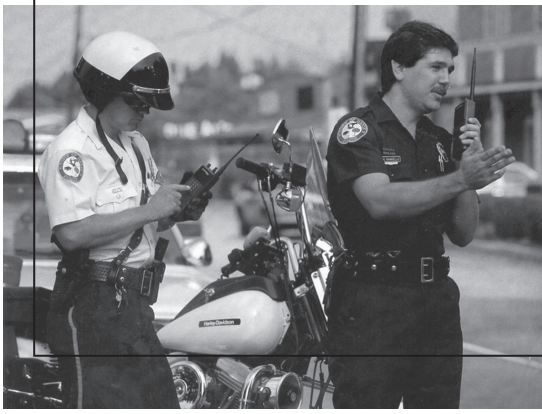
MOTOROLA



ASTRO® XTS™ 5000 Digital Portable Radio

Model I

User Guide

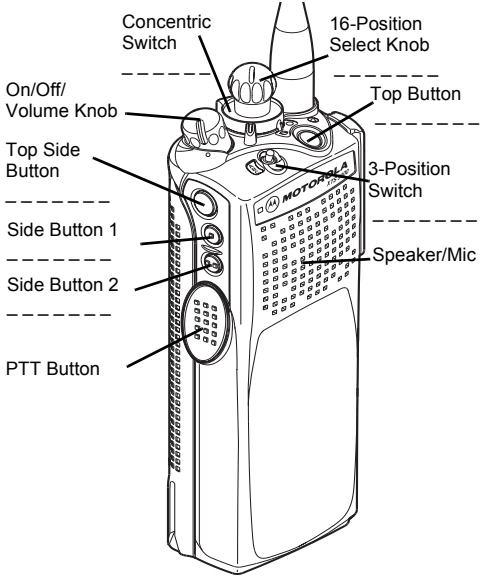
ASTRO® XTS™ 5000 Digital Portable Radio, Model I Quick Reference Card

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 68P81095C98) to ensure compliance with RF energy exposure limits.



Write your radio's programmed features on the dashed lines.

Radio On/Off

1. On – **On/Off/Volume** knob clockwise.
2. Off – **On/Off/Volume** knob counterclockwise.

Zones/Channels

1. Zone – **Zone** switch to desired zone.
2. Channel – **Channel** switch to desired channel.

Receive/Transmit

1. Radio on and select zone/channel.
2. Listen for a transmission.
   – or –
   Press and hold **Volume Set** button.
   – or –
   Press **Monitor** button and listen for activity.
3. Adjust volume, if necessary.
4. Press **PTT** to transmit; release to receive.

Send Emergency Alarm

Radio on and press **Emergency** button. You see red LED; you hear short, medium-pitched tone.

Note: To exit emergency at any time, press and hold **Emergency** button.

When acknowledgment is received, you hear four beeps; alarm ends; radio exits emergency.

Send Emergency Call

1. Radio on and press **Emergency** button.

Note: To exit emergency at any time, press and hold **Emergency** button.

2. Press and hold **PTT**. Announce your emergency into the microphone.
3. Release **PTT** to end call.
4. Press and hold **Emergency** button to exit emergency.

Send Silent Emergency Alarm

1. Radio on and press **Emergency** button. You see no LED; you hear no tone.

Note: To exit emergency at any time, press and hold **Emergency** button.

2. Silent emergency continues until you:
   - Press and hold **Emergency** button to exit emergency state.
     – or –
   - Press and release **PTT** to exit silent emergency and enter regular emergency (alarm, call, or alarm with call).

Notes

ASTRO® XTS™ 5000 Digital Portable Radio Model I User Guide

Motorola, Inc.
1301 E. Algonquin Rd.
Schaumburg, IL60196-1078, U.S.A.

6881094C25-K

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, Inc.

Address: 1301 E. Algonquin Rd, Schaumburg, IL 60196-1078 USA

Phone Number: 1-800-927-2744

Hereby declares that the product:

Model Name: **XTS 5000**

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.

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.

Product Safety and RF Exposure Compliance

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 68P81095C98) to ensure compliance with RF energy exposure limits.

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Notes

Contents

Table 1: Channel Map

Use the chart below to map the channels (C*x*) and zones (Z*x*) for your radio.

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

General Radio Operation

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.

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

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:

Example	*Description*
Light button	Buttons are shown in bold print.

Additional Performance Enhancement

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

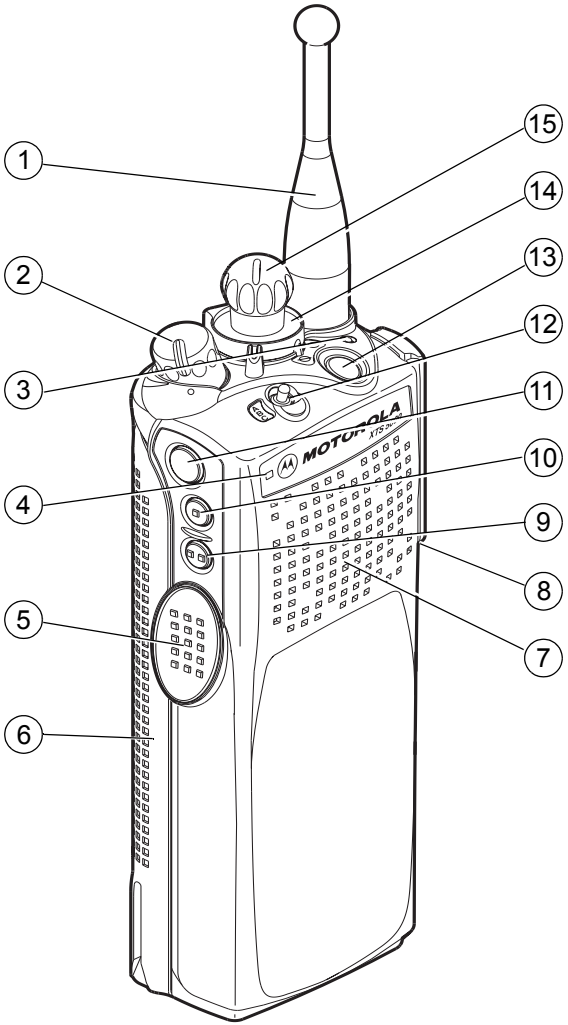
Dynamic System Resilience (DSR)

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.

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.

Your XTS 5000 Model I Radio



Physical Features of the XTS 5000 Model I Radio

Table 2: Physical Features

No.	Feature	Page	No.	Feature	Page
1	Antenna	11	**5**	PTT (Push-to-Talk) Button	–
2	On/Off/Volume Control Knob	14	**6**	Battery	9
3	LED	5	**7**	Speaker	–
4	Microphone	–	**8**	Universal Connector	13

Programmable Controls

The following radio controls can be programmed to operate certain software-activated features.

No.	Feature	No.	Feature
9	Side Button 2	**13**	Top Button
10	Side Button 1	**14**	2-Position Concentric Switch
11	Top Side (Select) Button	**15**	16-Position Select Knob
12	3-Position A/B/C Switch	–	

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.

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.

