



P5400 Series

Portable Radio

AT	OY	DK	ES	HU	FI	LU	NL	PT	SI
BE	OZ	EE	FI	IE	LI	NO	RO	SK	
BG	DE	EL	FR	IS	LT	MT	PL	SE	UK
CH									

CE 0560

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Declaration of Conformity

We, the undersigned,

Company	Harris Corporation, RF Communications Division
Address, City	221 Jefferson Ridge Parkway, Lynchburg, VA 24501
Country	United States
Phone number	434.455.6600
Fax number	434.455.6851

certify and declare under our sole responsibility that the following equipment:

Product description / Intended use	PTT handheld portable radio
EU / EFTA member states intended for use	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom; Iceland, Liechtenstein, Norway, Switzerland.
Member states with restrictive use	
Manufacturer	Harris Corporation
Brand	P5400
Type	VHF (136-174 MHz); UHF-L (378 – 430 MHz); UHF-H (440 – 512 MHz)

is tested to and conforms with the essential requirements for protection of health and the safety of the user and any other person and Electromagnetic Compatibility, as included in following standards:

Standard	Issue date
EN 60950-1	2006
EN 301 489-1 V1.6.1	2005-09
EN 301 489-5 V1.3.1	2002-08

and is tested to and conforms with the essential radio test suites so that it effectively uses the frequency spectrum allocated to terrestrial/space radio communication and orbital resources so to as to avoid harmful interference, as included in following standards:

Standard	Issue date
EN 300 086-2 V1.1.1	2001-03
EN 300 113-2 V1.3.1	2003-12

and therefore complies with the essential requirements and provisions of the **Directive 1999/5/EC** of the European Parliament and of the council of March 9, 1999 on Radio equipment and Telecommunications Terminal Equipment and the mutual recognition of their conformity and with the provisions of Annex IV (Conformity Assessment procedure referred to in article 10).

The following Notified Body has been consulted in the Conformity Assessment procedure:

Notified Body number	Name and address
0560	Telefication B.V., Edisonstraat 12 A, 6902 PK Zevenaar, The Netherlands

The technical documentation as required by the Conformity Assessment procedure is kept at the following address:

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TCF/TF reference nr.	2008051TCF
Drawn up in	Herndon, VA
Date	July 1, 2008
Updated	August 3, 2010

Daryl G. Popowitch

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MANUAL REVISION HISTORY

REV	DATE	REASON FOR REVISION
B	Mar/08	Added SAR information for VHF series P5400 portable radios and updated the product warranty.
C	Apr/08	Added SAR information for 800 MHz series P5400 portable radios. Added Type 99 Operation information.
D	Oct/08	Added CE Marking, OpenSky, and V-TAC operation. Updated OpenSky user interface information.
E	Aug/09	Reformat to change to the Harris corporate identity. Include, modify, and make consistent any language for Dual Position A/B Switch functionality.
F	Mar/10	Removed reference to BT-023406-006.
G	Apr/11	Updated for OTP R17 and consolidated EDACS, Conventional, and P25 operation into one section.
H	Jul/11	Updated Declaration of Conformity, incorporated addendum, minor correction to Section 8.25.1.
J	Oct/12	Added stealth mode and PIN entry. Added cleaning instructions.
K	May/13	Added Audio Playback. Added OTP R20A features and updated OpenSky operation. Updated options and accessories. Updated warranty.
L	Sep/13	Updated accessories. Updated cleaning procedure.
M	May/14	Updated accessories and data TX/RX indicators. Adding Radio TextLink operation, view GPS information, and control and status services.
N	Oct/14	Updated for XGP R4A – added Voice Annunciation.

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1. SAFETY CONVENTIONS

The following conventions are used throughout this manual to alert the user to general safety precautions that must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warning elsewhere in this manual 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 the equipment performance.



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



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



The electrical hazard symbol indicates there is an electrical hazard present.

2. SAFETY TRAINING INFORMATION



The Harris P5400 portable radio generates RF electromagnetic energy during transmit mode. This radio is designed for and classified as “Occupational Use Only,” meaning it must be used only during the course of employment by individuals aware of the hazards and the ways to minimize such hazards. This radio is NOT intended for use by the “General Population” in an uncontrolled environment.

The P5400 portable radio has been tested and complies with the FCC RF exposure limits for “Occupational Use Only.” In addition, this Harris radio complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans:

- FCC OET Bulletin 65 Edition 97-01 Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
- American National Standards Institute (C95.1 – 1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- American National Standards Institute (C95.3 – 1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.

2.1 RF EXPOSURE GUIDELINES



To ensure that exposure to RF electromagnetic energy is within the FCC allowable limits for occupational use, always adhere to the following guidelines:

DO NOT operate the radio without a proper antenna attached, as this may damage the radio and may also cause the FCC RF exposure limits to be exceeded. A proper antenna is the antenna supplied with this radio by Harris or an antenna specifically authorized by Harris for use with this radio. (Refer to Table 7-1.)

- DO NOT transmit for more than 50% of total radio use time (“50% duty cycle”). Transmitting more than 50% of the time can cause FCC RF exposure compliance requirements to be exceeded. The radio is transmitting when the “TX” indicator appears in the display. The radio will transmit by pressing the “PTT” (Push-To-Talk) button.
- ALWAYS transmit using low power when possible. In addition to conserving battery charge, low power can reduce RF exposure.
- ALWAYS use Harris authorized accessories (antennas, batteries, belt clips, speaker/mics, etc). Use of unauthorized accessories may cause the FCC Occupational/Controlled Exposure RF compliance requirements to be exceeded. (Refer to Table 2-1.)

- As noted in Table 2-1, ALWAYS keep the device and its antenna **AT LEAST** 1.1 cm (0.43 inches) from the body and at least 2.5 cm (1.0 inch) from the face when transmitting to ensure FCC RF exposure compliance requirements are not exceeded. However, to provide the best sound quality to the recipients of your transmission, Harris recommends you hold the microphone at least 5 cm (2 inches) from mouth, and slightly off to one side.

Table 2-1: RF Exposure Compliance Testing Distances

RADIO FREQUENCY	TESTED DISTANCES (worst case scenario)	
	Body	Face
VHF	1.1 cm	2.5 cm
UHF-L (378-430 MHz)	1.1 cm	2.5 cm
UHF-H (440-512 MHz)	1.1 cm	2.5 cm
800 MHz	1.1 cm	2.5 cm

The information in this section provides the information needed to make the user aware of RF exposure, and what to do to assure that this radio operates within the FCC RF exposure limits of this radio.

2.2 ELECTROMAGNETIC INTERFERENCE/COMPATIBILITY

During transmissions, this Harris radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so. DO NOT operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals, aircraft, and blasting sites.

2.3 REGULATORY APPROVALS

2.3.1 Part 15

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

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

2.3.2 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.

3. OPERATING TIPS

Antenna location and condition are important when operating a portable radio. Operating the radio in low lying areas or terrain, under power lines or bridges, inside of a vehicle or in a metal framed building can severely reduce the range of the unit. Mountains can also reduce the range of the unit.

In areas where transmission or reception is poor, some improvement may be obtained by ensuring that the antenna is vertical. Moving a few yards in another direction or moving to a higher elevation may also improve communications. Vehicular operation can be aided with the use of an externally mounted antenna.

Battery condition is another important factor in the trouble free operation of a portable radio. Always properly charge the batteries.

3.1 EFFICIENT RADIO OPERATION

For optimum audio clarity at the receiving radio(s), hold the portable radio approximately two inches from your mouth and speak into the microphone at a normal voice level.

Keep the antenna in a vertical position when receiving or transmitting a message.

Do not hold the antenna when receiving a message and, especially, do not hold when transmitting a message.



Do NOT hold onto the antenna when the radio is powered on!

3.2 ANTENNA CARE AND REPLACEMENT



Do not use the portable radio with a damaged or missing antenna. A minor burn may result if a damaged antenna comes into contact with the skin. Replace a damaged antenna immediately. Operating a portable radio with the antenna missing could cause personal injury, damage the radio, and may violate FCC regulations.



Use only the supplied or approved antenna. Unauthorized antennas, modifications, or attachments could cause damage to the radio unit and may violate FCC regulations. Refer to Table 7-1.

3.3 ELECTRONIC DEVICES



RF energy from portable radios may affect some electronic equipment. Most modern electronic equipment in cars, hospitals, homes, etc. is shielded from RF energy. However, in areas in which you are instructed to turn off two-way radio equipment, always observe the rules. If in doubt, turn it off!

3.4 AIRCRAFT



- Always turn off a portable radio before boarding any aircraft!
- Use it on the ground only with crew permission.
- **DO NOT** use while in-flight!

3.5 ELECTRIC BLASTING CAPS



To prevent accidental detonation of electric blasting caps, **DO NOT** use two-way radios within 1000 feet of blasting operations. Always obey the "Turn Off Two-Way Radios" signs posted where electric blasting caps are being used. (OSHA Standard: 1926.900)

3.6 POTENTIALLY EXPLOSIVE ATMOSPHERES



Areas with potentially explosive atmospheres are often, but not always, clearly marked. These may be fuelling areas, such as gas stations, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles, such as grain, dust, or metal powders.

Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Turn OFF two-way radios when in any area with a potentially explosive atmosphere. It is rare, but not impossible that a radio or its accessories could generate sparks.

4. CLEANING

Keep the exterior of the radio, battery, antenna, and radio accessories clean.

Periodically clean using the following procedures:

1. To remove dust and dirt, clean using damp clean cloth (warm water and mild detergent soap).
2. Follow by wiping with damp (warm water) clean cloth. Wipe dry with clean cloth.
3. Remove the battery and wipe the battery and radio contacts using a soft dry cloth to remove dirt or grease. This will ensure efficient power transfer from the battery to the radio.
4. Remove any accessories and clean the accessories Universal Device Connector (UDC) contacts using a clean dry cloth. When the UDC is not in use, cover the connector with the protective dust cap to prevent the build-up of dust or water particles.
5. If the radio is used in a harsh environment (such as driving rain, salt fog, etc.), it may be necessary to periodically dry and clean the battery and radio contacts with a soft dry cloth or soft-bristle non-metallic brush.

For more rigorous cleaning, use the following procedure:



Do not use chemical cleaners, spray, or petroleum-based products. They may damage the radio housing. We recommend using Chemtronics® Electro-Wash® PR (ES-1603) or equivalent.

1. Apply the cleaning solution to a clean damp cloth and clean the radio.



Do not spray cleaning solution directly on radio. To clean the radio in the speaker and microphone areas, carefully wipe these areas but prevent the cleaning solution from entering the speaker or microphone openings.

2. Wipe off the radio with clean damp cloth using mild warm soapy water.
3. Follow up by wiping off the radio with clean damp cloth using warm water only.
4. Wipe dry with clean cloth.

5. BATTERIES

The P5400 series portable radios use rechargeable, recyclable Nickel Cadmium (NiCd), Nickel Metal Hydride (NiMH), or Lithium-Ion (Li-Ion) batteries. Please follow the directions below to maximize the useful life of each type of battery.



Do not disassemble or modify Lithium Ion battery packs. The Lithium Ion battery packs are equipped with built-in safety and protection features. Should these features be disabled or tampered with in any way, the battery pack can leak acid, overheat, emit smoke, burst, and/or, ignite.



If the battery is ruptured or is leaking electrolyte that results in skin or eye contact with the electrolyte, immediately flush the affected area with water. If the battery electrolyte gets in the eyes, flush with water for 15 minutes and consult a physician immediately.

5.1 CONDITIONING BATTERY PACKS

5.1.1 Conditioning NiMH Battery Packs

Condition a new NiMH battery before putting into use. This also applies to rechargeable NiMH batteries that have been stored for long periods (weeks, months, or longer). Conditioning requires fully charging and fully discharging the battery three (3) times using the tri-chemistry charger. The first time the battery is put into the charger, this unit will condition Nickel-based battery packs by automatically charging and discharging (cycling) the battery. Refer to the appropriate charger manual for details.



Failure to properly condition NiMH battery packs before initial use will result in shortened performance by the battery.

5.1.2 Conditioning NiCd Battery Packs

A new NiCd battery does not require conditioning before use. Periodically condition NiCd batteries to avoid the memory effect. If a NiCd battery is repeatedly charged and not fully discharged, the result is lower voltage and a lower capacity. Fortunately, both nominal voltage and capacity are restored through battery conditioning.

Conditioning requires fully charging and fully discharging the battery three (3) times using the tri-chemistry charger. The first time the battery is put into the charger, this unit will condition Nickel-based battery packs by automatically charging and discharging (cycling) the battery. Refer to the appropriate charger manual for details.



Always use Harris authorized chargers and conditioners. Use of unauthorized chargers and conditioners may void the warranty.

5.1.3 Additional Information

For more information regarding the proper care of portable radio battery packs or establishing a battery maintenance program, refer to ECR-7367 which may be ordered by calling toll free 1-800-368-3277 (international - 1-434-455-6403) or via <https://premier.pspc.harris.com/infocenter/>.

5.2 STORING LI-ION BATTERY PACKS

If a battery pack is expected to be idle for a month or more, it should be properly prepared. Li-Ion battery packs should not be stored fully charged. Before storing the battery pack, discharge it to 40% capacity. If the battery is not discharged prior to storage, its overall capacity may be reduced. Although all battery packs experience some capacity loss during storage, the shelf life for Li-Ion battery packs is about 3 months. However, note that any capacity drop which occurs during storage is permanent and cannot be reversed. Li-Ion battery packs should be purchased and used immediately. They should not be stock-piled without a rotating stock plan.

5.3 CHARGING BATTERY PACKS

Battery chargers are available from Harris with nominal charge times. Combinations include single and multi-position charge units.

Harris chargers are specifically designed for charging nickel-based and Lithium Ion battery packs. The chargers are chemistry-specific for the battery packs and automatically adjust the charging profiles accordingly. Refer to the appropriate charger manual for specific operating instructions.

Observe the following guidelines when charging a battery pack:

- Avoid high temperature during charging.
- Discontinue use if the charger is overheating.
- Only charge Harris battery packs using a charger approved for use by Harris.
- Do not leave batteries in the charger indefinitely. For best results leave the battery in the charger for two to six hours after the Green Ready LED comes on. Then place the battery pack into service and fully discharge (as indicated by the radio low battery warning) before re-charging.

If any faults are encountered while charging the battery pack, consult the charger's manual to determine the cause and possible corrective action.

5.4 BATTERY PACK USAGE

Both Nickel-based and Lithium-Ion batteries vary in capacity and life cycle. For instance, NiCd batteries have a longer life cycle than NiMH batteries whereas NiMH batteries have a larger capacity. However, both Nickel-based and Lithium-Ion type batteries require basic usage guidelines be followed in order to optimize the battery runtime or shift life.

The following guidelines will help optimize the battery runtime or shift life:

- Ensure Nickel-based battery packs are fully discharged (as indicated by the radio low battery warning) before re-charging. Full discharge is not required for Lithium-Ion battery packs.
- Periodically condition Nickel-based battery packs. The frequency should be determined based on usage patterns (refer to ECR-7367). If the battery is fully discharged (to radio Low Battery warning) during routine use, the frequency of conditioning may be reduced. Lithium-Ion batteries do not suffer from memory-effect and therefore do not require conditioning.

Do not leave any Harris rechargeable batteries in a charger for more than a few days.

5.5 CHANGING THE BATTERY PACK

5.5.1 Removing the Battery Pack

Make sure the power to the radio is turned OFF.



Although the P5400 has been designed to tolerate changing the battery pack without turning power off, Harris recommends turning the radio off before changing battery packs to ensure safety and best operation.

1. Press or pull both latches on either side of the battery pack ① toward the bottom of the radio simultaneously.
2. Pull the battery ② away from the radio.
3. Remove the battery pack from the radio.



Figure 5-1: Removing the Battery Pack

5.5.2 Attaching the Battery Pack

Make sure the power to the radio is turned OFF.

1. Align the tabs at each side on the bottom of the battery pack with the slots at the bottom of the battery cavity ①.
2. Push the top of the battery pack ② down until the latches click to attach the battery to the radio.
3. Tug gently to verify that the latches are secure and the battery pack is properly attached to the radio.



Figure 5-2: Attaching the Battery Pack

5.6 BATTERY DISPOSAL



In no instance should a battery be incinerated. Disposing of a battery by burning will cause an explosion.



RECHARGEABLE BATTERY PACK DISPOSAL – The product you have purchased contains a rechargeable battery. The battery is recyclable. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal. Canadian and U.S. users may call Toll Free 1-800-8-BATTERY® for information and/or procedures for returning rechargeable batteries in your locality.

6. INTRODUCTION

The P5400 series portable radio is available in two models: the P5450 Scan model with a limited 6-button front-mounted keypad and the P5470 System model with a 15-button DTMF front-mounted keypad.



Figure 6-1: P5470 System and P5450 Scan Models

The P5400 portable radio delivers end-to-end encrypted digital voice and IP data communications. It is designed to support multiple operating modes including:

- EDACS® (*Enhanced Digital Access Communications System*)
- ProVoice™ Trunked Mode
- OpenSky® Trunked Protocol
- P25 Trunked Mode
- P25 Digital Conventional Mode
- Conventional Analog Mode

The P5400 portables can include all of these modes or just one. Additional modes of operation can be added with software updates.

The P5400 supports a full range of advanced digital trunking features, including voice group calls, priority scanning, emergency calls, late call entry, and dynamic reconfiguration. It performs autonomous roaming for wide area applications. High quality voice coding and robust audio components assure speech clarity.

In the trunked modes, the user selects a communications “operating” system (i.e., EDACS, OpenSky, ProVoice, or P25) and group. While communicating in a trunked mode, channel selection is transparent to the user and is controlled via digital communication with the system controller (e.g., a CSD in an EDACS system). This provides advanced programmable features and fast access to communication channels.

In Conventional Analog mode, the user selects a channel and communicates directly on that channel. A channel is a transmit/receive radio frequency pair.

The exact operation of the radio will depend on the operating mode, the radio’s programming, and the particular radio system. Most features described in this manual can be enabled through programming. Consult your System Administrator for the particular features programmed into your P5400. Then refer to the corresponding section(s) within this manual for feature and operation information.

6.1 WATER RESISTANCE

The P5400 series portable radios operate reliably even under adverse conditions. These radios meet MIL-STD-810F specifications for wind driven rain, humidity, and salt fog.

6.2 UNIVERSAL DEVICE CONNECTOR

The Universal Device Connector (UDC) provides connections for external accessories such as a headset, a speaker-microphone, audio test box, audio test cables, and programming cables. The UDC is located on the right side of the radio, opposite the PTT Button. The UDC facilitates programming and testing the radio. The UDC pins perform different functions depending on the accessory attached to the UDC.

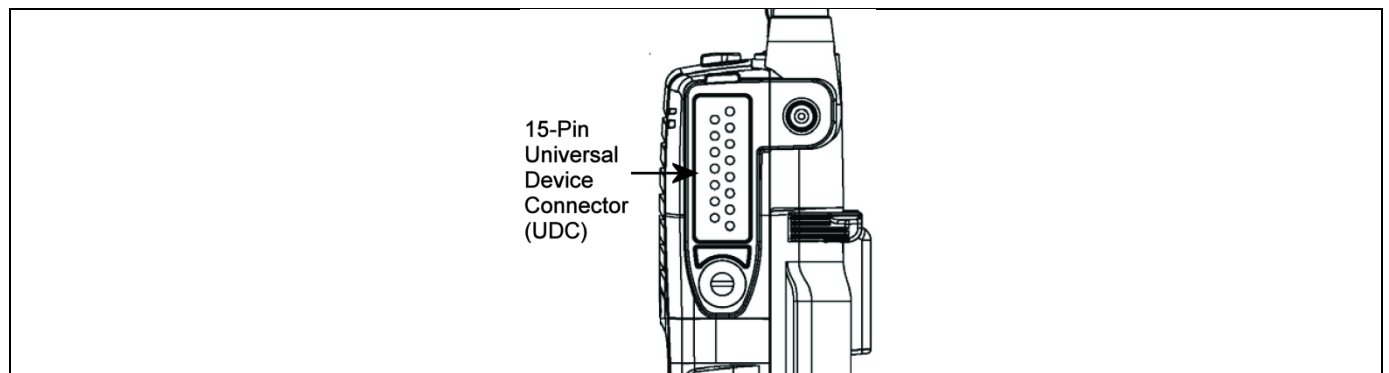


Figure 6-2: P5400 15-Pin Universal Device Connector

7. OPTIONS AND ACCESSORIES

Table 7-1 lists the Options and Accessories tested for use with the P5400 series portable radios. Refer to the Products and Services Catalog for a complete list of options and accessories, including those items that do not adversely affect the RF energy exposure.



Always use Harris authorized accessories (antennas, batteries, belt clips, speaker/mics, etc). Use of unauthorized accessories may cause the FCC Occupational/Controlled Exposure RF compliance requirements to be exceeded. Refer to Table 2-1.



Always use the correct options and accessories (battery, antenna, speaker/mic, etc.) for the radio. Immersion rated options must be used with an immersion rated radio. Intrinsically safe options (identified by [FM]) are certified by Factory Mutual and must only be used with FM certified radios or, if applicable, Canadian Standards Association (CSA) certified radios. See Table 7-1.

Table 7-1: Options and Accessories¹

DESCRIPTION	PART NUMBER	OPTION NUMBER
ANTENNAS		
Helical Coil 136-151 MHz	KRE 101 1219/1	MAEX-NNC1B
Helical Coil 150-162 MHz	KRE 101 1219/2	MAEX-NNC1C
Helical Coil 162-174 MHz	KRE 101 1219/3	MAEX-NNC1D
Helical Coil 150-174 MHz	KRE 101 1219/21	MAEX-NNC5W
Helical Coil 378-403 MHz	KRE 101 1219/9	MAEX-NNC5B
Helical Coil 403-430 MHz	KRE 101 1219/10	MAEX-NNC1U
¼ Wave Whip 378-430 MHz	KRE 101 1223/10	MAEX-NNC1L
Helical Stub 440-494 MHz	KRE 101 1219/12	MAEX-NNC1F
Helical Stub 470-512 MHz	KRE 101 1219/14	MAEX-NNC5Y
¼ Wave Whip 440-512 MHz	KRE 101 1223/12	MAEX-NNC1N
¼ Wave Whip 800 MHz [CSA]	KRE 101 1223/01	MAEX-NNC1K
High Gain, Flexible Construction, 800 MHz [CSA]	KRE 101 1506/1	MAEX-NNC5K
¼ Wave Whip, Wide Bandwidth, 800 MHz [CSA]	KRE 101 1506/2	MAEX-NNC5X
Antenna, 764-870 MHz, Flex, End-Fed, Hi Gain	14002-0223-01	EX-NC7A
BATTERIES		
NiMH, immersible, [FM] [CSA]	BT-023406-004	MAEX-NPA2A
NiMH, Immersible	BT-023406-003	MAEX-NPA9X
Li Ion, Immersible	BT-023406-005	MAEX-NPA9Y
Lithium Polymer, Immersible	BT-023436-001	MAEX-PA2U
Battery, Li-Ion, 2000 mAh, [FM]	BT-023406-006	EX-PA3N
CHARGERS		
Power Adapter Kit, VC4000 Charger	PS-007810-001	MAH2-NPS9X
VC4000 Tri-Chemistry Charger	CH-017231-001	MAH2-VC4PB
Single Charger, Tri-Chemistry	CH-104560-007	MAEX-NCH9T
6-bay Charger, Li-Ion/Polymer	12082-0314-01	MAEX-CH4B
Wall Mount Kit, 6-Bay Li-Ion/Poly Charger	12082-0315-01	MAEX-AE4A
Charger, 6-Bay, Tri-Chemistry	CH-104570-007	MAEX-NCH9U
AUDIO ACCESSORIES		
Speaker Mic without Antenna (cc) provision, [FM] [CSA]	MC-023933-001	MAEX-NAE9D
Earphone for Speaker Mic [FM] [CSA]	LS103239V1	MAEX-NAE3Z
Earphone for Speaker Mic, Right-Angle	LS103239V2	EX-AE1K









¹ Options and Accessories table updated in MM-012099-001, Rev. M.

