

FRCOG/CoMIRS

Franklin Regional Council of Governments

Commonwealth of Massachusetts Interoperable Radio System

MOTOROLA APX 4000 / 6000

Portable Radio Guide

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MOTOROLA APX PORTABLE RADIO OVERVIEW

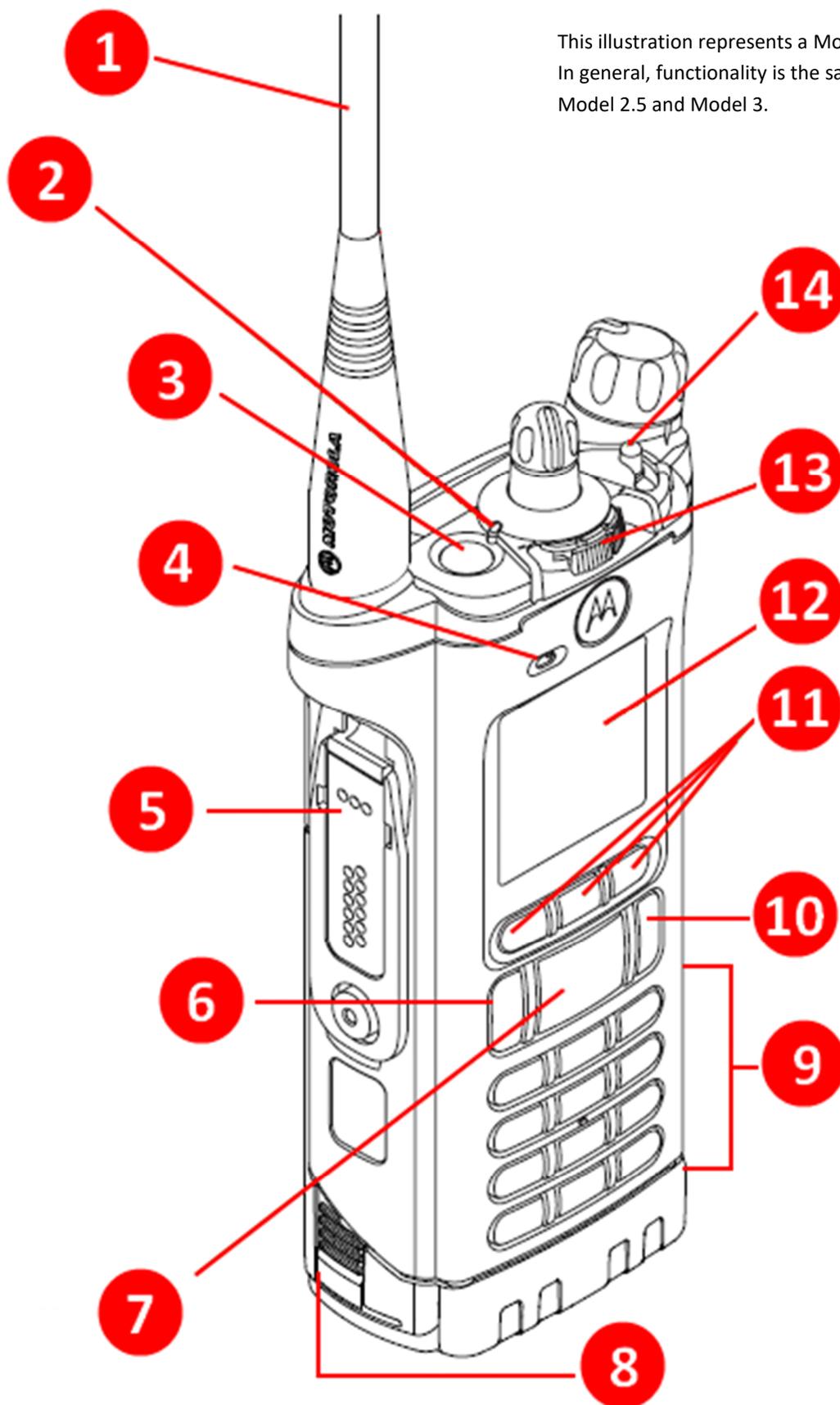
While the radios addressed in this guide will be using the Commonwealth of Massachusetts Interoperable Radio System (CoMIRS), the purpose of this guide is not to instruct the reader on the system itself, but to explain what the various features of the radios are.

There are four types of portable radios that can utilize the system as it stands today. Two Kenwood Viking models and two Motorola models. This guide deals with the two Motorola models: the APX 4000 and the APX 6000 portable radios. The APX 6000 can be upgraded to a multiband radio (APX 8000) but will not be discussed in this guide. These radios will operate in both the analog and digital modes by simply selecting the proper zone.

As both radios are from the same APX family, and are programmed as similar as possible, many of the programable buttons have the same function and are located in a similar location. The APX 6000 has a few buttons/switches and functions that are not available on the APX 4000 and will be noted.

