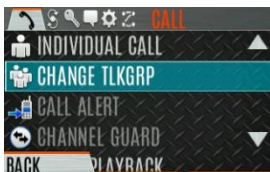
Or

A button on the control head can be programmed for DIRECT CHANNEL ENTRY to allow the user to enter the talkgroup/channel number. Press PTT to transmit.

Or

To transmit a group call:

1. In P25 Conventional, the talkgroup for the selected channel may be overridden as follows: Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **CALL** menu.
3. Press the up or down navigation buttons to highlight **CHANGE TLKGRP** and press the Menu/Select button.



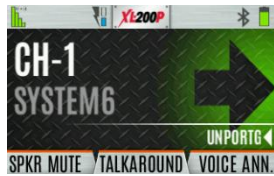
4. Press the up or down navigation buttons to highlight and the desired talkgroup and press the Menu/Select button. After selecting the new talkgroup, the radio returns to the main screen.



5. Press the PTT button to transmit.

4.12.2 Receive a Group Call

When receiving a group call, the status area of the idle display toggles between the Unit Name and the Group Name of the transmitting radio. Note that if either of those names is not programmed the corresponding ID number is displayed.

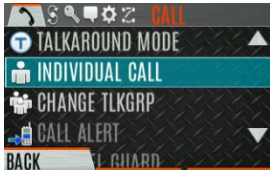


4.13 INDIVIDUAL CALLS

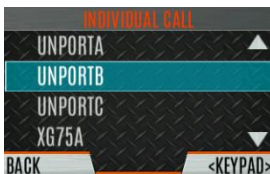
An individual call is used to make a call to one radio as opposed to a group of radios.

4.13.1 Transmit an Individual Call

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



4. Use the up or down navigation buttons to highlight the unit to call and press the Menu/Select button, or select **KEYPAD** to enter the Unit ID.



5. Press PTT to make the call. When transmitting an Individual Call, the radio displays the called radio's name or Unit ID. If the radio is programmed for Acknowledged Individual Call, the radio displays "CALL QUEUED" until the callee answers or rejects the call.



6. After the callee answers, press PTT to respond.
7. Press ► to end the call.

How long the radio remains in Individual Call mode with no activity is programmable.

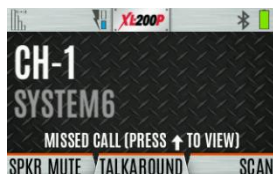
4.13.2 Receiving an Individual Call

1. When receiving an Individual Call, the radio displays the calling radio's name or Unit ID. The radio will also display "Press → to END."

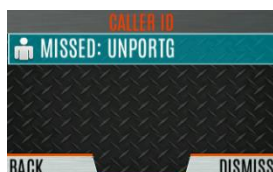


2. Press PTT to respond or ► to END/REJECT the call. How long the radio remains in the Individual Call mode with no activity is programmable.

3. The radio rings and indicates a missed call if you do not respond. The ring sounds until you press PTT, view the missed call menu (▲), change channel/group/system, or power cycle the radio.



4. On the missed call screen, press the **DISMISS** soft key to clear the entry.



4.14 USER PROFILES

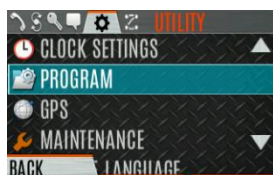
XL-series radios support User Profiles. A User Profile is a grouping of preset configurations that allow the user to change radio operation based on the current activity/scenario. For example, the radio can be programmed with profiles named Noisy, Fire, etc., and the radio user can switch profiles on the radio depending on the environment they are entering. User Profile selection persists across system/group changes and power cycles. Up to 10 profiles can be programmed to the radio. When you activate a new personality, the selected Profile changes to None.

A "Covert" Profile is installed on the radio by default. This profile cannot be modified or deleted. The following attributes apply when the Covert profile is active:

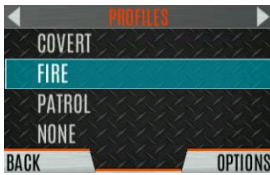
- The speaker is enabled.
- All tones are disabled.
- Keypad tones are disabled.
- Voice Annunciation is disabled.
- The backlight is disabled.
- The indicator LED is disabled.
- All other attributes remain at their current value.

To change the currently selected Profile:

1. Press the Menu/Select button to access the menu.
2. Press the left or right navigation buttons until the **UTILITY** menu is displayed.
3. Press the up or down navigation buttons to highlight **PROGRAM** and press the Menu/Select button.



4. Press the left or right navigation buttons until the **PROFILES** menu is displayed.
5. Press the up or down navigation buttons to select the desired Profile and press the Menu/Select button.



A profile change persists across system/channel changes and power cycles.



A button on the control head can be used to toggle profiles. See Section 6.4.

4.15 NOISE CANCELLATION

XL Mobile radios feature Harris' proprietary noise suppression capability to provide clear and crisp voice quality in high-noise environments. This can be used in any mode, including analog and digital communications.

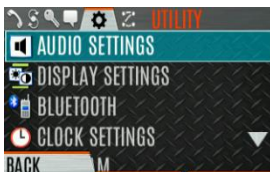
The standard mic has two microphones; one located at the top (primary) and one on the bottom (secondary). When noise cancellation is enabled, voice is picked up by the upper microphone, and noise is picked up from the bottom microphone.

In the case where noise cancellation is enabled and the bottom (secondary) microphone is blocked, the radio operates as though noise cancellation is turned off.

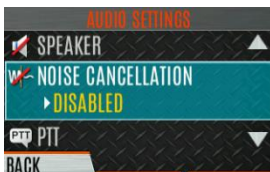
4.15.1 Enable Noise Cancellation

To enable Noise Cancellation:

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



4. Press the up or down navigation buttons to highlight **NOISE CANCELLATION**. Toggle Noise Cancellation **ENABLED/DISABLED** using the Menu/Select button.



Refer to Section 5.5 for more information on the Audio Settings menu.

4.15.2 Using Noise Cancellation

When using the noise cancellation feature, observe the following:

- Verify **NOISE CANCELLATION** is enabled (see Section 4.15.1).
- Talk within two (2) inches of the primary microphone.
- Ensure the primary and secondary microphones are not covered. See Section 4.15.4 for more information on the primary and secondary microphones.
- Speak clearly, loudly, and with authority.
- If necessary, it is o.k. to yell into the radio. The radio can handle loud input levels.

4.15.3 The Effect of Distance from the Microphone

Unlike a normal microphone system, noise cancellation makes the level of your voice diminish quickly as you move away from the radio. The radio starts to see your voice as surrounding noise. Therefore, noise cancellation requires that you hold the radio close.

4.15.4 Primary versus Secondary Microphone

The voice microphone is located on top front face of the mic and the noise microphone is on the lower rear side. Every effort should be made to not obstruct either element during radio transmissions.

4.16 VOICE ANNUNCIATION

When enabled via programming, Voice Annunciation provides audible feedback for various radio operations. The radio can be programmed to play an audio message for any or all the following. This message can be a pre-recorded (canned) message or a user-recorded message.

- Zone changes
- Channel changes
- System changes
- Encryption On/Off
- Noise Cancellation On/Off
- Scan On/Off
- Talkaround On/Off
- Monitor Mode On/Off

For more information on configuring the radio for Voice Annunciation, refer to the Voice Annunciation Feature manual 14221-7200-6110.

4.17 ENABLE/DISABLE ENCRYPTION

A button on the control head can be programmed to enable/disable encryption.



NOTE

See Section 6.4 for the various options that can be programmed to the control head buttons.

Or

Turn encryption on or off via the Security Menu:

1. Press the Menu/Select button to access the menus.
2. Use the left or right navigation buttons button to highlight and select the **SECURITY** menu.
3. Use the up or down navigation buttons button to highlight **ENCRYPTION**. Toggle encryption enabled/disabled using the Menu/Select button. This option is grayed out if Encryption Mode in the radio's personality is programmed "Forced On."



