TM9100 mobiles

User's Guide

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For your safety

Before using your radio, please read the following important safety and compliance information.

Radio frequency exposure information

For your own safety and to ensure you comply with the Federal Communication Commission's (FCC) radio frequency (RF) exposure guidelines, please read the following information before using this radio.

Using this radio

You should use this radio only for work-related purposes (it is not authorized for any other use) and if you are fully aware of, and can exercise control over, your exposure to RF energy. To prevent exceeding FCC RF exposure limits, you must control the amount and duration of RF that you and other people are exposed to.

It is also important that you:

- Do not remove the RF Exposure label from the radio.
- Ensure this RF exposure information accompanies the radio when it is transferred to other users.
- Do not use the radio if you do not adhere to the guidelines on controlling your exposure to RF.

Controlling your exposure to RF energy

This radio emits radio frequency (RF) energy or radio waves primarily when calls are made. RF is a form of electromagnetic energy (as is sunlight), and there are recommended levels of maximum RF exposure.

To control your exposure to RF and comply with the maximum exposure limits for occupational/controlled environments, follow these guidelines:

- Do not talk (transmit) on the radio more than the rated transmit duty cycle. This is important because

the radio radiates more energy when it is transmitting than when it is receiving.

- While you are transmitting (talking or sending data) on the radio, you must ensure that there is always a distance of 35 inches (0.9m) between people and the antenna. This is the minimum safe distance. For 110W mobiles, the minimum safe distance is 44 inches (1.1m).
- Use the radio only with approved antennas and attachments, and make only authorized modifications to the antenna otherwise you could damage the radio and violate FCC regulations.

For more information on what RF energy is and how to control your exposure to it, visit the FCC website at http://www.fcc.gov/oet/rfsafety/rf-faqs.html.

Compliance with RF energy exposure standards

This two-way radio complies with these RF energy exposure standards and guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR §§ 1.1307, 1.1310, and 2.1091.
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95.1-1992.
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition.

This radio complies with the IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environments at operating duty factors of up to 50% talk to 50% listen.

Radio frequency emissions limits in the USA

Part 15 of the FCC Rules imposes RF emission limits on receivers.

This radio complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

Unapproved modifications or changes to radio

The radio is designed to satisfy the applicable compliance regulations. Do not make modifications or changes to the radio that are not expressly approved by Tait Electronics Limited. Failure to do so could invalidate compliance requirements and void the user's authority to operate the radio.

Frequency band reserved for distress beacons

Frequency band 406 to 406.1 MHz is reserved for use by distress beacons. Transmissions should not be made within this frequency band.

Safe radio operation

Warning: Switch off the radio:

- at petrol filling stations or near flammable liquids or gases
- in the vicinity of explosive devices and blasting zones.

Using a handheld microphone or a radio while driving a vehicle may violate the laws and legislation that apply in your country or state. Please check the vehicle regulations in your area.

Interference with electronic devices

Some electronic devices may be prone to malfunction due to the lack of protection from RF energy that is present when your radio is transmitting.

Examples of electronic devices that may be affected by RF energy are:

- vehicular electronic systems such as fuel injection, anti-skid brakes, and cruise control
- medical devices such as hearing aids and pacemakers
- medical equipment in hospitals or health care facilities.

Consult the manufacturer (or its representative) of the equipment to determine whether these electronic circuits will perform normally when the radio is transmitting.

High temperatures

The bottom surface of the radio and the heatsink fins can become hot during prolonged operation. Do not touch these parts of the radio.

110 watt mobiles

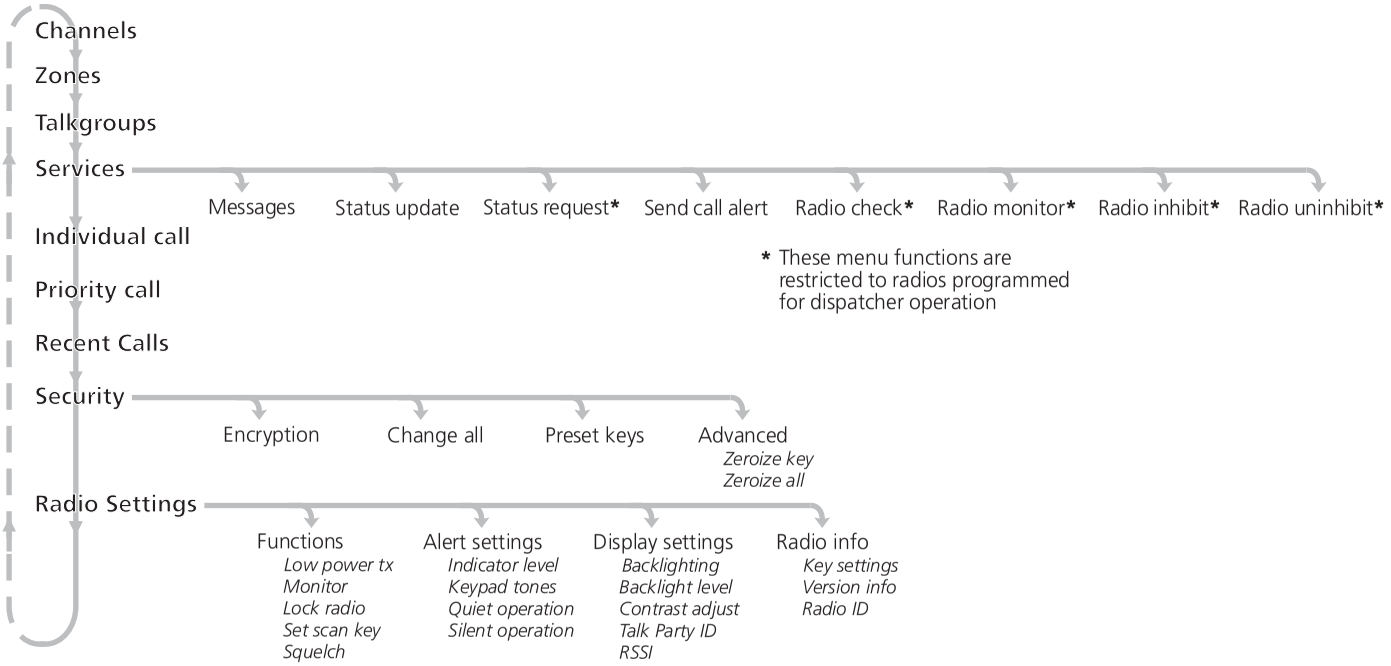
Do not place objects on the radio. The heatsink needs a clearance of at least one inch (2.5cm) and a free flow of air.

Radio protection when charging the vehicle battery

Always remove the fuses from the radio power cable before charging the vehicle battery, connecting a second battery or using power from another vehicle (e.g. when "jump-starting" the vehicle).

Menu map

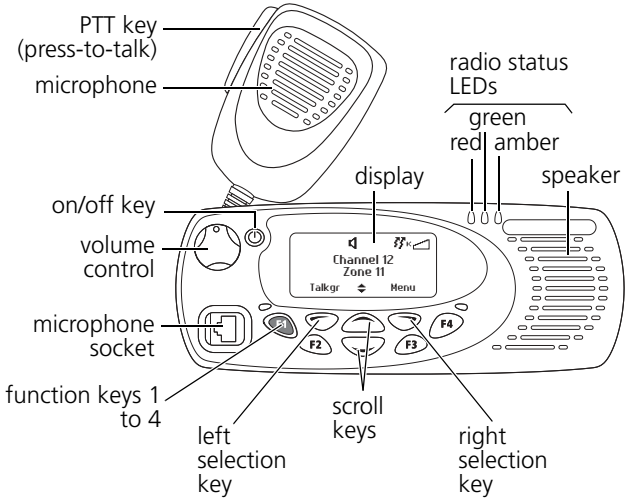
Note: The menus shown below may not be available for your radio.



Menu Map

Radio controls

For more information about the radio controls, see "About your radio" on page 15.



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1 About this guide

This user's guide provides information about the TM9155 mobile radio.

Safety warnings used in this guide

Within this user's guide, the following warnings are used to alert you to important safety information:

Warning: There is a potential risk of death or serious injury.

Caution: There is the risk of minor or moderate injury to people.

Caution: There is a risk of equipment damage or malfunction.

Related documentation

The following documentation is also available for your Tait radio, which you can access from the Tait Technical Support website (http://support.taitworld.com/):

- *TM9100 Installation Guide*—covers installing the TM9100 mobile radios, microphones, antennas, emergency switches, and external alert devices.
- *TM9100 Safety and Compliance Information*—supplied with each radio. (The same information is included in this user's guide.)
- Accessory installation instructions—may be supplied with an accessory.