Table 3: Programmable Features

Feature	*Page*	*Feature*	*Page*	*Feature*	*Page*
Call Response	31	Nuisance Delete	29	Secure/Clear	35
Channel	15	PL Defeat	21	Site Lock/ Unlock	41
Dynamic Priority	30	Repeater/Direct	33	Site Search	41
Emergency	22	Reprogram Request	39	TX Power Level	21
Light	5	Scan On/Off	29	Volume Set	18
Monitor	19	Scan List Programming	27	Zone	15

Backlight

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

These lights will 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

LED Indicator	*What it Means*
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.

Table 5: Alert Tones

You Hear	*Tone Name*	*Heard*
Short, Low-Pitched Tone	Invalid Key-Press	when wrong key is pressed
	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
Long, Low-Pitched Tone	No ACK Received	when radio fails to receive an acknowledgment
	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 unprogrammed channel
	Individual Call Warning Tone	when radio is in an individual call for greater than 6 seconds without any activity
A Group of Low-Pitched Tones	Busy	when system is busy

Table 5: Alert Tones (Continued)

You Hear	*Tone Name*	*Heard*
Short, Medium-Pitched Tone	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	Volume Set	when volume is changed on a quiet channel
	Emergency Exit	when exiting the emergency state
A Group of Medium-Pitched Tones	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
	Call Alert Sent	when Call Alert is received by the target radio
Short, High-Pitched Tone (Chirp)	Low-Battery Chirp	when battery is below preset threshold value

Table 5: Alert Tones (Continued)

You Hear	*Tone Name*	*Heard*
Short, Medium-Pitched Tone (Chirp)	GPS RSM Low Battery Chirp	when this accessory battery is below preset threshold value
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	Dynamic Regrouping	(when the **PTT** button is pressed) a dynamic ID has been received

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.**

Charging the Battery

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.

For a list of Motorola-authorized batteries available for use with your XTS 5000 radio, see “Batteries and Battery Accessories” on page 50.

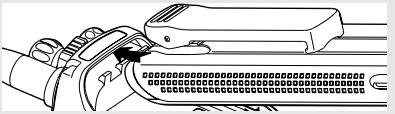
Note: When charging a battery attached to a radio, turn the radio off to ensure a full charge.

Battery Charger

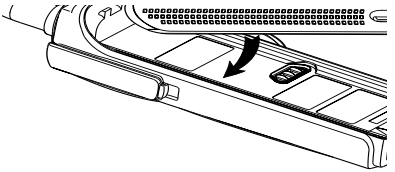
To charge the battery, place the battery, with or without the radio, in a Motorola-approved charger. The charger’s LED indicates the charging progress; see your charger’s user guide. For a list of chargers, see “Chargers” on page 52.

Attach the Battery

1 With the radio turned off, insert the top edge of the battery into the radio's frame as shown.



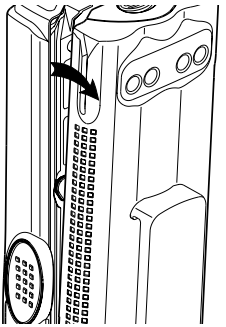
2 Rotate the battery toward the radio and press down until the battery clicks into place.



Remove the Battery

1 With the radio turned off, press the release button on the bottom of the battery until the battery releases from the radio.

2 Remove the battery from the radio.



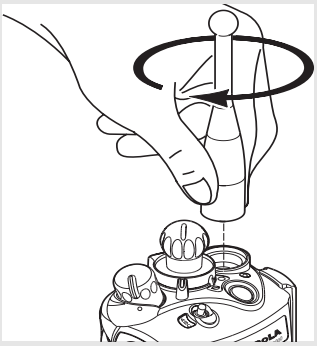
Note: If your radio is programmed with volatile-key retention, encryption keys will be retained for approximately 30 seconds after battery removal. Consult a qualified radio technician for details.

Antenna

For information regarding available antennas, see page 48.

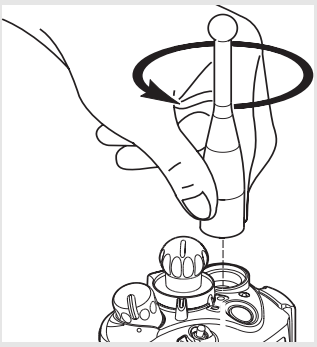
Attach the Antenna

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



Remove the Antenna

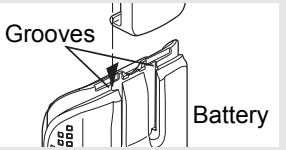
With the radio turned off, turn the antenna counterclockwise to remove it from the radio.



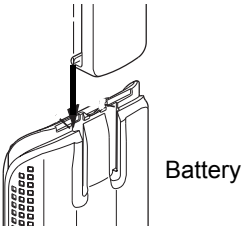
Belt Clip

Attach the Belt Clip

1 Align the grooves of the belt clip with those of the battery.

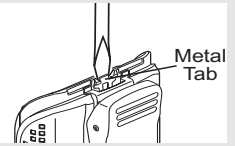


2 Press the belt clip downward until you clear a click.

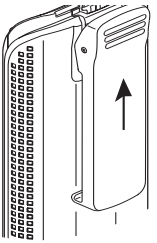


Remove the Belt Clip

1 Use a flat-bladed object to press the belt clip tab away from the battery.



2 Slide the belt clip upward to remove it.



Universal Connector Cover

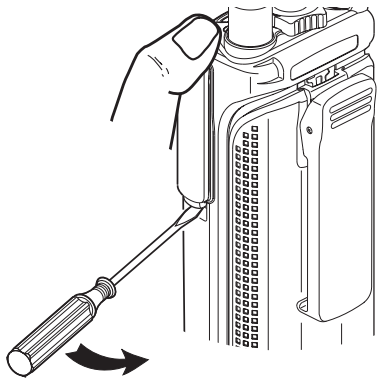
The universal connector is located on the antenna side of the radio. It is used to connect accessories to the radio.

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

Remove the Connector Cover

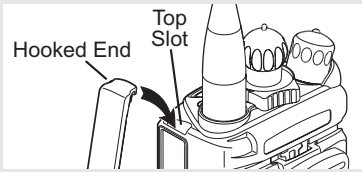
1 Insert a flat-bladed screwdriver into the area between the bottom of the cover and the slot below the connector.

2 Hold the top of the cover with your thumb while you pry the bottom of the cover away from the radio with the screwdriver.

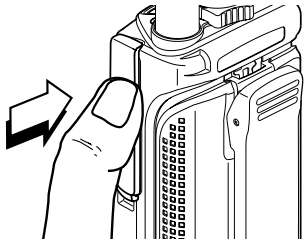


Attach the Connector Cover

1 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.



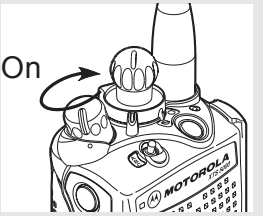
2 Rub the ball of your thumb from the top to the bottom of the cover while applying pressure towards the radio. This should flex the cover and snap it into place.



Radio On and Off

Turn the Radio On

Turn the **On/Off/Volume Control** knob clockwise. The radio does a self test.



Note: If the self test is successful, you hear a medium-pitched tone.

