



## PORTABLE RADIO OPERATOR MANUAL



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## **IMPORTANT**

Please read all instructions included in this owner's manual before using the transceiver

This manual contains important information for the Guardian GII portable series radios and should be saved for future reference.

## **ABOUT APCO 25**

This device is made under license under one or more of the following US Patents: 4590473, 4636791, 4833701, 4972460, 5146497, 5148482, 5164986, 5185795, 5185796, 5164986, 5185796, 5271017, 5377229,

The AMBE+2™ voice coding Technology embodied in this product is protected by intellectual property rights including patent rights, copyrights and trade secrets of Digital Voice Systems, Inc. This voice coding Technology is licensed solely for use within this Communications Equipment. The user of this Technology is explicitly prohibited from attempting to extract, remove, decompile, reverse engineer, or disassemble the Object Code, or in any other way convert the Object Code into a human-readable form. U.S. Patent Nos.: 6,912,495 B2, 6,199,037 B1, 5,870,405, 5,826,222, #5,754,974, 5,701,390, 5,715,365, 5,649,050, 5,630,011, 5,581,656, 5,517,511, 5,491,772, 5,247,579, #5,226,084 and 5,195,166

## **PRECAUTIONS**

### **BEFORE USING YOUR PORTABLE 2-WAY RADIO READ THIS IMPORTANT RF ENERGY AWARENESS AND CONTROL INFORMATION AND OPERATIONAL INSTRUCTIONS TO ENSURE COMPLIANCE WITH THE FCC'S RF EXPOSURE LIMITS**

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

This 2-way radio uses electromagnetic energy in the radio frequency (RF) spectrum to provide communications between two or more users over a distance. It uses radio frequency (RF) energy or radio waves to send and receive calls. RF energy is one form of electromagnetic energy, which when used improperly can cause biological damage. Very high levels of x-rays, for example, can damage tissue and genetic material.

Experts in science, engineering, medicine, health and industry work with organizations to develop standards for exposure to RF energy. These standards provide recommended levels of RF exposure or both workers and the general public. These recommended RF

exposure levels include substantial margins of protection. All 2-way radios marketed in North America are designed, manufactured and tested to ensure they meet government established RF exposure levels. In addition, manufacturers also recommend specific operating instructions to users of 2-way radios. These instructions are important because they inform users about RF energy exposure and provide simple instructions on how to control it. Please refer to the following website for more information on what RF energy exposure is and how to control your exposure to assure compliance with established RF exposure limits.

[www.fcc.gov/oet/rfsafety/rf-faqs.html](http://www.fcc.gov/oet/rfsafety/rf-faqs.html)

[www.osha.gov/SLTC/radiofrequencyradiation/index.html](http://www.osha.gov/SLTC/radiofrequencyradiation/index.html)

### Federal Communications Commission Regulations

The FCC rules require manufacturers to comply with FCC RF energy exposure limits for portable 2-way radios before they can be marketed in the US. When 2-way radios are used as a consequence of employment, the FCC requires users to be fully aware of and able to control their exposure to meet occupational requirements. Exposure awareness can be facilitated by the use of a product label directing users to specific user awareness information. Your Datron 2-way radio has a RF exposure product label. Also your Datron user manual includes information and operating instructions required to control your RF exposure to satisfy compliance requirements.

### COMPLIANCE WITH RF EXPOSURE STANDARDS

Your Datron 2-way radio is designed and tested to comply with a number of national and international standards and guidelines (listed below) for human exposure to radio frequency electromagnetic energy. This radio complies with IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environment at operating duty factors of up to 50 % transmitting and is authorized by the FCC for occupational use only. In terms of measuring RF energy for compliance with the FCC exposure guidelines, your radio radiates measurable RF energy only while it is transmitting (during talking), not when it is receiving (listening) or in standby mode. The approved batteries supplied with this radio are rated at 5-5-90 duty factor (5% talk- 5% Listen 90% standby), even though this radio complies with the FCC occupational RF exposure limits and may operate at duty factors of up to 50 % talk.

Your Datron 2-way radio complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR §§1.1307, 1.1310, 2.1091 and 2.1093
- American National Standards Institute (ANSI)/Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1999 Edition

## RF EXPOSURE COMPLIANCE AND CONTROL GUIDELINES AND OPERATING INSTRUCTIONS

To control your exposure and ensure compliance with occupational/controlled environment exposure limits always adhere to the following procedures.

### Guidelines:

- Do not remove the RF Exposure Label from the device.
- User awareness instructions should accompany device when transferred to other users.
- Do not use this device if the operational requirements described herein are not met.

### Operating Instructions:

- Transmit no more than the rated duty factor of 50 % of the time. To transmit (talk), push the Push-To-Talk (PTT) button. To receive calls, release the PTT button. Transmitting 50 % of the time, or less, is important because this radio generates measureable RF energy exposure only when transmitting (in terms of measuring for standards compliance).
- Hold the radio in a vertical position in front of face with the microphone (and the other parts of the radio, including the antenna) at least one inch (2.5 cm) away from the nose. Keeping the radio at the proper distance is important because RF exposure decreases with distance from the antenna. Antenna should be kept away from the eyes.
- When worn on the body, always place the radio in a Datron approved clip, holder, holster, or body harness for this product. Using approved body-worn accessories is important because the use of Datron or other manufacturer's non-approved accessories may result in exposure levels, which exceed the FCC's occupational/controlled environmental RF exposure limits.
- If you are not using a body-worn accessory and are not using the radio in the intended use position in front of the face, then ensure the antenna and the radio are kept at least 1 inch (2.5 cm) from the body when transmitting. Keeping the radio at the proper distance is important because RF exposure decreases with increasing distance from the antenna.
- Use only Datron approved supplied or replacement antennas, batteries and accessories. Use of non Datron approved antennas, batteries and accessories may exceed the FCC exposure guidelines.

- For a list of Datron approved accessories refer to the accessory section in this manual or visit [www.dtwc.com](http://www.dtwc.com).

### Contact Information

For additional information on exposure requirements or other information contact Datron Customer Service at 760-597-1500.

## LIMITED WARRANTY AND REMEDIES

Datron warrants that its manufactured products (radios) are free from defect in design, material, and workmanship for a period of 24 months from date of shipment from factory. Products such as antennas, batteries, carry cases, and other parts purchased from other vendors for resale are warranted for a period of 12 months from date of shipment from factory. If products do not provide satisfactory service due to defects covered by this warranty, Datron will, at its option, replace or repair the item(s) free of charge. This warranty is limited to the original purchaser and is not transferable. Repair service performed by Datron is warranted for the balance of the original warranty or 90 days, whichever is longer.

**Exclusive Warranty:** There are no other warranties beyond the warranty as contained herein. No agent, employee, or representative of Datron has any authority to bind Datron to any affirmation, representation, or warranty concerning the equipment or parts not in conformity with the warranties contained herein. EXCEPT AS EXPRESSLY SET FORTH ABOVE, NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, ARE MADE WITH RESPECT TO THE EQUIPMENT OR THE PARTS CONTAINED THEREIN, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND DATRON EXPRESSLY DISCLAIMS ALL WARRANTIES NOT STATED HEREIN.

**Limitations of Warranty:** This warranty does not cover: (1) physical damage to the equipment or its parts that does not involve defects in design, material, or workmanship, including damage by impact, liquids, temperature, or gases, (2) damage to the equipment or its parts caused by lightning, static discharge, voltage transients, or application of incorrect supply voltages, (3) defects or failures caused by unauthorized attempts to repair or modify the equipment, and (4) defects or failures caused by abuse or misuse.

**Remedies:** Buyer's sole remedies and the entire liability of Datron are set forth above. In no event will Datron be liable to Buyer or any other person for damages, including any incidental or consequential damages, expenses, lost profits, lost savings, or other damages arising out of use of or inability to use the equipment.

