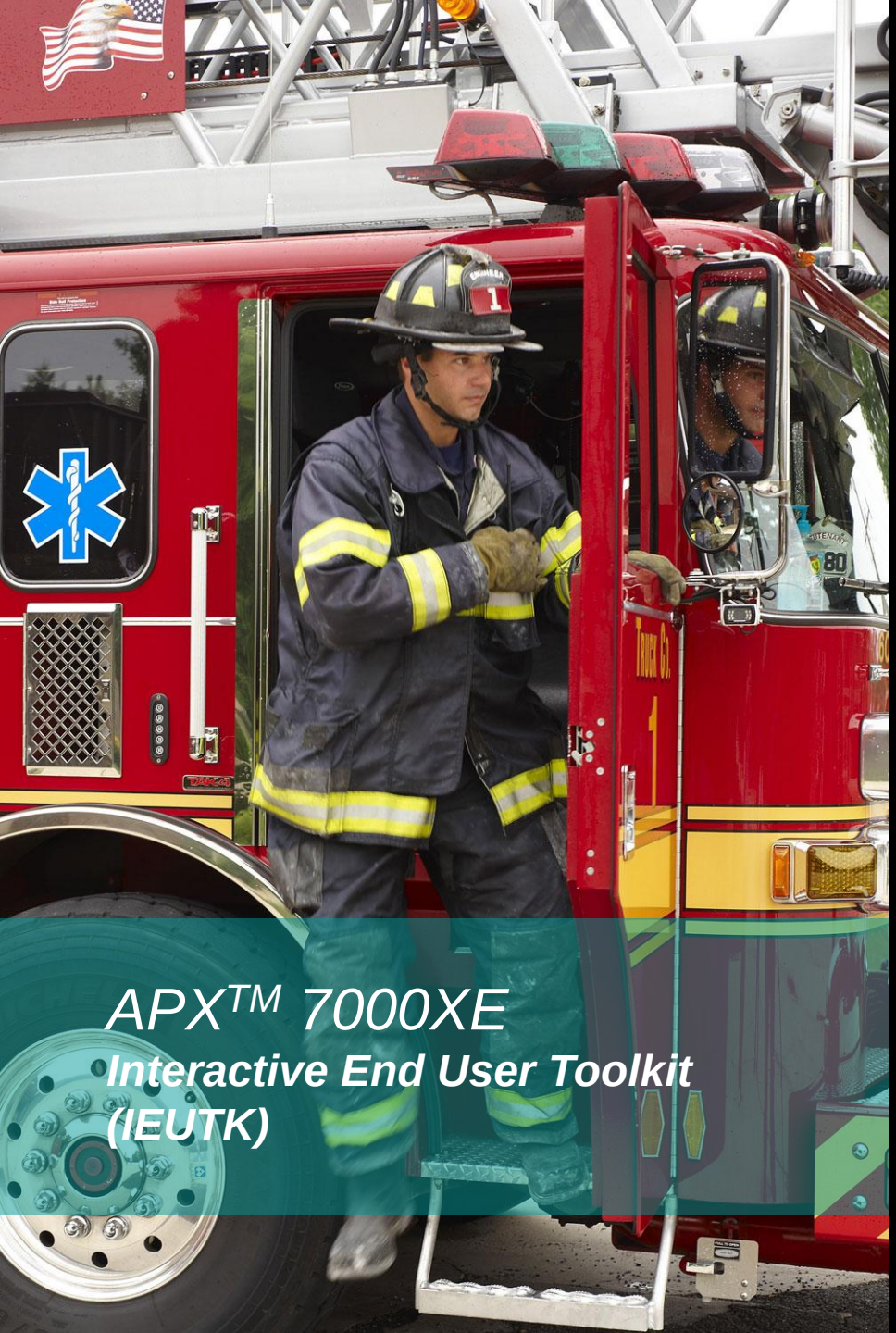
APX™ Two-Way Radios



APX™ 7000XE

Interactive End User Toolkit (IEUTK)

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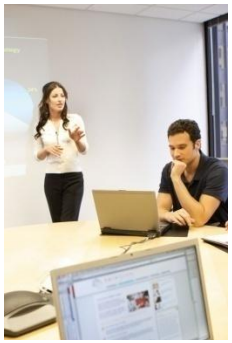

System Requirements

Component	Requirement
Computer and processor	Intel® Pentium® II 450MHz or faster processor.
Memory	128 megabytes (MB) of RAM or greater.
Drive	CD-ROM or DVD drive.
Display	Super VGA (800 × 600) or higher-resolution monitor.
Operating system	Microsoft® Windows Vista®. Microsoft Windows XP. Microsoft Windows 2000 with Service Pack 3 (SP3).
Other	Microsoft Office PowerPoint 2003 or above. Adobe Flash Player 9.0 or above.

Adobe Flash Player is required to run demo in this module.
Please download and install Adobe Flash Player from http://get.adobe.com/flashplayer/

Declaration of Conformity

This declaration is applicable to your radio *only* if your radio is labeled with the FCC logo shown below.

DECLARATION OF CONFORMITY

Per FCC CFR 47 Part 2 Section 2.1077(a)

Responsible Party

Name: Motorola Solutions, Inc.

Address: 1303 East Algonquin Road, Schaumburg, IL 60196, U.S.A.

Phone Number: 1-800-927-2744

Hereby declares that the product:

Model Name: **APX 7000XE**

conforms to the following regulations:

FCC Part 15, subpart B, section 15.107(a), 15.107(d) and section 15.109(a)

Class B Digital Device

As a personal computer peripheral, this device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

Declaration of Conformity

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Additional FCC Note to Users

The following FCC information applies to Bluetooth radio options

Model Name: MNUK6000

Description: APX 7000XE Bluetooth Option Board

FCC ID: AZ489FT6000

IC: 109U-89FT6000

Conforms to the following regulations: FCC Part 15, Section 15.19, 15.21, and 15.105

Note: Changes or modifications not expressly approved by Motorola may void the users authority, as authorized by the FCC, to operate this device and should not be made. See 47 CFR Part 15.21. Information to the user. The user manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. See 47 CFR Part. 15.19(3).

This device has been tested and found to comply with the limits of Part 15.15 of the FCC rules. Parties responsible for equipment compliance should note that the limits specified in this part will not prevent harmful interference under all circumstances.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. See Part 15.105b These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada (IC) Statements:

This Class B digital apparatus complies with ICES-003 and Radio Standards Specification (RSS) 210.

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This Interactive End User Toolkit (IEUTK) covers the basic operation of the APX™ 7000XE portable radios.

However, your dealer or system administrator may have customized your radio for your specific needs. Check with your dealer or system administrator for more information.

Notations Used in This Tutorial

Throughout the text in this tutorial, you will notice the use of WARNING, Caution, and Note. These notations are used to emphasize that safety hazards exist, and the care that must be taken or observed.

WARNING

An operational procedure, practice, or condition, etc., which may result in injury or death if not carefully observed.

Caution

An operational procedure, practice, or condition, etc., which may result in damage to the equipment if not carefully observed.

Note: *An operational procedure, practice, or condition, etc., which is essential to emphasize.*

Additional Performance Enhancement

The following are some of the latest creations designed to enhance the security, quality and efficiency of APX radios.

Dynamic System Resilience (DSR)

DSR ensures the radio system is seamlessly switched to a backup master site dynamically in case of system failure. DSR also provides additional indication e.g. failure detection, fault recovery, and redundancy within the system to address to the user in need. Mechanisms related to the Integrated Voice and Data (IV & D) or data centric are all supported by DSR.

CrossTalk Prevention

This feature prevents crosstalk scenario from happening, especially when a wideband antenna is used. This feature allows the adjustment of the Trident Transmitting SSI clock rate in the radio to be varied from the Receiving Frequency. This subsequently reduced the possibilities of radio frequency interfering spurs and prevents the issues of crosstalk.

Encrypted Integrated Data (EID)

EID provides security encryption and authentication of IV & D data bearer service communication between the radio and the Customer Enterprise Network.

SecureNet

SecureNet allows user to perform secured communications on an Analog or Motorola Data Communication (MDC) channel.

The MDC OTAR feature will allow users to perform OTAR activities on an MDC channel.

HOME

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Getting Started

Additional Performance Enhancement

Radio Parts and Controls

Fleet Map

Preparing Your Radio for Use

Identifying Radio Controls

Identifying Status Indicators

General Radio Operation

Advanced Features

Radio Parts and Controls

*** These radio controls/buttons are programmable.**

Radio Parts and Controls

*** These radio controls/buttons are programmable.**

Radio Parts and Controls

*** These radio controls/buttons are programmable.**

	Z1	Z2	Z3	Z4	Z5	Z6
C1						
C2						
C3						
C4						
C5						
C6						
C7						
C8						
C9						
C10						
C11						
C12						
C13						
C14						
C15						
C16						

❑ Charging the Battery

To avoid a possible explosion:

- **DO NOT** replace the battery in any area labeled “hazardous atmosphere”.
- **DO NOT** discard batteries in a fire.

The Motorola-approved battery shipped with your radio is uncharged. Prior to using a new battery, charge it for a minimum of 16 hours to ensure optimum capacity and performance.

***Note**: When charging a battery attached to a radio, turn the radio off to ensure a full charge.*

Battery Charger

To charge the battery, place the battery, with or without the radio, in a Motorola-approved charger. The charger’s LED indicates the charging progress; see your charger’s user guide.

❑ Attaching/Removing the Battery

With the radio turned off, slide the battery into the radio's frame until side latches click into place.