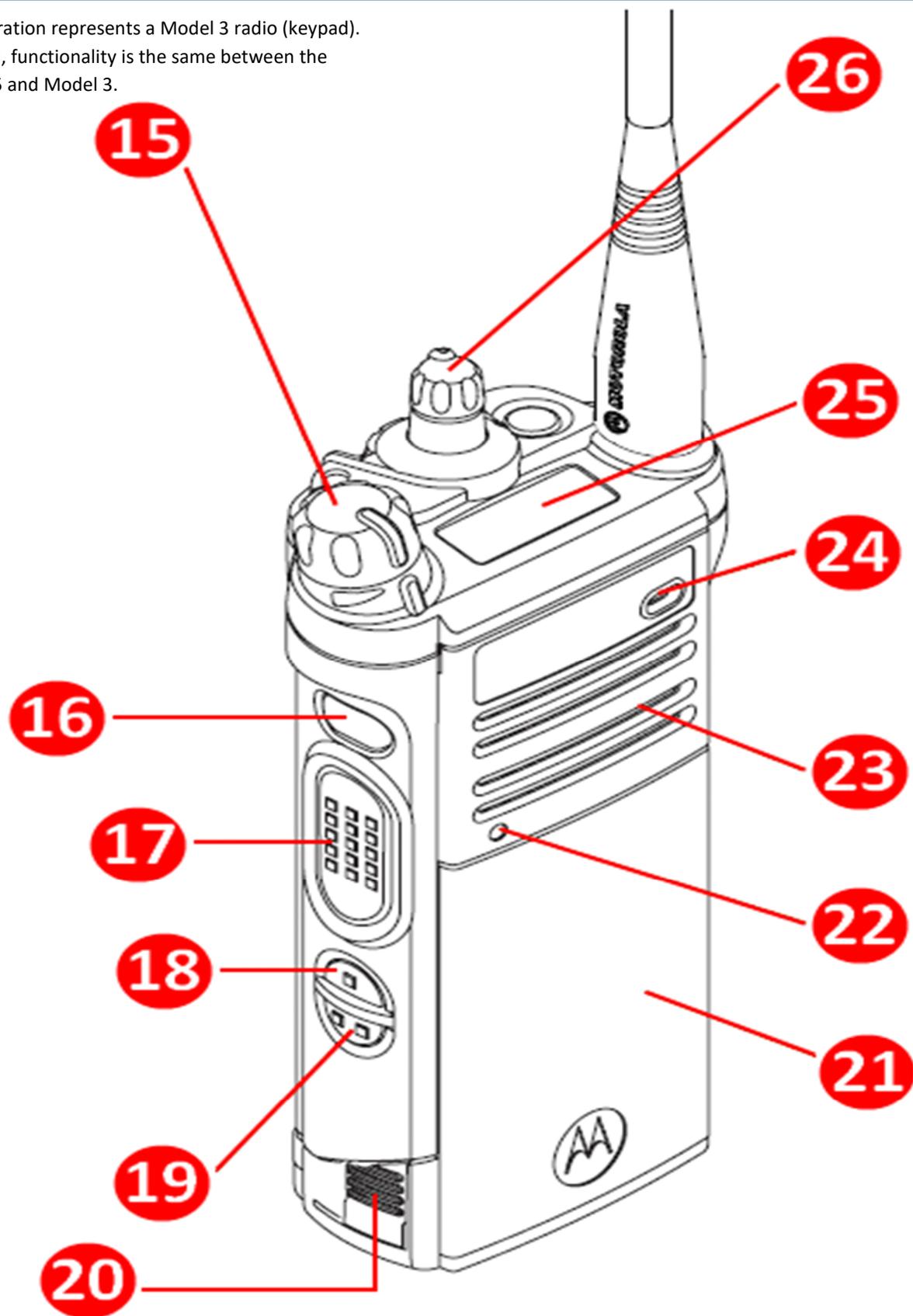
APX 6000 Nomenclature—FRONT

This illustration represents a Model 3 radio (keypad).
In general, functionality is the same between the
Model 2.5 and Model 3.



APX 6000 Nomenclature—REAR

This illustration represents a Model 3 radio (keypad).
In general, functionality is the same between the
Model 2.5 and Model 3.



APX 6000 Nomenclature—FRONT

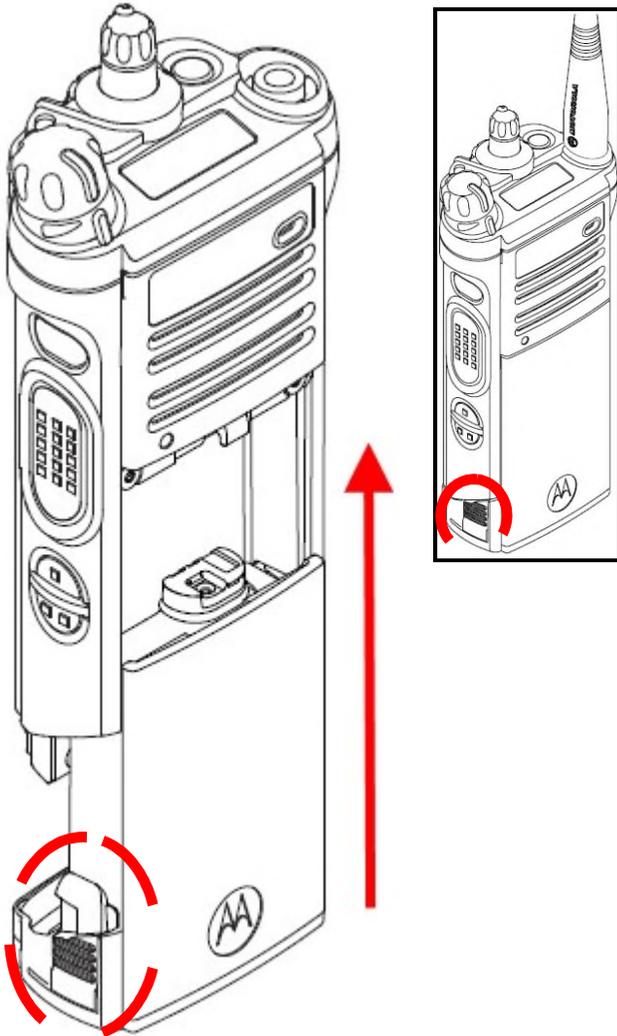
NUMBER	DESCRIPTION	NUMBER	DESCRIPTION
1	Antenna	8	Battery Latch APX 6000 APX 4000 has battery latch on bottom of battery.
2	Multi-Color LED	9	Keypad (<i>Model 3 Only</i>)
3	Emergency Button At least 1 second push to activate. At least 2 second push to reset	10	Computer Icon / "Future Use"
4	Front Microphone	11	Menu Select Buttons
5	Accessory / Shoulder Microphone Connector	12	Main Display
6	Home Button	13	Encryption on/off Not Used APX 6000 only
7	4-Way Navigation Buttons Used to navigate through the menu functions.	14	Multi position "A", "B", "C" switch Keypad lock in position "C". Position "A" and "B" have no function. APX 6000 only

APX 6000 Nomenclature—REAR

NUMBER	DESCRIPTION	NUMBER	DESCRIPTION
15	On/Off / Volume	22	Bluetooth Dot
16	Purple Button Short push = Scan on/off Long push = Scan edit	23	Speaker
17	Push-to-Talk (PTT)	24	Rear Microphone
18	One-Dot Button Nuisance Delete	25	Top Display APX 6000 only
19	Two-Dot Button Short push = Light on/off APX 6000 only Long push = top screen flip	26	Mode Knob Talk-group select knob (channel select)
20	Battery Latch APX 6000 APX 4000 has battery latch on bottom of battery.		
21	Battery		

USING THE APX PORTABLE RADIO

BATTERY:



The APX 4000 & APX 6000 can accept a variety of different rechargeable batteries. Prior to replacing a battery, it is essential that the radio be turned off. **If the radio is powered up when the battery is removed, it could damage the radio.**

To change or replace the battery on the APX 6000, depress the small latches located on the bottom of the radio (*circled*). There is one latch to either side of the battery. Gently pull the battery downward until it separates from the radio.

