

TM9300/TM9400 Mobile Radio User's Guide DRAFT

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Environmental responsibilities



Tait Limited is an environmentally responsible company which supports waste minimization, material recovery and restrictions in the use of hazardous materials.

The European Union's Waste Electrical and Electronic Equipment (WEEE) Directive requires that this product be disposed of separately from the general waste stream when its service life is over. For more information about how to dispose of your unwanted Tait product, visit the Tait WEEE website at www.taitradio.com/weee. Please be environmentally responsible and dispose through the original supplier, or contact Tait Limited.

Tait Limited also complies with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive in the European Union.

In China, we comply with the Measures for Administration of the Pollution Control of Electronic Information Products. We will comply with environmental requirements in other markets as they are introduced.

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 RSS-210 Industry Canada 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 Tait-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 www.fcc.gov/oet/rfsafety/rf-faqs.html.

RSS-210 Industry Canada warning statement

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit an RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from the Health Canada's website http://www.hc-sc.gc.ca.

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.

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.

Health, safety and electromagnetic compatibility in Europe

In the European Community, radio and telecommunications equipment is regulated by Directive 1999/5/EC, also known as the Radio and Telecommunications Terminal Equipment (R&TTE) directive. The requirements of this directive include protection of health and safety of users, as well as electromagnetic compatibility.

Intended purpose of product

This product is an FM radio transceiver. It is intended for radiocommunication in the Private Mobile Radio (PMR) or Public Access Mobile Radio (PAMR) services, to be used in all member states of the European Union (EU) and states within the European Economic Area (EEA).

Restrictions

This product can be programmed to transmit on frequencies that are not harmonized throughout the EU/EEA, and will require a licence to operate in each member state.

This product can be programmed for frequencies or emissions that may make its use illegal. Where applicable, a license must be obtained before this product is used. All license requirements must be observed. Limitations may apply to transmitter power, operating frequency, channel spacing, and emission.

Declaration of conformity

Brief Declarations of Conformity appear on page 2 of this booklet. To download the formal declaration of conformity, go to

http://eudocs.taitradio.com/.

A signed and dated paper copy of the declaration of conformity can be obtained from Tait Communications.

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:

- aircraft electronic systems
- 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.

Switch off the radio before boarding an aircraft. Using your radio while in the air is not permitted.

Consult the manufacturer (or its representative) of any such electronic devices to determine whether electronic circuits in those devices will perform normally when the radio is transmitting.

If you have a pacemaker, immediately turn off the radio if you suspect it is interfering with the pacemaker.

If there is interference between your hearing aid and the radio, please discuss an alternative solution with the hearing aid manufacturer.

Potentially explosive atmospheres and blasting areas



Warning Turn off the radio before approaching blasting caps, a blasting area, or any area where you are instructed to turn off a two-way radio. Obey all signs and instructions. Interference with blasting operations could cause serious injury or death.

Radio installation and operation in vehicles



Warning Keep the radio away from airbags and airbag deployment areas. Do not install, charge, or place a radio near such areas. An activated airbag can propel a portable radio with sufficient force to cause serious injury to vehicle occupants. An airbag may not perform to specification if obstructed by a radio.



Warning To avoid damage to existing wiring, airbags, fuel tanks, fuel and brake lines, or battery cables, refer to the installation guide for the radio, and to the vehicle manufacturer's manual, before installing electronic equipment in the vehicle.

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.

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).

Electromagnetic compatibility in European vehicles

In the European Community, radio equipment fitted to automotive vehicles is regulated by Directive 72/245/ EEC and its amendments. The requirements of this directive cover the electromagnetic compatibility of electrical or electronic equipment fitted to automotive vehicles.

To meet the requirements of Directive 72/245/EEC and its amendments, installation of this product in a vehicle must be performed according to the instructions provided by the vehicle manufacturer

Notice Failure to install the product correctly may void the vehicle's type-approval. The owner could be held responsible for any damage resulting from vehicle failure that can be attributed to RF energy interfering with the vehicle systems.

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 Limited. Failure to do so could invalidate compliance requirements and void the user's authority to operate the radio.

High radio surface temperatures



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

EN 60950 requirements (25 watt mobiles)

This radio complies with the European Union standard EN 60950 when operated up to the rated 33% duty cycle of two minutes transmit and four minutes receive, and with ambient temperatures of 30°C or lower.