- If a channel is programmed to be encrypted, an optional key icon appears on the main display when encryption is enabled. The system must also be programmed for encryption.
- When encryption is enabled and you use any channel not configured for encryption, the radio allows PTT. The signal is transmitted unencrypted.
- Systems configured for Global Encryption (enabled in the Security menu) can display an optional Global Encryption icon in addition to or instead of a key icon (Section 5.18.3).

4.18 CHANNEL GUARD (ANALOG CONVENTIONAL ONLY)

Channel Guard is Harris's trademark for CTCSS (tone squelch) and CDCSS (digital tone squelch).

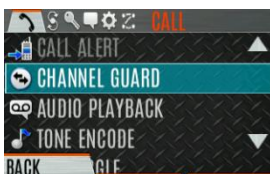


NOTE

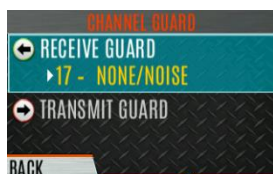
The Channel Guard menu is only accessible if the System is setup for CG SEL in the radio's personality.

To select the Channel Guard tone:

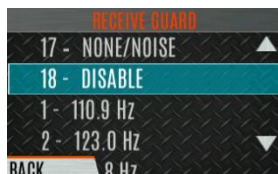
1. Press Menu/Select button to access the main menu.
2. Use the left or right navigation buttons to display the **CALL** menu.
3. Use the up or down navigation buttons to highlight **CHANNEL GUARD** and press the Menu/Select button.



- Use the up or down navigation buttons to highlight **RECEIVE GUARD** or **TRANSMIT GUARD** and press the Menu/Select button.



- Use the up or down navigation buttons to highlight the desired option from the list and select using the Menu/Select button.



- The Channel Guard frequency is displayed on the main display.

The Channel Info screen and Channel Edit screen will change depending on this selection. See Sections 5.4 and 6.2 for more information.



A button on the control head can be programmed for Channel Guard Override (see Section 6.4).

4.19 USE TALKAROUND TO BYPASS REPEATER (ANALOG AND P25 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.



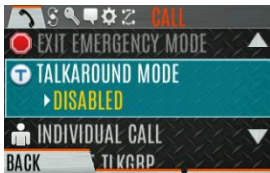
Talkaround is not supported on 700 MHz.



Talkaround can be enabled/disabled on a per-channel basis. When talkaround is disabled, the  icon is shown on the front and top display. If talkaround is disabled for a channel (via the RPM2 personality), and the user tries to enable talkaround via the menus or knobs while on that channel, the radio emits a “boop” deny tone. Additionally, if talkaround is disabled on a channel, the talkaround programmable button becomes inoperable and the radio boops.

To enable talkaround:

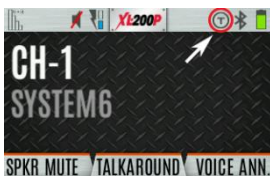
- Press Menu/Select button to access the main menu.
- Press the left or right navigation buttons to display the **CALL** menu.
- Press the up or down navigation buttons to highlight **TALKAROUND MODE**.



4. Press the Menu/Select button to toggle **TALKAROUND MODE** to **ENABLED**.



5. The optional 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

A button on the control head can be programmed to toggle talkaround enable/disable. See Section 6.4 for the various options that can be programmed to the control head buttons.

If the talkaround Indication feature is enabled using RPM2, the radio will play a unique grant tone when a call is placed on a simplex channel or when talkaround has been enabled on a duplex channel. This feature applies to both Analog and P25 Conventional systems. It optionally allows the radio to also play the same tone when it receives a call while operating in simplex or talkaround. ***If configured, the radio plays the tone at the selected volume level.***



NOTE

The tone will not play on systems configured with MDC.

Talkaround Indication can be specified for each individual Analog and P25 Conventional system configured in personality. The following options can be selected, and apply only when the radio is on a simplex channel or when talkaround has been enabled by the user:

- **Disabled:** (This is the default option.) When this option is selected, the radio plays the standard grant tone when a call is placed. The radio does not play a tone when a call is received.
- **Transmit Only:** When this option is selected, the radio plays a different “talkaround” grant tone when a call is placed. The radio does not play a tone when a call is received.
- **Transmit and Receive:** When this option is selected, the radio plays a different “talkaround” grant tone when a call is placed, and at the beginning of a received call.



NOTE

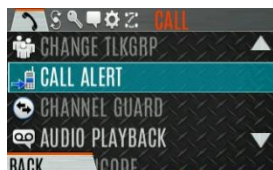
In the radio personality, the “Alert Tone” parameter needs to be enabled for each channel on the Conventional Frequency Set. The “Ready to Talk Tone” parameter must also be enabled for the Talk Around Indication tone to be played when the radio is keyed.

4.20 CALL ALERT (PAGE)

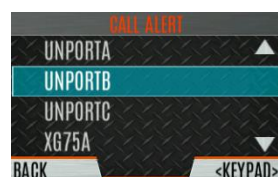
4.20.1 Send Alert

To send an alert:

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



4. Press the up or down navigation buttons to highlight the desired unit from the list and press the Menu/Select button, or select **KEYPAD** to enter the Unit ID.



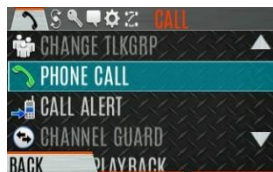
5. Press **PTT** to send the page.

4.20.2 Receive Alert

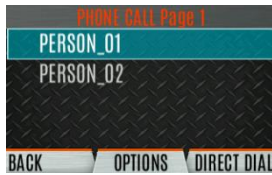
1. When receiving a Call Alert, the radio displays the calling radio's name or Unit ID.
2. The radio rings and indicates a missed call. The ring sounds continuously until you press PTT, press the CLR MISSED softkey, change group/system, or power cycle the radio.

4.21 TELEPHONE INTERCONNECT

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



4. Select an entry from the list of pre-programmed entries, or click **DIRECT DIAL** to enter the number directly. Direct Dial entries can have up to 31 characters (0-9, *, #, or a space; the space correlates to a pause.) Select **OPTIONS** to view details about the highlighted pre-programmed entry. The radio supports up to 255 pre-programmed entries.



5. Press PTT to initiate the phone call. Press the right navigation button to end the call.

The radio does not permit telephone interconnect calls during an emergency. While in a phone call, the radio ignores all types of calls EXCEPT a System All Call. If the radio receives a System All Call while in a phone call, it immediately drops the phone call and accepts the All Call.

4.22 DTMF

XL Mobile Radios support the transmission of DTMF tones corresponding to the numbers/characters on the keypad. To over dial numbers/characters, press and hold the PTT button, and then press the corresponding keys one at a time on the keypad. Valid keys for DTMF tones are: 1, 2, 3, 4, 5, 6, 7, 8, 9, *, 0, and #.



For conventional or P25 Conventional systems, DTMF tones only play if the current system is programmed for DTMF (part of general System configuration). DTMF tones are always enabled for P25 Trunking systems.

4.23 AUDIO PLAYBACK

The Audio Playback feature allows the user to playback a previously received call. Recordings are stored in the radio's RAM and are not persistent across power cycles. The radio stores the last five (5) recorded calls up to one (1) minute each.

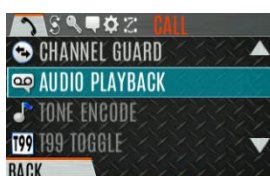
A button on the control head can be programmed to replay the last recorded call. To playback the last received call from a button:

1. Press the button programmed for audio playback. The last call received before the button was pressed is played each time the button is pressed.
2. Additional incoming calls will be recorded in the background, but pressing the button continues to replay the captured call until reset.
3. To reset the feature and allow a new call to be captured, press and hold the button until you hear a two-tone chirp. At this point, the button can be used to capture a new incoming call.

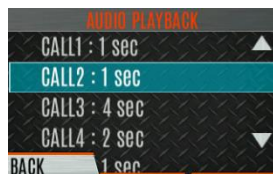
You can also playback one of the last five calls received via the menu.

To playback a previously received call from the menu:

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



4. Select the desired call from the list (the most recent call is at the top of the list) and press the select button. The selected call will be played.