To remove the battery, turn the radio off. Squeeze the release latches on the bottom of the battery until the battery releases from the radio. Remove the battery from the radio.

Note: *If your radio is preprogrammed with volatile-key retention, the encryption keys are retained for approximately 30 seconds after battery removal.*

Check with your dealer or system administrator for more information.

You can view the status of your IMPRES battery.

See ***Accessing the Radio Information*** for more information.

❑ Attaching/Removing the Antenna

With the radio turned off, set the antenna in its receptacle and turn clockwise to attach it to the radio.

To remove the antenna, turn the antenna counterclockwise.

Make sure you turn off the radio first.

❑ Attaching/Removing the Accessory Connector Cover

The accessory connector is located on the antenna side of the radio. It is used to connect accessories to the radio.

Note: *To prevent damage to the connector, shield it with the connector cover when not in use.*

Insert the hooked end of the cover into the slot above the connector.

Press downward on the cover's top to seat it in the slot.

Once in place, rotate the thumbscrew clockwise by hand until tight.

To remove the accessory connector cover, rotate the thumbscrew counterclockwise until it disengages from the radio.

If the thumbscrew is too tight, use an Allen wrench to loosen it first.

Rotate and lift the connector cover to disengage it from the radio.

❑ Attaching the Belt Clip

Align the grooves of the belt clip with those of the radio and press upward until you hear a click.

To remove the clip, use a flat-bladed object to press the belt clip tab away from the radio. Then, slide the clip downward and away from the radio.

❑ Turning On/Off the Radio

Rotate the **On/Off/Volume Control Knob** clockwise until you hear a click.

If the power-up test is successful, you see **SELFTEST** on the radio's display momentarily, followed by the Home screen.

Note: *If the power-up test is unsuccessful, you see* ***Error XX/YY*** *(****XX/YY*** *is an alphanumeric code).*

Turn off the radio, check the battery, and turn the radio back on. If the radio fails the power-up test again, record the ***Error XX/YY*** *code and contact your dealer.*

Note*: If the power-up test is successful, but you see* ***Hw Board Absent*** *or* ***HW Board Mismatch****. Then, send the radio to the qualified technician to fix this error.*

If the power-up test is successful, but you see, ***Hw Board Failed*** *or* ***MAN-DOWN Hw Error****, send the radio to the qualified technician to fix this error.*

To turn off the radio, rotate the **On/Off/Volume Control Knob** counterclockwise until you hear a click.

❑ Adjusting the Volume

To increase the volume, turn the **On/Off/Volume Control Knob** clockwise.

To decrease the volume, turn this knob counterclockwise.

Note: *Ensure that the main speaker is pointed towards you for increased loudness and intelligibility, especially in areas with loud background noises.*

❑ Programmable Features

Any reference in this manual to a control that is "preprogrammed" means that the control must be programmed by a dealer or qualified radio technician using the radio's programming software, in order to assign a feature to that control.

The programmable buttons can be programmed as shortcuts to radio functions or preset channels/groups depending on the duration of a button press:

- ***Press*** *– Pressing and releasing rapidly.*
- ***Long press*** *– Pressing and holding for the preprogrammed* duration (between 0.25 seconds and 3.75 seconds).
- ***Hold down*** *– Keeping the button pressed.*

Assignable Radio Functions

Bluetooth On/Off – Allows you to turn on/off the Bluetooth.

Bluetooth Configuration – Allows you to access to the Bluetooth menu.

Bluetooth Audio Reroute – Allows you to toggle the audio route between radio speaker or Remote Speaker Microphone and Bluetooth headset.

Bluetooth Headset PTT – Function like a PTT button, but is used to key up the Bluetooth Headset's microphone.

Bluetooth Clear All Pairing – Allows you to clear all pairing info for Bluetooth. This is accessed by long pressing the Bluetooth On/Off button.

Continues on next page

Identifying Radio Controls

Call Response – Allows you to answer a private call.

Dynamic Priority (Conventional Only) – Allows any channel in a scan list (except for the Priority-One channel) to temporarily replace the Priority-Two channel.

Emergency – Depending on the programming, initiates or cancels an emergency alarm or call.

Internet Protocol – Displays the Internet Protocol (IP) address, device name and status of the radio.

Man Down – Prompts Emergency Alarm or Call when the radio achieves or passes a tilt angle threshold or a combination of the angle threshold and a motion sensitivity level.

Monitor (Conventional Only) – Monitors a selected channel for all radio traffic until function is disabled.

Nuisance Delete – Temporarily removes an unwanted channel, except for priority channels or the designated transmit channel, from the scan list.

One Touch 1 – 4 – Launches a specific feature with one single button-press. You can setup as much as four separately programmed buttons for four different features.

Private Line Defeat (Conventional Only) – Overrides any coded squelch (DPL or PL) that is preprogrammed to a channel.

Rekey Request – Notifies the dispatcher that you want a new encryption keys.

Repeater Access Button (RAB) (Conventional Only) – Allows to manually send a repeater access codeword.

Reprogram Request (Trunking Only) – Notifies the dispatcher that you want a new dynamic regrouping assignment.

Request-To-Talk (Conventional Only) – Notifies the dispatcher that you want to send a voice call.

Scan – Toggles scan on or off.

Scan List Programming – Selects the scan list for editing (by long press on the Scan button).

Secure/Clear – Toggles secure operation on or off.

Continues on next page

Site Display (Trunking Only) – Displays the current site ID and RSSI value; performs site search for AMSS (Automatic Multiple Site Select) or SmartZone operation.

Site Lock/Unlock (Trunking Only) – Locks onto a specific site.

Site Display/Search (Trunking Only) – Performs site search for AMSS (Automatic Multiple Site Select) or SmartZone operation.

Talkaround/Direct – Toggles between using a repeater and communicating directly with another radio.

Zone Select – Allows selection from a list of zones.

Basic Zone Bank – Provides access from up to 6 zones by toggling between 2 banks of 3 zones, one group of 3 (A, B and C) to a second group of 3 zones (D, E and F).

Enhanced Zone Bank – Provides access from up to 75 zones by toggling between 25 banks (A, B ... X or Y) of 3 zones.

Assignable Settings or Utility Functions

Light/Flip – Press the button to toggle the display backlight on or off; press and hold the button to reverse the content of the top display.

TX Power Level – Toggles transmit power level between high and low.

Voice Announcement – Audibly indicates the current feature mode, Zone or Channel the user has just assigned.

Voice Mute – Toggles voice mute on or off.

Volume Set Tone – Sets the volume set tone.

❑ Accessing the Preprogrammed Functions

You can access various radio functions through a short or long press of the relevant programmable buttons.

*** These radio controls/buttons are programmable.**

❑ Push-To-Talk (PTT) Button

The **PTT button** on the side of the radio serves two basic purposes:

• While a call is in progress, the **PTT button** allows the radio to transmit to other radios in the call.

Press and hold down **PTT** button to talk. Release the **PTT button to listen.**

The microphone is activated when the **PTT** button is pressed.

• While a call is not in progress, the **PTT button** is used to make a new call.

Status Icons

The 112 x 32 pixel top monochrome display screen of your radio shows the radio status and operating conditions.

Battery
The number of bars (0 – 4) shown indicates the charge remaining in the battery. Blinks when the battery is low.

Received Signal Strength Indicator (RSSI)
The number of bars displayed represents the received signal strength for the current site, for trunking only. The more stripes in the icon, the stronger the signal.

Direct
• **On** = Radio is currently configured for direct radio-to-radio communication (during conventional operation only).
• **Off** = Radio is connected with other radios through a repeater.

Monitor (Carrier Squelch)
Selected channel is being monitored (during conventional operation only).

Power Level
• **L** = Radio is set at Low power.
• **H** = Radio is set at High power.

Scan
Radio is scanning a scan list.

Priority Channel Scan
• Blinking dot = Radio detects activity on channel designated as Priority-One.
• Steady dot = Radio detects activity on channel designated as Priority-Two.

Continues on next page

Identifying Status Indicators

View/Program Mode

Radio is in the view or program mode.

- On steady = View mode
- Blinking = Program mode

Vote Scan Enabled

The vote scan feature is enabled.

Basic Zone Bank 1

- **A** = Radio is in Zone 1.
- **B** = Radio is in Zone 2.
- **C** = Radio is in Zone 3.

Basic Zone Bank 2

- **D** = Radio is in Zone 4.
- **E** = Radio is in Zone 5.
- **F** = Radio is in Zone 6.

Enhanced Zone Bank

A = Contains Zone 1, Zone 2 and Zone 3,
B = Contains Zone 4, Zone 5 and Zone 6,
C = Contains Zone 7, Zone 8 and Zone 9,
.
X = Contains Zone 70, Zone 71 and Zone 72,
Y = Contains Zone 73, Zone 74 and Zone 75.

Secure Operation

- ***On*** = *Secure operation.*
- ***Off*** = *Clear operation.*
- ***Blinking*** = *Receiving an encrypted voice call.*

Bluetooth On

Bluetooth is on and ready for Bluetooth connection.

Bluetooth Connected

Bluetooth is currently connected to the external Bluetooth device.

❑ LED Indicator

The LED indicator shows the operational status of your radio.

Solid red – Radio is transmitting.

Blinking red – Radio is transmitting at low battery condition.

Rapidly blinking red – Radio has failed the self test upon powering up or encountered a fatal error.

Solid yellow – Channel is busy.

Blinking yellow – Radio is receiving a secured transmission.