Warning Operation outside these limits may cause the external temperature of the radio to rise higher than this standard permits.

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.

About this guide

This user's guide provides information about TM9300 and TM9400 mobile radios. If your radio does not operate as you expect, contact your radio provider for assistance.

Safety warnings used in this guide

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



Warning This alert is used when there is a hazardous situation which, if not avoided, could result in death or serious injury.



Caution This alert is used when there is a hazardous situation which, if not avoided, could result in minor or moderate injury.

Notice This alert is used to highlight information that is required to ensure procedures are performed correctly. Incorrectly performed procedures could result in equipment damage or malfunction.



This icon is used to draw your attention to information that may improve your understanding of the equipment or procedure.

Related documentation

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

- Safety and Compliance Information—supplied with each radio. (The same information is included in this user's guide.)
- *Installation Guide*—covers installing the TM9300/ TM9400 mobile radios, microphones, antennas, emergency switches, and external alert devices.
- Accessory installation instructions—may be supplied with an accessory.

Getting started 2

This section describes your radio's controls and indicators.

This section covers:

- About your digital radio
- About the radio controls
- Understanding the radio display
- Understanding the radio indicators
- Using function keys to access frequently used features
- Navigating the radio's menus
- Locating a menu

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

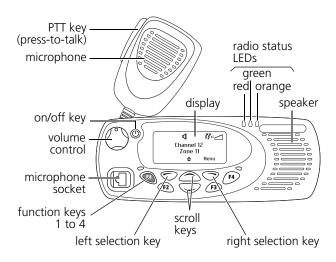
With analog channels, the background noise in a call gets progressively worse when you are in fringe areas or even slightly outside normal coverage areas. With digital channels, a call remains clear and then drops off quickly at the border of a coverage area. The reason for this is that a digital call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

About the radio controls

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.

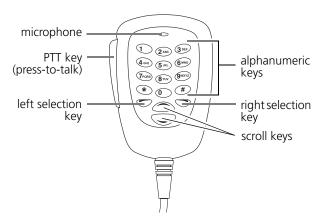


Name	Function
PTT key	Press and hold to transmit and release to listen
Volume control	Rotate to change the speaker volume
On/off key	Turn the radio on or off with a long press
Left and right selection keys	Action determined by the text above the selection key
Scroll keys	Scroll up and down through a list of menu options, scroll left and right in messages, or select the Quick Access menu
Emergency key	Activates emergency mode
Function keys	Programmed for frequently used options

About the keypad microphone

Your radio may have a keypad microphone installed. The keypad microphone has a PTT key as well as alphanumeric keys, two scroll keys, and left and right selection keys.

The PTT key, the scroll keys and the selection keys all work in the same way as those on the radio control head (see "About the radio controls" on page 15).



Understanding the radio display

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

Radio display icons

These are some of the icons you may see on your radio display:

Icon	Meaning
©	Scanning: your radio is monitoring a group of channels or talkgroups for activity
Q	Scanning: your radio is monitoring a group of channels or talkgroups for activity, and the currently selected channel or talkgroup is a member of the scan group
*	External alert: external alert is turned on
\$	Silent operation: your radio's audible tones have been turned off
3	Low-power transmit: your radio is set to transmit on low power
33	Transmit: your radio is transmitting
(%)	Headset connected: there is a wireless headset connected to your radio Flashing: your radio is attempting to connect to a headset, or the headset connection has been lost
Î	Scrambler: the voice-inversion scrambler is turned on
К	Zone: this letter represents the zone in which your radio is operating, where $\bf R$ is zone 1, $\bf Z$ is zone 26 (for example, $\bf K$ represents zone 11)
.addl	Signal strength indicator: the more bars, the stronger the signal being received by the radio
÷	Scrolling: you can use or to move through a list, or access a Quick Reference menu

lcon	Meaning			
Conventional mode icons				
4	Monitor or squelch override: monitor or squelch override is turned on			
Н	Repeater talkaround: your radio is operating in repeater talkaround mode, or you are on a simplex channel			
Trunked mode icons				
	Call queuing: call queuing is turned on			
<u>P</u> a	Call queuing: there are calls in the call queue			
Ψ	Service: your radio is operating on a DMR or MPT trunked network Flashing: your radio is attempting to access a trunked network			
GO	Trunking: your radio has established a call and you are now able to speak to the other party			

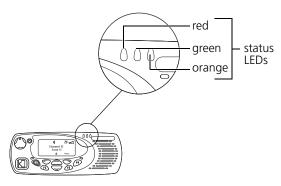
Understanding the radio indicators

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.

