AP 73

Portable Radios

User Manual

MOTOROLA

AP73 Quick Reference

Selector Knob

Antenna Connector

Toggle Light / Enter and Parameter Transfer Button

Monitor Button

Push-to-Talk (PTT) Button

On / Off and Volume Knob

Microphone

Speaker

LCD Screen

Keypad

TX LOW CTCSS + - BATT
SCAN
SAVE
SIGNAL
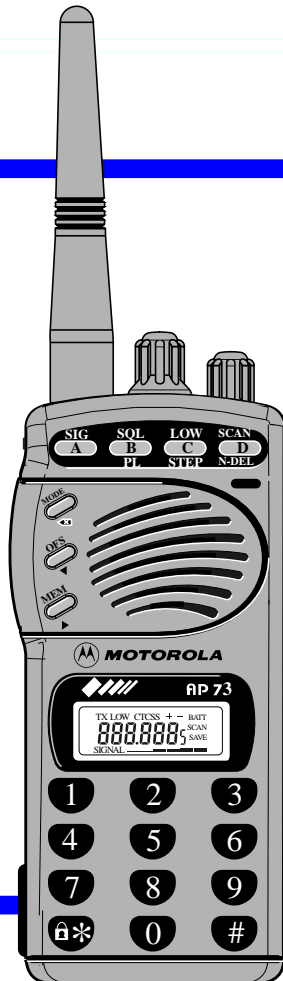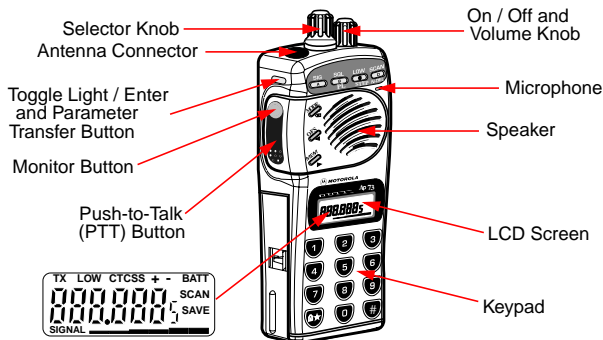
Basic Operation...

Turning Radio On/Off: Rotate **On/Off and Volume Knob** clockwise / anti-clockwise.

Adjusting Volume: Press **Monitor Button** and adjust **On/Off and Volume Knob** to comfortable volume level.

Setting High/Low Power Output Level: Press $\overset{LOW}{STEP}$ to toggle power levels; '**LOW**' indicator is on when radio is set for Low Power output level.

Transmitting: Select the desired channel / frequency. Make sure channel is free then press **PTT** to talk, release to listen. '**TX**' indicator lights up.

Locking/Unlocking Radio's Function: Press 🔒 for 2 seconds to lock / unlock **Keypad** and **Selector Knob**. **LCD** displays *FLoc* when locked.

Changing Squelch Modes: Press $\overset{SIG}{A}$ to toggle between Carrier ('**CTCSS**' *off*), Coded('**CTCSS**' *on*) and Signalling ('**CTCSS**' *flashing*) squelch.

Setting Squelch Level: Press $\overset{SQL}{PL}$ then rotate **Selector Knob** clockwise / anti-clockwise to increase / decrease squelch level. Press any key to accept.

Selecting Receive PL/DPL Squelch: Press $\overset{SQL}{PL}$ until *rPL.xxx* is shown. Rotate **Selector Knob** to the desired active Receive PL/DPL code. Press any key to accept.

Selecting Transmit PL/DPL Squelch: Press $\overset{SQL}{PL}$ until *rPL.xxx* is shown. Press $\overset{SQL}{PL}$ to get *tPL.xxx*. Rotate **Selector Knob** to the desired active Transmit PL/DPL code. Press any key to accept.

Selecting MHz/Memory Mode: Press 〰️ to toggle between MHz (frequency displayed) and Memory (channel number displayed) mode.

MHz Operation...

Selecting Frequency Step Size: Press ^{LOW} ⊂⊃ _{STEP} until current frequency size is shown. Rotate **Selector Knob** to the desired frequency step size then press any key to accept.

**Selecting Receive Frequency:** In MHz mode, enter desired frequency (whole or ✤part) or/and rotate **Selector Knob** to the required frequency.

Selecting TX Offset: Press to toggle between *no offset*, *standard positive offset* ('**+**' displayed), *standard negative offset* ('**-**' displayed) and *user-defined TX frequency* ("**+ -**" displayed).

Programming User-Defined TX Frequency: Press until '**+ -**' is shown. Enter desired TX frequency (whole or ✤part) or/and rotate **Selector Knob** to the required frequency then press **Toggle Light / Enter and Parameter Transfer Button**.