Solid green – Radio is powering up, or is on a non-priority channel while in the Scan List Programming mode.

Blinking green – Radio is receiving an individual or telephone call, or is on a Priority-Two channel while in the Scan List Programming mode.

Rapidly blinking green – Radio is on a Priority-One channel while in the Scan List Programming mode.

***Note**: No LED indication when the radio receives a clear (non-secured) transmission in trunking Mode.*

❑ Intelligent Lighting Indicators

This feature temporary changes the backlight of the display screen and the keypad, and adds a color bar to the main display screen to help signal that a radio event has occurred.

Note: *This feature must be preprogrammed by a qualified radio technician.*

Backlight and Bar Color	Notification	When
Orange	Emergency Alerts	The radio initiates an emergency alarm or call.
		The radio receives an emergency alarm or call.
		The radio initiates the Man Down Post-Alert timer.
Red	Critical Alerts	The radio battery is low.
		The radio is out of range.
		The radio enters failsoft mode.
		The radio is unable to establish a full connection with the system.
		The radio is unable to authenticate or register with the system.
Green	Call Alerts	The radio receives a private call.
		The radio receives a phone call.
		The radio receives a call alert.
		The radio receives a selective call.

Identifying Status Indicators

Orange

Emergency Alerts

Red

Critical Alerts

Green

Call Alerts

❑ Alert Tones

An alert tone is a sound or group of sounds. Your radio uses alert tones to inform you of your radio's conditions. The following table lists these tones and when they occur.

You Hear	Tone Name	Heard
Short, Low-Pitched Tone **Play**	Radio Self Test Fail	When radio fails its power-up self test.
	Reject	When unauthorized request is made.
	Time-Out Timer Warning	Four seconds before time out.
	No ACK Received	When radio fails to receive an acknowledgment.
	Individual Call Warning Tone	When radio is in an individual call for greater than 6 seconds without any activity.
Long, Low-Pitched Tone **Play**	Time-Out Timer Timed Out	After time out.
	Talk Prohibit/**PTT** Inhibit	(When **PTT** button is pressed) transmissions are not allowed.
	Out of Range	(When **PTT** button is pressed) the radio is out of range of the system.
	Invalid Mode	When radio is on an unpreprogrammed channel.

Identifying Status Indicators

You Hear	Tone Name	Heard
Two Short, Low-Pitched Tones	Man Down Pre-Alert	When the Pre-Alert Timer ends and the Post-Alert Timer begins.
A Group of Low-Pitched Tones **Play**	Busy	When system is busy.
Short, Medium-Pitched Tone **Play**	Valid Key-Press	When correct key is pressed.
	Radio Self Test Pass	When radio passes its power-up self test.
	Clear Voice	At beginning of a non-coded communication.
	Priority Channel Received	When activity on a priority channel is received.
	Emergency Alarm Entry	When entering the emergency state.
	Central Echo	When central controller has received a request from a radio.
Long, Medium-Pitched Tone **Play**	Volume Set	When volume is changed on a quiet channel.
	Emergency Exit	When exiting the emergency state.

Identifying Status Indicators

You Hear	Tone Name	Heard
A Group of Medium-Pitched Tones **Play**	Failsoft	When the trunking system fails.
	Automatic Call Back	When voice channel is available from previous request.
	Talk Permit	(When **PTT** button is pressed) verifying system accepting transmissions.
	Keyfail	When encryption key has been lost.
	Console Acknowledge	When status, emergency alarm, or reprogram request ACK is received.
	Received Individual Call	When Call Alert or Private Call is received.
	Site Trunking	When a SmartZone trunking system fails.
Short, High-Pitched Tone (Chirp)	Low-Battery Chirp	When battery is below preset threshold value.

Identifying Status Indicators

You Hear	Tone Name	Heard
Ringing	Fast Ringing	When system is searching for target of Private Call.
	Enhanced Call Sent	When waiting for target of Private Call to answer the call.
	Phone Call Received	When a land-to-mobile phone call is received.
Gurgle **Play**	Dynamic Regrouping	(When the **PTT** button is pressed) a dynamic ID has been received.
Unique, Low-Pitched Chirp	New Message	When a new message is received.
Unique, High-Pitched Chirp	Priority Status	When a priority message is received.

Identifying Status Indicators

You Hear	Tone Name	Heard
Incremental-Pitched Tone	Bluetooth Paired Tone	When Bluetooth accessory is paired with the radio.
	Bluetooth Connected Tone	When Bluetooth accessory is connected to the radio.
Decremental-Pitched Tone	Bluetooth Unpaired Tone	When Bluetooth accessory is unpaired from the radio.
	Bluetooth Disconnected Tone	When Bluetooth accessory is disconnected from the radio.
A Group of Very High-Pitched Tones	Man Down Post-Alert	When the Post-Alert Timer is active.

General Radio Operation

- Selecting a Zone
- Selecting a Radio Channel
- Receiving and Responding to a Radio Call
  - Receiving and Responding to a Talkgroup Call
  - Receiving and Responding to a Private Call (Trunking Only)
  - Receiving and Responding to a Telephone Call (Trunking Only)
- Making a Radio Call
  - Making a Talkgroup Call
- Repeater or Direct Operation
- Monitoring Features
  - Monitoring a Channel
  - Conventional Mode Operation

❑ Selecting a Zone

A zone is a group of channels.

Use the following procedure to select a zone.

Procedure: Demo

1 Move the preprogrammed **Zone** (**3-Position A/B/C**) switch to the position of the required zone.

2 Press the **PTT** button to transmit on the displayed zone channel.

❑ Selecting a Radio Channel

A channel is a group of radio characteristics, such as transmit/ receive frequency pairs.

Use the following procedure to select a channel.

Procedure: Demo

1 Turn the preprogrammed **16-Position Select** knob to the desired channel.
2 Press the **PTT** button to transmit on the displayed zone channel.

❑ Receiving and Responding to a Radio Call

Once you have selected the required channel and/or zone, you can proceed to receive and respond to calls.

The LED lights up solid red while the radio is transmitting, and solid yellow when the radio is receiving a transmission (conventional mode only). There is no LED indication when the radio receives a transmission in trunking mode.

If the radio is receiving a secure transmission, the LED blinks yellow.

❑ Receiving and Responding to a Radio Call

Receiving and Responding to a Talkgroup Call

To receive a call from a group of users, your radio must be configured as part of that talkgroup.

Procedure:

When you receive a talkgroup call (while on the Home screen), depending on how your radio is preprogrammed:

1 ASTRO Conventional Only:

The LED lights up solid yellow.

The display shows the caller alias or ID.

OR

Trunking Only:

The display shows the caller alias or ID.

2 Hold the radio vertically 1 to 2 inches (2.5 to 5.0 cm) from your mouth.

Press the **PTT** button to respond to the call.

The LED lights up solid red.

Release the **PTT** button to listen**.**

See Making a Talkgroup Call for details on making a Talkgroup Call.

❑ Receiving and Responding to a Radio Call

Receiving and Responding to a Private Call (Trunking Only)

Receiving and Responding to a Private Call (Trunking Only)

A Private Call is a call from an individual radio to another individual radio.

These one-to-one calls between two radios are not heard by others in the current talkgroup. The calling radio automatically verifies that the receiving radio is active on the system and can display the caller's ID.

Note: *The radio automatically exits the feature, if the time-out timer is enabled, when the radio is left idle and the timer expires. You will hear the Inactive Exit Tone upon feature exit.*

Procedure:

When you receive a Private Call:

1 You hear two alert tones and the LED blinks green.
*The backlight of the screen turns green and the display shows **CALL RCV**, alternating with the caller alias (name) or ID (number).*

2 Press the **Call Response** button within 20 seconds after the call indicators begin.

3 Press and hold the **PTT** button to talk.
Release the **PTT** button to listen.

4 Press the **Call Response** button to hang up and return to the Home screen.

You cannot initiate a Private Call.

❑ Receiving and Responding to a Radio Call

Receiving and Responding to a Telephone Call (Trunking Only)

Receiving and Responding to a Telephone Call (Trunking Only)

This feature allows you to receive calls similar to standard phone calls from a landline phone.

Note: *The radio automatically exits the feature, if the time-out timer is enabled, when the radio is left idle and the timer expires. You will hear the Inactive Exit Tone upon feature exit.*

Procedure:

When you receive a Telephone Call:

1 You hear a telephone-type ringing and the LED blinks green.
*The backlight of the screen turns green and the display shows **PHN CALL**.*

2 Press the **Call Response** button within 20 seconds after the call indicators begin.

3 Press and hold the **PTT** button to talk. Release the **PTT** button to listen.

4 Press the **Call Response** button to hang up and return to the Home screen.

You cannot initiate a Telephone Call.

❑ Making a Radio Call

You can select a zone, channel or talkgroup by using:

- The preprogrammed Zone switch
- The Channel Selector Knob

Making a Radio Call

Making a Talkgroup Call

To make a call to a group of users, your radio must be configured as part of that talkgroup.

Procedure: Demo

1 Turn the **Channel Selector Knob** to select the channel with the desired talkgroup.
2 Hold the radio vertically 1 to 2 inches (2.5 to 5.0 cm) from your mouth.
Press the **PTT** button to make the call.
3 ASTRO Conventional Only:
The LED lights up solid red.
The display shows the talkgroup alias or ID.
OR
Trunking Only:
The LED lights up solid red.
4 Speak clearly into the microphone.
5 Release the **PTT** button to listened talkgroup.

❑ Repeater or Direct Operation

The **REPEATER** operation increases the radio's range by connecting with other radios through a repeater. The transmit and receive frequencies are different.

