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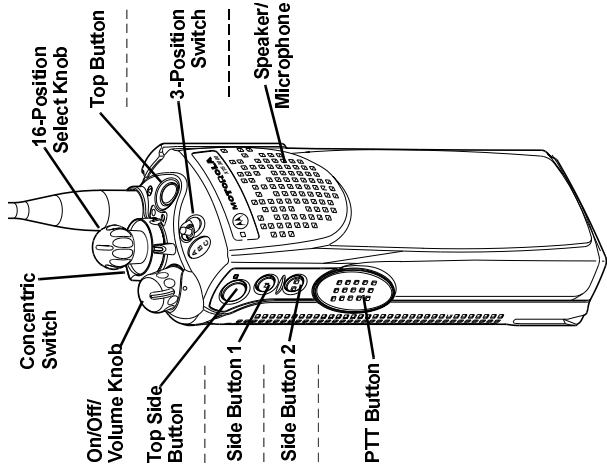


XTS™ 3000 ASTRO®
Digital Portable Radio
Model I
User Guide



ASTRO XTS 3000 Model I Digital Portable Radio

Quick-Reference Card



GENERAL

Turning the Radio On: Rotate the **On/Off/Volume Control knob** clockwise.

Monitoring (Conventional Channels Only): Momentarily press the programmed **Monitor button** and listen for voice activity.

Transmitting: Press and hold the **PTT button**.

Receiving: Release the **PTT button**.

Selecting a Zone and Channel:

- 1 Place the programmed **Zone switch** to the desired position.

If you would like a different channel than the presently selected channel:

- 2 Rotate the **Zone/Channel Select knob** to the desired channel; then go to step 7.
- 3 Press the **PTT button** to talk and release it to listen.

COMMON RADIO FEATURE

Answering an Individual Call

- 1 For telephone calls, press the programmed **Call Response button**.

OR

For Private-conversation Calls and Call-Alert Pages with Private-Conversation, within 20 seconds, press the **PTT button** to talk privately.

For Selective Call after 2 seconds, the speaker will unmute.

OR

For Call-Alert Pages Only - To respond, press the **PTT button**. Your conversation will be heard by the entire talkgroup.

- 2 Press the **PTT button** to talk and release it to listen.

- 3 To disconnect when you have finished your conversation, press the **Call Response button**.

FOLD

Write your radio's programmed features on the dotted line.

COMMON and SPECIAL RADIO FEATURES

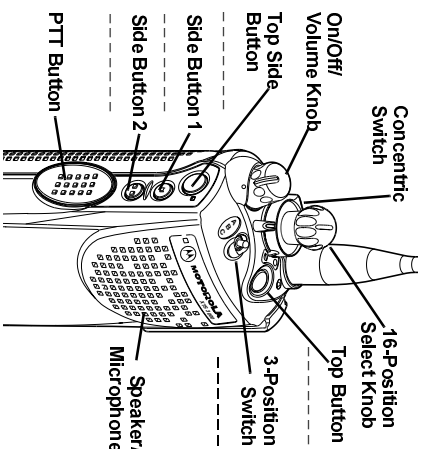
Most of your radio features can be accessed by performing the following step (for more detail, refer to the feature description in your manual).

- 1 Press (or rotate) the **Feature button/switch** (if programmed).

LED Description

Indicates the radio's operating status:

- Red = Transmitting
- Blinking Red = Channel busy or low battery
- Blinking Green = Receipt of individual call



Write in your radio's programmed features (consult your system administrator or radio technician)



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***XTS™ 3000 ASTRO®
Digital Portable Radio
Model I User Guide***

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6881083C70-A

Product Safety and RF Exposure Compliance



Caution

Before using this product, read the operating instructions for safe usage contained in the Product Safety and RF Exposure booklet enclosed with your radio.

ATTENTION!

This radio is restricted to occupational use only to satisfy FCC RF energy exposure requirements. Before using this product, read the RF energy awareness information and operating instructions in the Product Safety and RF Exposure booklet enclosed with your radio (Motorola Publication part number 6881095C98) to ensure compliance with RF energy exposure limits.

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P25 radios contain technology patented by Digital Voice Systems, Inc.

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Introduction

This manual describes how to operate your XTS™ 3000 ASTRO® Type III Model I Digital Portable Radio.



This manual discusses the following:

- General Radio Operation
- Common Radio Features
- Special Radio Features
- Helpful Tips

Use this manual to become familiar with your XTS 3000 ASTRO radio.

Notations Used in This Manual

Throughout the text in this publication, you will notice the use of **WARNINGS**, **Cautions**, and **Notes**. 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.

The following special notations identify certain items:

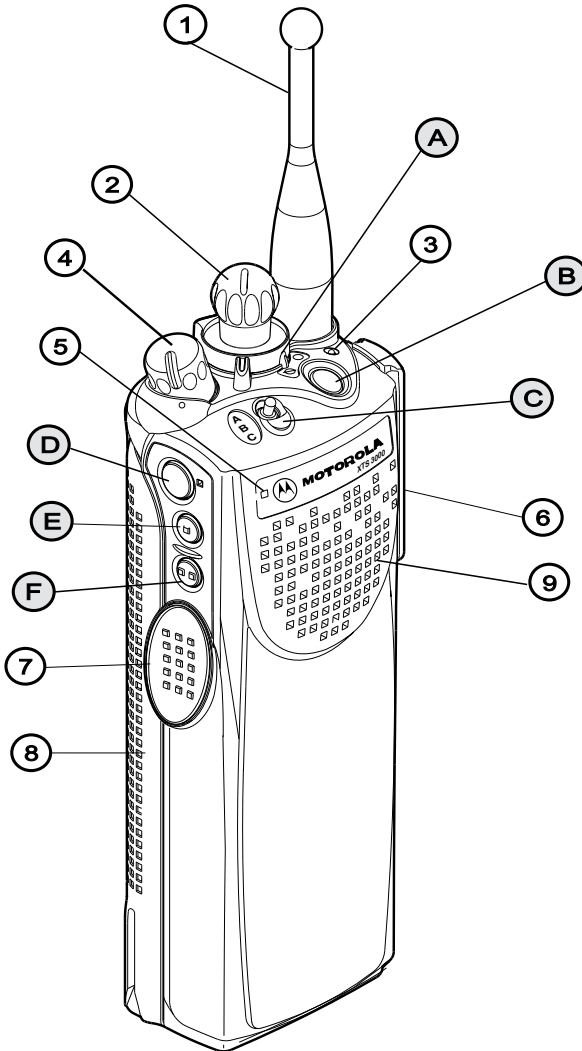
| <i>Example</i> | <i>Description</i> |
|---------------------|---------------------------------------|
| Light button | Button names are shown in bold print. |

APCO Project 25 Radios

XTS 3000 ASTRO digital radios are part of Motorola's Project 25 digital solution. When a radio is equipped with the ASTRO Digital CAI option, it complies with APCO Project 25 standards on conventional two-way radio systems and Common Air Interface (CAI) on digital trunked systems. Not only does the ASTRO Digital CAI option include Project 25 interoperable voice features, but other Project 25 compliant advanced digital signalling capabilities as well.