Memory Mode Operation...

Selecting Memory Channel: In Memory mode, rotate **Selector Knob**.

Programming Memory Channel: In MHz mode, select the desired frequency, type of offset and offset frequency then press **Toggle Light / Enter and Parameter Transfer Button** until *┌┐┌┐ XXX* is shown. Rotate **Selector Knob** to select the desired memory channel then press **Toggle Light / Enter and Parameter Transfer Button** to accept.

Loading Memory Channel: In Memory mode, rotate **Selector Knob** to the desired memory channel then press **Toggle Light / Enter and Parameter Transfer Button** to accept.

Scan Operation...

Scanning Frequency Range/Memory Channel : In MHz/Memory mode, press ⊂⊃ _{N-DEL} to begin scanning the preprogrammed frequency range/channel. '**SCAN**' indicator flashes when scanning is in progress, and lights up continuously when it is receiving a signal.

Transmitting During Band Scanning: Press **PTT** when scan is locked at a frequency.

Deleting Nuisance Channel: With radio locked onto unwanted channel, press ⊂⊃ _{N-DEL} until you hear two beeps.

✤DTMF Telephone Interconnect...

Placing a Telephone Call: Press and hold **PTT** and dial access code (or, if radio has preprogrammed code, press followed by ⓐⓧ). Release **PTT** and wait for dial tone. If successful, press and hold **PTT**, then dial phone number (or, if radio has preprogrammed phone number, press followed by number button that stores phone number). Press **PTT** to talk, release to listen. To hang up, press and hold **PTT**, then dial deaccess code (or, if radio has preprogrammed code, press followed by ⓗ).

Last Number Redial: Once you have accessed the telephone network, press and hold **PTT**, then press followed by ⓪ (only works with manual entered phone number).

Storing a Phone Number or Access/Deaccess Code: Press and hold

until **LCD** displays `PhLoc` (with a flashing cursor). Enter a phone number location (1 to 9), or press (A✱) / (#) to enter access / deaccess code. Enter the phone number (up to 12 digits), or access/deaccess code (up to 8 digits). Press **Toggle Light/Enter and Parameter Transfer Button** to accept.

Displaying a Stored Number: To view stored phone number, press , followed by a phone number location (1 to 9). To view access/deaccess code, press followed by (A✱) / (#). Press followed by (0) to view the last manually dialled number.

✱**Voice Selective Call (Optional)...**

Receiving a Voice Selective Call: When radio decodes a Voice Selective Call, **LCD** indicates the type of SelCall message being received: `IndiCAL` (Individual Call), `GrPCAL`, (Group Call), or `ALLCAL` (All Call).

Sending a Voice Selective Call: Press and hold **PTT**, then dial the required ID. Release **PTT** and wait for a response.

Special Programming Mode (SPM)...

Entering SPM: Hold down while turning on the radio. Only release after the radio sounds a ringing SPM start-up tone.

Exiting a Menu Item: Select another menu item by rotating **Selector Knob**. **NOTE:** This aborts the phone access / deaccess codes entry, if **Toggle Light/Enter and Parameter Transfer Button** is not pressed first.

Exiting Special Programming mode: Turn radio off, then on again.

The following table provides a complete list of the available parameters and their programming procedures (items with similar procedures are grouped together).

First go to SPM then rotate **Selector Knob** to the desired menu item (refer to the SPM display column below).

<div align="center">SPM Browse Menu</div>

SPM Display	SPM Browse Menu Item	To Edit
`ScnLSt`	Edit Channel Scan List	Press or to scroll through the channels (01 to 20). Press **Toggle Light/Enter and Parameter Change Button** to toggle status of channel.
`ErAChn`	Erase Single Channel from Memory	Press or to scroll through the channels (01 to 20) and **Toggle Light/ Enter and Parameter Transfer Button** to erase a programmed channel.

SPM Display	SPM Browse Menu Item	To Edit
*Phn.Acc / *Phn.dEA	Edit Phone Access / Deaccess Code	Press ⏻ or ⟳ to enter into edit mode. ⟳ to erase unwanted digits. Enter new code.
Ptt.id Ack.id Ind.id GrP.id ALL.id	Edit PTT ID Edit Acknowledgement / Individual / Group / All Call IDs	Press ⏻ or ⟳ to enter into edit mode. ⟳ to erase unwanted digits. Enter new ID.
tot.xxx	Edit Time-Out Timer	Press ⏻ or ⟳ .
Sc - On Sc - OFF St - On St - OFF AL - OFF AL - On	§Set SelCall Tone Status ('On' or 'Off') Set Sidetones Status ('On' or 'Off'). Set Alert Tone Volume ('Off' or 'On').	Press ⏻ or ⟳ to toggle between the available states. Sidetones Status affects DTMF sidetones only. If Alert Tone Volume is set to 'off', *all* radio alert tones are disabled.
bS - OFF bS - Nor bS - Enh bt - ALn bt - N iC Ac - Aut Ac - SPE Ac - HSE	Set Battery Saver Status ('Off', 'Normal' or 'Enhanced') Set Battery Type 'Alkaline' or 'NiCd' Set Accessory Option ('Autosense', 'Speaker Microphone only' or 'Headset Only')	Refer to your AP73 User Manual for a full description of these menu items.