*Guardian*<sup>™</sup> radios are manufactured by Datron World Communications Inc. in Vista, CA, USA. Datron is respected worldwide as the best value supplier of voice and data communications products for government and business.

# 1: INTRODUCTION

## Guardian II Portable Radio

The Guardian II series portable radios are crafted with advanced electronics, software and materials incorporated into a rugged, professional design offering years of reliable service. The radios provide operation in analog or digital, wideband or narrowband modes, and are APCO Project-25 compatible. The Guardian II is available in three separate models (pictured below) allowing the radio to be customized to end user requirements. Numerous combinations of options, features and channel settings are possible using the Guardian PC Programmer.



Standard features include:

- 1024-channels/ Talkgroups (64 zones of 16 channels/zone)
- AES, DES OFB Encryption
- P-25 Trunking
- P-25 OTAR (Over the Air Rekey)
- Backlit LCD
- Tri-color LED status indicator
- 16-position rotary volume and channel knobs
- Two programmable collar switches
- Emergency and function buttons

Channels can be individually programmed for 25 kHz wideband or 12.5 kHz narrowband operation, analog or digital, clear or encrypted, with transmitter power settable from .2W to 5W. Up to eight shadow channels can be programmed for any channel providing all-mode radio performance. Thirty two encryption keys can be stored in the radio.

## Radio Configuration

A radio configuration includes channels, zones and banks.

### Channels

Channels contain all the information required to transmit and receive. A channel is referred to as primary when it is differentiated from a shadow channel. The standard radio has a total of 1024 programmable channels. Each channel can be set for: Receive and transmit frequencies

- Wideband or narrowband

- Analog or digital
- Various squelch types
- Encryption key
- Power output level
- 12-character alphanumeric channel tag (name)

### **Zones**

Zones provide a way of rapidly switching groups of channels. Each zone can contain up to 16 channels. If the 3 position collar switch set for Zone Select, the radio provides easy access to 48 channels by using the collar switch and the channel select knob. Up to 64 zones can be accessed from the radio keypad or programmable soft keys and displayed in the standard radio. Channels can be mapped to the channel select knob within each zone using the PC Programmer. A zone must be assigned to a bank.

### **Banks**

Banks provide a way of switching a set of zones (containing channels) with a few key presses. For example, the Banks can be programmed with different geographic frequency plans. Up to 8 banks (with a maximum of 16 zones each) can be programmed into the radio. Each bank contains a collection of zones, as well as defined priority channels, a home channel, and an emergency channel.

### **Shadow Channels**

Shadow channels are created and edited using the PC Programmer. Up to 8 shadow channels are available for each primary channel. Shadow channels enable you to monitor and reply (if all settings match) to all transmissions on a given channel. Shadow channels can have different modulation modes (analog or digital), bandwidths, squelch modes, digital network access codes (NAC), or encryption keys than their associated primary channel. Each shadow channel must have the same transmit and receive frequencies, scan list, talk-around, locked options, and transmit power level as its associated primary channel. Shadow\_channels count toward the 1024-channel total radio capacity.

### **Accessories**

The following accessories are available for the Guardian Portable radio. Contact your Guardian representative for details on these accessories.

- Rechargeable battery packs
- Single and multi-unit rapid chargers
- Antenna
- PC Programming kit
- Cloning cable
- Audio Accessories
- Speaker Microphone
- Radio case and belt clip

## Options

The Guardian II portable radio supports add-on software options for solutions to communications requirements such as P-25 Trunking and Encryption. Optional enhancements are discussed in the final chapters of this manual.

The Guardian II Portable is covered by the limited warranty (see warranty statement)

## Factory Support

For warranty service, contact:

Technical Support Services Group  
Datron World Communications Division  
3030 Enterprise Court  
Vista, CA 92081  
Phone: (760) 597-1500  
E-mail: [service@dtwc.com](mailto:service@dtwc.com).

Before calling have the following information:

- Radio model number, serial number, and date of installation.
- Name of dealer or supplier of equipment.
- Detailed explanation of suspected problem.
- Return shipping instructions.
- Telephone or fax number where buyer can be contacted.

Do not return a radio to the factory for service without first obtaining an RMA number from the Technical Support Services Group.

## User Servicing

No user serviceable parts are inside. This product is subject to electrostatic discharge (ESD) damage. Specialized maintenance and repair procedures are required. Unsuccessful attempts to repair this product can void the warranty. This product requires customer-specific programming to function as required. Radio programming is performed using a computer and authorized software. The factory does not have knowledge of customer-specific programming. Government agency users should contact their authorized personnel for assistance regarding the correct operation of this product.



## 2: RADIO CONTROLS AND INDICATORS



### Power and Volume Knob

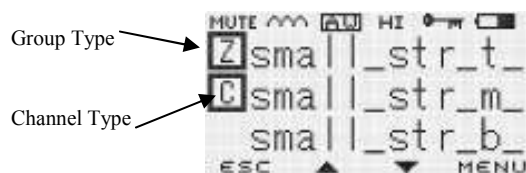
The fully counterclockwise position is power off. The first clockwise position is power on with the speaker muted. Subsequent positions (clicks) increase the speaker volume. The clicking feature prevents accidental knob rotation.

### Channel Select Knob

The 16-position rotary knob is for selecting radio channels that have been programmed into it. The current channel appears on the display.

### Display

On power up, the radio momentarily displays the Guardian II name and software version. The display then indicates the operation status for the selected channel. Turn the channel knob to select a different channel.



The display consists of various icons as shown in the figure above.

#### Channel type icons:

**c** = channel **B** = bank

**s** = shadow channel **z** = zone

**H** = home channel    a **□** around a zone type means it is included in the zone scan list

#### Group type icons:

**E** = emergency

**P** = priority channel

a  around a channel type means it is included in a scan list

**Modulation type icons:**

**AW** = analog wideband

**AN** = analog narrowband

**DG** = digital

a  around the modulation type means some form of selective squelch is active for the channel (NAS, CTCSS or DCS)

**Other icons:**

**TX** = transmit channel in scan mode

**RX** = receive channel in scan mode

**TA** = talkaround

☺☺☺ = repeater

🔒 = encrypted

**U** = unit ID call mode

🔋 = Battery Gauge

📶 = Signal Strength Indicator

## Navigation Buttons

These four buttons perform actions determined by what appears on the display.



The **MENU** button lets you access the internal software menus, toggle between a setting and its value and save data. The **ESCAPE** (<ESC>) button allows you to return to a previous display without making changes to values. The Scroll up and down buttons highlight menu choices for selection.



The left and right scroll buttons highlight alpha and numeric characters when changing values.



## Keypad

Because all channel information and switch definitions can be programmed by the PC Programmer, the keypad is not required for basic operation of the radio. The keypad is used to select options within the radio, or to reprogram almost any setting. It is used for DTMF signaling, keypad programming and feature selection, among other things.

## Collar Switch (three position)

The 3-position (A, B, C) collar switch located under the ON/OFF Volume control is programmed using the PC Programmer. Ask your radio programmer how it is setup to function.

Function	Description
Scan	<p>Sets scan mode to On, Priority, or Off.</p> <p>Position A: Scan, Priority scan, or off            Position B: Scan, Priority scan, or off            Position C: All scan modes off</p>
Monitor (includes squelch adjust)	<p>Provides monitor and carrier squelch adjust functions.</p> <p>Position A: Squelch adjust mode (carrier squelch only)            Position B: Monitor on            Position C: Programmed squelch mode (monitor off)</p>
Zone Select	<p>Selects Zone A, B or C.</p> <p>Position A: First zone assigned in current bank            Position B: Second zone assigned in current bank            Position C: Third zone assigned in current bank</p>
Talkaround	<p>Toggles channels between talkaround and repeater modes.</p> <p>Position A: Talkaround enabled            Position B: Talkaround disabled (repeater mode)            Position C: Talkaround disabled (repeater mode)</p>
Hi/Lo Power	<p>Toggles the power setting from high to low. This setting is programmed into each individual channel and can be the same power level.</p> <p>Position A: RF Power HI            Position B: RF Power LO            Position C: RF Power LO</p> <p>The radio reads the toggle switch on power-up and periodically. Setting is retained if battery is removed.</p>
Encryption	<p>Enables or disables encryption. The toggle positions:</p> <p>Position A: TX encryption enabled            Position B: TX encryption disabled            Position C: TX encryption disabled</p>
Disabled	<p>Ignores any attempted use and provides an error tone.</p>

## Collar Switch

The 2-position (o, ø) collar switch located under the channel selector and is programmed using the PC Programmer. The most useful function of this control is to enable/disable encryption of the selected channel.