APCO Project 25 is the creation of the Association of Public Safety Communication Officers (APCO). It brings together representatives of various user groups to evaluate basic technologies in advanced land mobile radios to find common solutions to best serve the marketplace.

Your XTS 3000 ASTRO Model I Radio



Note: Physical features are denoted by number (see Table 2 on page 4). Programmable controls are denoted by alphabet lettering (see Table 2 on page 4).

Physical Features of the XTS 3000 ASTRO Model I Radio

Table 1: Physical Features

| <i>No.</i> | <i>Feature</i> | <i>Page</i> | <i>No.</i> | <i>Feature</i> | <i>Page</i> |
|------------|----------------------------|-------------|------------|---------------------------|-------------|
| 1 | Antenna | 11 | 6 | Universal Connector Cover | 16 |
| 2 | 16-Position Select Knob | 23 | 7 | PTT (Push-to-Talk) Button | 22 |
| 3 | LED | 5 | 8 | Battery | 9 |
| 4 | On/Off/Volume Control Knob | 21 | 9 | Speaker | |
| 5 | Microphone | | | | |

Programmable Controls

The following radio controls can be programmed to activate certain software features.

Table 2: Programmable Controls

| <i>No.</i> | <i>Feature</i> | <i>No.</i> | <i>Feature</i> |
|------------|------------------------------|------------|--------------------------|
| A | 2-Position Concentric Switch | D | Top Side (Select) Button |
| B | Orange Top Button | E | Side Button 1 |
| C | 3-Position A/B/C Switch | F | Side Button 2 |

The features that can be assigned to these controls by a qualified radio technician, and the pages where these features can be found are listed in Table 3 on page 5.

Note: Any references in this manual to controls that are preprogrammed mean that a qualified radio technician must use the radio's programming software to assign a feature to a control. Contact your system administrator for details.

Table 3: Programmable Features

| <i>Feature</i> | <i>Page</i> | <i>Feature</i> | <i>Page</i> | <i>Feature</i> | <i>Page</i> |
|------------------|-------------|----------------------|-------------|----------------------|-------------|
| Call Response | 32 | Nuisance Delete | 35 | Site Lock/ Unlock | 44 |
| Channel | 23 | PL Defeat | 33 | Site Search | 45 |
| Dynamic Priority | 36 | Repeater/Direct | 33 | Volume Set | 23 |
| Emergency | 28 | Reprogram Request | 40 | Zone | 22 |
| Light/Backlight | 5 | Scan On/Off | 35 | | |
| Monitor | 23 | Secure/Clear | 41 | | |

Backlight

If poor light conditions make the channel numbers (around the **16-Position Select knob**) difficult to read, turn on the radio's backlight by pressing the preprogrammed **Light button** if applicable.

These lights remain on for a preprogrammed time before they turn off automatically, or you can turn them off immediately by pressing the **Light button** again.

LED Indicators

The LED on top of the radio indicates the radio's operating status:

Table 4: LED Indicators

| <i>LED Indicator</i> | <i>What it Means</i> |
|----------------------|--|
| Red | Radio transmitting |
| Flashing red | Channel busy, or Low battery (while transmitting) |
| Double flashing red | Receiving encrypted audio |
| Flashing green | Receiving an individual call |

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.

| Sound | Tone Name | Occurs: |
|---|------------------------------|--|
| Short, Low-Pitched Tone | Invalid Key-Press | When the wrong key is pressed. |
| | Radio Self-Test Fail | When the radio fails its power-up self test. |
| | No ACK Received | When the radio fails to receive an acknowledgement from the dispatcher. |
| | Reject | When an unauthorized request is made. |
| | Time-Out Timer Warning | Four seconds before time out. |
| Continuous, Low-Pitched Tone | Time-Out Timer Timed Out | After time out. |
| | Talk Prohibit/PTT Inhibit | When the PTT button is pressed and transmissions are not allowed. |
| | Out-of-Range | When the PTT button is pressed and the radio is out of range of the system. |
| | Invalid Mode | When the radio is on a channel that is not programmed. |
| | Individual Call Warning Tone | When the radio is in an individual call for greater than six seconds without any activity. |
| A Group of Low-Pitched Tones (Busy Tone) | Busy | When a channel, phone line, or system is unavailable due to high traffic volume. |

| Sound | Tone Name | Occurs: |
|---|---------------------------|---|
| Short, Medium- Pitched Tone | Valid Key-Press | When the correct key is pressed. |
| | Radio Self-Test Pass | When radio passes its power-up self test. |
| | Clear Voice | At the beginning of a non-coded communication. |
| | Priority Channel Received | Upon receipt of activity on a priority channel. |
| | Emergency Alarm Entry | Upon entering emergency state. |
| | Central Echo | When the central controller has received a request from a radio. |
| Continuous, Medium- Pitched Tone | Volume Set | Sounds when volume level is adjusted on a quiet channel. |
| | Emergency Exit | Upon exiting emergency state |
| | PTT Sidetone | When data is sent by pressing the PTT button , but the user must wait to talk. |

| Sound | Tone Name | Occurs: |
|---|--|---|
| A Group of Medium-Pitched Tones | Failsoft | When system fails. |
| | Automatic Call Back | When voice channel becomes available in response to a previous request. |
| | Talk Permit | Upon pressing the PTT button ; verifying system accepting transmissions. |
| | Dispatcher-Interrupter | Upon receipt of a dispatcher-interrupt call. |
| | Keyfail | When an encryption key has been lost. |
| | Console Acknowledge | When a status, message, emergency alarm, or reprogram request ACK is received. |
| | Received Individual Call | When a Call Alert or Private Conversation call is received. |
| | Call Alert Sent | When a Call Alert is received by the target radio. |
| Short, High-Pitched Tone (Chirp) | Low-Battery Chirp | When battery level is below preset threshold value |
| | Phone Dekey Chirp | When switching from radio to phone line upon releasing the PTT button . |
| Continuous, High-Pitched Tone | Quik-Call™ Group Call | When a Quik-Call group call is received |
| A Group of High-Pitched Tones | Quik-Call Individual Call | When a Quik-Call individual call is received |
| Ringling | Phone Ringing | When a phone call is received |
| | Enhanced Call Received | When originator receives ACK from an enhanced private call |
| Gurgle | Dynamic Regrouping/ Over-The-Air Programming | When a dynamic ID has been received and the PTT button is pressed and the reprogrammed group has not been selected and when the radio is successfully re-keyed |

Standard Accessories

Battery



To avoid a possible explosion:

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



Caution

If your radio is programmed with volatile-key retention (consult your service technician), encryption keys are retained for approximately 30 seconds after battery removal.