- If a button is also programmed for Audio Playback, pressing the button replays the call that selected in the menu. The feature must be reset as above to use the button to capture a new call.
- If a button is not programmed for Audio Playback, then you must navigate back to the menu to play the call again.



NOTE

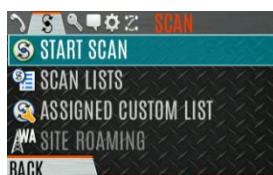
Any incoming call that occurs during playback preempts the playback.

4.24 START SCAN

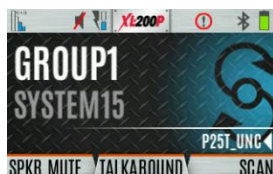
This procedure assumes that the scan list has been added and the radio is not in active scan. Refer to Section 5.11 for scan setup or Section 4.25 for stopping scan. Refer to Section 5.12.1.1, Section 5.12.1.2, and Section 5.12.1.3 for home and priority channel descriptions.

To start scan:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **START SCAN** and press the Menu/Select button. **START SCAN** text changes to **STOP SCAN**.



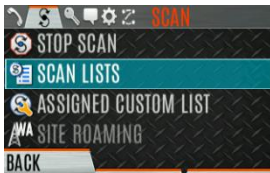
4. Press the **BACK** soft key to exit the scan menu.
5. The scan icon is displayed on the idle display when scanning is enabled.



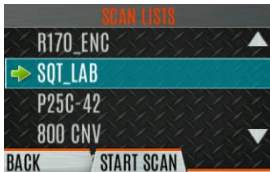
Or

To start scan:

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



4. Press the up or down navigation buttons to highlight the desired **SCAN LIST** and press the **START SCAN** soft key.



Or

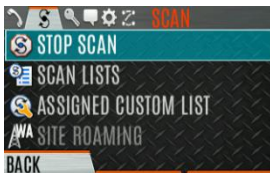
A button on the control head can be programmed to start/stop scan.



See Section 6.4 for the various options that can be programmed to the control head buttons.

4.25 STOP SCAN

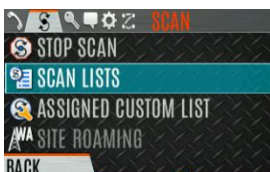
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **STOP SCAN** and press the Menu/Select button.



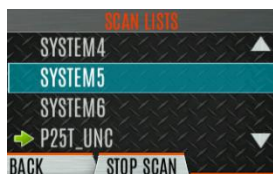
4. Press the **BACK** soft key to exit the scan menu.

Or

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



4. Press the **STOP SCAN** soft key.



Or

A button on the control head can be programmed to start/stop scan.



NOTE

If button is programmed for start/stop scan, the menu for starting and stopping scan is disabled.



NOTE

See Section 6.4 for the various options that can be programmed to the control head buttons.

4.26 MONITOR AND SQUELCH TYPES (CONVENTIONAL ONLY)

The monitor function allows you to temporarily turn off selected squelch to monitor for traffic that may not normally break squelch. The type of squelch used depends on an analog or digital channel. A button on the control head can be programmed to start or stop Monitor (see Section 6.4 for the various options that can be programmed to the control head buttons.).

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) must be correct to break squelch.
- Selective squelch - Received NAC and talkgroup Identification (ID) or unit ID must be correct to break squelch.



NOTE

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

4.27 NUISANCE DELETE

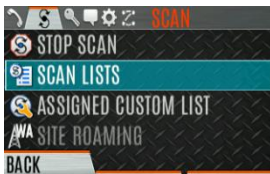
A channel can temporarily be deleted from the scan list. The selected channel, priority 1, and priority 2 channels cannot be nuisance deleted. A button on the control head can be programmed for nuisance delete (see Section 6.4 for the various options that can be programmed to the control head buttons).



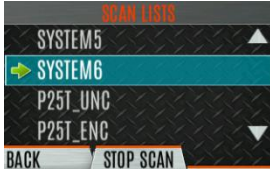
Nuisance delete can only be performed on the active scan list.

To perform a nuisance delete from the menu:

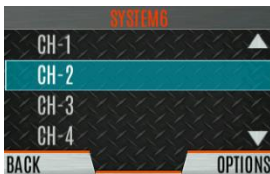
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **SCAN LISTS** and press the Menu/Select button.



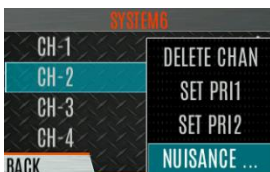
4. Press the up or down navigation buttons to highlight the scan list and press the Menu/Select button. When scanning is started, ➡ indicates the active scan list; when scanning is stopped, 📶 indicates the active scan list.



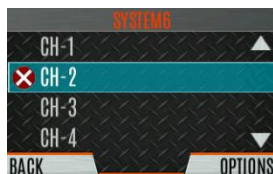
5. Press the up or down navigation buttons to highlight the desired channel.
6. Press the **OPTIONS** soft key.



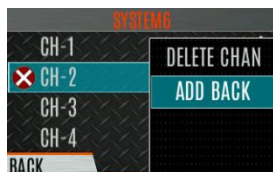
7. Press the up or down navigation buttons to highlight **NUISANCE** and press the Menu/Select button.



8. The  icon appears next to the channel and it will not be scanned.



9. Highlight the channel, press the **OPTIONS** soft key, and select **ADD BACK** to add channel back to scan list. If you do not add the channel back to the list, the channel will return to the scan list when you cycle radio power or activate a personality.



10. Press the **BACK** soft key to exit the channel list.
11. Press the **BACK** soft key to exit the scan list display.

4.28 FAILSOFT (P25 TRUNKED)

When the site-link to the VNIC is down, the site is operating in Failsoft mode. Radios operating on that site can still communicate with each other, but not with the rest of the system. The radio provides a visual indicator ( icon) on the display and plays a tone for a configured interval to indicate that the site is in Failsoft. This tone interval range is 0 to 120 seconds. This tone is not played during incoming voice or PTT.

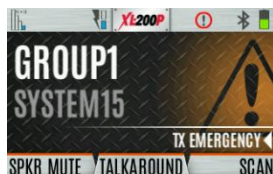
4.29 EMERGENCY OPERATION

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

4.29.1 Declaring an Emergency Call

To declare an emergency:

1. Press and hold the emergency button on the control head. The length of time you need to hold the button is configured using RPM2.
2. The emergency icon is displayed on the idle display.



- For digital channels, the radio transmits the talkgroup or radio ID to the dispatch console and receiving radio.
- The radio can be programmed to have a dedicated emergency channel, which can be activated from analog or digital channels.
- The radio can also be programmed to send an Emergency Alarm in addition to or in place of the emergency call (P25 modes).

The radio goes through transmit and receive cycles if so configured. Speak into the microphone while the radio is transmitting or press PTT to talk.

3. To exit emergency, power cycle the radio or select **EXIT EMERGENCY** from the CALL menu.

If enabled via programming, you can clear an emergency by pressing the button programmed for the Monitor/Clear function and then the emergency button.



4.29.2 Receiving an Emergency Call

When receiving an Emergency Call, an alert beep sounds (if tones are enabled) and an emergency indication is displayed. The unit ID and/or unit name of the unit in emergency is displayed. While the emergency display is active, press PTT to respond to the emergency caller.

4.29.3 Stealth Emergency

The radio can be programmed with the following emergency behavior:

- No audio indications when declaring an emergency.
Or
- No visual indications when declaring an emergency.
Or
- No audio *and* no visual indications when declaring an emergency.

During stealth mode, the radio will not receive any type of call. Once the user presses the PTT button, the radio display and audio return to normal.

4.30 MDC-1200 (ANALOG CONVENTIONAL ONLY)

MDC-1200 is a legacy in-band signaling protocol that provides the radio with the ability to transmit and receive a unique PTT ID. This PTT ID can be decoded by receiving radios and displayed as a hexadecimal number or an alias string. In addition, MDC-1200 provides radios with the ability to transmit emergency status to a console. Refer to the MDC-1200 Feature Manual, 14221-7200-6000, for complete instructions on configuring and using this feature.