Notes...

☆*xxx* represents a number.

❖ Press T**oggle Light / Enter and Parameter Transfer Button** to commit partially entered frequency.

✕Radio must be equipped with an optional DTMF Decode Option board.

§SelCall Tone Status only displays when an option board is installed.

MOTOROLA

2-YEAR LIMITED WARRANTY FOR RADIOS

We thank you for purchasing our Motorola radios. These radios are manufactured according to the highest quality standards set and are backed by Motorola's two (2) year warranty. The rechargeable Motorola supplied batteries have a one (1) year warranty. Kindly approach your dealer for more information.

Motorola warrants its radios and batteries against defects in material and workmanship under normal use and service for the period stated above.

Motorola recommends that you use Motorola supplied accessories and batteries in connection with the radio. We would also advise you against attempting any modifications or repairs or any other form of unauthorised service to your radio.

Should you have any queries, please contact:

Singapore - Telephone/Fax: (65) 2812053/2874181
Beijing   - Telephone/Fax: (86-10) 68438231/4610277

Fill in the details of your radio below for your own reference:

Model Name/No.:
Serial Number:
Date of Purchase:
Dealer Name:
Address:
Telephone:
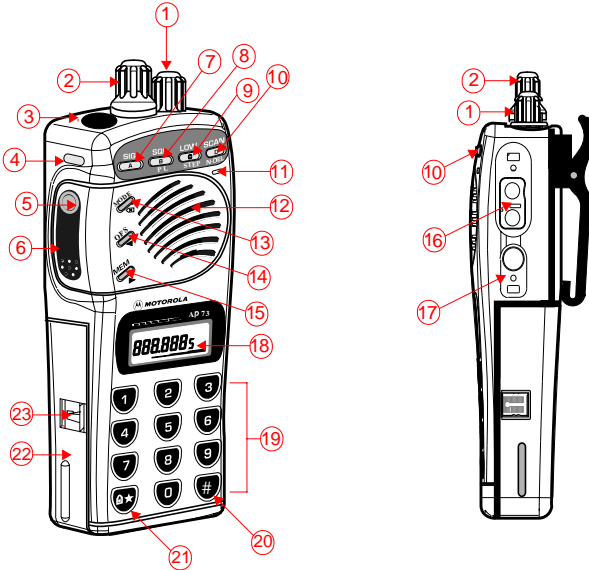
1. On / Off and Volume Knob	13. Mode / Backspace Button
2. Selector Knob	14. Left Scroll / Offset Button
3. Antenna Connector	15. Right Scroll / Memory Button
4. Toggle Light / Enter and Parameter Transfer Button	16. Accessory Connector
5. Monitor Button	17. SCI Port
6. Push-To-Talk (PTT) Button	18. LCD Screen
7. Signal Button	19. Numeric Keypad
8. Squelch / PL Button	20. Enable / Disable PTT ID Key
9. Low Power / Frequency Step Button	21. Lock / Unlock Key
10. Scan / Nuisance Delete Button	22. Battery Pack
11. Microphone	23. Battery Latches
12. Speaker	

NOTE
Keep this page open for easy reference as you go through the user guide.

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Contents

Introduction

Congratulations on your purchase of a Motorola two-way radio. Your radio is a product of Motorola's more than 50 years of experience as a world leader in the designing and manufacturing of communications equipment. This radio offers superior quality, superior performance, ultimate flexibility and years of reliable and effective communications.

This radio incorporates the latest technology available in two-way radio communications. The use of micro-computer technology makes changing radio character-istics such as operating frequencies and squelch codes both economical and fast. Any computer equipped dealer can easily reprogram your radio's operating characteristics.

The radio meets tough environmental demands while providing cost-effective and reliable communications. It meets established standards for low pressure, high temperature, low temperature, temperature shock, solar radiation, rain, humidity, salt fog, dust, vibration, and shock. This radio also meets the Electronic Indus-try Association RS316B electrical and mechanical specifications. The Motorola Accelerated Life Test (ALT) assures that possible failures brought on by field stress and abuse are identified and designed out of your radio before it reaches your hands.

All of these features provide for better, yet more cost effective communications for you.