Battery Life

Battery life is determined by several factors. Among the more critical are the regular overcharge of batteries and the average depth of discharge with each cycle. Typically, the greater the overcharge and the deeper the average discharge, the fewer cycles a battery will last. For example, a battery which is overcharged and discharged 100% several times a day, lasts fewer cycles than a battery that receives less of an overcharge and is discharged to 50% per day. Further, a battery which receives minimal overcharging and averages only 25% discharge, lasts even longer.



WARNING

Care should be taken to avoid external short circuiting of the battery. A sustained high-rate discharge (for example, a paper clip placed accidentally across the battery contacts) may permanently damage the battery, void the battery warranty, and create a burn or fire hazard.

Charging the Battery

Motorola batteries are designed specifically to be used with a Motorola charger and vice versa. Charging in non-Motorola equipment may lead to battery damage and void the battery warranty.

The battery should be at about 77°F (25°C) (room temperature), whenever possible. Charging a cold battery (below 50° F [10°C]) may result in leakage of electrolyte and ultimately in failure of the battery. Charging a hot battery (above 95°F [35°C]) results in reduced discharge capacity, affecting the performance of the radio. Motorola rapid-rate battery chargers contain a temperature-sensing circuit to ensure that batteries are charged within the temperature limits stated above.



WARNING

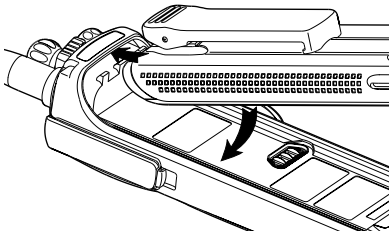
Do not attempt to change or charge the battery in a hazardous atmosphere.

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 user guide for details.

Attach the Battery

To attach the battery:

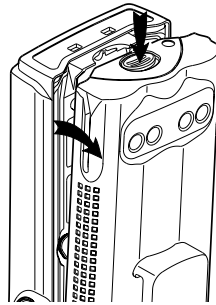
- 1 Turn off the radio and hold it with the back of the radio facing upward.
- 2 Align the three slots at the top of the battery with the three tabs on the back of the radio.
- 3 Push the battery down toward the radio until the battery clicks into place.



Remove the Battery

To remove the battery:

- 1 Turn the radio off.
- 2 Hold the radio with the back of the radio facing upward.
- 3 To release the battery from the radio, push the battery release button located on the bottom of the battery.
- 4 Lift the battery away from the radio and remove.



Note: If your radio is programmed with volatile-key retention, encryption keys are retained for approximately 30 seconds after battery removal. Consult a qualified radio technician for details.

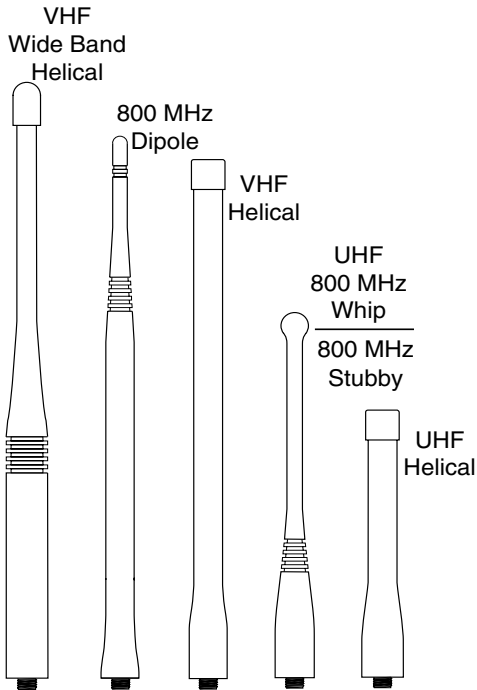
Antenna

Radio Operating Frequencies

Before installing the antenna, ensure that the antenna you have can be used with your radio. Your radio's model number is on a label attached to the back of your radio. A typical model number might be H09UCC9PW5AN. The fourth position of the model number (in this example, U) identifies the operating-frequency band of the radio. The following table lists all fourth-position alpha characters and corresponding frequency band.

| Fourth Position | Operating Frequency | Fourth Position | Operating Frequency |
|-----------------|---------------------|-----------------|---------------------|
| K | 136-178MHz | R | 403-470MHz |
| S | 450-512MHz | U | 806-870MHz |

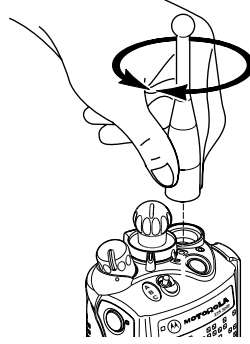
Antennas are frequency sensitive and are color coded according to the frequency range of the antenna. The color code indicator is in the center of the base of the antenna. The following illustrations and table helps identify the antenna, antenna frequency range, and corresponding color code.



| Antenna Identification Table | | | | | |
|-------------------------------------|-------------------|-------------------|-------------------------|---|-------------------------------|
| Antenna Type | Approx. Length | | Insulator Color Code | Frequency Range | Antenna Kit No. |
| | in. | mm | | | |
| VHF Wide Band Helical | 8.1 | 203 | RED | 136-174MHz | NAD6563 |
| VHF Helical | 7.8 7.3 6.9 | 195 183 172 | YELLOW BLACK BLUE | 136-151MHz 151-162MHz 162-174MHz | NAD6566 NAD6567 NAD6568 |
| UHF Helical | 3.3 3.2 3.2 | 83 80 79 | RED GREEN BLACK | 403-435 MHz 435-470MHz 470-512MHz | NAE6546 NAE6547 NAE6548 |
| UHF Wide Band Whip | 5.2 | 130 | GREY | 403-512MHz | NAE6549 |
| 800MHz Whip | 7 | 175 | RED | 806-870MHz | NAF5037 |
| 800MHz Dipole | 8 | 200 | RED | 806-870MHz | NAF5039 |
| 800MHz Stubby, Quarterwave | 3.3 | 83 | WHITE | 806-870MHz | NAF5042 |

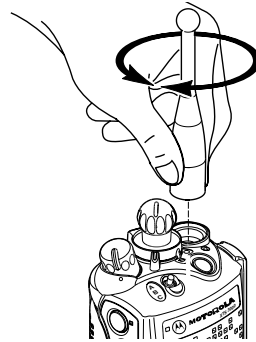
Attach the Antenna

With the radio turned off, turn the antenna clockwise to attach it to the radio.



Remove the Antenna

With the radio turned off, turn the antenna counter-clockwise to remove it from the radio.

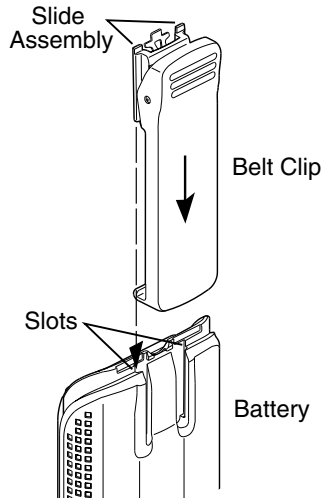


Belt Clip

Note: The battery must be removed from the radio before the belt clip can be installed or removed.

