



# ***KNG M-150/M-400/M-500***

## ***Radio User'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 Mobile radio 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 Mobile radio. 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.

---

**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

## ***KNG Mobile Operation***

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 mobile 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).

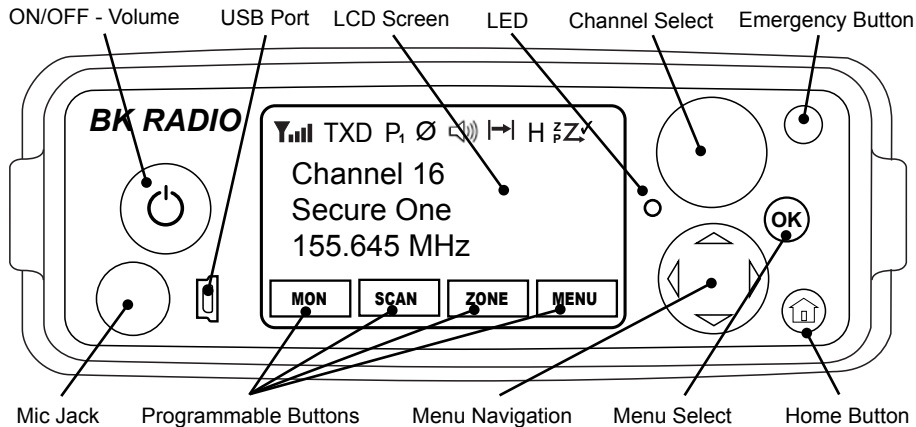
Transmit only when persons around the vehicle are at least 3 feet (90 centimeters) away from the vehicle with a properly installed antenna. This separation distance will ensure that there is sufficient distance from a properly installed (according to installation instructions) externally-mounted antenna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

# Radio Controls



**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.



# LCD Touch Screen

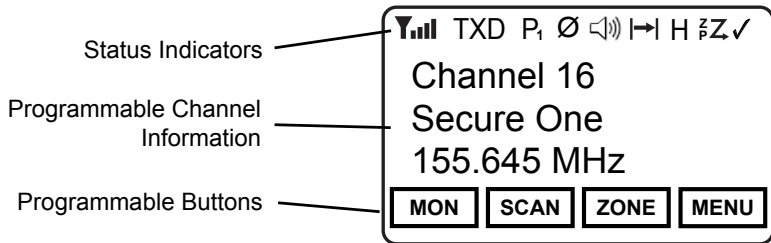
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KNG mobile radios are equipped with a programmable touch sensitive display.




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.<br>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  |

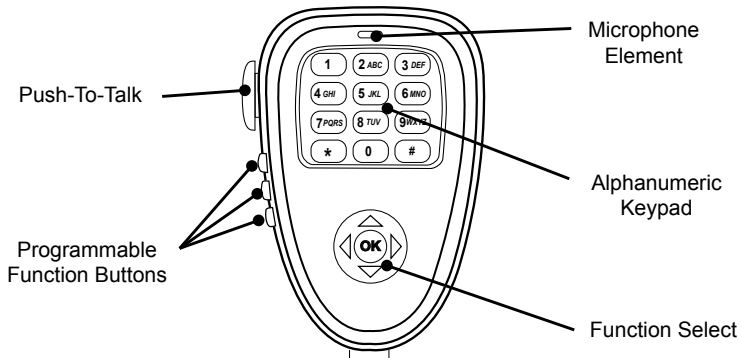
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## Microphone Controls

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Many functions of the KNG Mobile 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.



---

## Function Selection

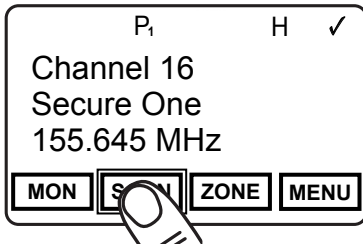
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Most radio functions can be programmed as Touch Screen selections, microphone button selections or as part of a menu list.

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.