To attach a battery, align it on the radio chassis and gently push upwards (*as indicated*) until you hear two small clicks. These clicks indicate each of the two latches has engaged. The radio may turn on if only one latch functions, but the battery will not be secure on the chassis and this could cause the radio to power down.

To change or replace the battery on the APX 4000, locate the release on the bottom of the battery. Push release towards the back of the radio/battery and gently pull the battery downward until it separates from the radio.

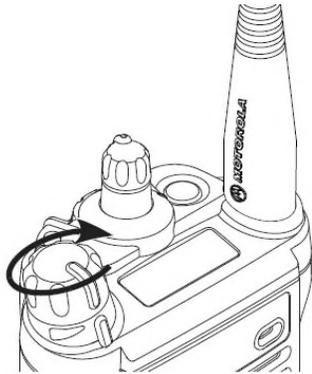
To attach a battery, align it on the radio chassis and gently push upward until you hear a click indicating that the latch has engaged.

The APX radios are designed to be used with IMPRES batteries. These batteries have a chip in them that

communicate with an IMPRES charger. They will automatically recondition themselves on occasion; this helps to negate the “memory effect” sometimes seen in rechargeable batteries.

See page 23 for additional information on battery care.

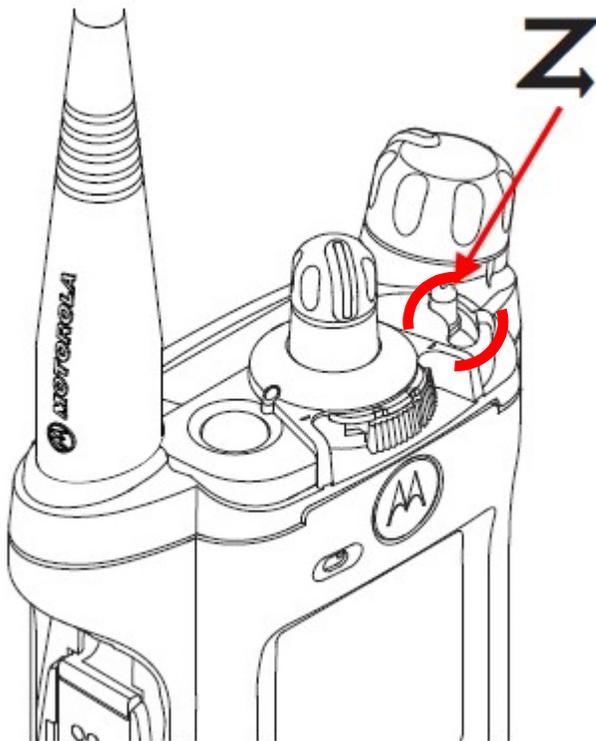
ON / OFF & VOLUME CONTROL:



The large knob located on top of the radio opposite of the antenna is used to turn the radio on or off. A “click” will be felt when the knob has been rotated far enough to either power the radio up or turn it off. Continuing to turn the knob clockwise once the radio has powered up will adjust the volume; the further the knob is turned clockwise, the louder the speaker output will be.

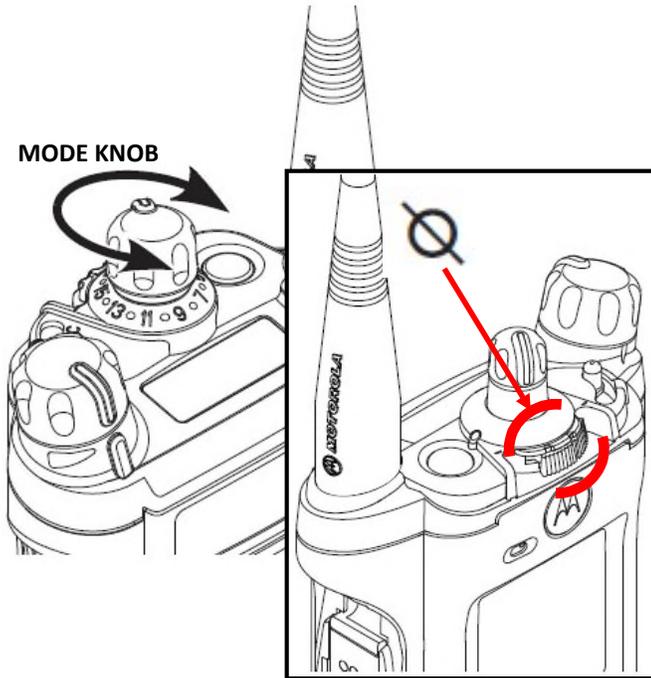
Once the radio has been powered up, the display will read “*SELFTEST*” and it will automatically affiliate with a tower. The radio will remember the talk-group it was last tuned to prior to being powered down and will attempt to affiliate with this talk-group.

KEYPAD LOCK: APX 6000 only



Adjacent to the on/off/volume knob is a small three-position switch labeled **A B C**. This switch can do different things depending on how the radio is programmed. On the Franklin County/CoMIRS radios, this switch has been programmed as a Keypad Lock switch. When placed in the “C” position the keypad is locked. When the switch is in the “A” or “B” position the Keypad is unlocked.

MODE KNOB

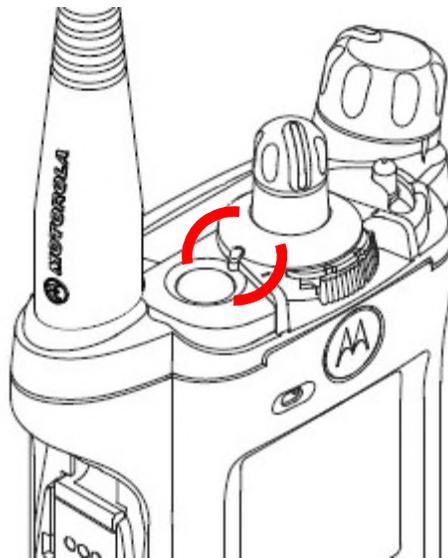


The sixteen-position knob on top of the APX portable radio is called the **mode knob** or “selector.” It primarily functions to change back-and-forth between talk-groups within a particular zone.

The white line running down the side of the mode knob tells you what particular number the knob is currently set to; the knob will click as you rotate it.

Immediately underneath of the mode knob is the **encryption on/off switch** (see inset). This switch is not programmed in the FC/CoMIRS radios as this is done in the Zone and talk-group selection in those radios that are programmed with encryption capabilities.