Coverage of this User Guide

This user guide describes the operation of the AP 73 portable radios.

Packing Information

When you receive your packaged Motorola radio, inspect the shipping carton for any signs of damage. Next, remove and check the contents of the packing case to be sure that all items ordered have been included.

Antenna

Antenna Adaptor

Radio

Spring Belt Clip

Standard Packaged Model Contents

- *Radio*
- *Antenna*
- *Antenna Adaptor*
- *Spring Belt Clip*
- *User Manual*

Inspect the equipment thoroughly. If any part of the equipment has been damaged in transit, report the extent of the damage to the transportation company immediately.

NOTE

The radio as shipped accepts an alkaline battery case (for six standard "AA" size batteries) or a rechargeable NiCd battery cell-pack (available as standard or high capacity packs). Please refer to page 73 for a complete list of available accessories.

Knobs, Buttons, Connectors and Others

NOTE

The numbers in brackets below refer to the locations of the control buttons, knobs, etc. as shown in the illustration on the inside front cover.

On / Off and Volume Knob (1)

Turns the radio on and off and adjusts the volume level.

Selector Knob (2)

❶ Selects the frequency (MHz mode), channel (Memory mode), PL / DL code, frequency step size and squelch level.

❷ Changes the direction of scanning when the radio is in scan mode.

Antenna Connector (3)

Connects antenna to the radio.

Toggle Light / Enter and Parameter Transfer Button (4)

❶ Toggles display backlight status (quick press).

❷ Confirms user input (quick press).

❸ Transfers parameters from MHz mode to Memory mode (long press).

❹ Transfers parameters from Memory mode to MHz mode (long press).

Monitor Button (5)

Monitors the channel for activities (squelch is disabled).

Push-To-Talk (PTT) Button (6)

❶ Push to talk, release to listen.

❷ Press and hold when making DTMF dialling.

Signal Button (7), $\overset{\text{SIG}}{\underset{}{\text{A}}}$

❶ Toggles between *Carrier*, Coded (PL / DPL), and Signalling Squelch modes.

❷ DTMF (Dual Tone Multiple Frequencies) digit 'A'.

Squelch / PL Button (8), $\overset{\text{SQL}}{\underset{\text{PL}}{\text{B}}}$

❶ Selects Carrier Squelch level.

❷ Selects Receive and Transmit PL / DPL codes (long press).

❸ DTMF digit 'B'.

Low Power / Frequency Step Button (9), $\overset{\text{LOW}}{\underset{\text{STEP}}{\text{C}}}$

❶ Toggles between high and low transmit power.

❷ Selects the frequency step size (long press).

❸ DTMF digit 'C'.

Scan / Nuisance Delete Button (10), $\overset{\text{SCAN}}{\underset{\text{N-DEL}}{\text{D}}}$

❶ Enables / disables scanning in MHz and Memory mode.

❷ Deletes a Nuisance Channel in Memory mode (long press).

❸ DTMF digit 'D'.

Microphone (11)

Used in the process of transmitting messages.

Speaker (12)

Used in the process of receiving messages.

Mode / Backspace Button (13),

❶ Toggles between MHz / Memory modes.

❷ When editing phone numbers and IDs, this key acts as a backspace (rub-out) key.

Left Scroll / Offset Button (14),

❶ Selects the TX (repeater) offset frequency type.

❷ Scrolls to the left when editing phone numbers and IDs.

Right Scroll / Memory Button (15),

❶ Stores / recalls phone numbers, phone access and phone deaccess code.

❷ If held on power-up, radio enters into *Special Programming* mode.

❸ Scrolls to the right when editing phone numbers and IDs.

Accessory Connector (16)

Connects accessories such as remote speaker microphone or external handset to radio.

SCI Port (17)

Used to service the radio.

LCD Screen (18)

Displays information about the current state of the radio (see *"LCD Segments and Indicators"* on page 59).

Numeric Keypad (19)

❶ Used to enter the frequency (MHz mode), phone number or phone number location.

❷ Used for numeric data entry during parameter changing session.

❸ DTMF digits '0' to '9'.

Enable / Disable PTT ID Key (20), #

❶ Enables / disables PTT ID (long press).

❷ DTMF digit '#'.

❸ Pressing this key after ✏ sends the programmed phone deaccess code.

❹ Pressing this key immediately following 🔒✱, inserts a pause.

Lock / Unlock Key (21), 🔒✱

❶ Locks / unlocks the keypad (long press).

❷ DTMF digit '✱'.

❸ Pressing this key after ✏ sends the programmed phone access code.

Battery Pack (22)

Power supply to the radio.

Battery Latches (23)

For attaching battery tray / pack to the radio.

