

APX 1500 O2 CONTROL HEAD





Public Works

Declaration of Conformity

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 1500

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. This device complies with Industry Canada license-exempt RSS standard(s). 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.

RF Energy Exposure Training and Product Safety Information

Compliance with RF Exposure Standards

National and international regulations require manufacturers to comply with the RF energy exposure limits for portable two-way radios before they can be marketed.

Your Motorola Solutions two-way radio is designed, manufactured, and tested to comply with all applicable national and international regulations for human exposure to radio frequency electromagnetic energy. When two-way radios are used as a consequence of employment, applicable regulations may require users to be fully aware of and able to control their exposure to meet occupational requirements.

RF Energy Exposure Awareness and Control Information and Operational Instructions for Occupational Use

Note: This radio is intended for use in occupational/controlled conditions where users are aware of their exposure and can exercise control over their exposure to meet the requirements in national and international regulations. This radio device is not authorized for general population, consumer use.

For more information on what RF energy exposure is, and how to control your exposure to ensure compliance with established RF exposure limits, consult the following websites:

- https://www.fcc.gov/
- https://www.osha.gov/
- https://osha.europa.eu/en
- http://www.who.int/peh-emf/project/en/

For additional user training information on exposure requirements, consult the following websites:

- https://www.motorolasolutions.com/en_us/about/company-overview/corporateresponsibility/governance-and-policies/wireless-communication-and-healthfaqs.html
- http://learning.motorolasolutions.com/

RF Exposure Compliance and Control Guidelines

To control your exposure, and ensure compliance with the relevant RF exposure limits, always adhere to the following guidelines:

- Do not remove any of the RF Exposure Labels if present from this device or its related accessories.
- Attach these instructions to the device when you transfer it to other users.
- Do not use this device if the operational requirements described herein are not met.

Operating Instructions

- Transmit no more than 50% of the time. To transmit (talk), press the Push-To-Talk (PTT) button. To receive
 calls, release the PTT button. Transmitting more than 50% of the time may cause RF exposure compliance
 requirements to be exceeded.
- Transmit only when people (bystanders) outside the vehicle are at least at the recommended minimum lateral distance (as shown in Tables 1 and 2) away from the vehicle body. This separation will ensure that there is sufficient distance from a properly installed (according to the installation instructions) externally-mounted antenna to satisfy the relevant RF exposure limits.
- To ensure continued compliance with applicable RF exposure limits, use only Motorola Solutions approved, supplied or replacement antennas, batteries, and accessories.
- For a list of Motorola Solutions approved accessories please refer to your user manual or visit www.motorolasolutions.com.

Table 1 lists the recommended lateral distance for bystanders from the body of a vehicle (For example, truck, van, car, motorcycle) equipped with an approved, properly installed single-band mobile radio and associated antenna(s).

These lateral distances, for single-band radios, depend on the radio rated power.

Single-Band Mobile Radio Rated Power (see Notice)	Minimum Lateral Distance of Bystanders from Vehicle Body
Less than 7 W	8 in. (20 cm)
7 to 14 W	1 ft (30 cm)
15 to 39 W	2 ft (60 cm)
40 to 110 W	3 ft (90 cm)

<u>Table 1: Rated Power of Vehicle-Installed Single-Band Mobile Radio and Recommended Minimum Lateral</u> Distance from Vehicle Body

Operational Warnings

The following explains the operational warnings:



For Vehicle With Air Bags

- Refer to vehicle manufacturer's manual prior to installation of electronic equipment to avoid interference with air bag wiring.
- DO NOT place a portable radio in the area over an air bag or in the air bag deployment area. Air bags inflate with great force. If a portable radio is placed in the air bag deployment area and the air bag inflates, the radio may be propelled with great force and cause serious injury to occupants of the vehicle.