- Medium-pitched tone

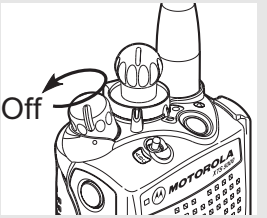
If the self test is not successful, you hear a low-pitched tone.

- 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 a qualified radio technician.

Turn the Radio Off

Turn the **On/Off/Volume Control** knob counterclockwise until it clicks.



Zones and Channels

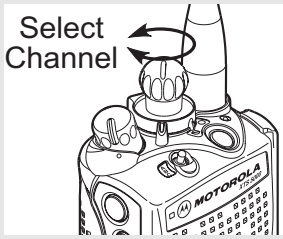
A zone is a grouping of channels. A channel is a group of radio characteristics, such as transmit/receive frequency pairs.

Before you use your radio to receive or send messages, you should select the zone and channel.

Select a Zone

1	If a control on your radio has been preprogrammed as the **Zone** switch, move the **Zone** switch to the position for the zone you want.	
2	If the zone you selected is unprogrammed, you hear a long, medium-pitched tone. Repeat step **1**.	• Long, medium-pitched tone

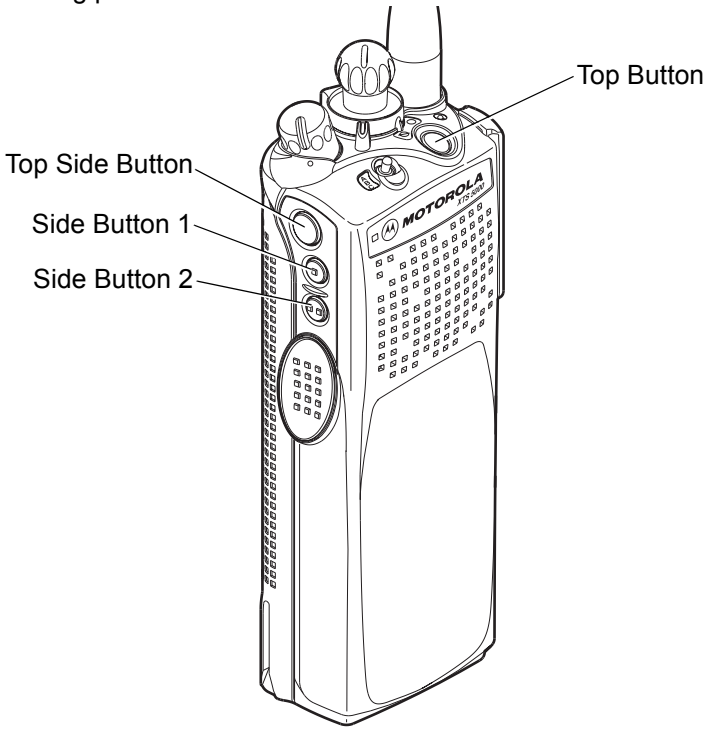
Select a Channel

1	When the zone you want has been selected, turn the preprogrammed **16-Position Select** knob to the desired channel.	
2	If the channel you selected is unprogrammed, you hear a long, medium-pitched tone. Repeat step **1**.	• Long, medium-pitched tone

Mode Select Button

This feature lets you program the current zone and channel to a **Mode Select** button with a long press on the **Mode Select** button. After the buttons are programmed, you can return to the pre-programmed zone and channel with a short press on the programmed **Mode Select** button.

The buttons that are assigned for this feature are labeled in the following picture.

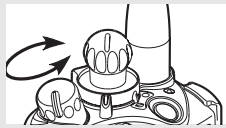


Receive / Transmit

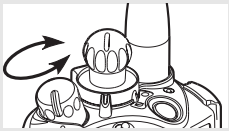
Radio users who switch from analog to digital radios often assume that the lack of static on a digital channel is an indication that the radio is not working properly. This is not the case. Digital technology quiets the transmission by removing the “noise” from the signal and allowing only the clear 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.

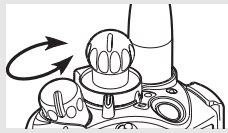
Without Using Volume Set and Monitor Buttons

1	Turn the radio on and select the desired zone and channel.	
2	Listen for a transmission.	
3	Adjust the **Volume Control** knob if necessary.	
4	Press and hold the **PTT** button to transmit. The LED lights RED while transmitting.	
5	Release the **PTT** button to receive (listen).	

Use the Preprogrammed Volume Set Button

1	Turn the radio on and select the desired zone and channel.	
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 RED while transmitting.	
6	Release the **PTT** button to receive (listen).	

Use the Preprogrammed Monitor Button

1	Turn the radio on and select the desired zone and channel.	
2	Press the **Monitor** button and listen for activity. (See the following **Conventional Mode Operation**.)	
3	Adjust the **Volume Control** knob if necessary.	
4	Press and hold the **PTT** button to transmit. The LED lights RED while transmitting.	
5	Release the **PTT** button to receive (listen).	

Conventional Mode Operation

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

1	Momentarily press the **Monitor** button to listen for activity.
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.

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

Common Radio Features

Selectable Power Level

This feature lets you select the power level at which your radio will transmit. This feature must be preprogrammed by a qualified radio technician.

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

Place the preprogrammed **TX Power Level** switch in the **High Power** or **Low Power** position.

Conventional Squelch Operation

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

When in	*This condition occurs*
Carrier squelch	You hear all traffic on a channel.
PL or DPL	The radio responds only to your messages.

PL Defeat

With this feature, you can override any coded squelch (DPL or PL) that might be preprogrammed to a channel.

Place the preprogrammed **PL Defeat** switch in the **PL Defeat** position. You can now hear any activity on the channel. The radio is muted if no activity is present.

Time-out Timer

The time-out timer turns off your radio's transmitter. The timer is set for 60 seconds at shipment, but it can be programmed from 0 to 7.75 minutes (465 seconds) by a qualified radio technician.

1	Hold down the **PTT** button longer than the programmed time. You will hear a short, low-pitched warning tone, the transmission will cut-off, and the LED will go out until you release the **PTT**.	• Short warning tone • Transmission is cut-off • LED goes out
2	Release the **PTT** button.	• LED re-lights • Timer resets
3	Press the **PTT** to re-transmit. The time-out timer restarts.	• Timer restarts • LED is red

Emergency

If the top (orange) button is programmed to send an emergency signal, then this signal overrides any other communication over the selected channel.

Your radio can be programmed for the following:

- Emergency Alarm
- Emergency Call
- Emergency Alarm with Emergency Call
- Silent Emergency Alarm

Consult a qualified radio technician for emergency programming of your radio.

Send an Emergency Alarm

An emergency alarm sends a data transmission to the dispatcher, which identifies the radio sending the emergency.

1	With your radio turned on, press the **Emergency** button. The red LED lights, and you hear a short, medium-pitched tone.	• Red LED • Short tone

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

2	When you receive the dispatcher's acknowledgment, you hear four tones, the alarm ends, and the radio exits the emergency mode.	• Four tones • Alarm ends • Radio exits emergency
	If no acknowledgment is received, the alarm ends and the radio exits the emergency mode.	• Alarm ends • Radio exits emergency

Note: **For Emergency Alarm with Emergency Call:** The radio enters the Emergency Call state either after it receives the dispatcher's acknowledgment, or if you press the **PTT** button while in Emergency Alarm. Go to step 2 of "Send an Emergency Call" on page 24.