Getting Started

Attaching and Removing the Antenna

Attaching

❶ *Fasten the antenna to the radio by placing the threaded end of the antenna into the Antenna Connector (3).*

❷ *Rotate the antenna clockwise until tight.*

Removing

• *Turn the antenna in an anti-clockwise direction until it disengages from the radio.*

Attaching and Removing the Belt Clip

Attaching

❶ *Align mounting rails of the radio with the grooves of belt clip.*

❷ *Slide belt clip downwards until it clicks into place.*

Removing

❶ *Insert the end of a key between the release tab and the back surface of the radio.*

❷ *Lift the release tab; slide the belt clip upwards.*

Installing and Removing Batteries

Installing

❶ *Align the Battery Pack (22) with the back of the radio.*

❷ *Slide the Battery Pack (22) into place.*
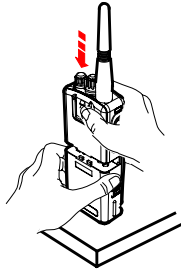
Removing

❶ *Release the Battery Latches (23).*

❷ *Slide the Battery Pack (22) away from the radio.*

Charging NiCd Battery Pack

Before using your radio with a rechargeable (NiCd) battery, you must charge the battery.

WARNING

DO NOT attempt to charge your radio if you are using alkaline batteries. Doing this may cause the batteries to leak or explode, leading to severe skin burns or eye injuries.

IMPORTANT

Transmitting a message while your radio is charging can cause the radio or the charger to operate improperly. **DO NOT** transmit when your radio is charging.

NOTE

Your radio may take twice as long to charge if it is not turned off during charging.

Charging your Battery for the FIRST time

New batteries are supplied in a totally uncharged state. To ensure maximum battery performance, a new battery MUST be FULLY charged. Refer to the following table for guidelines.

Table 1: Length of time required to fully charge a new battery

	Standard Capacity NiCd Battery Pack	High Capacity NiCd Battery Pack
Wall Charger (with/without Wall Charger Base)	16 hours	20 hours
Standard Desktop Charger	16 hours	16 hours
Quick Charge Desktop Charger	16 hours	16 hours

Charging your Battery Subsequently

Refer to the following table for guidelines on recharging your batteries.

Table 2: Length of time required to fully recharge a used battery

	Standard Capacity NiCd Battery Pack	High Capacity NiCd Battery Pack
Wall Charger (with/without Wall Charger Base)	10 hours	20 hours
Standard Desktop Charger	10 hours	10 hours
Quick Charge Desktop Charger	3 hours	3 hours

NOTE

A battery that is left unused for several months will be completely discharged. In this case, follow guidelines in Table 1 on page 10 to recharge the battery.

Charging with Wall Charger

❶ *Make sure the battery pack is attached to the radio.*

NOTE

With the Charger Base, the battery can be charged when connected or not connected to the radio.

❷ *Turn the radio off (if it is turned on).*

If not using the Charger Base:

❸ *Lift the dust cover covering the Accessory Connector (16).*

❹ *Insert one end of the Wall Charger into the lower port of the Accessory Connector (16), and the other into an electrical outlet.*

If using the Charger Base:

❸ *Insert the radio / battery into the charging docket.*

❹ *Refer to Table 1 and 2 on pages 10 and 11 for an estimation of the duration involved for charging the battery pack.*

❺ *Unplug the Wall Charger from the radio when charging is complete.*

NOTE

The LED on the *Wall Charger* is lit (red) continuously during charging.

Charging with Desktop Charger

NOTE

With Desktop Chargers, the battery can be charged when connected or not connected to the radio.

❶ *Place the Charger Insert into the Desktop Charger.*
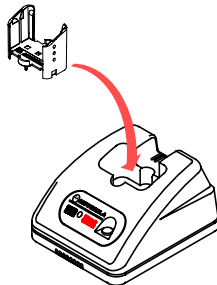
❷ *Insert the radio / battery into the charging docket.*

If using the Quick Charge Desktop Charger:

❶ *Press the Quick Charge button.*

❷ *Refer to Table 1 and 2 on pages 10 and 11 for an estimation of the duration involved for charging the battery pack.*

❸ *Remove the radio / battery from the charger when charging is complete.*

NOTE

The LED on the charger lights up continuously during charging. For the Standard Desktop Charger, it is red for the whole charging period. For the Quick Charge Desktop Charger, it changes from yellow (before charging begins) to red (during charging) to green (when charging is completed).

CAUTION

The Quick Charge Desktop charger runs on a 3-hour timer which begins counting each time you press the *Quick Charge* button**.** Removing the battery or radio from the charger before the battery is fully charged, or removing and replacing battery / radio repeatedly during charging, and then pressing the *Quick Charge* button again can overcharge or damage the battery. Press the *Quick Charge* button only when the battery needs to be fully charged.

