



# ***KNG Desktop Base Station Operator's Manual***





**Many factors are taken into consideration when implementing features and functionality of KNG Series radios. Easy of use and customer requirements are among the most important to us. Most enhancements are achieved thru radio firmware updates.**

**Current firmware and radio editor versions, along with the latest user manuals and addendums, are available for download in the support section of the RELM Wireless web site.**

**We recommend joining our e-mail list to keep informed of updates and enhancements on all your RELM Wireless and BK Radio products.**

**Visit us at:  
[www.relm.com](http://www.relm.com)**

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## **Introduction**

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Congratulations on your purchase of the BK Radio KNG Base Station from RELM Wireless.

The KNG APCO Project 25 radio offers an array of programmable functionality to help radio users get the most out of their portable communications. Check with your RELM/BK Radio dealer or communications officer for information on the programmed functions of your radio prior to operation.

This manual contains information concerning the operation procedures for the BK Radio KNG Base Station. The KNG has been designed to meet the tough requirements of today's communications environment. Please take a moment to read the information in this manual so you can get optimum performance from your new radio.

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## **FCC Requirements**

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Your radio must be properly licensed by the Federal Communications Commission prior to use. Your BK Radio dealer can assist you in meeting these requirements. Your dealer will program each radio with your authorized frequencies, signaling codes, etc., and will be there to meet your communications needs as your system expands.

## Safety Precautions



- Do not operate the transmitter in close proximity to blasting caps.
- Do not operate the radio in an explosive atmosphere (petroleum fuels, solvents, dust, etc.).
- Do not operate the transmitter if a person outside the vehicle is less than three feet from the antenna or touching the antenna.

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### **RF ENERGY EXPOSURE AWARENESS AND CONTROL INFORMATION, AND OPERATIONAL INSTRUCTIONS FOR FCC OCCUPATIONAL USE REQUIREMENTS**

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BEFORE USING YOUR MOBILE 2-WAY RADIO, READ THE INFORMATION BELOW WHICH CONTAINS IMPORTANT OPERATING INSTRUCTIONS FOR SAFE USAGE AND RF ENERGY AWARENESS AND CONTROL INFORMATION FOR COMPLIANCE WITH RF ENERGY EXPOSURE LIMITS IN APPLICABLE



## National and International Standards

*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; other forms include, but are not limited to, sunlight and x-rays. RF energy, however, should not be confused with these other forms of electromagnetic energy, which when used improperly, can cause biological damage. Very high levels of x-rays, for example, can damage tissues and genetic material.

Experts in science, engineering, medicine, health and industry work with organizations to develop standards for exposure to RF energy. These standards provide recommended levels of RF exposure for both workers and the general public. These recommended RF exposure levels include substantial margins of protection. All 2-way radios 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 procedures on how to control it. Please refer to the

following websites for more information on what RF energy exposure is and how to control your exposure to assure compliance with established RF exposure limits.

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

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

## **Federal Communications Commission Regulations**

The FCC rules require manufacturers to comply with the FCC RF energy exposure limits for 2-way radios before they can be marketed in the U.S. 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 BK Radio 2-way radio has an RF exposure product label. Also, your BK Radio owner's and service manuals include information and operating instructions required to control your RF exposure and to satisfy compliance requirements.

## **Compliance with RF Exposure Standards**

Your BK Radio 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 the IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environment at operating duty factors of up to 50% talk-50% listen 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 antenna radiates measurable RF energy only while it is transmitting (during talking), not when it is receiving (listening) or in Standby Mode.

Your BK Radio 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

## **Industry Canada Compliance**

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 Canada.

## **RF Exposure Compliance and Control Guidelines**

To control exposure to yourself and others and to ensure compliance with the RF exposure limits, always adhere to the following procedures.

### **Guidelines:**

- User awareness instructions must 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. The red LED will illuminate when the radio is transmitting. To receive calls, release the PTT button. The red LED will extinguish when the radio stops transmitting. Transmitting 50% of the time, or less, is important because this radio generates measurable RF energy exposure only when transmitting (in terms of measuring for standards compliance).

Transmit only when persons around the vehicle are at least 3 feet (90 centimeters) away from the vehicle with a properly installed antenna. This separation distance will ensure that there is sufficient distance from a properly installed (according to installation instructions) externally-mounted antenna to satisfy the RF exposure requirements in the standards listed above.

The AMBE® voice compression software included in this product is protected by intellectual property rights including patent rights, copyrights and trade secrets of Digital Voice Systems, Inc. The user of this software is explicitly prohibited from attempting to decompile, reverse engineer, or disassemble the object code, or in any other way convert the object code into a human-readable form. This software is licensed solely for use within this product. US Patent Nos. #6,912,495 B2, #5,870,405, #5,826,222, #5,754,974, #5,715,365, #5,701,390, #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.

## **Contact Information**

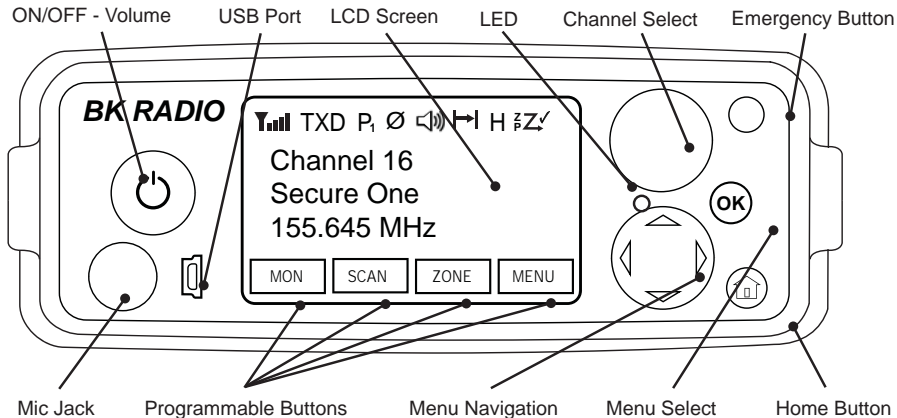
For additional information on exposure requirements or other information, visit website <http://www.relm.com>

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# Radio Controls and Connections

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## Front Panel



**On / Off / Volume:** This control is both a push on/off button and a rotate volume knob. Pushing the button in and releasing will toggle the state of the mobile from on to off and back. Rotating this knob will increase or decrease the audio volume setting.

**USB Port:** This is a USB client port and is used for programming and configuring the radio with the Windows PC programming software.

**LCD Touch Screen:** The LCD screen is used to show radio status and operating condition as well as receive input from the user via programmed buttons. Up to three lines of information can be displayed in the main display window. (See Display Options)

**LED:** The LED indicator is used to show various operational states such as active receive and active transmit.

**Channel Select:** The Channel Select knob may be programmed via PC to select channels or zones. Turn the knob to select the desired channel or zone.

**Emergency Button:** The orange programmable function is typically assigned to enter the Emergency Operation mode but can be programmed for other functions. (See Button Options)

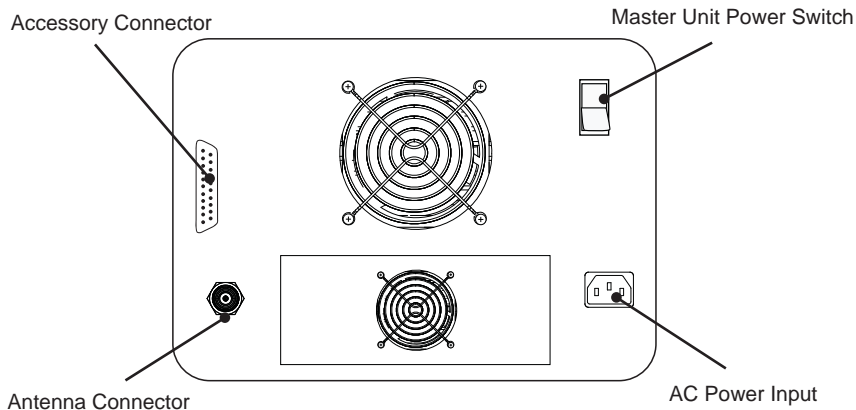
**Microphone Jack:** Connector for attaching the microphone.

**Programmable Buttons:** Up to four touch-activated buttons can be programmed to the LCD display. (See Button Options)

**Menu Navigation:** The menu navigation pad is used to navigate the menu system. Use the right/left buttons to highlight a menu selection. Press OK to select the currently highlighted menu item.

**Home:** When navigating a menu pressing the Home button will exit the menu mode and return to normal radio operation.

## Rear Panel



**Master Power Switch:** Turns on/off the unit's internal power supply.

**Antenna Connector:** Antenna input/output.

**AC Power Input:** 120VAC input.

**Accessory Connector:** Twenty-five pin connector provides input/output connections for external equipment.



## Accessory Connector Pins

1	SPKR1+	14	SPKR1-
2	RF_USB_HOST_PWR	15	RF_USB_HOST_D+
3	RF_USB_HOST_D-	16	ACC_RS232_TXD
4	ACC_RS232_RTS	17	ACC_RS232_DSR
5	ACC_RS232_CTS	18	ACC_RS232_RXD
6	ACC_AUDIO_OUT	19	ACC_MIC
7	LOW_CURRENT_A+_OUT	20	FUSED_SWA+
8	GND	21	IGNITION_SENS
9	EXT_EMERGENCY_INPUT	22	OPT_1_INPUT
10	OPT_2_INPUT	23	OPT_3_OUTPUT
11	OPT_4_OUTPUT	24	OPT_5_OUTPUT
12	$\overline{\text{ACC\_PTT}}$	25	SPKR2 -
13	SPKR2 +		

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## LCD Touch Screen

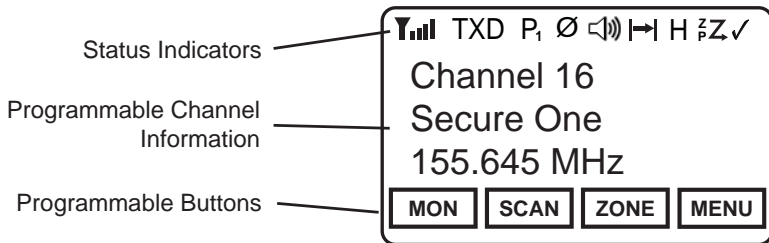
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KNG Desktop Base Stations are equipped with a programmable touch sensitive display.




The bottom line of the display is populated with programmable buttons. Button functions are assigned using the PC radio editor. Buttons are toggled off or on by pressing the displayed icon.

The top line displays radio activity such as transmit and receive indications, scan operations, etc.

The middle section shows programmed information for the selected channel.  
(See Channel Information Display Options)










## Status Indicators

	Receiver Signal Strength
<b>RXD, RXA</b>	Receive Digital, Receive Analog, Hold Time Active
<b>TXD, TXA</b>	Transmit Digital, Transmit Analog
<b>H</b>	High Transmit Power
<b>L</b>	Low Transmit Power
<b>P1, P2</b>	Priority 1 Channel, Priority 2 Channel
	Selected channel is encrypted. Flashing when Tx is encrypted or when Rx incoming signal is encrypted
	Scanned Channel

(continued)

## Status Indicators

	Channel Scan On
	Zone Scan On
	Priority Scan On
	Repeater Talkaround Enabled
	Monitor Mode
	Flashing indicates Normal Mode in digital operation
	Open Audio

## Channel Information Display Options

NOTE: Three channel information lines are programmable with PC Radio Editor.