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

Status indicators



Color		Meaning
Red	•	Glowing: your radio is transmitting
(transmit)		Flashing: your transmit timer is about to expire
Green	•	Glowing: the current channel is busy
(receive)		Flashing: you have received a call or monitor is active
orange (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

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.
- Incoming call tone—when the radio is receiving a call.

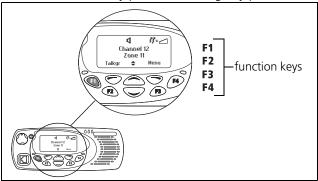
Notice If quiet or silent mode is turned on, you will not hear any alert tones.

Some of the more common audible tones are described below:

Tone	Meaning	
One short beep	 Valid keypress: the action you have attempted is permitted 	
	■ Function activated: a function has been turned on (using either the Main menu or a function key)	
One long, low- pitched beep	Invalid keypress: the action you have attempted is not permitted	
	■ 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	

Using function keys to access frequently used features

The function keys provide 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 the function key settings

Use the Main menu to check the features assigned to your radio's function keys:

- 1 Press Menu and select Radio settings > Radio info > Key settings.
- 2 In the Key Settings menu, scroll through the list of function kevs.
- **3** Press **Select** to view details of the function associated with a particular function key.

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



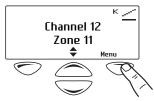
4 Press the left or right selection key to return to the menu.

Navigating the radio's menus

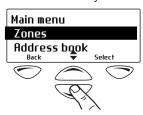
Your radio has a number of menus, each containing lists or submenus. The menus available depend on the way your radio is programmed.

Using the Main menu

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



Use the scroll keys to move through the menu list.



When the menu you want is highlighted, press **Select** to open 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

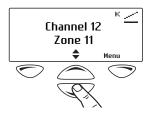
Depending on how your radio is programmed, you may have two different Quick Access menus. One Quick Access menu is displayed when you press a scroll key, and the other when you press the left selection key. These give you easy access to the menus you use most often.

Using the scroll key Quick Access menu

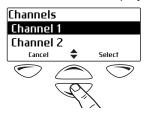
There are two ways to use this Quick Access menu:

- Use the scroll keys to scroll through a list of zones or channels.
- Press the scroll keys and the Quick Access menu appears.

In this example, the Channels menu is the Quick Access menu. Use the scroll keys to go directly to the Channels menu.



The Channels menu, with a list of your available channels, is now displayed.

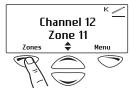


Using the left selection key Quick Access menu

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

To use this Quick Access menu:

■ Press the left selection key and the associated menu appears.



Locating a menu

The following diagrams shows the menus and submenus that may be programmed for your radio, in either conventional or trunked mode.

Main menu (conventional mode)

Channels Display settings Backlight level Zones Backlighting Address book Contrast adjust Local calls RSSI Radio info Set status Key settings Dial radio call Multi head info Dial patch call Version info Customer info Radio settings Serial number **Functions** Radio updates Scrambler Update now Lock radio Undo last update Low power tx Advanced services Monitor Program groups Squelch o'ride

Set scan key VOX VOX sensitivity **GPS** info Repeater Change mode Talkaround Call settings Ignore 2-tone Alert settings

External alert Indicator level Keypress tones Quiet operation Silent operation

Main menu (trunked mode) Preset calls Radio settings **Functions** Set zone Scrambler Set workgroup Lock radio Go to homegroup VOX VOX sensitivity Scanning Call settings Send Call queuing Status Do not disturb Text message Alert settings Preset message External alert Edit message Indicator level New message Keypress tones Dispatcher call Quiet operation Broadcast call Silent operation Send group Display settings Send to preset Backlight level Send to dialed Backlighting Conference call Contrast adjust Send group Channel display Send to preset RSSI Send to dialed Radio info Priority call Trunked identity Send dispatcher Key settings Send to preset Multi head info Send to dialed Version info Emergency call Customer info Send dispatcher Serial number Send to preset Radio updates Send to dialed Update now Undo last update Group select Edit groups Call groups Set homegroup **GPS** info Subscribe all Unsubscribe all Change network Change mode

Diagnostics

Basic operation 3

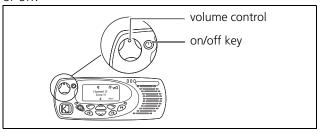
This section describes the basic operation of your radio.