## Auxiliary Buttons

These Six programmable buttons are located on the side panel and the front (under the display) of the radio and their use depends on how they are programmed using the PC Programmer. Ask your radio programmer how they are set up to function.

The three most commonly used functions of these buttons are

Hi/Lo Power (useful for conserving battery life), Monitor (valuable when using analog FM channels - also includes squelch control)

, and Next Zone.

Function	Description
Hi/Lo Power	Toggles the radio power setting from Hi to Lo. These settings are programmed into each channel.
Monitor (includes squelch adjust)	Provides monitor and carrier squelch adjust functions. <b>Momentary press:</b> Momentarily opens squelch. <b>Press and hold for 2 seconds:</b> Locks radio into squelch open condition. To return to normal mode, momentarily press the monitor button. <b>Press and hold for 4 seconds:</b> Activates carrier squelch adjust (on carrier squelch adjust channels only). To return to normal mode, momentarily press the monitor button.
Next Zone	Cycles the radio through all zones of the current bank. The zone is stored and retained as long as the battery is on the radio. If this is pressed and held until an audible tone is heard the direction of Next Zone is reversed.
Scan	Toggles the scan mode on and off.
Priority Scan	Toggles the priority scan mode off and on. This does not affect regular scan, which works independently.
Scan List Add and Delete	Toggles the channel's scan list off and on. Affects the current channel only.
Backlight	Toggles the radio's backlight from off to Bright to Dim with each key press. The backlight timer is not affected. (The Bright+RX and Dim+RX turns the backlight on when a signal is received)
Disabled	Ignores any attempted use and provides error tone.

Encryption	Toggles TX encryption from off to on for channels programmed with encryption enabled. RX encryption is unaffected. Encrypted channels can be set by the PC Programmer to ignore this switch. The switch has no effect on these channels (they stay encrypted).
Home Channel	Toggles the active channel from the Home Channel to the currently selected channel. Normal operation resumes on channel, zone, or bank change. This setting can be changed using the keypad.
Keypad Disable	To activate the key, press and hold it for 1 second. Continue pressing to disabled the keys you want. <b>1st press:</b> All keys enabled (front and side). <b>2nd press:</b> Keypad disabled (side keys and toggle switch still enabled). <b>3rd press:</b> Keypad, side keys and toggle switch disabled (PTT remains enabled). This function can also be accessed from the keypad by pressing and holding <ESC> then pressing and holding <ENT>. To regain access, do these steps again.
Talkaround	To bypass a repeater and talk directly (DIRECT, CAR-CAR, TAC, etc.) on a repeater channel. Toggles channel from talkaround mode to repeater mode.

## Push-to-Talk (PTT)

The Guardian II radio is normally in a ready-to-receive mode (PTT not depressed). To transmit, press PTT and speak into the radio in a normal voice. Distance from the radio is not critical, but 2-6 inches from the radio is optimal. To return to receive mode, release PTT.

## Status Indicator

The LED indicates several conditions of the radio.

Indicator	Description
Red	Radio is transmitting.
Steady Green	Radio has detected RF traffic on the channel.
Flashing Green	Radio has detected an encrypted signal on the channel.

## Internal Speaker and Microphone

The internal speaker is active when external audio accessories are not used. The internal microphone is active when you press the PTT button.

## Emergency Button

The red emergency button on top of the radio is typically used for P25 Emergency operation but can be programmed by the PC Programmer for any of the following functions. Ask your radio programmer how it is set up to function.

Function	Description
Disabled	Ignores any attempted use and provides an error tone.
Emergency Mode	The emergency channel is programmed by the PC Programmer or from the radio keypad. If left unused, the current channel serves as the emergency channel. In P25 mode the emergency bit is set. Since analog modes have no similar function, the radio performs an open-mic function for the duration and interval programmed by the PC Programmer.
Zeroize	Erases all encryption keys in the radio.

## Alert Tones

Audible tones provide important information about the radio's operating state or condition.

Tone Pitch	Tone Length	Description
Low	Burst	Error pressing button, failed self-test, talk time out warning or empty channel.
Low	Steady	Talk time out, talk inhibit, invalid mode or radio locked.
Medium	Burst	Button press, passed self-test or receiving in clear voice.
Medium	Pulsed	Emergency call mode or key error.
High	Burst	Low battery.
High	Pulsed	Individual call.

## Backlight

The backlight is illuminated when a signal is received (if programmed by the PC Programmer). It is activated from an auxiliary button (toggles through settings) on the radio or from the keypad

There is a slight reduction in battery life if using the backlight, but not significant. The power drain difference between dim and bright is negligible.

## 3: OPERATING THE RADIO

The Guardian II operates with most of its features already programmed into the radio. Request a list of the functions that are assigned to the buttons and switch on your radio.

### Quick Start

Before proceeding, the radio must be set up using the Guardian PC Programmer. If necessary, refer to Chapter 2, Controls and Indicators.

- 1. Battery** Install a charged battery.
- 2. Antenna** Install the correct antenna for the frequency being used. Do not operate the radio without an antenna.
- 3. Power-up** Turn the power-volume knob clockwise about halfway around. Set the volume to a comfortable level when a transmission is heard. A 5-10 second delay at power-up is normal.
- 4. Select channel** Turn the channel knob until the desired channel is shown on the display.
- 5. Receive** Listen using the built-in speaker. Note: the first volume knob click position mutes the speaker.
- 6. Transmit** Press **PTT** and speak about 4 inches from microphone. Release **PTT** when finished speaking. Do not press **PTT** longer than necessary after talking.

### Selecting Channels

Use the rotary channel selector to select the desired operating channel. Changing Zones also makes other preprogrammed channels available for use. (See Zone Select)

### Selecting Shadow Channels

The Guardian II can be programmed to detect any type of analog FM signals and any combination of P25 digital signals, up to 9 sets of analog/digital settings. This is done with the use of shadow channels. Once received, the radio is programmable to transmit either in kind or strapped to its channel selector.

This mix-mode of operation enables digital systems to seamlessly integrate into older analog systems. The preferred signaling mode can be set up for a P25 digital signal, be able to receive any analog signal and respond back to the operator on the analog radio.

### Applications

Some applications that are available using shadow channels are:

- Simultaneous analog and digital operation
- CTCSS (or DCS) picklists used to choose repeaters
- P25 NAC picklists used to choose repeaters
- Multiple encryption use
- Supervisory talkgroups

### Accessing Shadow Channels

**Note:** *Shadow channels must be programmed into the radio to access them. For information on programming shadow channels, refer to “Adding a Shadow Channel” on page 5-15).*

From the keypad, select shadow channels by pressing \* then the appropriate shadow channel number (for example, pressing \*3 selects shadow channel 3). Return to the primary channel by pressing \*\*, \*0, or <ESC>.

A talkback timer allows you to transmit within 10 seconds on the shadow channel. The timer is reset at the end of each received message. When a transmission is received on a shadow channel, an **S** displays as the channel type.