2 About your radio

This section describes all the various buttons and keys on your radio.

This section covers:

- About your digital radio
- Basic operation
- Radios with a hand-held control head
- Using function keys to access frequently used features
- Understanding the radio display
- Using the menus to access settings and features
- Understanding the radio indicators

About your digital radio

Your digital radio may have some channels programmed as either analog or dual mode. Dual mode channels are able to receive both digital and analog calls.

You may notice differences between your radio's analog and digital channels in terms of:

- static noise in low signal areas, and
- radio coverage in marginal reception areas.

Lack of static noise

On digital channels there is no static noise, even in low signal areas. This lack of static is because your digital radio removes the 'noise' from the call, so that you hear only clear voice.

Coverage

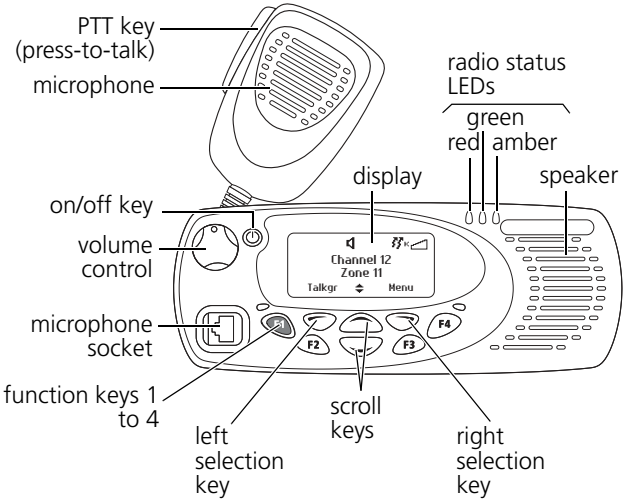
With analog channels, the background noise in a call gets progressively worse when you are in fringe areas or even slightly outside normal coverage areas. With digital channels, a call remains clear and then drops off quickly at the border of a coverage area. The reason for this is that a digital call is either received or it isn't.

Basic operation

The radio controls are the PTT key, volume control, on/off key, scroll keys, selection keys and function keys. Some keys have functions assigned to both short and long key presses:

- a short key press is less than one second, and
- a long key press is more than one second.

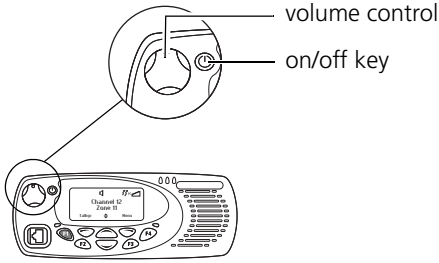
The radio controls and their functions are described in the following sections.



Turning your radio on and off

Note: If your radio has a security lock, you must enter your 'unlock sequence' before you can use the radio. See "Unlocking your radio" on page 56.

A long press of the on/off key turns the radio on and off.



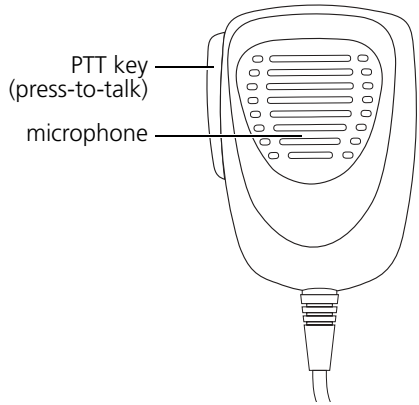
When the radio is first turned on, the red, green, and amber LEDs flash briefly and the radio gives two short beeps. A brief message may appear on the display.

Adjusting the volume

Rotate the volume control clockwise to increase the speaker volume, and counter-clockwise to decrease the volume. The raised dot indicates the current volume setting.

About the press-to-talk (PTT) key

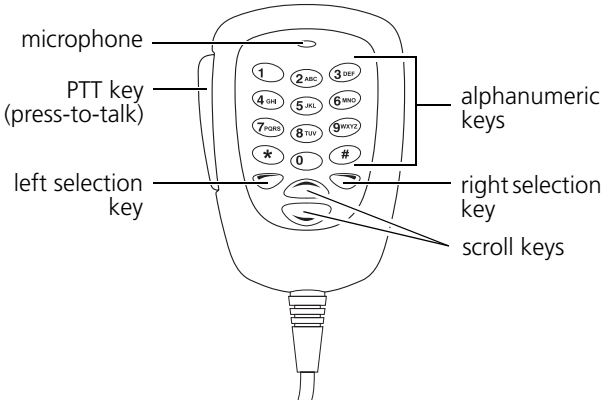
Press and hold the PTT key to talk. Release it to listen.



About the keypad microphone

The keypad microphone has a PTT key as well as twelve alphanumeric keys, two scroll keys, and left and right selection keys.

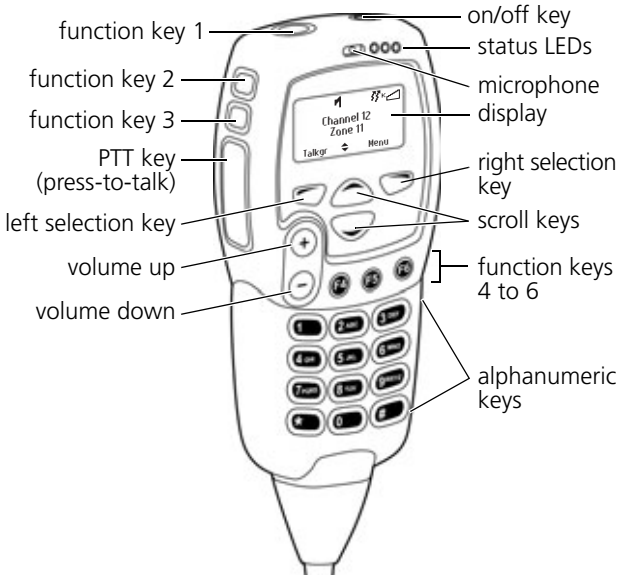
The scroll and selection keys work in the same way as those on the control head (see "Selection keys" and "Scroll keys" on page 23).



Radios with a hand-held control head

Your radio may have a hand-held control head installed, to enable you to operate the radio at a distance from the radio body.

The keys and controls work in the same way as those on the standard control head, with the exception of the PTT and volume up and down keys. The hand-held control head also has two additional function keys.



Turning the radio on

There are two controls you can use to turn the radio on:

- the on/off key, or
- the PTT key.

Press the on/off or PTT key to turn the radio on.

Turning the radio off

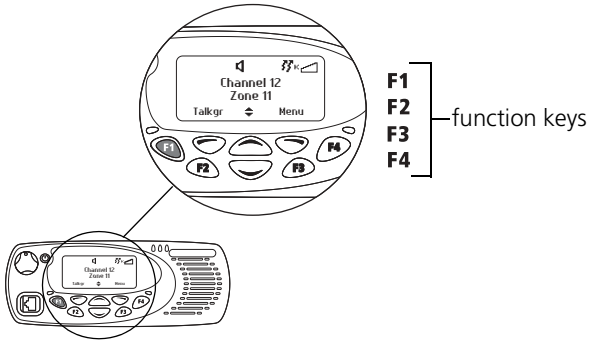
Press the on/off key to turn the radio off.

Adjusting the volume using the hand-held control head

Press the ⊕ key to increase the speaker volume and the ⊖ key to decrease the volume.

Using function keys to access frequently used features

The function keys provide quick access to some of the features you use most often. These features are assigned to the function keys when the radio is programmed. Some keys may have a feature associated with both a short key press and a long key press.



Viewing your function key settings

To check which functions are assigned to the function keys:

1 Press **Menu** and select **Radio settings** > **Radio info** > **Key settings**.

2 In the menu list, scroll to a function key and press **Select** to view the associated function.

The example shown is for a function key programmed to turn backlighting on and off.

3 Press a selection key or to return to the menu.

Emergency key

You can activate emergency mode by pressing the F1 key if your radio is programmed in this way. (See also "Making an emergency call" on page 34.)

See also "About emergency calls" on page 65.

Understanding the radio display

The messages and symbols you see on your radio display depend on the mode in which your radio is operating and the way it is programmed.