Send an Emergency Call

This type of dispatch gives your radio priority access on a channel.

The radio operates in the normal dispatch manner while in Emergency Call, except, if enabled, it will return 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.

1	With your radio turned on, press the **Emergency** button. A short, medium-pitched tone sounds.	• Short tone
Note:	To exit emergency at any time, press and hold the **Emergency** button.	
2	Press and hold the **PTT** button and announce your emergency into the microphone.	
3	Release the **PTT** button to end the transmission and wait for a response from the dispatcher.	
4	Press and hold the **Emergency** button for about a second to exit emergency.	

Send a Silent Emergency Alarm

1	With your radio turned on, press the **Emergency** button. The LED does not light, and you hear no tones.	• LED does not light • No tones
Note:	To exit emergency at any time, press and hold the **Emergency** button for about a second.	
2	The silent emergency state continues until you: Press and hold the **Emergency** button for about a second to exit the emergency state. **OR** Press and release the **PTT** button to exit silent emergency and enter regular dispatch or emergency call.	• Press and hold **Emergency** button **OR** • Press and release the **PTT** button

Note: For ALL Emergency signals, when changing channels:

- If the new channel is also programmed 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 programmed for Emergency, you hear an invalid tone until you exit Emergency or change to a channel programmed for emergency.

Emergency Keep-Alive

With Emergency Keep-Alive enabled, if the radio is in the Emergency state, you cannot turn off the radio by using the **On/Off Volume Control** knob.

With Keep-Alive, the radio will only exit the Emergency state using one of the ways mentioned in the previous sections (Emergency Alarm, Silent Emergency Alarm, or Emergency Call).

Lists

View a Scan List

You can view the status of members of **one** preselected scan list.

1 Select the zone/channel whose scan status you wish to view (see “Zones and Channels” on page 15).

2 Move the preprogrammed **Scan List Programming** switch to the “scan list programming” position.

The LED’s color and condition indicates the status of the selected zone/channel.

- Steady Green = a non-priority member of the scan list.
- Steady Red = the *Priority 2* member of the scan list.
- Flashing Red = the *Priority 1* member of the scan list.
- Unlighted = not a member of the scan list.

3 Select additional zones/ channels as desired to view their scan status.

4 When finished, move the **Scan List Programming** switch away from the “scan list programming” position.

Edit a Scan List

You can add or change the priority status of members in **one** preselected scan list.

1 Select the zone/channel you wish to add or whose scan priority status you wish to change (see “Zones and Channels” on page 15).

2 Move the preprogrammed **Scan List Programming** switch to the **Scan List Programming** position.

The LED’s color and condition indicates the status of the selected zone/channel.

- Steady Green = a non-priority member of the scan list.
- Steady Red = the *Priority 2* member of the scan list.
- Flashing Red = the *Priority 1* member of the scan list. You will hear all traffic on the Priority 1 channel, regardless of traffic on non-priority channels.
- Unlighted = not a member of the scan list.

Note: You cannot delete a priority channel from a scan list.

3 Press the **Select** button (Top Side button) once to add the selected zone/channel to the scan list.

AND/OR

Press the **Select** button (Top Side button) one or more times to find the desired scan status. The last scan status shown is the one that is saved.

Note:	In **Scan List Programming** mode, the Top Side button automatically becomes the **Select** button. This is only true while in **Scan List Programming** mode. The maximum number of members for a conventional scan list is 15.
4	Select additional zones/ channels as desired to add them or to change their scan status.
5	When finished, move the **Scan List Programming** switch away from the **Scan List Programming** position.

Scan

The scan feature allows you to monitor traffic on different channels by scanning a preprogrammed list of channels. Your radio can have up to 32 different scan lists. These lists must be preprogrammed by a qualified radio technician.

- To view your radio's scan lists, see "View a Scan List" on page 26.
- To change one of your radio's scan lists, see "Edit a Scan List" on page 27.

Turn Scan On or Off

Place the **Scan** switch in the **Scan On** or **Scan Off** position.

Delete a Nuisance Channel

When the radio scans to 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.

Repeat this step to delete more channels.

Note: You cannot delete priority channels or the designated transmit channel.

2 The radio continues scanning the remaining channels in the list. To resume scanning the deleted channel, change channels or turn scan off and then back on again.

Conventional Scan Only

Make a Dynamic Priority Change

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 replaced Priority 2 channel becomes a non-priority channel. This change remains in effect until scan is turned off, then scanning reverts back to the preprogrammed state.

1 When the radio is locked onto the channel to be designated as Priority 2, press the preprogrammed **Dynamic Priority** button.

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

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

Individual Calls

You can answer individual calls made to your radio. Use the preprogrammed **Call Response** button to answer a call.

Answer a Telephone Call (Trunking Only)

Use your radio to answer calls similar to standard phone calls. A landline phone can be used to call a radio. Use the preprogrammed **Call Response** button to answer a call.

1	When a phone call is received, you hear a telephone-type ringing, and the LED flashes GREEN.	• Telephone-type ringing • Flashing GREEN LED
2	Press the **Call Response** button within 20 seconds after the call indicators begin.	
3	Press and hold the **PTT** button to talk; release it to listen.	
4	To hang up, press the **Call Response** button again.	

Answer a Private Call (Trunking Only)

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. Use the preprogrammed **Call Response** button to answer a call.

1	When a private call is received, you hear two alert tones, and the LED flashes GREEN.	• Two tones • Flashing GREEN LED
2	Press the **Call Response** button within 20 seconds.	

3	Press and hold the **PTT** button to talk; release it to listen.	
4	To hang up, press the **Call Response** button again.	

Answer a Selective Call (ASTRO Conventional Only)

A Selective Call is used to call a select 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.

1	When a Selective Call is received, you hear two alert tones and the LED flashes GREEN.	• Two tones • Flashing GREEN LED
2	Press and hold the **PTT** button to talk; release it to listen.	
3	Press to hang up.	

Answer a Call Alert Page

Call Alert allows your radio to work like a pager.

1	When a Call Alert page is received, you hear four repeating alert tones, and the LED flashes GREEN.	• Four repeating alert tones • Flashing GREEN LED
2	Press and hold the **PTT** button to talk; release it to listen. Your conversation is heard by the entire talkgroup.	

Select Repeater or Direct Operation

- REPEATER operation = increases radio range by connecting radios through a repeater or repeaters. Transmit and receive frequencies are different.
- DIRECT (or Talkaround) operation = You bypass the repeater and connect directly to another radio. Transmit and receive frequencies are the same.

Place the **Repeater/Direct** switch in the **Repeater** or **Direct** position.

Smart PTT (Conventional Only)

Smart PTT is a per-channel, 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 will not be able to transmit on an active channel. If you try to transmit (press the **PTT** button) on an active smart-PTT channel, you will hear an alert tone, and the transmission will be inhibited. The LED will also blink red to indicate that the channel is busy.

Three radio-wide variations of smart PTT are available:

Transmit Inhibit on Busy Channel with Carrier	You cannot transmit if any activity 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 will not be 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.

Special Radio Features

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.

Note: Secure operation is not available in trunked analog modes.