<b>Channel Number</b>	Channel Number of Currently Selected Channel or Active Scanned Channel
<b>Channel Label</b>	Alphanumeric Label of Currently Selected Channel or Active Scanned Channel
<b>Frequency</b>	Operating Frequency of Currently Selected Channel or Active Scanned Channel
<b>Received Unit ID</b>	P25 ID or the corresponding label of the radio transmitting the message currently being received
<b>Received Talk Group ID</b>	P25 Talk Group ID of the radio transmitting the message currently being received
<b>Rx Picklist Selections</b>	Displays active Rx picklist NAC, TGID and/or Tone
<b>Tx Picklist Selections</b>	Displays active Tx picklist NAC, TGID and/or Tone
<b>Zone Number</b>	Number of Currently Selected Zone
<b>Zone Label</b>	Programmed Label of Currently Selected Zone
<b>Zone and Channel</b>	Currently Selected Zone and Channel Numbers

## Programmable Button Options

NOTE: Active functions are indicated by highlighted text.

**SCAN** = Active, **SCAN** = Inactive.

<b>CHAN</b>	Channel Select (Direct microphone keypad entry or navigation wheel selection)
<b>DEL</b>	Nuisance Channel Delete
<b>LITE</b>	Keypad and Display Backlight
<b>MENU</b>	Open the programmed radio menu
<b>MON</b>	Monitor
<b>PRI</b>	Set Priority Channels
<b>PSCN</b>	Priority Scan
<b>PWR</b>	Transmit in Low Power Mode
<b>RKY</b>	Request OTAR Encryption Rekey
<b>RXCG</b>	User Selectable RX CTCSS/CDCSS Code Guard (Analog or Mixed Mode Operation)
<b>RXNAC</b>	User Selectable Receive NAC
<b>SCAN</b>	Channel Scan
<b>SCN+</b>	Add/Delete Scan Channels

## Programmable Button Options (cont)

<b>SEC</b>	Transmit Secure (Encrypted Models)
<b>SQ AD</b>	Squelch Adjust
<b>SURV</b>	Surveillance Mode
<b>T/A</b>	Repeater Talkaround
<b>TXAD</b>	Transmit Digital (Mixed Mode Operation)
<b>TXCG</b>	User Selectable TX CTCSS/CDCSS Code Guard (Analog or Mixed Mode Operation)
<b>TXNAC</b>	User Selectable TX NAC (Digital or Mixed Mode Operation)
<b>UKEY</b>	User Selectable Encryption Key (Encrypted Models)
<b>UKST</b>	User Selectable Encryption Keyset (Encrypted OTAR Models)
<b>UNIT</b>	Unit-to-Unit Call (Digital Operation Only)
<b>TGID</b>	User Selectable Talk Group (Digital or Mixed Mode Operation)
<b>ZERO</b>	Zeroize Encryption Keys and Password (Encrypted Models)
<b>ZONE</b>	Channel Zone Select
<b>ZSC+</b>	Add/Delete Zone Scan Zones
<b>ZSCN</b>	Zone Scan

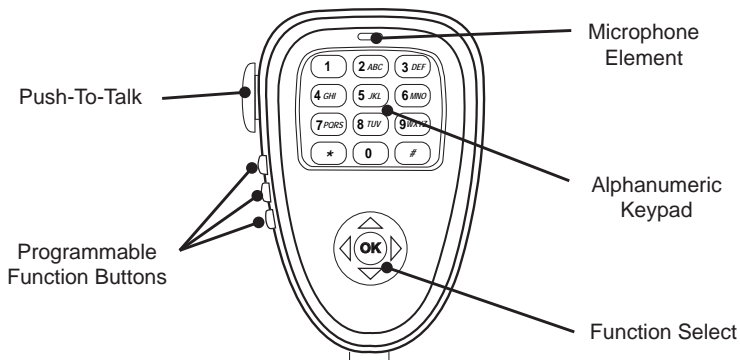
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## Keypad Microphone Controls

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Many functions of the KNG Base Station can be controlled via the optional KAA0290 Smart Microphone.

KAA0290 functions include three programmable function buttons, an alphanumeric keypad and a function select switch.





**Push-to-Talk:** Press and hold the PTT (Push-To-Talk) switch on the microphone to transmit.

**Microphone Element:** While transmitting, talk in a normal voice with the microphone approximately one to two inches from your mouth.

**Function Buttons:** The three function buttons on the left side of the microphone can be programmed via PC to access specific radio functions. (See Programmable Button Options)

**Alphanumeric Keypad:** Depending on radio programming, the keypad can perform a variety of functions. Keypad functions can include DTMF tone generation, direct channel selection, direct P25 ID entry for unit-to-unit calling and field programming.

**Function Select:** The menu navigation pad is used to navigate the menu system. Use the right/left buttons to highlight a menu selection. Press OK to select the currently highlighted menu item.

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## Function Selection

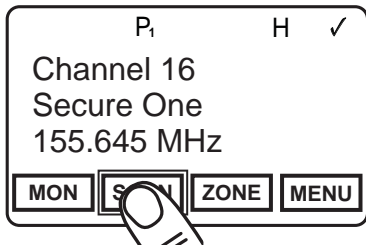
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Most radio functions can be programmed as Touch Screen selections, microphone button selections or as part of a menu list.

NOTE: Items can be directly accessed from the Touch Screen or by using the navigation wheels on the front panel or microphone.

### Touch Screen Selection

To toggle assigned Touch Screen functions on and off, or access the associated menu, press the desired function on the LCD touch screen.

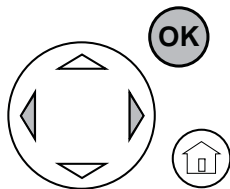
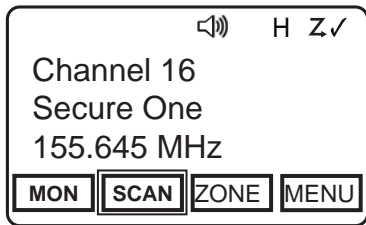


## Navigation Wheel Selection

The navigation wheel on the radio front panel and microphone can also be used to toggle functions and access menu lists.

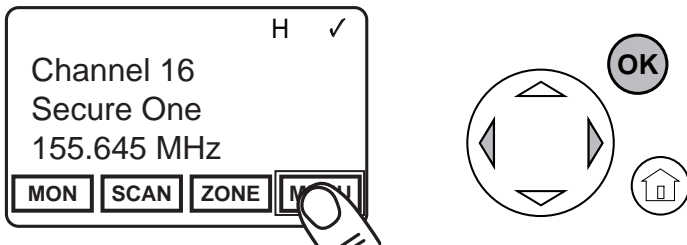
Use the right and left arrows to highlight the desired function. Press the OK button to open the menu or toggle the highlighted item.

The active button will be indicated by an outline.

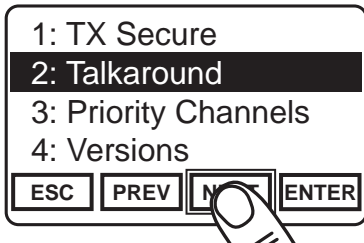


## Menu Screen Selection

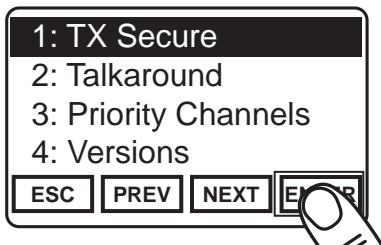
By programming a button as “MENU” a list of additional functions are accessed by pressing the button or highlighting “MENU” with the Navigation Wheel and pressing OK.



Use the “PREV” and “NEXT” buttons to highlight the desired function.



Use “ENTER” to select the function.

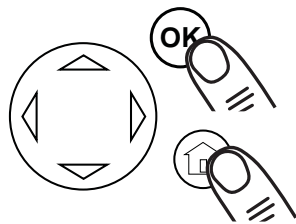
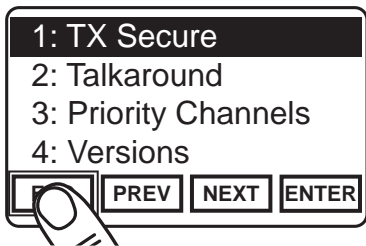


When selected, a menu for the function will show in the display.

Use the “PREV” and “NEXT” buttons to highlight the desire setting and “ENTER” to select or set the function.

## Exiting the Menu

To return to normal operation press the HOME button or press and hold “ESC”.



## Menu Options

The following items may be programmed as menu items.

Backlight	Channel Scan	Channel Scan List
Channel Select	Cloning	Contrast
Control Lock	Keypad Programming <sup>1</sup>	Monitor
Picklist-Key*	Picklist Keypad**	Picklist-Rx CxCSS
Picklist-Rx NAC	Picklist-Talkgroup ID	Picklist-Tx CxCSS
Picklist-Tx NAC	Priority Channel Select	Priority Scan
Rekey Request**	Repeater Talkaround	Squelch Adjust
Surveillance Mode	System Test	Tactical OTAR***
Tx Digital	Tx Power	Tx Secure*
Unit Call	Version	Zeroize Keys*
Zone Scan	Zone Scan List	Zone Select

<sup>1</sup> See Keypad Programming Items chart for details

\* Requires Encryption option.

\*\* Requires Over-the-Air rekeying option.

\*\*\* Requires Tactical OTAR option.

## Keypad Programming Items

Keypad	Allows programming of channels, zones and global settings.
CxCSS Picklist	Allows programming of the selectable Code Guard list.
NAC Picklist	Allows programming of the selectable Network Access Code list.
TGID Picklist	Allows programming of the selectable Talk Group ID list.
Call List	Allows programming of the P25 IDs and associated labels in the call list.



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# Basic Operation

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## Power Up

1. Turn on main unit power using the master switch on the back of the unit.  
NOTE: When the main power is turned on the radio will power-up.
2. Turn radio power on by pushing and releasing the Volume knob. The radio will beep, indicating that it has passed its self test and is operational.

## Receive

1. Set volume by pressing and holding the [MON] button, to hear squelch noise or by selecting "Monitor" from the menu list and selecting "Open" . Turn the Volume knob to set a comfortable volume level. Press the [MON] button again or select desired monitor mode from the "Monitor" menu to stop squelch noise.
2. Select a channel zone (if applicable) by pressing the [ZONE] button or selecting "Zone Select" from the menu and scrolling to the desired zone. Press the "OK" button to return to Channel Select mode.
3. Select a channel by turning the Channel Selector knob. When the unstopped channel selector is rotated past the highest channel, the radio will return to the lowest channel. When rotated past the lowest (1st) channel, the radio will go to the highest channel.

## Transmit

1. Press the PTT (Push-To-Talk) switch on the microphone. The TX annunciator appears on the display and the red Transmit indicator illuminates while the PTT is pressed.
2. Talk in a normal voice with the microphone approximately one to two inches from your mouth.
3. Release the PTT switch to stop transmitting.
4. If the TX annunciator does not appear and a tone is heard, you are on a receive-only channel or the channel is busy and Busy Channel Lockout is enabled. Turn the Channel Selector knob to an authorized transmit channel or wait until the channel is clear.
5. If the length of your transmission exceeds the preset Time-Out Timer setting, the transmitter automatically shuts off and a tone sounds. To continue the transmission, release the PTT switch, then press it again and continue talking.