These are the various symbols you may see on your radio display:

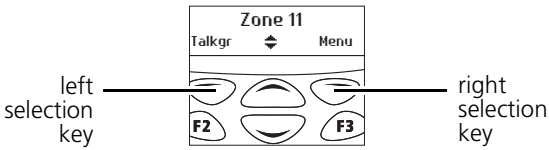
Symbol	Meaning
	Signal strength indicator: the more bars, the stronger the signal being received by your radio
	Transmit: your radio is transmitting
	Low-power transmit: indicates that low power mode is turned on
	Repeater talkaround: your radio is operating in repeater talkaround mode
	Zone: this letter represents the zone in which your radio is operating, where **A** is zone 1 and **Z** is zone 26 (in the example shown, **K** represents zone 11)
	Scanning: your radio is monitoring a group of channels for activity
	Monitor or squelch override: monitor or squelch override is active
	Silent operation: your radio's audible tones have been turned off
	Encryption: your radio's transmissions are encrypted
	Scrolling: you can use the scroll keys ⌒ or ⌒ to move through a list

Using the menus to access settings and features

You can access settings and features for your radio using the menu.

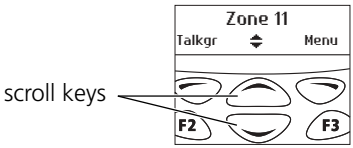
The selection and scroll keys enable you to make selections and move around the menus.

Selection keys



There are two selection keys beneath the display screen. How these keys work depend on the word that appears above them on the screen.

Scroll keys

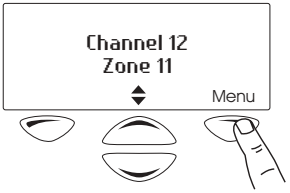


The up and down scroll keys allow you to:

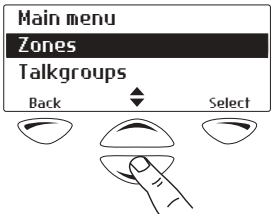
- access the Quick Access menu
- scroll up and down through a list
- display the previous or next part of a message that is too long to be displayed on the screen.

Accessing the Main menu

1 To access the Main menu, press the right selection key whenever **Menu** appears above it.



2 Use the scroll keys to move through the menu list.



3 When the menu you want is highlighted, press **Select** to enter the menu you have chosen.

Tip: To quickly exit the menu system, press and hold the left selection key when the word **Cancel** or **Back** appears above it.

Accessing frequently used menus

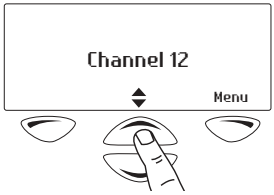
Depending on how your radio is programmed, you may have two different 'quick access' menus. One quick access menu is displayed when you press a scroll key, and the other when you press the left selection key. These give you easy access to the menus you use most often.

Using the scroll key Quick Access menu

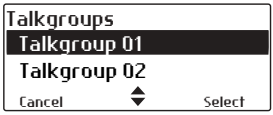
There are two ways to use this Quick Access menu:

- Press a scroll key ⌒ or ⌓, to begin scrolling through a list of zones or channels.
- Press a scroll key ⌒ or ⌓, and the Quick Access menu appears.

In this example, the Talkgroups menu is the Quick Access menu. Press a scroll key or to go directly to the Talkgroups menu.



The Talkgroups menu, with a list of your available talkgroups, is now displayed:

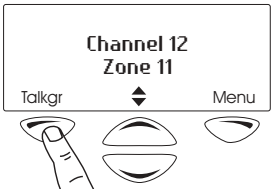


Using the left selection key Quick Access menu

The text above the left selection key corresponds to the Quick Access menu, for example, Talkgroups.

To use this Quick Access menu:

- Press your left selection key , and the associated menu appears.



Understanding the radio indicators

The status LED indicators and the radio's audible tones—together with the radio display—all combine to give you information about the state of your radio.

The most common way the indicators work is described in the following sections.

Audible tones

The radio uses audible tones to alert you to its status:

- Radio controls and keypress tones—the tones and beeps you hear when you press your radio's keys or use the controls. (You can turn these tones off—see "Turning off radio controls and keypress tones" on page 74.)
- Incoming call tone—when the radio is receiving a call.
- Warning tones—when there is an error.

Note: If quiet or silent mode is turned on, you will not hear any alert tones. See "Customizing the audible alert settings" on page 73.

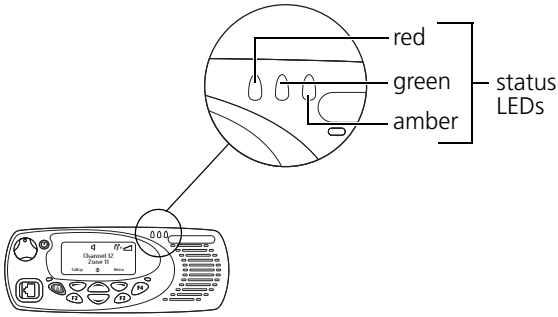
Some of the more common audible tones are described below:

Tone	Meaning
One short beep	■ Valid keypress: the action you have attempted is permitted, or ■ Function activated: a function has been turned on (using either the Main menu or a function key)

Tone	Meaning
One long, low-pitched beep	■ Invalid keypress: the action you have attempted is not permitted, or ■ Transmission inhibited: you have attempted to transmit, but for some reason you cannot make a call at this time
One short, low-pitched beep	Function deactivated: a function has been turned off (using either the Main menu or a function key)
Two short beeps	Radio turned on: the radio is powered on and ready to use

Status indicators

Note: The way these indicators behave may be affected by the way your radio is programmed.



Color	Meaning
Red (transmit)	Glowing: your radio is transmitting Flashing: your transmit timer is about to expire
Green (receive)	Glowing: the current channel is busy Flashing: you have received a call
Amber (scanning)	Glowing: your radio is scanning a group of channels for activity Flashing: your radio has detected activity on a channel, and has halted on this channel

3 Making and receiving calls

This section describes how to make and receive calls.

This section covers:

- Making calls
- Receiving calls
- Communicating directly with other radios
- Checking your recent calls
- Checking that the channel is clear (monitor)
- Call alert paging
- Checking whether a radio is available

Making calls

1 Select the required zone (see "Selecting a zone" on page 31).

2 Select the required channel (see "Selecting a channel" on page 32).

3 Select the required talkgroup or individual radio unit ID (see "Making a talkgroup call" on page 33 or "Making an individual call" on page 34).

4 Lift the microphone off the microphone clip.

5 Hold the microphone about 2 inches (5 cm) from your mouth and press the PTT key to transmit.

Note: If the channel is busy, you may not be able to transmit. Wait until the green status LED has stopped glowing, and then try again.

6 Speak clearly into the microphone and release the PTT key when you have finished talking.

While you are transmitting the red LED glows and the transmit symbol appears in the display:

Limiting call time (transmit timer)

Your radio may limit the amount of time you can talk (transmit) continuously. This is known as the 'transmit timer' or 'time-out timer' and allows other radio users to make calls on that channel.

The radio warns you before the transmit timer expires by beeping three times. The red status LED flashes and the message **Transmit Timeout Imminent** appears in the display.

Finish your conversation as soon as possible and release the PTT. For a short time, your radio may prevent you from making a call.

Selecting a zone

A zone is a collection of channels. Zones are a way of grouping channels, for example, by public safety agency type (fire, police, ambulance, etc.) or by geographical region (Dallas, Houston, etc.).

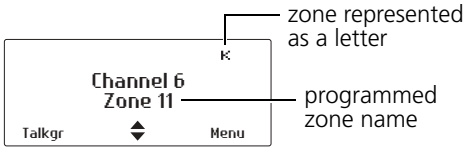
1 Press **Menu** and select **Zones**.

2 Scroll to the zone you want.

3 Press **Select**.

Your radio may indicate the zone in which it is currently operating in the following ways:

- the name of the zone appears below the channel name in the default radio display, or
- the zone symbol appears as a letter in the top right corner of the display.



Other ways of selecting a zone

You may also be able to use the following controls to select a zone:

- left selection key (see "Using the left selection key Quick Access menu" on page 25), or
- scroll keys (see "Using the scroll key Quick Access menu" on page 24).

Selecting a channel

It is important to distinguish between channels and talkgroups. A channel is frequency-related, whereas a talkgroup is a group of radio users. Talkgroups are only available for digital channels.

For an explanation of talkgroups, see "Understanding talkgroups" on page 33.