Basic Operations

Turning the Radio On

- *Rotate the **On / Off and Volume Knob (1)** clockwise to turn the radio on.*

Turning the Radio Off

- *Rotate the **On / Off and Volume Knob (1)** anti-clockwise until a click is heard to turn the radio off.*

Adjusting the Volume

- *Rotate the **On / Off and Volume Knob (1)** clockwise to increase your radio's volume level, or anti-clockwise to decrease it.*

NOTE
To do an initial setting of the volume, press and hold the **Monitor Button (5)** until the background noise is heard. Continue holding the **Monitor Button (5)** while adjusting to the desired volume.

High / Low Power Output

- *Press $\overset{\text{LOW}}{\underset{\text{STEP}}{\boxed{C}}}$ to toggle between high and low power output levels.*

NOTE
The indicator **LOW** lights up on the **LCD Screen (18)** when the radio is operating in *low power* mode.

NOTE
High power mode can improve the clarity of voice activity in areas where signals are weak while low power mode extends battery life.

Transmitting a Message

❶ *Select the desired channel or frequency (see* **"MHz Mode Operations"** *and* **"Memory Mode Operations"** *on pages 25 and 31).*

❷ *Press and hold the* **Monitor Button (5)**, *and listen for channel activity.*

NOTE

If the selected channel is in Carrier squelch mode - **CTCSS** indicator is not displayed on the **LCD Screen (18)**, you can skip step ❷.

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❸ *If the channel is clear, press the* **Push-To-Talk (PTT) Button (6)** *and speak clearly into the* **Micro-phone (11)** *(see* **"Information For Safe, Efficient Operation"** *on page 62 for more information).*

```
 TX
145.100
```
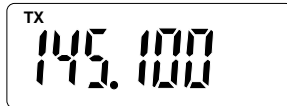
NOTE

Unless disabled ("dot" indicator flashes on the **LCD Screen (18)**), PTT ID tones are heard as they are being transmitted (see **"PTT ID"** on page 17). You can start your conversation when the tones end.

NOTE

The **TX** indicator lights up on the **LCD Screen (18)** when the **Push-To-Talk (PTT) Button (6)** is pressed.

IMPORTANT

Whenever you transmit a message, you are using the resources of the transmitting channel. Speaking for long periods of time would deprive others from using that channel.

NOTE

The maximum duration for transmission is determined by the value of the *Time-Out-Timer* (see **"Editing Time Out Timer"** on page 53). Once you reach the time limit, a *"Time-Out Timer Alert"* tone is sounded, and the transmission is cut off.

Receiving a Message

- *If the* **Push-To-Talk (PTT) Button (6)** *is pressed, release it and listen for incoming messages.*

NOTE

Make sure the volume level is set properly, or else you may receive a message but are unaware about it.

Additional Operations

Display Backlight

> • *Press the Toggle Light / Enter and Parameter Transfer Button (4) to turn on / off the backlight.*

NOTE

To conserve power, the backlight is programmed to automatically turn off after 5 seconds.

NOTE

Pressing either the *Push-To-Talk (PTT) Button (6)* or the *Monitor Button (5)* has no effect on the backlight.

PTT ID

If programmed, the radio transmits a DTMF identification code (unit ID), indicating which portable is in operation.

During a conversation, the code is normally sent only on the initial PTT press (unless PTT ID has been disabled). The '**TX**' indicator lights for the duration of the PTT ID. If there is no PTT or receive activity for 7 seconds, or if you change the frequency or channel (or scan resumes), the PTT ID is once again transmitted on the next PTT press.

> • *Press and hold* **#** *to enable / disable PTT ID.*

NOTE

Upon pressing **#**, you will hear a beep. Hold the button down until you hear a second beep, indicating that the PTT ID status has been changed.
When PTT ID is *disabled*, the "dot" indicator flashes on the *LCD Screen (18)*.

Locking / Unlocking the Radio's Function

Locking the radio will disable all buttons except the *Toggle Light / Enter and Parameter Transfer Button (4)*, *Monitor Button (5)*, *Push-To-Talk (PTT) Button (6)* and 🔒✕. Pressing a locked button will result ᶠᴸᵒᶜ being shown on the *LCD Screen (18)*. To lock / unlock the radio:

• *Press and hold* 🔒✕ *(for about 2 seconds) until two beeps are heard.*

NOTE

The *lock* / *unlock* status remains unchanged even when the power is turned off.

Changing Squelch Modes

Squelch acts as a kind of filtering system which helps to control the amount of signals the radio receives. Configuring the radio to receive only the desired signals minimizes interference from other users of the same channel.