DESCRIPTION	PART NUMBER	OPTION NUMBER
Ruggedized Speaker Mic, Coil Cord	MC-011617-601	MAEX-NAE6C
Standard Speaker Mic, Non-Antenna	MC-011617-701	MAEX-NAE6A
Hi-Visibility Rugged Speaker Mic, Coiled Cord	MC-011617-606	EX-AE4C
Speaker Mic, Straight Cord, 25.6 in, Antenna	MC-011617-703	MAEX-AE6L
Speaker Mic, Straight, 18 in, Antenna	MC-011617-718	MAEX-AE6M
Speaker Mic, Straight, 30 in, Antenna	MC-011617-730	MAEX-AE6N
Speaker Mic, Rugged, Antenna, Straight	MC-011617-602	MAEX-NAE6D
GPS Speaker Mic	MC-009104-002	MAEX-NAE9R
Speaker Mic, Rugged, Coiled, Hirose Port	MC-011617-611	EX-AE4K
DROP SHIP AUDIO ACCESSORIES		
Earphone Kit, Black	EA-009580-001	
Earphone Kit, Beige	EA-009580-002	
2-Wire Kit, Palm Mic, Black	EA-009580-003	
2-Wire Kit, Palm Mic, Beige	EA-009580-004	
3-Wire Kit, Mini-Lapel Mic, Black	EA-009580-005	
3-Wire Kit, Mini-Lapel Mic, Beige	EA-009580-006	
Explorer Headset with PTT	EA-009580-007	
Lightweight Headset Single Speaker with PTT	EA-009580-008	
Breeze Headset with PTT	EA-009580-009	
Headset, Heavy Duty, N/C Behind-the-Head, with PTT	EA-009580-010	
Ranger Headset with PTT	EA-009580-011	
Skull Mic with Body PTT and Earcup	EA-009580-012	
Headset, Heavy Duty, N/C Over-the-Head, with PTT	EA-009580-013	
Throat Mic with Acoustic Tube and Body PTT	EA-009580-014	
Throat Mic with Acoustic Tube, Body PTT, and Ring PTT	EA-009580-015	
Breeze Headset with PTT and Pigtail Jack	EA-009580-016	
Hurricane Headset with PTT	EA-009580-017	
Hurricane Headset with PTT and Pigtail Jack	EA-009580-018	
CARRYING CASE ACCESSORIES		
Leather Carrying Case without D-Rings Kit, consists of: Leather Case without D-rings Elastic Strap Swivel Mount, used with Belt Loop	Kit: CC-023931-003 , incl: CC-023931-001 FM-011820 KRY 101 1608/2 used with: KRY 101 1609/1	MAEX-NHC9L
Nylon Case (black) with Belt Loop	CC-023932-001 KRY 101 1609/1	MAEX-NHC9M
Standard Leather Case with Shoulder Strap Kit, consists of: Standard Leather Case with D-Rings Shoulder Strap with Loop for Speaker/Mic used with Swivel Mount	Kit: CC-014528-004 , incl: CC-014528-002 CC-014524-001 KRY 101 1608/2	MAEX-NHC9S
Standard Leather Case with Belt Loop Kit, consists of: Standard Leather case without D-Rings Standard Leather Belt Loop used with Swivel Mount	Kit: CC-014528-003 , incl: CC-014528-001 CC-014527 KRY 101 1608/2	MAEX-NHC9T
Standard Black Nylon Case with Belt Loop Kit, consists of: Standard Black Nylon Case Standard Leather Belt Loop	Kit: CC-014534-002 , incl: CC-014534-001 CC-014527	MAEX-NHC9U
Standard Restraining Strap used with Shoulder Strap with Loop for Speaker/Mic	CC-014524-002	MAEX-NHC9V
Metal Belt Clip (standard)	CC23894	MAEX-NHC7P
Leather Belt Loop with Swivel	FM-017262-001 KRY 101 1609/1	MAEX-NHC7T

8. CHANGE OPERATING MODE

8.1 CHANGE FROM OTP MODE

To change from OTP operating mode to EDACS/P25/Conventional (ECP):

1. Use  or  to cycle through the menu until “App Mode” is displayed.
2. Use  or  to choose an available mode. Press  and  or  to confirm (Y/N).
3. Press the  button to confirm.



Or

With a system model radio, press 1# to transition to ECP.

Or

If configured, turn the A/B Switch to the A or B position.

8.2 CHANGE TO OTP MODE

1. Use  or  to scroll through available systems until OpenSky is displayed and wait.
2. The radio transitions to OTP mode.

9. OPENSky OPERATION



OpenSky is only available in the 800 MHz model of the P5400 series portable radios.

Once an OpenSky system has been selected from the available systems on your P5400 series portable radio, the characteristics described in the following sections will govern operation.

9.1 CONTROLS

The P5400 portable radio features two rotary control knobs, an emergency button, and a dual-position A/B switch, all located on the top of the radio. Refer to Figure 9-1. The Push-To-Talk (PTT) button and two option buttons are located to the left side of the radio keypad, see Figure 9-2. The front mounted keypad of the P5470 “System” model has 15 buttons and the P5450 “Scan” model has six buttons. Refer to Figure 9-3 and Figure 9-4.

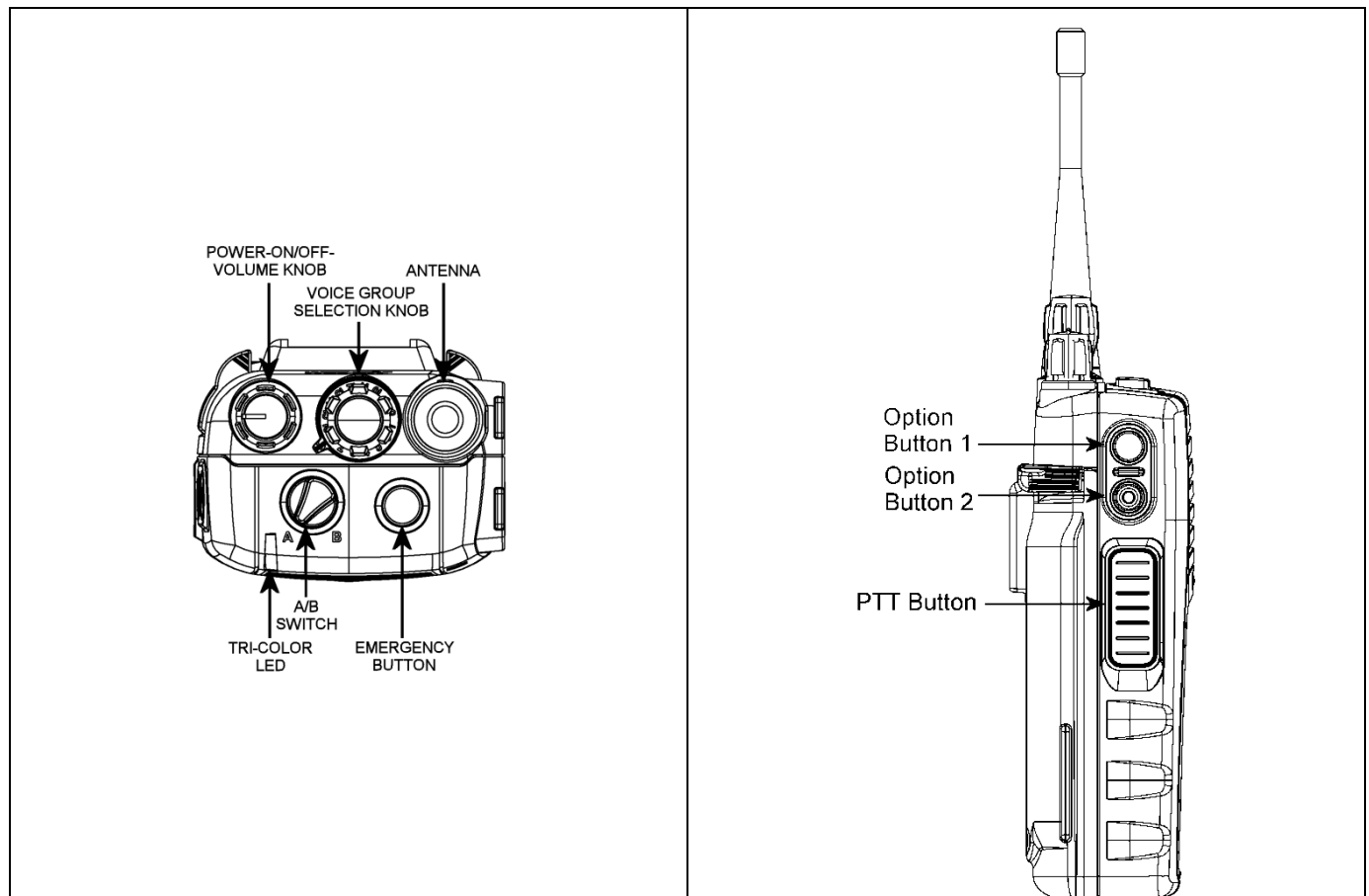






Figure 9-1: Top View

Figure 9-2: Side View

9.1.1 Buttons, Knobs, and Switch

The functions of the buttons, knob controls, and dual position A/B Switch vary depending on the mode of operation. Their functions while in the OpenSky mode of operation are discussed in the following paragraphs.

Table 9-1: Buttons, Knobs, and Switch Functions

POWER ON-OFF VOLUME KNOB	<p>The Power On-Off/Volume Knob is rotated to apply power to the radio and adjust audio volume up and down.</p> <p>Rotating the control clockwise applies power to the radio. Rotating the control clockwise increases the volume level. Minimum volume levels may be programmed into the radio to prevent missed calls due to a low volume setting. While adjusting the volume, the display will momentarily indicate the volume level (e.g., VOL=39). The volume range is from a minimum programmed level of 1 (displayed as OFF in the display) up to 39, which is the maximum level.</p>
VOICE GROUP SELECTION KNOB	<p>Used to select voice groups when operating within an OpenSky system. This is a 16-position rotary knob.</p> <p>A mechanical stop, which can limit the number of positions accessed, is shipped with the radio but must be installed. To install the mechanical stop, remove the voice group selection knob, loosen the set screw on the voice group selection knob metal base (using a 1.27 mm hex wrench), and remove the voice group selection knob metal base. Replace the 16 channel ring with the channel stop ring located at the desired channel. Re-install the voice group selection knob metal base, tighten the set screw, and re-install the voice group selection knob.</p>
EMERGENCY BUTTON	<p>Press the emergency button to declare an emergency. To clear an emergency, press and hold the Option 2 button . While holding , press the emergency button. Release both buttons when the "emergency cleared" tone sounds.</p>
PTT BUTTON	<p>The Push-To-Talk button must be pressed before voice transmission begins.</p>
SIDE OPTION BUTTON 1 	<p>Scrolls UP or DOWN thru available items within a sub-menu, such as available Talk Groups, pre-programmed speed dial numbers, canned alert messages, etc.</p>
SIDE OPTION BUTTON 2 	
A/B SWITCH	<p>The following settings are configurable via the at@abcs switch command:</p> <ul style="list-style-type: none"> • No Action. • V-TAC Detach (same as *60). • V-TAC Attach (same as *61, *62, or *62 depending on at@cmode setting). • Change to ECP mode. • Scan Mode - No Scan (See Section 9.24.1). • Scan Mode - Normal (See Section 9.24.1). • Scan Mode - Fixed (See Section 9.24.1). • Voice Encryption OFF - If the Selected Talk Group is voice encrypted, disable voice encryption on transmit. • Voice Encryption ON - If the Selected Talk Group is voice encrypted, enable voice encryption on transmit.

9.1.2 Keypad

The front mounted keypad of the P5450 “Scan” model has six buttons and P5470 “System” model has 15 buttons. Refer to Figure 9-5 and Figure 9-6, respectively.

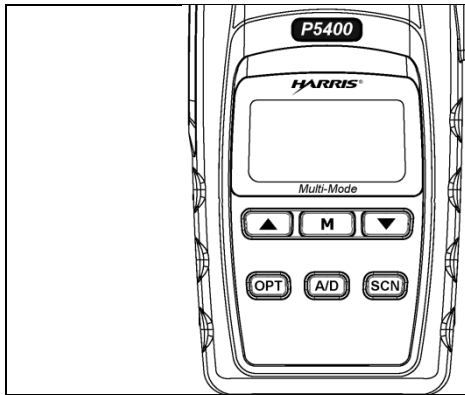


Figure 9-3: P5450 “Scan” Model Front Panel

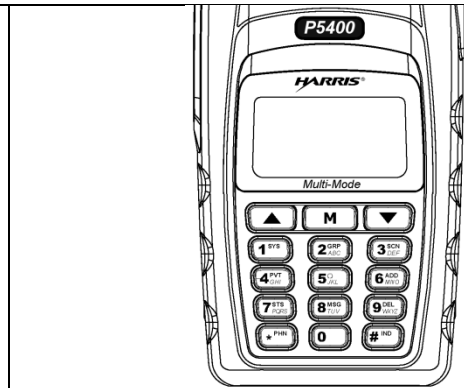


Figure 9-4: P5470 “System” Model Front Panel

In OTP mode, numeric entry is the primary function of the keys. Each key is described in Table 9-2.

Table 9-2: Keypad Functions

KEY	FUNCTION
	Primary function: Acts much as an “enter” button to activate a selection. Secondary function: While in the “dwell display,” press repeatedly to scroll through and view status display (on 2 nd line) for current profile, caller, received Talk Group, and channel.
	Scrolls thru available menu items (see Table 9-5).
 (P5450 only)	Currently undefined in OpenSky mode.
 (P5450 only)	Toggles scan mode On/Off in OpenSky mode.
 (P5450 only)	Currently undefined in OpenSky mode.
 (P5470 Only)	<p>The alpha-numeric keys are used to enter alpha-numeric passwords for logging into the OpenSky network, if not pre-configured for automatic registration at power-up.</p> <p>Also used to place telephone interconnect and individual (unit-to-unit) calls, operating like a normal telephone keypad. Additional functions are also available, such as speed dial, quick access to V-TAC, voice scanning, and Stealth mode operation.</p>
 (P5470 Only)	Initiates OpenSky functions (log-in, log out, selective call, telephone interconnect call, etc.). See page 35 for additional information. It is also used as an escape or to clear an entry (something like backspace, but it clears everything, not only the last digit/character).
 (P5470 Only)	Used in conjunction with alpha-numeric keys for passwords and OpenSky functions. See page 35 for additional information.

9.1.3 Display

The P5400 display is made up of 3 lines. Lines 1 and 2 each contain twelve alpha-numeric character blocks. The 3rd line also contains twelve blocks, each used to display radio status icons. If programmed, the display backlighting will illuminate upon power-up or when radio controls are operated. Specific display characteristics will be discussed in following sub-sections.

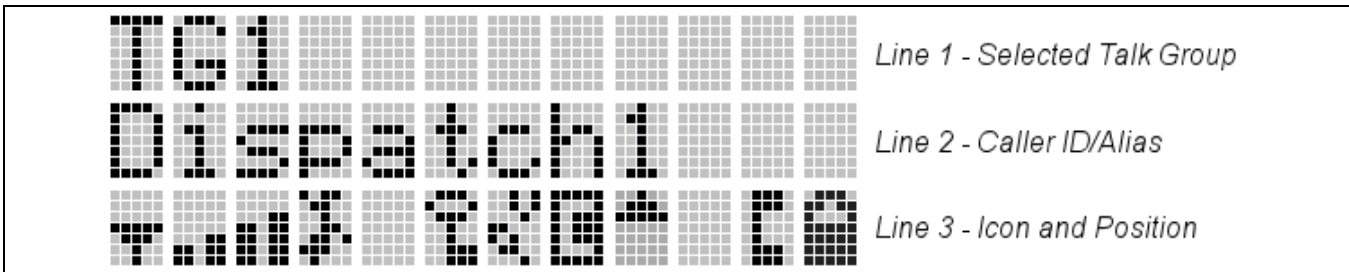
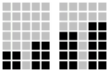











Figure 9-5: Radio Display OpenSky Mode

9.1.4 Radio Status Icons

Status Icons indicate the various operating characteristics of the radio. The icons show operating modes and conditions and appear on the third line of the display (see Table 9-3).

Table 9-3: Status Icons Descriptions

STATUS ICON DESCRIPTIONS	
OPENSky ICONS	
	Steady – Received Signal Strength Indicator (RSSI).
	Steady – Radio is data registered.
	Steady – Stealth mode is enabled; all tones and the display backlight are disabled, voice is still heard.
	Steady - Radio is transmitting or receiving an encrypted voice call.
	Animated – The radio is scanning for a V-TAC. Once the radio has attached to a V-TAC, the icon will turn off.
	V-TAC Connection Indicator – Indicates the client is connected to a V-TAC.
	Steady – Indicates Voice Scan mode is Normal or Fixed. Is not displayed when Voice Scan mode is No Scan.
	Steady – Indicates Selective Call mode.
	Steady – Battery charge indicator.
	Flashing – Low battery indicator.

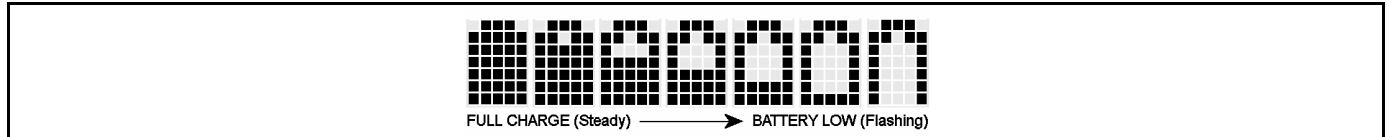


Figure 9-6: Full Cycle Battery Charge Indicator

The battery charge indicator illustrates approximate charge only, based on battery voltage. Refer to Figure 9-6.

9.2 TRI-COLOR LED

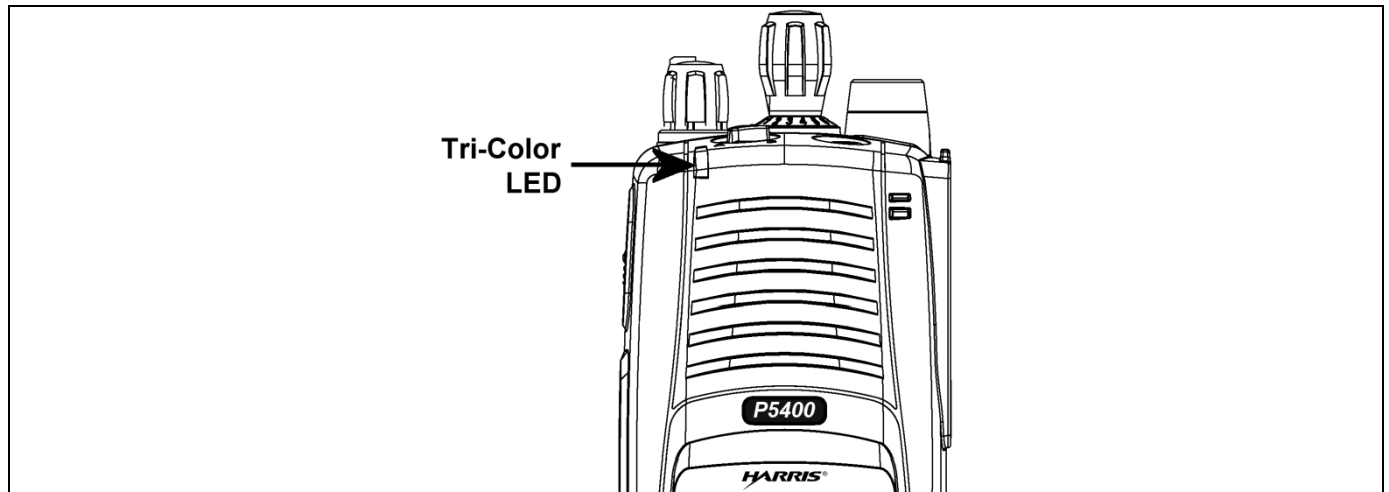


Figure 9-7: Tri-Color LED

The Tri-Color LED changes color to indicate radio status and is visible from both the front and top of the radio (see Figure 9-7).

In OpenSky mode the following radio states are reflected by the LED and the status they represent are:

Green:	Receiving
Red:	Transmitting
Orange:	If the LED is flashing rapidly, the radio is receiving an emergency call. If the LED is flashing every ½ second, the selected Talk Group is in the emergency state (although not transmitting). If the selected Talk Group is in the emergency state, an asterisk will be displayed next to the Talk Group name.





9.3 LOG-IN TO THE NETWORK

Log-in occurs either automatically (auto registration) if the radio has a valid registration or, if enabled, requires the user to enter a User ID and password.



The user will be prompted with “Pls Login” if one Talk Group in the selected profile can be encrypted. The user has to log-in to use that Talk Group in encrypted mode.

1. Press *1 keys (Log-in command).
2. Enter the full 10-digit User ID.

3. Press the  key.
4. Enter the password.
 - If the radio is configured for alpha-numeric passwords and the password has consecutive duplicate numbers (“MES33” for example), enter #, the  key, between the consecutive duplicate numbers so the radio will **not** interpret the entry as a letter (“D” in this example).
 - If the radio is configured for numeric-only passwords, do not press the  key between duplicated numbers.
5. Press the  key twice for alphanumeric passwords or once for numeric only passwords.