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## Function Details

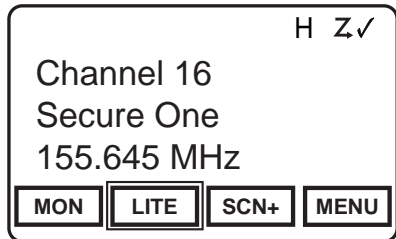
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Many operational features and functions can be programmed for user selection and control. Items can be programmed as touch-screen buttons or to the three buttons available on some microphone models.

In addition to these quick set buttons, a menu of multiple functions can be accessed with a "MENU" button.

This section covers the operation of user accessible functions.

### Backlight



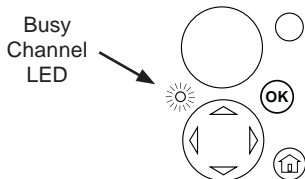
Radio lighting can be turned off or on using the backlight function. When off the radios display, navigation button backlights and microphone lighting are all turned off.

Backlight operation can be assigned as a touch screen or menu list item or on a microphone function button.

Backlight settings are On or Off.

## Busy Channel Operation

The radio can be programmed for different behavior when a channel is busy.

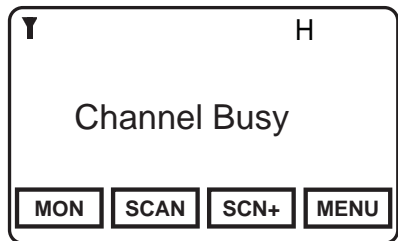


**Indicate** - When a channel is busy the front panel LED will flash green.

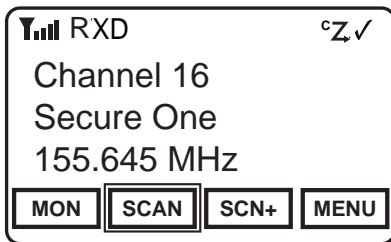
**Lockout** - When a channel is busy the LED flashes and Push-to-talk will be disabled. When PTT is pressed a Busy message will show in the display.

**Override** - LED flashes and first PTT displays the Busy message. Release and press the PTT again to override the lockout and allow transmitting.

### Channel Scan



When on, Channel Scan monitors activity on the scan list channels in the currently operating Zone. Scan operates only while the radio is not transmitting.



Channels designated as scan channels are identified by the ✓ symbol at the top of the LCD display. If allowed, the scan list can be edited by the radio user. (See Channel Scan List).

When Channel Scan is on, the °Z symbol will be shown at the top of the LCD display.

When a signal is detected, scanning stops and the message is received. The received channel is shown in place of the selected channel.

Once the signal ends, the radio continues to monitor the channel for the preset scan delay time before it resumes scanning.

Channel Scan operation can be assigned as a touch screen or menu list item or on a microphone function button.

Channel Scan is either On or Off.

Channel Scan may be used in conjunction with Priority Scan operation.

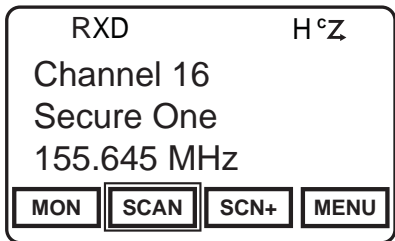
### **Scanning Code Guarded Channels**

When a signal is detected, scanning stops while the radio checks for the proper Code Guard value. If the signal contains the proper Code Guard value, the radio receives the message. Otherwise, the radio resumes scanning immediately.

### **Transmitting with Scan On**

The radio transmits on the channel selected by the Channel Selector knob unless Talkback Scan is enabled or "Transmit on Priority 1" is enabled (see Priority Scan).

## Talkback Scan



If your radio is programmed for Talkback Scan, press PTT while a channel is active or while scan delay time remains, you will be responding on the transmit frequency of the received channel. The 'RX' indicator will be shown in the display while scan delay time remains.

Talkback Scan will not work if Priority Scan is on and your radio is also programmed to transmit on the Priority 1 channel.

## Vote Scan (Requires Option KZA0581)

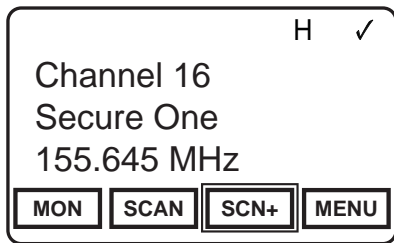
Channels in a multicast conventional systems can be added to the scan list and designated as “voted” channels. When a signal is received on a voted channel the radio checks all voted channels and selects the channel with the best signal.

If enabled, vote scanning takes place whenever the channel scan switch in on.

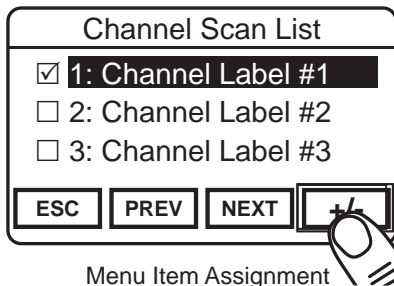
NOTE: Channel voting occurs only with Channel Scan and is disabled when Zone Scanning. Channels programmed as Vote channels are treated as normal scan list channels during Zone Scan operation.

*See also Priority Scan and Zone Scan.*

## Channel Scan List



Touch Screen or Button Assignment



Menu Item Assignment

The Channel Scan List allows the radio user to add or remove channels from the list of channels to be monitored when scanning.

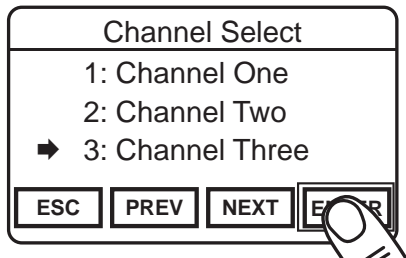
Channels designated as scan channels are identified by the ✓ symbol at the top of the LCD display.

The Scan List operation can be assigned as a touch screen or menu list item or on a microphone function button.

When Channel Scan List is assigned to the touch screen or as a microphone function button, press the button to add or remove the selected channel from the scan list.

When assigned as a menu item, open the menu as described in the Navigation section and select the channel you wish to add or remove from the scan list. Press "+/-" to add or remove. Channels in the scan list will be indicated with the ✓ symbol.

## Channel Select



In addition to the channel knob, Channel Selection can be accomplished via the touch screen, using the navigation buttons or entered from the KAA0290 microphone.

If assigned as a Touch Screen or function button, press the button to open the Channel Select menu.

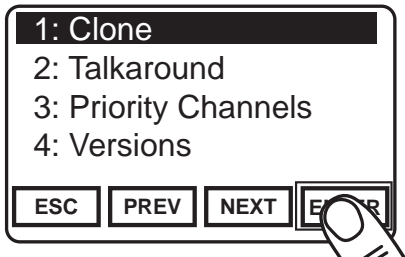
When assigned as a menu item, open the menu as described in the Navigation section.

Select the desired Channel and press "ENTER".

If Microphone Channel Select is allowed, use the number keys to enter the channel number and press "OK".



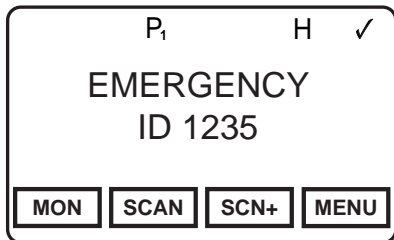
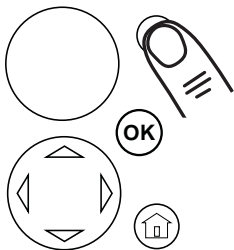
## Cloning



The KNG radio can be set up to send or receive programmed information from other BK Radio products via a cloning cable available from RELM Wireless.

Refer to the cloning cable instruction manual for cloning information between radios.

## Emergency Signaling



### **Sending an Emergency Call**

If programmed, the Orange button on the front panel is used to send an emergency call on the programmed Emergency channel. The emergency channel must be programmed to transmit in digital mode.

Press and hold the button to initiate an Emergency Call.

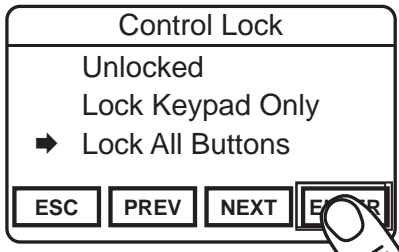
Once the call is activated, the emergency message is transmitted automatically every ten seconds. Each push-to-talk will also transmit the emergency information along with voice traffic.

Press and hold the button to cancel the Emergency Call.

### **Receiving an Emergency Call**

When the radio receives an Emergency Call, an alert tone will be emitted. "EMERGENCY" and the incoming P25 ID number or label will be displayed during the reception.

## Control Lockout



The KNG Base Station offers two lockout settings, "Lock Keypad Only" and "Lock All Buttons".

"Lock Keypad Only" locks all touch screen and button operations except the three side buttons on the microphone.

"Lock All Buttons" locks all touch screen and button operations including the three side buttons on the microphone.

The Orange button, Push-to-Talk and On/Off switch are unaffected by Control Lock selections.

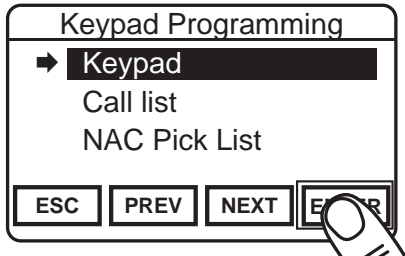
Control Lock can only be assigned as a menu item. To enable the lock function open the menu as described in the Navigation section and select Control Lock from the list.

Select the desired lockout setting and press "ENTER"

When attempting to access a locked function the radio will display a message with instructions to disable Control Lock. The navigation wheel on the radio front panel or microphone is used to unlock the controls.

To disable Control Lock press the left arrow button twice, then the right arrow button twice.

## Keypad Programming



Much of the information stored in the KNG Base Station radio can be edited using the KAA0290 Microphone. Four separate programming functions can be enabled with the PC Radio Editor software.

Keypad programming selections can only be assigned as a menu item.

Open the menu as described in the Navigation section to select the information you want to edit.

Available programming functions are:

**Keypad** - Used to edit individual channel and zone information such as labels, frequencies, operating modes, etc.

NOTE: Individual items may be blocked from keypad programming access.

**Call List** - Used to edit the Unit-to-Unit P25 ID Call List entries.

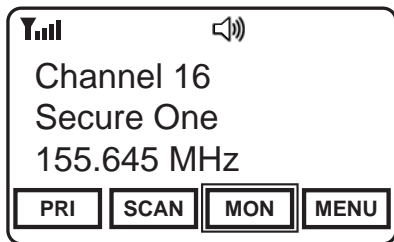
**CxCSS Pick List** - Used to edit the list of user selectable Code Guard entries.

**NAC Pick List** - Used to edit the list of user selectable Network Access Codes.

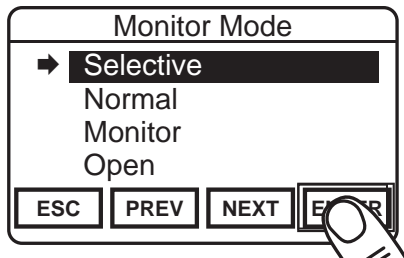
**Talkgroup ID Pick List** - Used to edit the list of user selectable P25 Talk Groups

*Refer to the Keypad Programming section for detailed information on how to edit programmed radio information.*

## Monitor



Touch Screen or Button Assignment



Menu Item Assignment

There are four settings available for monitoring traffic on a selected channel.


