

APX™ TWO-WAY RADIOS



BERKS COUNTY APX 4500 MODEL 02



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

DECLARATION OF CONFORMITY

Per FCC CFR 47 Part 2 Section 2.1077(a)



Responsible Party

Name: Motorola Solutions, Inc.

Address: Motorola Solutions, Inc., 1303 East Algonquin Road Schaumburg, IL60196, U.S.A.

Phone Number: 1-800-927-2744

Hereby declares that the product:

Model Name: **APX 4500**

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.

Additional FCC Notes to Users

The following FCC information applies to Bluetooth radio options

IC Model Name: PMHN4193A

Description: O2 Bluetooth Option Board

FCC ID: AZ492FT6002

IC: 109U-92FT6002

Conforms to the following regulations: FCC Part 15, Section 15.19, 15.12, and 15.105

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

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

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

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

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

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

Industry Canada (IC) Statements:

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



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 6881095C99) to ensure compliance with RF energy exposure limits.

For a list of Motorola-approved antennas and other accessories, visit the following website: <http://www.motorola.com/APX>

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The following special notations identify certain items:

Example	Description
Home button or 	Buttons and keys are shown in bold print or as an icon.
Zone	Menu entries are shown similar to the way they appear on the radio's display.
	This means "Press the right side of the 4-way Navigation button."

Additional Performance Enhancement

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

Dynamic System Resilience (DSR)

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

CrossTalk Prevention

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

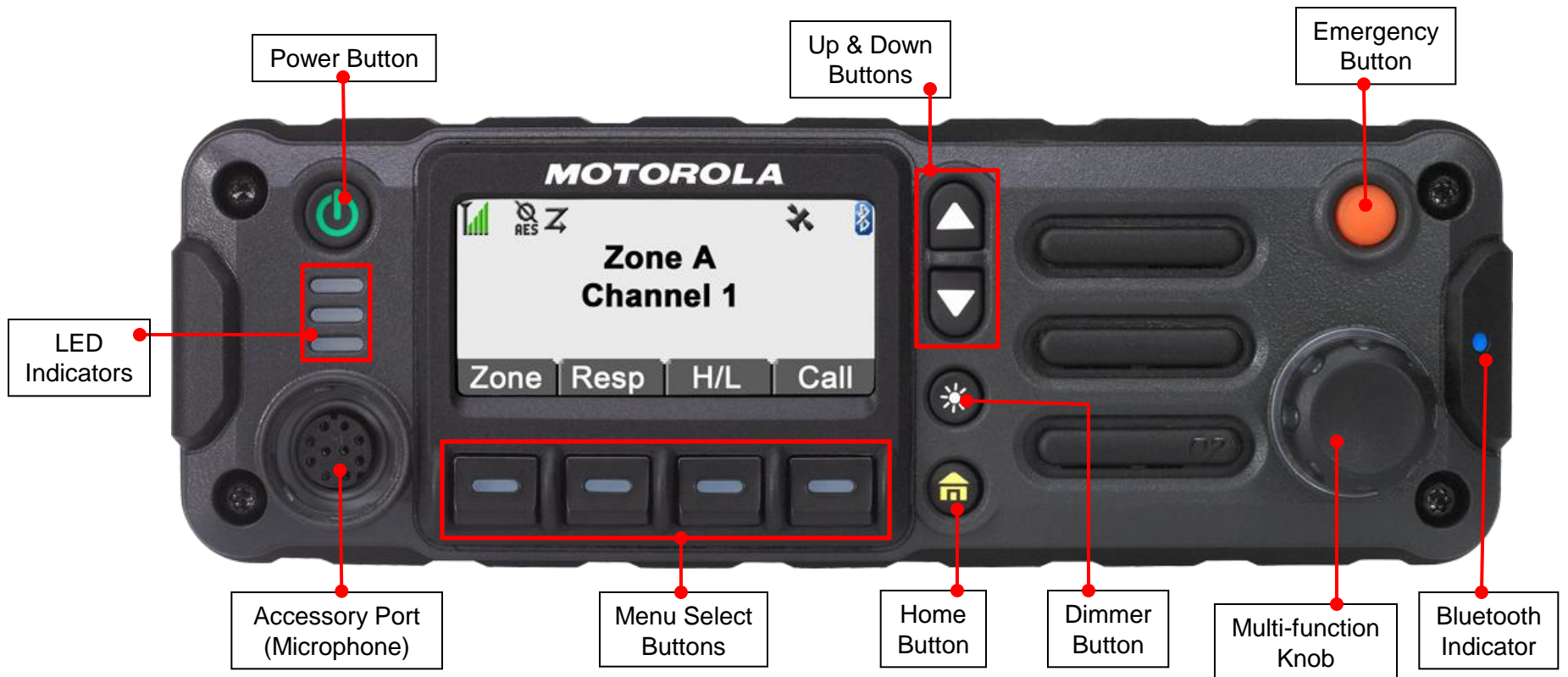
Encrypted Integrated Data (EID)

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

SecureNet

SecureNet allows user to perform secured communications on an Analog or Motorola Data Communication (MDC) channel. The MDC OTAR feature will allow users to perform OTAR activities on an MDC channel.

❑ O2 Control Head





Radio Parts and Controls



❑ Turning on/off the Radio

Press the **Power Button** briefly to power on the radio.

After a short time, the red, yellow and green LEDs light up. The display then shows Zone and channel text, and menu items display on the screen.

The backlight will turn on to the last selected dim level.

Note:

Pressing the Power Button before the LED lights up will be ignored.

If **FAIL ###/##** appears in the display, the radio will not function until the condition has been corrected.

If **ERROR ###/##** appears, some non-critical data has been changed.

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

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

If **CH MISMATCH** appears, means that either the Control Head has been connected to an incompatible transceiver, or vice versa.

If your radio does not power up, contact your dealer.

To turn off the radio, press the **Power Button** after the LEDs light up.



❑ Validating Compatibility During Power Up

The radio validates and updates the software and hardware of your control head(s) during power up.

Follow the procedure below when your radio runs this task.

Procedure:

- 1 The display shows **Maintenance mode remote device**; promptly followed by other maintenance statuses.
- 2 The display shows **Update done please reset** upon completion.
OR
The display shows **Update failed please reset** when it fails to update.
- 3 Press the **Power Button** to reset.
The radio runs the usual power up operation if the software updates are complete.
OR
The radio runs the Maintenance Mode if the updates are not complete and repeat step 1.

❑ Adjusting the Volume

To increase the volume, rotate the **Multi-function Knob (MFK)** clockwise.

The display shows volume bars and volume level when you change the volume.

To decrease the volume, rotate the **Multi-function Knob (MFK)** counterclockwise.