Select Secure Transmissions

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

Note: *If the selected channel is programmed for clear-only operation* – when you press the **PTT** button, you hear an invalid mode tone.

The radio will not transmit until you set the **Secure/Clear** switch to the clear position (○).

Select Clear Transmissions

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

Note: *If the selected channel is programmed for secure-only operation* – when you press the **PTT** button, you hear an invalid mode tone.

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

Managing Encryption

Key Loading

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

1	Attach the KVL to your radio. When it is attached, all radio functions, except for power down, backlight, and volume, will be locked out.
2	Press the **PTT** button on the KVL. This will load the encryption keys into your radio. When the key has been loaded successfully, the radio will sound a short tone for single-key radios; for multikey radios, an alternating tone will be heard.

Multikey

The multikey feature allows your radio to be equipped with as many as 48 different encryption keys and supports the DES-OFB algorithm.

- **Conventional Multikey** – The encryption keys can be tied (strapped), on a one-per-channel basis, through radio service 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 will 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.

Key Zeroization

Note: This is the method used for erasing the single key in radios with the single-key option, and for erasing all keys in radios with the multikey option.

With the radio on, press and hold the **Top Side** button; while holding this button down, press the **Top** button. When the keys have been erased, you will hear a valid key-press tone.

Note: **DO NOT** press the **Top** button before pressing the **Top Side** button, unless you are in an emergency situation; this would send an emergency alarm.

Dynamic Regrouping (Trunking Only)

The dynamic regrouping feature lets the dispatcher 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, you will hear an invalid tone.

When your radio is dynamically regrouped, it automatically switches to the dynamically regrouped channel. You see the dynamically regrouped channel's name, and hear a "gurgle" tone.

Press the **PTT** button to talk; release it 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.

Reprogram Request (ASTRO 25 Trunking Only)

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

1	Press the preprogrammed **Reprogram Request** button. The reprogram request is sent to the dispatcher.	• Reprogram request sent
2	If you hear *one beep,* press the **PTT** button to send the reprogram request again. **OR**	• One beep
	If you hear *five beeps*, the reprogram request was acknowledged by the dispatcher. **OR**	• Five beeps
	If the dispatcher does not acknowledge the reprogram request within six seconds, you hear a low-pitched alert tone. Try again.	• Alert tone

Select Enable / Disable

The dispatcher can classify regrouped radios into either 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. 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.

Trunking System Controls

Failsoft

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.

During failsoft operation:

Your radio transmits and receives in conventional operation on a predetermined frequency.	
You hear a medium-pitched tone every 10 seconds	• A medium-pitched tone

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

Out-of-Range

If you go out of the 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 locks onto a control channel, locks onto a failsoft channel, or is turned off.	• Locks onto control channel • Locks onto failsoft channel • Turned off.

Site Lock

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.

Lock or Unlock a Site

Press the preprogrammed **Site Lock/Unlock** button. The site lock state changes.

Site Change

You can manually force your radio to change to a new site.

Change the Current Site

1	Press and hold down the preprogrammed **Site Search** button. You hear a tone while the radio scans for a new site.	• Tone sounds
2	When the radio finds a new site, the tone stops.	• Tone stops

Outdoor Location (using GPS)

The Outdoor Location (using GPS) feature allows radio users using the model with display to determine their current location using a location menu. For non display model, radio location may be reported over-the-air but unknown to users.

This feature is only available when a location enabled accessory such as the GPS Remote Speaker Microphone (RSM) is attached to the radio.

Helpful Tips

Radio Care

Caution

- The XTS 5000 radio casting has two vent ports that allow for pressure equalization in the radio. Never poke these vents with any objects, such as needles, tweezers, or screwdrivers. This could create leak paths into the radio and the radio's submergibility will be lost.
- (**For XTS 5000 R Radios Only**) The XTS 5000 R radio is designed to be submerged to a maximum depth of 6 feet, with a maximum submersion time of 4 hours. Exceeding either maximum limit may result in damage to the radio.
- (**For XTS 5000 R Radios Only**) 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 as a preventive measure in order to assure the watertight integrity of the radio. Motorola details the disassembly, test, and reassembly procedures along with necessary test equipment needed to inspect, maintain and troubleshoot radio seals in the radio's service manual.
- If the radio battery contact area has been submerged in water, dry and clean the radio battery contacts before attaching a battery to the radio. Otherwise, the water could short-circuit the radio.

Caution

- If the radio has been submerged in water, shake the radio well so that any water that may be trapped inside the speaker grille and microphone port can be removed. Otherwise, the water will decrease the audio quality of the radio.
- Do not disassemble the radio. This could damage radio seals and result in leak paths into the radio. Any radio maintenance should be performed only by a qualified radio technician.

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.

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 5000 R model.
- Avoid subjecting the radio to corrosives, solvents or spirits.
- Do not disassemble the radio.
- Keep the accessory-connector cover in place until ready to use the connector. Replace the cover immediately once the accessory has been disconnected.

Service

Proper repair and maintenance procedures will assure efficient operation and long life for this product. A Motorola maintenance agreement will provide 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 3761 South Central Avenue, Rockford, IL 61102 (800) 227-6772 / (847)725-4200.

Battery

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, will last 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, will last even longer.

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. Motorola-authorized battery chargers may not charge batteries other than the ones listed on page 50.

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.

Battery Charge Status

Your radio can indicate your battery's charge status through LED and sounds.

When your battery is low:

- you see the LED flash red when the **PTT** button is pressed
- you hear a low-battery "chirp" (short, high-pitched tone)

Battery Recycling and Disposal

Nickel-cadmium (NiCd) rechargeable batteries can 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, NiCd 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.

Motorola fully endorses and encourages the recycling of NiCd batteries. In the U.S. and Canada, Motorola participates in the nationwide Rechargeable Battery Recycling Corporation (RBRC) program for NiCd 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.

Antenna

Radio Operating Frequencies

Before installing the antenna, make sure it matches your radio's operating frequency. Antennas are frequency sensitive and are color coded according to their frequency range. The color code indicator is located in the center of the antenna's base.

Color Code

The following antenna types are compatible with your radio:

Antenna Type	*Approx. Length*		*Insulator Color Code*	*Frequency Range*	*Antenna Kit No.*
	in.	*mm*			
VHF Helical	8	203	RED	136 – 174 MHz	NAD6563
VHF Helical	7.6	193	YELLOW	136 – 150.8 MHz	NAD6566
VHF Helical	7	178	BLACK	150.8 – 162 MHz	NAD6567
VHF Helical	6.5	165	BLUE	162 – 174 MHz	NAD6568
UHF Helical	3.4	88	RED	380 – 435 MHz	NAE6546
UHF Helical	3.2	80	GREEN	435 – 470 MHz	NAE6547
UHF Helical	3.1	79	BLACK	470 – 512 MHz	NAE6548
UHF Whip, Wideband	5.2	130	GRAY	380 – 520 MHz	NAE6549

Antenna Type	*Approx. Length*		*Insulator Color Code*	*Frequency Range*	*Antenna Kit No.*
	in.	*mm*			
800 MHz Whip, Halfwave	7	178	RED	806 – 870 MHz	NAF5037
800 MHz Stubby, Quarterwave	3.4	86	WHITE	806 – 870 MHz	NAF5042
700/800 MHz Whip	7	178	GREEN	764 – 870 MHz	NAF5080

Accessories

Motorola provides the following approved accessories to improve the productivity of your XTS 5000 portable two-way radio.