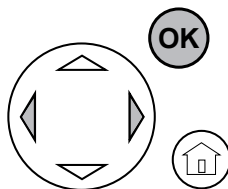
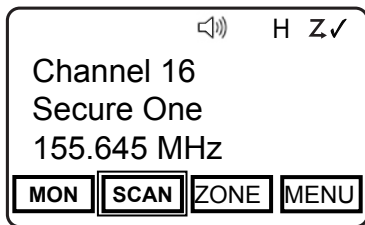


## Navigation Wheel Selection

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

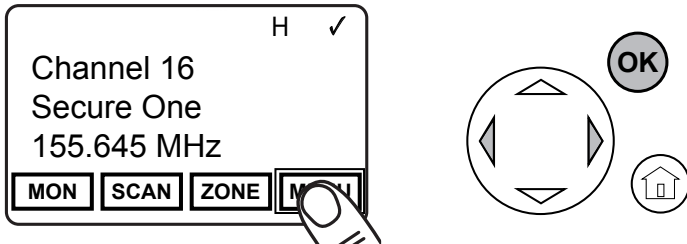
Use the right and left arrows to highlight the desired function. Press the OK button to open the menu or toggle the highlighted item.

The active button will be indicated by an outline.

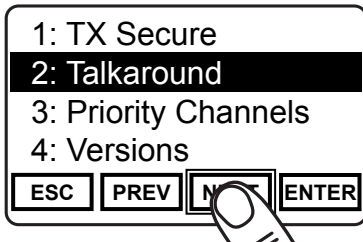


## Menu Screen Selection

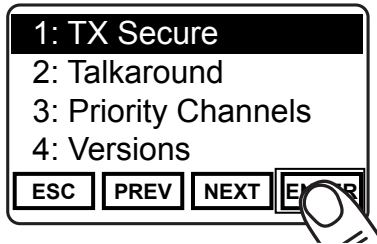
By programming a button as “MENU” a list of additional functions are accessed by pressing the button or highlighting “MENU” with the Navigation Wheel and pressing OK.



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



Use “ENTER” to select the function.

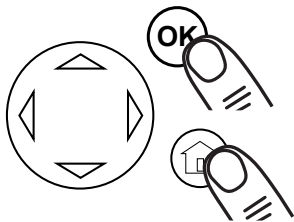
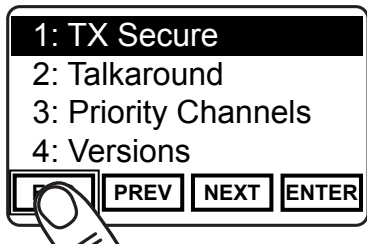


When selected, a menu for the function will show in the display.

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. |

---

## **Basic Operation**

---

### **Receive**

1. Turn power on by pushing and releasing the Volume knob. The radio will beep, indicating that it has passed its self test and is operational.
2. 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.
3. 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.
4. 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

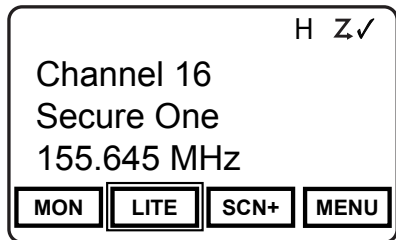
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Many operational features and functions can be programmed for user selection and control. Items can be programmed as touch-screen buttons or to the three buttons available on some microphone models.

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



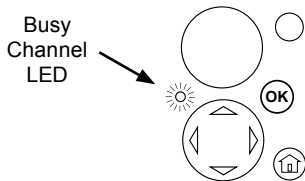
Radio lighting can be turned off or on using the backlight function. When off the radios display, navigation button backlights and microphone lighting are all turned off.

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

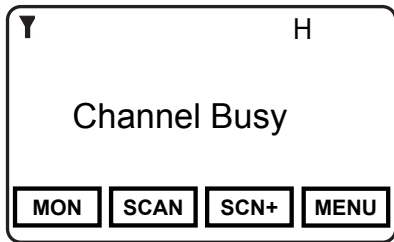
The radio can be programmed for different behavior when a channel is busy.



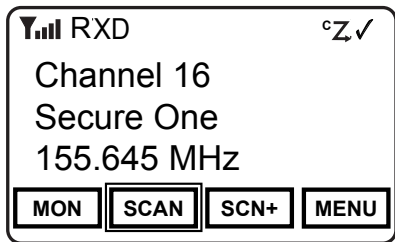
**Indicate** - When a channel is busy the front panel LED will flash green.

**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 <sup>c</sup>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.