LED INDICATOR:

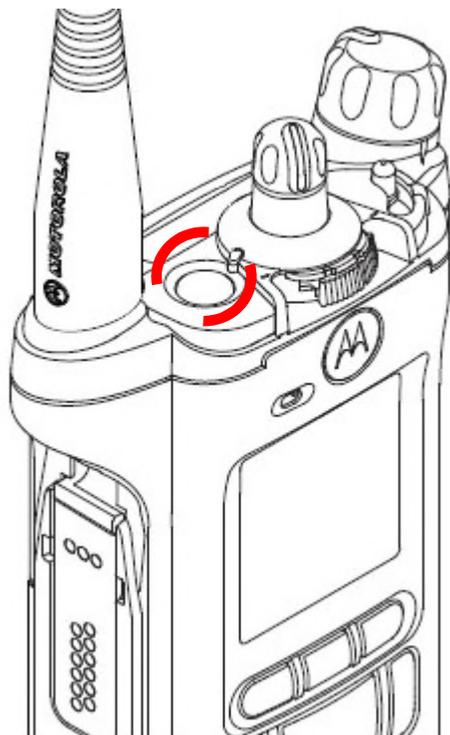


Next to the mode knob is a small LED indicator. This LED has three colors: red, green, and yellow. The LED indicator is typically not illuminated.

COLOR	MEANING
Solid Red	Radio is transmitting
Blinking Red	Burst transmission/data or low battery (constant)
Blinking Yellow	Radio is receiving an encrypted transmission
Solid Green	Radio is powering up
Blinking Green	Radio is receiving a private call or page

EMERGENCY BUTTON:

On radios that have the necessary equipment on the dispatch side, the large orange button on the top of the radio is programmed as the **emergency button**. Some APX shoulder microphones also have a similar orange button on them that functions the same way.



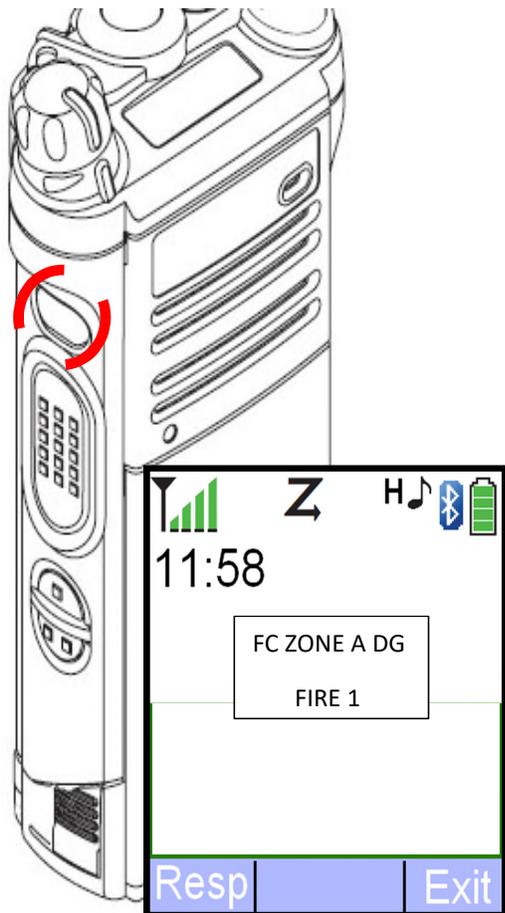
Pressing this button, *a single time*, for at least one second activates an emergency alert that only you and your dispatcher are aware of. *Pressing the PTT after pressing the emergency button* elevates the emergency alert to an emergency call. This allows you to override other users of the system and transmit on the talk-group selected. All other users then become aware you have activated an emergency call as their radios will send off tones and their radio display will change colors and show your radio ID number.

To cancel an emergency alert or call, press and hold the emergency button for at least two seconds until you hear a solid tone. It may take a few seconds for the system to clear the emergency status. Shelburne Control will have to reset the alarm if an Emergency Call was activated. This also applies to radios using the Greenfield, Montague/Turners Falls and Orange talk-groups.

If activated unintentionally, do not cycle through the various talk-groups as this will set off an emergency status on all the talk-groups you turn to. Always contact Shelburne Control to advise of an accidental activation.

Refer to FCECS/CoMIRS Training Bulletin 2021-01 for a more detailed explanation of how the emergency button functions on different talk-groups.

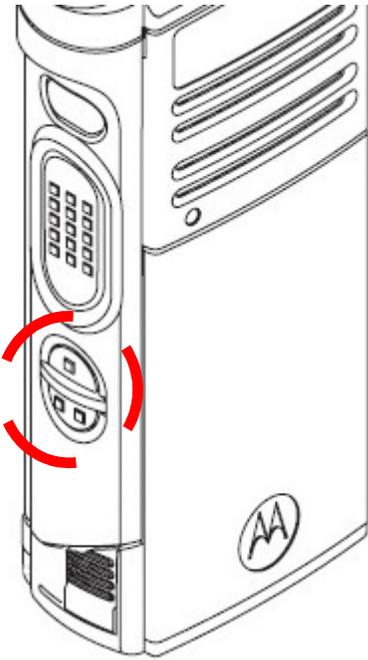
SCAN ON/OFF, SCAN EDIT BUTTON:



On the side of the radio near the top, is a large purple button. This button has two functions. A short push turns the scan function on and off. A long push enters the scan edit mode.

See page 18 for information on building and editing a scan list

ONE-DOT BUTTON & TWO-DOT BUTTON:



On the side of the APX portable radio, immediately below the PTT, there are two small buttons.

The top button has a single raised dot and is referred to as the **one-dot button**. The lower button has two raised dots and is referred to as the **two-dot button**. Each button can do different things depending on the programming and how long it is pressed:

One-Dot Button (Short Press)	Two-Dot Button (Short Press)
Nuisance delete	Backlight on / off
One-Dot Button (Long Press)	Two-Dot Button (Long Press)
No Function	Flip top display APX 6000 only No function on APX 4000

MENU SELECT, HOME, AND 4-WAY NAVIGATION BUTTONS:

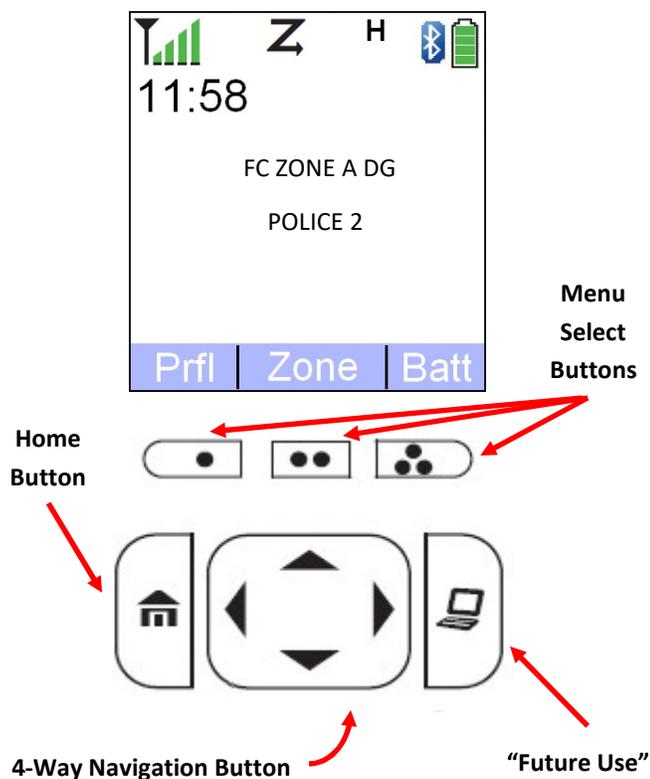
On the front of the radio, immediately below the main display, are a series of buttons.