This section covers:

- Turning the radio on and off
- Adjusting the speaker volume
- Locking and unlocking the keypad
- Changing your operating mode
- Making and receiving calls

Turning the radio on and off

Long press the on/off key to turn the radio either on or off.



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

Security lock on power-up feature

Your radio may be automatically locked each time it is powered-up. If the message **Enter PIN** appears in the display, enter your assigned PIN (personal identification number). See "Unlocking the radio".

Locking the 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** or **Off** and press **Select**. (The current setting is highlighted.)

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

Unlocking the 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.

Adjusting the speaker volume

Rotate the power/volume control clockwise to increase the speaker volume and counterclockwise to decrease the volume. The raised dot indicates the current volume settina.

Notice The volume control also changes the volume level of the radio's audible indicators.

Locking and unlocking the keypaď

The keypad lock feature prevents you from pressing a key accidentally. The number of keys that are locked depends on the way your radio is programmed.

If you receive a call while the keypad is locked, press any key to answer.

To lock the keypad:

Press and hold the right selection key for about one second.

The message **Keypad locked** briefly appears in the display, and **Unlock** appears above the left selection key, in place of **Menu**.

When any of the locked keys are pressed, the message **Keypad lock active** appears.

To unlock the keypad:

Press and hold the right selection key for about one second.

Changing your operating mode

The way your radio performs basic functions, such as sending and receiving calls, depends on the operating mode of your network. The two operating modes that are available on your radio are:

- conventional mode, and
- trunked mode.

To change your operating mode:

- 1 Press Menu and select Change mode. (Depending on how your radio is programmed, you may be able to press a function key to change mode.)
- 2 Select **Yes** to confirm your selection, and your radio now shows the default display for either conventional of trunked mode.

Making and receiving calls

Conventional mode

Making a call

- **1** Select the required channel or scan group.
- You may need to select the zone you want first, then select the channel or group from that zone.
- **2** Check that the channel is clear. If the green LED is glowing, the channel is busy and you may not be able to transmit.
- **3** Once the channel is clear (the green LED is off), lift the microphone off the microphone clip.
- **4** Hold the microphone about 2 inches (5cm) from your mouth.
- **5** Press and hold the PTT key to transmit.
- **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 icon appears in the display.

Receiving a call

When there is valid activity on your radio's currently selected channel or group, the radio then unmutes and you can hear the call. If the incoming call contains special signalling that matches the signalling programmed for your radio, the green LED flashes and your radio may give a ringing tone.

Trunked mode

Making a call

- 1 Select a preset call from your list of preset calls, and select **Send**. Alternatively, you may be able to dial the call using your keypad microphone.
 - While the call is being set up, you can select **Clear** to cancel the call.
- **2** Once the called party answers, lift the microphone off the microphone clip.
- **3** Hold the microphone about 2 inches (5cm) from vour mouth.
- **4** Press and hold the PTT key to transmit.
- **5** 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 icon appears in the display.

Receiving a call

When you receive a call, your radio displays the caller's identity and either automatically accepts the call, or waits for you to accept the call.

Once the **GO** symbol appears, you can proceed with the call.

Limiting call time

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.

Troubleshooting 4

This section describes troubleshooting procedures and basic maintenance.

This section covers:

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

About troubleshooting

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

When your radio won't turn on

If the red, green and orange 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.
Continuous low- pitched tone	Radio system error: a system error has occurred and the radio may be inoperable. COntact your radio provider.

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

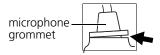
■ Hold down the PTT key and turn on the radio.

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

Removing the microphone

Notice For information on installing or removing your radio from a vehicle, refer to the TM9300/TM9400 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.

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