This radio supports *Carrier Squelch (CSQ), Coded Squelch - Tone Private-Line (PL)*, *Digital Private-Line (DPL)* and *Signalling Squelch - Voice Selective Call (SelCall)* operations on a per channel basis.

Carrier Squelch transmission allows all radios tuned to the selected receive channel (frequency) to hear the conversation. *Coded Squelch* transmission only allows radio(s) having the same *PL / DPL* code on the selected receive channel (frequency) to hear the conversation. S*ignalling Squelch* transmission can only be decoded by radios equipped with optional DTMF Decode boards with valid *Voice Selective Call (SelCall)* identification code (see **"Voice Selective Call (Optional)"** on page 44).

NOTE

To perform *Signalling Squelch (SelCall)* operation, the radio must be equipped with an optional *DTMF Decode board*.

To temporarily override the default receive squelch mode for the channel:

- *Press $\overset{\text{SIG}}{\underset{\text{A}}{\frown}}$ to change between Carrier (CSQ), Coded (PL /DPL) and Signalling (SelCall) squelch modes.*
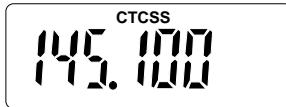
NOTE

The "**CTCSS**" indicator lights up continuously when the radio is operating in *Coded (PL / DPL)* mode, flashes when operating in *Signalling (SelCall)* mode and is not displayed when operating in *Carrier (CSQ)* mode.

NOTE

When transmitting in *Signalling* squelch mode, *PL / DPL* is transmitted (unless it is programmed to '**000**'). After PTT is released, the radio automatically enters into *CSQ* mode for a period of time. If there is no receive activity, the radio resumes *Signalling* squelch mode.

NOTE

Whenever you switch from one channel to the other, the default squelch mode of the new channel takes effect.

NOTE

Using this procedure in Memory mode to switch from one squelch mode to the other, does not affect the default squelch mode for the channel. Each time you turn the radio off and on again, or when you switch to another channel and back again, the radio reverts back to its default squelch mode.

Setting Squelch Level

An open (low) squelch level sets the threshold for the receiving signal strength to be low. This means that the radio would receive a great variety of signals, both weak and strong. A tighter (higher) squelch level raises the threshold, thus filtering weak signals and only accepting the stronger ones. To set the squelch level:

❶ *Press* ^{SQL} **B** _{PL} *.*

```
59L.02
```

❷ *Rotate the Selector Knob (2) to select the desired squelch level.*

❸ *Press the Toggle Light / Enter and Parameter Transfer Button (4) (or any other button) momentarily to adopt the selected squelch level and return to normal operating mode.*

IMPORTANT

The radio automatically adopts the new squelch level and returns to normal operation after 5 seconds of inactivity.

NOTE

If you reach the upper ('**15**') or lower ('**00**') limit of the squelch range, the squelch level does NOT wrap around to the opposite limit but remains where it is.

Selecting The Receive PL / DPL Squelch Code

NOTE

Receive PL / DPL squelch code selection can only be done in MHz mode.

There are 126 different Receive PL / DPL codes available, numbered from 001 to 126 (see ***"Receive And Transmit PL / DPL Code Tables"*** on page 23).

NOTE

Receive PL / DPL code '**000**' represents *Carrier* squelch.

❶ *Press and hold $\overset{\text{SQL}}{\underset{\text{PL}}{\boxed{\text{B}}}}$ until rPL.xxx is shown (where xxx represents the active Receive PL / DPL code number).*

❷ *Rotate the Selector Knob (2) to select the desired active Receive PL / DPL code.*

❸ *Press the Toggle Light / Enter and Parameter Transfer Button (4) (or any other button) momentarily to adopt this Receive PL / DPL code and return to normal operating mode.*

IMPORTANT

The radio automatically adopts the new Receive PL / DPL code and returns to normal operation after 5 seconds of inactivity.

Selecting A Transmit PL / DPL Squelch Code

There are 126 different Transmit PL / DPL codes avail-able, numbered from 001 to 126 (see *"Receive And Transmit PL / DPL Code Tables"* on page 23).

NOTE

Transmit PL / DPL code '**000**' represents *Carrier* squelch.

---

❶ *Press and hold* $\overset{\text{SQL}}{\underset{\text{PL}}{\textcircled{B}}}$ *until* ᴦ ᴾᴸ.*xxx is shown (where xxx represents the active Receive PL / DPL code number).*

❷ *Press* $\overset{\text{SQL}}{\underset{\text{PL}}{\textcircled{B}}}$ *momentarily to toggle the display to* ᴸ ᴾᴸ.*xxx (where xxx represents the active Transmit PL / DPL code number).*

❸ *Rotate the Selector Knob (2) to select the desired active Transmit PL / DPL code.*

❹ *Press the Toggle Light / Enter and Parameter Transfer Button (4) (or any other button) momen-tarily to adopt this Transmit PL / DPL code and return to normal operating mode.*

IMPORTANT

The radio automatically adopts the new *Transmit* PL / DPL code and returns to normal operation after 5 seconds of inactivity.