❑ Programmable Features

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

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

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

One Touch Button

Each of the four **Menu Select** buttons, the **Emergency** button and the three **Accy** buttons on the microphone are programmable buttons which can be preprogrammed by a qualified radio technician to a default function which is activated upon a short press.

❑ Accessing the Preprogrammed Functions

You can access various radio functions through one of the following ways:

- A short or long press of the relevant programmable buttons.

OR

- Use the **Menu Select Buttons** ().

Using the Menu Select Buttons

The **Menu Select Buttons** allow to access the menu entries of features.

Note: Check with your dealer or system administrator for the list of features activated in your radio.

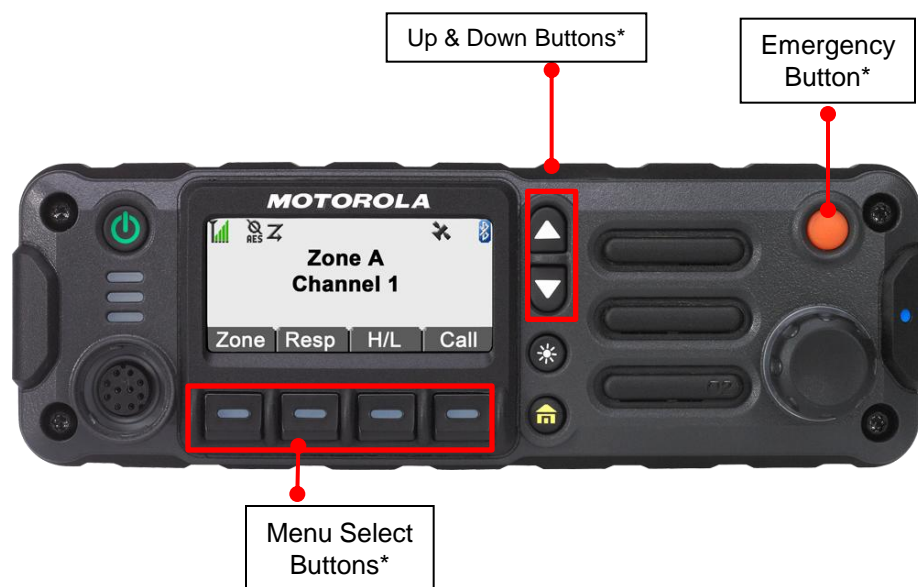
Your radio may be preprogrammed differently from the following example, but the steps for selecting a zone may appear as shown below:

- Press the **Menu Select** button () directly below **Zone**.

Using the Advance Programmable Buttons

This feature is to help you to shorten the process of applying certain common features.



(Quick Access) One Touch Button – Enters a menu with a short press on the preprogrammed One Touch button. Features assigned to these buttons are Call, Call Alert, Phone, Repeater Access, MDC RTT Button Access, Status and Message.




* These programmable buttons support the **One Touch Button** feature.

Using the Navigation Buttons

Home Button



The  button returns you to the Home (default) screen. In most cases, this is the current mode. For selected radio features, the  button is also used to save user-edited radio settings or information before returning you to the Home screen.

Note: Some features do not require you to press  to go to the Home screen. Refer to the individual feature sections in this manual for further details on saving user-edited radio settings or information.

Dimmer Button

Use this button to adjust the brightness of the display.
Long press to toggle between day and night mode.

Up and Down Buttons

By default, the  and  buttons are used as up and down arrow input. These buttons are programmable. They can be programmed to navigate through zones, channels and to increase and decrease the volume of the radio.

4-Way Navigation Button (on keypad mic)

Use this button to scroll up , down , left  or right .


Press and release one of the button to scroll from one entry to the next one.

Press and hold one of the button to have the radio toggles through the list automatically (release the button to stop).

Multi-function Knob (MFK)

The **MFK** button on your radio is programmable to the following features :

Mode Change  – Press the **MFK** once and turn clockwise to scroll the channel list.

Volume Change  – Turn the **MFK** clockwise or counterclockwise to adjust the volume level of the speaker.

The volume level can be adjusted in 16 steps or 32 steps. A fast turn of the **MFK** adjusts the volume level in 16 steps with large increments in volume level. A slow turn of the **MFK** adjusts the volume level in 32 steps with small increments in volume level.

The display shows the volume level and bars to indicate the current level. The level of last selected volume when your radio powers down remains the same when the radio powers up.

The main display shows the icon of the secondary feature. The main display does not show the icon of primary feature.

Your radio by default is set to use the primary feature. Short press the **MFK** to toggle it to work on either the secondary or primary feature.

The concentric ring LED on the multi-function knob will blink in green when the knob is set to secondary feature.

The secondary feature has an inactivity timer. This timer starts when the secondary feature is idle. The radio returns to primary feature when the timer expires.

If the **MFK** is set to operate only one feature, it is recommended that it be set to Volume Change.

Consult your dealer or system administrator for the best option available for **MFK**.



❑ Using the Keypad (on Keypad Mic)

Keypad Characters – Uppercase Mode

Key	Number of Times Key is Pressed																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	.	,	?	!	;	@	_	-	*	#	&	\$	/	+	=	\	"	()
2 abc	A	B	C																	
3 def	D	E	F																	
4 ghi	G	H	I																	
5 jkl	J	K	L																	
6 mno	M	N	O																	
7 pqrs	P	Q	R	S																
8 tuv	T	U	V																	
9 ^{wx} _{yz}	W	X	Y	Z																
0	Toggle between mixed case mode, uppercase mode, and lowercase mode.																			
*	Space																			
#	Toggle between numeric and letter mode.																			

❑ Using the Keypad (on Keypad Mic)

Keypad Characters – Lowercase Mode

Key	Number of Times Key is Pressed																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	.	,	?	!	;	@	_	-	*	#	&	\$	/	+	=	\	"	()
2 abc	a	b	c																	
3 def	d	e	f																	
4 ghi	g	h	i																	
5 jkl	j	k	l																	
6 mno	m	n	o																	
7 pqrs	p	q	r	s																
8 tuv	t	u	v																	
9 ^{wx} _{yz}	w	x	y	z																
0	Toggle between mixed case mode, uppercase mode, and lowercase mode.																			
*	Space																			
#	Toggle between numeric and letter mode.																			

❑ Using the Keypad (on Keypad Mic)

Keypad Characters – Numeric Mode

Key	Number of Times Key is Pressed																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	.	,	?	!	;	@	_	-	*	#	&	\$	/	+	=	\	"	()
2 abc	2																			
3 def	3																			
4 ghi	4																			
5 jkl	5																			
6 mno	6																			
7 pqrs	7																			
8 tuv	8																			
9 wx yz	9																			
0	0																			
*	Space																			
#	Toggle between numeric and letter mode.																			