The **DIRECT** or "talkaround operation" allows you to bypass the repeater and connect directly to another radio. The transmit and receive frequencies are the same.

Procedure:

1 Press the preprogrammed **Repeater/Direct** switch to toggle between talkaround and repeater modes.

2 The display shows **RPTR MOD** if the radio is currently in Repeater mode.

OR

The display shows **DIR MODE** and the Talkaround icon if the radio is currently in Direct mode (during conventional operation only).

❑ Monitoring Features

Radio users who switch from analog to digital radios often assume that the lack of static on a digital channel is an indication that the radio is not working properly. This is not the case.

Digital technology quiets the transmission by removing the “noise” from the signal and allowing only the clear voice or data information to be heard.

Use the Monitor feature to make sure a channel is clear before transmitting.

❑ Monitoring Features

Monitoring a Channel

Procedure:

1 Press the preprogrammed **Monitor** button.
2 Press and hold the **Volume Set** button to hear the volume set tone.
3 Adjust the **Volume Control** knob if necessary.
4 Release the **Volume Set** button.
5 Press and hold the **PTT** button to transmit. The LED lights up solid red.
6 Release the **PTT** button to receive (listen).

*The Carrier Squelch indicator appears on the display when you monitor a channel via the preprogrammed **Monitor** button.*

❑ Monitoring Features

Conventional Mode Operation

Your radio may be preprogrammed to receive Private-Line® (PL) calls.

Procedure:

1 Momentarily press the **Monitor** button to listen for activity.
The Carrier Squelch indicator appears on the display.
2 Press and hold the **Monitor** button to set continuous monitor operation.
The duration of the button press is programmable.
3 Press the **Monitor** button again, or the **PTT** button, to return to the original squelch setting.

If you try to transmit on a receive-only channel, you hear an invalid tone until you release the PTT button.

Advanced Features

- Advanced Call Features
  - Receiving and Making a Selective Call (ASTRO Conventional Only)
  - Using the Dynamic Regrouping Feature (Trunking Only)
    - *Requesting a Reprogram (Trunking Only)*
    - *Classifying Regrouped Radios*
- Scan Lists
  - Viewing a Scan List
  - Viewing and Changing the Priority Status
- Scan
  - Turning Scan On or Off
  - Making a Dynamic Priority Change (Conventional Scan Only)
  - Deleting a Nuisance Channel
  - Restoring a Nuisance Channel
- Call Alert Paging
  - Receiving a Call Alert Page
- Emergency Operation
  - Sending an Emergency Alarm
  - Sending an Emergency Call (Trunking Only)
  - Sending an Emergency Alarm with Emergency Call
  - Sending a Silent Emergency Alarm
  - Using the Emergency Keep-Alive Feature
- Man Down
  - Pre-Alert Timer
  - Post-Alert Timer
  - Alerting User When Man Down Feature is Triggered
  - Triggering Emergency
  - Exiting Man Down Feature
  - Testing the Man Down Feature
  - Handling Man Down Functional Error Messages
  - Man Down Functional Test
- Secure Operations
  - Selecting Secure Transmissions
  - Selecting Clear Transmissions
  - Managing Encryption
    - *Loading an Encryption Key*
    - *Using the Multikey Feature*
    - *Erasing the Selected Encryption Keys*
    - *Requesting an Over-the-Air Rekey (ASTRO Conventional Only)*
    - *MDC Over-the-Air Rekeying (OTAR) Page*
    - *Hear Clear*

Continues on next page

Advanced Features

- Trunking System Controls
  - Using the Failsoft System
  - Going Out of Range
  - Using the Site Trunking Feature
  - Locking and Unlocking a Site
  - Viewing and Changing a Site
    - *Viewing the Current Site*
    - *Changing the Current Site*

- Mission Critical Wireless - Bluetooth -
  - Turning Off the Bluetooth
  - Turning On the Bluetooth
  - Re-Pair Timer
  - Bluetooth Drop Timer
  - Pairing Bluetooth Device with the Radio
  - Bluetooth Reconnect Timer
  - Indicating Bluetooth Connection is Lost
  - Turning On the Bluetooth Audio (Routing the Audio from the Radio to the Headset)
  - Turning Off the Bluetooth Audio (Routing the Audio from the Headset to the Radio)
  - Adjusting the Volume of the Radio from Bluetooth
  - Audio Device

- Utilities
  - Using the Flip Display
  - Selecting a Basic Zone Bank
  - Selecting an Enhanced Zone Bank
  - Selecting the Power Level
  - Controlling the Display Backlight
  - Locking and Unlocking the Keypad
  - Turning Voice Mute On or Off
  - Using the Time-Out Timer
  - Using the Conventional Squelch Operation Features
    - *Analog Options*
    - *Digital Options*
  - Using the PL Defeat Feature
  - Using the Digital PTT ID Feature
  - Using the Smart PTT Feature (Conventional Only)
  - Voice Announcement

❑ Advanced Call Features

Receiving and Making a Selective Call (ASTRO Conventional Only)

This feature allows you to receive a call from or to call a specific individual. It is intended to provide privacy and to eliminate the annoyance of having to listen to conversations that are of no interest to you.

Procedure:

1 *When you receive a Selective Call, you hear two alert tones and the LED lights up solid yellow.*
*The backlight of the screen momentarily turns green and the display briefly shows **CALL RCV**.*
The speaker unmutes.

2 Hold the radio vertically 1 to 2 inches (2.5 to 5.0 cm) from your mouth.
Press and hold the **PTT** button to talk.
Release the **PTT** button to listen.

You cannot initiate a Selective Call.

❑ Advanced Call Features

Using the Dynamic Regrouping Feature (Trunking Only)

This feature allows the dispatcher to temporarily reassign selected radios to a single special channel so they can communicate with each other. This feature is typically used during special operations and is enabled by a qualified radio technician.

You will not notice whether your radio has this feature enabled until a dynamic regrouping command is sent by the dispatcher.

***Note**: If you try to access a zone or channel that has been reserved by the dispatcher as a dynamically regrouped mode for other users, an invalid tone sounds.*

Procedure:

1 *When your radio is dynamically regrouped, it automatically switches to the dynamically regrouped channel.*

A "gurgle" tone sounds and the display shows the dynamically regrouped channel's name.

2 Press the **PTT** button to talk.

Release **PTT** button to listen.

When the dispatcher cancels dynamic regrouping, the radio automatically returns to the zone and channel that you were using before the radio was dynamically regrouped.

Advanced Call Features

Using the Dynamic Regrouping Feature (Trunking Only)

Requesting a Reprogram (Trunking Only)

This feature lets you notify the dispatcher that you want a new dynamic regrouping assignment.

Procedure:

1 Press the preprogrammed **Reprogram Request** button to send reprogram request to the dispatcher.
The display alternates between **RPGM** and **PLS WAIT**.

2 If you hear five beeps, the dispatcher has acknowledged the reprogram request.
The display shows **ACK RCVD** and the radio returns to the Home screen.
OR
If the dispatcher does not acknowledge the reprogram request within six seconds, a low-pitched alert tone sounds and the display shows **NO ACK**.
The radio returns to the Home screen.

❑ Advanced Call Features

Using the Dynamic Regrouping Feature (Trunking Only)

Classifying Regrouped Radios

The dispatcher can classify regrouped radios into either of two categories: **Select Enabled or Select Disabled.**

• Select-enabled radios are free to change to any available channel, including the dynamic-regrouping channel, once the user has selected the dynamic-regrouping position.

• Select-disabled radios cannot change channels while dynamically regrouped. The dispatcher has forced the radio to remain on the dynamic-regrouping channel.

The Scan or Private Call feature cannot be selected while your radio is Select Disabled.

Scan Lists

Scan lists are created and assigned to individual channels/ groups. Your radio scans for voice activity by cycling through the channel/group sequence specified in the scan list for the current channel/group.

Your radio supports different types of Scan Lists:

- *Trunking Priority Monitor Scan List*
- *Conventional Scan List*
- *Talkgroup Scan List*

A maximum of 200 Scan Lists can be programmed in your radio. These lists must be preprogrammed by a qualified radio technician.

Scan Lists

Viewing a Scan List

Procedure:

Turn the **16-Position Select** knob to view the members on the list.

Scan Lists

Viewing and Changing the Priority Status

Procedure:

1 Press the **Top Side (Select)** button to change the priority status of the currently displayed channel or the scan list status icon of the currently displayed channel.

2 A Scan icon indicates that the current channel is in the scan list as a non-priority channel.

The LED lights up solid green.

OR

A Priority-Two Channel Scan icon indicates that the current channel is in the scan list as the Priority-Two channel.

The LED blinks green.

OR

A Priority-One Channel Scan icon indicates that the current channel is in the scan list as the Priority-One channel.

The LED rapidly blinks green.

You hear all traffic on the Priority-One channel, regardless of traffic on non-priority channels.

OR

No icon indicates that the current channel is deleted from the scan list.

Scan

Turning Scan On or Off

Procedure:

1 Press the preprogrammed Scan button, or turn the preprogrammed Scan switch to the Scan on or Scan off position.

*The display shows **SCAN ON** and the scan icon, indicating that scan is enabled.*

OR

*The display shows **SCAN OFF**, indicating that scan is disabled.*

❑ Scan

Making a Dynamic Priority Change (Conventional Scan Only)

While the radio is scanning, the dynamic priority change feature allows you to temporarily change any channel in a scan list (except for the Priority-One channel) to the Priority-Two channel.