The User ID may be remembered from the previous log-in. (Refer to Section 9.4 for further details regarding log-off commands.) The password will be established before the radio is put into operation. Contact the local OpenSky network administrator for more information.

**NOTE**

If necessary, contact radio system administration personnel for log-in assistance and/or radio-specific log-in instructions.

9.4 LOG OFF THE NETWORK

The *0## command de-registers the radio. Typically, this is automatically performed when powering down the radio. Using this method, the User ID is remembered by the radio, so only the password is needed at next log-in. If a user is logged in, it is necessary to log-off.

9.5 PERSONALITY

As illustrated in Figure 9-8, a personality defines the profiles and Talk Groups available to the user. It is the structuring of a collection of profiles and privileges established by the OpenSky network administrator to provide the user with a comprehensive set of profiles to communicate effectively with the necessary Talk Groups or individuals.

Personalities are stored on the network and downloaded over-the-air to the radio. This process is called “provisioning.” Provisioning occurs at radio power-up (if the personality is not already stored in the radio’s memory) and at user log-in (if the radio has been deregistered). When changes are made to the personality, the radio is automatically re-provisioned. Each personality can contain up to sixteen (16) profiles and each profile can contain up to sixteen Talk Groups.

9.5.1 Profiles

As stated above, each profile can contain up to sixteen (16) Talk Groups. A profile also defines the radio’s emergency behavior. All transmissions are made on the selected Talk Group (displayed on the top line of the dwell display). The user can change the selected Talk Group to any of the other Talk Groups within the profile.

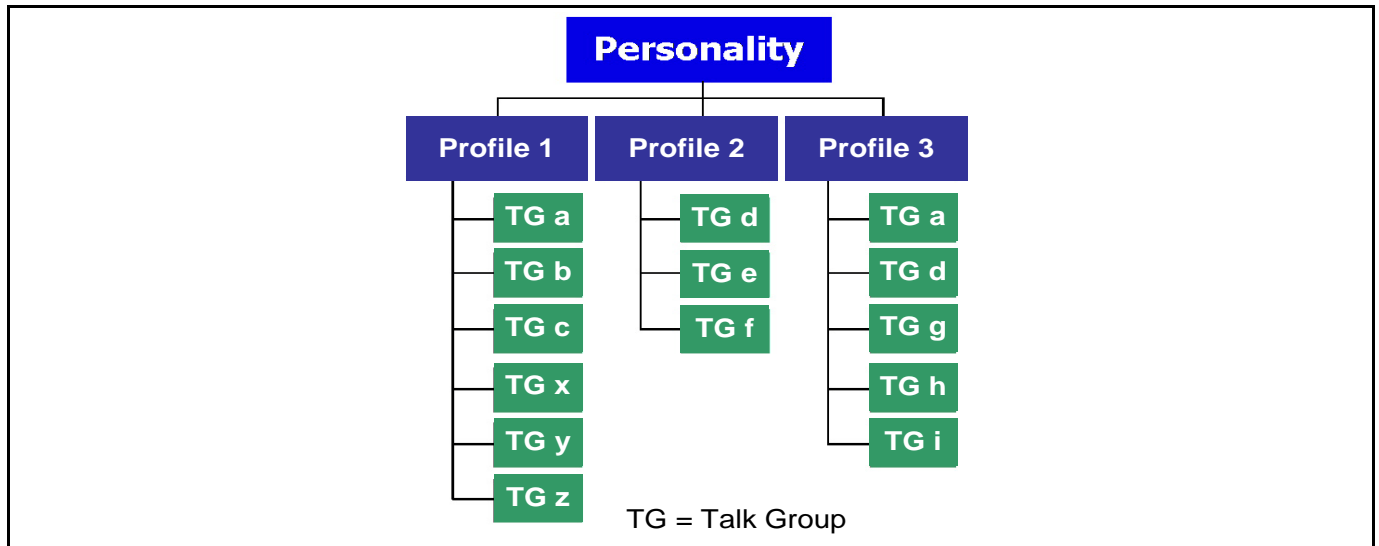


Figure 9-8: Personality Structure Example



9.5.2 Talk Groups

A Talk Group represents a set of users that regularly need to communicate with one another. There can be any number of authorized users assigned to a Talk Group. Talk groups are established and organized by the OpenSky network administrator. An OpenSky Talk Group is similar to a channel within a conventional FM radio system.

9.6 OPENSky DISPLAY OVERVIEW

The 12-character x 3-line display shows the radio status. The first two lines of the display are text lines that change in response to user interaction with the menu buttons. Status icons appear in the bottom line (line 3) of the display (see Table 9-3).


9.6.1 Display's Top Line

The display's top line of text changes as the  and  buttons are pressed to scroll through the available menu options (see Table 9-5). When the dwell display is present, the selected Talk Group will be displayed. Other information, such as alert messages will scroll across the top line of the display.

9.6.2 Display's Second Line

The second line will display information such as active menu, log-in prompt, emergency status, and dwell display messages as described in the following section.

9.6.3 Dwell Display

When not engaged in menu selection, the first two lines of the display default to the user-defined display, known as the "dwell display." The top line indicates the currently selected Talk Group. The second line will display the currently selected profile, caller ID/alias², received Talk Group, and current channel name if the channel menu is enabled. Press the  button repeatedly to scroll through and view one of these second line options.

² Alias is a logical ID name such as "J_Smith." The name corresponds to a user ID such as 003-542-0001.

9.7 ALERT TONES

The P5400 radio also provides audible Alert Tones or “beeps” to indicate the various operating conditions (see Table 9-4).

Table 9-4: Alert Tones

NAME	STONE	DESCRIPTION
Call Queued	One low tone/two high tones	Call is queued for processing.
Call Denied	Three short beeps	Radio is out of coverage area or requested Talk Group is active.
Grant (or Go-Ahead)	Single short beep	Sounded when resources become available for a call request placed in the queue (if enabled) upon channel access. If the radio roams to another site while transmitting, then it will auto rekey and begin transmitting on that tower. It gives a second grant tone to let the user know they have roamed.
Call Removed	Single long low-pitched tone	Notifies the user access to the channel has been lost (out of coverage area or pre-empted by higher-priority call).
Low Battery	One low-pitched/one short mid-pitched	Low battery.
Selective Alert Received	Four short tones	Only played once to indicate a selective alert has been received.
Emergency Alert Tone	Three long beeps	Sounds when an emergency alert is declared.
Emergency Cleared Tone	Single long low-pitched tone	Sounds when an emergency is cleared.
Selective Call Ring Tone	A ringing tone similar to a telephone	Ringing is repeated every four (4) seconds until the call is accepted or rejected by the radio being called or until the network drops the call if unanswered after one (1) minute.
Roam Tone	Two short tones, one high-pitched and one low-pitched	Sounds when the radio transitions from one radio base station site to another. While transmitting voice.
Out of Range Tone	Three brief tones	If enabled via programming, sounds at a programmable interval while the radio is in a state of persistent deactivation.
Priority Bump	Single medium mid-pitched tone	Sounds when the current received call is preempted by a higher priority call.
XCOV Connect Tone or Site Found Tone	Three short high-pitched tones	Sounds when a radio connects to a V-TAC in XCOV, XCOV-TG, or XCOV-Prof mode. Sounds when the selected site is found using the Site Lock Menu.
XCOV Disconnect Tone or Site Not Found Tone	Three short high-pitched tones	Sounds when a radio connects to a V-TAC in XCOV, XCOV-TG, or XCOV-Prof mode. Sounds when the selected site is not found using the Site Lock Menu.
Man Down Tone	Single long low-pitch tone followed by a single short high-pitched tone	Sounds when the man down accessory is connect to the radio's UDC port and the radio is a horizontal.



















9.8 BASIC MENU STRUCTURE

Table 9-5 illustrates the basic P5400 OpenSky menu structure. Menu items will vary depending upon system programming, radio hardware, and optional configurations. All menus except the dwell display menu can be turned off by network administration personnel.

Table 9-5: Basic P5400 OpenSky Menu Structure

MENU NAME	RADIO DISPLAYS	USAGE NOTES
	To/From Dwell Display ▼ ▲	
Engineering Display	bit-error rates, RSSI data, sync status, current channel and registration status ▼ ▲	Displays radio system connection data. For engineering use.
Silent Emergency	"SilentEmerg" ▼ ▲	Use or to toggle between OFF/ON. Press to enable.
Operating Mode	"App Mode" ▼ ▲	Use or to choose an available mode (OTP, OCF, or ECP). Press and confirm (Y/N) with or and again.
GPS Fix	"GPS" ▼ ▲	GPS latitude and longitude position of currently tuned-to base station ["GPS (Site)"] or V-TAC ("GPS") scrolls across top line of the display. "GPS (Aged)" indicates V-TAC coordinates haven't been updated for more that 2 minutes.
User ID	"User ID" ▼ ▲	User's identification/name scrolls across top line of the display (if programmed).
IP Address	"IP Address" ▼ ▲	Radio's Internet Protocol (IP) address scrolls across top line of the display.
Station Identification	"Station ID" ▼ ▲	Station's identification/name scrolls across top line of the display (if programmed).
Stealth Mode (display backlight is disabled)	"StealthMenu" ▼ ▲	Use or to turn Stealth Mode "On" or "Off." See Section 8.17 for more information about Stealth Mode.
Treble Level	"Treble Menu" ▼ ▲	Use or to choose speaker treble level (LOW, MEDIUM, MEDHIGH, or HIGH). Press to return to dwell display.
Display Brightness	"Bright Menu" ▼ ▲	Use or to brighten or dim backlighting. Press to return to dwell display.
Side Tone Level	"Side Menu" ▼ ▲	Use or to choose side tone level (OFF, LOW, MED, or HIGH). Press to return to dwell display.
See Next Page		

MENU NAME	RADIO DISPLAYS	USAGE NOTES
See Previous Page		
Selected Channel	"ChannelMenu"	Displays the current channel. Press [M] to return to dwell display.
▼ ▲		
Scan Mode	"ScnModeMenu"	Use [O] or [D] to scroll through available scan modes (Normal, No Scan, or Fixed). Press [M] to return to dwell display.
▼ ▲		
Talk group Lock Out	"LockOutMenu"	Use [O] or [D] to choose a Talk Group for locking/unlocking. Press [M] to toggle "<" on (locked out) and off.
▼ ▲		
Priority 2 Talk group	"Priority2"	Use [O] or [D] to choose Priority 2 Talk Group. Press [M] to return to dwell display.
▼ ▲		
Priority 1 Talk group	"Priority1"	Use [O] or [D] to choose Priority 1 Talk Group. Press [M] to return to dwell display.
▼ ▲		
Alerts Received	"Alerts Rcvd" or oldest message	"No alerts" or alert message text scrolls in display. Use [O] or [D] to scroll through all messages.
▼ ▲		
Alert Destination	"Alert Dest"	Use [O] or [D] to choose a speed-dial number. Press [D] to go to the "Alert Msg" menu. Use [O] or [D] to scroll through "canned messages." Press [M] to send message and return to dwell display.
▼ ▲		
Speed Dial	"Speed Dial"	Use [O] or [D] to choose a speed-dial number and press PTT to place call.
▼ ▲		
Profile Selection	"ProfileMenu"	Use [O] or [D] to choose an available profile. Press [M] to return to dwell display.
▼ ▲		
Talk group Selection	"TalkGrpMenu"	Use [O] or [D] to choose a Talk Group in current profile. Press [M] to return to dwell display.
▼ ▲		
Status LED	"Status LED"	Use [O] or [D] to toggle status led "On" or "Off." When On, the LED flashes red when the radio transmits, green when receiving, and amber when in emergency. When Off, the LED will not light at all.
▼ ▲		
Status Message	"Status Msg"	Use [O] or [D] to scroll through available messages. Press [M] to send the selected message.
▼ ▲		
Request to Talk Message	"RTT Msg"	Use [O] or [D] to scroll through available messages. Press [M] to send the selected message.
▼ ▲		
V-TAC Client Mode	"Client Mode"	Use [O] or [D] to choose Client Mode (Network, XCOV, XCOV-TG, or SOI).
▼ ▲		
Emergency Dismiss	"EmgDismiss"	Use [O] or [D] to choose emergency Talk Group. Press [M] to toggle "<" on (dismiss) and off.
▼ ▲		
See Next Page		

MENU NAME	RADIO DISPLAYS	USAGE NOTES
See Previous Page		
Site Lock	"Site Lock"	Use  or  to scroll through sites. Press  to select site.
 		
OTP Software Version	"Software Ver"	Displays OTP software version Press  to return to dwell display.
 		
RF Diagnostics	"Diagnostics"	Use  or  to scroll through RF diagnostics displays. Press  to reset RF diagnostics counters.
 		
Priority 3 Talk Group	"Priority 3"	Use  or  to choose Priority 3 Talk Group. Press  to toggle "<" on (selected) and off.
Use  and  to scroll through menus.		

9.9 ERROR MESSAGES

This section lists and describes the error messages that may be displayed by the radio during OpenSky operation.

MESSAGE	DESCRIPTION
NOAUT01	Unspecified MDIS (data switch) error. If condition persists in strong signal conditions, contact your system administrator.
MDENIED	Unspecified MDIS error. If condition persists in strong signal conditions, contact your system administrator.
UNAUTH3	Unauthorized IP. The radio network ID has not been added to network.
UNAUTH4	Bad authentication. If condition persists in strong signal conditions, contact your system administrator.
UNAUTH5	Unsupported authentication. If condition persists in strong signal conditions, contact your system administrator.
MDISBSY	The MDIS is busy. If condition persists in strong signal conditions, contact your system administrator.
DUP IP	Duplicate IP.
BADIKEY	Invalid infrastructure public key sequence number (IPKSN).
BADEKEY	Invalid end-system public key sequence number (EPKSN).
UNK MES	Unknown mobile end system (MES); i.e., radio. If condition persists in strong signal conditions, contact your system administrator.
NOAUT05	MDIS failed mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
BADMDIS	MDIS failed mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
MDS BSY	MDIS busy – retry.
UNK DOM	Unknown home domain. If condition persists in strong signal conditions, contact your system administrator.

<u>MESSAGE</u>	<u>DESCRIPTION</u>
KEYSYNC	Mismatched key sequence number.
UNK ALG	Unknown/unsupported encryption algorithm.
BADSIZE	Unsupported MDIS key size.
NOAUT11	MES failed data mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
NOAUT12	No response from MDIS. If condition persists in strong signal conditions, contact your system administrator.
NOREPLY	No SME response from MDIS. If condition persists in strong signal conditions, contact your system administrator.
VDENIED	Unspecified VNIC (voice switch) error. If condition persists in strong signal conditions, contact your system administrator.
BAD VID	Invalid voice User ID. Check User ID. If correct, contact your system administrator.
HOM DWN	The Home VNIC is down. Retry. If error continues, contact your system administrator.
SRV BSY	The serving VNIC is busy (congested).
MAX USR	The maximum number of users are already registered with the specified User ID. OpenSky allows one User ID to log onto the network using up to three different radios. Use *0## command or power down one of the other radios to de-register the radio.
NAS BSY	The system cannot provision MES because of an administrative process.
NOAUTHM	The MES failed voice mutual authentication. If a valid radio displays this error, contact TAC (see Section 11.2).
NOSUPRT	The MES cannot support the required provision. If condition persists in strong signal conditions, contact your system administrator.
NOAUTHV	VNIC does not support or failed mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
PLS LOGIN	Log-in with keypad.
BAD PWD	An invalid password has been entered. Verify the password and re-enter.
OVER_TEMP	The radio may be too hot. The radio will cease transmitting if it exceeds an operational temperature threshold. Let the radio cool before attempting to transmit. Report this failure to authorized technician.
No App	ECP mode is unavailable (not programmed).
NO PRIV	Missing required privilege.
NO SYNC	No forward-channel sync (weak or no coverage). If condition persists in strong signal conditions, contact your system administrator.
Dead battery	Radio must shutdown because battery charge is critically low.
NO REG	Not registered with MDIS, VNIC, or both.
DISABLED	Function disabled (e.g., function invalid in current context).

9.10 KEYPAD FUNCTION COMMANDS (P5470 ONLY)

To perform a command from the keypad, use the keypad commands in Table 9-6.

Table 9-6: Keypad Function Commands

COMMANDS	FUNCTION
*0	Log-off command: *0## (logs the user off the system).
*1	Log-in command: *1<User ID> # <Password> ## (required for encryption).
*2	Status Message: *2 <0...9> #.
*4	Enter Scene of Incident Mode (SOI) on specified channel and band: *4#<Chan>#<Band># where Chan is the channel number that is being used as a SOI repeater and band is the number assigned to each frequency band. For example, if Channel 25 800 MHz (band 0) is being used for SOI, then enter *4#25#0#. Exit SOI Mode with *40#
*5	RTT Message: *5 <0...9> #.
*7	Initiate Selective Alert command: *7<Target ID>#(Choose Message)##.
*8	Radio-to-Radio Call command: *8<Selective call number>#(PTT to dial).
*9	Public Switched Telephone Network (PSTN) Call command: *9 <telephone number>#(PTT to dial)
*32	Begin Manual Encryption command: *32<Pre-determined Encryption Key># 1-16 digit encryption key for 128 bit encryption; 17-32 digit encryption key for 256 bit encryption.
*33	End Manual Encryption command: *33#
*61	Initiate XCOV Mode: Extended coverage for individual users.
*62	Initiate XCOV-TG Mode: Extended coverage for Talk Groups.
*63	Initiate XCOV-PROF Mode command: *63#.
*60	Exit XCOV or XCOV-TG Mode: Returns to the Network mode.

9.11 QUICK KEYS (P5470 ONLY)

Quick Keys are a two-button sequence that provides the user with quick access to certain menu items. Quick Keys function as a toggle for these menu items.

Table 9-7: Quick Key Sequence




QUICK KEYS	FUNCTION
1#	Transition to ECP Mode If ECP code is not loaded in the radio, "No App" appears in the display.
2#	Toggles Stealth Mode On/Off
3#	Toggles Scan Mode On/Off (Normal/Fixed, see details below) <ul style="list-style-type: none"> If the Scan Mode is Normal when the Scan Mode is toggled Off, the Scan Mode will be Normal when toggled On again. If the Scan Mode is Fixed when the Scan Mode is toggled Off, the Scan Mode will be Fixed when scan mode is toggled On again. If the Scan Mode is Off when the radio boots up, the Scan Mode will be Normal when Scan Mode is toggled On.

QUICK KEYS	FUNCTION
4#	Lights/Tones On/Off Pressing 4# turns the TX/RX LEDs, Backlight, and Side Tones On/Off. If any of the TX/RX LEDs, Backlight, and/or Side Tones are On, and this quick key sequence is used, then all of the TX/RX LEDs, Backlight, and Side Tones are turned Off. If the radio is in Stealth mode, this quick key is disabled since the user is not able to turn on the light/tones in stealth mode.
5#	This quick key sequence is used to set the current active profile to the default profile in the personality as defined in the UAS.
6#	XCOV & XCOV-TG Attach/Detach This quick key sequence is used to manually connect to a V-TAC. When attaching to a V-TAC, the radio's programming determines whether to attach to the V-TAC in XCOV or XCOV-TG mode. <ul style="list-style-type: none"> • If the user attaches to a V-TAC manually, using the *61# or *62# command sequence, the radio is understood to be attached and this quick key sequence will detach the radio from the V-TAC. • If the user detaches manually from a V-TAC using the *60# command sequence, the radio is understood to be detached and this quick key sequence will attach the radio to a V-TAC. • At bootup, the radio is understood to be detached from a V-TAC. If a radio automatically attaches to a V-TAC, the radio is still understood to be detached from a V-TAC and will attempt to attach to a V-TAC. • If a radio manually attaches to a V-TAC and then is automatically detached from a V-TAC, the radio will attempt to attach to another V-TAC.
7#	This quick key sequence is used to transmit the RTT Automatic Normal Message to the console.
8#	This quick key sequence is used to transmit the RTT Automatic Priority Message to the console.

9.12 DTMF OVERDIAL

Using the keypad on a System Model, the radio can transmit DTMF tones corresponding to numbers/characters 0 - 9, *, and # on the keypad. To overdial numbers/characters, transmit by pressing and holding the PTT button and then, press the corresponding keys (one at a time) on the keypad.

9.13 LOCK/UNLOCK THE KEYPAD





1. Press and hold the  button.
2. While holding the  button, press the  button on the side of the radio.





9.14 DUAL-TONE MULTI-FREQUENCY (P5470 ONLY)

Dual-Tone Multi-Frequency (DTMF) is the system used by touch-tone telephones. DTMF assigns a specific set of tone frequencies to each key. This allows for specific tasks such as entering a user ID and password, or selective calling. When a key on the DTMF keypad is pressed, the DTMF tone is played through the radio's speaker.

9.15 CHANGING THE ACTIVE PROFILE

The radio can store up to sixteen (16) standard profiles, one of which is the currently active profile. To change the currently active profile:





1. Press the  or  buttons until "ProfileMenu" is displayed.
2. Use  or  to scroll through the list of available profiles.

3. Profile becomes active when selected for longer than 2 seconds, when the  is pressed, or when the menu is changed using the  or  button. Press  to activate the selected profile.

9.16 CHANGING THE SELECTED TALK GROUP

Each profile stored in the radio can have up to sixteen (16) Talk Groups. One Talk Group within the currently active profile is set as the “selected Talk Group.” To change the selected Talk Group, turn the Group Selection knob on top of the radio or use the Talk Group selection menu.

9.17 ADJUSTING DISPLAY AND BUTTON BACKLIGHT BRIGHTNESS

1. Press the  or  buttons until Bright Menu is displayed.
2. Use  or  to brighten or dim the display and button backlighting.





9.18 STEALTH MODE

For some users, it is important to be able to turn off the radio’s display lights and side tones, but not the radio traffic. For example, in covert operations, lights and sounds could inadvertently expose an otherwise unobservable radio user. For this purpose, the radio has a Stealth feature that disables the radio display lights, indicator lights, and audible alert and side tones.

When Stealth Mode is on, the radio continues to scan the programmed list of Talk Groups and the user can key-up on the selected Talk Group.

9.18.1 Enabling Stealth Mode

P5470 only: Quick Key combination 2# toggles Stealth Mode on and off.

Both models: Press the  or  buttons to scroll through menus until “StealthMenu” appears in the display. To immediately activate Stealth Mode press the  or  button once. This activates Stealth Mode, exits the Stealth Menu, and returns to the Dwell Display.

The display lights, indicator lights, and side tones are disabled. The stealth mode icon is displayed.

9.18.2 Disabling Stealth Mode

P5470 only: To re-enable all lighting, side tones and exit Stealth Mode, press Quick Key combination 2# again. The radio returns to the Dwell Display.



Stealth Mode can also be disabled by using the Stealth Menu.