**Selective** applies only to digital and mixed mode channels.


If assigned as a Touch Screen or function button, press the button to cycle to the next mode. Press and hold for Open Squelch.

When assigned as a menu item, open the menu as described in the Navigation section and select the Monitor mode you wish to use. Press "ENTER" to select.

### Monitor Modes and Indicators

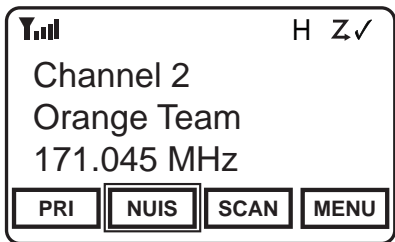
**Selective** - Required for Unit-to-Unit calls and Talkgroup use. Digital only. (No symbol)

**Normal** - Requires NAC or Tone. Ignores Talkgroup and Unit-to-Unit information. 

**Monitor** - Monitors activity on selected frequency. 

**Open** - Open Squelch. 

## Nuisance Channel Delete



If enabled, a Nuisance Channel can be temporarily removed from the Scan List.

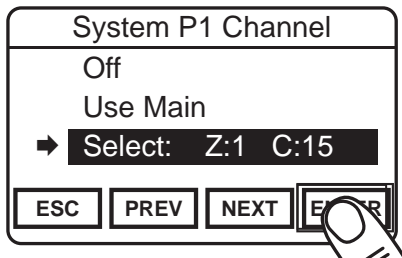
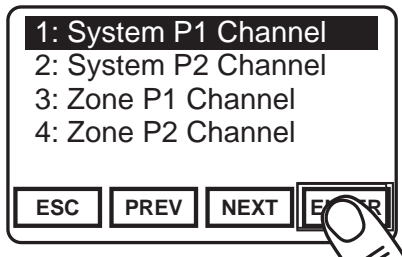
Nuisance Channel Delete can be assigned as a touch screen item or on a microphone function button.

To temporarily remove a channel from the scan list, press the assigned button while the nuisance channel is being received.

To revert to the programmed scan list, turn off Scan, cycle radio power or select another zone or channel.

## Priority Channel Select

Depending on programming, priority channels can be radio-wide (System) or zone specific (Zone). Radio-wide priority channels are monitored regardless of the current operating zone. (See Priority Scan for more details.)



### System Priority Channel Selection

Open the menu as described in the Navigation section and select the System Priority channel you wish to change.

Press "ENTER" to open System Priority Channel menu.

Options:

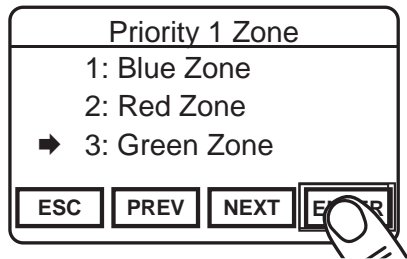
**Off** - Disables the priority channel.

**Use Main** - Uses the currently selected channel as the priority channel.

**Select** - Assigns a specific channel as the priority channel.

To assign a specific channel as a System Priority Channel, highlight "Select" and press the "ENTER" button.

## System Priority Channel Selection (continued)



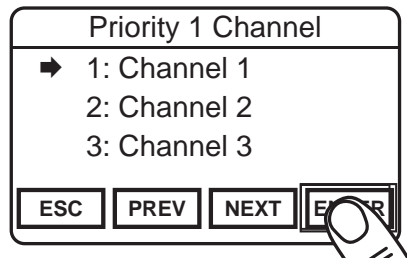
The Zone selection menu will be displayed.

Highlight the zone of the desired priority channel and press the "ENTER" buttons.

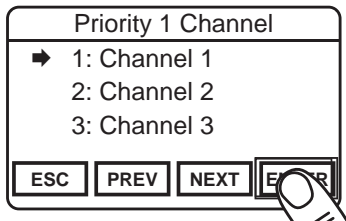
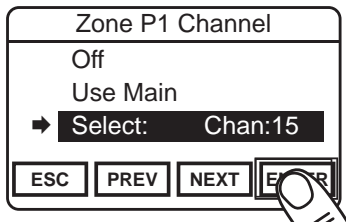
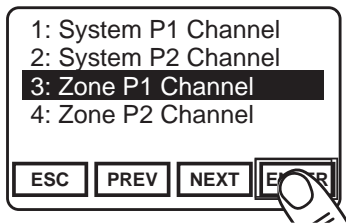
The Channel selection menu will then be displayed.

Highlight the desired channel and press the "ENTER" button to set the priority channel.

The display will return to the main Priority Channel Select menu.







## Zone Priority Channel Selection

Open the menu as described in the Navigation section and select the Zone Priority channel you wish to change.

Press "ENTER" to open Priority Channel menu.

Options:

**Off** - Disables the priority channel.

**Use Main** - Uses the currently selected channel as the priority channel.

**Select** - Assigns a specific channel as the priority channel.

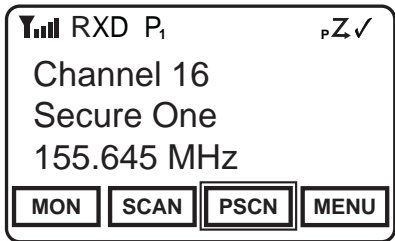
To assign a specific channel as a Zone Priority Channel, highlight "Select" and press the "ENTER" button.

The Channel selection menu will be displayed.

Highlight the desired channel and press the "ENTER" button to set the priority channel.

The display will return to the main Priority Channel Select menu.

## Priority Scan



Two channels can be designated as priority channels. When Priority Scan is on, these channels are monitored for incoming traffic. When a qualified signal is detected the speaker is opened to listen to the message.

If a message is detected on the channel designated as Priority 2, the radio will continue to monitor Priority 1 channel for activity. If activity is detected the radio will switch to the Priority 1 channel.

When used in conjunction with Channel Scan, the radio monitors the Priority channels and will switch from a scanned channel to the Priority channel if a qualified signal is detected.

Depending on radio setup, priority channels can be tied to the currently operating zone or can be assigned to a specific channel regardless of the operating group.

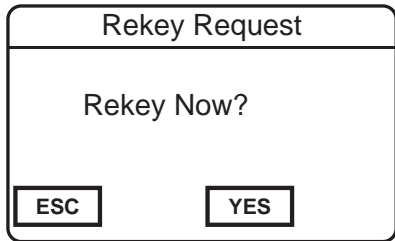
Channels designated as Priority channels are identified by the P1 or P2 symbol at the top of the LCD display. When Priority Scan is on, the PZ symbol will be shown.

Priority Scan operation can be assigned as a touch screen or menu list item or on a microphone function button.

Priority Scan is either On or Off.

If allowed, Priority Channels can be changed by the user. (See Priority Channel Select.)

## Rekey Request



On radios equipped with optional digital encryption and over-the-air rekeying (OTAR), a radio user can manually request an encryption rekey from the Key Management Facility (KMF).

For a radio to receive encryption keys or keysets over-the-air, the selected channel must be designated as an OTAR channel via PC programming. Refer to your PC programming documentation for more information.

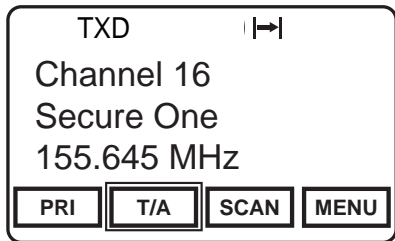
If assigned as a Touch Screen or function button, press the button to open the Rekey Request menu. When assigned as a menu item, open the menu as described in the Navigation section.


Press the "YES" button to Request Keys, or press "ESC" to cancel the operation.

If the "YES" button is pressed while on a channel that has not been marked as an OTAR channel, the radio will boop and "NON-OTAR" will appear on the display.

If a successful rekey occurs, a tone will sound, and the display will momentarily show "REKEYED".

## Repeater Talkaround



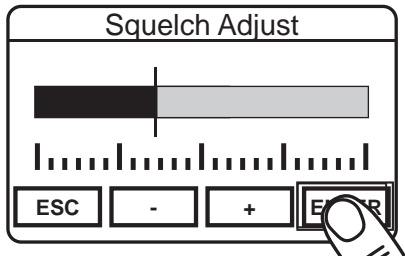
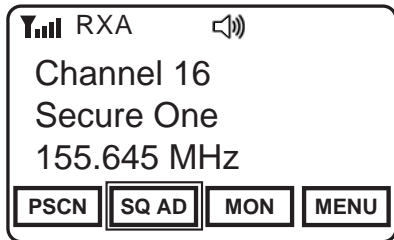
In Repeater Talkaround (T/A) mode, the radio will transmit on the programmed receive frequency of the selected channel. When T/A is enabled the  icon will be displayed on the top line of the LCD.

NOTE: Channels programmed as receive only are not affected by the Talkaround selection.

Talkaround selection can be assigned as a touch screen, menu list item or on a microphone function button.

Repeater Talkaround is either On or Off.

## Squelch Adjust



Squelch Adjust is used to change the signal strength required for the radio's speaker to unmute.

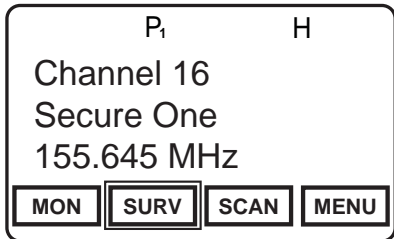
Squelch can be assigned as a touch screen or menu list item or on a microphone function button.

To adjust the squelch setting, press the assigned button or open the menu as described in the Navigation section.

Select the desired threshold using the -/+ buttons.

Press "ENTER" to set the level.

## Surveillance Mode



When Surveillance Mode is on, all audible indicators (beeps etc.) and lighting functions (LEDs and Display) are disabled. The LCD Touchscreen is set to the dimmest setting.

For best operation Surveillance Mode should be assigned as a touch screen button or on a microphone function button.

To enable or disable surveillance mode, press the assigned button.

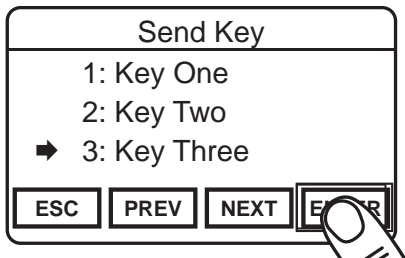
Surveillance Mode is either On or Off.

## Tactical OTAR

The Tactical Over-the-Air Rekeying option allows a key source KNG radio to send individual encryption keys to OTAR equipped target radios without the need for a full Key Management Facility (KMF).

For proper operation the Source and Target radios require specific control key loads and PC editor settings. Refer to the Tactical OTAR documentation for more information.

### Sending Keys

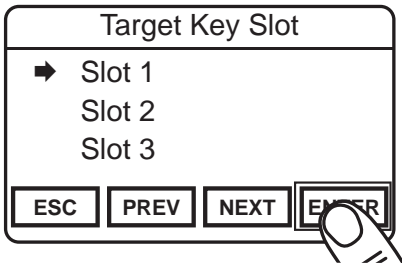


To send an encryption key via the tactical OTAR function turn the radio to a channel programmed for OTAR operation. Press the assigned button or open the Tactical OTAR menu as described in the Navigation section.

Select the encryption key to send and press "ENTER".

Depending on the programmed settings of the source radio, the key transfer will begin or the key slot menu will appear.

## Sending Keys (continued)



If the “Key Pick List Target” is programmed the pick list target screen is displayed.

Select the desired target key slot. This is the key pick list slot where the target radio will store the transferred key.