This change remains in effect until scan is turned off. Scan then reverts to the preprogrammed (original) setting.

Procedure:

1 When the radio locks onto the channel designated as the new Priority-Two channel, press the preprogrammed **Dynamic Priority** button.

2 The radio continues scanning the remaining channels in the list.

Scan

Deleting a Nuisance Channel

If a channel continually generates unwanted calls or noise (termed a “nuisance” channel), you can temporarily remove the unwanted channel from the scan list.

This capability does not apply to priority channels or the designated transmit channel.

Note: *Deleting a “nuisance” channel is only possible through the preprogrammed* ***Nuisance Channel Delete*** *button. This feature is not accessible through the menu.*

Procedure:

1 When the radio is locked onto the channel to be deleted, press the preprogrammed Nuisance Delete button.

The radio continues scanning the remaining channels in the list.

❑ Scan

Restoring a Nuisance Channel

Procedure:

To restore the deleted nuisance channel, do one of the following:

- Turn the radio off and then turning it on again.

  OR

- Stop and restart a scan via the preprogrammed **Scan** button or menu.

  OR

- Change the channel via the **16-Position Select** knob**.**

❑ Call Alert Paging

This feature allows your radio to work like a pager.

Note: This feature must be preprogrammed by a qualified radio technician.

❑ Call Alert Paging

Receiving a Call Alert Page

Procedure:

1 *When you receive a Call Alert page, you hear four repeating alert tones and the LED blinks green. The backlight of the screen turns green and the display briefly shows **PAGE RCV**.*

You cannot send a Call Alert page.

❑ Emergency Operation

The Emergency feature is used to indicate a critical situation. If the **Top (Orange)** button is preprogrammed to send an emergency signal, this signal overrides any other communication over the selected channel.

Your radio supports the following Emergency modes:

- *Emergency Alarm*
- *Emergency Call (Trunking Only)*
- *Emergency Alarm with Emergency Call*
- *Silent Emergency Alarm*

Check with your dealer or system administrator for more information on the programming of this feature.

Only one of the Emergency modes above can be assigned to the preprogrammed Emergency button.

Note: *To exit emergency at any time, press and hold the preprogrammed Emergency button for about a second.*

Emergency Operation

Sending an Emergency Alarm

This feature allows you to send a data transmission, which identifies the radio sending the emergency, to the dispatcher.

Procedure: Demo

1 Press the preprogrammed **Emergency** button.

*The display shows **EMERGNCY** and the current zone or channel. A short, medium-pitched tone sounds and the LED rapidly blinks red.*

OR

An invalid tone sounds, if the selected channel does not support emergency.

2 *When you receive the dispatcher's acknowledgment, the display shows **ACK RCVD**. Four tones sound, the alarm ends, and the radio exits the Emergency Alarm mode.*

OR

*If no acknowledgement is received, the display shows **NO ACK**. The alarm ends and the radio exits the Emergency Alarm mode*.

❑ Emergency Operation

Sending an Emergency Call (Trunking Only)

This feature gives your radio priority access on a channel.

Note: *The radio operates in the normal dispatch manner while in* ***Emergency Call****, except, if enabled, it returns to one of the following:*

- ***Tactical/Non-Revert –*** *You talk on the channel you selected before you entered the emergency state.*
- ***Non-Tactical/Revert –*** *You talk on a preprogrammed emergency channel. The emergency alarm is sent on this same channel.*

Procedure: Demo

1 Press the preprogrammed **Emergency** button.

The display shows **EMERGNCY** *and the current zone or channel.*

A short, medium-pitched tone sounds and the LED rapidly blinks red.

OR

An invalid tone sounds, if the selected channel does not support emergency.

2 Hold the radio vertically 1 to 2 inches (2.5 to 5.0 cm) from your mouth.

Press and hold the **PTT button.**

Speak clearly into the microphone.

Release the **PTT** button to end the transmission and wait for a response from the dispatcher.

3 Press and hold the preprogrammed **Emergency** button for about a second to exit the **Emergency Call** mode.

❑ Emergency Operation

Sending an Emergency Alarm with Emergency Call

Procedure: Demo

1 Press the preprogrammed **Emergency** button.
The display shows **EMERGNCY** *and the current zone or channel.*
A short, medium-pitched tone sounds and the LED rapidly blinks red.
OR
An invalid tone sounds, if the selected channel does not support emergency.

2 The radio enters the **Emergency Call** state when:
You receive the dispatcher's acknowledgment.
The display shows **ACK RCVD**.
OR
You press the **PTT** button while in the **Emergency Alarm** mode.

3 Hold the radio vertically 1 to 2 inches (2.5 to 5.0 cm) from your mouth.
Press and hold the **PTT button.**
Speak clearly into the microphone.
Release the **PTT** button to end the transmission and wait for a response from the dispatcher.

4 Press and hold the preprogrammed **Emergency** button for about a second to exit the **Emergency Call** mode.

❑ Emergency Operation

Sending a Silent Emergency Alarm

This feature allows you to send an Emergency Alarm to another radio without any audio or visual indicators.

Procedure: Demo

1 Press the preprogrammed **Emergency** button.

The display shows no changes, the LED does not light up, and you hear no tones.

2 The silent emergency state continues until you:

Press and hold the preprogrammed **Emergency** button for about a second to exit the Silent Emergency Alarm mode.

OR

Press and release the **PTT** button to exit the **Silent Emergency Alarm** mode and enter regular dispatch or **Emergency Call** mode.

Note:

For ALL Emergency signals, when changing channels:

- *If the new channel is also preprogrammed for Emergency, you can change channels while in Emergency operation. The emergency alarm or call continues on the new channel.*
- *If the new channel is NOT preprogrammed for Emergency, the display shows No emergency, and you hear an invalid tone until you exit the Emergency state or change to a channel preprogrammed for Emergency.*

Emergency Operation

Using the Emergency Keep-Alive Feature

This feature, when enabled, prevents the radio from being turned off via the **On/Off Control** knob when the radio is in the Emergency state.

Note: The radio only exits the Emergency state using one of the ways mentioned in the previous sections.

See ***Sending an Emergency Alarm , Sending an Emergency Call (Trunking Only), Sending an Emergency Alarm with Emergency Call,*** *or* ***Sending a Silent Emergency Alarm.***

❑ Man Down

Man Down condition is determined based upon the radio tilt angle or a combination of radio tilt angle and the lack of radio motion.

Man Down feature is an alternate way to activate the Emergency feature if Emergency has been programmed in your radio.

Your radio automatically activates Emergency Alarm or Call when the radio achieves or passes a tilt angle threshold or a combination of the angle threshold and radio motion below the motion sensitivity level, depending upon how the radio is programmed. The radio must stay in this condition for a preprogrammed amount of time before the Emergency Alarm or Call is activated.

Note: *It is recommended that an Emergency button is preprogrammed in order to allow the user to exit the emergency condition.*

The Man Down feature provides a **Clear** function to the user. After a Man Down condition has been detected, the user can press a preprogrammed **Clear** button or preprogrammed Menu Select button to cancel the Man Down condition. The radio remains in the Man Down state without triggering an emergency condition until the radio is moved out of the Man Down state, at which point Man Down functionality resumes.

The Man Down feature has three phases:

i The radio senses the Man Down condition and **Pre-Alert Timer** is initiated.

ii Man Down condition continues for the time duration defined in the **Pre-Alert Timer** field. At the end of this time, the radio alerts the user on the Man Down status with an audible alert tone and **Man Down** text on the screen. The Post-Alert Timer also initiates at this point.

iii Man Down condition continues for the time duration defined in the **Post-Alert Timer** field. Once the timer expires, the Emergency alarm is transmitted. The Man Down Clear function is used in this phase to cancel the Man Down condition.

The following scenarios affect the timers:

- Pressing the PTT button suspends the Man Down timers; releasing the PTT button reinitiates the Pre-Alert Timer.
- Pressing other buttons on the radio does not impact these timers.
- Repositioning the radio exits the Man Down feature, which stops and resets the timers.
- Pressing a preprogrammed **Clear** button or pressing a Menu Select button preprogrammed for **Clear** stops and resets the timers. The timers do not restart until the radio is repositioned.

***Note**: Emergency must be set up for this feature to operate. For details on operating the Emergency alerts, please see Emergency Operation.*

*If the radio is preprogrammed to **horizontal** only, it must be worn in a **vertical** position otherwise the Man Down alert may be inadvertently triggered.*

*When the radio is programmed with Man Down feature, special care is required when charging the radio with a **wall mounted charger**.*

Pre-Alert Timer

This timer sets the amount of time that a Man Down condition must be present before the radio-user is warned of the Man Down condition.

When the radio detects that it has returned to the vertical position or when the radio detects motion, the Pre-Alert timer stops and is reset.

The Pre-Alert timer reinitiates when the radio detects it is in the horizontal position or motionless again.

Post-Alert Timer

This timer sets the amount of time the radio needs to remain in the Man Down condition before the Emergency alarm is transmitted. When the Post-Alert Timer is initiated, the radio alerts the user with an audible tone and displays the “**Man Down**” text.

Alerting User When Man Down Feature is Triggered

The Man Down alert tone volume is directly related to the radio's volume. Ensure that the radio's volume is loud enough so that the user does not miss the Post-Alert tone.