❑ Using the Keypad (on Keypad Mic)

Keypad Characters – Hexadecimal Mode

Key	Number of Times Key is Pressed																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1	1																				
2 abc	2	A	B	C																	
3 def	3	D	E	F																	
4 ghi	4																				
5 jkl	5																				
6 mno	6																				
7 pqrs	7																				
8 tuv	8																				
9 wx yz	9																				
0	0																				
*	Not applicable																				
#	Not applicable																				











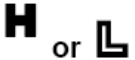



❑ Push-To-Talk (PTT) Button

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

- While a call is in progress, the **PTT** button allows the radio to transmit to other radios in the call. Press and hold down **PTT** button to talk. Release the **PTT** button to listen. The microphone is activated when the **PTT** button is pressed.
- While a call is not in progress, the **PTT** button is used to make a new call.



• Status Icons

	Receiving Radio is receiving a call or data.		Scan Radio is scanning a scan list.
	Transmitting Radio is transmitting a call or data.		User Login Indicator (IP Packet Data) <ul style="list-style-type: none"> • On = User is currently associated with the radio. • Off = User is currently not associated with the radio. • Blinking = Device registration or user registration with the server failed due to an invalid username or pin.
	Call Received Radio has received an Individual Call.		Secure Operation <ul style="list-style-type: none"> • On = Secure operation. • Off = Clear operation. • Blinking = Receiving an encrypted voice call.
	Received Signal Strength Indicator (RSSI) The number of bars displayed represents the received signal strength for the current site, for trunking only. The more stripes in the icon, the stronger the signal.		Data Activity Data activity is present.
	Direct <ul style="list-style-type: none"> • On = Radio is currently configured for direct radio to radio communication (during conventional operation only). • Off = Radio is connected with other radios through a repeater. 		View/Program Mode Radio is in the view or program mode. <ul style="list-style-type: none"> • On steady = View mode • Blinking = Program mode
	Power Level <ul style="list-style-type: none"> • L = Radio is set at Low power. • H = Radio is set at High power. 		MFK is in Mode Change feature Turn the MFK to change the channel.
	Priority-One Channel Scan <ul style="list-style-type: none"> • Blinking dot = Radio detects activity on channel designated as Priority-One. • Steady dot = Radio detects activity on channel designated as Priority-Two. 		MFK is in Volume Change feature Turn the MFK to adjust the volume.

Solid red – Radio is transmitting.

Blinking red – Radio is transmitting at low battery condition.

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

Solid yellow (Conventional Only) – Channel is busy.

Blinking yellow – Radio is receiving a secured transmission.

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

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

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



❑ Intelligent Lighting Indicators

This feature temporarily changes the radio's display backlight color and the alert text background color to help signal that a radio event has occurred.

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

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

Orange

Emergency Alerts



Red

Critical Alerts



Green

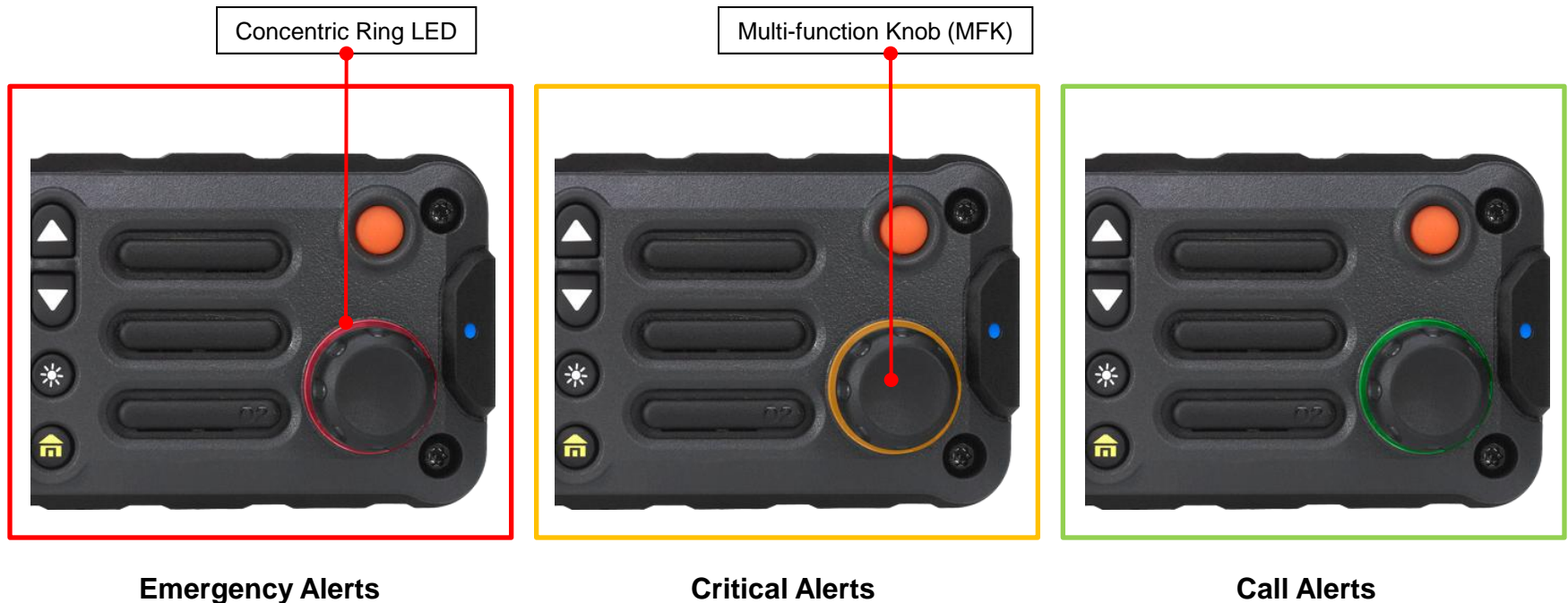
Call Alerts



❑ Multi-function Knob - Concentric Ring LED




The concentric ring LED blinks green when the **MFK** is using the secondary feature. See [Multi-function Knob \(MFK\)](#) to understand the functionality of **MFK**.




If Intelligent Lighting is activated, the concentric ring LED will not blink green when the **MFK** is in the secondary mode. The LED turns into solid color of orange, red or green depending on the status of Intelligent Lighting.





☐ Alert Tones

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

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

You Hear	Tone Name	Heard
Short, Medium-Pitched Tone  Play	Valid Key-Press	When correct key is pressed.
	Radio Self Test Pass	When radio passes its power-up self test.
	Clear Voice	At beginning of a non-coded communication.
	Priority Channel Received	When activity on a priority channel is received.
	Emergency Alarm Entry	When entering the emergency state.
	Central Echo	When central controller has received a request from a radio.
Long, Medium-Pitched Tone  Play	Volume Set	When volume is changed on a quiet channel.
	Emergency Exit	When exiting the emergency state.
A Group of Medium-Pitched Tones  Play	Fail-soft	When the trunking system fails.
	Automatic Call Back	When voice channel is available from previous request.
	Keyfail	When encryption key has been lost.
	Console Acknowledge	When status, emergency alarm, or reprogram request ACK is received.
	Received Individual Call	When Call Alert or Private Call is received.
	Site Trunking	When a SmartZone trunking system fails.
	Call Alert Sent	When Call Alert is received by the target radio.