P5450 only: To re-enable all lighting, side tones and exit Stealth Mode, press any key other than PTT or Emergency. The radio returns to the Dwell Display.

The display lights, indicator lights, and side tones are re-enabled. The stealth mode icon disappears.

9.19 ADJUSTING SIDE TONE AUDIO LEVEL

The radio sounds confirming tones called “side tones” when its buttons are pressed. Most users find this audible confirmation helpful when navigating the menus. Side tone audio level can be adjusted or turned completely off using the “Side Menu” or the Quick Key combination #4.







NOTE

Quick Key combination #4 turns off the backlight in addition to the side tones. Unlike Stealth Mode, alert tones can still be heard.

For covert operations, it may be necessary to turn off side tones. For safety's sake, turning off the radio during covert operations is not recommended.

If the radio is operating properly but side tones are not heard when the menu buttons are pressed, the side tones are probably turned off. To turn them back on, access the "Side Tone" menu and select a setting other than "off."

Use the following procedure set side tone level:

1. Press the  or  buttons to cycle through the menu until "Side Menu" is displayed.
2. Press  or  to change to the desired level (Off, Low, Medium, and High). To turn side tones off completely, use the "Off" setting.









9.20 CHANGE OPERATING MODE

9.20.1 From OTP to ECP Mode

Method 1 (Quick Key, P5470 only):

Press 1#. If ECP is not loaded in the radio, the radio displays "No App."



Method 2:

1. Press the  or  buttons to cycle through the menu until "App Mode" is displayed.
2. Press  or  to select the desired operation mode.
3. Press  and use  or  to select Y or N.
4. Press  to make selection and return to the dwell display.
5. "Restart Please Wait" appears in the display as the radio switches modes.

Method 3:

If configured, turn the A/B Switch to the A or B position.

9.20.2 From ECP to OTP Mode

Press the  or  buttons to cycle through available systems until "OPEN SKY" appears in the display. Pause briefly and the radio will switch automatically from ECP to OTP operation.

9.21 RECEIVING AND TRANSMITTING VOICE CALLS

As soon as the radio completes the initialization sequence and registers on the OpenSky network, the user will begin to hear calls from the Talk Groups in the active profile, if available.

9.21.1 Receiving a Voice Call

No action is required to receive a voice call. The display responds to incoming voice calls as follows:

- When the dwell display is set to received Talk Group and the scan mode is Normal or Fixed:

- a. If the received Talk Group matches the selected Talk Group, then the alias (if available) or user ID of the incoming caller is displayed.
 - b. If the received Talk Group does not match the selected Talk Group, then the received Talk Group name is displayed.
- When the dwell display is set to received Talk Group and the Scan Mode is None, the radio only receives voice on its selected Talk Group. When the call is received, the alias (if available) or the user ID of the incoming caller is displayed.
 - When the dwell display is not set to received Talk Group, then there is no display indication of an incoming call.








A radio receiving a System All Call, Regency All Call, or an Agency All Call displays “All Call” instead of the alias. A radio not transmitting on a Talk Group in emergency status will drop all other calls to scan into an All Call.

9.21.2 Transmitting a Voice Call

1. Select the desired Talk Group.
2. Depress and hold the **PTT** button, wait a couple of seconds. If programmed by the administrator, a grant tone will be sounded.
3. Begin speaking into the microphone in a normal voice.
4. For maximum clarity, hold the radio approximately 2 inches from your mouth. Take care not to cover up the microphone while speaking.
5. Release the **PTT** button to terminate an outgoing voice call.

9.22 ADJUSTING AUDIO TREBLE LEVEL

The tone of received signals can be adjusted using the radio’s “Treble Menu.”

1. Press the  or  buttons to cycle through the menu until “Treble Menu” is displayed.
2. Press  or  to increase or decrease level. There are four levels available: low, medium, medium-high, and high.
3. Press  or wait a few seconds to return to the dwell display.

9.23 TALK GROUP LOCK OUT

There are two ways to focus voice communications by suppressing calls from Talk Groups in the active profile.

- **No Scan.** By changing the Scanning Mode to “No Scan” only the selected Talk Group is scanned.
- **Lock Out.** By locking out selected Talk Groups, background noise or chatter can be eliminated and scanning resources can be focused on just those groups whose calls you wish to monitor.



Lock out is a listening (receive) function and only blocks received calls on locked out Talk Groups. Lock out does not affect transmit capability. “No Scan” and “Lock Out” do not apply to recent emergency lock outs.

Only Talk Groups in the active profile can be locked out, since they are the only Talk Groups whose voice calls can be heard on the radio. Talk group lock out is a scan-related feature. With lock out, one or more Talk Groups in the active profile can be temporarily disabled from being scanned. Calls are not received on locked-out Talk Groups. Lock out settings are not retained between profile changes.



P1, P2, and P3 groups CANNOT be locked out.

The default emergency and emergency-capable Talk Groups can be locked out if they are NOT in an emergency state. If a Talk Group is locked out and is subsequently changed to the currently selected Talk Group, it will automatically be unlocked by the radio so the user can hear calls on the Talk Group. The radio may be configured so all Talk Groups are automatically locked out by default. In this case, they must be manually unlocked, if desired.

9.23.1 Lock Out a Talk Group

1. Use the or buttons to scroll through the menu choices until “LockOutMenu” appears in the display.
2. Use the or keys to scroll through the list of Talk Groups, if any, until the user group you want to lock out appears in the display.
3. Press the key to select the lockable Talk Group.
4. “<” appears next to the locked out Talk Group.

9.23.2 Unlock a Talk Group

1. Use the or buttons to scroll through the menu choices until “LockOutMenu” appears in the display.
2. Use the or keys to scroll through the list of Talk Groups, if any, until the user group you want to unlock appears in the display.
3. Use the key to unlock the displayed Talk Group.



- Changing the active profile removes any lockouts you have made.
- Turning off the radio removes any lockouts you have made.

9.24 SCANNING

9.24.1 Selecting Scan Modes

Three scanning modes are available for the radio, but only one can be active at any time. Changing the scanning mode changes the way the radio scans voice calls for all of the profiles in the radio personality, no matter which profile is or becomes active.

The choice of scanning mode broadens or narrows the span of communications with all the groups in profiles you listen to, but does not affect your interaction with those groups you talk with.

The scanning modes available for selection may be limited by the administrator to a subset of the three scanning modes.






Table 9-8: Scan Modes

SCAN MODE	EXPLANATION
None	Eliminates distractions. Full communications (listen and talk) with the selected Talk Group. No calls received from other Talk Groups.
Normal (Default)	The user can scan all Talk Groups in the active profile that are not locked out as long as there is demand on the site. Priority (P1, P2, and P3) groups are user selectable. Receive calls from more than one Talk Group, if available from the current site. Allows dragging of the selected Talk Group, P1, P2, P3 and emergency Talk Group (in emergency state) to the site on which the radio is registered. (If other calls are available at the site, they also can be heard but they will not be actively dragged.) The default emergency Talk Group, as well as any emergency-enabled Talk Groups, is only dragged if it is in emergency mode.
Fixed	Functions the same as Normal Scan Mode, except the priority groups are fixed to the selected profile's pre-defined P1 and P2 groups (configured via the UAS).

The scanning mode choice remains in effect until it is changed. Even if the radio is turned off, the current scanning mode selection is saved for the next use.

9.24.2 Changing Active Scan Mode

9.24.2.1 Setting the Scan Mode

1. Press the  or  buttons until “ScnModeMenu” appears in the display.
2. Use the  or  keys to scroll through the list of modes until your choice appears: Normal, None, or Fixed.
3. Press the  key to activate the scan mode selection and return to the dwell display.

9.24.2.2 Duration of Scanning Mode Selections

Scanning Mode selections survive power down. At startup, the radio defaults to the scanning mode of set during last use. The last selection made remains in effect until a new selection is made from the Scan Mode menu.






9.24.3 Scanning Priority

The following lists the scanning priority order (from highest to lowest):

- Selected Talk Group in emergency state.
- Default emergency group in emergency state.
- Selected Talk Group.
- Emergency capable group in emergency state.
- Priority 1 Talk Group.
- Priority 2 Talk Group.

- Priority 3 Talk Group.
- Other (non-priority).

9.24.3.1 Changing Scan Priority






1. Press the  or  keys until “Priority 1” or “Priority 2” appears in the display (Priority 1 group has higher priority than the Priority 2 group).
2. Press the  or  button until the desired Talk Group is displayed.
3. Press the  key to select and activate the selection. The radio automatically returns to the Dwell Display.



NOTE

- Changing the priority of a listen group does not change your Talk Group.
- Priority can be set for six Talk Groups (Priority 1, Priority 2, and up to four Priority 3), but only in the selected profile.
- If the save settings is configured for the radio, scanning priority settings are saved when the radio is turned off. Otherwise, they are reset to the default values when the radio is turned off.

9.24.3.2 Changing Scan Priority 3 Talk Groups

1. Use the  or  buttons to scroll through the menu choices until “Priority 3” appears in the display.
2. Use the  or  keys to scroll through the list of Talk Groups, if any, until the user group you want to set as Priority 3 appears in the display.
3. Press the  key to select a Priority 3 Talk Group.
4. “<” appears next to the Priority 3 Talk Group.

9.24.4 Scan Mode A/B Switch

The A/B switch can be configured to toggle Scan Mode On/Off.

If the Scan mode icon (see Table 9-8) is On; either the Normal or Fixed Scan modes are enabled, depending on programming. If the Scan mode icon is not displayed, Scan mode is set to No Scan.

9.24.5 Scan Mode Quick Key (P5470 Only)

Press 3# to toggle Scan mode on and off.

If the Scan mode icon (see Table 9-3) is On; either the Normal or Fixed Scan modes are enabled, depending on programming. If the Scan mode icon is not displayed, Scan mode is set to No Scan.

9.25 MAKING SELECTIVE CALLS

Selective calling is the capability for two voice radio units to obtain and use an independent talk path for a unit-to-unit call. A properly equipped radio can initiate a selective call to any radio in the system that is also programmed for selective calls.

In the OpenSky system, a radio can be configured to initiate selective calls through a pre-programmed list in memory called a speed dial list. Alternatively, a properly equipped radio can initiate a selective call to

any radio in the system by entering the ten-digit User ID (similar to a telephone number) of the target radio. Some radios are configured to only receive (not initiate) selective calls.



Selective calls are terminated if an emergency is declared. The network limits selective calls to ten (10) minutes maximum.



If a Selective Call is attempted without registration, “No Priv” is displayed.

9.25.1 Manually Dialing a Selective Call (P5470 Only)

1. Enter *8, the User ID number of the user being called, and the # key (no dashes or spaces). ***This feature must be enabled by the administrator.***

*8<destination user id>#

A shortened User ID number can be dialed using the following guidelines:

- If the radio being called is in the same region and agency – enter only the last four digits.
- If the radio being called is in the same region, but a different agency – enter the last seven digits.
- If the radio being called is in another region or if the area is unknown – enter all ten digits.

2. Press the PTT (and release) to ring the other user.

The ring tone is sounded.

If the other user accepts the call, the called user’s alias will appear in initiating caller’s display. The two are now in a unit-to-unit call until one ends the call, the call is terminated due to an initiated emergency, or the maximum time limit of ten (10) minutes is reached.

If the called radio is busy “BUSY” will appear in the second line of the display.

Table 8-8 lists and defines the messages that are displayed by the radio during a selective call.





Table 8-9: Status of Selective Call

STATUS MESSAGE	DEFINITION
Busy	Peer is involved in another selective/PSTN call.
Disconnect	Selective/PSTN call was terminated for unknown reason.
Network Err	Selective/PSTN call cannot continue because of an unspecified network error.
Reject	Peer or this user declined request to establish selective/PSTN call.
Unavailable	Peer cannot be reached for selective/PSTN call.
Calling	Calling peer (i.e., for selective or PSTN calls).
Connecting	Establishing selective/PSTN call with peer.
Hangup	Peer or this user terminated selective/PSTN call.
Lim 10 min	Selective/PSTN call limited to 10 minutes.
Timing Out	Selective/PSTN call has 10 seconds remaining before limit is reached (shown for 5 seconds).
Sel Call	Selective call is active.


9.25.2 Selective Call Using Speed Dial



Speed dial numbers are defined and provisioned by the OpenSky network administrator and cannot be manually entered into the radio by the user. Contact the administrator if changes to the speed dial list are required.

1. Scroll through the Menu options using the  or  button until “Speed Dial” appears in the second line of the display. Using the  or  keys, scroll through the pre-programmed speed-dial numbers until the desired number appears in the display and press the PTT button.

OR




2. Press and hold a key associated with a given number for more than three seconds. For example, press and hold the  to open the Speed Dial Menu and display the number assigned to that key in the speed dial list. Press the PTT button.

A ring tone is sounded.



If the other user accepts the call, the called user’s alias will appear in initiating caller’s display. The two are now in a unit-to-unit call until one ends the call, or the call is terminated due to an initiated emergency.

If the called radio is involved in another selective call, “BUSY” will appear on the second line of the display. “Unavailable” is displayed when the call has not been answered after a 1 minute timeout or when the other party is not registered on the network.



9.25.3 Accepting a Selective Call

1. The radio will ring (like a telephone), indicating you are receiving a Selective Call.
2. Press  or the  or  buttons to accept the incoming Selective Call.
3. “CONNECT” will appear in the display, followed by “Lim 10 Min.,” “SEL CALL,” and the alias of the caller appear in the display once the call is established.

9.25.4 Rejecting a Selective Call

When a Selective Call is being received (the radio is ringing), you can reject the call by pressing the  or the  key. The call will be rejected and “Reject” appears on the callers display.

9.25.5 Terminating a Selective Call

When a Selective Call is active, terminate the call by pressing  or .

9.26 SELECTIVE ALERTS

Selective alert messaging is an OTP feature that allows one of up to eight (8) pre-programmed (canned) text messages to be sent from one radio to another. The sender specifies a destination (receiving) radio, selects one of the pre-programmed text messages, and then transmits it to the destination radio. The message delivery system adds sender and time-of-day information and forwards the message to the destination (receiving) radio. The sending radio receives a brief message noting the status of the transmission.

Received messages are stored in the radio until deleted or until the radio is rebooted. Received messages do not survive a reboot.

9.26.1 Defining Messages

All selective alert messages are pre-defined. The messages are programmed and provisioned remotely by your OpenSky system administrator. The radio user cannot create selective alert message content. The entire selective alert message, including the abbreviation, can be up to 99 characters long.

Table 8-9 lists and defines the messages that may be displayed by the radio during a Selective Alert.

Table 8-10: Status of Selective Alert Messages

STATUS MESSAGE	DEFINITION
Alert Sent	Alert message successfully sent to target.
Delivered	Alert message passed to network.
Delivering	Delivering alert message to target.
New alert	New alert message received.
No alerts	No alerts are available.
Busy	VNIC congested and cannot deliver message at the current time.
Dest Down	Destination home VNIC down.
Ignored	Destination is either non-responsive or does not care to respond.
Inv Option	Distribution option is invalid.
Not Reg	Destination is not registered.
Partial	Not all destination ESN instances reachable.
Unauth Alrt	Unauthorized service function; initiator is not authorized to send the selected service message.
Unknown Msg	Unknown status received from VNIC.
Unreachable	Alert destination cannot be reached.

9.26.2 Sending a Message








The sending process has three steps. First select the destination radio's User ID, then select the alert message, and finally send the message. Refer to the procedures in subsections 9.26.2.1 or 9.26.2.2 for instructions on selecting a destination for a Selective Alert Message.

9.26.2.1 Selecting a Destination Using the Keypad (P5470 Only)









- Using the keypad, enter *7.

At the "AlertDst" prompt, enter the full *User ID* of the unit to send the message. A shortened User ID number can be dialed using the following guidelines:

- If the radio being called is in the same region and agency – enter only the last four digits.
- If the radio being called is in the same region, but a different agency – enter the last seven digits.
- If the radio being called is in another region or if the area is unknown – enter all ten digits.

- Press the  key to activate the selection.
- Use the  and  buttons, or the  and  buttons to scroll through the available messages until the desired message is displayed.
- Press the  or  key to send the message.
- Observe Status Messages (Table 8-10) to ensure proper delivery.

9.26.2.2 Selecting a Destination Using the Menu





1. Using the  or  key, scroll through the menu until “AlertDst” (Alert Destination) appears.
2. Use the  or  button to scroll through the list of User IDs until the desired destination is displayed and press the  key.
3. Use the  or  buttons to scroll through the available messages until the desired message is displayed.
4. Press the  key to send the message.
5. Observe Status Messages (Table 8-10) to ensure proper delivery.

9.26.3 Receiving a Message





When a selective alert message is received by a radio, a four-beep tone is heard. The tone is heard only once, but the message “NEWALRT” alternates with the Talk Group on the main display. Up to 8 received messages can be stored. If a ninth message is received, the first (oldest) message is automatically deleted to make room for the new message.

Received messages are displayed with the time and source information.

To display a Selective Alert Message:

1. Using the  or  button, scroll through the menu items until “Alerts Rcvd” appears. The oldest message is displayed and scrolls across the top line of the display.
2. The message includes the time, the User ID, and alias of the sender along with the message.
3. To view the next message, press the  or  button to go forward or backwards.

9.26.4 Deleting a Selective Alert Message

1. Display the message.
2. Press the  key and  or  to select Y or N.
3. At the “Delete? Y” prompt, press the  key. The message will be deleted.





Received messages cannot be saved.

9.27 MAKING INTERCONNECT CALLS (P5470 ONLY)

1. Using the keypad, enter *9, followed by the telephone number being called, and the # key (no dashes or spaces).

**9<telephone number>#*

Wait a couple of seconds and press and release the PTT button to initiate the call. An initial ring tone will sound to indicate signal call initiation. Once the gateway picks up the call, the ring tone will change. Press and hold the PTT and talk normally, then release the PTT to listen.

2. To hang up the call, press  the button or the  key.

9.28 EMERGENCY COMMUNICATIONS

The P5400 portable radio is capable of sending an emergency alert and making emergency calls on the network. The OpenSky system handles emergency calls with the highest priority, allowing you or the people you serve to get needed help.

Emergency call and alert capability for a profile is configured by the system administrator.



The radio that initiates an *emergency alert* emits a signal of 3 distinct beeps that only goes to the dispatch console.

Table 9-11: Emergency Calls vs. Emergency Alerts

EMERGENCY ALERT	EMERGENCY CALL
An Emergency Alert message is sent to the dispatcher console. The dispatch console plays an emergency tone when it receives the message.	An Emergency Alert message is sent to the dispatcher console. All peers (radios and consoles) and the dispatch console play the emergency tone whenever an emergency call is detected. An emergency tone plays for each new emergency, or when a profile is changed, (assuming there is an emergency on one of the Talk Groups for the new profile). If the orange LED is flashing rapidly, the radio is receiving an emergency call. If the LED is flashing every ½ second, the selected Talk Group is in the emergency state (although not transmitting). If the selected Talk Group is in the emergency state, an asterisk displays next to the Talk Group name.
No emergency audio (voice) transmission (hot-mic) capability available (per programming by system administrator)	In addition to the Emergency Alert signal, the microphone goes hot for a predetermined length of time to allow for emergency audio (voice) transmission. The radio declaring the emergency has channel access priority. The User can also use the PTT after the pre-determined hot-mic audio transmission, or during to extend the initial hot-mic audio transmission.

9.28.1 Declaring an Emergency Call or Alert

1. Press the red emergency button on the radio to enter emergency mode.



The emergency behavior for the selected profile is configured by the network administrator. This determines whether pressing the Emergency button sends an Emergency Call or just an Emergency Alert. An Emergency Alert is always *part of* and *sent with* an Emergency Call.

If the active profile of the unit initiating the emergency is configured to Emergency Alert, the three-beep emergency alert signal is sent only to the dispatcher console.

If the active profile of the unit initiating the emergency is configured to Emergency Call, the three-beep emergency alert signal is sent to the dispatcher console and to all other radios within the selected Talk Group. The default emergency Talk Group becomes the selected Talk Group. The display will alternate between the emergency Talk Group name and “EMERGENCY” to indicate that the emergency has been initiated.

2. The microphone is hot (open mic) for a programmed amount of time in order to send your voice out on the emergency Talk Group.

If the attempt is unsuccessful, “E-PEND” flashes periodically and a retry is queued for 10 seconds. If unsuccessful because of lost sync, retry occurs immediately upon reacquiring sync. On each retry attempt, radio temporarily displays “E-RETRY.” This process repeats until the emergency is successfully declared.

9.28.2 Receiving an Emergency Call

Initially, when receiving an emergency call, the radio sounds the emergency tone (three short high-pitched tones).

The radio will flash “EMERGENCY” and display the alias of the user that triggered the emergency or the alias of the Talk Group (if the incoming Talk Group is the selected Talk Group of the receiving radio).

With “No Scan,” only the emergency tone is heard, not the initial open mic transmission.

To dismiss or ignore the emergency, refer to Section 9.28.3.

9.28.3 Dismissing an Emergency

The “Dismissing an Emergency” function allows you to “ignore” an emergency declared by another user.



An emergency is dismissed for a configurable amount of time (default = 5 minutes).

1. After receiving an emergency call, press the or button until you see “EmgDismiss.”
2. Press the to toggle “<” on (dismiss) and off. This works in similar fashion to the lock out menu.



The emergency dismiss timer is cleared when the emergency is cleared.

9.28.4 Clearing an Emergency Call or Alert



Check with your system administrator to ensure that your radio is configured with the ability to clear an emergency.

1. Press to declare an emergency. To clear an emergency, press and hold Option 2 button . While holding , press the emergency button. Release both buttons when the “emergency cleared” tone sounds.
2. The radio returns to your default selected Talk Group. The “EMERGENCY” display is removed from the main screen.



If the radio is in stealth mode, clearing the emergency will cause the radio to exit stealth mode.

9.29 OPENSky ENCRYPTION

In the OpenSky network, both data and voice use a 128-bit or 256-bit key encryption standard published by the Federal Information Processing Service (FIPS), called Advanced Encryption Standard (AES). AES is approved by the U.S. Department of Commerce for encryption of classified materials.

When encryption is enabled on the network, data is encrypted from the MDIS to the Mobile End System (MES) (e.g., P5400 portable radio). This form of encryption provides airlink security.

Voice encryption is handled either automatically or manually. Automatic encryption is initiated through the Unified Administration Server (UAS) for a specific Talk Group and requires nothing from the user. Manual encryption is initiated by two or more radio users. Both methods of encryption are discussed in the following sections.



When a user transmits encrypted voice, any listening users with different encryption keys hear distorted voice and “No Access” appears in the radio display.