4.30.1 Normal PTT Operation

If MDC signaling on PTT press is enabled using RPM2, the radio transmits an MDC PTT ID message when PTT is pressed. If the Sidetone option is enabled using RPM2, the radio plays a Ready-to-Talk (RTT) tone after the MDC pre-signaling has been transmitted.

If MDC signaling on PTT release is enabled (using RPM2), the radio transmits post-call MDC signaling when PTT is released.

- IF STE is enabled (using RPM2), the MDC post-call signaling is transmitted after STE is sent on PTT release only.
- MDC post-call signaling is also sent when there is a radio unkey due to Carrier Control Timeout (CCT). Normal CCT alert tones occur prior to unkey.

4.30.2 MDC PTT ID Receive Handling

When the radio receives an MDC PTT ID, it searches the MDC ID Alias List for an alias associated with the ID. If one is found, it displays the alias. If none is found, the radio displays the ID in hexadecimal.

4.30.3 Emergency Declaration

Emergency declaration is accomplished by the radio generating an MDC Emergency PTT message. An Emergency is considered acknowledged when the radio receives an “Ack To Emergency” PTT message with an ID which matches its own ID. If Emergency Audio is enabled and the PTT Sidetone option is enabled, the radio plays the Ready-to-Talk tone after the MDC Emergency PTT signaling is transmitted.

- If an MDC Alert on ACK is enabled, the radio plays an ACK tone when the MDC emergency is acknowledged.
- If audio tones are enabled, the radio plays an ACK tone if the emergency is not acknowledged within the programmed number of retries.

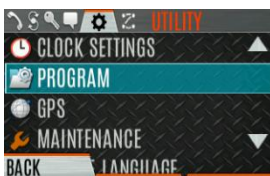
5. ADVANCED OPERATIONS

5.1 VIEW/CHANGE PERSONALITIES

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

5.1.1 View Personalities

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



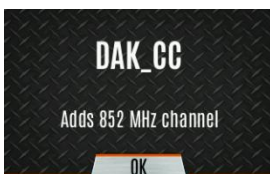
4. Press the **OPTIONS** soft key.



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



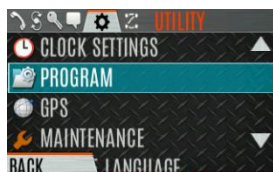
6. The radio displays the plan's filename. Personality information appears if populated using RPM2.



5.1.2 Change Active Personality

To change the active personality:

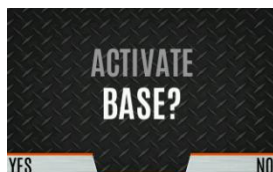
1. At main display, press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to highlight **PROGRAM** and press the Menu/Select button.



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



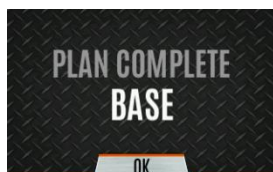
5. Press the **YES** soft key to confirm personality activation. If the personality has a power-up PIN, you are prompted to enter the PIN before activation continues.



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



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



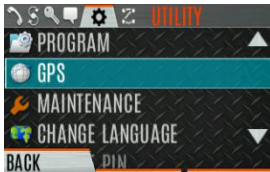
- You cannot activate a personality when the radio is transmitting an emergency.
- A **FAILED** message may be displayed for errors such as invalid syntax in the fill or some other invalid parameter.

5.2 SITUATIONAL AWARENESS (SA) – P25 CONVENTIONAL ONLY

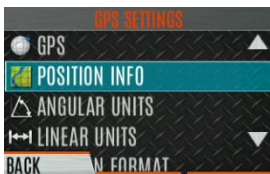
Situational Awareness is a feature in which the radio receives SA position from other units configured to send the SA packets. The SA display shows the positions of the other radios (units) relative to the radio. To make use of SA, all radios need to have a uniquely programmed Unit ID.

To display Situational Awareness Info:

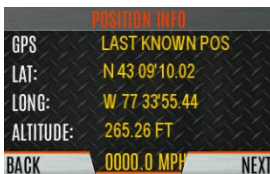
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **UTILITY** menu.
3. Press the up or down navigation buttons to select **GPS** and press the Menu/Select button.



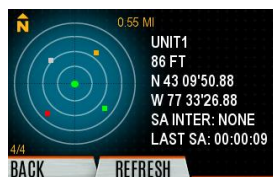
4. Press the up or down navigation buttons to select **POSITION INFO** and press the Menu/Select button.



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



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



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

5.3 USER-DEFINED ZONES/SYSTEMS

5.3.1 Command Tactical Zone

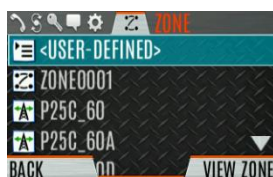
A Command Tactical Zone is defined at the radio.



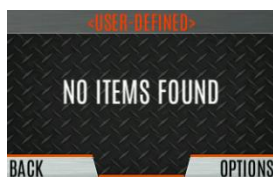
A Command Tactical Zone is reset when a Personality is activated.

To create a Command Tactical Zone:

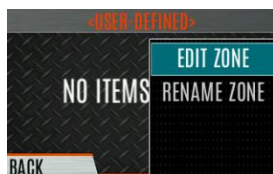
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **ZONE** menu.
3. Press the up or down navigation buttons to highlight **<USER-DEFINED>** and press the **VIEW ZONE** soft key.



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

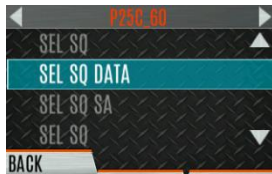


5. Press the up or down navigation buttons to select **EDIT ZONE** to create a zone, or **RENAME ZONE** to rename the Command Tactical Zone (up to 16 characters are allowed).

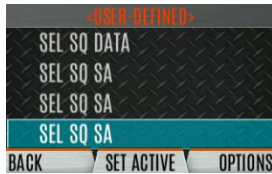


6. Press the left or right navigation buttons to scroll through existing systems. Press the up or down navigation buttons to highlight desired channel/group.
7. Press the Menu/Select button to add or remove channel/group.

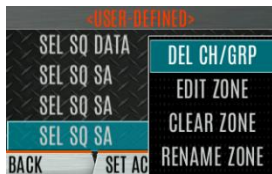
8. After adding all desired channels/groups, press the **BACK** soft key.



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



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

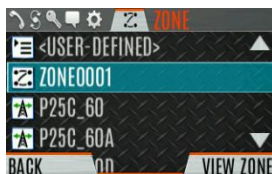


5.3.2 Mixed System Zone

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

To view Mixed System Zones:

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

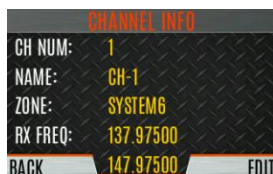


5.4 CH INFO MENU

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

To display channel information:

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



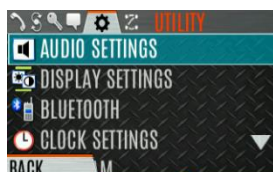
CONVENTIONAL OR P25 CHANNELS ONLY:

3. Press the **EDIT** soft key.
4. Enter the password. You may now select and change the values of the displayed channel parameters. The password remains active until power cycle. Refer to Section 6.2 for more information.

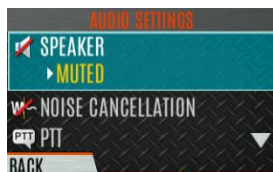
5.5 AUDIO SETTINGS

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

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



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



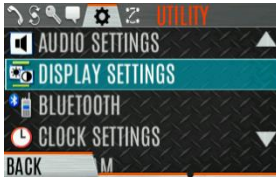
- **SPEAKER** - Mute or Unmute the speaker audio.
- **NOISE CANCELLATION** - Enable or disable noise cancellation. Noise cancellation reduces background noise during transmit.
- **PTT** - Enable or disable Push-To-Talk (PTT). Disable PTT to prevent accidental keying, such as when the radio is in a holster or you are getting into a car.
- **TONES** - Enable or disable alert tones (see Table 4-6).
- **KEYPAD TONES** - Enable or disable keypad tones. When enabled, the radio plays a tone when a button on the keypad is pressed.