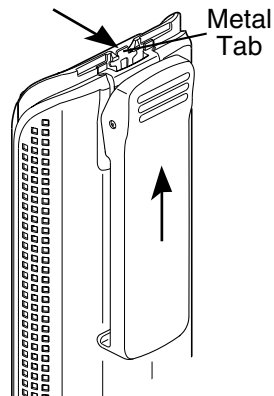
Attach the Belt Clip

- 1 Holding the battery in one hand so that the top of the battery faces upward and the back of the battery faces you, hold the belt clip in the other hand with its top facing upward.
- 2 Align the slide assembly on the front of the belt clip with the slots on the back of the battery. Slide the belt clip downward toward the bottom of the battery until the belt clip clicks in place.



Remove the Belt Clip

- 1 Hold the battery in one hand so that the top of the battery faces upward, and the front (radio side) of the battery faces you.
- 2 At the top of the battery, press down on the belt clip's metal tab and slide the belt clip upward. Continue to slide the belt clip upward until it is free from the battery.



Universal Connector Cover

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

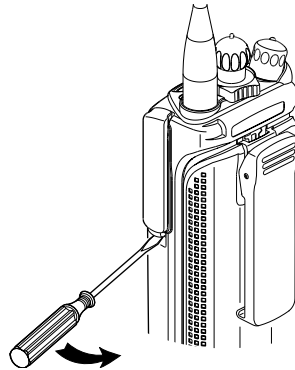
Remove the Connector Cover



Caution

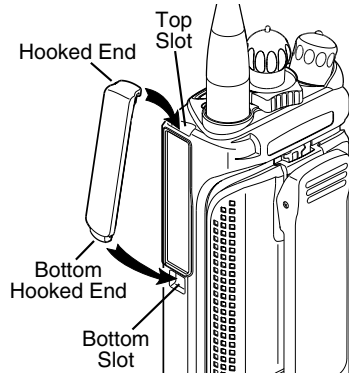
When the Universal Connector is not in use, keep it covered with the Universal Connector cover to prevent damage.

- 1 Turn the radio off.
- 2 *While holding the cover's top (flat) end in place with your thumb, pry upward on the cover's lower end until it disengages from the radio.*

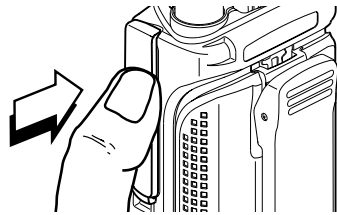


Attach the Connector Cover

- 1 Turn the radio off.
- 2 Insert the top, hooked end of the cover into the top of the connector slot.



- 3 While holding the top end, swing the rounded end into place at the bottom of the connector. Press firmly until it snaps into place.



XTS 3000 R Radios Only

Note: In XTS 3000 R radios, the “R” signifies the radio is a **Rugged**-type radio designed to withstand adverse field conditions such as being submersed in water..



Caution

- The XTS 3000 R radio casting has a vent hole that allows for pressure equalization in the radio. Never poke this vent with any objects, such as needles, tweezers or screwdrivers. This creates a leak path into the radio and the radio’s submersibility is lost.
- The pressure equalization vent is located on the chassis, just below the battery contact. Never obstruct or cover the two slots with any object, including a label. Ensure that no oily substances come in contact with this vent.
- The XTS 3000 R radio is designed to be submersed to a maximum depth of 6 feet and a maximum submersion time of 4 hours. Exceeding either maximum limit may result in damage to the radio.

Note:

- 1 If the radio has been submersed in water, shake the radio well to remove any water that may be trapped inside the speaker grille and microphone port. Otherwise, the water could cause decreased audio capabilities.
- 2 If the radio’s battery contact area has been exposed to water, dry the battery contacts (both on the radio and the battery) before attaching the battery to the radio. Otherwise, the water could short-circuit the radio.
- 3 If the radio has been submersed in a corrosive medium (such as salt water), rinse the radio and battery in fresh water and dry the radio and battery.
- 4 To clean the exterior surfaces of the radio, use a diluted solution of mild dish washing detergent and fresh water (one teaspoon of detergent to one gallon of water).

- 5** Do not disassemble the radio. This could damage radio seals and result in leak paths into the radio. Radio maintenance should be performed only by a qualified service person.
- 6** Elastomer technology materials used for seals in rugged portable radios can age with time and environmental exposure. Therefore, Motorola recommends that rugged radios be checked annually to assure the water-tight integrity of the radio. Radio disassembly and reassembly procedures and information regarding test equipment necessary to inspect, maintain and troubleshoot radio seals can be found in the XTS 3000 ASTRO Basic Service manual.

Notes

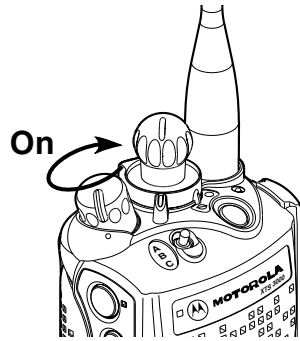
General Radio Operation

Your radio is ready for use once a fully-charged battery and antenna have been connected to the radio. Refer to page 3 to ensure a complete understanding of the radio's controls and indicators. If necessary, review the "Additional Information" section starting on page 47.

Turning the Radio On and Off

Turn the Radio On

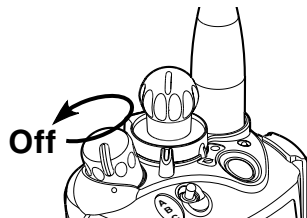
Turn the **On/Off/Volume Control knob** *clockwise*. The radio performs a power-up self test. When the radio passes the self test, a medium-pitched tone sounds. This tone is programmable by your system manager or radio technician using radio service software from Motorola.



If the radio fails the self test, you hear a low-pitched tone. Turn off the radio, check the battery, and turn the radio on. If the radio fails the power-up test again, contact your system administrator or an authorized radio technician.

Turn the Radio Off

Turn the **On/Off/Volume Control knob** *counterclockwise* until you hear a click.



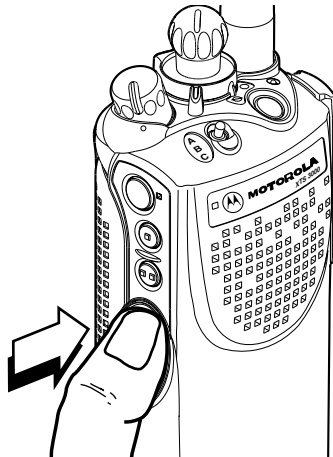
Zones and Channels

A zone is a grouping of channels. A channel is a group of radio characteristics such as transmit/receive frequency pairs. After you turn your radio on, select the desired zone and channel.

Select a Zone

Place the preprogrammed **Zone switch** (see page 4) in the desired position.