Antennas

NAD6563	136 – 174 MHz helical
NAD6566	136 – 150.8 MHz helical
NAD6567	150.8 – 162 MHz helical
NAD6568	162 – 174 MHz helical
NAE6546	380 – 435 MHz helical
NAE6547	435 – 470 MHz helical
NAE6548	470 – 512 MHz helical
NAE6549	380 – 520 MHz wideband whip
NAF5037	800 MHz whip, halfwave (806 – 870 MHz)
NAF5042	800 MHz stubby, quarterwave (806 – 870 MHz)
NAF5080	700/800 MHz whip (764 – 870 MHz)

Batteries and Battery Accessories

HNN9031	1525 mAh NiCd impres™ (non-FM/CSA)
HNN9032	1525 mAh NiCd impres™ Intrinsically Safe (FM/CSA)
NNTN4435	1800 mAh NiMH impres™ (non-FM/CSA)
NNTN4436	1750 mAh NiMH impres™ Intrinsically Safe (FM/CSA)
NNTN4437	1750 mAh NiMH impres™ Intrinsically Safe (FM/CSA) Ruggedized
NNTN7453	3950mAh Li-Ion impres™ Intrinsically Safe (FM) Ruggedized
NTN9862	2000 mAh impres™ Li Ion

NTN8294	1525 mAh NiCd (non-FM/CSA)
NTN8295	1525 mAh NiCd Intrinsically Safe (FM/CSA)
NTN8297	1525 mAh NiCd Intrinsically Safe (FM/CSA) Ruggedized
NTN8299	1700 mAh NiMH Intrinsically Safe (FM/CSA)
NTN8610	1650 mAh Li Ion
NTN8923	1800 mAh NiMH ultra-capacity (non-FM/CSA)
RNN4006	3000 mAh NiMH (non-FM/CSA)
RNN4007	3000 mAh NiMH Intrinsically Safe (FM/CSA)
NTN9177	Battery holder, clamshell, black (requires 12AA alkaline batteries)
NTN9183	Battery holder, clamshell, orange (requires 12AA alkaline batteries)

Carry Accessories

Belt Clips

NTN8266	Belt clip kit, 2.25", plastic (compatible with clamshell batteries)
NTN8460	Public Safety belt clip, 3.0”, metal (VHF use only)
NTN9179	Combo, high-activity D clip (NTN9212) and high-activity belt loop (NTN9213)
NTN9212	D clip, high-activity, swivel (for use with NTN9213)

Belt Loops

NTN8039	Swivel belt loop, 2.5" (for use only with the high-activity leather swivel snap carry cases)
NTN8040	Belt loop, swivel, leather, 3.0", high-activity (for use only with the high-activity leather swivel snap carry cases)

NTN8383	T-strap, plain, action snaps
NTN9213	Belt loop, 2.5", high-activity, D clip

Carry Cases

NTN8380	Case, hard leather high-activity (includes swivel belt loop and T-strap), 2.5" belt loop, for Model II and III radios
NTN8381	Case, hard leather high-activity (includes swivel belt loop and T-strap), 3.0" belt loop, for Model II and III radios
NTN8382	Case (includes belt loop and T-strap), for Model II and III radios
NTN8385	Case, hard leather high-activity (includes swivel belt loop and T-strap), 2.5" belt loop, for Model I radio
NTN8386	Case, hard leather high-activity (includes swivel belt loop and T-strap), 3.0" belt loop, for Model I radio
NTN8387	Leather case (includes belt loop and T-strap), for Model I radio
NTN8725	Nylon carry case with belt loop and T-strap
NTN9184	Leather case (includes belt loop), for clamshell battery

Chargers

NTN1667	Single-unit, tri-chemistry, rapid rate, 110 V
NTN1668	Single-unit, tri-chemistry, rapid rate, 230 V (2-prong Euro plug)
NTN1669	Single-unit, tri-chemistry, rapid rate, 230 V (3-prong UK plug)
WPLN4108	impres™ multi-unit, tri-chemistry, 110 V (US, NA plug)
WPLN4111	impres™ single-unit, tri-chemistry, 110 V

WPLN4130	impres™ multi-unit, tri-chemistry, with display (US, NA plug)

Surveillance Accessories

Earpieces

BDN6664	Earpiece with standard earphone, beige
BDN6665	Earpiece with extra-loud earphone (exceeds OSHA limits), beige
BDN6666	Earpiece with volume control, beige
BDN6667	Earpiece, mic and PTT combined, beige
BDN6668	Earpiece, mic and PTT separate, beige
BDN6669	Earpiece, mic and PTT combined, with extra-loud earphone (exceeds OSHA limits), beige
BDN6670	Earpiece, mic and PTT separate with extra-loud earphone (exceeds OSHA limits), beige
BDN6726	Earpiece with standard earphone, black
BDN6727	Earpiece with extra-loud earphone (exceeds OSHA limits), black
BDN6728	Earpiece with volume control, black
BDN6729	Earpiece, mic and PTT combined, black
BDN6730	Earpiece, mic and PTT separate, black
BDN6731	Earpiece, mic and PTT combined, with extra-loud earphone (exceeds OSHA limits), black
BDN6732	Earpiece, mic and PTT separate, with extra-loud earphone (exceeds OSHA limits), black
BDN6780	Earbud, single with mic and PTT combined, beige
BDN6781	Earbud, single, receive only, black

Headsets and Headset Accessories

BDN6635	Heavy-duty VOX headset with noise-canceling boom mic (requires BDN6673 adapter cable)
BDN6636	Heavy-duty VOX headset with throat mic (requires BDN6673 adapter cable)
BDN6645	Noise-canceling boom mic headset with PTT on earcup
BDN6673	Headset adapter cable (for use with BDN6635, BDN6636, and BDN6645)
BDN6676	3.0 mm threaded adapter jack
NMN1020	Safety helmet headset (requires BDN6676 adapter jack)
NMN6245	Light-weight headset
NMN6246	Ultralite headset with boom mic
NMN6258	Over-the-head headset with in-line PTT
NMN6259	Medium-weight, dual headset with NC mic
NTN8613	Keyload adapter
RMN4049	Temple Transducer

Radio Interface Modules for Ear Microphones

BDN6641	Ear mic, high noise level up to 105 dB, grey (must order interface module separately)
BDN6677	Ear mic, standard, noise up to 95 dB (must order interface module separately), black
BDN6678	Ear mic, standard, noise up to 95 dB (must order interface module separately), beige
BDN6671	Push-to-talk (PTT) and voice-activated (VOX) interface module (for use with BDN6641, BDN6677, and BDN6678)
BDN6708	PTT interface module (for use with BDN6641, BDN6677, and BDN6678)

Speaker, Remote Speaker and Public Safety Microphones

NMN6191	RSM noise-canceling (includes 6.0' coiled cord assembly, 3.5mm earjack, swivel clip, quick disconnect)
NMN6193	Remote speaker mic
NMN6247*	Public safety mic with straight cord, 30"
NMN6250*	Public safety mic with straight cord, 24"
NMN6251*	Public safety mic with straight cord, 18"
RMN5021	Commander, smart remote speaker mic
RMN5023	Commander, submersible smart remote speaker mic
HMN4080	Global Positioning Satellite (GPS) remote speaker mic