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

Selecting a Zone

Selecting a Radio Channel

Receiving and Responding to a Radio Call

Receiving and Responding to a Talkgroup Call

Making a Radio Call

Making a Talkgroup Call

Repeater or Direct Operation

Zones and Channels

Channels	Zone1	Zone2	Zone3	Zone4	Zone5	Zone6
1	BrksEMS	BrksALSHail	Fire Pol CW	BrksFTCTrg1	BrksFTCTrg1	BrksPW R 1
2	BrksEMSOps 1	BrksALSPtch1	FP Ops N1	BrksFTCTrg2	BrksFTCTrg2	BrksPW R 2
3	BrksEMSOps 2	BrksALSPtch2	FP Ops N2	BrksFTCAAdmin	BrksFirTrgN1	BrksPW R 3
4	BrksEMSAadm1	BrksALSPtch3	FP Ops S1	BrksFirTrgN1	BrksFirTrgN2	BrksPW R 4
5	BrksEMSAadm2	RHTCBLSPtch1	FP Ops S2	BrksFirTrgN2	BrksFirTrgS1	BrksPW R 5
6	Rdg EMSDisp	RHTCBLSPtch2	BrksFireA	BrksFirTrgS1	BrksFirTrgS2	BrksPW R 6
7	Rdg EMSOps1	SJMCBLSPtch1	BrksFireB	BrksFirTrgS2	BrksExerCW	BrksPW R 7
8	Rdg EMSOps2	SJMCBLSPtch2	BrksFirOps 1	BrksExerCW	BLANK	BrksPW R 8
9	BrksFireA	PotsBLSPtch1	BrksFirOps 2	BLANK	BLANK	BrksPW R 9
10	BrksFireB	FlightOps 1	BrksFirOps 3	BLANK	BLANK	BrksPW R 10
11	BrksFirOps 1	FlightOps 2	BrksFirOps 4	BLANK	BLANK	BrksPW R 11
12	BrksFirOps 2	BLANK	BrksFirOps 5	Rdg EMSDisp	Rdg EMSDisp	BrksPW R 12
13	BrksFirOps 3	BLANK	BrksFirOps 6	Rdg FireDisp	Rdg FireDisp	BksPWInrtaOp
14	Fire/EMSDisp	Fire/EMSDisp	Fire/EMSDisp	Fire/EMSDisp	Fire/EMSDisp	Fire/EMSDisp
15	CWIntraOp	CWIntraOp	CWIntraOp	CWIntraOp	CWIntraOp	CWIntraOp
16	County EMERG	County EMERG	County EMERG	County EMERG	County EMERG	County EMERG

❑ Selecting a Zone

A zone is a group of channels.

Procedure:

Press the Zone Up or Zone Down Button

OR

[Menu]

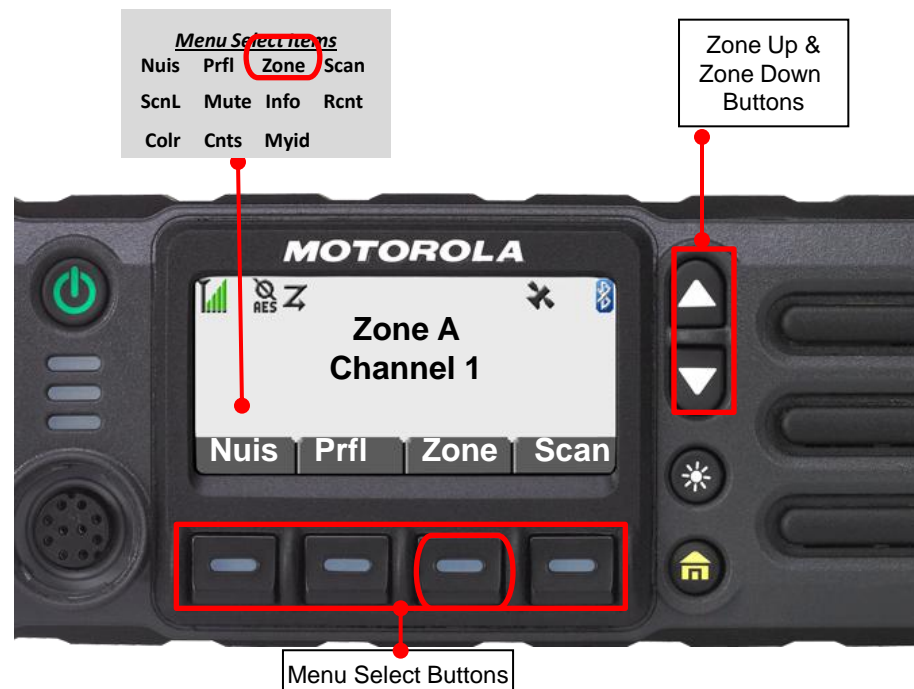
1 ◀ or ▶ to Zone.

2 Press the **Menu Select** button directly below **Zone**.

3 ▲ or ▼ to the required zone.

4 Press the **Menu Select** button directly below **Sel** to confirm the displayed zone.

5 Press the **PTT** button to transmit on the displayed zone.



❑ Selecting a Radio Channel

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

Procedure:

[MFK]

If channel is set as the primary mode,

- 1 Turn the **MFK** until the display shows the desired channel.
- 2 Press the **PTT** button to transmit on the displayed channel.

If channel is not set as the primary mode, press the **MFK** once and repeat step 1.



Multi-function
Knob
Channel Selector/
Volume Set

Extra page intentionally inserted.

❑ Receiving and Responding to a Radio Call

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

The LED lights up solid red while the radio is transmitting. In conventional mode, the LED lights up solid yellow when the radio is receiving a transmission. In trunking mode, there is no LED indication when the radio receives a transmission.

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



❑ Receiving and Responding to a Radio Call

Receiving and Responding to a Talkgroup Call

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

Procedure:

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

1 ASTRO Conventional Only:

The LED lights up solid yellow.

The display shows the talkgroup alias or ID, and the caller alias or ID.

OR

Trunking Only:

The display shows the caller alias or ID.

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

The LED lights up solid red.

Release the **PTT** button to listen.



❑ Receiving and Responding to a Radio Call

Receiving and Responding to a Private Call (Trunking Only)


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

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

Procedure:

When you receive a Private Call:

- 1 You hear two alert tones and the LED blinks green. The display shows **Call received** and the caller alias or ID. Press the **Menu Select** button directly below **Resp** within 20 seconds after the call indicators begin. During the call, the display shows the caller alias (name), if it is in the call list.
OR
During the call, the display shows the caller ID (number), if the caller's name is not in the call list.