Note: *If the radio is programmed with Silent Emergency, the radio inhibits the alert tone and visual alert associated with the emergency feature.*

Note: *If the radio is programmed in Surveillance Mode, the radio inhibits all tones and lights on the radio including the Man Down tones.*

Triggering Emergency

When the user does not clear the Man Down condition and the Post-Alert Timer comes to an end, Emergency Alarm or call is triggered. The radio sends emergency message to units within the same Talkgroup. The radio also sends ID number and GPS coordinates to dispatcher if these features are enabled. User can exit Emergency following the Emergency procedure.

Note: *At this point the Man Down features is complete. Use normal Emergency procedures to cancel Emergency transmissions.*

Exiting Man Down Feature

If you are not in a real Man Down situation, you should exit the Man Down feature and prevent emergency from going off with the following operation.

Procedure:

Repositioning the radio or shaking the radio (when motion sensitivity is enabled).

OR

Press the preprogrammed **Man Down Clear** button to exit.

OR

Press the **Menu Select Button** below **Clr** to exit.

Re-Initiating Man Down

After exiting the Emergency Operation when the radio is still in Man Down condition (tilted achieving threshold angle or motionless), user must first exit Man Down condition to then reinitiate the Man Down feature.

Procedure:

Return the radio to the vertical position

OR

Shake the radio (when motion sensitivity is enabled).

Testing the Man Down Feature

Note: *Enable the Emergency feature with Silent Alarm disabled, but not in Surveillance Mode before running this test on the radio.*

Procedure:

When Man Down is enabled on the radio:

1 Turn the radio on and place in the vertical position, for at least 5 seconds.

2 Lay the radio down in the horizontal position.

3 Wait for alert tone.

4 The radio alerts with audible tone and displays **Man Down**.

OR

If no tone is heard, make sure that the Man Down feature is enabled on your radio. If Man Down feature was not enabled, please enable it and go through steps 1,2 and 3 again.

OR

If the Man Down feature is enabled and no tone is heard, send the radio to a qualified technician.

Handling Man Down Functional Error Messages

Procedure:

1 If your radio display shows one of the following error messages: **Hw Board Absent**, **MAN-DOWN Hw Error** or **Hw Board Mismatch**. Send the radio to the qualified technician to fix this error.

Man Down Functional Test

***Note**: Throughout the procedure, the radio should pivot on the dot in the bottom left hand corner of this page.*

Procedure:

Step 1 Place the radio beside the vertical line on this leaflet with the speaker facing right and antenna against/beside this leaflet.
Turn the radio on and wait for at least 5 seconds to ensure the Man Down mode is enabled.

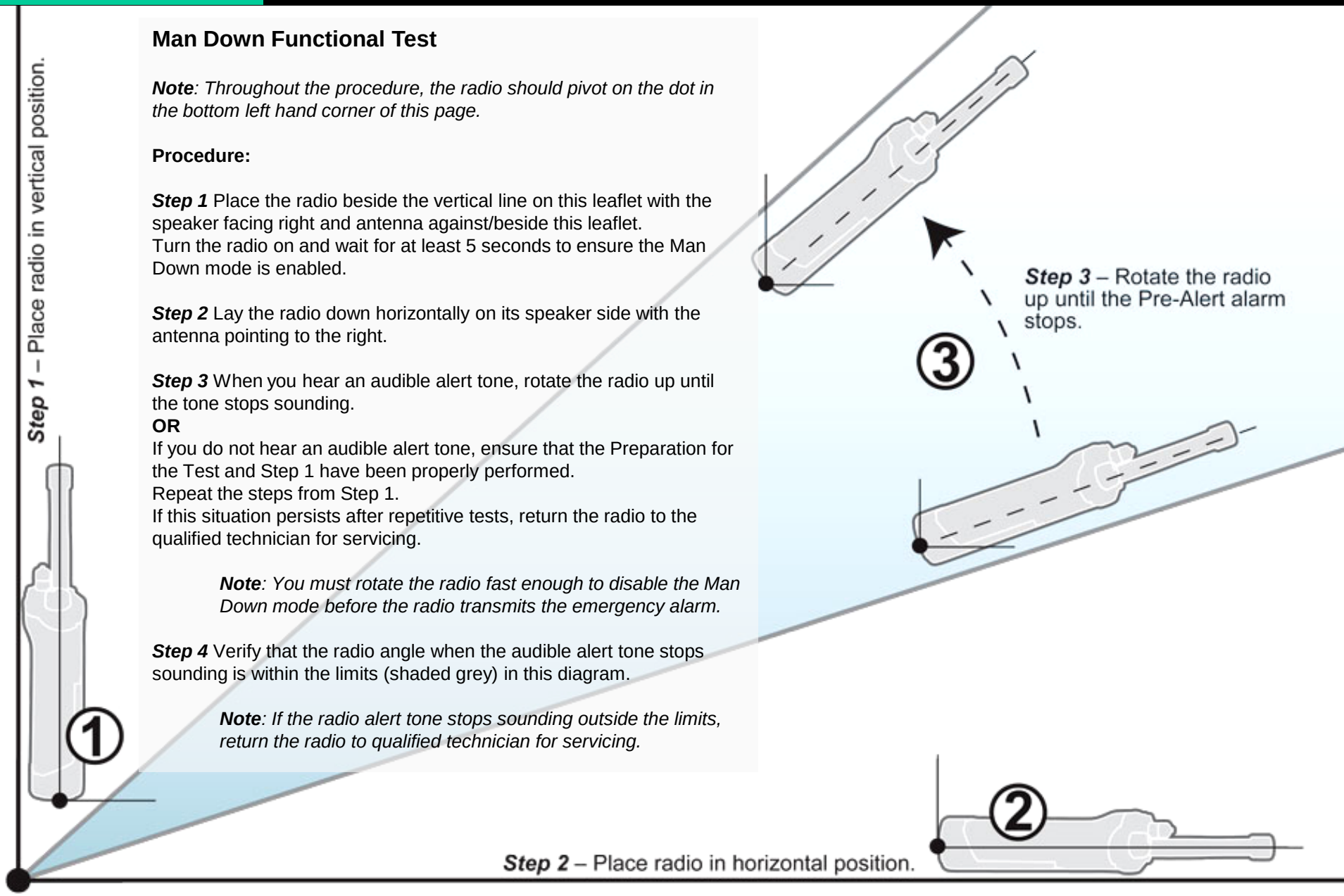
Step 2 Lay the radio down horizontally on its speaker side with the antenna pointing to the right.

Step 3 When you hear an audible alert tone, rotate the radio up until the tone stops sounding.
OR
If you do not hear an audible alert tone, ensure that the Preparation for the Test and Step 1 have been properly performed.
Repeat the steps from Step 1.
If this situation persists after repetitive tests, return the radio to the qualified technician for servicing.

> ***Note**: You must rotate the radio fast enough to disable the Man Down mode before the radio transmits the emergency alarm.*

Step 4 Verify that the radio angle when the audible alert tone stops sounding is within the limits (shaded grey) in this diagram.

> ***Note**: If the radio alert tone stops sounding outside the limits, return the radio to qualified technician for servicing.*



Secure Operations

Secure radio operation provides the highest commercially available level of voice security on both trunked and conventional channels.

Unlike other forms of security, Motorola digital encryption provides signaling that makes it virtually impossible for others to decode any part of an encrypted message.

Secure Operations

Selecting Secure Transmissions

Procedure:

Turn the preprogrammed **Secure/Clear** switch to the secure position.

***Note**: If the selected channel is preprogrammed for clear-only operation – when you press the **PTT** button, an invalid mode tone sounds and the display shows **CLR TX.** The radio will not transmit until you set the **Secure/Clear** switch to the clear position.*

Secure Operations

Selecting Clear Transmissions

Procedure:

Turn the preprogrammed **Secure/Clear** switch to the clear position.

***Note**: If the selected channel is preprogrammed for secure only operation – when you press the **PTT** button, an invalid mode tone sounds and the display shows **SEC TX**.*

*The radio will not transmit until you set the **Secure/Clear** switch to the secure position.*

Secure Operations

Managing Encryption

Loading an Encryption Key

Note: *Refer to the key-variable loader (KVL) manual for equipment connections and setup.*

Procedure:

1 Attach the KVL to your radio.
The display shows **KEYLOAD,** and all other radio functions, except for power down, backlight, and volume, are locked out.

2 Select the required keys and press the **Menu Select** button directly below **LOAD** on the KVL.
This loads the encryption keys into your radio.

3 When the key has been loaded successfully, the radio sounds a short tone for single-key radios.
OR
When the key has been loaded successfully, the radio sounds an alternating tone for multikey radios.

Secure Operations

Managing Encryption

Using the Multikey Feature

This feature allows the radio to be equipped with different encryption keys and supports the DES-OFB algorithm. There are two types:

• **Conventional Multikey** – The encryption keys can be tied (strapped), on a one-per-channel basis, through Customer Programming Software. In addition, you can have operator selectable keys, operator-selectable keysets, and operator selectable key erasure. If talkgroups are enabled in conventional, then the encryption keys are strapped to the talkgroups.

• **Trunked Multikey** – If you use your radio for both conventional and trunked applications, you have to strap your encryption keys for trunking on a per-talkgroup or announcement-group basis. In addition, you may strap a different key to other features, such as dynamic regrouping, failsoft, or emergency talkgroup. You can have operator selectable key erasure.

❑ Secure Operations

Managing Encryption

Erasing the Selected Encryption Keys

This feature allows you to erase all or selected encryption keys.

Procedure: Demo

Use the preprogrammed **Top Side (Select)** button and **Top (Orange)** button to erase the single key in radios with the single-key option, and to erase all keys in radios with the multikey option.