Using the Main menu

1 Press **Menu** and select **Channels**.

2 Scroll to the channel you want and press **Select**.

Other ways of selecting a channel

You may also be able to use the following controls to select a channel:

- function key (see "Using function keys to access frequently used features" on page 21)
- left selection key (see "Using the left selection key Quick Access menu" on page 25)
- scroll keys (see "Using the scroll key Quick Access menu" on page 24).

Understanding talkgroups

Note: This feature is available for digital channels only.

Talkgroups are a collection of people (radio unit IDs) with whom you want to have private conversations as a group.

For example, a state's public safety agencies could have the following talkgroups:

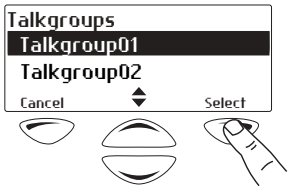
- Local talkgroups—used by a specific agency to communicate within their own local agency. It may even be made up of a county of public safety officers.
- Regional talkgroups—used by large state agencies that have regional divisions.
- Statewide talkgroups—used by an agency to communicate with a public safety member in another region. Statewide talkgroups, as their name suggests, enable public safety agencies to communicate with each other from one end of the state to the other.
- Special event talkgroups—may be used to manage emergencies encompassing a large area, or even events such as visits by heads of state.

Making a talkgroup call

1 Press **Menu** and select **Talkgroups**.

(Depending on how your radio is programmed, you may be able to use a Quick Access menu to go to the Talkgroup menu.)

2 Scroll through the list of talkgroups to the one you want and press **Select**.



3 Press the PTT key to make a call to the currently selected talkgroup.

Making an emergency call

For information about making and ending emergency calls together with a explanation of how your radio behaves in emergency mode, see "About emergency calls" on page 65 and "Understanding emergency mode" on page 66.

Making an individual call

Note: This feature is available for digital channels only.

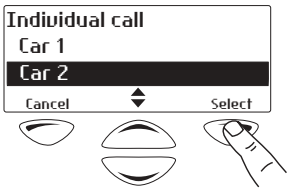
To make a call to one person rather than a group of people:

1 Press **Menu** and select **Individual call**. (The person to whom you last made an individual call is highlighted.)

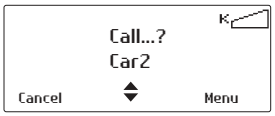
(Depending on how your radio is programmed, you may be able to press a function key or use your Quick Access menu to select individual calls.)

2 Scroll to the person you want to call and press the PTT key to make the call immediately.

3 Alternatively, scroll to the person you want to call and press **Select**.



The message **Call...?** briefly appears in the screen:



4 Press the PTT key to make the call.

Receiving calls

When a call is received with valid signaling, the radio unmutes and you can hear the call.

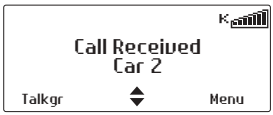
Identifying a caller (talking party ID)

Note: This feature is available for digital channels only.

You can use Talking Party ID to identify the radio user calling you. (This feature is usually turned on when the radio is programmed.)

- talkgroup call: the name of the talkgroup is displayed:

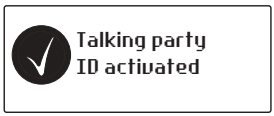
- individual call: the name of the radio name from your call list is displayed (if there is no associated name, only the radio unit ID is shown):



Turning talking party ID off and on

1. Press **Menu** and select **Radio settings** > **Display settings** > **Talk party ID**.
2. Scroll to either **On** (or **Off**) and press **Select**. (The current setting is highlighted).

   The message **Talking party ID activated** (or **Talking party ID deactivated**) appears in the display:



Communicating directly with other radios

You can bypass the radio repeater and communicate directly with another radio using the Radio Talkaround feature. You can do this when you are out of range of the repeater, or if the repeater is busy.

While repeater talkaround is active, all calls are made on your current channel's receive frequency.

Turning repeater talkaround on and off

You can turn repeater talkaround on and off using a function key, if your radio is programmed in this way.

- Press the function key to turn repeater talkaround on.

  The message **Repeater talkaround activated** (or **Repeater talkaround deactivated**) appears and the repeater talkaround symbol appears in the display.

  Repeater talkaround remains on until you press the function key again.

Checking your recent calls

Note: This feature is available for digital channels only and applies to individual calls and call alert pages only.

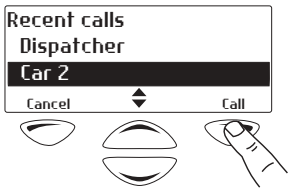
Your radio may be able to store a list of the last 20 calls. These calls may be calls that you have received or calls that you have made.

Using your recent calls list to make a call

1 Press **Menu** and select **Recent calls**. (Depending on how your radio is programmed, you may be able to press a function key or use your Quick Access menu to select recent calls.)

The most recent call is displayed at the top of the list. If you have not participated in any calls since your radio was switched on, the message **No items in list** appears in the display.

2 Scroll through the list of recent calls until the call you want appears, and then press **Call**.



The message **Call...?** briefly appears in the screen.

Press the PTT key to make the call.

3 Alternatively, scroll through the list of recent calls until the call you want appears.

Press the PTT key to make the call immediately.

Checking that the channel is clear (monitor)

Monitor allows you to override some or all of the radio's mutes, allowing you to hear if there is any traffic (including talkgroup and individual calls) on a channel.

For analog channels, this is so that you can check that the channel is clear before you make a call.

Turning monitor on and off

Using the microphone hookswitch

Your radio may be programmed to turn monitor on whenever the microphone is removed from the microphone clip. Monitor is turned off when the microphone is replaced.

Using the Main menu

1 Press **Menu** and select **Radio settings** > **Functions** > **Monitor**.

(Depending on how your radio is programmed, you may be able to press a function key to toggle monitor on and off.)

2 Scroll to **On** (or **Off**) and press **Select**.

The monitor symbol appears in the display and remains on while monitor is active.

Call alert paging

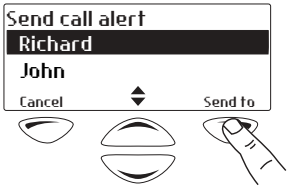
Note: This feature is available for digital channels only and applies to individual calls only.

You can let another radio user know that you want to talk to them by sending them a call alert page. When the other radio user receives the call alert page, they can call you back when it is convenient.

Sending a call alert page

1 Press **Menu** and select **Services** > **Send call alert**.

2 Scroll to the radio you wish to page from the call list and press **Send to**.



A message appears in the display:

The red LED glows and a message may be displayed to advise you whether the call alert has been sent successfully or not.

If an acknowledgement is not received from the recipient's radio, you may have the option of either cancelling or resending the call alert page.

Answering a call alert page

If you receive a call alert page from another radio user, the message **Page Rx'd from ...** briefly appears in the display.

Select **Call** to return the page or **OK** to delete it. If you miss the call alert page, the identity of the caller may be saved in your recent calls list.

Checking whether a radio is available

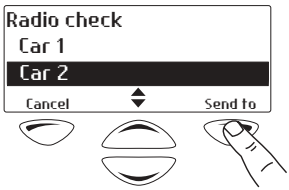
Note: This feature is available for digital channels only and for radios configured for dispatcher operation.

If you want to find out whether a particular radio is available on the system, you can use the Radio Check feature. This sends a radio-check message to the radio unit you have specified.

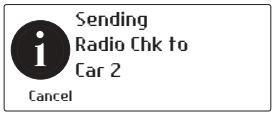
1 Press **Menu** and select **Services** > **Radio check**.

2 Scroll to the radio you wish to check from the call list.

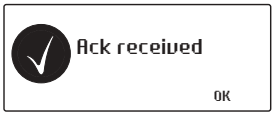
3 Press **Send to**.



The red LED glows and a message showing the destination appears in the display:



If the radio is available on the system, an acknowledgement message is displayed:



4 Listening to channel traffic

This section describes using your radio in different repeater areas, scanning a group of channels for activity, and using the squelch override function to hear faint and noisy signals on a channel.

This section covers:

- Selecting a voting or scan group
- Using your radio in different repeater areas
- Scanning a group of channels
- Hearing faint and noisy signals

Selecting a voting or scan group

A group is a collection of channels that are grouped together for either voting or scanning. Voting or scanning groups can be made up of channels from different zones. You may be able to select groups either by using a function key or by using the Main menu.

The following sections explain how your radio operates once a group has been selected:

- voting groups: "Using your radio in different repeater areas" on page 44, and
- scan groups: "Scanning a group of channels" on page 45.

Using a function key

To use a function key to select a preset voting or scan group:

- Press the function key to select and activate a preset voting or scan group.