## ***KNG Mobile Operation***

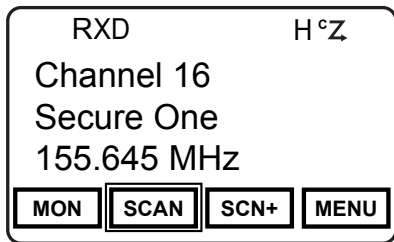
### **Scanning Code Guarded Channels**

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)

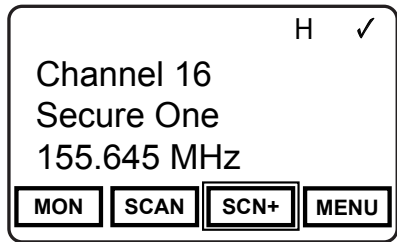
Channels in a multicast conventional systems can be added to the scan list and designated as “voted” channels. When a signal is received on a voted channel the radio checks all voted channels and selects the channel with the best signal.

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

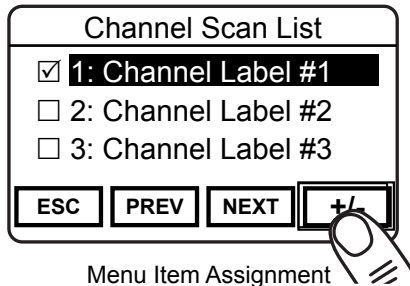
NOTE: Channel voting occurs only with Channel Scan and is disabled when Zone Scanning. Channels programmed as Vote channels are treated as normal scan list channels during Zone Scan operation.

*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.

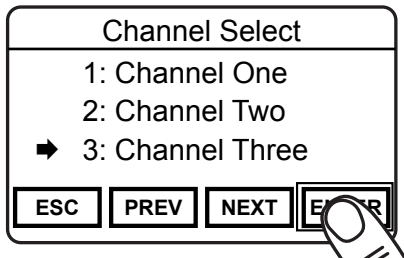
Channels designated as scan channels are identified by the ✓ symbol at the top of the LCD display.

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.

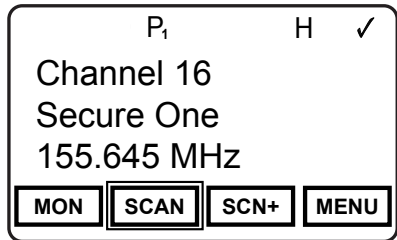
When assigned as a menu item, open the menu as described in the Navigation section.

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".



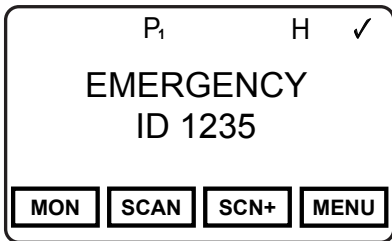
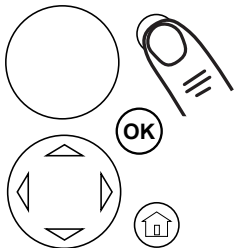
## Cloning



The KNG Mobile 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.

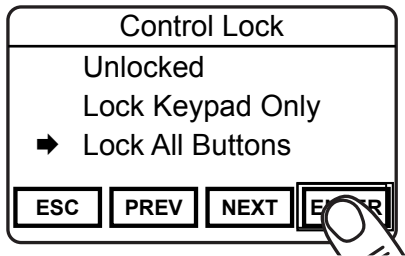
Once the call is activated, the emergency message is transmitted automatically every ten seconds. Each push-to-talk will also transmit the emergency information along with voice traffic.

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 mobile 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.

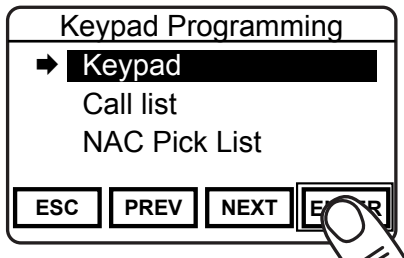
Control Lock can only be assigned as a menu item. To enable the lock function open the menu as described in the Navigation section and select Control Lock from the list.

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 mobile 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.

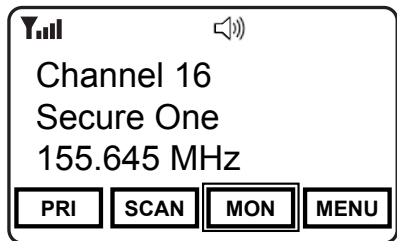
**CxCSS Pick List** - Used to edit the list of user selectable Code Guard entries.