Potentially Explosive Atmospheres

- Use of a radio that is not intrinsically safe in a potentially explosive atmosphere could result in a serious injury or death.
 You should only use a certified Intrinsically Safe radio in potentially explosive atmospheres.
- Explosive atmospheres refer to hazard classified locations that may contain hazardous gas, vapors, dusts, such as fueling
 areas below decks on boats, fuel or chemical transferor storage facilities, and areas where the air contains chemicals or
 particles such as grain, dust or metal powders. Areas with potentially explosive atmospheres are often, but not always,
 posted.
- Turn off your radio prior to entering any area with a potentially explosive atmosphere unless it is a radio type specifically certified for use in hazardous location areas.
- DO NOT remove, install, or charge batteries in such areas, or remove or install antennas. Sparks in a potentially
 explosive atmosphere can cause an explosion or fire resulting in bodily injury or even death.

Blasting Caps and Blasting Areas

To avoid possible interference with blasting operations, turn off your radio when you are near electrical blasting caps, in a blasting area, or in areas posted: "Turn off two-way radio." Obey all signs and instructions.

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Radio Parts and Controls

O2 Control Head



Fleet map

	Z 1	Z2	Z 3	Z4	Z 5	Z6
C1						
C2						
C3						
C4						
C5						
C6						
C 7						
C8						
C9						
C10						
C11						
C12						
C13						
C14						
C15						
C16						

Preparing Your Radio for Use

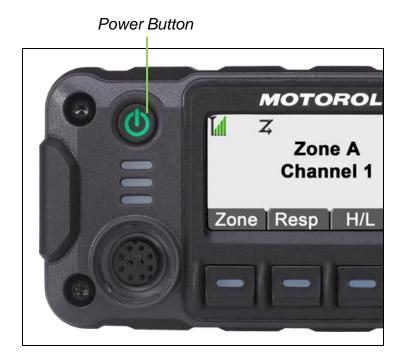
Turning On/Off the Radio

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.



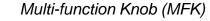
Preparing Your Radio for Use

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** counterclockwise.





Identifying Radio Controls

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.
- Use the Menu Select buttons.



Menu Select Buttons

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

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

Press the **Menu Select** button () directly below **Chan**.

Home Button

The $\stackrel{\triangle}{\blacksquare}$ 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.

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 are programmed to navigate through channels

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.

Identifying Radio Controls

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.



Identifying Status Indicators

Status Icons

The front liquid crystal display (LCD) of your radio shows radio status, text entries, and menu entries. The top two display rows contain color icons that indicate radio operating conditions.

Selected icons are also shown on the first row of the top monochrome display screen of your radio.

The following are the icons that appear on the radio's display.



Receiving

Radio is receiving a call or data.



Transmitting

Radio is transmitting a call or data.



Call Received

MOTOROLA SOLUTIONS

Radio has received an Individual 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.



Direct

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

H or **L**

Power Level

- L = Radio is set at Low power.
- H = Radio is set at High power.

Scan

Radio is scanning a scan list.

Priority Channel Scan

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

Identifying Status Indicators

LED Indicator

The LED indicator shows the operational status of your radio.

- **Solid red** Radio is transmitting.
- Blinking red Radio is transmitting at low battery condition.
- **Double blinking red** Radio is in Emergency Mode.
- 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 nonpriority channel while in the Scan List Programming mode.
- Blinking green Radio is receiving an individual or telephone call, or is on a Priority-Two channel while in the Scan List Programming mode.
- Rapidly blinking green Radio is on a Priority-One channel while in the Scan List Programming mode.



Note: No LED indication when the radio receives a clear (non-secured) transmission in trunking mode. LED indication can be preprogrammed by qualified technician to be permanently disabled. Consult your dealer for further details if you want to disable it.

Identifying Status Indicators

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.

Backlight and Bar Color	Notification	When
0	Emergency Alerts	The radio initiates an emergency alarm or call.
Orange		The radio receives an emergency alarm or call.
Red	Critical Alerts	The radio is out of range.
		The radio enters failsoft mode.
		The radio is unable to establish a full connection with the system.
		The radio is unable to authenticate or register with the system.
		The radio lost GPS signal or GPS function fails.
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.
		The radio enters Geofence.