  The programmed group name may now appear in the display, the amber LED glows and the scanning icon appears in the display:

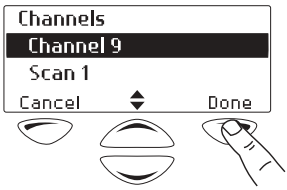
Using the Main menu

To select a voting or scan group using the Main menu:

Note: This method is not available for background scan.

1 Press **Menu** and select **Channels**.

2 Scroll to the group you want and press **Done**.



The amber LED glows and the scanning icon appears in the display:

Using your radio in different repeater areas

Your radio may have a group of channels programmed as a voting group. The channels in the voting group all carry the same traffic, but from different repeaters. As your radio moves in and out of different repeater coverage areas, the best communication channel is automatically selected for you to use.

This channel is known as the 'home' channel, and may be the channel you make and receive calls on. While voting is active, the amber LED glows and the scanning symbol appears in the display.

Suspending a channel from a voting group

You may be able to use the function key programmed for 'nuisance delete' to temporarily remove one of the channels from the voting group.

To remove a channel from a voting group:

1. Wait until the radio has stopped on the channel that you want to remove from the voting group.
2. Press the function key programmed for nuisance delete.

   If the channel has been successfully been removed, the message **Channel deleted from group** briefly appears in the display:

   The channel remains removed from the voting group until you either select another voting group or the radio is turned off and then on again.

Note: The function key programmed to activate a voting group may be programmed so that a short key press activates voting and a long key press activates nuisance delete.

Scanning a group of channels

The scanning feature is used to monitor a pre-programmed group of channels for activity. When a busy channel is detected in a group, the radio stops on ('captures') that channel, and you can now hear the call. Scanning resumes when the channel is no longer busy.

Note: 'Priority' channels may be specified when the radio is programmed. These are channels that you want the radio to check for activity more often than other 'non-priority' channels. Priority channels are scanned periodically when a non-priority channel is busy.

Understanding the different types of scanning

The two types of scanning that may be available on your radio are *standard* scanning and *background* scanning. Background scan can only be activated using a function key programmed for background scan. When you activate background scan, the currently selected channel automatically becomes a member of the scan group.

Making a call while scanning

If you want to make a call while your radio is scanning:

1 Lift the microphone off the microphone clip.

2 Press the PTT key to transmit.

If the amber LED is flashing, or background scan is active, your radio will now call the currently selected channel.

If standard scan is active and there has been no recent activity on the channel (the amber LED is glowing rather than flashing), then the channel that is called depends on the way your radio has been programmed.

The possible options are:

- your radio calls a predetermined channel e.g. your dispatcher
- your radio calls the channel where activity was last detected
- your radio calls the last free channel.

3 When the called party responds, proceed with your conversation.

Suspending a channel from a scan group

If the radio is continuously stopping on an undesired channel (for example, if there is too much activity or even interference) while scanning, you may be able to temporarily remove this channel from the scan group. To remove a channel from a scan group:

1 Wait until the radio has stopped on the channel that you want to remove from the scan group.

2 Press the function key programmed for nuisance delete.

If the channel has been successfully been removed, the message **Channel deleted from group** appears in the display:

The channel remains removed from the scan group until you either select another scan group or the radio is turned off and then on again.

Note: The function key programmed to activate a scan group may be programmed so that a short key press activates scanning and a long key press activates nuisance delete.

Editing a background scan group

You may be able to permanently change the membership of your background scan group by using the function key programmed for nuisance delete.

When background scan is active, you can scroll through the channel list to see which channel is a member of your background scan group. When the channel is a group member, the scanning symbol includes a tick.

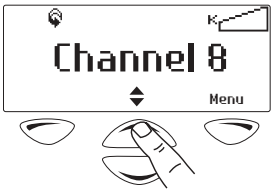
Note: The function key programmed to activate your background scan group may be programmed so that a short key press activates background scan and a long key press activates nuisance delete.

Adding a channel to your background scan group

1 Press the function key that activates background scan.

The amber LED glows and the scanning icon appears in the display:

2 Scroll through the list of channels until the channel that you want to add appears.



3 Press the nuisance delete key and this channel is now added to your background scan group.

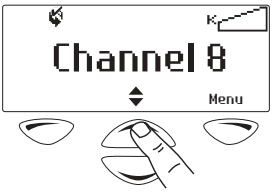
The message **Channel added** appears in the display and the scanning symbol now includes a tick:

Removing a channel from your background scan group

1 Press the function key that activates background scan.

The amber LED glows and the scanning icon appears in the display:

2 Scroll through the list of channels until the channel that you want to delete appears.



3 Press the nuisance delete key and this channel is now deleted from your background scan group.

The message **Channel deleted** appears in the display and the scanning symbol no longer includes a tick.

Hearing faint and noisy signals

Note: This feature is only applicable to analog channels.

Usually the radio's squelch mute (known as 'squelch') prevents you from hearing faint or noisy calls on a channel. Without squelch, the radio's speaker would 'chatter' in low signal strength areas.

On occasions when you want to hear everything that is being said on a channel, even if it is hard to understand, you can use the Squelch Override feature to force the mute open.

Turning squelch override on and off

1 Press **Menu** and select **Radio settings** > **Functions** > **Squelch override**.

(Depending on how your radio is programmed, you may be able to press a function key to turn squelch override on and off.)

2 Scroll to **On** (or **Off**) and press **Select**.

The message **Squelch override activated** (or **Squelch override deactivated**) appears in the display.

5 Sending and receiving messages

This section describes sending messages as well as responding to requests for status information.

This section covers:

- About messages
- Informing other radio users of your status
- Requesting a status update

About messages

Note: This feature is available for digital channels only.

You may be able to send short messages to another radio user. These messages are defined at programming time and are also known as 'pre-programmed messages'.

The person to whom you are sending the message must have the same message programmed into their radio in order to read and display your message.

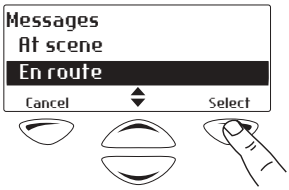
Sending a message

You may be able to send your message to a predetermined person or talkgroup, or to a person of your choice.

Sending a message to a predetermined person or talkgroup

1 Press **Menu** and select **Services** > **Messages**. (Depending on how your radio is programmed, you may be able to press a function key or use your Quick Access menu to select messages.)

2 Select the message you want from the message list and press **Select**.



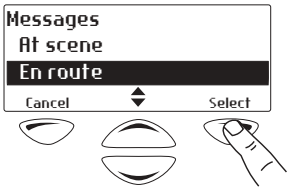
A message showing the destination appears in the display:

The red LED glows and a message may be displayed to advise you whether the message has been sent successfully or not.

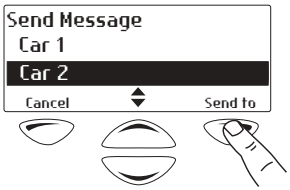
Sending a message to a person of your choice

1 Press **Menu** and select **Services** > **Messages**. (Depending on how your radio is programmed, you may be able to press a function key or use your Quick Access menu to select messages.)

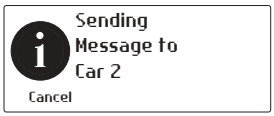
2 Select the message you want from the message list and press **Select**.



3 Select the message recipient from the list and press **Send to**.



A message showing the destination briefly appears in the display.



The red LED glows and a message may be displayed to advise you whether the message has been sent successfully or not.

Informing other radio users of your status

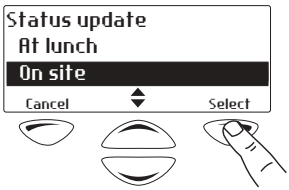
Note: This feature is available for digital channels only.

You can inform other radio users of your current status by sending them a status update, for example, 'At scene'. You may be able to send the status update to a predetermined person or talkgroup, or to a person of your choice.

When you send a status message, you are also *setting* your status, which the dispatcher may be able to check by 'interrogating' your radio. You can change your status at any time by selecting another status message and sending it. See "Requesting a status update" on page 54.

To send a status update:

1. Press **Menu** and select **Services** > **Status update**. (Depending on how your radio is programmed, you may be able to press a function key or use your Quick Access menu to select status update.)
2. Select the status message you want from the message list and press **Send to** or **Select**.



A message showing the destination appears in the display:

The red LED glows and a message may be displayed to advise you whether the status update has been sent successfully or not.