### Selecting Home Channel

If a button is programmed with a home channel, press the assigned home button. The home channel status displays. To assign a different home channel, access the main menu (refer to “Home Channel” )

### Selecting a Zone

If one of the auxiliary buttons is programmed for Next Zone, press that button to toggle through the zones. If the 3 position collar switch is programmed for Zone Select, rotate the switch to select the desired zones. A zone is also selectable by accessing the main menu (refer to “Select Menu”).

### Selecting a Bank

If one of the auxiliary buttons is programmed for Next Bank , press that button to toggle through the Banks. Banks are selected by accessing the main menu (refer to “Select Menu”).

### Selecting Talkaround

Talkaround forces the transmit frequency to an equal receive frequency for a selected channel. This is useful for direct radio-to-radio communication when a repeater is unavailable. If a button or switch is programmed for talkaround, press the assigned button or position the toggle switch appropriately. Talkaround is turned off and on by accessing the main menu (refer to “Select Menu”).

### Adjusting Analog Carrier Squelch

If an auxiliary button is programmed to access the squelch adjust (Monitor), press the button for at least 4 seconds until the squelch adjust status displays. Use the scroll buttons to change the squelch setting. Press <ESC> to save the value and return to normal operation.

Squelch is also adjustable from the main menu (refer to “Channel Submenu”).



## Transmitting

Press the **PTT** button and speak normally about four inches from the microphone. Release the **PTT** button when finished speaking. Do not hold the **PTT** longer than necessary after talking. Channels programmed for receive-only sound an alert tone, display **RX ONLY**, and do not transmit.

Your radio may be setup with the Transmit Inhibit feature. This feature locks the PTT switch to keep users from talking over other radio conversations. It can also be setup to allow you to transmit over the signal anyway if the PTT switch is pressed twice within approximately ½ second. The transmit inhibit settings are accessed from the main menu (refer to “Global Submenu”).

Your radio may be set up with the Transmit Timeout feature that shuts the transmitter down after a pre-determined time. This is useful for preventing long transmissions when PTT is accidentally pressed. Transmit timeout defaults to off, but can be programmed from 0 minutes (off) to 5 minutes, in 30 second increments (refer to “Global Submenu”).

## Scanning

Scanning is available on the Guardian portable at a rate of about 8 channels per second. Various types of scanning exist. The radio can be programmed to talkback on the received channel or on the currently selected channel.

### Guidelines

To maximize the efficiency of scanning channels, use the following guidelines:

- Keep the number of channels in a scanlist to the minimum required. Since the radio scans at about 8 per second, each channel is scanned faster if there are fewer channels to scan.
- If scanning channels with noise squelch settings, higher carrier squelch values provide faster results (improvements above values of 8 are minimal), but higher squelch values reduce effective range.
- If scanning multiple channels with the same frequency (regardless of squelch values), use shadow channels when possible. A primary channel with all its shadows still scans at the rate of about 8 per second.

### Setup

1. Create a scan list. Display the channel to include in the scan list. Use the scan list add/delete button to toggle channels on/off the scan list. A square around the **C** indicates the channel is in the scan list. To remove the channel from the scan list, press the left scroll button. The square around the **C** is cleared.  
  
To add a zone to the zone scan list, set the radio to the zone to include in the scan list. Press and hold the scan list add/delete button to toggle the selected Zone on/off the Zone Scan List. A square around the **Z** indicates the zone is in the scan list.
2. Select a scan mode. The mode is preprogrammed into the radio but you can verify or change it using the keypad. Refer to “Scan Menu”. The modes are normal scan, scan zones in the scan zone list or scan all frequencies programmed into the radio.
3. Activate scan. Use one of the following methods:
  - Use the preprogrammed auxiliary button
  - Use the preprogrammed collar switch, or
  - Access the main menu (refer to “Scan Menu”)

The selected mode of scanning is evident by the display. Examples are:

**SCAN\*\*\*\***

**ZONE\*\*\*\***

**SRCH\*\*\*\***

## Priority Scanning

Priority scanning is independent of regular scanning and allows you to sample a priority channel at various rates while listening to another conversation. It is not necessary to be scanning to monitor a priority channel. Up to 2 priority channels can be selected.

Priority scan breaks into actively received signals at a priority interval rate setup in the PC Programmer or through the programming menu.

Priority scanning is set up by creating a priority scanlist, selecting a priority mode and activating priority scan.

1. Create priority channels. While you can have up to two priority channels, one is recommended. This is programmed into the radio but can be changed by accessing the main menu. To select priority channels from the menu, [refer to “Scan Submenu”](#).
2. Select the priority scan mode. This is programmed into the radio from the PC Programmer. It is highly recommended to leave this at its default value (PR1), unless it is absolutely necessary to scan two priority channels. To change this mode using the keypad, [refer to “Scan Menu”](#).
3. Activate priority scan. Several options exist for turning priority scan on or off.
  - Use the preprogrammed auxiliary button
  - Use the preprogrammed collar switch
  - Use the keypad ([refer to “Scan Menu”](#)).

You know you are scanning when the top row of the display briefly flashes one of the following:

**scanP1\*\***

**scanP1P2**

## 4: OTHER STANDARD FEATURES

### Cloning Radio to Radio

**Note:** *The cloning described in this section is for standard radios. If you have a radio equipped with the Fire Features option, refer to Chapter 8.*

Radio to radio cloning enables the transfer of channel settings from one radio into another radio.

Information that is cloned:

- All channel settings
- Channel assignment to zones
- Zone assignments to banks
- Special function channels and assignments

Information that is not cloned:

- Encryption keys
- Passwords
- P25 Unit ID
- *Auxiliary button functions*
- *Toggle switch functions*
- *Emergency switch functions*
- *Other global parameters*

**Note:** *Do not turn radios off or disconnect cable during cloning process.*

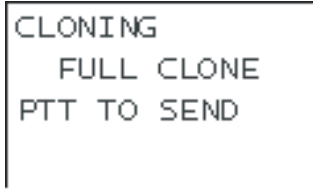
To clone one Guardian II portable radio to another:

1. Turn off both radios.
2. Connect One end of the Source End of the clone cable to the source radio. (the radio with the information to be cloned).
3. Connect the other end of the cloning cable to the side connector of the target radio

**Note:** *Guide the top and bottom pegs on the end of the cable into the corresponding slots on the radio's side connector. When they click together, use your thumb to hold the cable to the radio and turn the screw handle until the cable is tight against the radio.*

5. Turn on the target radio and the source radio. The source radio indicates the cloning

mode.



```
CLONING
FULL CLONE
PTT TO SEND
```

6. Press PTT on the source radio. Banks 1 to 4, with all of their zones and channels, are sent to the target radio. The source radio can then be used to clone another radio.

### DTMF Dialing

DTMF dialing transmits (including sidetone) the DTMF tone that corresponds to a pressed key. It is used primarily for:

- Entering a repeater code for access to a repeater.
- Accessing a repeater with a phone patch to dial a phone number.
- Accessing remote weather stations using DTMF tones A, B, C, and D by pressing the corresponding navigation keys.



To access while in any analog mode, press the PTT button and the desired key.

## Emergency Mode

To activate Emergency mode, press and hold the Emergency button (must be programmed as Emergency) for about ½ second. The emergency mode remains active indefinitely until deactivated. To deactivate, press and hold the button again, or turn the radio off and on.

Emergency channels are setup using the keypad (refer to “Global Submenu”). If the Emergency setting (**EMG**) is left empty, the current channel serves as the emergency channel. In P25 mode, the emergency bit is set. Since analog modes have no similar function, the radio performs an open-mic function for the duration and interval programmed by the PC Programmer.

Two types of operation are available for the emergency mode: Normal and Silent. The operation is selected from the PC Programmer or the keypad (refer to “Global Submenu”). In Normal Emergency mode, each time the radio transmits or receives emergency signals, the LED flashes orange, an audible alarm is sounded, and the display indicates **EMERGENCY**. In Silent Emergency mode, **EMERGENCY** still displays but the flashing lights and sounds are disabled.