- 2 Press and hold the **PTT** button to talk. Release the **PTT** button to listen.
- 3 Press  or the **Call Response** button to hang up and return to the Home screen.




❑ Repeater or Direct Operation

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

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

Move the 16-Position Channel/Talkgroup Select to a preprogrammed Direct channel in the radio to talk in a direct/talkaround mode.

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



Advanced Call Features

- Receiving and Making a Selective Call (ASTRO Conventional Only).....*
- Using the Talkgroup Call Feature (Conventional Operation Only).....*

Contacts

- Viewing Details of a Contact*
- Adding a New Contact Entry*
- Deleting a Contact Entry.....*
- Editing a Contact (Entry Alias and Entry ID).....*
- Editing a Contact (Call Type).....*

Scan Lists.....

- Viewing a Scan List*
- Editing the Scan List.....*
- Changing the Scan List Status*
- Viewing and Changing the Priority Status*

Scan

- Turning Scan On or Off.....*
- Transmitting While the Scan is On*
- Deleting a Nuisance Channel*
- Restoring a Nuisance Channel*
- Changing Priorities Status While Scan is On*

Call Alert Paging

- Receiving a Call Alert Page*

Emergency Operation

- Sending an Emergency Alarm with Emergency Call*
- Special Considerations for Emergencies*

Secure Operations

Selecting Secure/Clear Transmissions

Trunking System Controls

Using the Fail-soft System

Going Out of Range

Trunked Announcement

☐ Contacts

This feature provides “address-book” capabilities on your radio.

Each entry corresponds to an alias (name) or ID (number) that you use to initiate a call.

Contact entries are alphabetically sorted according to entry alias. Each alias can have up to 5 IDs of different call types associated with it.

Additionally, each entry, depending on context (conventional, trunking, or phone), associates with Private Call, or Call Alert.

Each entry within Contacts displays the following information:

- Call Alias (Name)
- Call ID (Number)
- Call Type (Icon)
- WACN ID (Astro 25 Trunking IDs only)
- System ID

Note. For Berks County, the contact list is set up only to help display the calling radio Alias. A total of 500 default records are added to the “Unified Call List” for this purpose. No Hot Lists are set up in the radios.

The systems include the Trunking system, ASTRO conventional and MDC conventional.

The radio automatically exits the feature, if the feature inactivity timer is enabled, when the radio is left idle and the timer expires. You will hear the Menu Inactive Exit Tone upon feature exit.

☐ Contacts

Adding a New Contact Entry

Procedure:

- 1 ◀ OR ▶ to **Cnts.**
 - 2 Press the **Menu Select** button directly below **Cnts.**
 - 3 ▲ OR ▼ to **[New Contact]**.
 - 4 Press the **Menu Select** button directly below **Sel.**
 - 5 ▲ OR ▼ to **Name.**
 - 6 Press the **Menu Select** button directly below **Edit.**
*The display shows **Edit name** and a blinking cursor appears.*
- Use the keypad to enter the name.
 Press ◀ to move one space to the left.
 Press ▶ to move one space to the right.
 Press the **Menu Select** button directly below **Del** to delete any unwanted characters.
 Press ***** to add a space.
 Press **0** to toggle between mixed case mode, uppercase mode, and lowercase mode.
 Press **#** to toggle between numeric and letter mode.

Press the **Menu Select** button directly below **Ok** once you have entered the name.

OR

Press the **Menu Select** button directly below **Cncl** to return to the previous screen.

- 7 ▲ OR ▼ to **[Add Number]**.
- 8 Press the **Menu Select** button directly below **Sel.**
- 9 ▲ OR ▼ to **Number 1.**
- 10 Press the **Menu Select** button directly below **Edit.**
*The display shows **Edit Number 1** and a blinking cursor appears.*

Use the keypad to enter the number.

Press the **Menu Select** button directly below **Del** to delete any unwanted characters.

Press the **Menu Select** button directly below **Ok** once you have entered the number.

OR

Press the **Menu Select** button directly below **Cncl** to return to the previous screen.

11 ▲ Or ▼ to **Type 1**.

12 Press the **Menu Select** button directly below **Edit**.

▲ Or ▼ to the required mode.

Press the **Menu Select** button directly below **Ok**.

OR

Use keypad to enter or edit the existing system IDs.

OR

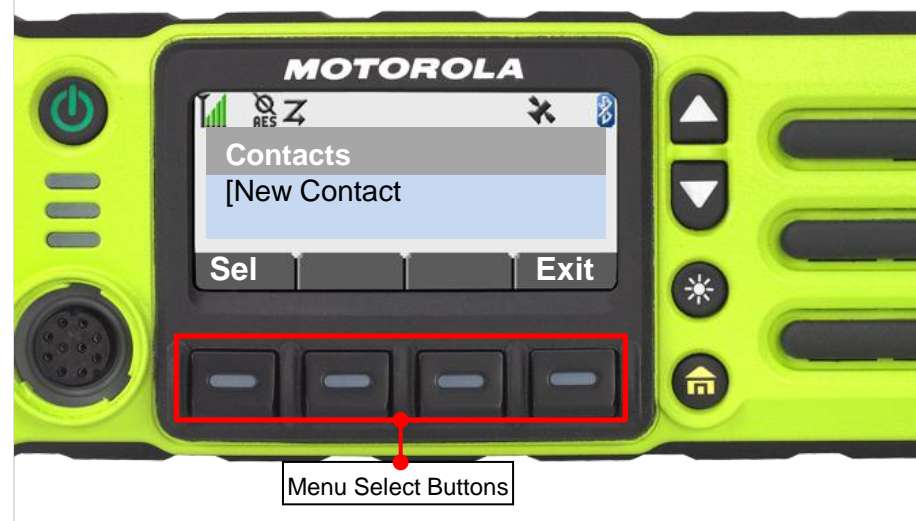
▲ or ▼ to **[Add Number]**.

Press the **Menu Select** button directly below **Sel** to add a new number.

13 Press the **Menu Select** button directly below **Done** once you have finished.

The display shows <Entry> Stored, confirming that the contact entry has been added.

The radio returns to the main Contacts screen.



☐ Contacts

Editing a Contact (Entry Alias and Entry ID)

Entry Alias and Entry ID can be edited.

Procedure:

- 1 ◀ or ▶ to **Cnts.**
- 2 Press the **Menu Select** button directly below **Cnts.**
- 3 ▲ or ▼ to entry you want to edit.
- 4 Press the **Menu Select** button directly below **Optn.**
- 5 ▲ or ▼ to **Edit.**
- 6 Press the **Menu Select** button directly below **Sel.**
- 7 ▲ or ▼ to entry alias or entry ID you want to edit.