Requesting a status update

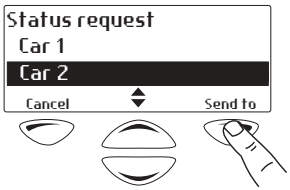
Note: This feature is available for digital channels only and for radios configured for dispatcher operation.

You can find out what another radio user is currently doing by asking them to send you a status update.

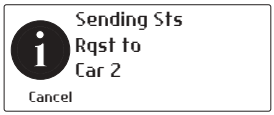
To send a status request:

1 Press **Menu** and select **Services** > **Status request**.

2 Select the status request recipient from the list and press **Send to** key.



A message showing the destination appears in the display:



The red LED glows and a message may be displayed to advise you whether the message has been sent successfully or not.

6 Safeguarding you and your radio

This section describes how to prevent unauthorized use of your radio, how to make your communications completely private and how to get help when you need it most.

This section covers:

- About locking your radio
- Making a radio inoperable
- Radio monitor
- About encryption
- About emergency calls
- Making a priority call
- Understanding emergency mode

About locking your radio

You can lock your radio to prevent unauthorized use, if this feature is programmed for your radio. When your radio is locked, you can only make emergency calls. Your radio can still receive calls and status requests, but you must unlock the radio to respond to them.

Your radio will remain locked even if it is turned off and then on again.

Locking your radio

You may be able to lock your radio by either turning it off and then on again, using the menu or by pressing a function key.

'Security lock on power-up' feature

Your radio may be automatically locked each time it is powered-up. The message **Enter PIN** appears in the display.

Using the menu to lock your radio

1. Press **Menu** and select **Radio settings** > **Functions** > **Lock radio**. (Depending on how your radio is programmed, you may be able to press a function key to turn radio lock on and off.)
2. Scroll to either **On** of **Off** and press **Select**. (The current setting is highlighted.)

   The radio is now locked and the message **Enter PIN** appears in the display.

Unlocking your radio

- To unlock your radio, use the 'unlock sequence' you have been given. (This is a pre-programmed sequence of four keys.)

The radio remains locked until the correct sequence of keys is pressed. If you forget the unlock sequence or you do not know it, contact your radio provider for assistance.

Making a radio inoperable

Note: This feature is available for digital channels only and for radios configured for dispatcher operation.

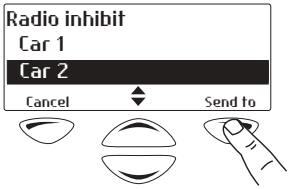
If you want to make another radio on the system inoperable, you can use the Radio Inhibit feature. This feature is also known as ‘stun’.

To the user of the inhibited radio, it appears as though the radio has turned off. The radio remains inoperable even if it is turned off and then on again.

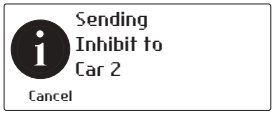
The radio cannot return to operation until it receives an ‘uninhibit’ request. This is also known as ‘revive’.

Sending a Radio Inhibit request

1. Press **Menu** and select **Services** > **Radio inhibit**.
2. Scroll to the radio you wish to make inoperable.
3. Press **Send to**.



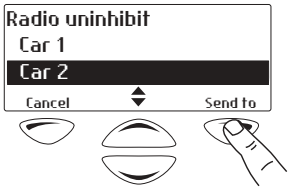
The red LED glows and a message appears in the display:



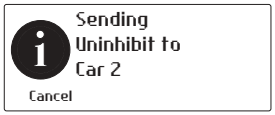
If the radio has been successfully immobilized, an acknowledgement message is displayed:

Sending a Radio Uninhibit request

1. Press **Menu** and select **Services** > **Radio uninhibit**.
2. Scroll to the radio you wish to make operable.
3. Press **Send to**.



The red LED glows and a message appears in the display:



If the radio has been successfully returned to operation, an acknowledgement message is displayed:

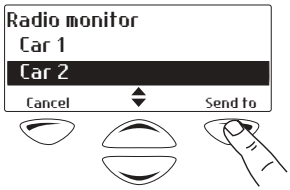
Radio monitor

Note: This feature is available for digital channels only and for radios configured for dispatcher operation.

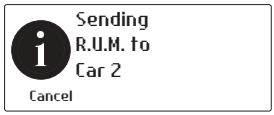
The Radio Monitor feature can be used when you are concerned about the safety of a radio user on your system. When you send a radio-monitor request to a radio, it calls you back without giving any indication that it is making a call. You can hear any activity near the radio for up to 20 seconds.

Sending a Radio monitor request

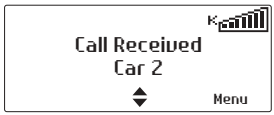
1. Press **Menu** and select **Services** > **Radio monitor**.
2. Scroll to the radio you wish to monitor.
3. Press **Send to**.



The red LED glows and a message appears in the display:



If the other radio has received your request, it will now call you, so that you can monitor activity near the radio.



About encryption

Note: This feature is available for digital and dual-mode channels only.

To make communications with other users on your system completely private, your radio may be able to encrypt outgoing calls, using a confidential encryption key. The radio receiving your call must have the same encryption key installed before it can hear your encrypted call.

Encrypting your calls

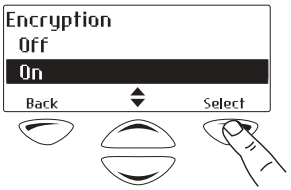
Your radio may be able to turn encryption on and off. While encryption is on, your outgoing calls are encrypted on channels programmed for encryption, and the encryption symbol remains in the display.

Note: This setting only affects outgoing calls. Incoming calls will still be decoded by your radio so long as the key required to decode the call is stored in your radio.

To turn encryption on or off:

1 Press **Menu** and select **Security** > **Encryption**. (Depending on how your radio is programmed, you may be able to press a function key to turn encryption on and off.)

2 Scroll to **On** (or **Off**) and press **Select**.



The message **Encryption activated** (or **Encryption deactivated**) appears in the display.

Making an encrypted call

1. Select the channel or group you wish to call.
2. Check that encryption is on (the encryption symbol is showing in the display).
3. Check that the channel is free (green LED is off).
4. Press and hold the PTT key to transmit.

   The name of the encryption key that your radio is using for the transmission may briefly appear in the display:

   While you are transmitting, the red LED glows and the transmit symbol appears in the display.

Receiving an encrypted call

When you receive an encrypted call, your radio unmutes and you can hear clear speech, so long as the key required to decode the call is stored in your radio.

The name of the encryption key used to encrypt the incoming call may briefly appear in the display, below the name of the caller:

If the key required to decode the call is not stored in your radio, then your radio remains muted.

Note: Your radio may also remain muted if the currently selected channel has 'proper key detect' programmed.

Proper Key Detect feature

Your radio may be programmed with ‘proper key detect’. This means that you can only hear an encrypted call if the key used to encrypt the incoming call matches the key used to encrypt your outgoing calls on that channel.

Note: Encryption does not need to be turned ‘on’ for the radio to unmute.

For example, you are encrypting your outgoing calls using encryption **key 7**. Although **key 1** and **key 2** are also stored in your radio, your radio has been programmed so that it will only unmute for incoming calls encrypted using **key 7**.

Changing your radio’s encryption key

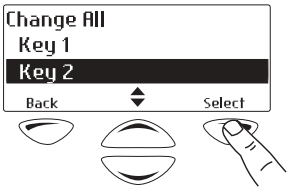
You may be able to use the Change All menu to change the encryption key that encrypts your outgoing calls. You can then use the Preset Keys menu to change the encryption keys back to the default encryption key for each channel.

Note: Once you change the encryption key, it may also automatically update the encryption keys used to encrypt calls on other channels.

Changing your transmit encryption key

1 Press **Menu** and select **Security** > **Change all**.

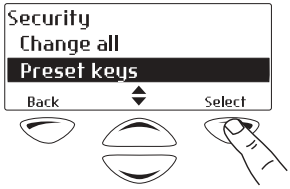
2 Scroll to the key you want and press S**elect**.



The message **Global Key Selected** briefly appears in the display.

Changing your transmit encryption key back to the default setting

1 Press **Menu** and select **Security** > **Preset keys**.



The message **Select Preset Keys?** appears in the display.

2 Select OK and the message **Preset Keys selected** briefly appears in the display.

Removing encryption keys from your radio

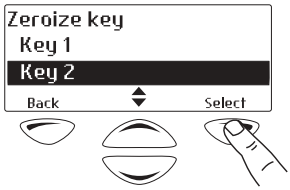
It may be possible for you to delete encryption keys from your radio.