Identifying Status Indicators

Alert Tones

Your radio uses alert tones to inform you of your radio's condition. The following table lists these tones and when they occur.

You Hear	Tone Name	Heard
Short,	Radio Self Test Fail	When radio fails its power-up self test.
Low-Pitched	Reject	When unauthorized request is made.
Tone	Time-Out Timer Warning	Four seconds before time out.
$\boxed{ \ \ }$	No ACK Received	When radio fails to receive an acknowledgement.
Play	Individual Call Warning Tone	When radio is in an individual call for greater than 6 seconds without any activity.
Long,	Time-Out Timer Timed Out	After time out.
Low-Pitched	Talk Prohibit/PTT Inhibit	(When PTT button is pressed) transmissions are not allowed.
Tone	Lack of Voice PTT Time out	When the radio ends your call after it detected there are lack of voice for 5 seconds after the PTT is pressed and hold. Your radio ends the call to enable your radio to receive calls from other radio users.
Play	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	Busy	When system is busy.
Play		

Short,	Valid Key-Press	When correct key is pressed.
Medium- Pitched	Radio Self Test Pass	When radio passes its power-up self test.
Tone	Clear Voice	At beginning of a non-coded communication.
	Priority Channel Received	When activity on a priority channel is received.
$\boxed{ \ \langle 1 \rangle \rangle }$	Emergency Alarm Entry	When entering the emergency state.
Play	Central Echo	When central controller has received a request from a radio.
Long,	Volume Set	When volume is changed on a quiet channel.
Medium- Pitched	Emergency Exit	When exiting the emergency state.
Tone		
Play		
A Group of	Failsoft	When the trunking system fails.
Medium- Pitched	Automatic Call Back	When voice channel is available from previous request.
Tones	Keyfail	When encryption key has been lost.
	Console Acknowledge	When status, emergency alarm, or reprogram request ACK is received.
(1))		
Play		
Two Short, Medium- Pitched Tones	Over-the-Air Programming request	When the radio receives an over-the-air programming request.

Short, High-Pitched Tone (Chirp)	Low-Battery Chirp	When battery is below preset threshold value.
Two High- Pitched Tones	GPS Fails	When the GPS signal is lost or when GPS fails.
Ringing	Fast Ringing	When system is searching for target of Private Call.
$\boxed{ \ \langle 1 \rangle \rangle }$	Enhanced Call Sent	When waiting for target of Private Call to answer the call.
Play	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.
Play	Talk Permit	(When PTT button is pressed) is verifying with the system for accepting its 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.
Incremental-	Bluetooth Paired	When Bluetooth accessory is paired with the radio.
Pitched Tone	Bluetooth Connected	When Bluetooth accessory is connected to the radio.
Decremental-	Bluetooth Unpaired	When Bluetooth accessory is unpaired from the radio.
Pitched Tone	Bluetooth Disconnected	When Bluetooth accessory is disconnected from the radio.

GENERAL RADIO OPERATION

This chapter explains the general radio operations in your radio.

Selecting a Zone

A zone is a group of channels.

Procedure:

[Menu]

- 1. From the home screen, scroll **right** or **left** to Zone.
- 2. Press the **Menu Select** button directly below Zone.
- 3. Scroll **up** or **down** 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 channel.

Selecting a Radio Channel

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

Procedure:

Use the **up** or **down** arrow to the required channel.

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

Receiving and Responding to a Radio Call

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

The LED lights up solid red while the radio is transmitting. 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.

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.

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

Scan Lists

Viewing a Scan List



Procedure:

- 1. From the home screen, scroll right or left to Scan.
- 2. Press the **Menu Select** button directly below **ScnL**.
- 3. Scroll **up** or **down** to view the members on the list.
- 4. Press to exit the current display and return to the home screen.

Scan Lists

Priority Status

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 **Sel** button 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.



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

Priority-One: Blinking dot

The LED rapidly blinks green.

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



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

Priority-Two: Steady dot

The LED blinks green.