Press "ENTER" to begin the key transfer.

If the key information was successfully transmitted the LCD will momentarily display “Key Transfer Successful”.

NOTE: This is no indication verifying that the key was received by the Target radio.

If the radio is not programmed for Tactical OTAR operation or is on a non-OTAR channel the display will read “Non-Tact. OTAR Channel”.

Should the key transfer fail for any other reason a failure message with a two digit error code will be displayed. (See table)

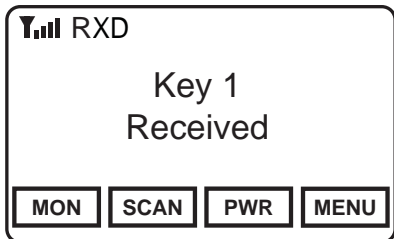




## Tactical OTAR Error Code Table

Code	Description
01	General Failure
02	DTEK Not Found or Not AES
04	MTEK Not Found or Not AES
F0	General Failure during Key Wrap
F1	Key Not Found for Key Wrap
F4	Key to Wrap Key is Not identified as a KEK

### Receiving Keys



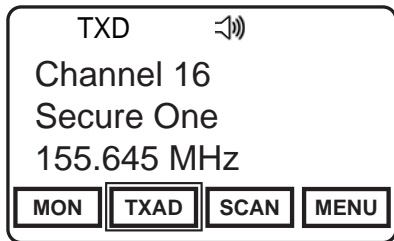
To receive an encryption key from a source radio, select the channel designated as the OTAR channel and wait for the transmission from the Source radio

If the key is successfully received the Key Received message will appear on the LCD.

Cycle radio power to clear the message.

**NOTE:** There is no message for an unsuccessful attempt to receive a key.

## Transmit Digital



When Transmit Digital is on, channels programmed for mixed-mode transmit will transmit in digital mode. When off, mixed-mode channels transmit in analog mode.

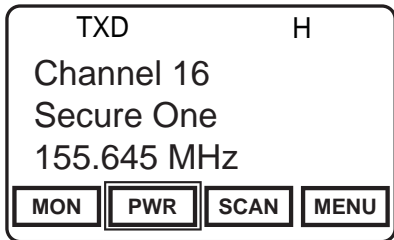
When transmitting in digital mode the display shows 'D' behind the TX indicator. In analog transmit, 'A' will follow the indicator.

Transmit Digital selection can be assigned as a touch screen, menu list item or on a microphone function button.

When assigned as a touch screen function, the "TXAD" button will be highlighted when in the Transmit Digital mode.

Transmit Digital is either On or Off.

## Transmit Power



Transmit Power can be selected between the programmed high and low settings. The power output of the settings depend on radio options, model and editor settings.

When operating in the high power mode, "H" will be displayed on the top line of the LCD. In low power mode, "L" is displayed.

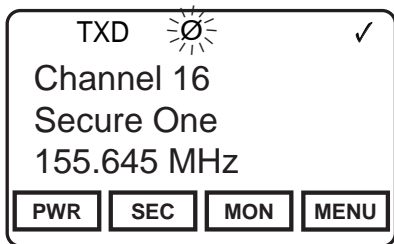
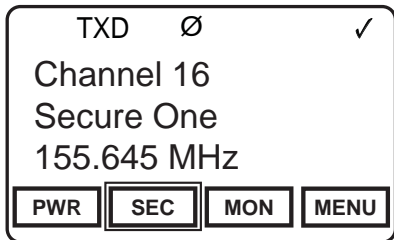
Transmit Power Selection can be assigned as a touch screen or menu list item or on a microphone function button.

When assigned to the touch screen or as a microphone function button, press the assigned button to switch between high and low power.

When assigned as a menu item, open the menu as described in the Navigation section and select "High" or "Low" from the menu.

Press "ENTER" to set the selection.

## Transmit Secure



When SEC is on, encrypted channels programmed for switchable encryption will transmit an encrypted signal.

NOTE: The SEC switch has no effect on channels programmed as Encrypted Only or Clear Only.

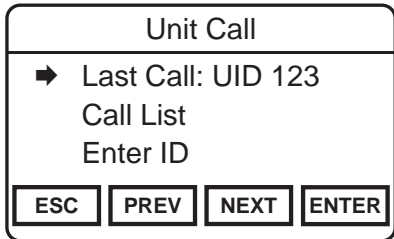
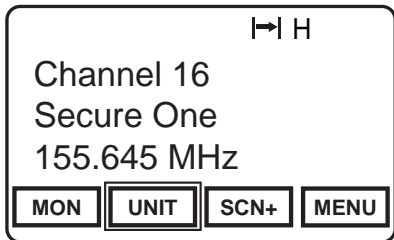
Channels in the Ready-to-Transmit Encrypted mode will display the Ø symbol on the top line of the LCD.

When transmitting or receiving an encrypted signal a flashing Ø symbol will be displayed.

Transmit Secure selection can be assigned as a touch screen, menu list item or on a microphone function button.

Transmit Secure is either "Secure" or "CLEAR".

## Unit Call



P25 Unit IDs allow for Unit-To-Unit calls when the radio is operating in Digital Mode. The function must be enabled by radio programming to allow this mode of operation.

Unit Call operation can be assigned as a touch screen or menu list item or on a microphone function button.

Channels programmed for analog only operation will not be able to transmit or receive Unit-To-Unit calls.

### **Sending a Unit-to-Unit Call**

Open the menu as described in the Navigation section.

There are three ways to select a P25 ID for sending a Unit-to-Unit call.

**Last Call** - Uses the P25 ID of the last Call.

**Call List** - Uses the programmed P25 ID List.

**Enter ID** - Enter a P25 ID with the keypad.

## Sending a Unit-to-Unit Call (cont.)

"Last Call" displays the ID of the last active unit call whether received or transmitted. If the Unit ID is part of the radio's call list the associated label will be displayed. Select to initiate a call to the displayed ID.

Call List			
➔	1: Call 1		
	2: Call 2		
	3: Call 3		
ESC	PREV	NEXT	ENTER

Select "Call List" to choose a P25 ID from the programmed list. Programmed IDs will display the associated label.

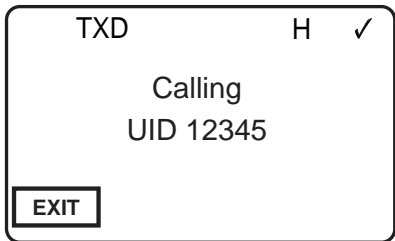
Select the desired label to initiate the call.

Enter Call ID			
12345			
ESC	PREV	NEXT	ENTER

A P25 ID number can be entered with the microphone keypad by selecting "Enter ID". Press the number keys to enter the ID.

Select "ENTER" to initiate the call.

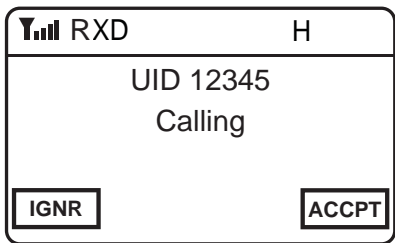
## Sending a Unit-to-Unit Call (cont.)



Once the Unit Call function is activated the "Calling" message will be displayed showing the currently active ID. Each push-to-talk will generate a unit-to-unit call with the displayed ID.

Select "Exit" to return to normal operation.

If there is no activity for one minute the radio automatically returns to normal operation.



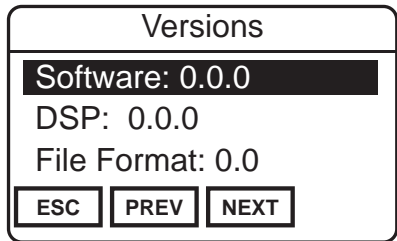
## Receiving a Unit Call

When an incoming Unit Call is detected, an incoming message display is shown with the incoming radio ID.

Select "Accept" to return a Unit Call.

Selecting "Ignore" will return to normal operation.

## Versions



Information about your radio can be viewed via a Versions menu item.

To review the information, open the Versions menu as described in the Navigation section. Use the NEXT or PREV to view the installed revisions of individual items.

Version information includes:

**Software:** Date code of installed software firmware.

**DSP:** Date code of installed DSP firmware.

**File Format:** Currently installed file format.

**BSP:** Date code of installed BSP firmware.

**PCB Revision:** Installed printed circuit board revision number.

**Date of Manufacture:** Date of manufacture.

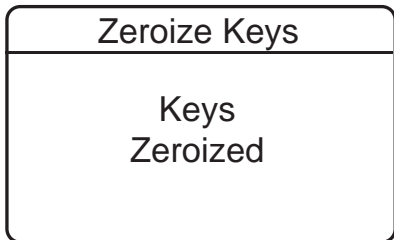
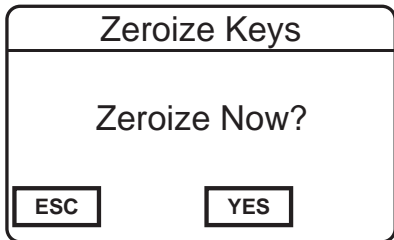
**FIPSCOM Bootloader:** Revision required for encryption installation.

**FIPSCOM Application:** Installed encryption source file.

Information on current versions can be found in the service section at [www.relm.com](http://www.relm.com).



## Zeroize Keys



For radios with the digital encryption option, the radio provides a method for the user to "panic-zeroize" all encryption keys. Zeroizing removes all encryption keys from the radio, including keys used for OTAR and Tactical OTAR operation.

Zeroize can be assigned as a touch screen or menu list item or on a microphone function button.

When assigned to the touch screen or as a microphone function button, press the assigned button to open the zeroize menu.

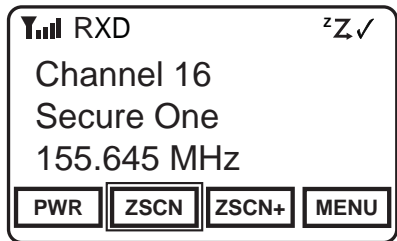
When assigned as a menu item, open the "Zeroize Keys" menu as described in the Navigation section.

Press "YES" to erase all encryption keys or "ESC" to cancel the action.

When the keys are successfully removed the "Keys Removed" message will momentarily be displayed.

Press "ESC" to return to normal operation.

## Zone Scan



When Zone Scan is on, the radio scans all programmed scan channels in zones designated as Zone Scan zones.

If allowed, the scanned zone list can be edited by the radio user. (See Zone Scan List).

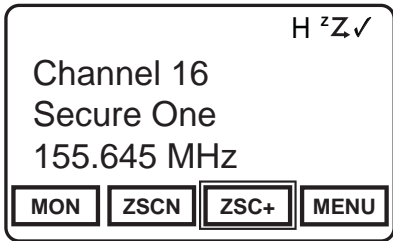
When Zone Scan is on, the <sup>z</sup>Z symbol will be shown at the top of the LCD display.

Zone Scan operation can be assigned as a touch screen or menu list item or on a microphone function button.

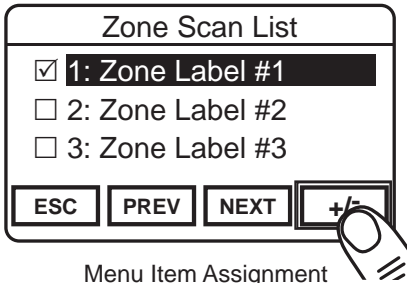
Zone Scan is either On or Off.

Zone Scan may be used in conjunction with Priority Scan operation.