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

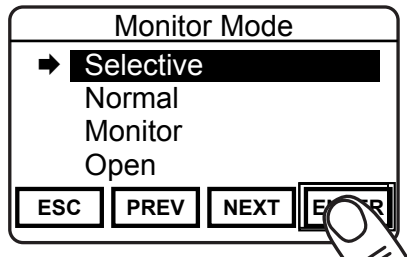
**Talkgroup ID Pick List** - Used to edit the list of user selectable P25 Talk Groups

*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

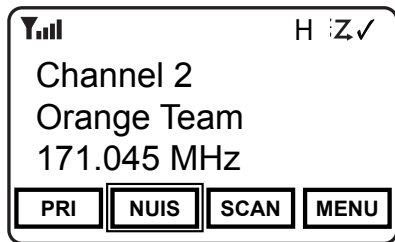
**Selective** - Required for Unit-to-Unit calls and Talkgroup use. Digital only. (No symbol)

**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.

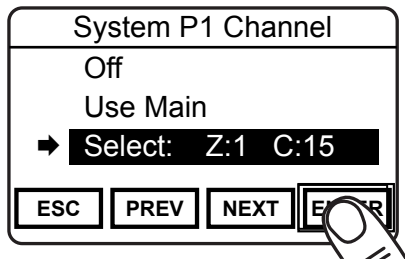
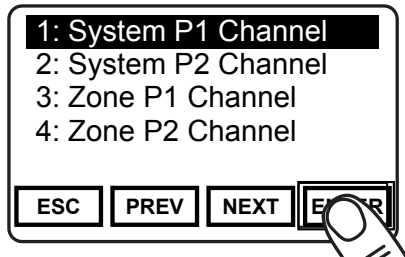
Nuisance Channel Delete can be assigned as a touch screen item or on a microphone function button.

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:

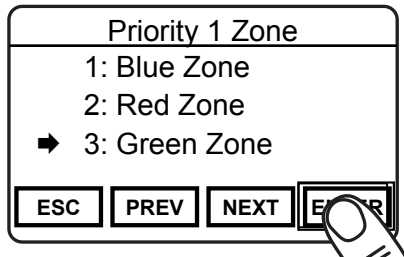
**Off** - Disables the priority channel.

**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)



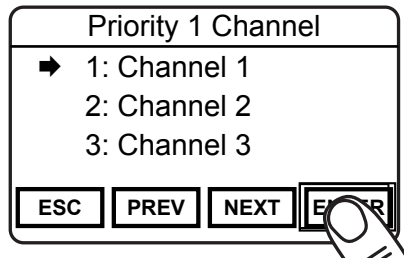
The Zone selection menu will be displayed.

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

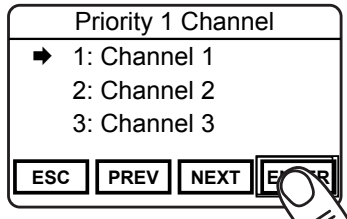
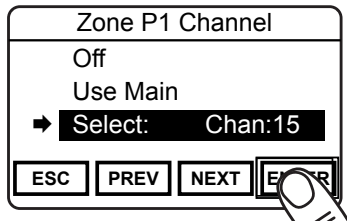
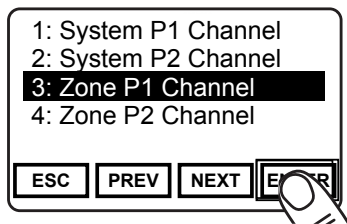
The Channel selection menu will then be displayed.

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.

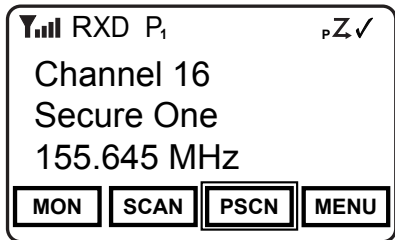
To assign a specific channel as a Zone Priority Channel, highlight "Select" and press the "ENTER" button.

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.

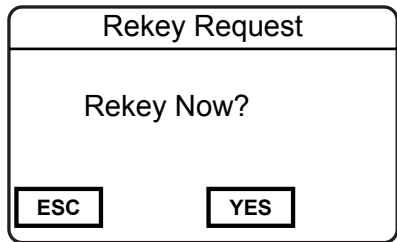
Channels designated as Priority channels are identified by the P1 or P2 symbol at the top of the LCD display. When Priority Scan is on, the PZ symbol will be shown.