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

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]

Press the preprogrammed **Scan** button, or turn the preprogrammed Scan switch to the Scan on or Scan off position, to initiate or stop scan.

Transmitting While the Scan is On

This feature allows the user to transmit using radio programmed for talkback scan and non-talkback scan.

Transmitting Using Radio Programmed for Talkback Scan

Procedure:

1. Press the **PTT** button to transmit on the channel indicated by the display.

The radio does not begin scanning again for a predetermined hang time after you release the **PTT** button, allowing the other party to respond.

If the other party responds within the hang time, scanning does not resume until the full hang time expires after they have finished speaking, allowing the conversation to be completed.

To transmit on the selected channel if another channel is active, first turn scan off by pressing the Menu Select button below Scan momentarily.

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. From the home screen, scroll **right** or **left** to **Nuis**.
- Press the Menu Select button directly below Nuis.

The radio continues scanning the remaining channels in the list.

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

Emergency Operation HOT MIC 15 Seconds

The Emergency feature is used to indicate a critical situation.

If the **Orange** button is preprogrammed to send an emergency signal, this signal overrides any other communication over the selected channel.

Your radio supports the following Emergency modes:

Emergency Alarm with Emergency Call

Each channel can only assigned one of the Emergency modes above. The radio responds differently when pressing the preprogrammed **Emergency** button in each channel.

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

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

- Tactical/Non-Revert
 - The radio sends emergency alarm and/or make emergency call on the current selected channel.
- Non-Tactical/Revert for Conventional system
 - The radio reverts to the preprogrammed emergency channel to send alarm and/or make emergency call.
- Non-Tactical/Revert for Trunking system
 - The radio reverts to the preprogrammed emergency talkgroup to send alarm and/or make emergency call.



Emergency (Orange) Button

Emergency Operation

Sending an Emergency Call With Hot Mic (Trunking Only)

This feature allows you to send an Emergency Call with hot mic to a group of radios.

Your radio must be programmed for this type of operation.

Your radio microphone is automatically activated, allowing you to communicate with the group of radios without pressing the PTT button. This activated microphone state is also known as hot mic. The hot mic applies to the first voice transmission from your radio during the Emergency call.

For subsequent transmissions in the same Emergency call, you must press the **PTT** button.

Procedure:

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

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

You hear a short, medium-pitched tone and the LED momentarily blinks red.

OR

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

- 2. The microphone remains active for the hot mic time specified in the radio's codeplug programming.
- 3. To exit Emergency Call, press and hold the preprogrammed **Emergency** button for about a second.

Emergency Operation

Sending an Emergency Alarm with Emergency Call

This feature gives your radio priority access on a channel for conventional system, and to a talkgroup for trunking system.

Procedure:

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

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

You hear a short, medium-pitched tone and the LED momentarily blinks red.

OR

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

2. The radio enters the Emergency Call state when:

You receive the dispatcher's acknowledgement.

The display shows **Ack received**.

OR

You receive no acknowledgement.

The display shows **No acknowledge**.

OR

You press the **PTT** button while in the Emergency Alarm mode.

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

Turning off the radio also cancels the emergency state.

Emergency Operation

Changing Channels during Emergency

For **ALL** Emergency transmissions, when changing channels:

If the new channel is also preprogrammed for Emergency, you can change channels while in Emergency operation.

The emergency alarm or call continues on the new channel.

If the new channel is **NOT** preprogrammed for Emergency, the display shows **No emergency**, and you hear an invalid tone until you exit the Emergency state or change to a channel preprogrammed for Emergency.

Trunking System Controls

Operating in Failsoft System

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

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

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

You hear a medium-pitched tone every 10 seconds and the display shows Failsoft.

To continue in failsoft, to communicate with other talkgroups, 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.

Trunking System Controls

Out-of-Range Radio

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

Procedure:

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 failsoft channel.

OR

It is turned off.



Trunking System Controls

Site Trunking Feature

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

The display shows the currently selected zone/channel combination and **Site trunking**.

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

Time-Out Timer

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

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

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

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

Procedure:

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