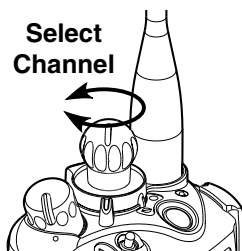
To transmit on the displayed zone/channel combination, press the **PTT button**.



Note: If the selected zone is not programmed, the you hear a continuous, low-pitched tone (invalid-mode tone) until a valid programmed zone is selected. This does not mean your radio is not programmed; only that the zone you selected is not programmed.

Select a Channel

Rotate the preprogrammed **16-Position Select knob** to the desired channel.



Note: If the selected channel is not programmed, you hear an continuous, low-pitched tone (invalid-mode tone) until a valid programmed channel is selected. This does not mean your radio is not programmed; only that the channel you selected is not programmed.

To transmit on the displayed zone/channel combination, press the **PTT button**.

Transmitting and Receiving

Note: 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.

This section emphasizes the importance of knowing how to monitor a channel for traffic before keying up to send a transmission.

- 1 Turn the radio on and select the desired zone and channel.
- 2 To hear the volume set tone, press and hold the preprogrammed **Volume Set button** (see page 4).
- 3 Press the preprogrammed **Monitor button** (see page 4) to listen for activity. See notes below.
- 4 Adjust the **Volume Control knob** if necessary.

- 5 To transmit, press and hold the **PTT button** and release it to listen. The LED lights RED while transmitting.

Note: If the channel on which you are transmitting is programmed to receive Private-Line® (PL), ensure that the channel is not in use by momentarily pressing the preprogrammed **Monitor button** (see page 4) to listen for activity. To put the radio in permanent monitor operation (squellch defeat), press and hold the preprogrammed **Monitor button** for five seconds (programmed by your system administrator or radio technician). To return the radio to its original squellch state, tap the **Monitor button** again or press the **PTT button**.

If you try to transmit on a channel that is programmed for receive only, an invalid tone sounds until you release the **PTT button**.

General Radio Features

Time-Out Timer

The new ASTRO portable radio is equipped with a programmable time-out timer which, upon expiration, turns off the transmitter. This timer is programmable by your system manager or service technician and can be set from 0 seconds (off) to 7.75 minutes (465 seconds), at 15-second increments. ASTRO radios have been programmed at shipment with a default time-out timer duration of 60 seconds.

A time-out timer warning occurs approximately four seconds before the allocated time-out timer expires. The warning is a short, low-pitched tone.

If the **PTT button** is held down longer than the time-out timer's allotted time, a continuous, low-pitched tone sounds and the LED stops lighting red, indicating that your transmission has been cut off. This tone continues to sound until the **PTT button** is released.

- 1 Release the **PTT button** to silence the warning.
- 2 To transmit another message, press the **PTT button**.

Low-Battery Indication

If a low-battery indication occurs, replace the battery.

Your system administrator may have programmed your radio to indicate a low-battery status in one of the following ways:

- When the **PTT button** is pressed, the bi-color LED blinks red to indicate a low-battery condition.
- When the **PTT button** is released following a transmission, you hear a short, high-pitched tone (chirp) to indicate a low-battery condition.
- When the radio is in the standby mode and a low-battery condition occurs, you hear an alert tone for 30 to 930 seconds at 30-second increments. This duration is programmed by your system administrator or radio technician.

Notes

Common Radio Features

Conventional Squelch Options

Tone Private Line (PL), Digital Private-Line (DPL), network ID, and carrier squelch operations are all available in the same radio on a per channel basis.

Note: Network ID is only available on ASTRO digital channels consult your service technician for details.

In carrier squelch operation, all traffic on the channel is heard. However, in PL, DPL, or network ID operation, your radio responds only to those messages intended for you. PL, DPL, network ID, and carrier squelch can be programmed for each channel.

Project 25 Digital Squelch Options

Each conventional personality may be programmed by your system administrator or radio technician for one of the following squelch options in digital mode:

| | |
|--|---|
| <i>Digital Carrier-Operated Squelch (COS)</i> | This option allows the radio to respond to any received digital Project 25 signal. |
| <i>Normal Squelch</i> | This option allows the radio to respond to any digital Project 25 signal that has the correct Network access code. |
| <i>Selective Squelch</i> | This option allows the radio to respond to any digital Project 25 signal that has the correct Network access code and the correct talkgroup. |
| <i>Data and Squelch</i> | This option allows the radio to respond to any digital Project 25 signal that has the correct Network access code and is addressed to a specific radio. The radio responds to selective calls only. |

Non-Project 25 Digital Squelch Options

Each conventional personality may be programmed for one of the following squelch options in digital mode (consult your service technician).

| | |
|-------------------------|---|
| No Squelch | This option allows the radio to respond to any ASTRO digital signal that has the correct Network access code. |
| Data or Squelch | This option allows the radio to respond to any ASTRO digital signal that has the correct Network access code and the correct talkgroup. |
| Data and Squelch | This option allows the radio to respond to any ASTRO digital signal that has the correct Network access code and is addressed to a specific radio (the radio responds to selective calls only). |

Emergency State

Your radio may have been programmed by your system administrator or radio technician with the Emergency State feature.

Press the preprogrammed **Emergency button** (see page 4) to send out an emergency signal that takes precedence over any other signalling activity in progress on the selected channel. There are two types of emergency signals:

- Emergency Alarm sends a data transmission to alert the dispatcher to an emergency condition and identifies the radio sending the emergency signal.
- Emergency Call is a type of dispatch operation that gives your radio priority access to channels. This feature is not available on conventional radios.

Note: Entering Emergency State signals a critical situation. It should never be used for any other reason.

If you change channels during emergency operation, the emergency alarm or call is moved to, and continue on, the new channel if the new channel is also programmed for emergency operation. If the new channel is not programmed

for emergency operation, you hear a continuous, low-pitched invalid mode tone until the radio exits emergency state or you change to a channel programmed for emergency operation.

For emergency-alarm with emergency-call signals, once an acknowledgment is received from the dispatcher, your radio enters emergency call state.

While your radio is in emergency-call state, it operates in the usual dispatch manner or returns to one of the following operations if programmed to do so:

- Tactical/Non-Revert Operation — you talk on the channel selected before entering the emergency state.
- Non-Tactical/Revert Operation — you talk on a preprogrammed emergency channel, and the emergency alarm is sent to this preprogrammed emergency channel.

Entering the Emergency State

- 1 Press and hold the preprogrammed **Emergency button** (see page 4). The length of the press-and-hold time required is programmed by your system administrator or radio technician.

During emergency alarm state:

- The LED lights red, and
- You hear a group of short, medium-pitched tone.
- When the emergency alarm is acknowledged by the dispatcher, the radio sounds four beeps and the alarm ends.

During a silent-emergency call:

- The LED will not light,
- You do not hear tones.
- The audio is muted (turned off) and remains so until you exit the emergency alarm state, and the silent-emergency state continues until you press the **PTT button**.