9.29.1 Automatic Encryption

For automatic encryption, a system administrator will select the Talk Group to be encrypted at the interface to the UAS. Once the Talk Groups have been selected and identified as secure, credentials for key generation are generated automatically by the system and provisioned to authorized users. This process requires that authorized users log-in to the network and be authenticated. Encryption keys require no manual handling and are never sent “in the clear” over any network interface or airlink.

9.29.1.1 Using Automatic Encryption

1. Locate the Talk Group that has been encrypted at the system administrator level.
2. “Pls Login” appears in the display (unless the keypad was used to log-in).
3. Log-in normally by entering your User ID and Password.

If a user is engaged in a call on a Talk Group encrypted at the network administrator level, “Secure Call” will appear in the second line of the dwell display if the user is logged in to that Talk Group.

If a secure call is in progress elsewhere and the user has not logged in, the bottom of the dwell display will alternate between “No Access” and the alias of the radio that is currently engaged in the secure call.



If enabled via programming, a radio can automatically log-in at voice registration and enable voice encryption.

9.29.2 A/B Switch

If configured, the A/B switch can be used to enable or disable encryption.

9.29.3 Manual Encryption (P5470 Only)

Two or more users can manually encrypt a call, if enabled, without an established encrypted Talk Group. A pre-determined “key or code” is required. Note that while a user is engaged in an encrypted call, users within the Talk Group that are not encrypted can still make standard voice calls on that Talk Group. The encrypted user can hear the standard unencrypted calls, but cannot respond while still manually encrypted.

Manual key entry only affects the currently selected Talk Group. All available Talk Groups within the current profile may be independently encrypted.



The key must be pre-determined by the users prior to making a manually encrypted call on a Talk Group and is entered into the radio using the keypad. For 128 bit encryption, this key is between 1 and 16 digits. For 256 bit encryption, this key is between 17 and 32 digits.

9.29.3.1 Using Manual Encryption

1. Press *32 on the keypad.
2. Enter the key (1 – 16 digits for 128 bit encryption; 17 – 32 digits for 256 bit encryption).
3. Press #.
4. To end manual encryption, press *33.

If a user is engaged in a call on a Talk Group that has been manually encrypted at the radio level, the user will see “Secure Call” on the bottom of the dwell display.

If a secure (encrypted) call is in progress, and the user has not entered the key, the bottom of the dwell display will alternate between “No Access” and the alias of the radio that is currently engaged in the secure call.

Once the user has terminated manual encryption, “UnSecure” appears temporarily in the bottom line of the dwell display.

9.30 STATUS MESSAGES







If enabled via programming, the radio can transmit a pre-programmed status message. Section 8.30.1 describes how to send a status message via the keypad and Section 8.30.2 describes how to send a status message via the menu.

9.30.1 Send Status Message via the Keypad (System Model Radios Only)

1. Press *2 <0...9> # on the keypad.
2. A Status message can be associated with each key (0 – 9). This text is displayed on the first line of the display when the key is pressed until another key is pressed.
 - If no messages have been configured, “No Messages” is displayed.
 - If a message is not assigned to a key, “No Entry” is displayed for the keypad sequence.
 - You can press multiple keys to select the desired Status message.
3. The # key terminates the keypad sequence and sends the currently selected status message. If no messages have been configured or no message is associated with the key, no message is sent and an error tone is played.

Press the * key to cancel the keypad sequence.

9.30.2 Send Status Message via the Menu

1. Press  or  until “Status Msg” appears and press . If no messages have been configured, “No Messages” is displayed.
2. Scroll through the available messages using  or . The configured Status message is displayed on the 1st line of the display.
3. Press the  button to send the currently selected message. If no messages have been configured, no message is sent and an error tone sounds.

Press  or  to cancel status message selection.

9.31 REQUEST TO TALK (RTT) MESSAGES







If enabled via programming, the RTT message feature allows you to send a short service message to the VNIC. Section 9.31.1 describes how to send an RTT message via the keypad and Section 9.31.2 describes how to send an RTT message via the menu. Note that only one RTT message can be programmed into the radio.

9.31.1 Send RTT Message via the Keypad (System Model Radios Only)

1. Press *5 <0...9> # on the keypad. The key associated with the RTT message (0-9) is configured via programming.
2. This message is displayed on the first line of the display when the key is pressed until another key is pressed.
 - If no message has been configured, “No Message” is displayed.
 - If a message is not assigned to the key, “No Entry” is displayed for the keypad sequence.
3. The # key terminates the keypad sequence and sends the currently selected RTT message. If no message has been configured or no message is associated with the key, no message is sent and an error tone is played.

Press the * key to cancel the keypad sequence.

9.31.2 Send RTT Message via the Menu

1. Press  or  until “RTT Msg” appears and press . If no message has been configured, “No Message” is displayed.
2. Use  or  to select the message. The configured RTT message is displayed on the 1st line of the display.
3. Press the  button to send the selected message. If no message has been configured, no message is sent and an error tone sounds.

Press  or  to cancel RTT message selection.

9.32 SITE LOCK

Users may need to select the site in cases where network communications are down. The Site Lock menu allows a user to manually roam to a specific site. The sites in the menu are populated with the current site, adjacent sites, and node 2 sites. The menu allows the user to select a particular site based on the Site





Name. Once selected, the radio will randomly pick a channel at the site that is identified as operational and attempt to attach to it.

If the channel is not available, the radio attempts to attach to the next channel in the channel list for the site until it has attempted every channel at the site. If no channels are available, the radio plays a “Site Not Found” tone and displays “SiteUnavail” on the second line of the Site Lock menu. The radio reverts to its normal roaming functionality.

If the radio does find a valid channel on the site, it attaches to it, plays a “Site Found” tone, displays “SiteAvail” on the second line of the Site Lock menu for 2 seconds, and then reverts to the Dwell menu.

9.33 GPS COORDINATES

The radio’s current latitude and longitude coordinates may be displayed using the “GPS” menu. The following procedure assumes a GPS antenna is connected to the radio and it is receiving adequate signals from GPS satellites.

1. Press  or  until the “GPS” menu appears in the display. Current GPS coordinate latitude and longitude data continuously scrolls in the top line of the display in a degrees:minutes:seconds format.
2. Press  or  to change to another menu.



NOTE

If the internal GPS receiver’s data is expired (30 minutes or more) or unavailable, the radio uses the serving base station’s coordinates [GPS (Site) is displayed]. The GPS Menu will also indicate if the data is aged (2 minutes or more) [GPS (Aged) is displayed].

9.34 V-TAC OPERATION

9.34.1 Extended Coverage Modes (XCOV, XCOV-TG, and XCOV-PROF)

In addition to all standard portable radio operating capabilities, Extended Coverage adds the V-TAC’s bridging (vehicular repeat) functionality for accessing the OpenSky radio network. Each portable radio connected to the V-TAC using Extended Coverage is considered a “client” on the V-TAC. Extended Coverage benefits portable radio users since it allows them to get network connectivity using the V-TAC’s higher transmit output power and better antenna system.

The V-TAC supports three Extended Coverage modes: Extended Coverage for individual users (XCOV), Extended Coverage for a Talk Group (XCOV-TG), and Profile Extended Coverage (XCOV-PROF). Typically, Extended Coverage is used after the vehicle’s operator has exited the vehicle with a portable radio unit and the portable unit requires this bridging functionality to access the OpenSky radio network.

The V-TAC takes advantage of OpenSky’s TDMA capability to eliminate interference between its local and network radio links when operating in an Extended Coverage mode, an undesirable characteristic of many traditional vehicular repeater systems. Because the V-TAC employs this technology, interference on the network and local radio links is minimized.

A V-TAC in Extended Coverage mode sends its alias to clients. The alias is displayed in the second line of the dwell menu of the client, (“VA <alias>”). The client must be connected to a V-TAC running version OTP14.4 or later for the V-TAC to provide the alias to the client. If the client is connected to a V-TAC running version OTP14.3.1 or earlier, the client displays “VA None.”

9.34.2 Change between Extended Coverage Modes

By default, the specific Extended Coverage mode utilized is determined by settings programmed into the V-TAC and portable radios from the system administrator or radio installation personnel. These

programmed settings determine which Extended Coverage mode the V-TAC and radios normally use and determine the access method employed by a portable radio to connect to the V-TAC. After these settings are programmed to the V-TAC and portable radios, each must be rebooted (powered off and then back on) before the change takes effect.

See the following sections for instructions on how to override this setting manually. The override is only successful if the V-TAC operating mode matches the manually selected portable V-TAC mode.

9.34.3 Radio Limitations Using Extended Coverage Modes

Connecting a portable radio to a V-TAC introduces minor functional limitations. See the following sections for a listing.

9.34.3.1 Limitations Using XCOV, XCOV-TG, and XCOV-PROF

Portable radios connected to the V-TAC using any of the Extended Coverage Modes, XCOV, XCOV-TG, or XCOV-PROF, will not channel-scan unless they lose radio frequency contact with the V-TAC. If manually enabled, radios will not scan network channels.

9.34.3.2 Limitations Using XCOV-TG

The following portable radio keypad functions are disabled when the radio is connected to the V-TAC using the XCOV-TG mode: log-off, manual log-in, alerts, selective calls, PSTN calls, speed dial calls, SOI mode, and RTT.

The following portable radio menus are disabled when the radio is connected to the V-TAC using the XCOV-TG mode: alert destination, alert message, alert received, channel, speed dial, priority 1 Talk Group, priority 2 Talk Group, priority 3 Talk Group, RTT, Status message, site lock and scan mode. In addition, the user cannot change Talk Group or profile.

9.34.3.3 Limitations Using XCOV-PROF

The following portable radio keypad functions are disabled when the radio is connected to the V-TAC using the XCOV-PROF mode: log-off, manual log-in, alerts, selective calls, PSTN calls, speed dial calls, SOI mode, and RTT.

The following portable radio menus are disabled when the radio is connected to the V-TAC using the XCOV-TG mode: alert destination, alert message, alert received, priority 1 Talk Group, priority 2 Talk Group, priority 3 Talk Group and scan mode. In addition, the user cannot change Talk Group or profile.

9.34.4 Use XCOV Mode

The Extended Coverage for individual users (XCOV) mode allows up to eight (8) client radios to connect to the V-TAC. The radios have full radio functionality including selective calling and mobile data.






With the Extended Coverage for individual users' (XCOV) mode, V-TAC configuration defines which portable radios are permitted V-TAC access. The radio will automatically connect to a V-TAC if it cannot find a network channel. The radio can also be manually connected to a V-TAC as indicated with the *61# and *62# commands, each determined by the system administrator in the radio configuration.

9.34.4.1 Manually Accessing the XCOV Mode

System Model Radios

1. Press *61# to manually access XCOV mode.
2. Press *60# to manually disconnect from XCOV mode.

Both Model Radios

1. Press  or  until the Client Mode menu appears.
2. Press  or  until XCOV is displayed.
3. Press  to confirm mode selection. The radio reverts to the dwell display and the V-TAC icon is displayed.

9.34.5 Use XCOV-TG Mode

When using the XCOV-TG mode, up to thirty (30) client radios can connect to the V-TAC. However, unlike XCOV, radios connected using XCOV-TG are limited to communicating only on the XCOV-TG Talk Group. The radio can only raise an emergency if this Talk Group is emergency capable. Advanced features such as selective calling and mobile data operations are not available to the XCOV-TG connected clients. The radio will automatically connect to a V-TAC if it cannot find a network channel.

The Talk Group used for XCOV-TG communications is the Talk Group that was selected at the V-TAC when it entered XCOV-TG mode. Before a radio can connect to the V-TAC, the Talk Group must be selected on the P5300. If this Talk Group is not provisioned in the radio's personality, the radio cannot connect to the V-TAC via the XCOV-TG mode. While connected to the V-TAC via XCOV-TG, a different Talk Group or profile cannot be selected.

When a portable radio is connected to the V-TAC via XCOV-TG, the V-TAC forwards only the network voice traffic on the XCOV-TG Talk Groups.

9.34.5.1 Manually Accessing the XCOV-TG Mode

For the Extended Coverage for a Talk Group mode (XCOV-TG), a portable radio user is granted access and connects to the V-TAC by simply selecting the same Talk Group that the V-TAC had selected when it entered the XCOV-TG mode. Contact the system administrator for questions regarding these aspects.






During XCOV-TG mode operations, the V-TAC will not disconnect portable radios connected to it. A portable radio user must manually disconnect from the V-TAC by pressing *60 # on the radio's keypad.

However, if the V-TAC is switched out of the XCOV-TG mode, all portable radios will be automatically disconnected from the V-TAC. The radios will continue to look for another V-TAC until manually disconnected (*60#).

System Model Radios

- Press *62# to manually access XCOV-TG mode.
- Press *60# to manually disconnect XCOV-TG mode.

Both Model Radios

1. Press  or  until the Client Mode menu appears.
2. Press  or  until XCOV-TG is displayed.
3. Press  to confirm mode selection. The radio reverts to the dwell display and the V-TAC icon is displayed.

9.34.6 Using XCOV-PROF Mode

In XCOV-PROF mode, client attachment to a V-TAC is based on profile rather than Talk Group. XCOV-PROF mode allows the transmission and receipt of voice calls on any Talk Group in the profile as opposed to only one Talk Group. XCOV-PROF allows emergencies on a non-selected Talk Group based on the emergency behaviors of the profile. XCOV-PROF minimizes data traffic between the client and V-

TAC while allowing flexibility of voice functionality. As a result, data services between the client and V-TAC are disabled. The radio will automatically connect to a V-TAC if it cannot find a network channel.

Note the following regarding XCOV-PROF mode:






- The client profile must match the V-TAC.
- The client profile used to connect to the V-TAC must have been previously provisioned to the client prior to connection. If the profile is not in the client's personality, the client cannot connect to the V-TAC.
- Neither the V-TAC nor a client can change the profile once it has entered XCOV-PROF mode. The Profile menu will be disabled.
- Client global profiles are disabled.

9.34.6.1 Access XCOV-PROF Mode

System Model Radios Only:

- Enter the command *63 # to set the radio to use the XCOV-PROF mode.
- Press *60 # to disconnect from the XCOV-PROF mode.

Both Model Radios:

1. Press  or  until the Client Mode menu appears.
2. Press  or  until XCOV-PROF is displayed.
3. Press  to confirm mode selection. The radio reverts to the dwell display and the V-TAC icon is displayed.



9.34.7 Use Scene-of-Incident Mode

The Scene-of-Incident mode (SOI) is user-selectable. The SOI mode provides a local repeater function (V-TAC) with no network connection.



When operating in the SOI mode, the radio is disconnected from the OpenSky network. Therefore, communications with radios and dispatch personnel on the network is not possible.

SOI Mode, Manual Channel Entry (System Model Only)

1. Press *4#.
2. The radio prompts for the channel. Enter the channel number and press  to confirm channel.
3. The radio prompts for the band. Table 9-12 lists valid bands and their definitions. Enter the number assigned for the desired frequency band and press  to confirm.
4. The radio reverts to the dwell display. If accepted, you will be switched off the network, and be communicating locally through the V-TAC.

Press *40# or use the Client Mode menu to return to normal operation (Network Mode). The personality and profile in use at the time the radio entered SOI mode is restored.

SOI Mode, Manual Channel Entry (Both Model Radios)

1. Press  or  until the Client Mode menu appears.

2. Press ☐ or ☒ until SOI is displayed.
3. Press ☐ **M** to confirm mode selection.
4. Press ☐ or ☒ until “Manual Select Chan” is displayed and press ☐ **M**.
5. Press ☐ or ☒ to edit the right-most digit and press ☐ **M** to advance to the next digit. Repeat until the desired channel is entered.
6. The radio then prompts the user to edit the band. Table 9-12 lists valid bands and their definitions. Press ☐ or ☒ to edit the number assigned to the frequency band and press ☐ **M** to confirm and enter the SOI mode.

Use the Client Mode menu to return to normal operation (Network Mode). The personality and profile in use at the time the radio entered SOI mode is restored.

SOI Mode, Pre-Programmed Channel Selection (Both Model Radios)

1. Press ☐ **▲** or ☐ **▼** until the Client Mode menu appears.
2. Press ☐ or ☒ until SOI is displayed.
3. Press ☐ **M** to confirm mode selection.
4. Press ☐ or ☒ scroll through a list of pre-programmed channels.
5. Press ☐ **M** to confirm channel and enter SOI mode.

Use the Client Mode menu to return to normal operation (Network Mode). The personality and profile in use at the time the radio entered SOI mode is restored.

Table 9-12: Band Definitions

RF BAND	RF CHANNEL NUMBER
0 = SMR	Band 0: 1-830
1 = AMPS	Band 1: 1-600
2 = BORDER	Band 2: 1-600
3 = 700 MHz Band 1	Band 3: 1-477
4 = 700 MHz Band 2	Band 4: 481-957
5 = 700 MHz Band 3	Band 5: 1-477
6 = 700 MHz Band 4	Band 6: 481-957
7 = 900 MHz	Band 7: 1-399
8 = 800 MHz Rebanded	Band 8: 1-830
9 = 400 MHz T band WB	Band 9: 1-6718 (Independent Separation Between TX and RX)
10 = 400 MHz T band NB	Band 10: 1-6718 (Independent Separation Between TX and RX)
11 = 400 MHz T band Temp (NYPD only)	Band 11: 1-120
14 = 700 MHz reband WB	Band 14: 1-957
15 = 700 MHz reband NB	Band 15: 1-959

10. EDACS, CONVENTIONAL, P25 (ECP) OPERATION

10.1 TURNING ON THE RADIO

1. Power ON the radio by rotating the POWER ON-OFF/VOLUME knob clockwise. A short alert signal (if enabled through programming) indicates the radio is ready to use.



NOTE

The radio can be programmed to require the entry of a PIN in order to operate the radio. Check with your System Administrator if you forget your PIN. As the PIN is entered, an asterisk is displayed for each digit. The actual value is not displayed.

2. The display shows the last selected system and group or a default system and group (depending on programming).
3. Adjust the POWER ON-OFF/VOLUME knob to the desired volume level.
4. Select the desired system and group. The display indicates the current system and group names.
5. The radio is now ready to transmit and receive calls.



NOTE

In the trunked environment, CC SCAN will be displayed if communication with the system's control channel cannot be established. This may occur if, for example, the radio is out of range of the trunking site. It may be necessary to move to another location or select another trunking system to re-establish the control channel link for trunked mode operations. CC SCAN is displayed on the group line until a control channel is accessed.

10.2 CONTROLS

The radio features two rotary control knobs, an emergency button, and a dual position A/B switch mounted on the top of the radio. The Push-To-Talk and two option buttons are located on the side. The front mounted keypad has six buttons on the P5450 Scan model and 15 buttons on the P5470 System Model Radio.

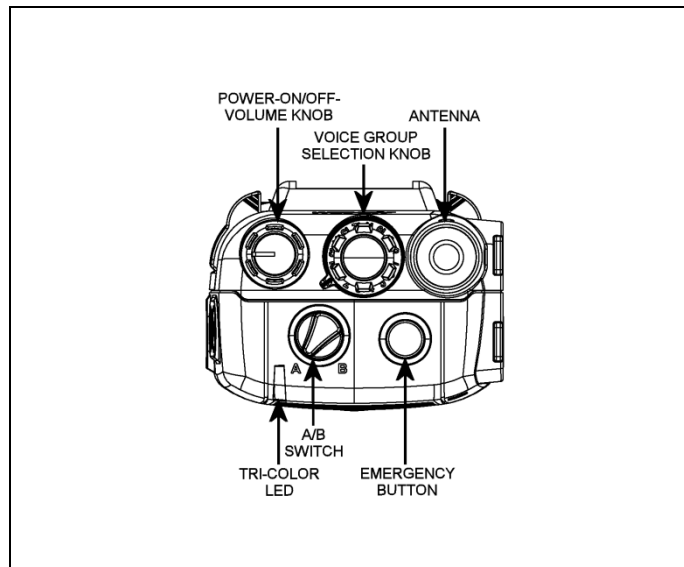


Figure 10-1: Top View

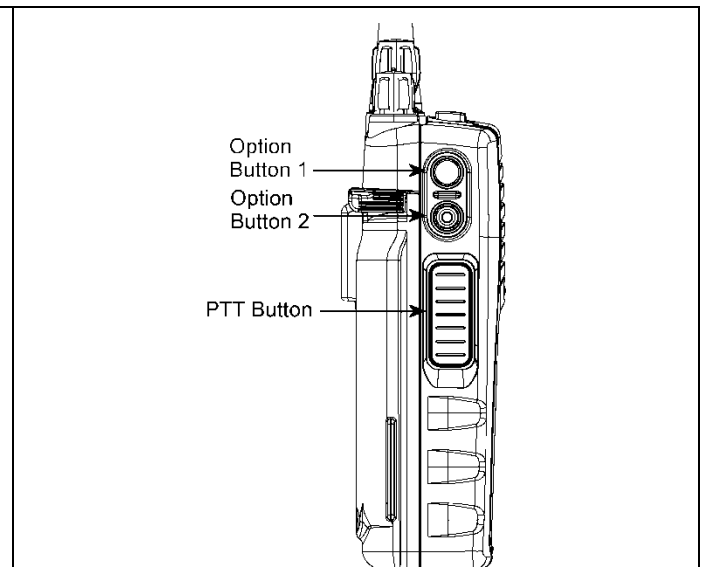



Figure 10-2: Side View

10.2.1 Buttons, Knobs, and Switch

The functions of the buttons, knob controls, and dual position A/B Switch vary depending on the mode of operation. Their functions while in EDACS (ECP) mode are discussed in the following paragraphs. Refer to Figure 10-1 and Figure 10-2.

Table 10-1: Buttons, Knobs, and Switch Functions

POWER ON-OFF/VOLUME KNOB	<p>Applies power to and adjusts the receiver's volume. Rotating the control clockwise applies power to the radio. A single alert tone (if enabled through programming) indicates the radio is operational.</p> <div>  </div> <div> NOTE </div> <div style="border: 1px solid black; padding: 5px;"> <p>The radio can be programmed to require the entry of a PIN in order to operate the radio. Check with your System Administrator if you forget your PIN. As the PIN is entered, an asterisk is displayed for each digit. The actual value is not displayed.</p> </div> <p>Rotating the control clockwise increases the volume level. Minimum volume levels may be programmed into the radio to prevent missed calls due to a low volume setting. While adjusting the volume the display will momentarily indicate the volume level (i.e., VOL=31). The volume range is from a minimum programmed level of zero (displayed as OFF in the display) up to 40, which is the loudest level.</p>
VOICE GROUP SELECTION CONTROL KNOB	<p>Selects systems or group/channels (depending on programming). This is a 16-position rotary knob.</p>
EMERGENCY/HOME BUTTON	<p>Automatically selects the pre-programmed Group/System by pressing and holding for a programmed duration. It can also be used to declare an emergency by pressing and holding for a programmed duration. The button must be pre-programmed for either operation, but not both.</p>
PTT BUTTON	<p>Push-To-Talk must be pressed before voice transmission begins. In trunked mode the radio's ID is transmitted upon depression of the PTT button.</p>
SIDE OPTION BUTTON 1 ○	<p>Activates one of a number of programmable software options selected during PC programming. Programmable options include hi/low power settings, keypad lock, LCD contrast, and LCD and keypad back lighting.</p>
SIDE OPTION BUTTON 2 ⊕	<p>Exits the current operation (removing all displays associated with it) and returns the radio to the selected Talk Group. Terminates individual and telephone interconnect calls.</p>
A/B SWITCH	<p>In ECP mode, can be pre-programmed to switch between two available software options.</p>

10.2.2 Keypad

The front mounted keypad of the P5450 “Scan” model has six buttons and P5470 “System” model has 15 buttons. Refer to Figure 10-3 and Figure 10-4, respectively.