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.

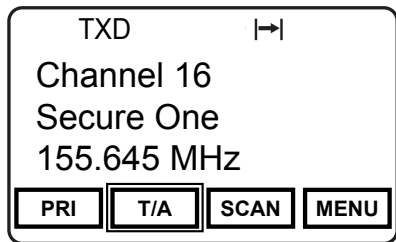
If assigned as a Touch Screen or function button, press the button to open the Rekey Request menu. When assigned as a menu item, open the menu as described in the Navigation section.


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



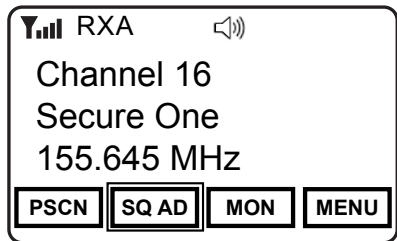
In Repeater Talkaround (T/A) mode, the radio will transmit on the programmed receive frequency of the selected channel. When T/A is enabled the  icon will be displayed on the top line of the LCD.

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.

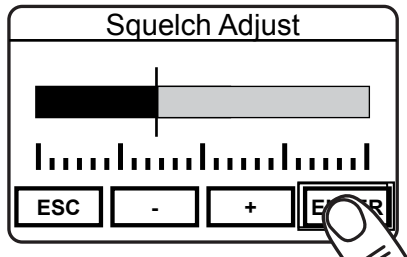
Repeater Talkaround is either On or Off.

## **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.

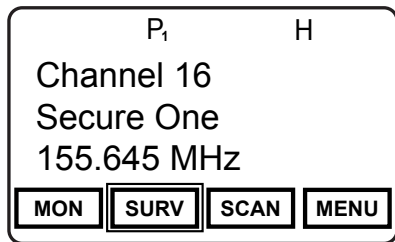


To adjust the squelch setting, press the assigned button or open the menu as described in the Navigation section.

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.

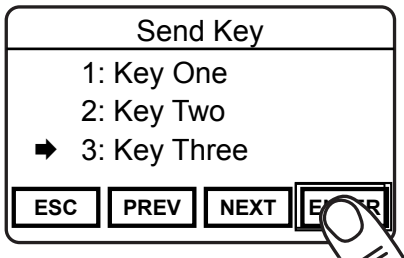
Surveillance Mode is either On or Off.

### **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**

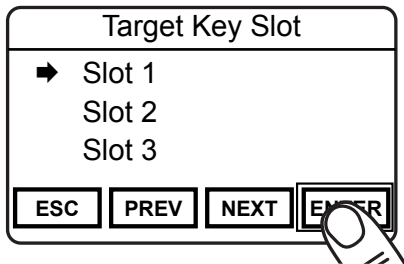


To send an encryption key via the tactical OTAR function turn the radio to a channel programmed for OTAR operation. Press the assigned button or open the Tactical OTAR menu as described in the Navigation section.

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.

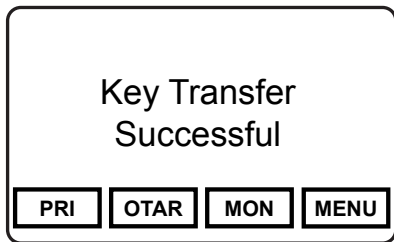
Press "ENTER" to begin the key transfer.

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)

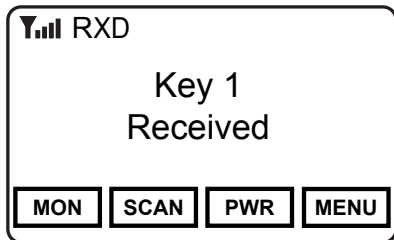




## Tactical OTAR Error Code Table

| 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



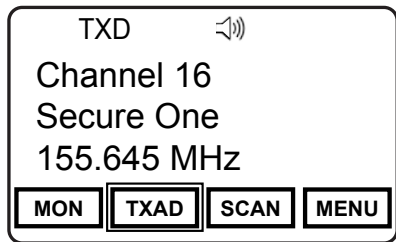
To receive an encryption key from a source radio, select the channel designated as the OTAR channel and wait for the transmission from the Source radio

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.