1 Press and hold the **Top Side (Select)** button.

2 While holding **Top Side (Select)** button down, press the **Top (Orange)** button.

*The display shows **PLS WAIT.***

*When all the encryption keys have been erased, the display shows **ALL ERASED.***

Note: DO NOT press the **Top (Orange)** button before pressing the **Top Side (Select)** button, unless you are in an emergency situation as this sends an emergency alarm.

Secure Operations

Managing Encryption

Requesting an Over-the-Air Rekey (ASTRO Conventional Only)

This feature, also known as **OTAR,** allows the dispatcher to reprogram the encryption keys in the radio remotely.

The dispatcher performs the rekey operation upon receiving a rekey request from the user.

Procedure:

1 Press and hold the preprogrammed **Rekey Request button** to send the rekey request.

2 If the rekey operation fails, a bad-key tone sounds and the display shows **RKY FAIL**.

Note: *The rekey operation failure indicates that your radio does not contain the Unique Shadow Key (USK). This key must be loaded into the radio with the key-variable loader (KVL) before the rekey request can be sent.*

Refer to your local key management supervisor for more information.

Secure Operations

Managing Encryption

MDC Over-the-Air Rekeying (OTAR) Page

This feature allows to view or define MDC Over-the-Air Rekeying (OTAR) features. It is applied only when operating in secure encrypted mode and only for conventional communications. In additional to Rekey Requests, OTAR transmissions include Delayed Acknowledgements, and Power up Acknowledgements.

Some of the options selected may also need to be set up at the Key Management Controller (KMC) site to work properly.

Note: *This feature must be preprogrammed by a qualified radio technician. Check with your dealer or system administrator for more information.*

Secure Operations

Managing Encryption

Hear Clear

There are two components of Hear Clear.

1 Companding:

Reduces the channel noise, e.g. OTA transmission, that is predominantly present in UHF2 and 900 MHz channel with the following features.

• ***Compressor*** *– reduces the background noise flow and the* speech signal at transmitting radio.

• ***Expander*** *– expands the speech while the noise flow* remains the same at receiving radio.

2 Random FM Noise Canceller (Flutter Fighter):

Reduces the unwanted effects of random FM noise pulses caused by channel fading under high Signal-to-Noise (S/N) conditions such as in a moving in a transportation. The fading effects, heard as audio pops and clicks, are cancelled without affecting the desired audio signal.

The Random FM Noise Canceller operates only in receive mode.

Note: *This feature must be preprogrammed by a qualified radio technician. Check with your dealer or system administrator for more information.*

Trunking System Controls

Using the Failsoft System

The failsoft system ensures continuous radio communications during a trunked system failure.

If a trunking system fails completely, the radio goes into failsoft operation and automatically switches to its failsoft channel.

Procedure:

1 During failsoft operation, your radio transmits and receives in conventional operation on a predetermined frequency.

2 A medium-pitched tone sounds every 10 seconds and the display shows **FAILSOFT**.

When the trunking system returns to normal operation, your radio automatically leaves failsoft operation and returns to trunked operation.

❑ Trunking System Controls

Going Out of Range

When your radio goes out of the range of the system, it can no longer lock onto a control channel.

Procedure: Demo

1 *A low-pitched tone sounds.*

AND/OR

*The display shows the currently selected zone/channel combination and **OUT RNG**.*

2 Your radio remains in this out-of-range condition until:

It locks onto a control channel.

OR

It locks onto a failsoft channel.

OR

It is turned off.

Trunking System Controls

Using the Site Trunking Feature

If the zone controller loses communication with any site, that site reverts to site trunking.

*The display shows the currently selected zone/channel combination and **STE TRNK**.*

***Note:** When this occurs, you can communicate only with other radios within your trunking site.*

❑ Trunking System Controls

Locking and Unlocking a Site

This feature allows your radio to lock onto a specific site and not roam among wide-area talkgroup sites.

This feature should be used with caution, since it inhibits roaming to another site in a wide-area system.

Procedure:

1 Use the preprogrammed **Site Lock/Unlock** button to toggle the lock state between locked and unlocked.

2 The radio saves the new site lock state and returns to the Home screen.

❑ Trunking System Controls

Viewing and Changing a Site

This feature allows you to view the number of the current site or force your radio to change to a new one.

Viewing the Current Site

Procedure: Demo

1 Press the preprogrammed **Site Search** button.

The display momentarily shows the name of the current site and its corresponding received signal strength indicator (RSSI).

Changing the Current Site

Procedure: Demo

1 Press and hold down the preprogrammed **Site Search** button.

*A tone sounds and the display momentarily shows **SCANNING**.*

When the radio finds a new site, it returns to the Home screen.

❑ Mission Critical Wireless - Bluetooth -

Note: *The use of this feature requires the purchase of the option board and the purchase of the Bluetooth Software.*

This feature allows the Radio to extend its functionality by connecting to external proprietary Motorola Accessories.

The default setting for enabled Bluetooth in option board is Bluetooth ON. See **Turning Off the Bluetooth** to turn the Bluetooth OFF.

Note*: Your radio must be preprogrammed to allow you to use this feature.*

❑ Mission Critical Wireless - Bluetooth –

Turning On Bluetooth

Procedure:

1 Press the preprogrammed button to turn on the Bluetooth.

A short, medium-pitched tone sounds.

*The display shows momentary **BT ON**, and* ✱ *appears.*

OR

*The display shows **BT ON FL** to indicate Bluetooth fails to launch.*

❑ Mission Critical Wireless - Bluetooth –

Turning Off Bluetooth

Procedure:

1 Press the preprogrammed button to turn off the Bluetooth.
A short, medium-pitched tone sounds.
The display shows momentary **BT OFF**, and ✱ disappears.

❑ Mission Critical Wireless - Bluetooth -

Bluetooth Drop Timer

The Bluetooth Drop Timer has two different settings and functions, depending upon the selection of the Re-Pair Timer:

Re-Pair Timer Options	Drop Timer Options
Immediate	• 0 – 15 minutes buffer time to re-establish Bluetooth Connection when the Bluetooth signal is out of range; or when the devices are powered on/off.
Infinite	• 0 – 15 minutes buffer time to re-establish Bluetooth Connection when the Bluetooth signal is out of range; or when the devices are powered on/off. • 2 hours, 4 hours or 8 hours period for the devices keeping the pairing keys even though they are disconnected or powered off. So when they detects the presence of each other they can automatically re-establish the Bluetooth Connection within this period.

Check with your dealer or system administrator for more information about these timers.

See **Pairing Bluetooth Device with the Radio** to establish the Bluetooth Connection.

❑ Mission Critical Wireless - Bluetooth -

Pairing Bluetooth Device with the Radio

Note:

*Bluetooth range of operation is 10 meters line of sight. This is an **unobstructed** path between the location of the signal transmitter and the location of the receiver (the Radio and the Accessory).*

Obstacles that can cause an obstruction in the line of sight include trees, buildings, mountains, cars and etc.).

*It is **NOT** recommended that the User leave their radio behind and expect that the Accessory to work with a high degree of reliability when they are separated.*

At the fringe areas of reception both voice and tone quality will start to sound "garbled" or "broken." To correct this problem, simply position the Accessory and Radio closer to each other (within the 10 meter defined range) to re-establish clear audio reception.

Procedure:

With your radio's Bluetooth feature ON:

1 Turn on the accessory, then place it close to the radio using the Blue dot-pairing indicator on the radio and the accessory.

2 *If the pairing process is successful, the radio sounds an incremental-pitched tone to indicate paired.*

OR

If the pairing process fails, the radio sounds a short, low pitched tone.

*The display shows **PAIRFAIL**.*

Repeat step 1 again.

3 The radio continues to connect to the device.

If the connecting process is successful, the radio sounds an incremental-pitched tone.

The display shows ***<Device Type> CONNCTED****, and* *turns solid.*

OR

If the connecting process fails, the radio sounds a short, low-pitched tone.

The display shows ***<Device Type> CON FAIL****.*

Repeat step 2 to reconnect the Bluetooth.

OR

If the connecting process fails, the radio sounds a short, low-pitched tone.

The display shows ***<Device Type> CON FAIL****.*

After Bluetooth Drop Timer expires, if the device is still not re-connecting with the radio, the radio sounds a decremental-pitched tone to indicate unpaired.

The display shows ***<Device Type> UNPAIRED****.*

❑ Mission Critical Wireless - Bluetooth -

Indicating Bluetooth Connection is Lost

The radio shows solid when the devices have a Bluetooth connection. Below is the scenario and radio indications when the connection is interrupted.

Procedure:

1 The Bluetooth icon starts blinking for 10 seconds. The radio sounds an decremental-pitched tone and the display shows **<Device Type>** alternates with **CON LOST**.

2 If the Bluetooth device successfully re-connects before the Bluetooth Drop Timer expires, the display shows momentary ***<Device Type> CONNCTED***, and turns solid.

OR

If reconnecting is unsuccessful after the 10 seconds blinking timer expires, the becomes solid.