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

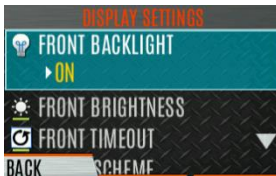
5.6 DISPLAY SETTINGS

To change display settings:

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



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



- **COLOR SCHEME** - Change the color scheme of the top and front displays for optimum viewing in day/night conditions.
 - **BACKLIGHT** - Turn front display backlight on, off, momentary, or momentary (off). Momentary (off) is similar to momentary, but the backlight turns off completely and only comes on when the center navigation button is pressed.
 - **BRIGHTNESS** - Set brightness level of front display. A level of 0 has same effect as turning off backlight.
 - **TIMEOUT** - Specify how long the radio needs to be inactive before the front display's backlight turns off.
 - **INDICATOR LED** - Toggle the indicator LED ON/OFF.
5. Press the **BACK** soft key to exit the menu.

5.7 GPS SETTINGS

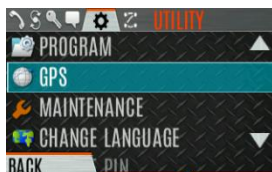


NOTE

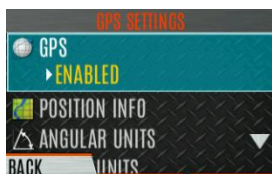
The **GPS SETTINGS** menu item only appears if enabled using RPM2 and the feature is installed.

To access GPS settings:

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



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



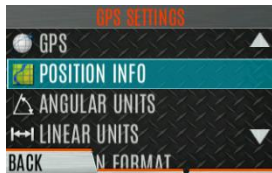
- **GPS** - Enable or disable internal GPS.
 - **POSITION INFO** - See Section 5.8.
 - **LINEAR UNITS** - Set unit of measurement of displayed linear units: **STATUTE**, **METRIC**, or **NAUTICAL**.
 - **ANGULAR UNITS** - Set unit of measurement of displayed angular units: **CARDINAL**, **DEGREES**, or **MILS**.
 - **POSITION FORMAT**- Set format of displayed position information: Latitude/Longitude Decimal Degrees (LAT LONG DD), Latitude/Longitude Degrees Minutes Seconds (**LAT/LONG DMS**), **LAT/LONG DM**, Military Grid Reference System (**MGRS**), or Universal Transverse Mercator (**UTM**).
5. Press the **BACK** soft key to exit the menu.

5.8 POSITION INFO

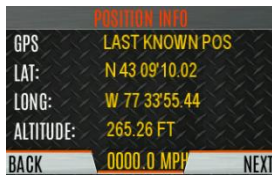
The Position Info screen displays the radio user's location information. GPS must be enabled in the GPS Settings (see Section 5.7).

To display position info:

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



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



5.9 BLUETOOTH

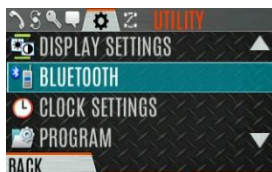


The **BLUETOOTH** menu item only appears if enabled using RPM2 and if the feature is installed.

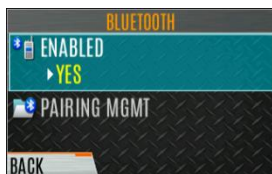
5.9.1 Enable Bluetooth

To enable Bluetooth:

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



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



Or

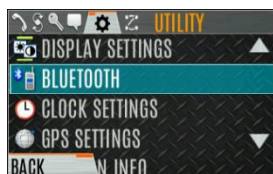
A button on the control head can be programmed to enable/disable Bluetooth.

5.9.2 Pair Devices

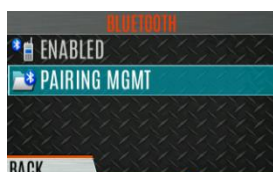
To pair devices:

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

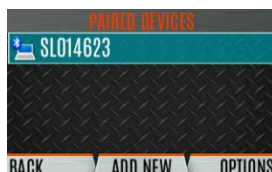
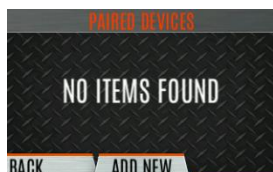
3. Press the up or down navigation buttons to highlight **BLUETOOTH** and press the Menu/Select button.



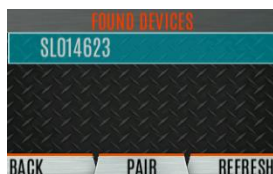
4. Press the up or down navigation buttons to highlight **PAIRING MGMT** and press the Menu/Select button.



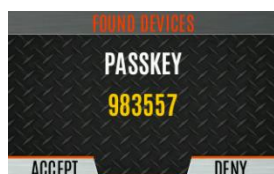
5. Make sure device being paired is powered on and has discovery mode enabled to pair with the radio.
If no devices are found and Bluetooth is enabled, only the **ADD NEW** soft key is available. If devices are paired, the **OPTIONS** soft key appears.



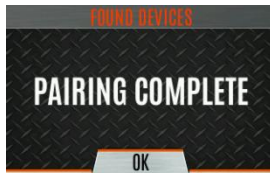
6. Press the **ADD NEW** soft key to select a device to pair.
7. A list of available Bluetooth devices appears.



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



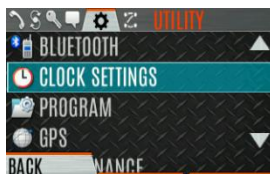
11. A **PAIRING COMPLETE** message appears when pairing is complete. Select **OK**. The paired device is then displayed in the **PAIRED DEVICES** list.



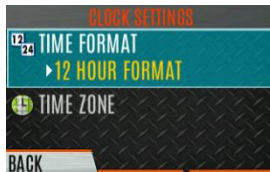
5.10 CLOCK SETTINGS

To view/change clock settings:

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



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



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

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

5.11 SELECT LANGUAGE

To change the language displayed by the radio:

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



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

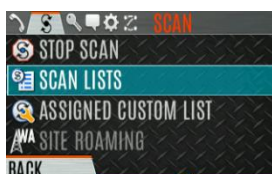


5.12 SET UP SCAN

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

To access the scan lists:

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



NOTE

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

5.12.1 Default, Priority 1, and Priority 2 Channels

5.12.1.1 Default Channel

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

5.12.1.2 Priority 1 Channel

This channel will be scanned more often than other channels in the list and will be scanned in between every other channel in the scan list. An example scan sequence would be P1 (priority 1), C2, P1, C3, P1, C4, etc. In addition, the priority channel 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.

5.12.1.3 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. In addition, 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.

5.12.2 Trunked/Conventional Scanning

Trunked/conventional scanning adds the ability to scan multiple conventional and P25 conventional channels while still maintaining trunked radio operation. The radio can scan a conventional scan list while still receiving a trunked control channel and receiving trunked calls. Selection of which conventional scan list is associated with a given trunked system is done using RPM2 and cannot be changed on the radio. However, a user with access to the necessary menu layout (see Section 4.7) can edit the scan list members (both trunked groups and conventional channels on the selected Conventional Priority System). As the number of conventional channels being scanned increases, the time between scanning each channel increases (roughly 250 milliseconds per channel), with the consequent increase in the number of calls that will late-enter. To avoid missing calls, it is recommended to keep the number of conventional channels being scanned to eight (8) or fewer.



The trunking site must have roaming set to Enhanced CC.

5.12.3 Vote Scan (Analog and P25 Conventional Only)

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



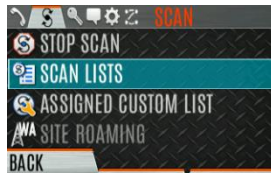
If talkaround is enabled, Vote Scan is disabled until talkaround is disabled again.

5.12.4 Edit Scan List

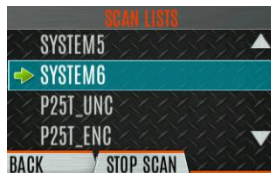
Depending on the scan list options selected via RPM2, you may be able to add or remove channels/groups from the scan list.