- 8 Press the **Menu Select** button directly below **Edit.**
*The display shows **Edit name** and a blinking cursor appears.*

Use the keypad to enter the name.

Press ◀ to move one space to the left.

Press ▶ to move one space to the right.

Press the **Menu Select** button directly below **Del** to delete any unwanted characters.

Press (#) to add a space.

Press (0) to toggle between mixed case mode, uppercase mode, and lowercase mode.

Press (*) to toggle between numeric and letter mode.

Press the **Menu Select** button directly below **Ok** once you have entered the name.

OR

Press the **Menu Select** button directly below **Cncl** to return to the previous screen.

The display returns to the Edit Contact screen.

- 9 Press the **Menu Select** button directly below **Done** to save your changes and return to the main screen for Contacts.

☐ **Contacts**

Editing a Contact (Call Type)

Procedure:

- 1 ◀ or ▶ to **Cnts.**
- 2 Press the **Menu Select** button directly below **Cnts.**
- 3 ▲ or ▼ to entry you want to edit.
- 4 Press the **Menu Select** button directly below **Optn.**
- 5 ▲ or ▼ to **Edit.**
- 6 Press the **Menu Select** button directly below **Sel.**
- 7 ▲ or ▼ to Call Type you want to edit.
- 8 Press the **Menu Select** button directly below **Edit.**
- 9 ▲ or ▼ to choose from the list of call types given.
- 10 Press the **Menu Select** button directly below **Ok** to select.
The display returns to the Edit Contact screen.

- 11 Press the **Menu Select** button directly below **Done** to save your changes and return to the main screen for Contacts.

☐ Scan Lists

Scan lists are created and assigned to individual channels/groups.

Your radio scans for voice activity by cycling through the channel/group sequence specified in the scan list for the current channel/group.

Your radio supports different types of Scan Lists:


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

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

☐ Scan Lists

Viewing a Scan List

Procedure:

- 1 ◀ or ▶ to **ScnL**.
- 2 Press the **Menu Select** button directly below **ScnL**.
- 3 ▲ or ▼ to view the members on the list.
- 4 Press  to exit the current display and return to the Home screen.

<u>Menu Select Items</u>			
Nuis	Prfl	Zone	Scan
ScnL	Mute	Info	Rcnt
Colr	Cnts	Myid	



☐ Scan Lists

Editing the Scan List

This feature lets you change scan list members and priorities.

Procedure:

- 1 ◀ or ▶ to **ScnL**.
- 2 Press the **Menu Select** button directly below **ScnL**.
The display shows the lists that can be changed.
- 3 ▲ Or ▼ to the entry you want to edit.
- 4 Press the **Menu Select** button directly below **Sel** to add and/ or change the priority of the currently displayed channel in the scan list.
OR
Press the **Menu Select** button directly below **Del** to delete the currently displayed channel from the scan list.
OR
Press the **Menu Select** button directly below **Rcl** to view the next member of the scan list.


- 5 ▲ Or ▼ to select more channels to be added or deleted.

OR

Use the **MFK** to select additional channels to be added or deleted.

OR

Use the keypad to go directly to additional channels to be added or deleted.

- 6 Press  to exit scan list programming and return to the Home screen.


❑ Scan Lists

Viewing and Changing the Priority Status

Procedure

1 Below the **Sel**, **Del**, and **Rcl** screen, press the **Menu Select** button directly below **Sel** to view and/or change the priority status of the currently displayed channel.

OR

Below the **Sel**, **Del**, and **Rcl** screen, press the  button or press the **Menu Select** button directly below **Sel**, one or more times to view and/or change the scan list status icon of the currently displayed channel.

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

The LED lights up solid green.

OR

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

The LED blinks green.

OR

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

The LED rapidly blinks green.

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

OR

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

☐ Scan

Turning Scan On or Off

This feature allows you to monitor traffic on different channels by scanning a preprogrammed list of channels.

Procedure:

[Preprogrammed Button]

1 Press the preprogrammed **Scan** button.

OR

[Menu]

1 ◀ or ▶ to **Scan**.

2 Press the **Menu Select** button directly below **Scan**.

*The display shows **Scan off** if scan is disabled.*

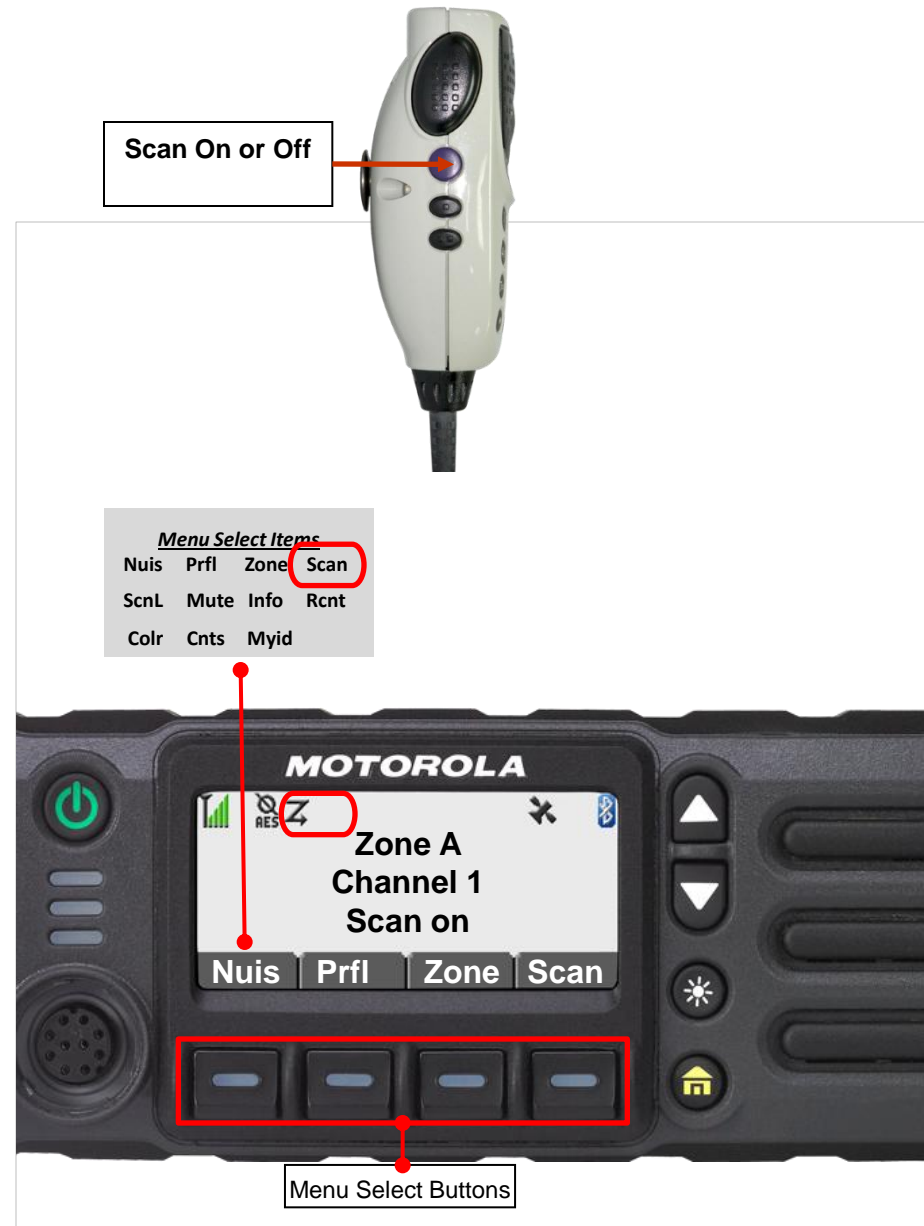
Press the **Menu Select** button directly below **Scan** to enable scan.