## Transmitting P25 Individual Calls

P25 radios include a feature that allows an individual radio to be targeted to transmit to. This is accomplished by the unique UnitID that all radios can be programmed with, and transmitted in the P25 CAI waveform. This UnitID can have a value of 1 to 9,999,999 (decimal).

**Note:** *If secure communications is desired, use encryption keys. Do not rely on P25 Individual Call alone.*

To initiate a P25 Individual Call:

1. Select the desired P25 digital channel.
2. Press the Soft Key assigned to Individual Call or access the main menu and choose **SELECT**.
3. Scroll down to **IDCL** and press **<ENT>**.
4. Toggle **IDCL** to **ON** and press **<ENT>**.
5. Scroll to **DEST** and press **<ENT>**. Enter the destination UnitID (1 to 9999999).
6. Press **<ESC>** twice to display the Individual Call screen.
7. Press PTT.

When a P25 Individual Call is received, the radio generates a special tone indicating that an individual call is being received.

If the receiving radio responds within 10 seconds, it remains in Individual Call mode. If not it returns to normal operation.

8. To exit to normal operation prior to the 10 second timeout, press **<ESC>**. The individual call mode is exited, and the normal operating screen displayed.

## 5: RADIO SETTINGS AND PROGRAMMING

Changing the radio's functions and features are permitted or restricted according to agency policy and federal law. Internal radio software provides limited access to certain features and settings. Information in this manual may or may not pertain to your radio. Consult the programmer for the features and functions that are enabled for you.

### Menu Structure

To access the main menu:

1. With the radio on, press the **ENTER (<ENT>)** button. If necessary, [see the "Navigation Buttons" section on page 2-3.](#)



2. Use the scroll buttons to highlight a menu selection.
3. Press **<ENT>** to access its submenu. Press **ESCAPE (<ESC>)** to return to the previous display. Submenus can consist of more than one page and are cyclic (roll over to the first page after the last page). When a submenu continues on more than one page, a **▼** appears in the lower right corner. Continue scrolling down through the selections.

The Guardian operates with most of its features already programmed. The ability to change certain programmed settings is made available by accessing menus.

### Required Passwords

Passwords may be required to operate the radio and to access the Program (**PROGRM**), Alert (**ALERT**), and encryption (**KMGR**) menus.



1. Use the keypad to enter your predetermined password.



2. If **INVALID ENTRY** displays, the entered password is incorrect. Press **<ESC>** and try again. If an invalid password is attempted 3 times consecutively, **ACCESS DENIED** is displayed.

3. Press **<ESC>** to resume radio operation.
4. To enter a new valid password, power the radio off and on.

When menus are disabled, the radio displays **MENU DISABLE**. Consult authorized personnel for guidance.

### Entering Data

Enter alphanumeric and numeric data using the keypad. Each Key has a number and alphanumeric letters associated with it. For Example when entering data and pressing the 2 key the display will show the following: A,B,C,2,a,b,c.

### Scan Menu

The scan menu allows you to enable and disable the normal scanning and priority scanning and to select the type or mode of scanning to use.

1. Access the main menu.



Scroll to highlight **ROPTNS** and press **ENT**.



2. Scroll to highlight **SCAN**, and press **<ENT>**.



By pressing the down scroll arrow.



3. Choose from the following settings.

Setting	Description
<b>SCAN</b>	Turns normal scanning on or off.
<b>PRSCAN</b>	Turns priority scanning on or off. Scroll to <b>PRMODE</b> to select the priority scan mode.
<b>SCMODE</b>	Select one of three scan modes. <b>SCAN</b> : scan currently selected channel and all channels within the current zone designated as scan channels. <b>ZONE</b> : scan all zones in the zone scanlist. <b>SEARCH</b> : scan all channels programmed into the radio regardless of their scan list assignments. If any channels exist with a squelch value of none, or signals that are always present, the radio stops. Press <ESC> to terminate the reception and continues the scan.
<b>PRMODE</b>	Select <b>PR1</b> or <b>PR1+2</b> .

3.

The table below shows an example of how channels and zones might be set up for a radio and how they would be received with each mode. It shows the radio is on Zone 1, Channel 1. Scan list channels are indicated by an X and Zone 3 is the only zone in the scanlist (SL).

- If **SCAN** is chosen, scanning detects Zone 1, channels 1, 4, and 7.
- If **ZONE** is chosen, scanning detects Zone 1, channels 1, 4, 7 and Zone 3, channels 4, 8, 12.
- If **SEARCH** is chosen, scanning detects all channels.

ZONE	1	2	3 (SL)
Chan 1	Current	X	
Chan 2			
Chan 3		X	
Chan 4	X		X
Chan 5		X	
Chan 6			
Chan 7	X		
Chan 8			X
Chan 9		X	
Chan 10			
Chan 11		X	



Chan 12			X
Chan 13			
Chan 14			
Chan 15		X	
Chan 16			

## Select Menu

The select menu allows you to designate a different zone or bank to a button or switch on the radio. You can also select an individual call and enable or disable Talkaround.

1. Access the main menu.



Highlight ROPTNS and press RNT.

2. Scroll to highlight **SELECT** and press <ENT>.



3. Choose from the following settings:



Setting	Description
<b>ZONE</b>	Select an alternate zone. If an auxiliary button is programmed as Next Zone and is pressed, it replaces the current zone until another is selected. If the switch is set to Next Select, and a Zone is selected via the keypad, that zone is permanently in the switch setting.
<b>BANK</b>	Select an alternate bank. Having 4 banks allows you to have 4 different radios in one (subject to the maximum number of 1024 channels). Reverts to the default bank if the battery is removed for an extended time.
<b>IDCL</b>	For placing a Unit ID call. Standard radio only.
<b>TKGP</b>	Talkgroup. Future development.
<b>TKRD</b>	Talkaround is for direct radio-to-radio communication when a repeater is unavailable. Forces a transmit frequency to a receive frequency for a selected

	channel. Select off or on.

3.

## Home Channel

The Home channel allows you to quickly access a commonly used channel. An auxiliary button can be programmed for home channel use.

1. Access the main menu, highlight ROPTNS and Press ENT.
2. Scroll to highlight **HOME** and press <ENT>.



3. To assign a different home channel, Global Submenu.

## Program Menu

The program menu allows you to change global radio settings, channel settings, scan settings, and passwords.

1. Access the main menu, highlight ROPTNS and press ENT.



2. If a password is require enter the following screen will display.



3. If required, enter the password for this radio and press <ENT>.



## Global Submenu

1. Select **ROPTNS**, **PROGRM**, **GLOBAL** and press **<ENT>**.



Pressing the down scroll key will go through the following pages:



2. Choose from the following settings:

Setting	Value	Description
<b>LITE</b> (Backlight)	Bright, dim or off	Enables, disables, and varies the intensity of the LCD's backlight.
<b>LT DLY</b> (Backlight delay)	1 to 9 seconds	Sets the time delay for the LCD and keypad backlighting.
<b>LTONRX</b>	On or off	Backlight goes on when signal received.