❑ Mission Critical Wireless - Bluetooth -

Turning On the Bluetooth Audio
(Routing the Audio from the Radio to the Headset)

Procedure:

1 Press the preprogrammed button to route the audio from the radio to the headset.
A short, medium-pitched tone sounds.
*The display shows **HDSET ON.***

❑ Mission Critical Wireless - Bluetooth -

Turning Off the Bluetooth Audio
(Routing the Audio from the Radio to the Headset)

Procedure:

1 Press the preprogrammed button to route the audio from the radio to the headset.
A short, medium-pitched tone sounds.
*The display shows **SPKR ON.***

❑ Mission Critical Wireless - Bluetooth -

Adjusting the Volume of the Radio from Bluetooth Audio Device

Procedure:

With the Bluetooth audio device connected to the radio:

1 Adjust volume up/down on the Bluetooth audio device.

*The radio display shows **Volume XX** and sounds a short, medium-pitched tone.*

❑ Mission Critical Wireless - Bluetooth -

Clearing All Pairing Information

Procedure:

1 Long press the preprogrammed Bluetooth On/Off button.

A short, medium-pitched tone sounds.

2 *The display shows **PLS WAIT** to indicate clearing is in progress.*

3 *The display shows **ALL CLR** to indicate clearing is successful.*

OR

The radio sounds a short, low-pitched tone.

*The display shows **CLR FAIL** to indicate clearing has failed.*

Note:

If Re-Pair Timer is set to infinite and you clear keys on the radio, you must clear keys on all previously paired devices as well. (Please see your accessories manual for further details.)

❑ Utilities

Using the Flip Display

This feature allows you to flip the content of the top display upside down. It is particularly useful when you would like to read the top display while the radio is still in the carry holder attached to your belt.

Procedure: Demo

Press and hold the preprogrammed **Light** button to flip the display.

❑ Utilities

Selecting a Zone Bank

This feature allows twice as many zones to be accessed from a switch, doubling the amount of switch positions.

Note: *The Zone Select feature must to be preprogrammed to the 3-position A-B-C switch, while the Zone Bank feature must be preprogrammed to any side button or top button before you can use this feature.*

Procedure:

1 Use the preprogrammed **Zone Bank** button to toggle the position between Bank 1 and Bank 2.

*The top display shows the status icons (**A, B, C, D, E** or **F**) or the zone name based on the bank and switch position selected.*

*See **Basic Zone Bank 1 and Basic Zone Bank 2** for more information on the status icons.*

❑ Utilities

Selecting an Enhanced Zone Bank

This feature is created in order to allow users to communicate in more zones. An **Enhanced Zone Bank (EZB)** consists of three zones. This also means each icon **A, B, C, ...or Y** consist of three zones. You can use the preprogrammed 3-position A-B-C switch to select the first, second or third zone in an EZB.

This feature allows user to navigate from up to 75 zones in 25 EZBs.

Note: *The Enhanced Zone Bank Select feature must to be preprogrammed to the 3-position A-B-C switch, while the Enhanced Zone Bank feature must be preprogrammed to any side button or* ***Top (Orange)*** *button before you can use this feature.*

Procedure:

1 Press the preprogrammed **EZB Up** or **EZB Down** button to scroll the EZB up or down.
OR
Press and hold the preprogrammed **EZB Up** or **EZB Down** button to fast scroll the EZB up or down.

2 Turn the 3-Position A/B/C Switch to select the first, second or third zone in the selected EZB.

❑ Utilities

Selecting the Power Level

You can select the power level at which your radio transmits.

The radio always turns on to the default setting.

Settings:

- Select **Low** for a shorter transmitting distance and to conserve power.
- Select **High** for a longer transmitting distance.

Procedure:

1 Press the preprogrammed **Transmit Power Level Switch** to toggle the power level between low and high power.

*The display shows **LOW PWR** and the low power icon.*

OR

*The display shows **HIGH PWR** and the high power icon.*

Utilities

Controlling the Display Backlight

You can enable or disable the radio's display backlight as needed, if poor light conditions make the display or keypad difficult to read.

Depending on how your radio is preprogrammed, you can also maintain a minimum backlight level on the radio's front display.

Note: *The backlight setting also affects the Menu Select buttons, the Menu Navigation buttons and the keypad backlighting accordingly.*

Procedure:

Press the preprogrammed **Light** button to toggle the backlight on or off.

OR

Press any key of the keypad, the Menu Select or Menu Navigation buttons, or any programmable radio controls or buttons to turn the backlight on.

Note: *The backlight remains on for a preprogrammed time before it automatically turns off completely or returns to the minimum backlight level.*

❑ Utilities

Turning Voice Mute On or Off

You can enable and disable voice transmission, if needed.

Procedure:

1 Press the preprogrammed **Voice Mute** button to turn the feature off or on.

*The display momentarily shows **VMUT OFF**, and a short tone sounds, indicating that the feature is disabled.*

OR

*The display momentarily shows **VMUT ON**, and a short tone sounds, indicating that the feature is enabled.*

Utilities

Using the Time-Out Timer

This feature turns off your radio's transmitter. You cannot transmit longer than the preset timer setting.

If you attempt to do so, the radio automatically stops your transmission, and you hear a talk-prohibit tone.

The timer is defaulted at 60 seconds, but it can be preprogrammed from 3 to 120 seconds, in 15-second intervals, or it can be disabled entirely for each radio mode, by a qualified radio technician.

Note: *You will hear a brief, low-pitched, warning tone four seconds before the transmission times out.*

Procedure:

1 Hold down the **PTT** button longer than the preprogrammed time.
*You hear a short, low-pitched warning tone, the transmission is cut-off, and the LED goes out until you release the **PTT** button.*

2 Release the **PTT** button. The timer resets.

3 Press the **PTT** button to re-transmit. The time-out timer restarts and the LED lights up solid red.

Utilities

Using the Conventional Squelch Operation Features

This feature filters out unwanted calls with low signal strength or channels that have a higher than normal background noise.

Analog Options

Tone Private Line (PL), Digital Private-Line (DPL), and carrier squelch can be available (preprogrammed) per channel.

Mode	Result
Carrier squelch (C)	You hear all traffic on a channel.
PL or DPL	The radio responds only to your messages.

Digital Options

One or more of the following options may be preprogrammed in your radio. Check with your dealer or system administrator for more information.

Option	Result
Digital Carrier-Operated Squelch (COS)	You hear any digital traffic.
Normal Squelch	You hear any digital traffic having the correct network access code.
Selective Switch	You hear any digital traffic having the correct network access code and correct talkgroup.

❑ Utilities

Using the PL Defeat Feature

This feature allows you to override any coded squelch (DPL or PL) that might be preprogrammed to a channel. The radio will also unmute to any digital activity on a digital channel.

Procedure:

Place the preprogrammed **PL Defeat** switch in the PL Defeat position.

You hear any activity on the channel.

OR

The radio is muted if no activity is present.

Note: *When this feature is active, the Carrier Squelch status indicator is displayed.*

❑ Utilities

Using the Digital PTT ID Feature

This feature allows you to see the radio ID (number) of the radio from whom you are currently receiving a transmission. This ID, consisting up to a maximum of eight characters, can be viewed by both the receiving radio and the dispatcher.

Your radio's ID number is also automatically sent every time the **PTT** button is pressed. This is a per-channel feature. For digital voice transmissions, your radio's ID is sent continuously during the voice message.

Utilities

Using the Smart PTT Feature (Conventional Only)

Smart **PTT** is a per-personality, programmable feature used in conventional radio systems to keep radio users from talking over other radio conversations.

When smart **PTT** is enabled in your radio, you cannot transmit on an active channel.

If you try to transmit on an active smart-**PTT** channel, you hear an alert tone, and the transmission is inhibited. The LED lights up solid yellow to indicate that the channel is busy.

Three variations of smart **PTT** are available:

Mode	Description
Transmit Inhibit on Busy Channel with Carrier	You cannot transmit if any traffic is detected on the channel.
Transmit Inhibit on Busy Channel with Wrong Squelch Code	You cannot transmit on an active channel with a squelch code or (if secure-equipped) encryption key other than your own. If the PL code is the same as yours, the transmission is not prevented.
Quick-Key Override	This feature can work in conjunction with either of the two above variations. You can override the transmit-inhibit state by quick-keying the radio. In other words, two **PTT** button presses within the preprogrammed time limit.

Utilities

Voice Announcement

This feature enables the radio to audibly indicate the current feature mode, Zone or Channel the user has just assigned. This audio indicator can be customized per customer requirements.

This is typically useful when the user is in a difficult condition to read the content shown on the display.

Each voice announcement is within a limit of three seconds maximum. The sum total duration for all voice announcements in a radio shall be no more than 1000 seconds.

Note: *This feature must be preprogrammed by a qualified radio technician.*

The features which Voice Announcement supports are:

- Zone
- Channel
- Scan
- PL Disabled
- Talkaround/Direct
- Tx Inhibit

Note: *Voice announcements support certain number of zone channel, but not all.*

Seek advice from your dealer or qualified technician for the best selections for this feature.

The two options of priority for the Voice Announcement available are:

- **High** – enables the voice of the feature to announce even when the radio is receiving calls.
- **Low** – disables the voice of the feature from announcing when the radio is receiving calls.

Continues on next page

Procedure:

You hear a voice announcement when the features below are preprogrammed in the radio.

• The radio powers up. The radio announces the current zone and channel it is transmitting.

• Press the preprogrammed voice announcement button (which specifically programmed to playback the current zone and channel). The radio announces the current zone and channel it is transmitting.

Note:

Pressing this preprogrammed playback button will always enable the voice feature to announce in High priority.

All the three programmable buttons at the side of the radio support this feature.

• Change to a new zone. The radio announces the current zone and channel it is transmitting.

• Change to a new channel remaining within the current zone. The radio announces the current channel.

• Press either the **Menu Select** button or preprogrammed button or switch of the radio to launch or terminate Scan, PL Disabled, Talkaround/Direct or Transmit Inhibit. The radio announces the corresponding feature activation or deactivation.