## Zone Scan List



Touch Screen or Button Assignment



Menu Item Assignment

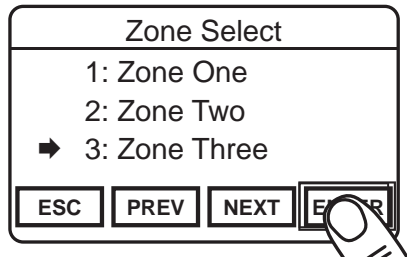
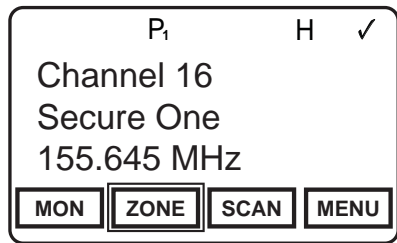
The Zone Scan List allows the radio user to add or remove zones from the list of zones to be scanned.

The Zone Scan List operation can be assigned as a touch screen or menu list item or on a microphone function button.

When Zone Scan List is assigned to the touch screen [ZSC+] or as a microphone function button, press the button to add or remove the currently operating zone from the scan list.

When assigned as a menu item, open the menu as described in the Navigation section and select the Zone you wish to add or remove from the scan list. Press "ENTER" to add or remove. Zones in the scan list will be indicated with the  symbol.

## Zone Select



Zone Select allows the radio user to switch between programmed channel zones.

The Zone Select operation can be assigned to a touch screen or menu list item or on a microphone function button.

When Zone is assigned to the touch screen or as a microphone function button, press the button to open the menu of available zones.

When assigned as a menu item, open the menu as described in the Navigation section.

Select the Zone you want to use.

Press "ENTER" select the Zone.

Additionally, the channel select knob can be used to change the operating zone. (Refer to your radio editor software documentation.)

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## User Picklist Options

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The KNG provides users the ability to select and assign Picklist functions to specific channels.

Picklist Options can be assigned to a touch screen or menu list item or on a microphone function button.

Available Pick List options include:

- Transmit Code Guards

- Receive Code Guards

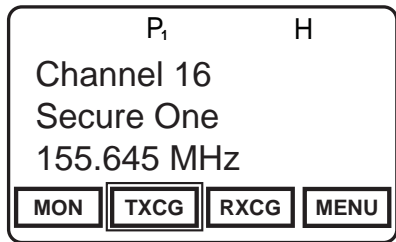
- Transmit Network Access Codes

- Receive Network Access Codes

- Talk Group IDs

- Encryption Keys

## User Selectable CTCSS/CDCSS Code Guard



Selecting a CTCSS/CDCSS Code Guard from the Pick List will assign the tone to a currently select analog or mixed-mode channel.

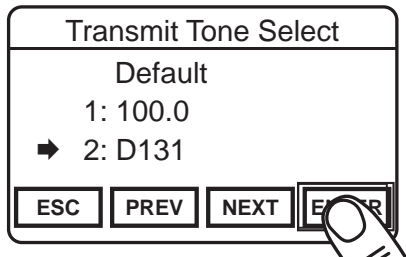
User assigned Transmit and Receive Code Guards are selected independently.

User selectable menu access can be assigned to a touch screen or menu list item or on a microphone function button.

When assigned as a touch screen button, "TXCG" opens the Transmit Code Guard menu and "RXCG" opens the Receiver Code Guard menu.

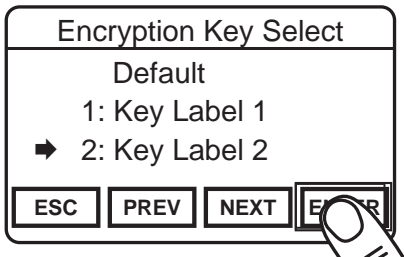
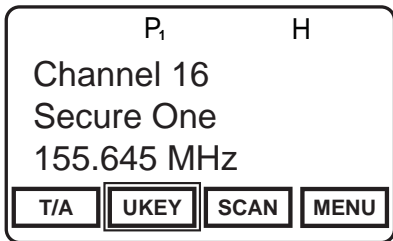
To change a Code Guard, open the RXCG or TXCG menu, select the desired tone and press "ENTER".

To return the tone to the pre-programmed value select "Default".



If allowed, picklist values can be changed through keypad programming. See "Keypad Programming".

## User Selectable Encryption Key



### Encrypted radios only.

Selecting an Encryption Key from the Picklist will assign the Key to *all* encrypted channels that do not have 'Key Lock' programmed. Locked key channels will continue to use their pre-programmed key.

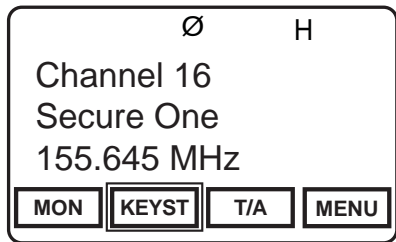
User selectable menu access can be assigned to a touch screen or menu list item or on a microphone function button.

To change an encryption key, open the UKEY menu. Programmed Key labels will be displayed.

Select the desired key and press "ENTER".

To return the tone to the pre-programmed value select "Default".

## User Selectable Encryption Keyst



### OTAR equipped radios only.

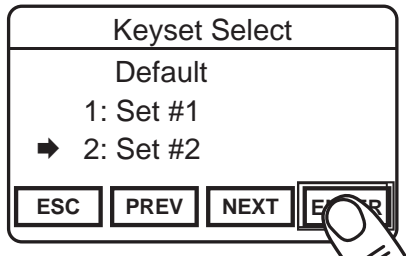
Selecting a Key Set from the Pick List will cause the radio to use encryption keys from the selected Key Set.

User selectable menu access can be assigned to a touch screen or menu list item or on a microphone function button.

To change an encryption key, open the KEYST menu. Programmed Keyst labels will be displayed.

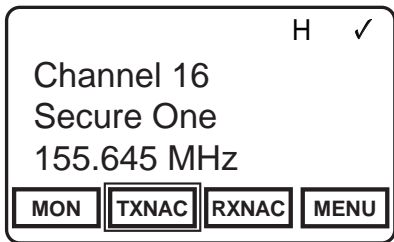
Select the desired keyset and press "ENTER".

To return the tone to the pre-programmed value select "Default".





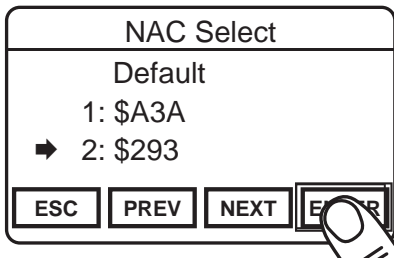
## User Selectable Network Access Codes



Selecting a Network Access Code (NAC) from the Pick List will assign the NAC to a currently select digital or mixed-mode channel.

User assigned Transmit and Receive NACs are selected independently.

User selectable menu access can be assigned to a touch screen or menu list item or on a microphone function button.



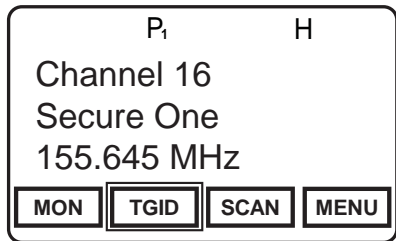
When assigned as a touch screen button, "TXNAC" opens the Transmit NAC menu and "RXNAC" opens the Receiver NAC menu.

To change a NAC, open the RXNAC or TXNAC menu, select the desired NAC and press "ENTER".

To return the NAC to the pre-programmed value select "Default".

If allowed, picklist values can be changed through keypad programming. See "Keypad Programming".

## User Selectable Talk Group ID



Selecting a Talk Group ID from the Pick List will assign the TGID to the currently select channel. All other channels are unaffected.

User selectable menu access can be assigned to a touch screen or menu list item or on a microphone function button.

When assigned to the touch screen or as a microphone function button, press the button to open the menu of available TGIDs.

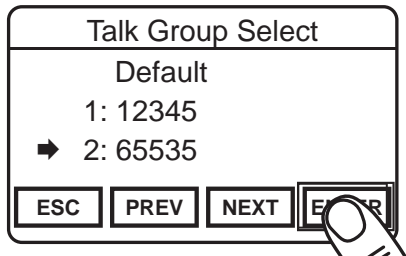
When assigned as a menu item, open the menu as described in the Navigation section.

Select the Talk Group ID you want to use.

Press "ENTER" select.

To return the TGID to the pre-programmed value select "Default".

If allowed, picklist values can be changed through keypad programming. See "Keypad Programming".



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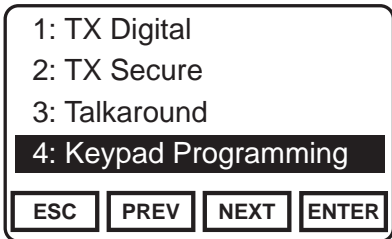
## Keypad Programming Options

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**NOTE:** Radio programming is to be performed only by authorized personnel. Any or all programmable functions are password protected to prevent unauthorized access. Check with your RELM/BK Radio dealer or communications officer for information on the programmed functions of your radio.

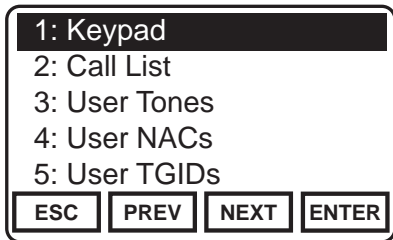
Programmable categories include Individual P25 ID Quick Call/Receive List, User Tone List, User NAC List, User Talk Group ID List and Keypad Programming of Channel, Zone, Global and System parameters.

### Entering Programming Mode



Select "Keypad Programming" from the Menu List.

Enter the User or Administrator password at the prompt.



Select programming menu from the list of available options.

**Keypad** - Used for programming Channel, Zone, System and Global radio information including frequencies, labels, priority scan rate, etc.

**Call List** - Used to edit labels and P25 IDs in the stored User Call List.

**User Tones** - Used to edit the 32 User Selectable CTCSS/CDCSS tones stored in the list.

**User NACs** - Used to edit the 32 User Selectable NACs stored in the list.

**User TGIDs** - Used to edit the 32 User Selectable TGIDs stored in the list.

## Keypad Programming

Keypad programming consists of four sections: Global, System, Zone and Channel.

1: Global			
2: System			
3: Zone			
4: Channel			
ESC	PREV	NEXT	ENTER

Global parameters apply to settings that effect all systems, zones and channels.

System parameters, such as scan hold time, effect all conventional zones.

Zone parameters pertain to settings in a select zone of channels.

Channel parameters include channel specific information such as frequencies, tones, operational modes, etc.

## Programming Global Parameters

User Password		
000000		
ESC	CLEAR	EDIT

### User Password

The User Password is used only for entering the keypad programming mode. The Administrator and Startup Passwords cannot be changed via the keypad.

Select "CLEAR" to reset the password to all zeros. Use the microphone keypad to enter a new six-digit password.

## User Password (cont.)

User Password

000000

ESC BACK NEXT ENTER

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Use the microphone keypad to enter a new digit.

Select "ENTER" to set the password and return to the previous step.