To edit the scan list:

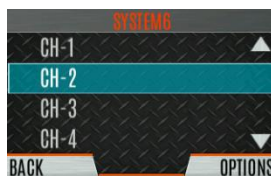
1. Press the Menu/Select button.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to select **SCAN LISTS**.



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

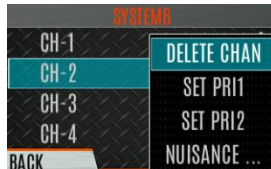


5. Press the up or down navigation buttons to highlight channel/group.
6. Select **OPTIONS**.



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

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



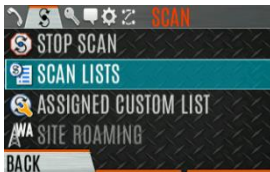
8. Press the Menu/Select button to toggle selection.

5.12.5 Set or Remove Priority 1 and Priority 2 Channels

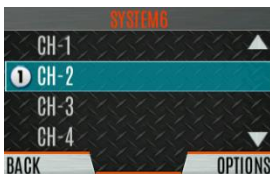
Priority channels are scanned more often than non-priority channels. Note that P1 and P2 can only be set if configured as “Keypad” and the scan list is not set to “Fixed” using RPM2.

To set or remove priority 1 and priority 2 channels:

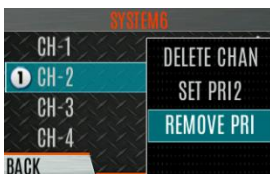
1. Press the Menu/Select button.
2. Press the left or right navigation buttons to display the SCAN menu.
3. Press the up or down navigation buttons to highlight SCAN LISTS and press the Menu/Select button.



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



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



5.12.6 Custom Scan Lists

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

- P25T Scan

When a custom scan list is assigned to a P25T system, the user can scan P25T, P25C, and Analog groups/channels. All P25T systems must have the same WACN, System ID, and Unit ID to be added to the custom scan list. If P25C and/or analog channels are added to the custom scan list, the radio will scan them using the Trunked/Conventional scan feature described in section 5.12.2, and will override any other conventional scan list that may have been programmed using RPM2.

- P25C and Analog Scan

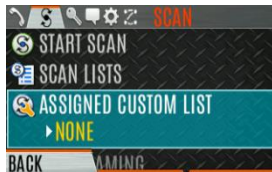
When a custom scan list is assigned to a P25C or Analog System, the user can scan P25C and Analog channels. P25T systems are ignored.

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

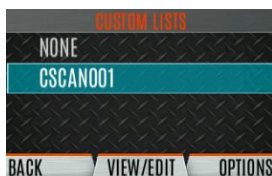
5.12.6.1 Create Custom Scan List

To create a custom scan list at the radio:

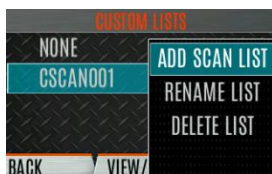
1. Press the Menu/Select button.
2. Press the left or right navigation buttons to display the **SCAN** menu.
3. Press the up or down navigation buttons to highlight **ASSIGNED CUSTOM LIST** and press the Menu/Select button.



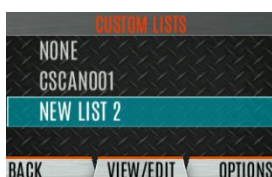
4. Press the **OPTIONS** softkey.



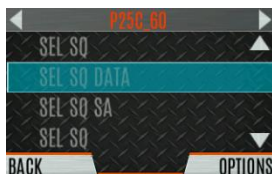
5. Select **ADD SCAN LIST**.



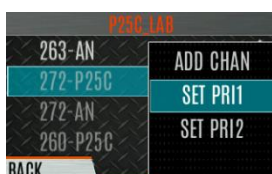
6. Press the up or down navigation buttons to highlight the newly added scan list and press the **VIEW/EDIT** soft key.



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



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





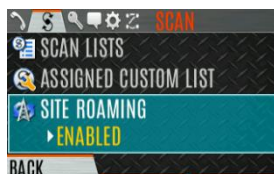
When a custom scan list is selected, that list is scanned any time scanning is enabled for any Trunked, conventional, or P25 Conventional system. To scan only the channels assigned to a system, custom scanning must be turned off.

5.12.7 Wide Area System Scan (P25 Trunked)

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

To enable/disable Wide Area System Scan:

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



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

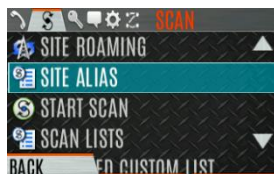
5.12.8 Site Lock

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

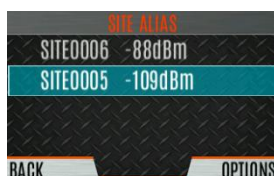


Site Lock is only supported on P25 Trunked Systems with Enhanced CC Scan enabled. A button on the control head can be programmed to access the Site Alias list (see Section 6.4).

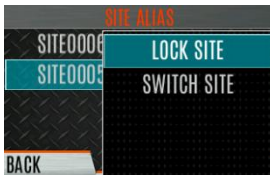
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the SCAN menu.
3. Press the up or down navigation buttons to highlight **SITE ALIAS**.



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



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



5.13 RADIO STATUS

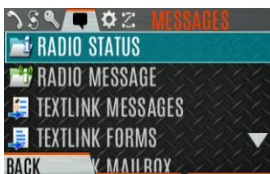
The status feature allows the radio user to send a status condition to the site without making a voice call. There can be up to 10 status conditions programmed into the radio. For each status defined, there is an ID and an alphanumeric name. The ID is sent to the site and the alphanumeric name appears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



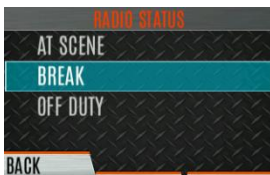
A button on the control head can be programmed to send a radio status (see Section 6.4).

To send a radio status:

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



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



5.14 RADIO MESSAGE

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

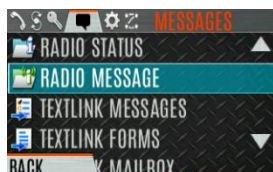


A button on the control head can be programmed to send a radio message (see Section 6.4).

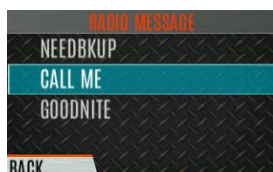
To send a radio message:

- Press the Menu/Select button to access the main menu.

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



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



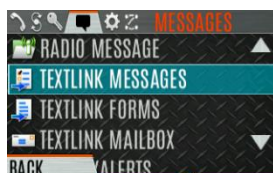
5.15 RADIO TEXTLINK

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

5.15.1 Radio TextLink Messages

To send a canned Radio TextLink message:

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



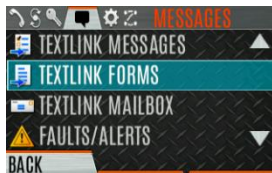
4. Press the left or right navigation buttons to display the desired message.
 - Press the Menu/Select button to send the message.
 - Select **CHG CALLEE** to change the destination for the message.
 - Select **TOD QUERY** to get the time of day.

5.15.2 Radio TextLink Forms

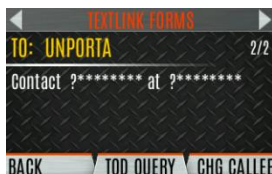
Form messages are displayed and stored in the radio as a message in which each field to be filled is indicated by a question mark (?) followed by one or more asterisks (*). The number of asterisks indicates the maximum number of alphanumeric characters allowed for that field.

To send a Radio TextLink form:

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



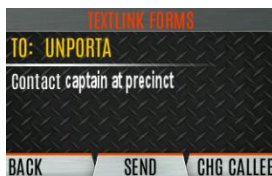
4. Press the left or right navigation buttons to display the desired message and press the Menu/Select button.