The first set consists of three small buttons, each with a dot or series of dots. These buttons are called the **menu select buttons** and correspond to the menu option the screen above them is showing. For instance, in the example on the left pressing the middle button would bring up the zone menu.

Below the menu select buttons are another series of buttons. The button with the small house on it is called the **home button**. Pressing this button acts like an escape button on a computer. If you are lost deep in a menu a short press on the **home button** will bring you back to the default menu screen (Zone Down/Zone/Zone Up). If have no idea how to get back to your home talk-group, a long press on the **home button** will take you back to your home talk-group as set in the initial programming, Fire-1 for fire and Police-2 for Police.

The large button in the center is the **4-way navigation button**. This button allows you to navigate through the various menus on the radio.

On the right is the **future use/computer button**. This button has no current use.



MAIN DISPLAY:

The APX 4000 / 6000 has a color LCD display on the front of the radio.

The main display is how the radio shows you, at a glance, how your radio is operating and setup. *The example to the right only shows some of the more commonly seen icons; however, there are additional icons which may appear and these are indicated in the following list.*

At the top left of the screen is a signal strength indicator. This functions much as the “signal bars” you may have on your cell phone screen. Moving to the right we see a number of small icons arrayed at the top of the screen. In this example, we see a large **Z** that indicates we have a scan list populated and the radio is actively scanning talk-groups within our scan list.

Adjacent to the scan icon we see a small H. The radios are set by default to “High Power,” thus this icon will constantly remain on your screen. Adjacent to the H we can see a battery life indicator. This also functions much as the battery life indicator you may have on your cell phone. Moving towards the center of the display, we can

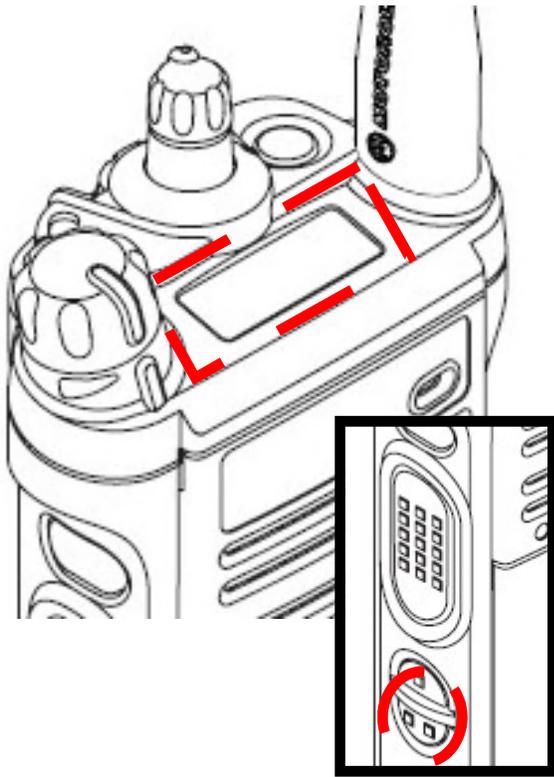
see that the radio is currently set to FC Zone A Dg (Digital) and is tuned to talk-group FIRE 1 within that zone. At the very bottom of the display we can see various menu options that can be accessed by pressing the corresponding *menu select button*. We can change the menu options at the bottom of the display by using the *4-way navigation button* to scroll between the various choices.



MAIN DISPLAY ICONS:

ICON	DESCRIPTION	ICON	DESCRIPTION	ICON	DESCRIPTION
	Displays the RSSI. The more bars, the stronger the signal.		If displayed the radio is in direct mode (tac channel). If absent the radio is in repeater/trunked mode.		Displays the battery level.
	The radio is transmitting.	H	Radio is set to high power by default; cannot be changed.		Battery increments will drop as battery is depleted.
	Solid: Encryption is turned on. Blinking: The radio is receiving an encrypted transmission.		Absent: GPS feature disabled. Solid: GPS feature available. Blinking: Seeking GPS signal.		Battery display will flash when battery level is critical.
Z	A scan list is populated and the radio is currently scanning.		Bluetooth is on and ready for a Bluetooth connection.		
Z with a small orange dot	You are tuned to a talkgroup in your scan list that is currently broadcasting.		Radio is currently connected to external Bluetooth accessory.		Private call or page received.

TOP DISPLAY:



In addition to the large color display on the front of the radio, the APX 6000 also have a smaller monochromatic display on the top of the radio.

This small display is observable to the user when the radio is worn on the duty belt and can eliminate the need to remove the radio from its holster to change talk-groups or setting.

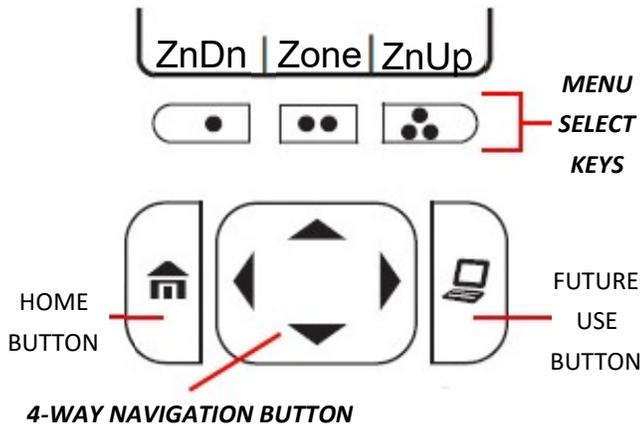
The functionality of the small display mimics that of the larger display and many of the icons are the same, albeit in black-and-white. On the top display, the selected zone and talk-group will alternate and flash continuously.