During an emergency call, press the **PTT button** to cancel the alert.

Exiting the Emergency State

It is important that you exit emergency state when it is no longer necessary.

To exit Emergency State, press the preprogrammed **Emergency button** for approximately one second. This duration is programmed by your system administrator or radio technician.

The way you exit Emergency State may vary based on how your radio was programmed by your system administrator or radio technician.

If your radio is programmed for emergency alarm,

Press the **PTT button**. The alarm is cancelled (without an emergency-exit tone), and you may begin transmitting your voice call.

OR

If your radio is programmed for emergency alarm with call,

Press the **PTT button** while the radio is in emergency-alarm operation to place the radio in emergency-call operation.

If your radio is programmed with emergency alarm only, the radio automatically exits emergency state after receiving an acknowledgment from the dispatcher or if the alarms are exhausted when no acknowledgment is received. This method applies to non-silent emergency alarm radios.

Note: If your radio is programmed for silent-emergency, your radio does not automatically exit Emergency State. One of the above methods must be used.

Emergency Keep-Alive

When this feature is enabled, moving the **On/Off Control knob** to the off position does not turn your radio off if it is in an emergency state. Your radio continues normal emergency operation as if the power is on. The radio will not turn power off until it exits emergency state.

Talkgroup Calls (Project 25 Radios Only)

Project 25 replaces Motorola's group selective calls with talkgroup calls. This feature allows you to define talkgroups for your conventional system. Talkgroups, combined with selective squelch operation, allow groups of users to transparently share a conventional channel. Talkgroups may be slaved to a personality by your system administrator or you may select them.

Encryption keys are slaved to talkgroups. When talkgroups are enabled, encryption keys are changed by changing the active talkgroup.

Individual Calls - Receive Only

Individual calls are defined as follows:

| | |
|--|--|
| <i>Telephone Calls</i> | Similar to standard telephone calls, except you use your radio. These can be landline-to-radio or radio-to- landline calls. |
| <i>Private-Conversation™ II Calls (Private Calls) (Trunked Channels Only)</i> | One-on-one calls involving two specific radios in which the conversation is not heard by others in the current radio talkgroup. |
| <i>Enhanced Private-Conversation Calls (Enhanced Private Calls) (Trunked Channels Only)</i> | Same as Private Conversation II calls except the radio automatically verifies that the target radio is active on the system. |
| Selective Calls (Conventional Channels Only) | Used to selectively call an individual radio on Project 25 systems, or an individual radio or group of radios on non-Project 25 systems. It is intended to provide privacy and to eliminate the annoyance of having to listen to conversations that are of no interest to you. |

| | |
|-------------------|--|
| Call-Alert™ Pages | Your radio functions like a pager; Call Alert pages provide a means to signal other radio users that you wish to get in touch with them (even if they are away from their radio or in a noisy environment). Call Alert pages also allow you to verify that the radio they are calling is active on the system. |
|-------------------|--|

Note: In the following procedures, any reference to Private-Conversation (Private Call) represents both Private-Conversation II calls and Enhanced Private-Conversation calls, unless otherwise specified.

Answering an Individual Call

1 When an individual call is being received, you hear and/or see:

- a telephone-type ringing if it is a telephone call;
- two alert tones if it is a Private-Conversation call or Selective call;
- a continuous cycle of four tones if it is a Call-Alert page;
- a blinking green signal on the LED;

2 Telephone Calls Only — Press the preprogrammed **Call Response button** (see page 4).

OR

Private-Conversation Calls and Call-Alert Pages with Private-Conversation — Within 20 seconds, press the preprogrammed **Call Response button** (see page 4).

Selective Call — After two seconds the speaker is no longer muted.

OR

Call-Alert Pages Only — To respond, press the **PTT button** and your conversation is heard by the entire talkgroup.

3 Press the **PTT button** to talk and release it to listen.

- 4 To disconnect after you have finished your conversation, press the preprogrammed **Call Response button** (see page 4).

PL Defeat

The PL defeat feature allows you to override any coded squelch (DPL, PL, or network ID) that may be programmed to a channel. To activate this feature, place the preprogrammed **PL Defeat switch** if applicable (see page 4) in the PL Defeat position. You are able to hear any activity on the channel; if no activity is present, the radio is muted.

Repeater Access

Repeater access allows you to selectively activate repeaters, which is especially useful in areas where repeaters are placed close together to ensure total coverage. Repeater access can operate automatically or manually and can be enabled or disabled by your system administrator or radio technician for specific channels as required. During automatic repeater access, you hear a sidetone to indicate that the repeater access code is being transmitted to discourage you from talking over the data transmission.

In radios programmed with manual repeater access, you can activate the repeater access code transmission by pressing the preprogrammed **Repeater Access button** if your radio has one (see page 4). You do not hear a sidetone. On radios with MDC-1200™ signalling, when the repeater access is acknowledged, the radio sounds an acknowledge alert tone. The acknowledge alert tone can be programmed by your system administrator or radio technician.

Repeater/Direct

The repeater/direct feature allows you to bypass the repeater and talk directly to another radio. This is known as DIRECT operation or talkaround operation. The transmit frequency is the same as the receive frequency.

In REPEATER operation, you talk through the repeater, which increases the radio's operating range. The transmit frequency is not the same as the receive frequency.

Selecting Repeater or Direct Operation

Place the preprogrammed **Repeater/Direct switch** (see page 4) in the repeater position or the direct position.

Scan

Scanning allows you to monitor different channels automatically through the use of scan lists. If there is activity on a channel, the Scan feature automatically takes you to that channel.

Each radio can have up to 20 unique scan lists. These scan lists are programmed by your system administrator or radio technician either manually or using radio service software.

Three types of scan lists are available (consult your service technician for additional information):

| | |
|---|---|
| <i>Trunking Priority Monitor</i> | Comprises channels that are all from the same trunking system (10 different channels maximum). This feature only works on systems that support it. |
| <i>Conventional</i> | Comprises only conventional channels (15 different channels, maximum). |
| <i>Talkgroup Scan</i> | Comprises conventional and trunked channels from more than one trunking system (10 different channels maximum). Priority operation is not available in this type of list. |

There are also several types of scanning available:

| | |
|--|---|
| <i>Priority 1 Scanning</i> | With Priority 1 scanning enabled, one member of the scan list is chosen as the Priority 1 member. Any activity on the Priority 1 channel is heard on the speaker even if another channel in the scan list has activity on it. |
| <i>Priority 2 and Non-Priority Scanning</i> | In addition to the Priority 1 channel being the number one priority, a second channel can be assigned as a Priority 2 channel, if desired. The remaining members in the scan list can be programmed as non-priority members of the scan list. |
| <i>Automatic Scanning (Autoscan)</i> | With this feature, the radio begins scanning whenever you select a channel to which a scan list is assigned (strapped). The radio continues auto scanning until you select a channel that does not have autoscan enabled. |
| <i>Operator-Selectable Scan</i> | Scan can be programmed by your system manager or service technician to be activated by a Scan On/Off switch (see page 4). |

Turning Scan On and Off

Place the preprogrammed **Scan On/Off Switch** (see page 4) in the on or off position.