<b>TOT</b> (Time out timer)	30 to 300 seconds in 30 second intervals or off	Limits the duration of messages (30 to 300 seconds in 30-second increments). Off setting allows unlimited transmitting time.
<b>DISPLY</b> (Display)	Alpha or numeric	Sets the display to either alpha or numeric characters.
<b>UNIT ID</b>	On or off	The ID of the transmitting radio.
<b>HOM</b> (Home channel)	Home channel designation	Sets the home channel. The channel's receive and transmit frequency is displayed but cannot be changed. Select the desired home channel using the channel knob. Press <ENT> to confirm the new home channel.
<b>EMG</b> (Emergency)	Emergency channel designation	Sets the emergency channel within the active zone and bank. The channel's transmit frequency displays but cannot be changed. Select the desired emergency channel using the channel knob (if left empty, current channel serves). Press <ENT> to confirm the new emergency channel.
<b>ALERT</b>	Normal or silent	Sets the emergency call alert mode. Choose <b>NORMAL</b> or <b>SILENT</b> . In <b>NORMAL</b> mode, <b>EMERG TX</b> and <b>EMG</b> displays. The radio beeps every time it transmits the emergency message until deactivated. In silent mode, there is no beep or display.
<b>TX INH</b> (Transmit inhibit)	Locks the PTT switch to prevent talking over other radio conversations.	
	<b>NAC</b>	Inhibit transmission on a busy channel using a different NAC.
	<b>NAC+O</b>	Override NAC inhibit with two rapid PTT presses.
	<b>CARR</b>	Inhibit transmission on a busy channel.
	<b>CARR+O</b>	Override CARR inhibit with two rapid PTT presses.
	<b>TONE</b>	Inhibit transmission on a busy channel using a different squelch tone.
	<b>TONE+O</b>	Override TONE inhibit with two rapid PTT presses.
	<b>NONE</b>	No transmit inhibit.

<b>BAUD</b>	4800, 9600, 19200, 38400 BAUD Rate	
<b>CNTRLS</b>	Enable/Disables	<i>Turn radio controls on or off.</i>

2.

### Channel Submenu

This submenu allows you to add new channels or make changes to existing channel settings. Channels can be selectively locked, preventing you from making changes. If you select a locked channel, **CHANNEL LOCKED/ACCESS DENIED** is displayed.

#### Adding a New Channel

The following is an example of programming a new channel into an empty slot. This same process is used to modify existing channels.

**Note:** *The new channel is assigned to whatever channel position the radio was selected to at the time of initial programming.*

1. From the main Menu go to ROPTNS, PROGRAM, CHANNEL and press enter. You may be required to enter a valid password to proceed.



2. Press <ENT>.



4. Press <ENT> again to access the tag setting for entering a name for this channel. Use cell phone techniques to enter the name. For example, to enter N, press the 6 key twice. To enter E, press the 3 key twice. To enter W, press the 9 key once. Press <ENT> to finish.



5. Scroll down to the **MODE** setting, press <ENT> and change the mode to **ANALOG**.



6. Scroll down to **RX**, and set it to 154.600000 MHz.



7. Scroll down to the next screen. Leave **RXSQMD** at **CTCSS**.



- 8.
8. Scroll down and to Tone and Press ENT. Use the up arrow until the desired to is found.



8. Scroll to **TX** and set it to 154.600000 MHz.



9. Scroll to **TXMSQMD** and set it to **CTCSS**. Set **TON** to 67.0 XZ.



10. Scroll down to the RF Power screen and set **LO PWR** to **0.5W** and **HI PWR** to **.5W**.



11. Scroll down to the next screen. Press **<ENT>** to accept the channel



settings.

12. Press **<ESC>** several times to get back to the operating screen. The new channel is ready to use.



To simplify programming, assume the following defaults unless told otherwise by the person assigning channel settings:


- RX Frequency must always be specified
- TX Frequency must always be specified (unless RX Only)
- TAG is any 8 character alphanumeric value
- ID is internal radio information and cannot be changed
- If using a repeater, a Transmit CTCSS, DCS, or NAC code must be assigned.

Refer to the following tables that describe the different settings for analog and digital channels, respectively.

#### Analog Settings

Setting	Value	Description
<b>ID</b>	User ID	Software assigned identifier.
<b>TAG</b>	Name	User defined channel name.



<b>MODE</b>	Analog	Analog settings displayed.
<b>B/W</b>	12.5 KHz or 25 KHz (default)	Bandwidth.
<b>RX</b>	136 MHz to 174 MHz	Receive frequency.
<b>RXSQMD</b>	NONE	No receive squelch.
	NOISE (default) SQ= 	If you choose noise, adjust the squelch level by highlighting <b>SQ</b> and scrolling left and right.
	DCS CODE=	If you choose DCS, highlight <b>CODE</b> and enter the DCS code.
	CTCSS TON	If you choose CTCSS, highlight <b>TON</b> and enter a CTCSS tone.
<b>TX</b>	136 MHz to 174 MHz	Transmit frequency.
<b>TXSQMD</b>	None	No transmit squelch.
	CTCSS TON	If you choose CTCSS, highlight <b>TON</b> and enter a CTCSS tone.
	DCS CODE=	If you choose DCS, highlight <b>CODE</b> and enter the DCS code.
<b>LO PWR</b>	0.5, 0.1, 1.0, 2.0 (default), 5.0	Low transmit power setting.
<b>HI PWR</b>	0.5, 0.1, 1.0, 2.0, 5.0 (default)	High transmit power setting.

### Digital Settings

Setting	Value	Description
<b>ID</b>	User ID	Software assigned identifier.
<b>TAG</b>	Name	User defined channel name.
<b>MODE</b>	Digital	Digital settings displayed.
<b>ENCRPT</b>	ENABLD	Select from the available encryption keys.
<b>RX</b>	136 MHz to 174 MHz	Change the receive frequency if necessary.
<b>RXNAC</b>	NAC value	Enter the receive network access code. 293 is default.
<b>RXSQMD</b>	P25NOR	P25 normal squelch mode.
	P25SEL TALKGRP=	P25 selective squelch. If you choose this, highlight <b>TALKGRP</b> to enter the hexadecimal talk group identifier.
	P25MON	P25 monitor squelch mode.
<b>ENCRPT</b>	ENABLD	Select from the available encryption keys.
	DISABD	Encryption is disabled.
<b>TX</b>	136 MHz to 174 MHz	Change the transmit frequency if necessary.
<b>TXNAC</b>	NAC value.	Enter the transmit network access code.
<b>TXSQMD</b>	P25SEL	Unchangeable.
<b>TALKGP</b>	Talkgroup identifier	Enter the talkgroup identifier.
<b>LO PWR</b>	0.5, 0.1, 1.0, 2.0 (default), 5.0	Low transmit power setting.
<b>HI PWR</b>	0.5, 0.1, 1.0, 2.0, 5.0 (default)	High transmit power setting.

### Adding a Shadow Channel

To add a shadow channel to a primary channel, perform the steps in the following sequence:

1. Determine the next available shadow channel (press \*1, \*2, etc. until an error tone is heard indicating the channel is empty).
2. Select **PROGRM, CHANEL** while on the desired primary channel.
3. Press \*x to get to the desired new shadow channel.
4. Scroll through the settings and change as necessary. Settings that can be changed are:
  - Channel type: analog or digital
  - Bandwidth
  - Key assignment
  - Squelch (CTCSS, DCS, P25 NAC, P25 Talkgroup)

All other settings must remain unchanged.

Shadow channels can be programmed to transmit back on the mode just received or the mode selected by the channel selector knob. This is valid only for the Shadow Channel delay period. The delay period can be overridden which would allow transmissions on the primary channel at any time by pressing **<ESC>**. This is programmed from the Scan Submenu, Scan Submenu.

### Lists Submenu

**Note:** *The Lists submenu is only available with the Fire Features option.*

This submenu allows you to add or delete a Unit ID to or from the call list.

1. Press **<ENT>** to access the Main Menu.
2. Scroll to **PROGRM** and press **<ENT>**.
3. Scroll to **LISTS** and press **<ENT>**. **IDCL** is highlighted.
4. Press **<ENT>** and do one of the following:
  - To add a new ID, select **ADD NEW**. Enter the Unit ID number (1 to 99) and press **<ENT>**. Enter the unit ID name and press **<ENT>** to add it to the list.
  - To delete an existing ID#, select **DELETE**. Scroll to the name to delete and press **<ENT>**. Verify the deletion: Select **YES** and it's deleted. Select **NO** and the list is displayed again.
5. To exit the P25 UnitID mode, press **<ESC>**.