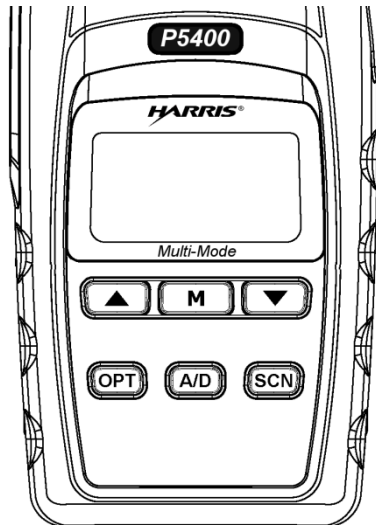


Figure 10-3: P5450 “Scan” Model Front Panel

Table 10-2: P5450 Keypad Functions

KEY	FUNCTION
	<u>Primary Function</u> : Accesses the pre-stored menu. <u>Secondary Function</u> : Activates a selected item within the menu. This is similar to an “Enter” key.
	Scrolls thru available menu items.
	Adds/Deletes selected groups or channels from SCAN list of the currently selected system.
	Toggles SCAN operation ON and OFF.
	Activates one of any programmable software options selected during the PC programming, including: high/low TX power and talkaround.

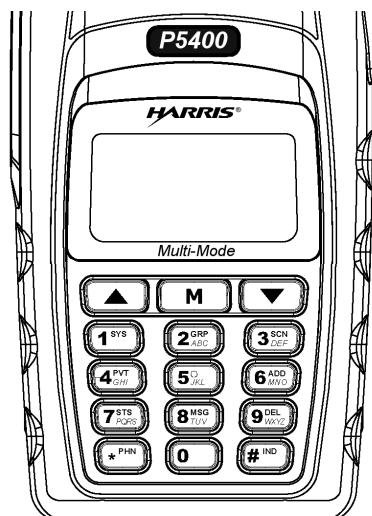





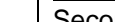
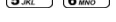
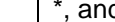

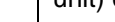
















Figure 10-4: P5470 “System” Model Front Panel

Table 10-3: P5470 Keypad Functions

KEY	FUNCTION
	<u>Primary Function:</u> Accesses the pre-stored menu. <u>Secondary Function:</u> Activates a selected item within the menu. This is similar to an “Enter” key.
	<u>Primary Function:</u> Allows the user to scroll through available systems, groups, or channels, depending on personality programming. <u>Secondary Function:</u> Changes the selection for an item within a list.
         	<u>Primary Function:</u> Refer to the separate key definitions within this table. <u>Secondary Function:</u> These keys function much as a typical DTMF telephone pad 0-9, *, and # keys; and are used to place telephone interconnect and individual (unit-to-unit) calls.
	Selects a specific system. If the rotary knob is used to select the system and more than 16 systems are programmed in the radio, the  key is used to select additional banks (groupings) of systems.
	Selects a specific group.
	Turns the Scan operation ON and OFF.
	Enables or disables Private Mode (encryption) for the system/group/channel displayed.
	Adds groups or channels from the currently selected system to the Scan list.
	Status. Access to the status list (0-9). The Status key permits the transmission of a pre-programmed status message to an EDACS site.
	Message. Access to the message list (0-9). The Message key permits the transmission of a pre-programmed message to an EDACS site.
	Deletes selected groups or channels of the currently selected system from the Scan list.
	Inverts display – Toggle normal/invert.
	Initiates telephone interconnect calls.
	Initiates individual unit-to-unit calls.

10.3 DISPLAY

The radio display is made up of 3 lines (see Figure 10-5). Lines 1 and 2 contain eight alphanumeric character blocks and are used primarily to display system and group names. Line 1 also displays radio status messages. The 3rd line is used primarily to display radio status icons. All three lines are used to display menu options when in the menu mode. If programmed, the display backlighting will illuminate upon power-up or when radio controls are operated.

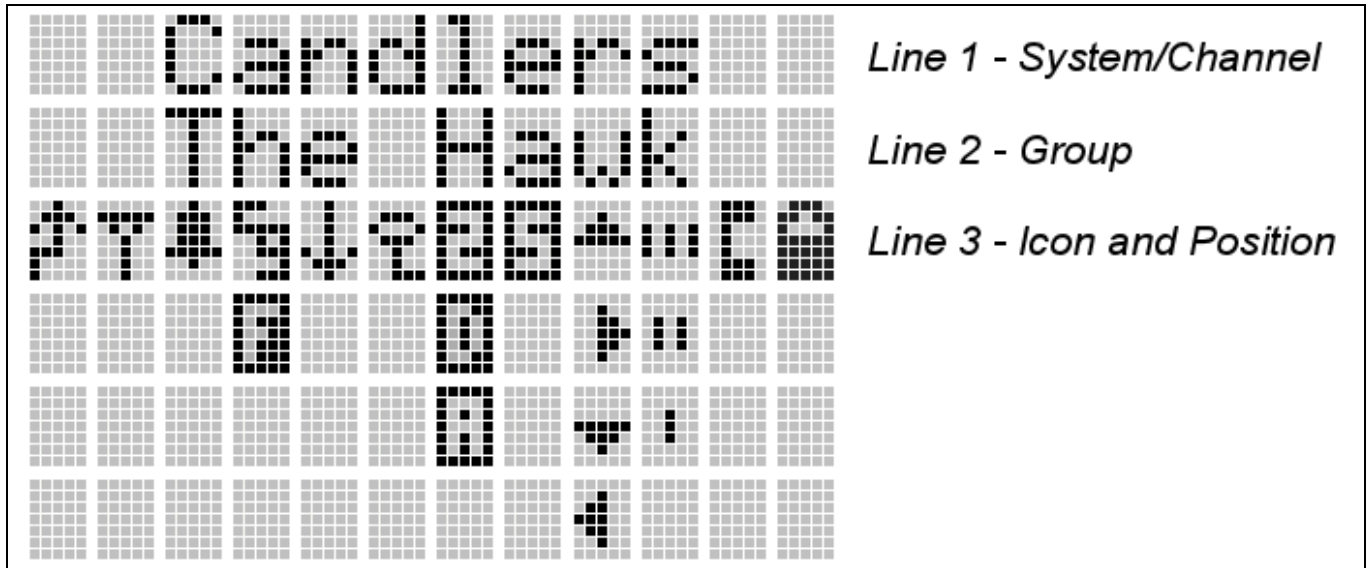


















Figure 10-5: Radio Display

10.4 RADIO STATUS ICONS

Status Icons indicate the various operating characteristics of the radio. The icons show operating modes and conditions and appear on the third line of the display (see Table 10-4).

Table 10-4: Status Icon Descriptions

STATUS ICON DESCRIPTIONS	
	Steady – During all radio transmissions. Appears in the 1 st position of the display.
	Steady – “Busy” transmitting or receiving. Appears in the 2 nd position of the display. Flashing – Call is queued.
	Steady – T99 Mode enabled. Appears in the 3 rd position of the display.
	Steady – Channel Guard enabled. Appears in the 4 th position of the display. If icon is not visible – Channel Guard is disabled.
	Steady – Trunked system in Failsoft™ mode. Appears in the 4 th position of the display.
	Steady – Transmit at low power. Appears in the 5 th position of the display. If icon is not visible – Transmit at high power.
	Steady – Transmit in encrypt mode. Appears in the 6 th position of the display. Flashing – Receiving an encrypted call.
	Steady – Indicates the current channel is set up as a Project 25 (P25) channel. Appears in the 7 th and 8 th positions of the display.
	Steady – Indicates the current channel is set up as a ProVoice channel. Appears in the 7 th position of the display.
	Steady – Indicates the current channel is set up as an analog channel. Appears in the 7 th position of the display.
	Animated (rotates clockwise) – Scan mode enabled. Appears in the 9 th position of the display. If icon is not visible – Scan is disabled.
	Steady – Group or channel in scan list. Appears in the 10 th position of the display.
	Steady – Priority 2 group or channel. Appears in the 10 th position of the display.
	Steady – Priority 1 group or channel. Appears in the 10 th position of the display.
	Steady – Special call mode (individual or telephone). Appears in the 11 th position of the display.
	Steady – Battery charge indicator. Appears in the 12 th position of the display. Flashing – Low battery indicator.

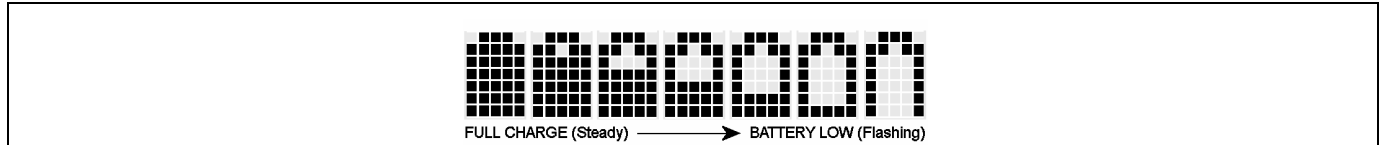


Figure 10-6: Full Cycle Battery Charge Indicator

The battery charge indicator illustrates approximate charge only, based on battery voltage. Refer to Figure 10-6.

10.5 TRI-COLOR LED

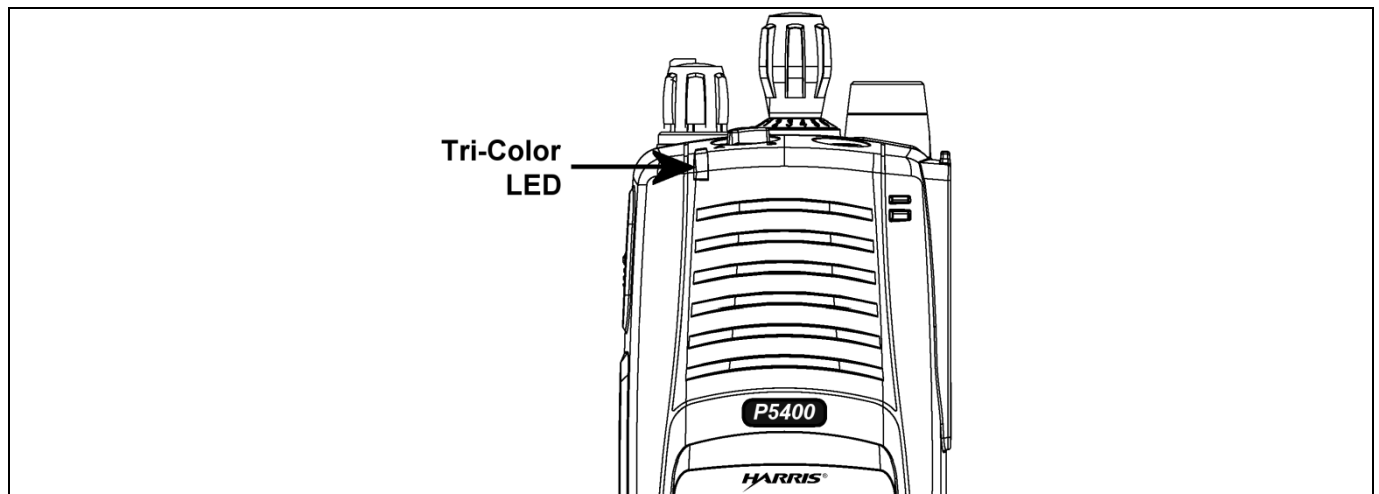


Figure 10-7: Tri-Color LED

The Tri-Color LED changes color to indicate radio status and is visible from both the front and top of the radio (see Figure 10-7). The colors of the LED and the status they represent while operating in EDACS, P25, and Conventional (ECP) modes are defined below.

Green:	Receiving
Red:	Unencrypted transmission
Orange:	Encrypted transmission



10.6 RADIO STATUS MESSAGES

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

<u>MESSAGE</u>	<u>NAME</u>	<u>DESCRIPTION</u>
QUEUED	Call Queued	Indicates the system has placed the call in a request queue.
SYS BUSY	System Busy	Indicates the system is busy, no channels are currently available, the queue is full, or an individual call is being attempted to a radio that is currently transmitting.
DENIED	Call Denied	Indicates the radio or talkgroup is not authorized to operate on the selected system and/or talkgroup.
CC SCAN	Control Channel Scan	Indicates the control channel is lost and the radio has entered the Control Channel Scan mode to search for the control channel (usually out of range indication).
WA SCAN	Wide Area Scan	Indicates the radio has entered the Wide Area Scan mode to search for a new system (if enabled through programming).
SYSC ON	System Scan Features On	Indicates the System Scan features are enabled.
SYSC OFF	System Scan Features Off	Indicates the System Scan features are disabled.
LOW BATT	Low Battery	Battery voltage has dropped to the point to where the radio is no longer able to transmit. The radio will still receive calls until the battery is discharged beyond the point of operation at which time the radio automatically shuts down.
RXEMER	Receive Emergency	Indicates an emergency call is being received. This message will be flashing on line two.
TXEMER	Transmit Emergency	Indicates an emergency call has been transmitted on this radio. This message will be flashing on line two.
VOL=31	Volume Level	Indicates the current volume level. The volume level display ranges from OFF (muted) to 40 (loudest).
WHC	Who Has Called	Indicates an individual call has been received, but not responded to. The indicator turns OFF if the individual call mode is entered, the system is changed, or the radio is turned off and then on again.
UNKNOWN	Unknown ID	Indicates an individual call is being received from an unknown ID.

10.7 ERROR MESSAGES

If either of the Error Messages shown below is displayed, the radio is programmed incorrectly or needs servicing.


 or
 
 (Power-up only)

Where  is the error code and  or  is the message.

10.8 ALERT TONES

The P5400 radio provides audible Alert Tones or “beeps” to indicate the various operating conditions (see Table 10-5).

Table 10-5: Alert Tones

NAME	tone	DESCRIPTION
Call Originate	one short mid-pitched	OK to talk after pressing the push-to-talk button.
Call Queued	one high-pitched	Call queued for processing.
Autokey	one mid-pitched	Queued call received channel assignment.
System Busy	three low-pitched	System busy or unable to complete call.
Call Denied	one low-pitched	Radio is not authorized on the system or group.
Carrier Control Timer	five high-pitched/one long low-pitched	PTT depressed for maximum length of time.
Low Battery	one low-pitched/one short mid-pitched	Low battery.
TX Low Battery Alert	one low-pitched	After PTT - battery too low to transmit.








10.9 VOICE ANNUNCIATION

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

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



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

10.10 SYSTEM SELECTION

- METHOD 1:** From the control knob: If system selection is programmed to the Voice Group Selection control knob, select a system by turning the knob to the desired system number position (1-16). The display registers the new system name on line one. The  button can be programmed to provide access to a “2nd bank” of 16 system number positions (17-32).
- METHOD 2:** From the keypad: If system selection is programmed as the primary function of  and  select a system by pressing  or  to scroll through the system list. The display registers the new system name on line one.
- METHOD 3:** **(P5470 model radios only)** Direct Access: Press  to enter the system select mode. Press the numeric key, which is mapped to the desired system. Press . The radio will move to the selected system.






NOTE

If system selection is programmed to the Voice Group Selection control knob, direct access to systems will not be available. Pressing  or  will scroll through different sets of 16 systems each (banks) if more than 16 systems are programmed into the radio. The systems within each bank are then selectable via the Voice Group Selection control knob as described previously in METHOD 1.








Example:

System: 1 = North	Group: 1 = Group 1
2 = South	2 = Group 2
3 = East	3 = Group 3
4 = West	4 = Group 4

1. Press . (South is the currently selected system.)
2. Press . (Press 4 to select “West” system.)
3. Press . (West is the newly selected system.)


10.11 GROUP/CHANNEL SELECTION

Several methods can be used to select a new group or channel.


- METHOD 1:** From the Control knob: If group selection is programmed to the Voice Group Selection control knob, select a group by turning the Voice Group Selection control knob to the desired group number position. The display registers the new group name on line two. If the knob is moved to a position greater than the number of programmed groups, the highest programmed group will remain selected. The  button can be programmed to provide access to a “2nd bank” of 16 group number positions (17-32).
- METHOD 2:** From keypad: If group selection is programmed as the primary function of  and  select a group by pressing  or  to scroll through the group list. The display registers the new group name on line two.
- METHOD 3:** **(P5470 model radios only)** Direct Access: Press  to enter the group select mode. Press the numeric key mapped to the desired group. Press . The radio will move to the selected group.

10.12 MODIFY SCAN LIST

10.12.1 P5470 Model

1. Press **[3 SCAN]** to toggle scan OFF and verify  is **not** displayed.
2. Select group or channel.
3. Press **[9 DEL]** once to remove group or channel from list.
4. Press **[6 ADD]** once to add as a normal group or channel.
5. Press **[6 ADD]** twice to add as a Priority 2 group.
6. Press **[6 ADD]** three times to add as a Priority 1 group.
7. Press **[3 SCAN]** to re-start scanning.

10.12.2 P5450 Model

1. Press **[SCN]** to toggle scan OFF and verify  is **not** displayed.
2. Select group or channel.
3. Press **[A/D]** once to remove group or channel from the list.
4. Press **[A/D]** once to add as a normal group or channel.
5. Press **[A/D]** twice to add as a Priority 2 group.
6. Press **[A/D]** three times to add as a Priority 1 group.
7. Press **[SCN]** to re-start scanning.

10.13 MENU

The Menu function accesses features that are not available directly from the keypad. The order and actual menu items available is configurable through programming. Upon radio power-up, the menu item that is at the top of the menu list will always be displayed first. Subsequent access to the menu function will return the last menu item that was shown in the display and cursor position.

1. To enter the menu mode, then press **[M]**.
2. Upon entering the menu selection mode, Menu options will appear in the display (see Figure 10-8).

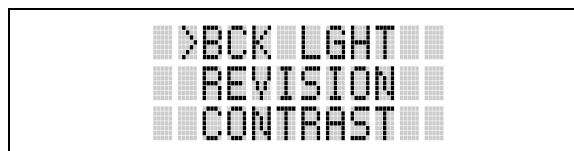


Figure 10-8: Menu Display

3. The radio will continue to receive and transmit normally while in the menu function.
4. To scroll through the menu options, use the **[▼]** or **[▲]** keys. When the required menu item has been found, align the cursor with the option then press **[M]** to select it. The menu item's parameter setting shown in the display can now be changed by using **[▼]** or **[▲]** to scroll through the list of parameter values.

- Once the desired setting is reached, press **M** to store the value and return to the menu option selection level.

For menu items that display radio information, pressing **▼** or **▲** will scroll through a list of informational displays. Possible menu items are listed in Table 10-6.

10.14 MENU ITEM SELECTION PROCESS

An example of the backlight menu item selection process and menu item parameter change is shown in Figure 10-9.

- Press **M**. The menu mode is entered.
- Press **▼** or **▲** until the display shows:

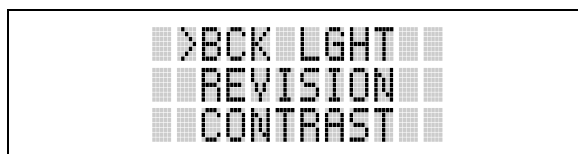


Figure 10-9: Backlight Menu Item Selection Parameter

- Press **M**. The backlight menu item is activated. Line one shows the active menu item and its current parameter setting. Line two shows the currently selected system or group name (see Figure 10-10).

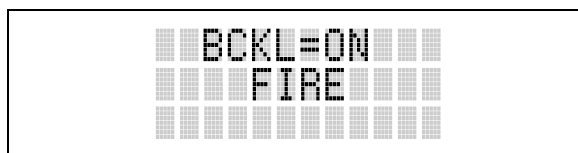


Figure 10-10: Backlight Menu Display

- The menu item's parameter setting shown in the display can now be changed by using **▼** or **▲**.
- Once the desired setting is reached press **M** to store the value and return the menu option selection level.

For menu items that display radio information pressing **▼** or **▲** will scroll through a list of informational displays. An example of information displays is shown in Table 10-6.



The TX POWER menu item, when selected, toggles LOW/HIGH power. It does not use **▼** or **▲** to scroll nor is an additional press of the **M** button required.

Table 10-6: Menu Item Information

FEATURE	DISPLAY	PARAMETER SETTING	COMMENT
Keypad Lock	KEY LOCK	Locked Unlocked	Locks the keypad. To unlock; press and release "M" then within 1 second press the option button.
Backlight Adjust	BACKLGHT	OFF, 1 thru 6	Selects the light level for backlighting.
Contrast Adjust	CONTRAST	1, 2, 3, 4	Selects the display contrast level.
Transmit Power Select	TX POWER	HIGH or LOW	Selects radio output power mode.
Radio Revision Information	REVISION	N/A	Selects the information display to view. Informational display only. <i>No user selectable settings.</i>
Toggle Scan On/Off	SCAN	ON/OFF	Toggles Scan operation ON/OFF.
Toggle Private Mode	PRIVATE	ON/OFF	Toggles Private Mode ON/OFF.
Display Current Encryption Key	DISP KEY	N/A	Displays current encryption key. Informational display only. <i>No selectable settings.</i>
Home Group/Channel	HOME		Returns the radio to the home system/ channel on conventional systems and to the home group on trunked systems.
Select Desired System	SYS SEL	N/A	Selects a new system.
Add Group/Channel to Scan List	SCAN ADD	N/A	Adds to Scan List.
Delete Group/Channel	SCAN DEL	N/A	Deletes Group or Channel from Scan List.
Add/Delete Scan List	SCAN A/D	N/A	Add or Delete from Scan List.
Select OpenSky mode	MODE		Allows you to activate OpenSky mode.
Message	MSG		Permits the transmission of a preprogrammed message to a P25 or EDACS site.
ProFile	PROFILE	ON/OFF	Toggles ProFile ON/OFF.
Talkaround	TALKARND	ON/OFF	Conventional Only. Toggles Talkaround feature ON/OFF.
Select Telephone Numbers From Phone List	PHONE	N/A	EDACS and P25 trunked.
Data Operation	NO DATA	ON/OFF	EDACS and P25 trunked. Toggles Data Operation ON/OFF.
Select Individual Call from IC List	INDV	N/A	EDACS and P25 modes.
Select Group	GRP	N/A	EDACS and P25 modes.
Feature Encryption Display	FEATURES	N/A	Indicates current features programmed into the radio as well as certain information required to add features to the radio. <i>Informational display only. No user selectable settings.</i>
System Scan Enable	SYS SCAN	ON/OFF	Toggles System Scan feature ON/OFF.
Talk-around	TALK		Toggles Talk-Around ON/OFF.
Type 99 Enable	T99 EN	ON/OFF	Toggles Type 99 Decode ON/OFF.