## Programming System Parameters

1: Global

2: System

3: Zone

4: Channel

ESC PREV NEXT ENTER

Programmable System Parameters include:

System Priority Channels

Transmit on Priority 1 selection

Scan Hold Time

Busy Channel Mode

Transmit Time-out setting

Transmit Power Setting

System P1 Channel			
Off			
Use Main			
➔ Select Z:1 C:12			
ESC	PREV	NEXT	ENTER

Priority 1 Zone			
1: Zone 1 Label			
2: Zone 2 Label			
➔ 3: Zone 3 Label			
ESC	PREV	NEXT	ENTER

## System Priority 1 Channel

A priority channel can be assigned on a system wide basis. If allowed, a system priority channel will be monitored during priority scan regardless of the currently operation zone.

When set to "Off", the Priority 1 Channel is designated by the currently selected zone setting. (See Programming Zone Parameters)

When set to "Use Main" the channel selected by the channel knob is the Priority 1 channel.

Choose "Select" to designate a specific channel as the System Priority1 channel.

Use "PREV" and "NEXT" to highlight the Zone of the desired Priority channel. Press "ENTER" to set the zone.

Use "PREV" and "NEXT" to highlight the desired Priority channel. Press "ENTER" finalize the selection.

Tx in Priority 1			
Off			
➔	On		
ESC	PREV	NEXT	ENTER

### Transmit on Priority 1

If Transmit on Priority 1 is "On" the radio will transmit on the programmed Priority 1 channel whenever priority scan is turned on.

Use "PREV" and "NEXT" to highlight the desired Operation. Press "ENTER" finalize the selection.

System P2 Channel			
Off			
Use Main			
➔	Select	Z:5	C:7
ESC	PREV	NEXT	ENTER

### System Priority 2 Channel

A priority channel can be assigned on a system wide basis. If allowed, a system priority channel will be monitored during priority scan regardless of the currently operation zone.

When set to "Off", the Priority 2 Channel is designated by the currently selected zone setting. (See Programming Zone Parameters)



## System Priority 2 Channel (cont.)

Priority 2 Zone			
1: Zone 1 Label			
2: Zone 2 Label			
➡ 3: Zone 3 Label			
ESC	PREV	NEXT	ENTER

Priority 2 Channel			
1: Channel 1 Label			
2: Channel 2 Label			
➡ 3: Channel 3 Label			
ESC	PREV	NEXT	ENTER

When set to "Use Main" the channel selected by the channel knob is the Priority 2 channel.

Choose "Select" to designate a specific channel as the System Priority 2 channel.

Use "PREV" and "NEXT" to highlight the Zone of the desired Priority channel.

Press "ENTER" to set the zone.

Use "PREV" and "NEXT" to highlight the desired Priority channel.

Press "ENTER" finalize the selection.

Scan Hold Time			
1.5 Sec			
ESC	-	+	ENTER

## Scan Hold Time

Scan Hold Time designates how long a scanned to channel is monitored before resuming scanning operation. The hold time can be set from 0 to 7.5 seconds.

Scan Hold Time is also used as the hold time for programmed talkback functions.

To edit the setting select "Scan Hold Time" from the System menu.

Use the "+" and "-" buttons to adjust the setting in .5 second increments.

Press "ENTER" to set the selection.

Busy Channel Mode			
	Off		
➔	Indicate		
	Override		
	Lockout		
ESC	PREV	NEXT	ENTER

## Busy Channel Mode

Busy Channel Mode determines how the radio operates when receiving an incoming signal.

**Off** - No busy channel indication.

**Indicate** - LED flashes green when the selected channel is busy.

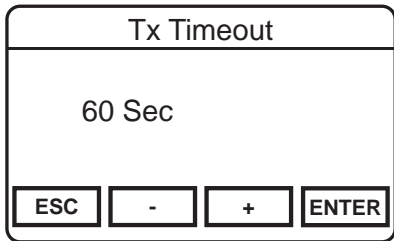
**Lockout** - Disallows transmitting while the channel is busy.

**Override** - While channel is busy, transmit is locked during initial push-to-talk. Releasing and re-pressing PTT overrides the lockout setting and allows transmit.

To edit the setting select "Busy Channel Mode" from the System menu.

Use the "PREV" and "NEXT" buttons to Select the setting.

Press "ENTER" to set the selection.



## Transmit Time-out Timer

Transmit Time-out Timer determines maximum time allowed per push-to-talk. The time-out time can be set from Off to 225 seconds.

Five seconds prior to reaching the programmed time limit the radio will emit a warning tone. At the end of the programmed time an audible warning signal is emitted and the display shows "Tx Timeout"

To re-transmit, release the PTT and re-press.

To edit the setting select "Tx Timeout" from the System menu.

Use the "+" and "-" buttons to adjust the setting in 15 second increments.

Press "ENTER" to set the selection.

Power Setting			
Medium			
➔	High		
ESC	PREV	NEXT	ENTER

## Power Setting

The Power Setting determines transmit power when operation in High Power mode.

Select "High" to transmit at the radios full rated power output.

Select "Medium" to set the maximum output to the the tuned medium power setting.

To change the setting select "Power setting" from the System menu.

Press "ENTER" to set the selection.

## Programming Zone Parameters

1: Global
2: System
<b>3: Zone</b>
4: Channel
<b>ESC</b> <b>PREV</b> <b>NEXT</b> <b>ENTER</b>

Programmable Zone Parameters include:

- Zone Label
- Zone PR1 Chan
- Zone Tx on PR1
- Zone P2 Channel
- DTMF Overdial

Select Zone	
1: Zone 1 Label	
2: Zone 2 Label	
➔ 3: Zone 3 Label	
<b>ESC</b> <b>PREV</b> <b>NEXT</b> <b>ENTER</b>	

To edit zone parameters select "Zone" from the Keypad Programming menu.

Use "PREV" and/or "NEXT" to select the zone to be programmed.

Press "ENTER" to open the Zone Parameters menu.

- ➔ 1: Zone Label  
2: Zone P1 Channel  
3: Zone Tx on P1  
4: Zone P1 Channel  
5: DTMF Overdial

ESC

PREV

NEXT

ENTER

Select the desired parameter with "PREV" and/or "NEXT".

Press "ENTER" to program the selection.

Zone Label

Zone 1 Label

ESC

CLEAR

EDIT

### **Zone Label**

Select "CLEAR" to reset the label. Use the microphone keypad to enter a new alphanumeric label.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the label and return to the previous step.

Zone 1 P1 Channel			
Off			
Use Main			
➔ Select: Chan: 1			
ESC	PREV	NEXT	ENTER

Zone 1 P1 Channel			
1: Channel 1 Label			
2: Channel 2 Label			
➔ 3: Channel 3 Label			
ESC	PREV	NEXT	ENTER

## Zone Priority 1 Channel

A priority channel can be assigned on a zone basis. If allowed, a system priority channel will be monitored during priority scan regardless of the selected zone settings. (See "System Priority Channel")

When set to "Off", Priority 1 is ignored.

When set to "Use Main" the channel selected by the channel knob is the Priority 1 channel.

Choose "Select" to designate a specific channel as the Priority1 channel.

Use "PREV" and "NEXT" to highlight the desired Priority channel.

Press "ENTER" finalize the selection.



Tx on Priority 1			
➡	Off		
	On		
ESC	PREV	NEXT	ENTER

### Transmit on Priority 1

If Transmit on Priority 1 is "On" the radio will transmit on the programmed Priority 1 channel whenever priority scan is turned on.

Use "PREV" and "NEXT" to highlight the desired Operation.

Press "ENTER" finalize the selection.

Zone 1 P2 Channel			
	Off		
	Use Main		
➡	Select: Chan: 1		
ESC	PREV	NEXT	ENTER

### Zone Priority 2 Channel

A priority channel can be assigned on a zone basis. If allowed, a system priority channel will be monitored during priority scan regardless of the selected zone settings. (See "System Priority Channel")

When set to "Off", Priority 2 is ignored.

When set to "Use Main" the channel selected by the channel knob is the Priority 2 channel.

### Zone Priority 2 Channel (cont.)

Zone 1 P2 Channel			
1: Channel 1 Label			
2: Channel 2 Label			
➔ 3: Channel 3 Label			
ESC	PREV	NEXT	ENTER

Choose "Select" to designate a specific channel as the Priority 2 channel.

Use "PREV" and "NEXT" to highlight the desired Priority channel.

Press "ENTER" finalize the selection

DTMF Overdial			
➔	Off On		
ESC	PREV	NEXT	ENTER

Allow Inbound Clone			
➔	No Yes		
ESC	PREV	NEXT	ENTER

### **DTMF Overdial**

If DTMF Overdial is "On", DTMF tones can be generated during transmit. Press the microphone keypad during PTT to send a the DTMF tone. Use the radio touchscreen to send A, B, C or D characters.

Use "PREV" and "NEXT" to highlight the desired Operation.  
Press "ENTER" finalize the selection.

### **Allow Inbound Clone**

Individual zones can be blocked from receiving information via radio cloning. Select "No" to block overwriting of zone information.

Use "PREV" and "NEXT" to highlight the desired Operation.  
Press "ENTER" finalize the selection.

## Programming Channel Parameters

1: Global			
2: System			
3: Zone			
<b>4: Channel</b>			
ESC	PREV	NEXT	ENTER

Programmable Channel Parameters include:

- Channel Label
- Receive Frequency
- Receive Mode
- Receive CTCSS/CDCSS Tones
- Receive Network Access Codes
- Digital Squelch Mode
- Analog Bandwidth
- Transmit Power
- Transmit Frequency
- Transmit Mode
- Transmit CTCSS/CDCSS Tones
- Transmit Network Access Codes
- Talkgroup ID
- Default Encryption Key
- Secure Mode

Select Zone			
1: Zone 1 Label			
2: Zone 2 Label			
➔ 3: Zone 3 Label			
ESC	PREV	NEXT	ENTER

Select Channel			
1: Channel 1 Label			
2: Channel 2 Label			
➔ 3: Channel 3 Label			
ESC	PREV	NEXT	ENTER

## Accessing Channel Parameters

To edit channel parameters select "Channel" from the Keypad Programming menu.

Use "PREV" and/or "NEXT" to select the zone of the channel to be programmed.

Press "ENTER" to select the zone.

Use "PREV" and/or "NEXT" to select the channel to be programmed.

Press "ENTER" to open the Channel Parameters Menu.

Channel Label		
Channel 1 Label		
ESC	CLEAR	EDIT

### Channel Label

Select "CLEAR" to reset the label. Use the microphone keypad to enter a new alphanumeric label.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the label and return to the previous step.

Rx Frequency		
151.62500 MHz		
ESC	CLEAR	EDIT

### Receive Frequency

Select "CLEAR" to reset the frequency to all zeros. Use the microphone keypad to enter a new frequency.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the frequency and return to the previous step.

NOTE: Entering zero sets selects the lowest valid frequency for the model type.

Rx Mode			
Analog			
Digital			
➔ Mixed			
ESC	PREV	NEXT	ENTER

### Receive Mode

Use "PREV" and/or "NEXT" to select the desired mode.

Press "ENTER" to set the selection and return to the previous step.

Rx Guard			
➔ Off			
Tone:	123.0 Hz		
Digital:			
ESC	PREV	NEXT	ENTER

### Receive CTCSS/CDCSS Code Guard

Receiver Code Guards only apply to analog or mixed mode operation. Code Guards can be subaudible tones or digital codes.

Select "Off" for analog signals to operate in carrier squelch mode.

## Receive CTCSS/CDCSS Code Guard (cont.)

Rx Guard		
123.0 Hz		
ESC	CLEAR	EDIT

To enter a CTCSS tone, select "Tone" from the menu.

Select "CLEAR" to reset the tone to all zeros. Use the microphone keypad to enter a new frequency.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the frequency and return to the previous step.