** For XTS 5000 UHF Range 1 radio models. Use only approved antennas NAE6547 or NAE6549 with these microphones.*

CommPort Integrated Microphone/Receivers

NTN1624	CommPort with palm PTT
NTN1625	CommPort ear mic with PTT for noise levels up to 100 dB (requires BDN6676 adapter)
NTN1663	CommPort ear mic with ring PTT for noise levels up to 100 dB (requires BDN6676 adapter)
NTN1736	CommPort ear mic with snap-on side PTT for noise levels up to 100 dB (requires BDN6676 adapter)
NNTN4186	CommPort ear mic receiver with body PTT switch

Switches

0180300E83	Remote PTT body switch for EMS
NTN7660	Tilt / man down switch
NTN8327	External RF switch

Vehicular Adapters

Accessories

HMN4069	Next-generation mobile mic
HSN1006	Speaker, 6-watt
NKN6455	Cable, 6-watt speaker
NTN1606	Vehicular adapter, BNC, open face
NTN1607	Vehicular adapter, BNC, closed face
NTN8560	Vehicular adapter, mini-U, open face
NTN8561	Vehicular adapter, mini-U, closed face
NTN8940	Vehicular adapter, trunnion mount
NTN9176	Vehicular charger, XTS, tri-chemistry, compatible with PAC•RT
PLN7737	Handheld control head
RLN4884	XTS travel charger (uses cigarette lighter adapter)

Glossary

This glossary is a list of specialized terms used in this manual.

ACK	Acknowledgment of communication.
Active Channel	A channel that has traffic on it.
Analog Signal	An RF signal that has a continuous nature rather than a pulsed or discrete nature.
ASTRO 25 Trunking	Motorola standard for wireless digital trunked communications.
ASTRO Conventional	Motorola standard for wireless analog or digital conventional communications.
Autoscan	A feature that allows the radio to automatically scan the members of a scan list.
Call Alert	Privately page an individual by sending an audible tone.
Carrier Squelch	Feature that responds to the presence of an RF carrier by opening or unmuting (turning on) a receiver's audio circuit. A squelch circuit silences the radio when no signal is being received so that the user does not have to listen to "noise."
Central Controller	A software-controlled, computer-driven device that receives and generates data for the trunked radios assigned to it. It monitors and directs the operations of the trunked repeaters.
Channel	A group of characteristics such as transmit/receive frequency pairs, radio parameters, and encryption encoding.
Control Channel	In a trunking system, one of the channels that is used to provide a continuous, two-way/data communications path between the central controller and all radios on the system.

Conventional	Typically refers to radio-to-radio communications, sometimes through a repeater (see Trunking).
Conventional Scan List	A scan list that includes only conventional channels.
Digital Private Line (DPL)	A type of coded squelch using data bursts. Similar to PL except a digital code is used instead of a tone.
Digital Signal	An RF signal that has a pulsed, or discrete, nature, rather than a continuous nature.
Dispatcher	An individual who has radio system management duties.
Dynamic Regrouping	A feature that allows the dispatcher to temporarily reassign selected radios to a single special channel so they can communicate with each other.
Failsoft	A feature that allows communications to take place even though the central controller has failed. Each trunked repeater in the system will transmit a data word informing every radio that the system has gone into failsoft.
FCC	Federal Communications Commission.
Hang Up	Disconnect.
KVL	Key-variable loader: A device for loading encryption keys into the radio.
LED	Light-emitting diode.
Monitor	Check channel activity by pressing the Monitor button. If the channel is clear, you will hear static. If the channel is in use, you will hear conversation. It also serves as a way to check the volume level of the radio, since the radio will “open the squelch” when pressing the monitor button.

Network Access Code	Network Access Code (NAC) operates on digital channels to reduce voice channel interference between adjacent systems and sites.
NiCd	Nickel-cadmium.
NiMH	Nickel-metal-hydride.
Non-tactical/Revert	The user will talk on a preprogrammed emergency channel. The emergency alarm is sent out on this same channel.
Page	A one-way alert, with audio messages.
Personality	A set of unique features specific to a radio.
Preprogrammed	Refers to a software feature that has been activated by a qualified radio technician.
Private (Conversation) Call	A feature that lets you have a private conversation with another radio user in the group.
Private Line (PL)	A sub-audible tone that is transmitted such that only receivers decoding the tone will receive it.
Programmable	Refers to a radio control that can have a radio feature assigned to it.
PTT	Push-To-Talk – the **PTT button** engages the transmitter and puts the radio in transmit (send) operation when pressed.
Radio Frequency (RF)	The part of the general frequency spectrum between the audio and infrared light regions (about 10 kHz to 10,000,000 MHz).
Repeater	A conventional radio feature, where you talk through a receive/transmit facility that retransmits received signals, in order to improve communications range and coverage.

Selective Call	A feature that allows you to call a select individual, intended to provide privacy and to eliminate the annoyance of having to listen to conversations of no interest to you.
Selective Switch	Any digital P25 traffic having the correct Network Access Code and the correct talkgroup.
Squelch	Special electronic circuitry, added to the receiver of a radio, that reduces, or cuts off, unwanted signals before they are heard in the speaker.
Standby	An operating condition whereby the radio's speaker is muted but still continues to receive data.
Tactical/Non-revert	The user will talk on the channel that was selected before the radio entered the emergency state.
Talkaround	Bypass a repeater and talk directly to another unit for easy local unit-to-unit communications.
Trunking	The automatic sharing of communications paths between a large number of users (see Conventional).
Zone	A grouping of channels.

Commercial Warranty

Limited Warranty

MOTOROLA COMMUNICATION PRODUCTS

I. WHAT THIS WARRANTY COVERS AND FOR HOW LONG:

MOTOROLA INC. (“MOTOROLA”) warrants the MOTOROLA manufactured Communication Products listed below (“Product”) against defects in material and workmanship under normal use and service for a period of time from the date of purchase as scheduled below:

ASTRO XTS 5000 Portable Units	One (1) Year
Product Accessories	One (1) Year

Motorola, at its option, will at no charge either repair the Product (with new or reconditioned parts), replace it (with a new or reconditioned Product), or refund the purchase price of the Product during the warranty period provided it is returned in accordance with the terms of this warranty. Replaced parts or boards are warranted for the balance of the original applicable warranty period. All replaced parts of Product shall become the property of MOTOROLA.

This express limited warranty is extended by MOTOROLA to the original end user purchaser only and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by MOTOROLA. MOTOROLA assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by an officer of MOTOROLA. Unless made in a separate agreement between MOTOROLA and the original end user purchaser, MOTOROLA does not warrant the installation, maintenance or service of the Product.

MOTOROLA cannot be responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use

the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system as a whole under this warranty.

II. GENERAL PROVISIONS:

This warranty sets forth the full extent of MOTOROLA'S responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at MOTOROLA's option, is the exclusive remedy. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS OR OTHER INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH PRODUCT, TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

III. STATE LAW RIGHTS:

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION OR EXCLUSIONS MAY NOT APPLY.