Table 10-7: Information Display

RADIO ID XXXXXXXX	LID in EDACS/EA. In CONV it has no meaning.
RAM SIZ	RAM Size.
FLSH SIZ	Flash Size.
RF BAND	Frequency Band.
PERS VER	Software Version.
DSP DATE	Date DSP code was built.
DSP TIME	Time DSP code was built.
DSP FEAT	The DSP Features supported by the DSP code, in Hexadecimal. Bit mapped (see IPC spec for details): <ul style="list-style-type: none"> • 0x0001 – Conventional • 0x0002 – EDACS • 0x0010 – AMPF • 0x0020 – undefined
DSP VER	DSP Software Version.
FLSH VER	FLASH Software ex: P54U0102 P=portable, 54=5400 radio, U=unencrypted, 01=major revision (>50 means unreleased code), 02=minor revision
HARRIS CORPORATION (C) 2014	Copyright.
PERSNLTY	Personality Name.
BLD DATE	Date host (ARM) code was built.
BLD TIME	Time host (ARM) code was built.






10.15 BACKLIGHT ON/OFF

1. Press **[M]** to access the menu.
2. Press **[▼]** or **[▲]** to scroll through menu until “BCKLGHT” appears.
3. Press **[M]** to select Backlight menu.
4. Press **[▼]** or **[▲]** to toggle backlight ON and OFF.
5. Press **[M]** to select new backlight setting.



10.16 CONTRAST ADJUST

1. Press **[M]** to access the menu.
2. Press **[▼]** or **[▲]** to scroll through menu until “CONTRAST” appears.
3. Press **[M]** to select Contrast menu.
4. Press **[▼]** or **[▲]** to adjust contrast setting from 1 - 4.
5. Press **[M]** to select new contrast setting.

10.17 DECLARING AN EMERGENCY

1. Press and hold the red Emergency/Home button (the length of time is programmable; check with the system administrator).
2. ***TXEMER*** will flash in the display, plus  and  will be displayed. After 2-3 seconds the transmit icon  will turn off.
3. ***TXEMER*** and  will remain until the emergency is cleared. See Section 10.24 for additional emergency operation.
4. Press the PTT and  will reappear.
5. Release PTT when the transmission is complete.

10.18 LOCKING/UNLOCKING KEYPAD





1. Press  button.
2. Within 1 second, press the  button on the side of the radio.

10.19 HIGH/LOW POWER ADJUSTMENT


Transmit power adjustment is possible if enabled through programming. Within conventional systems, transmit power is adjustable on a per channel basis. Within EDACS trunking systems, transmit power is adjustable on a per system basis.

There are two ways to toggle between high and low power, described in Sections 10.19.1 and 10.19.2.



10.19.1 Using the Menu Button

1. Press .
2. Using the  or  keys, scroll until the cursor (\triangleright) appears to the left of “TX POWER” in the display.
3. Press  again to toggle between High and Low power.
4. “POWER = HIGH” or “POWER = LOW” will appear momentarily on the top line of the display.

10.19.2 Using the Pre-Programmed Option Button






Press the  button. “POWER = HIGH” or “POWER = LOW” will appear momentarily on the top line of the display.

10.20 ENCRYPTION

The P5400 portable radio supports AES and DES encryption. When operating on a group or channel programmed for encryption, all transmissions are private and the radio receives clear and private signals.  is displayed when the encryption is enabled. If the selected group or channel is programmed for auto-select capability, the mode may be toggled between encrypted and unencrypted by pressing the  key, and then selecting the **PRIVATE** menu option. Radios programmed for forced encryption do not allow a change of the transmit mode.

10.20.1 Displaying the Currently Used Cryptographic Key Number

To display the Currently Used Cryptographic Key Number for either the system encryption key (for special calls such as individual, phone, all, agency or fleet) or the group/channel key (for group or conventional calls), perform the following procedure:

1. Press the  button.
2. Use the  or  button to select "DISP KEY."
3. Use the  or  button to toggle between displaying the system key (Figure 10-11) or the group/channel key (Figure 10-12).

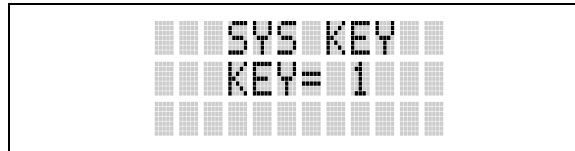


Figure 10-11: System Encryption Key Display

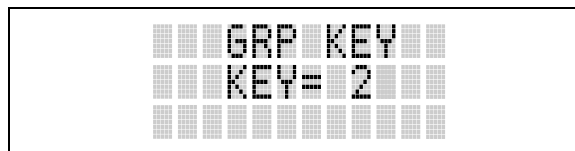




Figure 10-12: Group/Channel Encryption Key Display

10.20.2 Key Zero




All cryptographic keys can be zeroed (erased from radio memory) by pressing the  button and while still pressing this button, press and hold the OPTION button. Press both buttons for 2 seconds. A series of beeps will begin at the start of the 2 second period and then switch to a solid tone after the keys have been zeroed. The display will indicate **KEY ZERO**.

If the cryptographic key(s) are zeroed, one or more keys must be transferred from the Keyloader into the radio before private communications may continue.

10.20.3 Receiving an Encrypted Call

When receiving, the radio automatically switches between clear or private operation. If the transmission being received is an encrypted transmission, it will be decrypted, the  icon will be displayed, the receiver will unsquelch, and the message will be heard in the speaker. For this to occur, the selected group or channel must be programmed for private operation and the correct cryptographic key must be loaded into the radio.

10.20.4 Transmitting an Encrypted Call

1. Select the desired group or channel.
2. Place the radio in Private Mode by pressing  key; then follow the selection mode rules. On a System radio, the  key can be used to toggle the Private Mode ON/OFF. When Private Mode is enabled, the  icon is displayed.
3. If the last state of the radio was Private Mode, the Private Mode will be enabled on power-up. Also, the Private Mode will be enabled if forced operation has been programmed in the radio.

If a group or channel is not programmed for Private Mode operation, **PUT DIS** will be displayed if an attempt is made to enable private transmit mode. It is not possible to operate on this group/channel in Private Mode.







If the radio does not have the correct encryption key loaded, **NO KEY#** will be displayed and the call will not be transmitted.

4. Continue with standard transmission procedures. A Private Mode access tone will be heard when the PTT button is pressed.

10.21 SCAN OPERATION














Groups/channels that have been previously added to the scan list on a per system basis may be scanned. Each system's scan list is retained in memory when the radio is powered OFF or when the battery pack is removed.

10.21.1 Turning Scan On and Off

1. Toggle Scan operation ON by pressing  (P5450 model) or  (P5470 model).  icon rotates clockwise to indicate radio is scanning.
2. Toggle Scan operation OFF by again pressing  (P5450 model) or  (P5470 model).  will disappear.
 - If the radio scans to a group/channel other than the one selected and then receives a call on the selected group, the radio switches to the selected group/channel. However, if the “scanned-to” group/channel is programmed at a higher priority the radio remains on the “scanned-to” group/channel.
 - The radio continues scanning if a new group/channel is selected when scan is ON.
3. Pressing the PTT button when scan is ON will cause the radio to transmit on the displayed group/channel or to the currently selected group (depending on programming).

10.21.2 Add Groups and Channels to a Scan List

P5450 Model Radio

1. Scan must be OFF to add groups/channels to the scan list. If the Scan icon  is ON, press the  key to turn Scan OFF.
2. Select the desired group/channel using the System/Group/Channel control knob and/or the  or  keys. If the selected group/channel is currently on the list, pressing  will display  on line three.
3. If the scan list status icon is blank () , the group/channel can be added to the scan list by pressing the  key.  will be displayed on line three.
4. Press the  key a second time to set the group/channel to Priority 2. A  is displayed on line three.
5. Press  a third time to set the group to Priority 1. A  is displayed on line three. The priority level section sequence only advances the group/channel to the next high priority level and stops at priority level 1. To select a lower priority level, the group/channel must be deleted from the scan list and then added back to the scan list. Each new group added to the scan list starts at the lowest priority. If the Priority 1 and Priority 2 group/channel are already set and a new group is assigned as Priority 1 or

Priority 2, the previously assigned group/channel will change to non-priority scanning. One of the following messages may be momentarily displayed.

SCAN DIS The radio is not programmed to scan.




FIXED P1 A Priority 1 group has been pre-programmed into the radio. A new Priority 1 group cannot be selected.

FIXD LST A fixed scan list has been pre-programmed into the radio. It is not possible to change the list without reprogramming the radio.



To quickly view multiple group scan status, press **A/D** then slowly rotate the group knob. Each group status will appear on the display.

P5470 Model Radio

1. With scan operation turned OFF, select the desired group/channel to add to the selected scan list.
2. Press **6 ADD**. The current priority status of the group/channel will be displayed in column 10 of line three for a time-out period. If the group is not part of the scan list, the status will be blank.
3. While the status is displayed, press **6 ADD** to add the group/channel to the scan list. The  icon is displayed on line three.
4. Press **6 ADD** a second time to set the group to Priority 2. The  icon is displayed on line three.
5. Press **6 ADD** a third time to set the group/channel to Priority 1. The  icon is displayed on line three. The priority level selection sequence only advances the group/channel to next higher priority level and stops at priority level 1. To select a lower priority level, the group/channel must be deleted from the scan list and then added back to the scan list. Each new group/channel added to the scan list starts at the lowest priority. If the Priority 1 and Priority 2 group/channel are already set and a new group/channel is assigned as Priority 1 or Priority 2, the previously assigned group/channel will change to non-priority scanning. One of the following messages may be momentarily displayed.

SCAN DIS The radio is not programmed to scan.

FIXED P1 A Priority 1 group/channel has been pre-programmed into the radio. A new Priority 1 group cannot be selected.






FIXD LST A fixed scan list has been pre-programmed into the radio. It is not possible to change the list without reprogramming the radio.








To quickly view multiple group scan status, press either **6 ADD** or the **9 DEL** key. Then slowly rotate the group knob. Each group/channel status will appear on the display.

10.21.3 Deleting Groups from a Scan List



P5450 Model Radio

1. With scan operation turned OFF, select the desired group/channel to delete from the selected scan list.
2. Press . The current status of the group/channel is displayed for a time-out period.
3. While the current status is displayed, press  until the group/channel from the scan list is "**blank**." The sequence is "**blank**," , , , "**blank**." Any group that is not in a scan list will show a "**blank**" for the time-out period when it is the selected channel.

P5470 Model Radio

1. With scan operation turned OFF, select the desired group/channel to delete from the selected scan list.
2. Press . The current status of the group/channel is displayed for a time-out period.
3. While the status is displayed, press  to delete the group/channel from the scan list. , , or  turns OFF. Any group/channel that is not in a scan list will show a "**blank**" for the time out period when it is the selected group/channel.

10.21.4 Nuisance Delete

A group/channel can also be deleted from the scan list, if it is not the currently selected group/channel, by pressing the  key (P5450 model) or the  key (P5470 model) during scan operation while the radio is displaying the unwanted group/channel. The group/channel will be deleted from the scan list in the same manner as if done using the steps above. Deletions done in this manner will not remain deleted if the radio is powered OFF and then powered ON.

10.22 STEALTH MODE

Press the button programmed for Stealth Mode operation to toggle Stealth Mode ON or OFF. During Stealth Mode, all buttons are disabled except PTT, the button programmed for Stealth operation, Emergency, and Nuisance delete. The radio will receive and transmit when Stealth Mode is enabled.

The radio can be configured to disable any or all of the following during Stealth Mode:





1. LCD display
2. LED
3. Backlight
4. Side/alert tones

Stealth Mode can be configured to persist through a power cycle.

10.23 SYSTEM SCAN (EDACS AND P25 TRUNKED)

The radio can be programmed using Radio Personality Manager (RPM) with the following System Scan features. Then these features are automatically enabled when the radio is powered ON. A key or menu option is also defined to allow the System Scan features to be toggled during radio operation. The System Scan state will be maintained through system changes but will default to ON when the radio is powered ON.

Enable/Disable via Menu Selection

Press  and then use the  or  buttons to scroll through the selections until **SYS SCAN** is displayed. Then press  to toggle the System Scan state. The **SYSC ON** or **SYSC OFF** display message is displayed for two seconds to show the new state.

Enable/Disable via Pre-Programmed Keypad Key

Press the key pre-programmed to toggle System Scan and the **SYSC ON** or **SYSC OFF** display message is displayed for two seconds to show the new state.

10.23.1 Wide Area System Scanning

The P5400 series radio can be pre-programmed through RPM for Wide Area System Scan operation for roaming across mobile systems. EDACS radio systems manage the radios assigned to the system via a control channel (CC). Upon the loss of the currently selected system's control channel, radios can be programmed to automatically scan the control channels of other systems. If a new control channel is found, the radio will switch to the new system and sound an alert tone.

10.23.2 Priority System Scan

The radio can also be pre-programmed for Priority System Scan. The priority system is the desired or preferred system. While receiving the control channel of the selected system, the radio will periodically leave the selected system and search for the control channel of the priority system. This is done at a pre-programmed rate defined by the value in the Priority Scan Time control, unless the ProScan™ algorithm is enabled, as explained in the following sections. This priority scan timer is reset each time the PTT button is pressed or when the call is received. If the priority system control channel is found, or meets the predefined criteria (ProScan), the radio will automatically switch to the priority system.

10.23.2.1 Enabling the Wide Area System Scan Function

If the radio cannot find the control channel of the selected system and begins to wide area system scan, the radio will only scan for the priority system control channel if the priority system is in the wide area scan list.

10.23.2.2 When ProScan is Enabled

The radio monitors the priority system and will switch to the priority system if the pre-programmed criteria ProScan options are met. If ProScan is enabled, the rate at which the radio will scan for the priority system is defined by the System Sample Time control, set in RPM, (refer to RPM On-Line Help). See Section 10.23.3 for more information on ProScan.

10.23.3 ProScan


The radio may be programmed for ProScan system scan operation for multi-site applications. ProScan is a multi-site system scanning algorithm. ProScan provides the radio with the ability to select a new system for the radio to communicate on, when the selected system drops below a predefined level. This algorithm enables each radio to analyze the signal quality of its current control channel and compare it with the signal quality of the control channel for each site in its adjacent scan list. The signal quality metric used for the ProScan algorithm is based on a combination of both Received Signal Strength Indicator (RSSI) and Control Channel Verification (CCV) measurements. When the selected system degrades to a pre-programmed level, the radio will begin to look for a better control channel. Once a control channel that exceeds the pre-programmed parameters is found, the radio will change to the new system and emit a tone (if enabled through programming). If the control channel is completely lost, the

radio will enter Wide Area System scanning and search the programmed adjacent systems until a suitable control channel is found.

10.24 EMERGENCY OPERATION



The radio's ability to declare an emergency, clear an emergency, remain locked on an emergency system and group, and the emergency audio and display freeze can each be enabled or disabled through programming. When an emergency is declared scanning will stop and restarts only after the emergency has been cleared.



10.24.1 Receiving an Emergency Call

When receiving an Emergency Call on the selected group and system, an alert beep is heard and  is displayed. The message ***RXEMER*** flashes in the display on line two until the emergency condition is cleared.

10.24.2 Declaring an Emergency Call



Perform the following steps to send an emergency call to a selected system and group (or on an optionally pre-programmed group).

1. Press and hold the red EMERGENCY button that is on top of the radio in front of the antenna for approximately one second (this time is programmable and therefore could be longer or shorter; check with the system administrator). The radio will transmit an emergency call request with the radio ID until an emergency channel assignment is received.
2. When the working channel assignment is received, the radio sounds a single beep indicating the radio has auto keyed (see Table 10-5) and is ready for voice transmission. ***TXEMER*** flashes on line two in the display until the emergency is cleared.
3. Press PTT and speak into the microphone in a normal voice.  and  momentarily turn ON.
4. Release PTT when the transmission is complete.

To clear the emergency, first press and hold the  button. While holding the  button, press the EMERGENCY button. (The radio must be programmed to clear emergencies.)

10.25 INDIVIDUAL CALLS (EDACS AND P25 MODES)

10.25.1 Receiving and Responding to an Individual Call

When the radio receives an individual call (a call directed only to the user's radio), it un-mutes on the assigned working channel and displays . The first line on the display shows the logical ID number of the unit sending the message, or the associated name if the ID number is found in the individual call list. The radio can be programmed to ring when an individual call is received. If enabled, the ring begins five seconds after the caller un-keys and will continue until the PTT button, the  button or the individual call mode is entered.



NOTE

The volume of the ring is adjustable through the volume control levels.

If a response is made by pressing the PTT to the call prior to the programmed call-back time-out, the call will automatically be directed to the originating unit. If a response is not made before the call-back time-out, the radio will return to normal receive display, and ***WHC*** will appear on the first line of the LCD.

To respond after the call-back time-out, press the **#END** key. The radio's display will show the callers ID on the first line and **WHCI=1** on the second line. Pressing the PTT button at this point will initiate an individual call back to the original caller.

The radio stores the IDs of the last 10 callers in the Calls Received List as shown. Individual calls are stored in the top half of the list (1-10) and Group calls are stored in the bottom half of the list (1-10). The most recent call is stored in position 1, the second most recent call is stored in position 2, etc.

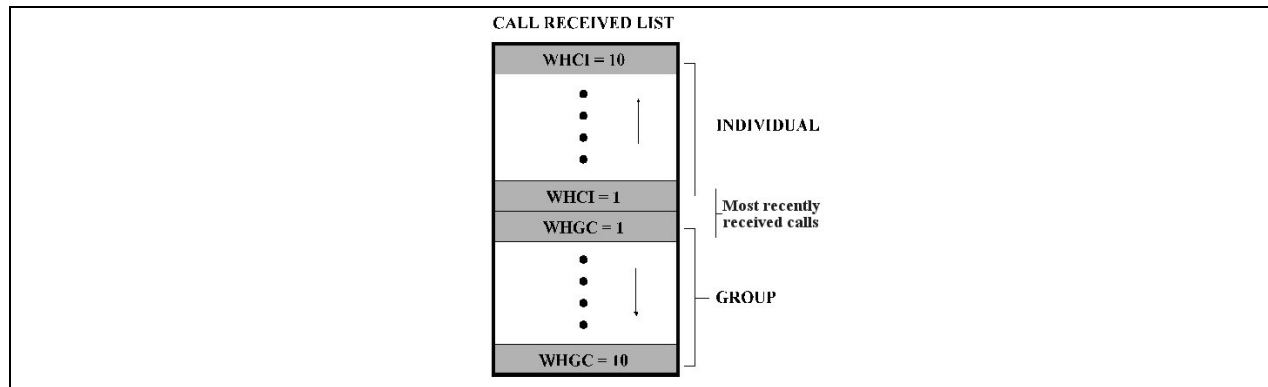


Figure 10-13: Calls Received Lists

To access the Calls Received List, press the **#END** key twice. Use the **▼** or **▲** buttons to scroll through the list. Pressing the **M** key will display the time elapsed since the call was received. After pressing **#END** the display will appear similar to Figure 10-14.

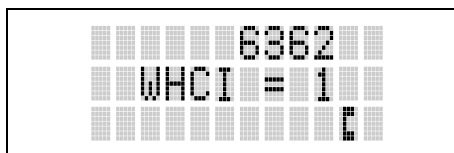


Figure 10-14: WHC Individual Call Display

Pressing the PTT will initiate an individual call to the displayed logical ID. Powering the radio OFF and ON will clear this list.

10.25.2 Sending an Individual Call

10.25.2.1 Pre-Stored Individual Calls

The following procedures describe how to initiate and complete a Pre-Stored Individual Call.

P5470 Model Radio

1. To select a pre-stored individual phone number, enter the individual call mode using the **#END** key. **IND** is displayed. Then scroll through the list of stored numbers using the **▼** or **▲** keys.
2. Press the PTT button; when the radio is clear to transmit, **PTT** turns ON, **IND** turns OFF and the channel access tone sounds. Line one shows the called individual's name if found in the list of stored individuals or **LID** followed by the logical ID number of the unit being called. The message ***INDV*** displays on line two.

P5450 Model Radio

1. To select a pre-stored individual number, enter the menu mode by pressing the **[M]** key. Scroll through the mode list using the **[v]** or **[^]** buttons.
2. Press **[M]**. **[M]** is displayed. Scroll through the list of stored phone numbers using the **[v]** or **[^]** buttons until the desired number is displayed. Press **[M]**.
3. Press the PTT button; when the radio is clear to transmit **[PTT]** turns ON, **[M]** turns OFF and the channel access tone sounds. Line one shows the called individual's name or LID. The message ***INDV*** displays on line two.

10.25.2.2 Direct Dial Individual Calls (P5470 Model Only)

1. The following procedure describes how to initiate and complete a Direct Dial Individual Call.
2. The individual call ID is not stored in the pre-stored list of call IDs but the individual unit ID is known, it can be entered directly from the keypad.
3. Press and hold the PTT button to transmit. **[PTT]** will turn ON, **[M]** will turn OFF, and the channel access tone will sound. Line one shows the called individual's ID followed by the logical ID number of the unit being called. The message ***INDV*** displays on line two. Proceed talking into the microphone.

10.25.3 Call Storage Lists

There are two lists available for call storage in the P5400 series radios, the **calls received** list (1 - 10) and the **personality** list (1 - 99 as defined by the user). When the individual call mode is entered by pressing **[#]**, the **calls received** list is available. The user can toggle to the personality list by selecting any index other than 0 or toggle between the two lists by pressing the **[#]** key. If wrap is enabled, the **calls received** list wraps on itself and not into the other list.