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



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

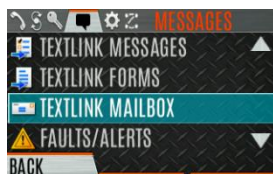


5.15.3 View Received Messages

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

To view received Radio TextLink messages:

1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **MESSAGES** menu.
3. Press the up or down navigation buttons to highlight **TEXTLINK MAILBOX** and press the Menu/Select button. From the mailbox, select **OPTIONS** to delete messages, view details of messages, and reply to messages.

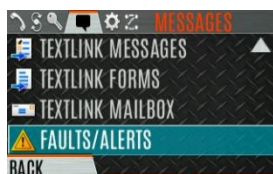


5.16 FAULTS/ALERTS

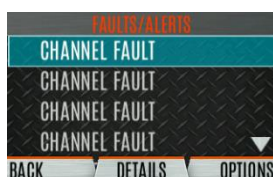
is displayed on the idle display when there is a fault.

To view and clear faults/alerts:

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



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



Possible faults include:

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

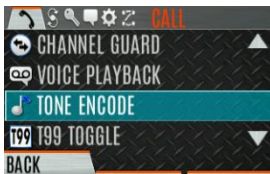
5.17 TONE ENCODE

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

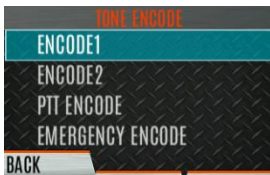
Tone encoding schemes are used to transmit calls to one or more target radios that have been programmed with the correct tone decode sequence. When the receiving radio detects its tone decode sequence, it unmutes on the call.

To select a Tone Encode option:

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



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



5.18 ENCRYPTION

5.18.1 Create and Load Keys

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

- 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
- Motorola® KVL 3000 Plus Key Variable Loader (KVL) User's Guide
- Motorola KVL 4000 Key Variable Loader (KVL) User's Guide

5.18.2 Zeroize Keys from Radio

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

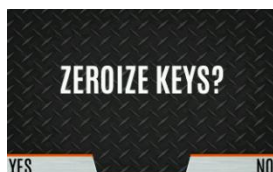
To zeroize keys from the radio:

1. Press the Menu/Select button to access the main menu.

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



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



5.18.3 Protected Keys

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

5.18.4 Global Encryption

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

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

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

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

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



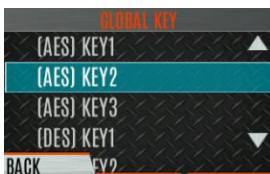
4. Press the up or down navigation buttons to highlight the desired Global Key and press the Menu/Select button to enable Global Encryption.



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



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



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

5.18.5 Select Keyset

To select a keyset:

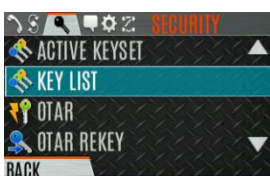
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SECURITY** menu.
3. Press the up or down navigation buttons to select **ACTIVE KEYSET**. Press the Menu/Select button to toggle to the inactive keyset.



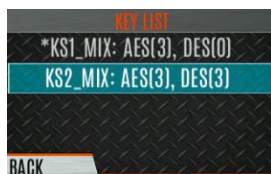
5.18.6 View Key List

To view the key list:

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



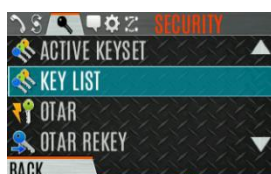
9. The available key lists are displayed.



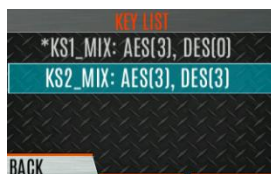
5.18.7 Delete Individual Keys

To delete individual keys from a keyset:

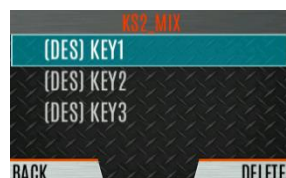
1. Press the Menu/Select button to access the main menu.
2. Press the left or right navigation buttons to display the **SECURITY** menu.
3. Press the up or down navigation buttons to select **KEY LIST** and press the Menu/Select button.



4. The available key lists are displayed.



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



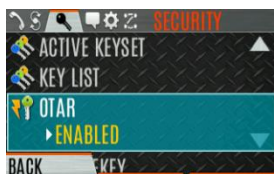
5.18.8 OTAR Configuration

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

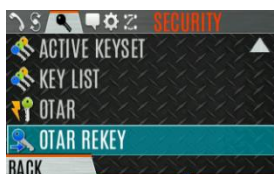
The KMF Configuration must include the RSI of the KMF and the appropriate Message Number Period.

To enable OTAR and request rekey:

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



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



5.19 P25 CONVENTIONAL FALLBACK

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

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

6. PROGRAMMING

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

6.1 PROGRAMMING VIA RPM2

Radio Personality Manager (RPM2) is used for the bulk of programming the radio. With RPM2, you can fully program the radio using cable 12082-0410-A1.



NOTE

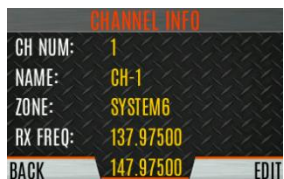
Ensure that the radio is turned off before connecting the programming cable. After the cable is connected, then power on the radio.

6.2 EDIT CHANNEL (ANALOG AND P25 CONVENTIONAL ONLY)

Channels can be edited from the Channel Information (CH INFO) menu display. Most of the displayed channel parameters can be modified here. Channel edits persist across a power cycle. Loading a personality clears any channel edits. Available parameters vary depending on whether the channel is a P25 or analog channel.

To edit a channel:

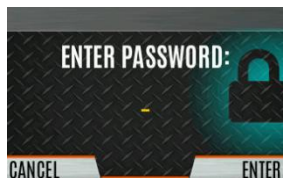
1. From the main display, press **◀** to access the **CH INFO** screen.
2. Press the up or down navigation buttons to scroll through the programmed channel settings.
3. Press the **EDIT** soft key.



CAUTION

Only authorized users should attempt channel editing.

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



6. Highlight and select the parameter to edit. For P25 channels, modify remaining channel settings:
 - **CHANNEL NAME** - The Channel Name cannot be changed from this screen; RPM2 is required to change the Channel Name.

- **RX FREQUENCY** - Receive frequency. Note that if the new frequency is invalid, the display reverts to the old frequency (Table 6-1).
- **TX FREQUENCY** - Transmit frequency.
- **TX POWER** - Transmit power. Toggle between LOW and HIGH.
- **TALKGROUP** - Select a talkgroup for the channel. Talkgroup name cannot be set here.
- **RX NAC** - Network Access Code (NAC) radio uses for Normal squelch in receive.
- **TX NAC** - NAC radio transmits to break Normal squelch on receiving radio.
- **P25 SQUELCH** - Select type the radio uses in receive. Select NORMAL, SELECTIVE, or MONITOR.
- **RX CHAN GUARD** - Squelch type radio uses in receive. Select Noise, CTCSS, or CDCSS. For a digital channel, the RX CHAN GUARD is used to receive from a Conventional analog channel that is on the same frequency and uses the selected Channel Guard.
 - **RX CODE** - Code radio looks to unmute the speaker on the receiving radio when CDCSS squelch is used in conventional mode.
 - **RX TONE** - Tone radio looks to unmute the speaker on the receiving radio when CTCSS squelch is used in conventional mode.

7. For analog channel, modify remaining channel settings:

- **CHANNEL NAME** - The Channel Name cannot be changed from this screen; RPM2 is required to change the Channel Name.
- **TX FREQUENCY** - Transmit frequency.
- **TX POWER** - Transmit power. Toggle between HIGH and LOW.
- **RX CHAN GUARD** - Squelch type radio uses in receive. Select Noise, CTCSS, or CDCSS.
 - **RX TONE** - Tone radio uses to break selective squelch on receiving radio. This is available when RX squelch is set to CTCSS.
 - **RX CODE** - Code radio uses to break selective squelch on receiving radio. This is available when RX squelch is set to CDCSS.