It is possible to flip the display so that the text is easier to understand to the user when the radio is worn on a duty belt. To flip the display, press and hold the *two-dot button* located on the side of the radio (*inset*). The top display will change to all red when an emergency call is received; it will change to all green when a private call or page is received.

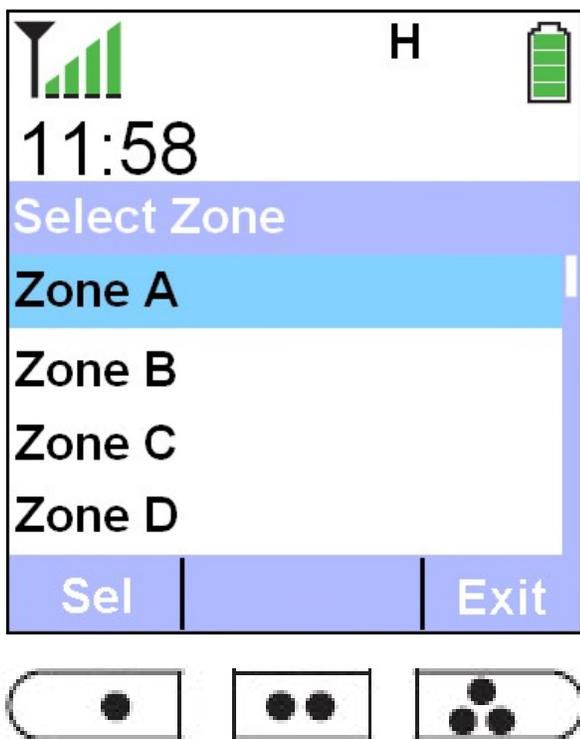
TOP DISPLAY ICONS:

ICON	DESCRIPTION	ICON	DESCRIPTION	ICON	DESCRIPTION
	Displays the RSSI. The more bars, the stronger the signal.		You are tuned to a talkgroup in your scan list that is currently broadcasting.		Displays the battery level.
	The radio is transmitting.		If displayed in the F Zone, the radio is in direct mode. If absent in the F Zone, the radio is in repeater mode.		Battery increments will drop as battery is depleted.
	Blinking: Radio is in a programming mode.		Radio is set to high power by default; cannot be changed.		Battery display will flash when battery level is critical.
	Solid: Encryption is turned on. Blinking: The radio is receiving an encrypted transmission.		Bluetooth is on and ready for a Bluetooth connection.		
	A scan list is populated and the radio is currently scanning.		Radio is currently connected to external Bluetooth accessory.		

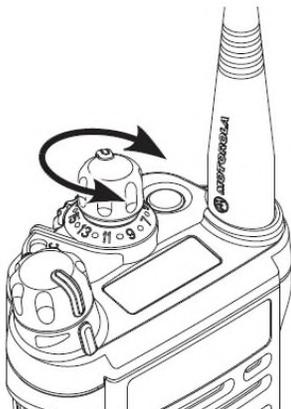
CHANGING THE ZONE & TALKGROUP:



To change the zone, look at the display. If the “ZnDn” “Zone” and “ZnUp” does not appear in the menu selections on the bottom of the display *either use the navigation buttons* to scroll until they appear or simply hit the Home button. Once the word “Zone” appears in the menu, press the corresponding *menu select button* directly underneath of where it appears on the display. In the example to the left, the zone menu is accessed by pressing the center *menu select button* (which has two small dots).



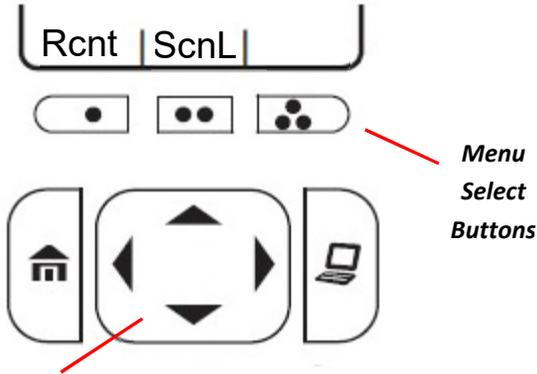
Once the zone menu is accessed, the display should appear similar to the example to the left. The currently selected zone is highlighted in light blue on your display. To scroll up and down through the various zones, use the up and down arrows on the *4-way navigation button*. As you move up and down through the zones, the area highlighted in light blue moves correspondingly, showing you what particular zone you currently have selected. For example, if you need to use a talk-group located within Zone A of your radio, you would move the navigation button until Zone A was highlighted in light blue on my screen (*as shown*). Once Zone A is highlighted, you would press the *menu select button* corresponding to “Sel” as shown in the bottom left of the example. This selects Zone A, and you will automatically exit the zone selection menu. The radio’s main display screen is then shown. You can also use the ZnDn and ZnUp functions to scroll through the Zones.



Once you have selected the zone you want, use the *mode knob* on the top of the portable radio to locate the Talk-group you wish to tune to.

Each zone is capable of holding up to 16 talk-groups. While many zones will contain the full amount, some may not. If your display reads “*Unprogrammed*” and the radio begins to tone, simply rotate the mode knob counter - clockwise until you begin to see talk-groups.

BUILDING A SCAN LIST & SCANNING:



4-WAY NAVIGATION BUTTON

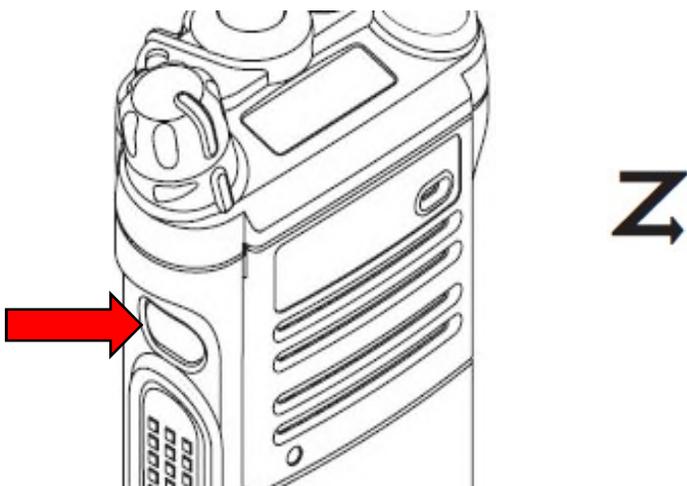
The APX 4000/6000 portable radio is capable of scanning other talk-groups in addition to the talk-group your radio is tuned to. In order for the radio to scan, it requires you build a scan list. While it is possible to select a number of additional talk-groups, it is recommended that you not scan more than three in addition to your home talk-group as the constant radio traffic can potentially become distracting.