Deleting Nuisance Channels

When the radio scans a channel that you do not wish to hear (nuisance channel), you can temporarily delete the channel from the scan list.

- 1 When the radio is locked onto the channel to be deleted, press the preprogrammed **Nuisance-Delete button** (see page 4). Repeat this step to delete additional nuisance channels.

Note: Priority channels and the selected channel cannot be deleted using the nuisance-delete feature.

The radio continues scanning the remaining channels in the list. To resume scanning the deleted channel, you can change channels or exit and re-enter scan operation.

Dynamic Priority Change (Conventional Operation Only)

While the radio is scanning, the dynamic priority change feature lets you *temporarily* change any channel in a scan list (except the Priority 1 channel) to the Priority 2 channel. The present Priority 2 channel becomes a non-priority channel. This change remains in effect until scan is turned off. Scanning then reverts to the preprogrammed state.

To change a channel to a Priority 2 channel:

- 1 Press the preprogrammed **Dynamic Priority button** (see page 4) when the radio is locked onto the channel to be designated as a Priority 2 channel.

Note: The Priority 1 channel cannot be changed to Priority 2 channel.

- 2 The radio continues scanning the remaining channels in the list. To resume scanning the preprogrammed Priority 2 channel, you must exit and re-enter scan operation.

Smart PTT

Smart PTT is a feature used in conventional radio systems to keep radio users from talking over other radio conversations. Smart PTT is programmed by your system administrator or radio technician.

When Smart PTT is enabled in your radio, you are unable to transmit on an active channel. If you try to transmit (press the **PTT button**) on an active Smart PTT channel, you hear an alert tone, and the transmission is inhibited. The LED blinks red to indicate that the channel is busy.

Three radio-wide variations of Smart PTT are available:

| | |
|--|---|
| <i>Transmit Inhibit on Busy Channel with Carrier</i> | With this feature enabled, you are prevented from transmitting if any activity is detected on the channel. |
| <i>Transmit Inhibit on Busy Channel with Wrong Squelch Code</i> | With this feature enabled, you are prevented from transmitting 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 allowed. |
| <i>Quick-Key Override</i> | This feature can work in conjunction with either of the two above variations. With this feature enabled, you are able to override the transmit-inhibit state by quick-keying the radio; in other words, two PTT button presses within the time programmed through radio service software (RSS) for Smart PTT Quick-Key Timer (default value is 1/2 second). |

Notes

Special Radio Features

Dynamic Regrouping

The dynamic regrouping feature allows the dispatcher to temporarily reassign selected radios to a single special channel so that they can communicate with each other. This feature, enabled in each radio by your system manager or service technician, is typically used during special operations. You will not notice whether your radio has this feature enabled until a dynamic regrouping command is sent by the dispatcher.

Note: If you select the dynamic-regrouping zone/channel using softkeys or other radio controls without being dynamically regrouped, you hear an short, low-pitched invalid tone.

When your radio has been dynamically regrouped, you hear a gurgle tone (unless you are already on the dynamic-regrouping zone/channel), and your radio automatically switches to the dynamic-regrouping channel.

Note: When you use a radio-control knob or switch to select the zone or channel, you are not be able to scan or initiate a private conversation call until you select the dynamic regrouping position. You also hear a gurgle tone each time you press the **PTT button**. This is a reminder to you that you are transmitting on the dynamic-regrouping channel, not the zone or channel indicated by the position of the radio control.

However, in some cases the radio is programmed as a select-enabled radio: see page 40 for details.

- 1 Press the **PTT button** to talk and release it to listen.
- 2 When the dynamic regrouping is cancelled by the dispatcher, your radio automatically returns to the present knob/switch zone and/or channel position.

Reprogram Request

This feature allows you to notify the dispatcher that you want a new dynamic-regrouping assignment.

- 1 Press the preprogrammed **Reprogram Request button** (see page 4).
- 2 If you hear one beep, press the **PTT button** to resend the reprogram request again.

If you hear five beeps, the reprogram request was acknowledged by the dispatcher.

Note: If the dispatcher fails to acknowledge the reprogram request within six seconds, you hear a low-pitched alert tone.

Select Enable/Disable

The dispatcher may classify regrouped radios into either of the following two categories:

- Select-enabled radios are free to make channel changes to any available channel, including the dynamic-regrouping channel.
- Select-disabled radios cannot change channels since the dispatcher has specifically chosen to force the radio to remain on the dynamic-regrouping channel.

Note: You cannot use the scan and private conversation call features when your radio is select disabled.

PTT-ID Transmit

The PTT-ID transmit feature is a per-channel feature in which your radio's ID number is automatically sent every time the **PTT button** is pressed. For analog voice transmissions, depending upon how your radio was programmed, your radio's ID can be transmitted at the beginning of a transmission, at the end of a transmission, or at the beginning and ending of a transmission. For digital voice transmissions, your radio's ID is sent continuously during the voice message.

If your radio has MDC-1200™ signalling and the ID is sent before the voice transmission, you hear a continuous low-pitched tone until the ID transmission is completed; this helps you avoid talking while the ID code is being transmitted.

Secure Operation

If your radio is programmed with secure operation, you may transmit in either clear or secure mode. Transmitting in secure mode ensures that no users other than the intended recipient(s) are able to decode your encrypted message.

Selecting Secure or Clear Transmissions

Use the preprogrammed **Secure/Clear switch** (see page 4) to select secure or clear operation of the radio before initiating a transmission using the **PTT button**. This selection cannot be made when a transmission is in progress.

If a channel is programmed for secure-only operation, and the **Secure/Clear switch** is in the clear (○) position, when the **PTT button** is pressed, you hear a continuous, low-pitched invalid-mode tone, and the radio does not transmit until the **Secure/Clear switch** is set to the secure (Ⓢ) position.

If a channel is programmed for clear-only operation, and the **Secure/Clear switch** is in the secure (Ⓢ) position, when the **PTT button** is pressed, you hear an invalid-mode tone, and the radio does not transmit until the **Secure/Clear switch** is set to the clear (○) position.

Managing Encryption

Your radio may be programmed for either single key or multikey encryption. If your radio is programmed for single key encryption, your radio has a single encryption key and supports one encryption algorithm. The multikey feature allows your radio to be equipped with as many as 16 different encryption keys and supports up to two different encryption algorithms simultaneously (for example, DVP-XL™ and DES-XL; or DVP™ and DVI-XL™ or DES-OFB).

KEY Loading

To load encryption keys into the radio:

- 1 Set up the radio and equipment as specified in the key-variable loader (KVL) manual.
- 2 When the KVL is attached to your radio, all other radio functions are locked out.
- 3 Press the KVL's **PTT button** to load the encryption keys into your radio. When the key has been loaded successfully, single-key radios sound a short tone and multi-key radios sound an alternate tone.