OR

*The display shows **Scan on** and the scan status icon if scan is enabled.*

Press the **Menu Select** button directly below **Scan** to disable scan.

The radio returns to the Home screen.



☐ Scan

Transmitting While the Scan is On

Radio Programmed for Non-Talkback Scan

Procedure:

- 1 Press the **PTT** button at any time to transmit on the selected channel or fixed channel.

☐ Scan

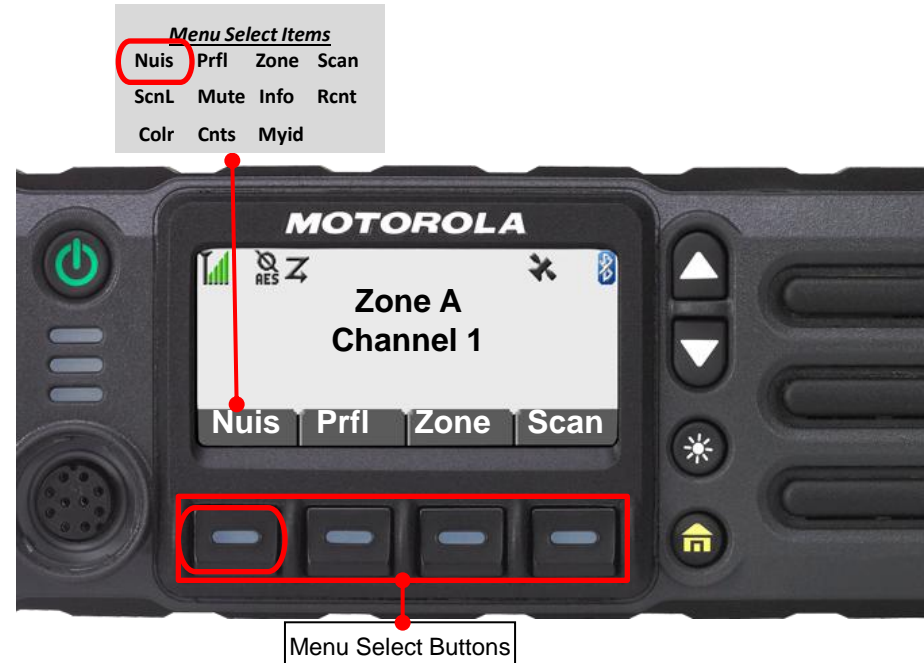
Deleting a Nuisance Channel

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

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

Procedure:

- 1 When the radio is locked onto the channel to be deleted, ◀ or ▶ to **Nuis**.
- 2 Press the **Menu Select** button directly below **Nuis**.
The radio continues scanning the remaining channels in the list.



☐ Scan*Restoring a Nuisance Channel***Procedure:**

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

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

OR

- Change modes.

OR

- Turn off the radio, and then turn it back on.

Nuisance mode delete can be disabled by the system administrator.

❑ Respond to a Call Alert Page

This feature allows your radio to work like a pager.

Even if other users are away from their radios, or if they are unable to hear their radios, you can send them an individual Call Alert page. You can also verify if a radio is active on the system.

Receiving a Call Alert Page

When you receive a Call Alert page, you hear four repeating alert tones and the LED blinks green

OR

You hear one alert tone and the green LED blinks if Call Alert Tone Auto Reset is enabled.

The call received icon blinks and the display shows **Page received**.

Press the **PTT** button to answer.

OR

Press any button to clear the Call Alert page.

□ Emergency Operation

Sending an Emergency Alarm with Emergency Call

This feature allows you to send an Emergency Alarm to another radio. Upon acknowledgement, both radios can communicate over a preprogrammed Emergency channel.

If the radio has both emergency call and alarm features enabled, it automatically proceeds to the call mode after the alarm is acknowledged.

Procedure:

- 1 Press the preprogrammed **Emergency** button.

*You hear a short medium-pitched tone and the display shows **Emergency** and the current zone or channel.*

OR

You hear a short low-pitched tone to indicate the selected channel does not support emergency and rejects to launch emergency mode.

*When you receive the dispatcher's acknowledgment, the display shows **Ack received**.*

You hear four tones, and the radio exits the Emergency Alarm mode then enters the Emergency Call mode.

- 2 Press and hold the **PTT** button.
Speak clearly into the microphone.
- 3 Release the **PTT** button to end the transmission and wait for a response from the dispatcher.
- 4 To exit Emergency Call, press and hold the preprogrammed **Emergency** button for about a second.



❑ Emergency Operation

Special Considerations for Emergencies

- If you press the emergency button while in a channel that has no emergency capability, a low-pitched tone sounds.
- If the unit is out of the range of the system and/or the emergency alarm is not acknowledged, a tone sounds and the display shows **No acknowledge**.
- If you press the emergency button, then change to a mode that has no emergency capability, the display shows **No emergency** and a continuous low-pitched tone sounds until a valid emergency mode is selected or until the emergency is cancelled.
- When an emergency is active, changing to another mode where emergency is enabled (trunked or conventional) causes an emergency alarm and/or emergency call to be active on the new mode.



❑ Secure Operations

Selecting Secure/Clear Transmissions

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

Berks County's talkgroup are strapped to clear, or Encrypted. The Secure/Clear switch is not programmed. In the case of Encrypted, the talkgroups can be either strapped to an AES or ADP key. If needed a list of these Talkgroups can be found in the master fleetmap document provided earlier.

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❑ Trunking System Controls

Using the Fail-soft System

The fail-soft system ensures continuous radio communications during a trunked system failure.

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

The fail-soft condition is indicated by a faint beeping tone every nine seconds (radio un-squelched) until the trunking system returns to normal operation.