Use the *4-way navigation button* to scroll the menu bar until you see "ScnL." This is shorthand for "Scan List." Select "ScnL" using the appropriate *menu select button*.



Once in the scan screen you can see three options on the bottom of the display: "Sel" is select, "Del" is delete, and "Rcl" is recall. Your talkgroup selection will be highlighted in light blue (*as shown*). If you select "Rcl," this will display talkgroups that have already been programmed into your list; each press brings up another scanned talkgroup. If you wish to delete one from your list, select "Del." If there is not an existing scan list, the radio will tone and the highlighted bar will remain on a single talkgroup.

To navigate between zones, press either the left or right arrow key on the *4-way navigation button*. Once you reach the zone you are looking for, press the up or down arrow keys until the talkgroup you wish to scan is highlighted in light blue. To add this talkgroup to your scan list, press *Sel*." To exit this function press the "Home" button.

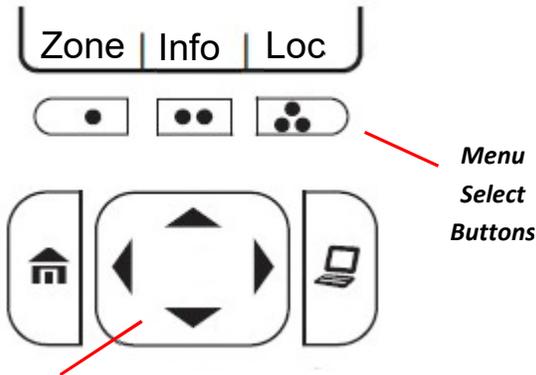


Once your scan list is built to your liking, use the purple button on the side of the radio (*shown at left*) to turn scan on or off.

If scan is active, the icon shown to the left will appear on the the main display of the radio. Also on the top display for the APX 6000.

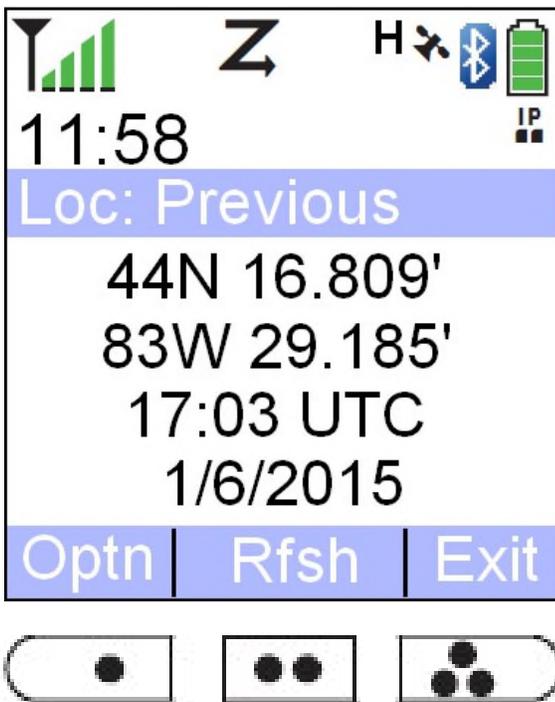
There are a variety of factors that impact scanning for users of the system. Essentially, if you are affiliated with a tower and no one else affiliated with that tower has selected *your scanned* talkgroup as *their primary* talkgroup, you will not hear it on scan.

USING GPS:



4-WAY NAVIGATION BUTTON

Some APX 4000/6000 radios have a GPS feature built into the radio. It communicates with the GPS system using the radio's antenna. To access your latitude and longitude from the radio, use the 4-way navigation button to scroll over until "Loc" appears on the menu. Press the appropriate menu select button to access the location feature of the radio.

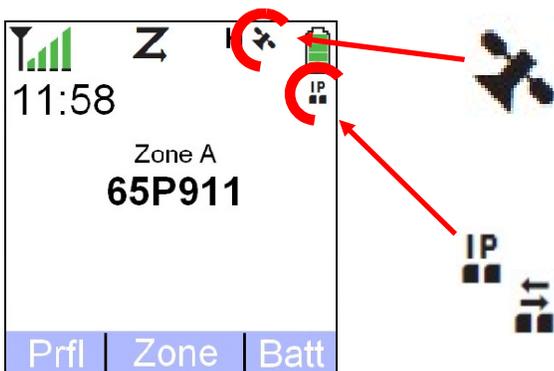


Once in the scan screen you can see three options on the bottom of the display: "Optn" is option, "Rfsh" is refresh, and "Exit" leaves the GPS menu.

The option selection enables you to set waypoints using the GPS feature of the portable radio.

Refresh causes the radio to update its current location using data received from the Global Position System satellites in orbit around Earth.

Choosing exit simply enables you to go back to the main display.



If the GPS feature of your radio is enabled, you will see a small satellite icon on the main display of your radio (shown at left). If the radio has a steady fix using the GPS system, the satellite icon will be solid. If the satellite icon is blinking, it means the radio has lost touch with the GPS system. This would be a common occurrence inside of buildings. You may see a small "IP" icon on the display, as well. This indicates data packets may be exchanged with a computer, most likely a CAD or mapping program at a dispatch center that is capable of using the GPS feature of your radio.

CLOCK, PROFILE, & BATTERY:



The APX 4000/6000 allows the user to change the day, date, and time of the radio. For instance, users can opt to use a 12hr clock or a 24hr clock. This option is selected by pressing the menu select buttons under the "Clck" tab on the radio's menu bar.

This function of the radio is a matter of convenience and it has no bearing on the radio's functionality. The clock will remember the time if the battery is removed; however, the user must manually adjust it to account for time changes.



The APX 4000/6000 enables the user to select radio profiles to suit his or her needs. This menu is accessed by selecting "Prfl" on the menu bar.

Profiles enable the user of the radio to tailor its operation regarding backlight, tones, and audio.