Key Erasure

With the radio on, press and hold the preprogrammed **Top Side button** (see page 4) while pressing the preprogrammed **Emergency button** (see page 4) at the same time.

Note: Pressing the Emergency button *before* pressing the Top Side button sends an emergency alarm.

MultiKEY

The multikey feature must be configured based on whether or not your radio is used for conventional applications or both conventional and trunked applications as described below:

| | |
|-------------------------|--|
| Multikey | The encryption keys can be tied (strapped), on a one-per-channel basis by your system administrator or radio technician. In addition, you can have operator-selectable keys, operator-selectable indices, 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 for example, dynamic regrouping, failsoft, emergency talkgroup, or emergency-announcement group. |

Selectable Power Level

This feature allows you to select the power level at which your radio transmits messages.

Note: When the radio is powered on, it defaults to the programmed setting.

Place the preprogrammed **TX Power-Level Switch** (see page 4) in the either the high-power or low-power position.

The low-power provides shorter transmitting distance and conserves battery life.

High power transmission mode provides longer transmitting distance and utilizes more battery power.

The new transmit power level is saved.

Trunking System Controls

Busy Override

When a talkgroup call is placed in a SmartZone™ system and the system is not able to obtain voice channels at all necessary sites, you hear a group of low-pitched busy tones. If preprogrammed, you may override the busy status by performing the following steps:

- 1 Press the **PTT button**; you hear a busy tone.
- 2 Release the **PTT button**.
- 3 Press and hold the **PTT button** a second time. The busy tone is heard again. After a few seconds, you hear a preprogrammed busy-override chirp and the radio sends in a busy-override request.

The talkgroup call is placed at all sites that have voice channel resources available. Other sites are added to the call as channels become available.

Note: Not all members of the talkgroup are able to hear a call when a busy override is requested.

Dispatcher Interrupt

The dispatcher-interrupt feature allows the dispatcher to interrupt your radio and places you in a Private Conversation call with the dispatcher.

- 1 When your radio receives a dispatcher-interrupt call, you hear a repeating sequence of four, short, medium-pitched tones until you answer the call. The green LED flashes indicating that a call is being received.
- 2 Press the **PTT button** to talk and release it to listen.
- 3 To hang up when you are finished with your conversation, press the **Call Response button**.

Failsoft

If a trunking system experiences a complete failure, the radio reverts to Failsoft operation and automatically switches to its Failsoft channel. During Failsoft, the trunking repeaters transmit a medium-pitched tone every 10 seconds. When the trunking system returns to normal operation, your radio automatically exits the Failsoft operation and returns to trunked operation.

Out-of-Range

If you go out of range of the system and can no longer lock onto a control channel, you hear a low-pitched tone. Your radio remains in this out-of-range condition until it (1) locks onto a control channel, (2) locks onto a failsoft channel, or (3) the radio is turned off.

Site Lock

This feature allows your radio to lock onto a specific site and not roam among wide-area talkgroup sites. This is particularly useful when operating at the fringe of a system's coverage.

Press the preprogrammed **Site Lock/Unlock button** (see page 4).

Site Change

- 1** Press and hold down the preprogrammed **Site Search button** (see page 4) to manually force the change to a new site.

You hear a tone while the radio scans for a new site. When a new site is found, the tone stops.

Notes

Additional Information

Troubleshooting

If you suspect a radio problem, check the following items before requesting service:

1 Radio Checks

- Be sure the radio is turned on and the **16-Position Select knob** is in the proper position.
- Replace or recharge the battery. The first time a new battery is used, it should charge a minimum of 16 hours.
- The antenna must be attached properly with its base flush against the top of the radio.
- Check that any accessories in use are properly connected.
- Test the radio from several different locations (especially if the problem occurs when the radio is used inside a building).
- Check the transmitter by transmitting to an alternate portable radio.

2 Operating Instructions

Review your operating instructions and ensure that you are using the radio properly.

- 3 If, after following steps 1 and 2, your radio still has a problem, contact your system manager or review your service agreement and call your Motorola service representative as applicable.

If you do not have a service agreement on your radio, contact your nearest authorized Motorola service shop for guidance toward a prompt and expedient evaluation and/or repair.

Radio Care

Handling

- Do not pound, drop, or throw the radio unnecessarily. Never carry the radio by the antenna.
- Avoid subjecting the radio to an excess of liquids. Do not submerge the radio unless it is a ruggedized, XTS 3000 R model.
- Avoid subjecting the radio to corrosives, solvents or spirits.
- Do not disassemble the radio.
- Keep the accessory-connector cover in place until you are ready to use the connector. Replace the cover immediately once the accessory has been disconnected.

Cleaning

To clean the external surfaces of your radio:

- 1 Combine one teaspoon of mild dishwashing detergent to one gallon of water (0.5% solution).
- 2 Apply the solution sparingly with a stiff, non-metallic, short-bristled brush, making sure excess detergent does not get entrapped near the connectors, controls or crevices. Dry the radio thoroughly with a soft, lint-free cloth.
- 3 Clean battery contacts with a lint-free cloth to remove dirt or grease.



Caution

Do not use solvents to clean your radio. Spirits may permanently damage the radio housing.

Do not submerge the radio in the detergent solution.

Service

Proper repair and maintenance procedures assures efficient operation and long life for this product. A Motorola maintenance agreement provides expert service to keep this and all other communication equipment in perfect operating condition. A nationwide service organization is provided by Motorola to support maintenance services. Through its maintenance and installation program, Motorola makes available the finest service to those desiring reliable, continuous communications on a contract basis. For a contract service agreement, please contact your nearest Motorola service or sales representative, or an authorized Motorola dealer.

Express Service Plus (ESP) is an optional extended service coverage plan, which provides for the repair of this product for an additional period of either one or two years beyond the normal expiration date of the standard warranty. For more information about ESP, contact the Motorola Radio Support Center at 8000 West Sunrise Boulevard, Ft. Lauderdale, FL 33322.

Battery

Battery Charge Status

Your radio can indicate your battery's charge status through an LED and/or alert tones.

See "Low-Battery Indication" on page 25.

Battery Recycling and Disposal

Rechargeable batteries may be recycled. However, recycling facilities may not be available in all areas. Under various U.S. state laws and the laws of several other countries, batteries must be recycled and cannot be disposed of in landfills or incinerators. Contact your local waste management agency for specific requirements and information in your area.

Additional Information

Motorola fully endorses and encourages the recycling of batteries. In the U.S. and Canada, Motorola participates in the nationwide Rechargeable Battery Recycling Corporation (RBRC) program for battery collection and recycling. Many retailers and dealers participate in this program.

For the location of the drop-off facility closest to you, access RBRC's Internet web site at www.rbrc.com or call 1-800-8-BATTERY. This Internet site and telephone number also provide other useful information concerning recycling options for consumers, businesses, and governmental agencies.

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