To continue, in Fail-soft, to communicate with other talkgroup, refer to the following procedure.

Procedure:

- 1 Rotate the **MFK** to change to a different repeater frequency.
- 2 Press the **PTT** button to talk, and release the button to listen.

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

❑ Trunking System Controls

Going Out of Range

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

Procedure:

- 1 You hear a low-pitched tone.

AND/OR

The display shows the currently selected zone/channel combination and **Out of range**.

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

It locks onto a control channel.

OR

It locks onto a fail-soft channel.

OR

It is turned off.



Viewing the Recent Calls

Selecting a Radio Profile

Controlling the Display Backlight

Turning Keypad Tones On or Off

Using the Time-Out Timer

Using the Digital PTT ID Feature

Accessing the General Radio Information


Voice Announcement

❑ Viewing the Recent Calls

This feature allows you to view the recent incoming and outgoing call information of the following call types:

- Call Alert
- Private Call

Procedure:

- 1 ◀ or ▶ to **Rcnt**.
- 2 Press the **Menu Select** button directly below **Rcnt** to access the Recent Calls feature screen.
- 3 ▲ or ▼ to scroll through the list.
- 4 Press the **Menu Select** button directly below **Exit** to return to the Home screen.
OR
Press  or the **PTT** button to return to the Home screen.



❑ Selecting a Radio Profile

This feature allows you to manually switch the visual and audio settings of the radio. The display, backlight, alert tones, and audio settings are defined according to the preprogrammed radio settings of each radio profile.

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

Procedure:

[Menu]

1 ◀ or ▶ to **Prfl**.

2 Press the **Menu Select** button directly below **Prfl** to access the Profiles feature screen.

3 ▲ or ▼ to scroll through the menu selections.

4 Press the **Menu Select** button directly below **Sel** to select the required radio profile.

The radio returns to the Home screen.

The profile name on the Home screen indicates the current selected radio profile.

OR

Press the **Menu Select** button directly below **Exit** to exit the screen without making any changes.



❑ Controlling the Display Backlight

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

Procedure:

- 1 Press the **Dimmer** button to adjust the brightness of the display.
Long press to toggle between day and night mode.



❑ Turning Keypad Tones On or Off

You can enable and disable keypad tones, if needed.

Procedure:

[Menu]

1 ◀ or ▶ to **Mute**.

2 Press the **Menu Select** button directly below **Mute**.

*The display momentarily shows **Tones off**, indicating that the keypad tones are disabled.*

OR

*The display momentarily shows **Tones on**, and you hear a short tone indicating that the keypad tones are enabled.*



❑ Using the Time-Out Timer

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

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

The timer is defaulted at 60 seconds.

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

Procedure:

- 1 Hold down the **PTT** button longer than the preprogrammed time.
*You hear a short, low-pitched warning tone, the transmission is cut-off, and the LED goes out until you release the **PTT** button.*
- 2 Release the **PTT** button.
The LEDs relight and the timer resets.
- 3 Press the **PTT** button to re-transmit.
The time-out timer restarts and the LED lights up solid red.

❑ Using the Digital PTT ID Feature

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

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



❑ Accessing the General Radio Information

Your radio contains information on the following:

- Radio Information
- IP Display
- Control Assignments


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

Accessing the Radio Information

This feature displays the following information of your radio:


- Host Version
- Secure Version
- CH 1 – 4 Version
(depending on the number of channels connected.)
- MCHIB Version
- AUX CH Version
- URC Version
- DSP Version
- KG (Secure Algorithm)
- Serial Number
- CHIB Version
- TIB Version
- TIB Version

- Siren Version
- VRS Version
- DVRS App Version (only when DVRS is available)
- DVRS CP Version (only when DVRS is available)
- Serial Number
- Flash Size & Type
- RF Band
- Processor Version
- TRC Version
- URC Version
- DVRS DSP Version (only when DVRS is available)
- Model Number
- ESN
- Flash Code
- Tuning Version

Note: Press  at any time to return to the Home screen.

Follow the procedure to view the information;

Procedure:

- 1 ◀ OR ▶ to **Info**.
- 2 Press the **Menu Select** button directly below **Info**.
- 3 ▲ OR ▼ to required information.
- 4 Press the **Menu Select** button directly below **Sel**.
The display shows the Information screen.
- 5 ▲ OR ▼ to scroll through the various information.
OR
Press the **Menu Select** button directly below **Back** to return to the previous screen.
OR
Press  to return to the Home screen.



Changing the Display Color

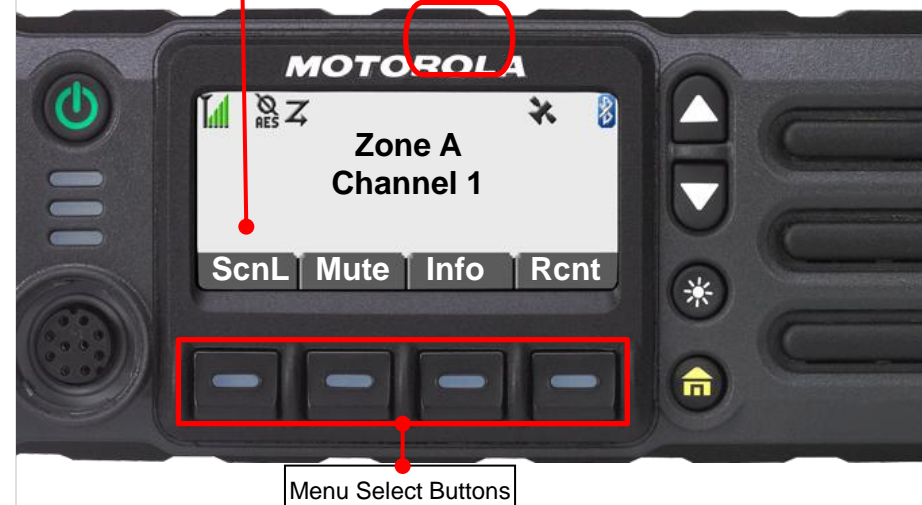
You can change or the radio's display color as needed.

- 1 Press ◀ or ▶ to COLR.
- 2 Press the Menu Select button directly below COLR.
- 3 Press ◀ or ▶ to scroll through the list of available choices.
- 4 Press the button below SEL to select the color or CNCL to exit without making changes.

*****NOTE: If you change the display to “RED” when the radio is “out of range” the display will not change colors.**

If you change the display to “ORANGE” and activate the “emergency button” the display will not change colors.

Menu Select Items			
Nuis	Prfl	Zone	Scan
ScnL	Mute	Info	Rcnt
Colr	Cnts	Myid	



Voice Announcement

This feature enables the radio to audibly indicate the current feature mode, Zone or Channel the user has just assigned.

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

The features which Voice Announcement supports are:

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