Rx Guard			
D000-			
ESC	CLEAR	EDIT	INV

To enter a CDCSS value, select "Digital" from the menu.

Select "CLEAR" to reset the code to all zeros. Use the microphone keypad to enter a new tone. Use "INV" to invert the tone.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the tone and return to the previous step.



Rx NAC			
➡ Enter	\$293		
Select			
ESC	PREV	NEXT	ENTER

Rx NAC		
293		
ESC	CLEAR	EDIT

## Receive Network Access Code

Receiver NACs only apply to digital or mixed mode operation. NACs are programmed as three digit hexadecimal numbers. \$F7E and \$F7F are invalid NACs.

To program a NAC, select "ENTER".

Select "CLEAR" to reset the NAC to all zeros. Use the microphone keypad to enter a new three digit value.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the NAC and return to the previous step.

## Receive Network Access Code (cont.)

Rx NAC	
NAC-01	\$123
NAC-02	\$456
➔ NAC-03	\$F73

ESC    PREV    NEXT    ENTER

To select a NAC from the programmed picklist, choose "Select" from the menu.

Use "PREV" and "NEXT" to highlight the desired NAC or press the number buttons on the microphone to go directly to a picklist slot.

(Pressing "5" will go to "NAC-5" in the picklist.)

Select "ENTER" to set the NAC and return to the previous step.

Squelch Mode	
➔ Selective	
Normal	

ESC    PREV    NEXT    ENTER

## Squelch Mode

Use "PREV" and "NEXT" to select Normal or Selective. (Selective squelch is required for Individual Calls and use of Talkgroup IDs.)

Select "ENTER" to set the mode.

Bandwidth			
➡ Narrowband Wideband			
ESC	PREV	NEXT	ENTER

### **Analog Bandwidth**

Bandwidth selection applies only to analog operation. Digital operation is always narrowband regardless of setting.

Use "PREV" and "NEXT" to select Narrowband or Wideband.

Select "ENTER" to set the mode.

Tx Power			
➡ Low Power Hi Power Selectable			
ESC	PREV	NEXT	ENTER

### **Transmit Power**

Individual channels can be designated to always transmit in low or high power.

Use "PREV" and "NEXT" to select "Low" or "High" power.

Choosing "Selectable" allows the transmit power to be selected by a programmed Tx Power switch.

Select "ENTER" to set the mode.

Tx Frequency		
151.62500 MHz		
ESC	CLEAR	EDIT

### Transmit Frequency

Select "CLEAR" to reset the frequency to all zeros. Use the microphone keypad to enter a new frequency.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the frequency and return to the previous step.

NOTE: Entering zero selects the lowest valid frequency for the model type.

Tx Mode			
Analog			
Digital			
➔	Mixed		
ESC	PREV	NEXT	ENTER

### Transmit Mode

Use "PREV" and/or "NEXT" to select the desired operating mode.

Press "ENTER" to set the selection and return to the previous step.

Tx Guard			
➔ Off			
Tone:	123.0 Hz		
Digital:			
ESC	PREV	NEXT	ENTER

Tx Guard		
123.0 Hz		
ESC	CLEAR	EDIT

## Transmit CTCSS/CDCSS Code Guard

Transmit Code Guards only apply to analog or mixed mode operation. Code Guards can be subaudible tones or digital codes.

Select "Off" transmit with no Code Guard tone.

To enter a CTCSS tone, select "Tone" form the menu.

Select "CLEAR" to reset the tone to all zeros. Use the microphone keypad to enter a a new frequency.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the frequency and return to the previous step.

### Transmit CTCSS/CDCSS Code Guard (cont.)

Tx Guard			
D000-			
ESC	CLEAR	EDIT	INV

To enter a CDCSS value, select "Digital" from the menu.

Select "CLEAR" to reset the tone to all zeros. Use the microphone keypad to enter a new tone. Use "INV" to invert the tone.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the tone and return to the previous step.

Tx NAC			
➔	Enter	\$293	
	Select		
ESC	PREV	NEXT	ENTER

### Transmit Network Access Code

Transmitter NACs only apply to digital or mixed mode operation. NACs are programmed as three digit hexadecimal numbers.

\$F7E and \$F7F are invalid NACs.

## Transmit Network Access Code (cont.)

Tx NAC		
293		
ESC	CLEAR	EDIT

To program a NAC, select "ENTER".

Select "CLEAR" to reset the NAC to all zeros. Use the microphone keypad to enter a new three digit value.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the NAC and return to the previous step.

Tx NAC			
NAC-01	\$123		
NAC-02	\$456		
➔ NAC-03	\$F73		
ESC	PREV	NEXT	ENTER

To select a NAC from the programmed picklist, choose "Select" from the menu.

Use "PREV" and "NEXT" to highlight the desired NAC or press the number buttons on the microphone to go directly to a picklist slot.

(Pressing "5" will go to "NAC-5" in the picklist.)

Select "ENTER" to set the NAC and return to the previous step.

TGID			
➔ Enter:	1		
Select:			
ESC	PREV	NEXT	ENTER

## Talk Group ID

The Talk Group ID applies only to digital or mixed mode operation.

TGID can be programmed from 1 to 65535.

TGID		
65535		
ESC	CLEAR	EDIT

To program a TGID, select "ENTER".

Select "CLEAR" to reset the TGID to all zeros. Use the microphone keypad to enter the new TGID.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the TGID and return to the previous step.



## Talk Group ID (cont.)

TGID	
TGID-01	1
TGID-02	2
➔ TGID-03	\$F73

ESC   PREV   NEXT   ENTER

To select a TGID from the programmed picklist, choose "Select" from the menu.

Use "PREV" and "NEXT" to highlight the desired TGID or press the microphone number buttons to go directly to a picklist slot.

(Pressing "5" will go to "TGID-5" in the picklist.)

Select "ENTER" to set TGID and return to the previous step.

Encryption Key	
Key Label 1	
Key Label 2	
➔ Key Label 3	

ESC   PREV   NEXT   ENTER

## Encryption Key

In radios equipped for encryption, a default encryption key can be assigned to a channel. If allowed by PC programming, a different key can be assigned during normal operation from a Key picklist.

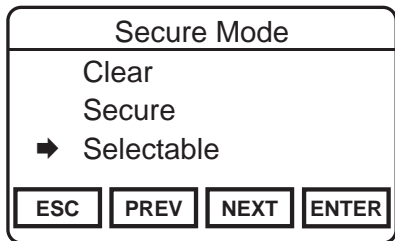
To assign an encryption key select "Key" from the programming menu.

## Encryption Key (cont.)

Use "PREV" and "NEXT" to highlight the desired Key or press the number buttons on the microphone to go directly to a picklist slot.

(Pressing "5" will go to "Key-5" in the picklist.)

Select "ENTER" to set the Key and return to the previous step



## Secure Mode Selection

In radios equipped for encryption, each channel can be set to always transmit in Clear or Secure mode.

Or, by choosing "Selectable", the encryption can be switched on or off by a programmed button, touchscreen or menu item.

To assign an encryption mode select "Secure Mode" from the programming menu.

Use "PREV" and "NEXT" to highlight the desired operation.

Select "ENTER" to set the Key and return to the previous step.

## Call List Programming

To program the P25 Unit-to-Unit call list, select "Call List" from the Keypad programming menu.

Program Call List			
➔	Call 1: Label		
	Call 2: Label		
	Call 3: Label		
ESC	PREV	NEXT	ENTER

Use "PREV" and "NEXT" to highlight the desired Call List item or press the number buttons on the microphone to go directly to a picklist slot.

(Pressing "5" will go to "Call 5" in the picklist.)

Select "ENTER" to select the item to be programmed.

Call ID			
Label: Call 1 Label			
ID: 12345			
ESC	PREV	NEXT	ENTER

Use "PREV" and "NEXT" to highlight the information you wish to program.

Select "ENTER" to select the item to open the item's programming window.

Call ID Label

Channel 1 Label

ESC CLEAR EDIT

### **Programming the Unit Call Label**

Select "CLEAR" to reset the label. Use the microphone keypad to enter a new label.

To edit individual characters select "EDIT". Use "PREV" and "NEXT" to highlight the character to change.

Select "ENTER" to set the label and return to the previous step.

Call ID

12345|

ESC CLEAR EDIT

### **Programming the Unit Call ID**

Select "CLEAR" to reset the P25 ID. Use the microphone keypad to enter the new P25 ID.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the ID and return to the previous step.

## Code Guard Picklist Programming

To program the User Selectable Code Guard List, select "User Tones" from the Keypad programming menu.

Code Guard Picklist	
CG-01	123.0 Hz
GC-02	67.0 Hz
➔ CG-03	D023-

ESC    PREV    NEXT    ENTER

Use "PREV" and "NEXT" to highlight the Code Guard to be programmed or press the number buttons on the microphone to go directly to a picklist slot.  
(Pressing "5" will go to "CG-05" in the picklist.)

Press "ENTER" to select the item to open the Code Guard menu.

Code Guard Picklist	
➔ Tone:	123.0 Hz
Digital:	

ESC    PREV    NEXT    ENTER

To enter a CTCSS tone, select "Tone" form the menu.

To enter a CDCSS value, select "Digital" form the menu.

Code Guard Picklist		
123.0 Hz		
ESC	CLEAR	EDIT

### **CTCSS Tone**

To enter a CTCSS tone, select "Tone" from the menu.

Select "CLEAR" to reset the tone to all zeros. Use the microphone keypad to enter a new frequency.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the frequency and return to the previous step.

Code Guard Picklist			
D000-			
ESC	CLEAR	EDIT	INV

### **CDCSS Tone**

Select "CLEAR" to reset the tone to all zeros. Use the microphone keypad to enter a new three digit tone. Use "INV" to invert the tone.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the tone and return to the previous step.

## NAC Picklist Programming

To program the User Selectable NAC List, select "User NACs" from the Keypad programming menu. NACs are programmed as three digit hexadecimal numbers. \$F7E and \$F7F are invalid NACs.

NAC Picklist	
NAC-01	\$123
NAC-02	\$456
➔ NAC-03	\$F73

ESC    PREV    NEXT    ENTER

Use "PREV" and "NEXT" to highlight the NAC to be programmed or press the number buttons on the microphone to go directly to a picklist slot. (Pressing "5" will go to "NAC-05" in the picklist.)

Press "ENTER" to open the NAC editing screen.

NAC Picklist	
293	

ESC    CLEAR    EDIT

Select "CLEAR" to reset the NAC to all zeros. Use the microphone keypad to enter a new three digit value.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the NAC and return to the previous step.

## Talkgroup ID Picklist Programming

To program the User Selectable TGID List, select "User TGIDs" from the Keypad programming menu.

TGID Picklist	
TGID-01	7890
TGID-02	65120
➔ TGID-03	10240

ESC    PREV    NEXT    ENTER

Use "PREV" and "NEXT" to highlight the TGID to be programmed or press the number buttons on the microphone to go directly to a picklist slot. (Pressing "5" will go to "TGID-05" in the picklist.)

Press "ENTER" to open the TGID editing screen.

TGID
65535

ESC    CLEAR    EDIT

To program a TGID, select "ENTER".

Select "CLEAR" to reset the NAC to all zeros. Use the microphone keypad to enter a new three digit value.

To edit individual digits select "EDIT". Use "PREV" and "NEXT" to highlight the digit to change.

Select "ENTER" to set the ID and return to the previous step.









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