NOTE

RX CHAN GUARD is not available on this screen if it was enabled from the CALL menu as per Section 4.18.

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



NOTE

TX CHAN GUARD is not available on this screen if it was enabled from the CALL menu as per Section 4.18.

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



NOTE

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

Table 6-1: Valid Frequency Ranges

INTERNATIONAL (NON-REBANDED)	FCC (US) (REBANDED)
763 - 776 MHz	769 - 775 MHz
793 - 806 MHz	799 - 805 MHz
806 - 825 MHz	806 - 816 MHz
851 - 870 MHz	851 - 861 MHz
896 - 902 MHz	896 - 901 MHz
935 - 944 MHz	935 - 944 MHz

6.3 OTAP

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

You can interrupt the programming process, if necessary, by depressing the Push-to-Talk (PTT) button or declaring an emergency. Once a radio personality update is successfully completed, the radio automatically resets itself, switches to the new personality, and returns to normal operation. For more information on using ProFile Manager, refer to software release notes AE/LZT 123 3263/1.

6.4 PROGRAMMABLE BUTTONS

Press the down navigation button while on the main display to view the functions assigned to the programmable buttons. The programmable buttons are programmed using RPM2. A delay of 0 to 10 seconds can be defined using RPM2 for the programmable buttons. Table 6-2 lists and describes the functions that can be programmed to the buttons:

Table 6-2: Programmable Button Options

FUNCTION	DESCRIPTION
No Operation	
Adjust Squelch	Allows the user to adjust the analog squelch level.
Audio Playback	Accesses the AUDIO PLAYBACK menu. See Section 4.23.
Channel Guard Override	Allow user to pick a different Channel Guard setting for the current channel.
Channel/Group Bank Select	Select the channel/group bank. If your system has more than 64 channels, this allows you to select a channel group with channels 65 to 127, 128 to 191, etc.
Drop Call	Drop or terminate any group call that the radio receives.
Backlight	Toggles the display's backlight On/Off/Momentary.
GPS SA Info	Display GPS Situational Awareness (SA) screen.
Home	Goes to home channel.

FUNCTION	DESCRIPTION
Individual Call	Initiate an Individual Call.
Lock Keypad	Locks the programmable function keys and navigation keys.
Monitor Toggle	Toggles Monitor On/Off.
Monitor/Clear	Temporarily turn off selected squelch to monitor for traffic that may not normally break squelch. Also, press this button followed by the emergency button to clear an emergency.
Nuisance Delete	Performs a Nuisance Delete. See Section 4.27 for more information.
Numeric Channel Entry	Allows number channel entry.
OTAR Rekey	Initiate an OTAR rekey. See Section 5.18.7.
Profile Toggle	Toggles between the currently active profile (if one has been selected) and no profile.
Scan Enable	Enable/disable scan.
Secure Enable Toggle	Toggles Encryption Mode On/Off. See Sections 4.17 and 5.18 for information on Encryption.
Send Message	Sends a preconfigured message. See Section 5.14 for more information.
Send Status	Sends a preconfigured status. See Section 5.13 for more information.
Site Alias	Accesses the Site Alias list. See Section 5.12.8 for more information.
Site Roaming	Enable/disable Site roaming. Site Roaming allows the radio to roam to another site.
Speaker Mute Toggle	Toggles Speaker Muted/Unmuted.
System Down	Scrolls down through the list of available systems, stopping when the end of the list is reached.
System Down Wrap	Scrolls down through the list of available systems, wrapping to the top when the bottom of the list is reached.
System Up	Scrolls up through the list of available systems, stopping at the top of the list.
System Up Wrap	Scrolls up through the list of available systems, wrapping to the end when the beginning of the list is reached.
Talkaround	Toggles talkaround On/Off. See Section 4.19.
TX Power High/Low	Toggle TX Power between LOW and HIGH.
Voice Announce	Enable/disable Voice Annunciation. See Section 4.16.
Zone Down	Scrolls down through the list of available mixed system zones, stopping when the end of the list is reached. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.
Zone Down Wrap	Scrolls down through the list of available mixed system zones, wrapping to the top when the bottom of the list is reached. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.
Zone Up	Scrolls up through the list of available mixed system zones, stopping at the top of the list. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.
Zone Up Wrap	Scrolls up through the list of available mixed system zones, wrapping to the end when the beginning of the list is reached. If no mixed system zones are defined, or there is only one, the user will hear a deny tone when the button is pressed.

6.5 PROGRAMMABLE ICONS

The display has space for up to 16 configurable icons, which can be programmed to display any of the following:

- Blank
- Signal Strength

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

7. REFERENCE

7.1 MARINE FREQUENCIES

Refer to Table 7-1: 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 7-1: Marine Frequencies

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

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

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

US CH.	INTL CH.	CA CH.	SHIP (MHZ)	SHORE (MHZ)	CHANNEL USAGE
	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.
72	72	72	T/R: 156.625	T/R: 156.625	US: Non-Commercial (Intership only) International: Intership Canada: May be used to communicate with aircraft and helicopters in predominantly maritime support operations. Pleasure craft - British Columbia coast area

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

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

7.2 NARROWBANDING

The FCC has mandated that all public safety radios manufactured after January 1, 2013 comply with narrowbanding restrictions. Radios manufactured after the above date will comply with these restrictions. Existing radio personalities that contain frequencies that violate these FCC rules will cause an invalid channel error indication on the radio display. The user will need to change the radio personality to comply with the new rules. Note that there are multiple exceptions to the narrowbanding mandate, including the Marine Frequencies listed in Section 7.1.

8. GLOSSARY

-A-

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

-B-

-C-

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

-D-

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

-E-

EPIRB	Emergency Position-Indicating Radio Beacons
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-F-

F	Fahrenheit
FCC	Federal Communications Commission
FM	Frequency Modulation

-G-

GHz	Giga (10 ⁹) Hertz
GEOTRANS	Geographic Translator
GPS	Global Positioning System

-H-

Hz	Hertz
HKL	Harris Key Loader

-I-

ID	Identification
IEEE	Institute of Electrical & Electronics Engineers
INTL	International

-J-

-K-

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

-L-

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

-M-

MHz	Megahertz
mm	Millimeter
MR	Mobile Radio
ms	milli (10 ⁻³) seconds

-N-

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

-O-

OET	Office of Engineering and Technology
OTAR	Over-The-Air Rekey

-P-

P25	Project 25
POS	Position
PRI	Priority (Channel)
PTT	Push-to-Talk

-Q-**-R-**

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

-S-

SA	Situational Awareness
SMA	Subminiature Version A

-T-

TIA	Telecommunications Industry Association
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TX	Transmit	
		-U-
UHF	Ultra High Frequency	
UKEK	Unique Key Encryption Key	
US	United States	
USCG	United States Coast Guard	
UTC	Universal Time Coordinated	
UTM	Universal Transverse Mercator	
		-V-
VDC	Volts, Direct Current	
VHF	Very High Frequency	
VIDA	Voice Interoperability Data Access	
VTs	Vessel Traffic Service	
		-W-
WEEE	Waste from Electric and Electronic Equipment	
		-X-
		-Y-
		-Z-

9. BASIC TROUBLESHOOTING

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

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

9.1 ERROR MESSAGES

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

Table 9-1: Displayed Error Messages, Reasons, and Resolutions

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

9.2 OTAR ERRORS/INFORMATION

WORKAROUNDS:

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

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

10. TECHNICAL ASSISTANCE

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

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

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

North America:	1-800-528-7711
International:	1-434-385-2400
Fax:	1-434-455-6712
E-mail:	PSPC_tac@harris.com

11. 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 the Customer Care center webpage:

<https://www.harris.com/solution/pspc-customer-service>

While on the webpage, please review the applicable product warranty literature.

NOTES

About Harris Corporation

Harris Corporation is a leading technology innovator, solving customers' toughest mission-critical challenges by providing solutions that connect, inform and protect. Harris supports government and commercial customers in more than 100 countries and has approximately \$6 billion in annual revenue. The company is organized into three business segments: Communication Systems, Space and Intelligence Systems and Electronic Systems. Learn more at harris.com.

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