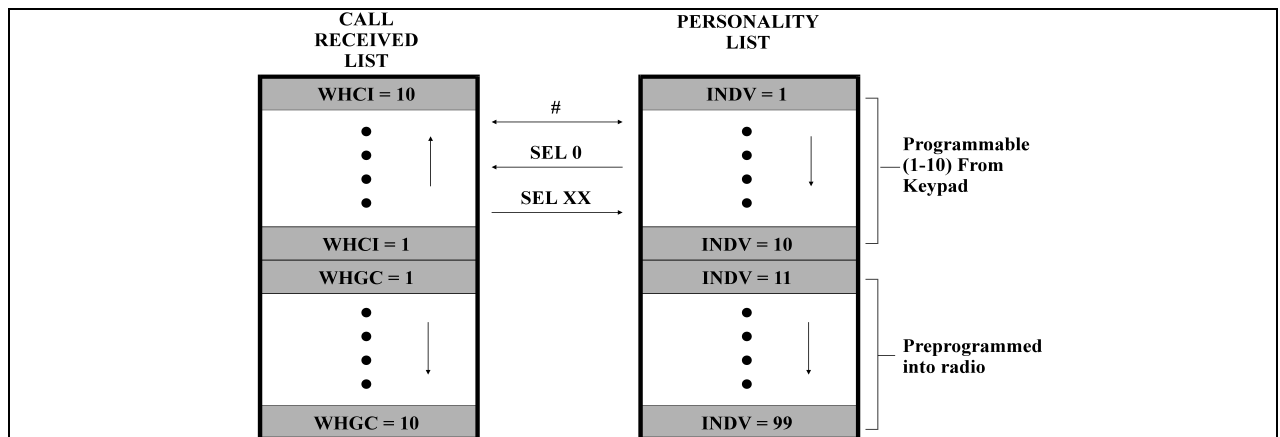



Figure 10-15: Calls Received and Personality Lists

The saved call list shows all ten storage locations. If no calls have been received, the saved call list will be empty and the pre-stored list will be available upon entering the individual call mode.

When in the saved call list, pressing the **[M]** key toggles the time stamp ON and OFF. The time stamp indicates how long ago the call was received. When in the pre-stored list pressing the **[M]** key toggles the **Logical IDentification (LID)** ON and OFF.

10.26 TELEPHONE INTERCONNECT CALLS (EDACS AND P25 TRUNKED)




10.26.1 Receiving a Telephone Interconnect Call







When the radio receives a telephone interconnect call (a call directed only to the user's radio), it un-mutes on the assigned working channel and displays . The first line displays ***PHONE***. The second line displays ***INDU***. Proceed with the call. Press the PTT to talk, release the PTT to listen.




10.26.2 Sending a Telephone Interconnect Call

10.26.2.1 Pre-Stored Number

Use the following procedures to initiate and complete a Telephone Interconnect call.

1. **P5470 Model:** To select a previously stored phone number, press the  key. Use the  or  buttons to scroll through the list of stored numbers.


P5450 Model: To select a previously stored phone number, press the  key. Use the  or  buttons to select the menu option **PHN CALL**. Press the  key again then use the  or  buttons to scroll through the list of pre-stored numbers.

2. Press and release the PTT button. When the radio is clear to transmit,  turns ON,  turns OFF and the channel access tone sounds. Line one shows the accompanying name selected from the list of stored numbers. The message ***PHONE*** appears on line two of the display. The radio then automatically transmits the programmed number stored in the special call queue.
3. A telephone ring will be heard from the speaker. When someone answers the phone, press the PTT button and speak into the microphone. Release the PTT button to listen to the callee. Unsuccessful interconnect signaling returns the radio to the normal receive mode and the number remains displayed until the special call is cleared or the time-out expires or another group or system is selected. Terminate a call by pressing the  button.





In half-duplex mode, only one person may talk at a time. The radio PTT button needs to be pressed in order to communicate to the individual called and released for the individual called to be heard.

10.26.2.2 Direct Dialing of Phone Calls (P5470 Model Only)

1. If the phone number is not stored in the pre-stored list of phone numbers, but the phone number is known, it can be entered directly from the keypad. Start by pressing the  key, then enter the required number from the keypad. Press and release the PTT button.



The last number directly entered can be recalled by first pressing  then pressing the PTT button.

2. A telephone ring can be heard from the speaker. When someone answers the phone, press and hold the PTT button and speak into the microphone. Release the PTT button to listen to the individual called. Unsuccessful interconnect signaling returns the radio to the normal receive mode and the number remains displayed until the special call is cleared or the time-out expires or another group or system is selected.
3. To terminate the call, momentarily press the  button.

10.26.3 Dual-Tone Multi-Frequency: Overdial

Once the radio has established a connection to the public telephone system, it may be necessary to “overdial” more digits to access banking services, answering machines, credit card calls, or other types of systems that require Dual-Tone Multi-Frequency (DTMF) access digits.

Overdial operation can also be used to initiate a telephone interconnect call via DTMF signaling if a dial tone has already been accessed on the system. This method makes a telephone interconnect call while operating in the conventional mode but will also function in trunked mode if a dial tone is directly accessible.

Telephone numbers and other number sequences for overdialing can be stored in the phone list when programming the radio. These numbers are accessed by pressing the **[M]** key, then following the selection mode rules. Perform the following procedures to access and dial these stored numbers.

P5450 Model Radio

1. Follow the procedure in Section 10.26.2 to establish a connection to the telephone system or consult the system administrator for the procedure to access a dial tone on the trunked or conventional system.
2. Enter selection mode first to enable entry of Overdial numbers by pressing the **[M]** button.
3. Follow the selection mode rules to call up a stored number from the phone list: Use the **[▼]** or **[▲]** buttons to scroll through the list of stored numbers. **[M]** is displayed. Press the PTT to send the overdial sequence once. If the number needs to be transmitted again it must be selected or entered again (this prevents unwanted numbers from being sent the next time the PTT button is pressed during the call).

Overdial select/entry mode remains active until the call is dropped, cleared, or **[M]** is pressed. The overdial select/entry mode can be re-entered if the call is still active by pressing **[M]**.

P5470 Model Radio


1. Follow the procedure in Section 10.26.2 to establish a connection to the telephone system or consult the system administrator for the procedure to access a dial tone on the trunked or conventional system.
2. Overdial numbers are transmitted using one of the following methods:



METHOD 1: 1. Enter the overdial selection mode by pressing the **[*PHN]** button.



2. Use the **[▼]** or **[▲]** buttons to scroll through the list of stored numbers. **[M]** is displayed. Press the PTT to send the overdial sequence once. If the number needs to be transmitted again it must be selected or entered again (this prevents unwanted numbers from being sent the next time the PTT button is pressed during the call).

Overdial select/entry mode remains active until the call is dropped, cleared, or **[M]** is pressed. The overdial select/entry mode can be re-entered if the call is still active by pressing **[M]**.

METHOD 2: (P5470 model radios only)

1. Enter the overdial selection mode by pressing the  button.
2. Press and hold the PTT button while entering the overdial number sequence from the keypad. This method sends DTMF tones during individual, telephone interconnect, trunked group, or conventional channel calls. Press the PTT to send the overdial sequence once. If the number needs to be transmitted again it must be selected or entered again (this prevents unwanted numbers from being sent the next time the PTT button is pressed during the call). *Anytime the PTT button is pressed and held, the keypad is enabled for DTMF entry.*









Overdial select/entry mode remains active until the call is dropped, cleared, or  is pressed. The overdial select/entry mode can be re-entered if the call is still active by pressing .

This overdial select/entry mode remains active until dropped, cleared, or  is pressed. The overdial select/entry mode can be re-entered if the call is still active by pressing the .

10.27 PRE-STORING INDIVIDUAL AND TELEPHONE INTERCONNECT CALLS FROM THE KEYPAD

Individual Call ID numbers, telephone numbers, and other number sequences for overdialing are stored in the special calls lists when programming the radio. The first ten entry locations of these lists can be changed by the radio operator. The keypad is used when adding, changing, and storing numbers in these entry locations.

Use the following procedure to store a number in one of the first ten entries of a special call list:

1. Press the  or  button to enter the individual call list or the phone call list.  is displayed.
2. Scroll through the list using the  or  keys until one of the first ten entries is reached. **NO ENTRY** is displayed if the location is empty.
3. Enter the desired number. If necessary, a pause can be entered by pressing and holding 0-9, , or  until an underscore appears in the display (telephone interconnect only). The individual call list entries will accept up to 5 digits. The phone call list entries accept a combination of up to 31 digits and pauses.
4. Press and hold the  key until the display changes indicating that the number has been stored.

Repeat steps 1-4 to store additional numbers, to change numbers already stored, or to change the storage location of a number.

10.28 STATUS/MESSAGE OPERATION (EDACS AND P25 MODES)

The **Status** and **Message** operations allow for the transmission of a *pre-programmed status* or a *pre-programmed message* to an EDACS or P25 site. Each Status and Message is assigned an ID then cross-referenced with the representative status condition ("Off Duty," for example) or a message ("Call home"). In addition, Status conditions can also be associated with a programmable Menu entry (required for second method of transmitting a Status condition (see Section 10.28.1).

10.28.1 Status Operation

P5470 Model Radio

One of two methods can be used to transmit a status condition.

- METHOD 1:
1. Press the **[M]** key, then use the **[▼]** or **[▲]** buttons to scroll to the pre-programmed status condition. STATUS and 0 through 9 pre-programmed status selections are available from the menu.
 2. If STATUS is selected, you need to enter the number of the status condition you intend to transmit. If no status has been programmed for the selected number key, the radio will display **NO ENTRY**. A valid selection will display the status for a pre-programmed time.

After the time-out expires or the **[M]** key has been pressed (the **[M]** key will override the time-out period), the status is selected and will be transmitted to the site or stored in the radio memory where it can be polled by the site at a future time.

- METHOD 2:
1. Press the **[7 SITE PROG]** key.
 2. Press the corresponding pre-programmed 0 through 9 status condition key. If no status has been programmed for the selected number key, the radio will display **NO ENTRY**. A valid selection will permit the status condition to appear in the top line of the display and the status ID to appear in the second line of the display for a pre-programmed time.

After the time-out expires or the **[M]** key has been pressed (the **[M]** key will override the time-out period), the status is selected and will be transmitted to the site or stored in the radio memory where it can be polled by the site at a future time.

View the currently selected status after it has been transmitted by pressing the **[M]** key and then the **[M]** key and then the **[⊙]** button prior to the time-out period. If the status was not sent successfully to the site, the text associated with the status condition will flash in the display.

The status selection can be changed by pressing a different status key 0 through 9, or the status operation can be cancelled by pressing Option Button **[⊙]**. Both operations must be carried out prior to the time-out period.

10.28.2 Message Operation

The following method can be used to transmit a Message using the Message Operation.


1. Press the **[8 MSG TYP]** key.
2. Press the corresponding pre-programmed 0 through 9 pre-programmed “message” key. If no message has been programmed for the selected number key, the radio will display **NO ENTRY**. A valid selection will permit the message to appear in the top line of the display and the message ID to appear in the second line of the display for a pre-programmed time.



The message selection can be changed by pressing a different message key 0 through 9, or the message operation can be cancelled by pressing Option Button **[⊙]**. Both operations must be carried out prior to the pre-programmed time-out period.

10.29 DYNAMIC REGROUP OPERATION (EDACS)

Dynamic Regroup Operation permits multiple Talk Groups (up to eight) to be added to a radio via the system manager. The radio must be pre-programmed to respond to regrouping. Dynamic regrouping will

not be activated in a radio until the system manager sends an activation message. Each radio that receives and acknowledges the regrouping instructions is successfully regrouped.

Pressing and holding the  button for 2.5 seconds toggles the user into and out of the dynamic regroup groupset. A double beep will sound for entry or exit. The display will indicate **REGRP_0x** where "x" is a digit of 1 to 8 indicating the group (when dynamic regroup has been enabled by the user). If the radio is in dynamic regroup and the user selects a group that has not been regrouped, the display will show **NO ENTRY**. The radio will be prevented from transmitting and receiving calls in this condition except for scanned groups.

After the time-out expires or the  key has been pressed (the  key will override the time-out period), the status is selected and will be transmitted to the site or stored in the radio memory where it can be polled by the site at a future time.

10.29.1 Emergency Operation

If the pre-programmed groupset on the currently selected system contains an EMER/HOME group and the radio is in dynamic regroup, the radio will declare the emergency on the currently selected dynamic group.

10.30 MACRO KEY OPERATION

Macro key operation permits the user to accomplish a series of keystrokes with a single "macro" keystroke. Each Macro Key is capable of executing up to twenty (20) keystrokes, to any push button input (i.e., keypad keys, OPTION buttons, etc.). Each macro key can be pre-programmed to activate when pressed or when released.

A macro key may also be pre-programmed to change the key stroke sequence the next time the macro key is activated.

For detailed operation and assignment of macro keys, contact your communications supervisor or administrator.

10.31 PORTABLE DATA

The P5400 series portable radios, when operating in the EDACS Trunked configuration, permit both voice and data calls to be transmitted and received. The radio can handle only one type of call at a time; however, either data or voice is selected transparently by the operator through normal usage of the radio.

The radios can be connected to a Mobile Data Terminal (MDT) or to a host computer. Any RS-232 compatible device that supports the Radio Data Interface (RDI) protocol (Version 1.91 or greater) may be connected to the radio. Support for an MDT or a host computer is a programmable option per radio. Additionally, radios may also be programmed for data only operation (no voice calls transmitted or received).

10.31.1 Displays

The following will be displayed during the various states of data mode of operation:


DATA T/R Appears on top line of display when the radio is transmitting/receiving a data call.

DATA OFF Appears on top line of display when the radio is in the data disabled state.

DATA ON Appears for two seconds on top line of display when the radio is toggled to the data enabled state.

10.31.2 DATA OFF Operation

The radio can be placed in the data disabled state by any of the following methods. When the data state is disabled, **DATA OFF** appears on the top line of the display.

- Declaring an emergency (not to be used unless an actual emergency condition exists). Alert tone will sound.
- Pressing Option Button 1  (if pre-programmed as “no data” key). Alert tone will sound.
- Pressing the pre-programmed “no data” (ND) key. Refer to previous bullet.

10.31.3 DATA ON Operation

The data state is enabled by one of the following (depending on how it was disabled). **DATA ON** will appear on the top line in the display for two seconds then the display will return to normal.

- Pressing the pre-programmed “no data” (ND) key toggles data state ON or OFF.
- Clearing an emergency. *This is valid only if the emergency caused “DATA OFF” operation.*




10.31.4 Exiting Data Calls

Under normal conditions, the radio enters the scan lockout mode and returns to the control channel after completion of a data call (transmit or receive). If, during a data call, one of the following operations occurs, the data call is immediately terminated and the radio performs the desired function:

- If the PTT is activated.
- If an Emergency is declared by pressing the pre-programmed emergency button.
- If a group or system is changed.

10.31.5 Scan Lockout Mode

Following the transmission or reception of a data call, if scan is enabled, scanning will stop temporarily. There are two independent pre-programmed times associated with this mode; one after a received data call and one after a transmitted data call. During this time the scan indicator will flash to indicate that scan is enabled but temporarily suspended. This condition typically returns to normal scan operation when the pre-programmed time expires; however, the following operations and conditions will terminate the scan lockout mode before the timeout has expired.

- Press the  button.
- Press the PTT.
- Change a group or system.
- Enter Telephone Interconnect mode.
- Enter Individual call mode.
- Receive a new emergency assignment.
- Declare or clear an emergency.
- Receive an individual or phone call.
- Receive an Agency, Fleet, or System All Call.
- Press  (P5450 model) or  (P5470 model) to toggle Scan ON or OFF.

10.31.6 Data Lockout Mode

During the voice call scan hang time (pre-programmed) the radio will not receive data calls.

10.32 TYPE 99 OPERATION (ANALOG CONVENTIONAL)

Type 99 is a conventional in-band, two-tone sequential signaling method. This conventional signaling protocol controls the muting and unmuting of a radio. Type 99 encoded base stations, mobiles, or portables can selectively call individual units or groups of units in a conventional system. Type 99 is used in paging operations providing a dispatcher with the ability to selectively call a radio or a group of radios. If Type 99 is enabled in the radio personality, the radio can decode Individual, Group, and Supergroup Type 99 calls.

In a selective signaling environment, the P5400 portable radios operate in one of two states, Monitor mode or Selective Call mode.

- In Monitor mode, Type 99 "OFF," the decoder is disabled and all calls are heard by the user.
- In Selective Call mode, Type 99 "ON," the decoder is enabled and only calls intended for the user will be heard.

10.32.1 Type 99 with or without Channel Guard



Selective signaling operates with or without Channel Guard. If Channel Guard is enabled, the radio can be programmed with an "And" or an "Or" option, determined by programming with T99 Mute Control.

- If the "And" option is programmed, T99 calls require the correct selective signaling (T99 tone sequence) **AND** the correct Channel Guard tones are heard by the user.
- If the "Or" option is programmed, calls with the correct Channel Guard tones **OR** calls with the correct T99 tone sequence and Channel Guard tones are heard by the user.

A radio operating in Selective Call mode that receives a selective call switches to the Monitor mode (after decoding the T99 call) and the **TX/RX LED** flashes green. The **TX/RX LED** indicates whether the channel has a carrier signal.

10.32.2 Resetting Type 99 after a Call

After decoding a Type 99 call, the radio operates in Monitor mode and all traffic on the channel is audible. If the channel has Channel Guard, only the traffic with the radio's Channel Guard tone will be heard. To reset Type 99 operation, use one of the following methods:

- Press the  button.
- Press the  button, if enabled through programming to toggle Type 99 ON/OFF.
- Allow the "Auto-Reset" timer, if enabled through programming, to reset the Type 99 decoder.

10.32.3 Type 99 Disable after PTT

The radio may be programmed with the Type 99 Disable after PTT feature, which automatically disables the Type 99 decoder after a transmission. Use one of the methods outlined in Section 10.32.2 section to reset Type 99 operation.

10.33 AUDIO PLAYBACK

Every call received by the radio is recorded in internal memory, overwriting the last recorded call. When the **PLAYBACK** key is pressed, the last recording is replayed **and any future recordings are stopped.**

Pressing **PLAYBACK** again repeats the **same** recorded call. Pressing and holding the **PLAYBACK** key until the tone sounds erases the recording and starts the recording of incoming calls again. If a call is received while the recorded call is playing, the recorded call continues to play, rather than the received audio. However, if a call is received and the recorded call is played back in close succession received audio could mute call playback. This feature requires RPM R8A and later, and ECP R15A and later.

10.34 RADIO TEXTLINK OPERATION

Radio TextLink provides a simple means of exchanging pre-defined, or “canned,” text messages. This section describes how to send messages if the Radio TextLink feature is enabled.

10.34.1 Send TextLink Messages

1. Press **[M]** to access the menu.
2. Press **[▼]** or **[▲]** to scroll through menu until **SND MAIL** is displayed. Press **[M]** to select.
3. Press **[▼]** or **[▲]** to scroll through the pre-defined messages that scroll across the top of the display. Press **[M]** to select to select the desired message.
4. Press **[▼]** or **[▲]** to scroll through the list of available destination IDs and select the desired ID with **[M]**.

10.34.2 View Received TextLink Messages

Received Messages are listed in the order in which they are received (newest at the top). All messages include the user LID along with the date and time stored/displayed. The mailbox can hold 16 messages at a time. If a new Message arrives after the limit is reached, the new message overwrites the oldest message.

When a new Radio TextLink message is received, **RCV TXT** is displayed on the top line of the display and the incoming message scrolls underneath.

To view all received messages:

1. Press **[M]** to access the menu.
2. Press **[▼]** or **[▲]** to scroll through menu until **RD MAIL** is displayed. Press **[M]** to select.
3. Scroll through the list of received messages using the **[▼]** or **[▲]** key.
4. Selecting a received message with the **[M]** key will bring up a “reply to sender” option.

10.34.3 Delete TextLink Messages

Select **DEL MAIL** with the **[M]** key to delete ALL messages in the inbox.






10.34.4 View the Current Time

Select **TIME** with the **[M]** key to retrieve the current date and time.

10.35 VIEW GPS INFORMATION

If the GPS Speaker microphone is connected to the P5400, you can view your position and satellite information via the GPS Menu. GPS requires an unobstructed view of the sky and the signal is greatly diminished inside buildings, tunnels, heavily forested areas, etc. GPS may not work at all under some conditions, especially in metal enclosures or buildings.

1. Press **[M]** to access the menu.

2. Press  or  to scroll through menu until **GPS** is displayed and press  to select.
3. Press  or  to scroll through available information screens.

10.36 CONTROL AND STATUS SERVICES

The P5400 supports Control and Status Services. These services allow the computer application to monitor and control a radio. The Control and Status Services can be used from a locally-connected Mobile Data Terminal (MDT) or a network MDT. In some cases, the radio can support both MDTs simultaneously. However, priority is given to the local MDT.

The Radio Status Service allows an MDT or Fixed End System (FES) to receive real-time status updates from a radio. An MDT sends Host Attach/Detach messages to the radio as UDP datagrams destined for the UDP Service Address and Service UDP Port of the radio. All responses and asynchronous reports are returned to the address and port of the requesting host. Refer to the *ECP Control and Status Services Feature Manual*, 14221-7200-6040, for more information on this feature.

11. CUSTOMER SERVICE

11.1 CUSTOMER CARE

If any part of the system equipment is damaged on arrival, contact the shipper to conduct an inspection and prepare a damage report. Save the shipping container and all packing materials until the inspection and the damage report are completed. In addition, contact the Customer Care center to make arrangements for replacement equipment. Do not return any part of the shipment until you receive detailed instructions from a Harris representative.

Contact the Customer Care center at <http://www.pspc.harris.com/CustomerService> or:

North America:

Phone Number: 1-800-368-3277

Fax Number: 1-321-409-4393

E-mail: PSPC_CustomerFocus@harris.com

International:

Phone Number: 1-434-455-6403

Fax Number: 1-321-409-4394

E-mail: PSPC_InternationalCustomerFocus@harris.com

11.2 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 call the Technical Assistance Center at:

North America: 1-800-528-7711

International: 1-434-385-2400

Fax: 1-434-455-6712

E-mail: PSPC_tac@harris.com

12. BASIC TROUBLESHOOTING

Use the contents of Table 12-1 as a troubleshooting guide if the radio is not functioning properly. If additional assistance is required, contact a qualified service technician or call TAC support at 1-800-528-7711.

Table 12-1: Troubleshooting

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Radio will not turn on.	Low battery charge.	Change the battery pack to a fully charged pack.
No Audio.	Speaker volume is muted.	Increase the volume level.
Poor Audio.	User is in a poor coverage area or not on the network.	Move to a better coverage area.
Radio powers off for no apparent reason.	Radio may be experiencing very low voltage.	Have the battery checked by an authorized technician.
Radio will not transmit.	Radio may be out of coverage area or may be overheated.	Return to coverage area if possible. If overheated, let radio cool before retrying transmission. Report this failure to an authorized technician.

13. WARRANTY

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

Registration can be made on-line at the Customer Care center webpage:

<http://www.pspc.harris.com/Service/Customerservice.aspx>.



While on the webpage, please review the applicable battery and/or product warranty literature.