Note: When emergency mode is activated, or when your radio is immobilized ('inhibited'), your encryption keys may be automatically deleted from your radio.

Deleting an encryption key

1 Press **Menu** and select **Security** > **Advanced** > **Zeroize key**.

2 Scroll to the key you want and press **Select**.



The message **Single Key Zeroized** briefly appears in the display.

Deleting all encryption keys

1 Press **Menu** and select **Security** > **Advanced** > **Zeroize all**.

The message **Zeroize All Keys?** appears in the display.

2 Press OK and the message **All Keys Zeroized** briefly appears in the display and the encryption symbol no longer appears.

About emergency calls

In an emergency you can summon help by sending an emergency call. There are two types of emergency calls:

Call type	Explanation
Priority call	(Digital channels only.) An emergency alert is automatically sent to the current talkgroup. Calls made when the priority call feature is turned on are flagged as 'emergency' calls.
Emergency call	Typically for life and death situations. When an emergency call is initiated, the radio enters 'emergency mode'. For further information see "Understanding emergency mode" on page 66.

Making a priority call

Note: This feature is available for digital channels only.

When you turn the Priority Call feature on, the radio automatically sends an emergency alert (message) to the current talkgroup.

Any calls you make while the Priority Call feature is turned on are flagged as 'emergency' calls.

To turn the priority call feature on and off:

1 Press **Menu** and select **Priority call**.

(Depending on how your radio is programmed, you may be able to press a function key to turn priority call on and off.)

2 Scroll to **On** (or **Off**) and press **Select**.

Understanding emergency mode

When you press the emergency key your radio enters 'emergency mode', if your radio is programmed in this way.

When the radio enters emergency mode, it will automatically send alerts together with your radio unit ID to the dispatcher. These alerts are usually sent on a designated emergency channel.

Note: The way your radio behaves in emergency mode depends on how your radio is programmed.

For further information on what your radio may do in emergency mode, see "What happens during an emergency call?" on page 67.

Stealth and non-stealth emergency modes

Your radio is programmed to operate in one of these ways:

- **Stealth:** you often work in situations where you do not want an assailant to know that you have activated emergency mode. For this reason, the radio is silent and the display remains unchanged—there is no indication that the radio has entered emergency mode.

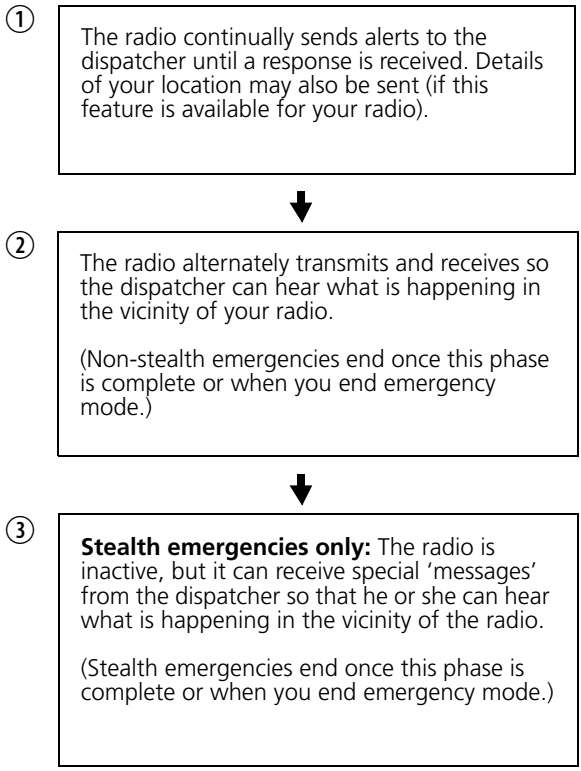
  An optional feature of stealth emergencies is false powerdown ('keep alive'). When an unauthorized person attempts to prevent you from using your radio by turning it off, the radio *appears* to turn off. However, the radio is still in emergency mode.

- **Non-stealth:** you often work in situations where you want audible and visual confirmation that you have activated emergency mode (for example, at an accident scene).

What happens during an emergency call?

The *exact* way your radio behaves when it enters emergency mode depends on how your radio is programmed. The main phases for both stealth and non-stealth emergency modes are summarized below. The length of each phase is determined when the radio is programmed.

When the emergency key is pressed:



See also "Stealth and non-stealth emergency modes" on page 66.

Activating emergency mode

You can activate emergency mode using the emergency function key or a hidden switch, if your radio is set up in this way.

1 Press the function key or hidden switch to activate emergency mode.

In non-stealth emergencies, 'Emergency mode' appears in the display:

One or more emergency calls are sent to your dispatcher or another predetermined radio user. During emergency mode, the radio will behave as described in "What happens during an emergency call?" on page 67.

Note: If your microphone is removed or damaged by an assailant, you still may be able to communicate with the dispatcher using the concealed microphone. This microphone is hidden behind the speaker and can only be used during emergency mode, if your radio is programmed in this way.

2 Turn the radio off and on again to end emergency mode (including 'false powerdown'). The radio returns to normal operation.

7 Customizing your radio

This section describes the ways in which you can customize your radio.

This section covers:

- About display and keypad backlighting
- Reducing power consumption
- Customizing the audible alert settings

About display and keypad backlighting

Whenever a key is pressed or a call is received, the keypad and display light up automatically to make it easy to read in poor light conditions.

Backlighting usually remains on for a few seconds, unless further radio activity is detected. The period of time that the backlighting remains on once no further radio activity is detected is determined by the backlighting timer. The duration of this timer is set when the radio is programmed.

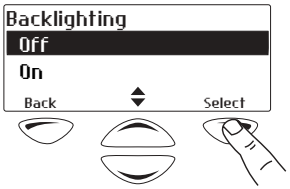
The radio's display can also be made darker or lighter to suit your working conditions. See "Adjusting the display contrast" on page 71.

Turning backlighting on or off

1 Press **Menu** and select **Radio settings** > **Display settings** > **Backlighting**.

(Depending on how your radio is programmed, you may be able to press a function key to turn backlighting on or off.)

2 Scroll to either **On** or **Off** and press **Select**. (The current setting is highlighted.)



The message **Backlighting activated** (or **deactivated**) appears in the display:

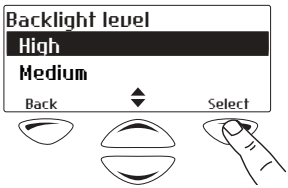
Turning backlighting on momentarily

You can turn backlighting on momentarily using a function key, if your radio is programmed in this way. Backlighting remains on for a few seconds and then turns off.

Adjusting the backlighting level

To change the level of your radio's backlight to make the display or keypad easier to read in low lighting conditions:

1. Press **Menu** and select **Radio settings** > **Display settings** > **Backlight level**.
2. Scroll to the setting you want (high, medium, or low) and press **Select**. (The current setting is highlighted.)

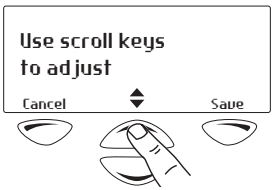


The backlighting level of the your radio's display now changes.

Adjusting the display contrast

To change the contrast of your radio display to suit the lighting conditions that you are working in:

1. Press **Menu**, and select **Radio settings** > **Display settings** > **Contrast adjust**.
2. Use the scroll keys or to adjust the display contrast to the level you want.



3. Press **Save** to save this setting.

Reducing power consumption

You can reduce the power consumption of your radio (and thereby reduce the drain on your vehicle battery) in the following ways:

- Transmit at low power (if your radio is not already configured to do this).
- Turn off backlighting when it is not required (see "About display and keypad backlighting" on page 70).

Turning low power transmit on or off

If you are using your radio in conditions where signal strength is high, you can reduce the drain on your vehicle battery by transmitting at low power.

When low power transmit is turned on, appears in the display and calls are made at low power rather than at the programmed power setting.

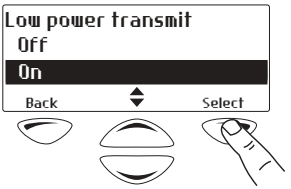
Note: Some channels may always transmit at low power.

To turn low power transmit on or off for all channels:

1 Press **Menu** and select **Radio settings** > **Functions** > **Low power transmit**.

(Depending on how your radio is programmed, you may be able to press a function key to turn low power transmit on or off.)

2 Scroll to **On** (or **Off**) and press **Select**.



The message **Low power transmit activated** (or **deactivated**) appears in the display.