This warranty gives specific legal rights, and there may be other rights which may vary from state to state.

IV. HOW TO GET WARRANTY SERVICE:

You must provide proof of purchase (bearing the date of purchase and Product item serial number) in order to receive warranty service and, also, deliver or send the Product item, transportation and insurance prepaid, to an authorized warranty service location. Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you first contact the company

which sold you the Product, it can facilitate your obtaining warranty service. You can also call Motorola at 1-888-567-7347 US/Canada.

V. WHAT THIS WARRANTY DOES NOT COVER:

A) Defects or damage resulting from use of the Product in other than its normal and customary manner.

B) Defects or damage from misuse, accident, water, or neglect.

C) Defects or damage from improper testing, operation, maintenance, installation, alteration, modification, or adjustment.

D) Breakage or damage to antennas unless caused directly by defects in material workmanship.

E) A Product subjected to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the addition to the Product of non-Motorola supplied equipment) which adversely affect performance of the Product or interfere with Motorola's normal warranty inspection and testing of the Product to verify any warranty claim.

F) Product which has had the serial number removed or made illegible.

G) Rechargeable batteries if:

- any of the seals on the battery enclosure of cells are broken or show evidence of tampering.
- the damage or defect is caused by charging or using the battery in equipment or service other than the Product for which it is specified.

H) Freight costs to the repair depot.

I) A Product which, due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA’s published specifications or the FCC certification labeling in effect for the Product at the time the Product was initially distributed from MOTOROLA.

J) Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.

K) Normal and customary wear and tear.

VI. PATENT AND SOFTWARE PROVISIONS:

MOTOROLA will defend, at its own expense, any suit brought against the end user purchaser to the extent that it is based on a claim that the Product or parts infringe a United States patent, and MOTOROLA will pay those costs and damages finally awarded against the end user purchaser in any such suit which are attributable to any such claim, but such defense and payments are conditioned on the following:

A) that MOTOROLA will be notified promptly in writing by such purchaser of any notice of such claim;

B) that MOTOROLA will have sole control of the defense of such suit and all negotiations for its settlement or compromise; and

C) should the Product or parts become, or in MOTOROLA's opinion be likely to become, the subject of a claim of infringement of a United States patent, that such purchaser will permit MOTOROLA, at its option and expense, either to procure for such purchaser the right to continue using the Product or parts or to replace or modify the same so that it becomes non-infringing or to grant such purchaser a credit for the Product or parts as depreciated and accept its return. The depreciation will be an equal amount per year over the lifetime of the Product or parts as established by MOTOROLA.

MOTOROLA will have no liability with respect to any claim of patent infringement which is based upon the combination of the Product or parts furnished hereunder with software, apparatus or devices not furnished by MOTOROLA, nor will MOTOROLA have any liability for the use of ancillary equipment or software not furnished by MOTOROLA which is attached to or used in connection with the

Product. The foregoing states the entire liability of MOTOROLA with respect to infringement of patents by the Product or any parts thereof.

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VII. GOVERNING LAW:

This Warranty is governed by the laws of the State of Illinois, USA.

Appendix: Maritime Radio Use in the VHF Frequency Range

Special Channel Assignments

Emergency Channel

If you are in imminent and grave danger at sea and require emergency assistance, use **VHF Channel 16** to send a distress call to nearby vessels and the United States Coast Guard. Transmit the following information, in this order:

1 "MAYDAY, MAYDAY, MAYDAY."

2 "THIS IS _____, CALL SIGN _____."

*State the name of the vessel in distress **3 times**, followed by the call sign or other identification of the vessel, stated **3 times**.*

3 Repeat "MAYDAY" and the name of the vessel.

4 "WE ARE LOCATED AT _____."

State the position of the vessel in distress, using any information that will help responders to locate you, e.g.:

- *latitude and longitude*
- *bearing (state whether you are using true or magnetic north)*
- *distance to a well-known landmark*
- *vessel course, speed or destination*

5 State the nature of the distress.

6 Specify what kind of assistance you need.

7 State the number of persons on board and the number needing medical attention, if any.

8 Mention any other information that would be helpful to responders, such as type of vessel, vessel length and/or tonnage, hull color, etc.

9 "OVER."

10 Wait for a response.

11 If you do not receive an immediate response, remain by the radio and repeat the transmission at intervals until you receive a response. Be prepared to follow any instructions given to you.

Non-Commercial Call Channel

For non-commercial transmissions, such as fishing reports, rendezvous arrangements, repair scheduling, or berthing information, use **VHF Channel 9**.

Operating Frequency Requirements

A radio designated for shipboard use must comply with Federal Communications Commission Rule Part 80 as follows:

- on ships subject to Part II of Title III of the Communications Act, the radio must be capable of operating on the 156.800 MHz frequency
- on ships subject to the Safety Convention, the radio must be capable of operating:
  - in the simplex mode on the ship station transmitting frequencies specified in the 156.025 – 157.425 MHz frequency band, and
  - in the semiduplex mode on the two frequency channels specified in the table below.

Note: Simplex channels 3, 21, 23, 61, 64, 81, 82, and 83 **cannot be lawfully used** by the general public in US waters.

Additional information about operating requirements in the Maritime Services can be obtained from the full text of FCC Rule Part 80 and from the US Coast Guard.

Table A-1: VHF Marine Channel List

Channel Number	Frequency (MHz)	
	Transmit	Receive
1	156.050	160.650
2	156.100	160.700
*	156.150	160.750
4	156.200	160.800
5	156.250	160.850
6	156.300	–
7	156.350	160.950

Table A-1: VHF Marine Channel List (Continued)

Channel Number	Frequency (MHz)	
	Transmit	Receive
8	156.400	–
9	156.450	156.450
10	156.500	156.500
11	156.550	156.550
12	156.600	156.600
13**	156.650	156.650
14	156.700	156.700
15**	156.750	156.750
16	156.800	156.800
17**	156.850	156.850
18	156.900	161.500
19	156.950	161.550
20	157.000	161.600
*	157.050	161.650
22	157.100	161.700
*	157.150	161.750
24	157.200	161.800
25	157.250	161.850
26	157.300	161.900
27	157.350	161.950
28	157.400	162.000
60	156.025	160.625
*	156.075	160.675
62	156.125	160.725
63	156.175	160.775
*	156.225	160.825
65	156.275	160.875
66	156.325	160.925

Table A-1: VHF Marine Channel List (Continued)

Channel Number	Frequency (MHz)	
	Transmit	Receive
67**	156.375	156.375
68	156.425	156.425
69	156.475	156.475
71	156.575	156.575
72	156.625	–
73	156.675	156.675
74	156.725	156.725
75	***	***
76	***	***
77**	156.875	–
78	156.925	161.525
79	156.975	161.575
80	157.025	161.625
*	157.075	161.675
*	157.125	161.725
*	157.175	161.775
84	157.225	161.825
85	157.275	161.875
86	157.325	161.925
87	157.375	161.975
88	157.425	162.025

* *Simplex channels 3, 21, 23, 61, 64, 81, 82, and 83* ***cannot be lawfully used*** *by the general public in US waters.*

** *Low power (1 W) only*

*** *Guard band*

Note: *A – in the Receive column indicates that the channel is transmit only.*

Index

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