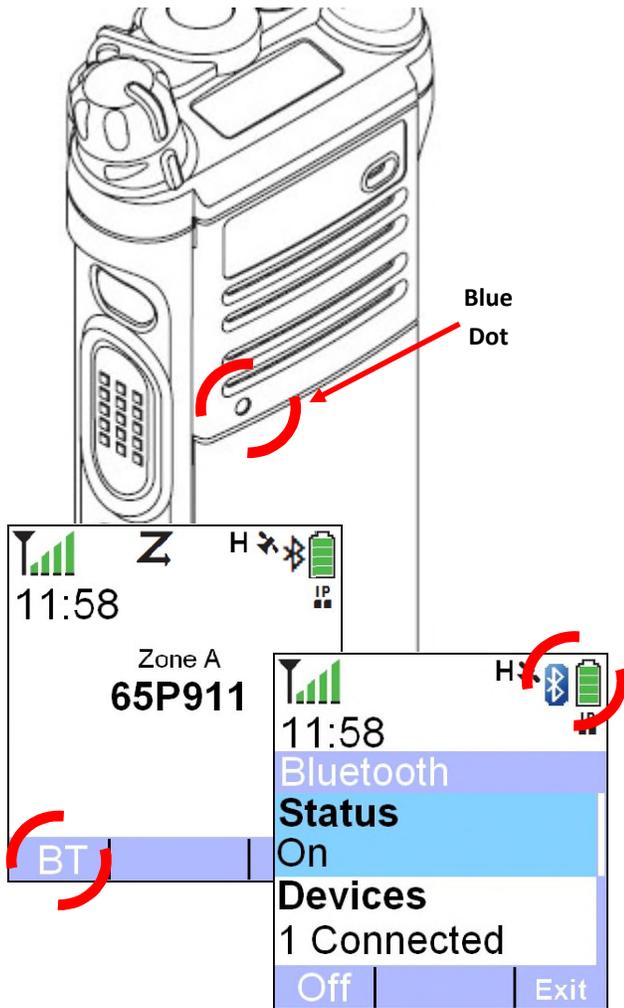
The profiles available for the FRCOG/CoMIRS radios are limited to three choices: "Default", "No Lights" and "No Lights, Speaker or Tones". Default enables the backlight on the screen, the speaker and tones (such as whenever a button is pushed). "No Lights" turns off the screen backlight for tactical operations. The "No Lights, Speaker, Tones" profile turns off the screen backlight, all tones and the speaker. If the unit is paired with a headset or blue tooth speaker you will still be able to hear through that device. Again this would be for tactical operations. A warning should be given that you will not be able to see the screen to make adjustments to your radio unless you are in good lighting.



The APX 4000/6000 portable radios are designed to use Motorola IMPRES batteries. IMPRES batteries have a chip in them that communicates with the AC charger; this helps to recondition the batteries and negate "memory effect."

In addition to the battery icon on the radio's displays, you can access the battery menu by selecting "Batt" on the menu bar. It will allow you to see the battery's remaining life measured as a percentage, the remaining life measured in milliamp hours (mAh), and the estimated number of charging cycles the battery has gone through.

PAIRING A BLUETOOTH DEVICE:



If the feature is enabled and the radio possesses the proper internal hardware, the APX 4000/6000 radio is capable of wirelessly connecting with Bluetooth devices such as speakers and shoulder or bone microphones.

To enable a Bluetooth device, press the *menu select button* under “BT” on the menu bar, then select “On” from the menu bar once you are in the Bluetooth menu. Pair the device by touching the blue dot on the powered-up device to the blue dot on the radio. You may have to press and hold the wireless device’s power button to enter the pairing mode.

Wireless ear devices will often verbally prompt the user on what to do to pair it to the radio. When the wireless device is turned on but not paired, it will say “to pair, touch blue dots.” Once the blue dots are touched together, the radio will beep to inform you of a successful connection and the device itself will advise “headset connected.”

If Bluetooth is turned on within the radio, but no device is paired with it, the small Bluetooth icon next to the battery gauge will be grey (*as shown*) and the Bluetooth menu will indicate that no device is paired with it.

Once a wireless device has been successfully paired, the grey icon will turn blue and the menu will indicate the connected device (*as shown*).

SOME OF THE TONES YOU MAY HEAR:

The APX 4000/6000 portable radios use various tones or sounds to keep you informed of how the radio is operating and if there is a problem. Some you will hear everyday (such as the channel grant), and some you may never hear (such as the system busy tone). *Many of these tones are accompanied by a message on the main display screen.*

TONE	DESCRIPTION
Channel Grant / Talk Permit <i>Quick chirping sound (dah dah dit)</i>	Your transmission can proceed and will be broadcast. You must wait until the channel grant sound is finished.
Bonk <i>Long, medium tone (boooooooooonk)</i>	You can't talk. Someone may be using the talkgroup you wish to use. Wait until they are finished. This tone is not the same as system busy.
System Busy <i>Quick series of tones (like a fast telephone busy)</i>	All Intellirepeaters on the tower are busy and there is no open pathway for communication. Continue pressing the PTT for up to four seconds as the system has you "in line" to talk.
Ringling <i>Fast telephone ringing</i>	You are private calling another radio and awaiting their acceptance of the call.
Battery Critical <i>Two short, high-pitched beeps</i>	Battery is critically low. Replace your battery.
Emergency Alert/Call <i>Four high-pitched beeps</i>	You have initiated an emergency alert/call.
Emergency Received <i>Alternating high and low pitched tones</i>	Someone else has initiated an emergency alert/call.
Time-Out Warning <i>Quick beep while you are transmitting</i>	You have transmitted for 55 seconds. The system will time you out at 60 seconds.
Time-Out <i>Long, medium tone</i>	System has timed you out. Key your PTT to continue transmitting.
Private Call Received <i>Two short, high-pitched beeps</i>	You have received a private call.
Page Received <i>Four short, high-pitched beeps</i>	You have received a page.

CHARGING AND CARING FOR YOUR BATTERY:

The APX 4000/6000 portable radios are designed to use Motorola IMPRES batteries. IMPRES batteries contain a chip that communicates with the IMPRES charger; this batteries are considered “smart” as they know when they need to be reconditioned. If you place your battery in the AC powered charger and the light turns yellow, this indicates the battery is undergoing recondition. This does not happen with the 12 volt DC vehicle chargers. Following reconditioning the battery will charge normally. It is best to let the entire cycle conclude if possible.

While cigarette-plug “travel chargers” are available for IMPRES batteries, they are not recommend for use unless it is an emergency. The “travel chargers” are not IMPRES and will dramatically shorten the life of the battery.

The light on the IMPRES charger will tell you some information about the battery itself. The table below explains this in detail. CHARGER LIGHT	DESCRIPTION
Flashing Yellow	Standby. Battery is waiting to charge. Battery needs to cool down or warm up before charging.
Steady Yellow	Reconditioning battery. Battery is reconditioning and will then begin charging normally.
Solid Red	Charging.
Flashing Red	Not chargeable. The battery is not chargeable .
Flashing Green	>90% charged. Battery charging is nearly complete.
Solid Green	Ready. Battery is fully charged and ready for use.
Flashing Alternating Red and Green	Service life. Battery has reached the end of its service life. Replace.