Customizing the audible alert settings

The radio uses audible tones to alert you to its status:

- Radio controls and keypress tones—the beeps you hear when you press your radio's keys or use the controls. (You can turn these tones off—see "Turning off radio controls and keypress tones" on page 74.)
- Incoming call tone—when the radio is receiving a call.
- Warning tones—when there is an error.

Changing the volume of all audible tones

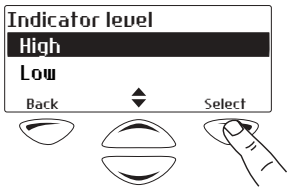
You can set the volume of all the audible sounds that the radio makes to indicate what is happening.

To change the volume of the audible tones between high or low:

1 Press **Menu** and select **Radio settings** > **Alert settings** > **Indicator level**.

(Depending on how your radio is programmed, you may be able to press a function key to change the volume of the audible tones between high or low.)

2 Scroll to **High** or **Low** and press **Select**. (The current setting is highlighted.)



Changing the keypress volume

Whenever you press a key on the control head, you will hear a beep to indicate whether or not what you are trying to do is allowed:

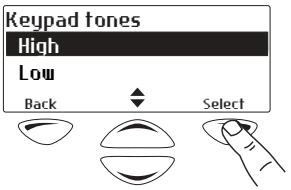
- Allowed: a short, medium-pitched beep.
- Not allowed: a long, low-pitched beep.

To change the volume of the keypress beeps between high, low, and off:

1 Press **Menu** and select **Radio settings** > **Alert settings** > **Keypad tones**.

(Depending on how your radio is programmed, you may be able to switch the volume of the keypress beeps between high, low, and off.)

2 Scroll to **High**, **Low**, or **Off** and press **Select**. (The current setting is highlighted.)



Turning off radio controls and keypress tones

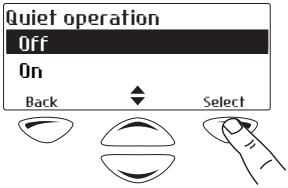
You can turn off all the tones and beeps you hear when you press the keys or use the radio controls. This is known as 'quiet operation'. You will still hear incoming call and warning tones.

To turn quiet operation on or off:

1 Press **Menu** and select **Radio settings** > **Alert settings** > **Quiet operation**.

(Depending on how your radio is programmed, you may be able to press a function key to turn backlighting on or off.)

2 Scroll to **On** or **Off** and press **Select**. (The current setting is highlighted.)



The message **Quiet operation activated** (or **deactivated**) appears in the display.

Hearing only channel traffic

You can turn off all the audible tones that the radio makes so that the only sound you will hear from the speaker is channel traffic. This is known as 'silent operation'.

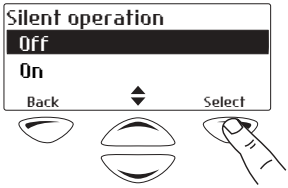
When silent operation is turned on appears in the display.

You can turn silent operation on or off:

1 Press **Menu**, and select **Radio settings** > **Alert settings** > **Silent operation**.

(Depending on how your radio is programmed, you may be able to press a function key to turn silent operation on or off.)

2 Scroll to **On** or **Off** and press **Select**. (The current setting is highlighted.)



The message **Silent operation activated** (or **deactivated**) appears in the display.

8 Troubleshooting

This section describes troubleshooting procedures and basic maintenance.

This section covers:

- Troubleshooting
- Error messages
- When your radio won't turn on
- Checking the version of your radio
- Removing the microphone
- General care
- Cleaning the radio

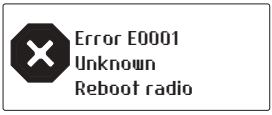
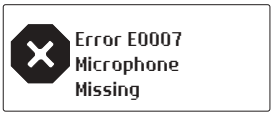
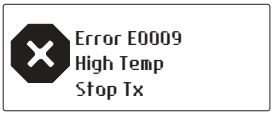
Troubleshooting

If you are experiencing difficulty operating your radio, you may find the following sections helpful. Consult your radio provider for assistance, if necessary.

Error messages

If an error message appears in the radio display, refer to the table below.

For any error messages not shown in the table below, it is recommended that you make a note of the error code (the letter 'E' followed by a four-digit number, for example, E0001) and consult your radio provider.

Error message	What you must do
	Turn the radio off and back on again.
	Attach a microphone to the radio control head. If a microphone is already attached, consult your radio provider.
	The radio is very hot—turn it off and allow it to cool down.

When your radio won't turn on

If the red, green and amber LEDs on the control head do not light up when the radio is turned on, it is probable that power is not reaching the radio. Check the following:

- Is the power connector firmly plugged into the rear of the radio?
- Are the in-line fuses in good condition?
- Is the power cable securely connected to the vehicle battery or power supply?

If all appears to be in order, but your radio still fails to operate properly, contact your radio provider for further assistance.

Identifying the radio's audible tones

The radio's audible tones can help you identify a potential problem:

Audible tone	Meaning
One short, high-pitched beep	The radio has been made inoperable ('stunned' or 'inhibited') by your service provider.
Two short beeps	The radio has been made operable ('revived' or 'uninhibited') by your service provider.
Two low-pitched beeps	The radio's temperature is high. (The radio will continue to operate.)
Two high-pitched beeps	The radio's temperature is in the very high range and all calls will now be at low power. If the radio's temperature rises above this range, calls will be inhibited. Turn off the radio and allow it to cool down.

Checking the version of your radio

Your radio provider may ask you for the hardware and firmware version of your radio, for troubleshooting purposes.

Using the Main menu

1. Press **Menu** and select **Radio info** > **Version info**.
2. Scroll to the version information you want to view and press **Select**.

Using the PTT key

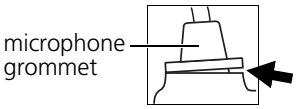
- Hold down the PTT key and turn on the radio.

  The firmware and hardware versions, and your radio's frequency band may be briefly displayed.

Removing the microphone

Note: For information on installing or removing your radio from a vehicle, refer to the *TM9100 Installation Guide*.

1. Using your thumb or forefinger, lift up one of the corners of the microphone grommet and firmly (but gently) pull that corner until the seal comes away from the cavity.



   Caution: Remove the grommet carefully as it serves two important functions. Firstly, it prevents damage to the microphone socket due to movement of the microphone cord, and secondly, it ensures that the control head is sealed against water, dust, and other environmental hazards.

2. Repeat to expose another corner.
3. Pull the exposed corners back and slide the grommet up the cable to reveal the microphone plug.
4. Remove the plug from the microphone socket.

General care

Your radio requires no regular maintenance other than ensuring that all the cables and connections are secure, and that no damage has occurred to the antenna or wiring.

To prevent permanent damage to the radio cover, do not allow the radio to come into contact with detergents, alcohol, aerosol sprays or petroleum-based products.

Cleaning the radio

If you need to clean the radio cover, use a cloth dampened with clean water. Do not immerse the radio in fluids.

9 Glossary

A

APCO — The Association of Public Safety Communications Officials.
The APCO Project 25 standards committee (http://www.apcointl.org/) defined a digital radio standard. The standard is often referred to as 'APCO' or 'P25'.

C

channel — A channel is a pair of frequencies used to transmit and receive radio signals.

F

FCC — Federal Communications Commission, an independent United States government agency that regulates interstate and international radio communications.

L

LED — Light Emitting Diode, a device that is able to emit light.

M

mute — A mute controls the circumstances under which a received signal is passed to the radio's speaker. For example, when a signal is received by the radio, the mute may remain 'closed' if the signal is not strong enough, does not have valid signaling or is encrypted.

P

P25 Project 25. The Association of Public Safety Communications Officials (APCO) established Project 25 (P25). This project was led by United States Federal, state, and local government representatives to develop standards for interoperable digital radios and systems to meet the needs of public safety users. See http://www.project25.org for further information.

R

repeater A repeater is a relaying site, usually situated above a city or town. The repeater extends the range of radio communications by receiving and re-transmitting signals received from radios.

RF Radio Frequency, the part of the electromagnetic spectrum that is suitable for radio transmissions. The frequency of the RF signal is described in terms of the number of cycles per second or Hertz (Hz).

RSSI Received Signal Strength Indicator, a symbol or number that shows the strength of a received signal.

V

valid signal A valid signal is a signal that the radio responds to by unmuting the receiver. A signal may be valid, for example, when it is stronger than a minimum level or has special signaling that matches the signaling programmed for the receiving radio.

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