### Scan Submenu

This submenu sets the basic functions of scan delay, revert mode, and priority-scan channels.

1. Press **<ENT>** to get to Main Menu screen.
2. Select **ROPTNS, PROGRM** and then **SCAN**.
3. Change the settings as necessary, using the table below as reference.

Setting	Description
<b>DELAY</b> (Scan delay)	Enter the number of seconds you want the radio to stay on the channel after the last transmission ends and before scanning resumes.

<b>RVERT</b> (Revert channel)  LSTSEL LASTRX HOME	The radio switches to the revert channel when scan is disabled.  Last channel selected. Last channel received. Home channel.
<b>REPLY</b>	Length of time in seconds to reply to a call.
<b>MONTR</b> (Monitor)	Length of time in seconds the radio remains on a channel picked up during a scan.
<b>P1</b> (Priority 1 channel)	First priority channel. Select this and press <ENT>. Move the channel knob to the desired P1 channel. Press <ENT> to save. The radio switches to <b>P1</b> when activity is detected on this channel.
<b>P2</b> (Priority 2 channel)	Second priority channel. Move the channel knob to the desired P1 channel. Press <ENT> to save. The radio switches to <b>P2</b> when activity is detected on this channel.

3.

## Password Submenu

This submenu changes the current six-character password.

1. From the **PROGRM** menu, scroll to **PASSWRD** and press **<ENT>**.
2. Enter the old password using the keypad and press **<ENT>**. If the entered password is incorrect, **INVALID ENTRY** displays. Press **<ESC>** and try again.

**Note:** *Three consecutive invalid entries and **OLD PASSWORD LOCKED** is displayed.*

3. Turn the radio off and on again if necessary.
4. When the old password is accepted, enter the new password.
5. Confirm the new password by entering it again. If the new password is entered incorrectly, **CONFRM PSSWRD** is displayed.
6. If the new password is accepted, **CONFRM PASSWORD ACCEPTED** is displayed.

## COVERT Menu

This menu is for setting the radio to covert operation including muting the speaker and setting alarms, beeps, and backlighting. Covert settings override all other radio settings.

1. From the main menu scroll to **ROPTNS**, **COVERT** and press **<ENT>**.
2. Enter the predefined password for this radio and press **<ENT>**.
3. Choose from the following settings.

Setting	Value
<b>BKLITE</b> (Backlight)	Off/on, disable/enable backlighting
<b>SPEAKR</b> (Speaker)	Off/on, disable/enable speaker
<b>KBEEPS</b> (Key beeps)	Off/on, disable/enable key beeps
<b>ALARMS</b> (User alert tones)	Off/on, disable/enable user alert tones
<b>LED</b> (Status indicator)	Off/on, disable/enable LED status indicator
<b><u>SYSCALL</u></b>	<u>System call on or off</u>

- 3.

## Encryption Menu

This menu is for modifying the encryption settings setup in the PC Programmer.

1. From the main menu, scroll to **ROPTNS, ENCRYPT** and press **<ENT>**.
2. Use the keypad to enter the password for this radio.
3. Press **<ENT>**.
4. Choose from the following settings:

Setting	Value
<b>KEYSEL</b> (Key select)	Choose the active key for the channel
<b>ZEROIZE</b> (Zeroize keys)	Zeroize key for channel or all keys
<b>DF KEY</b> (Default key)	Activates the channel's default key

4.

## 6: ENCRYPTION OPTION

This chapter assumes knowledge of the standard operations of the Guardian II portable radios detailed in the preceding chapters of this manual.

### Introduction

When operating in the digital mode the radio is capable of secure communications by means of software-based encryption and is fully compatible with any radio using P25 digital encryption standards AES or DES-OFB. When the radio is operating in the secure mode, the transmission of all tone squelch signals is disabled. The radio displays a key icon indicating that encryption is active. Encryption keys are assigned on a channel by channel basis via the PC Programmer or the radio's keypad.

The PC Programmer has an Encryption Lock option on a channel-by-channel basis that provides the opportunity to ensure that selected channels always transmit an encrypted signal.

Encryption is not available when the radio is operating in the analog mode.

### Programming/Activation

- Assign Encryption keys to channels using the PC Programmer or the main menu ([refer to "Encryption Menu"](#)).
- Use the preprogrammed auxiliary button (toggles encrypted channels on and off).
- Use the preprogrammed two position collar switch (turns encryption on and off).
- Use the KVL device (to add keys to radio).

### Zeroizing Keys

The radio can be programmed to immediately zeroize all encryption keys by pressing and holding the Emergency button for 1 second (if assigned). The radio can also zeroize all encryption keys, or can selectively zeroize individual keys using the radio's keypad from the Zeroize (**ZEROIZE**) submenu of the Encryption (**KMGR**) menu.

### Encryption Keyfill

The radio can store up to 32 encryption keys and retains them until they are zeroized. Keyfill is accomplished through the radio's side connector using the PC Programmer or a key variable loader (KVL CX or DX) device. The PC Programming cable or DES encryption cable is used to load keys.

To perform keyfill using a KVL device:

1. Turn off the target radio.
2. Connect the KVL to the target radio.
3. Turn on the radio. The radio automatically detects the KVL and **KVL KEYFILL** displays. If not, check the connections, and repeat the steps.
4. Scroll to highlight the desired key slot and press **<ENT>** to set the key slot selection.
5. To verify the key identification, press **ID** for the key ID display.
6. Press **TAG** to return to the key display.
7. Press **<ENT>** to access the key transfer display.

8. Press **PTT** on the KVL to initiate the key transfer. When the transfer is successful, **SUCCESS KEY DATA UPDATED** displays. If unsuccessful, **FAILURE KEY DATA NOT UPDATED** displays.
9. Press **<ENT>** to return to the key tag or the key ID displays.
10. Press **<ESC>** or turn the radio off and on to resume normal operation.

**Note:** *To stop the transfer at any time, press <ESC>.*

For more information, consult the KVL instruction manual.



## 7: FIRE FEATURES OPTION

This chapter assumes a knowledge of the standard operation of the Guardian portable radio detailed in the preceding chapters of this manual.

### Introduction

The Fire Feature option is designed for users in a high-risk fire environment or a similar special setting. This option adds the following features to the Guardian portable radio.

- Tone picklist
- P25 Talkgroup picklist
- P25 UnitID picklist
- Event bank for setting up an additional 3 zones of 16 channels each. Also known as incident command (ICP) bank
- Protected zone capability
- Enhanced radio-to-radio cloning

### Event Bank

A special Event bank simplifies incident command radio programming. It is the bank into which single zones are cloned. The Event bank has some special characteristics:

- The Event bank adds 3 additional zones of 16 channels each for an additional 48 possible channels. This brings the total number of user channels up to 1120 (48 primary channels plus 48 shadow channels). An additional four channels are reserved for the priority, home, and emergency channels.
- Unlike the main bank, each channel is independent. Changes to an Event bank channel do not affect other channels of the same name in the radio.
- Each Event bank channel can have a maximum of 1 shadow channel. If additional shadow channels are cloned into the Event bank, only the first shadow channel is cloned (per channel).
- The Event bank is predefined as Bank 9.
- Event zones are predefined as Zones 65, 66, and 67. Their zone names can be changed but their zone ID remains constant. If the toggle switch is defined as Zone Select, the following assignments apply:  
Switch Position A: Zone 65  
Switch Position B: Zone 66  
Switch Position C: Zone 67
- Zone 65, 66, 67 correspond to Zone A, B, and C respectively for the toggle switch and used as Zone Select. Use the Next Zone auxiliary button to toggle through Zones 65, 66, and 67.
- Event Zones cannot be protected.
- The **Z** icon on the display is inverted to provide a visual indication that the radio is in the Event bank.

### Cloning

The following cloning options exist for radio's equipped with Fire Features. They can be performed in any combination.

- Global only cloning
- Legacy full channel, zone, bank cloning
- Individual zone (up to 3 zones) cloning into the event bank
- Tone (A/D TX squelch mode) picklist cloning
- Talk Group picklist cloning
- P25 UnitID picklist cloning

Cloning from non-Fire Features radios to/from Fire Features radios is fully compatible, but only the standard full channel, zone, channel (no Event bank) option is possible.

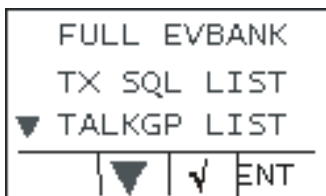
**Note:** Do not turn off or disconnect cable during the cloning process.

To clone one Fire Features equipped Guardian portable radio to another:

1. Turn off both radios.
2. Connect the red (cloning source) and black (PC) cables to each other.
3. Connect the source end of the cloning cable to the side connector of the source radio (the radio with the information to be cloned).

**Note:** Guide the top and bottom pegs on the end of the cable into the corresponding slots on the radio's side connector. When they click together, use your thumb to hold the cable to the radio and turn the screw handle until the cable is tight against the radio.

4. Connect the target end of the cloning cable to the side connector of the target radio (the radio to receive the information).
5. Turn on the target radio and the source radio. The source radio indicates the cloning mode. (If you see **CONNECT TARGET RADIO**, recheck your cable connection.)



These are the 6 cloning options from which to choose. A √ beside a cloning option indicates its selection. Select as many as apply. To make a selection or remove a selection, scroll to that option and press the corresponding √ button. When you've made your selection, press PTT to send the data. The display indicates the progress of cloning: **ERASING SENDING COMPLETE**.

The options for cloning are described in the sections that follow

**Note:** Zones can be protected using the PC Programmer. If a zone is protected, a password is needed to clone over the zone or zones. If a source cloning radio and target cloning radio have matching zone passwords, the password criteria is met. If a protected zone is cloned to another radio (main or Event bank), the target radio's zone does not become protected.

### Global Data

Check **GLOBAL DATA** to clone the auxiliary button settings, toggle switch settings, transmit timeout settings, transmit inhibit settings, scan settings, and priority scan settings. The following data is not cloned:

- Keypad lock
- Keypad disable
- Scan Mode
- Priority Scan Mode
- Passwords
- Unit ID and other Unit Identifiers

### All Zones

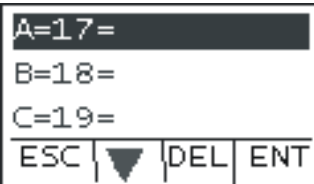
Check **ALL ZONES** to clone all banks, all zones, and all channels. This includes data from the Event bank.

### Event Clone

1. Check **EVENT CLONE** to clone a single zone or zones into the target radio's Event bank without affecting the remaining zones of the target radio. An interim screen is displayed offering **SELECT ZONES** and **START CLONING** as options. Use Select Zones to choose a zone (or zones) to clone into the Event Bank.

If Select Zones is selected, the following screen is displayed on both

radios.



```
A=17=  
B=18=  
C=19=  
-----  
ESC | ▼ | DEL | ENT
```

```
A=17=Zone17  
B=18=Zone18  
C=19=Zone19
```

2. On the source radio, scroll to the desired zone, and press **<ENT>**. A zone list is displayed containing all zones in the current bank.
3. Scroll to select the desired zone, and press **<ENT>**. Repeat this process for any remaining zones.

The target radio displays what is currently in its Event bank.

4. When this process is complete, return to the previous screen and select **START CLONING**. When cloning is complete, the target radio automatically switches to the Event Bank.

The settings remain in place on the source radio to simplify cloning additional target radios.

#### **Full EVBANK**

Check this option to clone all zones, channels, and special channels (priority, home, emergency channels) in the Event Bank. This data is first erased in the target radio.

#### **TX SQL LIST**

Check this option to clone the entire A/D transmit squelch (tone) picklist from the source radio to the target radio. This includes the tag names and tones. Tones can be CTCSS, DCS, or None for conventional analog channels, and NAC's for P25 digital channels.

#### **TALKGP LIST**

Check this option to clone the entire Talkgroup list from the source radio to the target radio. Talkgroups are applicable only for digital channels.

## Analog/Digital Tone Pick List

Tone pick lists are created in the PC Programmer. They are selected by accessing the main menu. Up to 32 transmit tones (CTCSS, DCS) and 32 digital NAC codes can be programmed into the radio. If one of these tones or codes is selected, the programmed tag name replaces the existing channel name. The use of a tone picklist provides a permanent change to the channel.

To access these tones, the following options exist. For all of these, press the # key for a short duration (press and release). A tone or code is replaced by the desired number:

- Press # and single digit ID number.
- Press # and 2-digit ID number.
- Press # and 0 and single digit number.
- Press # and single or 2 digits and <ENT>.
- A special case of pressing # 00 is reserved for removing the CTCSS or DCS tone on analog channels. **NO TXSQ** is displayed on the channel name.

**Note:** *If a channel is altered with the tone picklist that had a receive CTCSS or DCS tone programmed to it, that channel is automatically set to receive carrier squelch.*

## Talk Group Picklist

The talk group list applies only to digital channels. It can only be programmed by the PC Programmer or cloning. To access the list:

1. Press and hold the \* key until the talkgroup list is displayed. If no list exists, **EMPTY** is displayed.
2. Select the desired talkgroup, and press <ENT>. The talk group tag replaces the channel tag. The use of a talk group list provides a permanent change to the channel.

## P25 Unit ID Call Picklist

If a call is received with a matching UnitID in the lookup table, the name is displayed. Otherwise, the actual UnitID is displayed. It can be programmed by the PC Programmer or by accessing the radio's main menu. This picklist cannot be cloned.

To access an existing P25 UnitID picklist:

1. Turn the channel knob to the desired P25 digital channel.
2. Press and hold the # key to display the list. Do one of the following.
  - To make a UnitID call to someone who is not programmed into the radio, scroll to the first selection, **ENTER #**. Press **<ENT>** and enter the ID. Press **<ENT>** and PTT.
  - To make a UnitID to someone in the existing list, scroll to one of the UnitID's programmed into the radio. Press **<ENT>**. The name or UnitID number replaces the channel name while in this mode. Press PTT.
3. To return to normal operation, press **<ESC>**.

To edit the P25 UnitID picklist via the keypad:

1. Press **<ENT>** to access the Main Menu.
2. Scroll to **PROGRM** and press **<ENT>**.
3. Scroll to **LISTS** and press **<ENT>**.
4. Select **IDCL** and press **<ENT>**. Do one of the following:
  - To add a new ID, select **ADD NEW**. Enter the Unit ID number (1 to 999) and press **<ENT>**. Enter the unit ID name and press **<ENT>** to add it to the list.
  - To delete an existing ID#, select **DELETE**. Scroll to the name to delete and press **<ENT>**. Verify the deletion: Select **YES** and it's deleted. Select **NO** and the list is displayed again.
5. Press **<ESC>** to exit the P25 UnitID mode.

## 8: TROUBLESHOOTING

The following table of symptoms, possible causes, and suggested corrective actions may be helpful. Consult authorized personnel for further guidance.

Symptom	Probable Cause	Corrective Action
Radio does not turn on	No power source	Supply power source
Cannot talk with other users in plain mode	Radios programmed for different frequencies, squelch tones, talk-group IDs	Program radios to same frequency settings
Background noise or other conversations heard	Other users on channel or improper squelch tone setting	Select another channel or program squelch tones to eliminate interference
Error message on display	Operational error in radio	Follow displayed instructions
Alarm message on display	Encryption alarm in radio	Press <b>PTT</b> to clear alarm. Ensure encryption key is loaded into selected slot
Limited talk-out range	Radio signal obstructed or insufficient height above terrain	Move away from large metal objects or move to higher ground