IMPORTANT

If the Receive PL / DPL code is programmed for '**000**', then the Receive PL / DPL (coded squelch) mode cannot be selected. To select, the Receive code must be changed to any code besides '**000**' (see *"Selecting The Receive PL / DPL Squelch Code"* on page 21 and *"Selecting A Transmit PL / DPL Squelch Code"* on page 22).

Receive And Transmit PL / DPL Code Tables

When selecting a Receive or Transmit PL / DPL code (see **"Selecting The Receive PL / DPL Squelch Code"** on page 21 and **"Selecting A Transmit PL / DPL Squelch Code"** on page 22), the following tables give the PL frequencies, equivalent PL codes (if applicable) and DPL codes corresponding to the display *rPL.xxx* or *tPL.xxx* (where *xxx* is in the range 001 to 126).

NOTE

rPL.000 and *tPL.000* represents *Carrier* squelch (CSQ) for Receive and Transmit respectively.

---

rPL.xxx tPL.xxx	PL Freq. (Hz)	Equiv. PL Code	rPL.xxx tPL.xxx	PL Freq. (Hz)	Equiv. PL Code
000	CSQ	–	022	136.5	4Z
001	67.0	XZ	023	141.3	4A
002	69.3	WZ	024	146.2	4B
003	71.9	XA	025	151.4	5Z
004	74.4	WA	026	156.7	5A
005	77.0	XB	027	162.2	5B
006	79.7	WB	028	167.9	6Z
007	82.5	YZ	029	173.8	6A
008	85.4	YA	030	179.9	6B
009	88.5	YB	031	186.2	7Z
010	91.5	ZZ	032	192.8	7A
011	94.8	ZA	033	203.5	M1
012	97.4	ZB	034	206.5	8Z
013	100.0	1Z	035	210.7	M2
014	103.5	1A	036	218.1	M3
015	107.2	1B	037	225.7	M4
016	110.9	2Z	038	229.1	9Z
017	114.8	2A	039	233.6	M5
018	118.8	2B	040	241.8	M6
019	123.0	3Z	041	250.3	M7
020	127.3	3A	042	254.1	–
021	131.8	3B			

rPL.xxx tPL.xxx	EQUIV. DPL CODE	rPL.xxx tPL.xxx	EQUIV. DPL CODE
043	23	085	315
044	25	086	331
045	26	087	343
046	31	088	346
047	32	089	351
048	43	090	364
049	47	091	365
050	51	092	371
051	54	093	411
052	65	094	412
053	71	095	413
054	72	096	423
055	73	097	431
056	74	098	432
057	114	099	445
058	115	100	464
059	116	101	465
060	125	102	466
061	131	103	503
062	132	104	506
063	134	105	516
064	143	106	532
065	152	107	546
066	155	108	565
067	156	109	606
068	162	110	612
069	165	111	624
070	172	112	627
071	174	113	631
072	205	114	632
073	223	115	645
074	226	116	654
075	243	117	662
076	244	118	664
077	245	119	703
078	251	120	712
079	261	121	723
080	263	122	731
081	265	123	732
082	271	124	734
083	306	125	743
084	311	126	754

MHz Mode Operations

In the MHz mode the radio displays the selected receive frequency by its MHz designation. You can scroll through all legitimate frequencies from the lowest end to the highest end of the band.

Selecting MHz Mode

If the *LCD Screen (18)* is displaying a channel number, this means that the radio is currently operating in Memory mode. To operate in MHz mode:

• *Press* 🔘 *.*

Selecting the Frequency Step Size

Frequency step size determines the incremental steps the receiver takes when you rotate the *Selector Knob (2)*, or when the radio is scanning the frequency band.

NOTE

The available *frequency step sizes* are 5, 10, 12.5, 15, 20, and 25 kHz.

IMPORTANT

The selected *frequency step size* is retained even if you turn off the radio.

To select the *frequency step size*:

❶ *Press and hold* $\frac{\text{LOW}}{\frac{C}{\text{STEP}}}$ *until the LCD Screen (18) indicates the current frequency step size, in this case 12.5 kHz.*

$$StEP \ 12.5$$

---

❷ *Rotate the Selector Knob (2) to the desired frequency step size.*

❸ *Momentarily press Toggle Light / Enter and Parameter Transfer Button (4) (or any button) to save this frequency step size and return to normal operation.*

IMPORTANT

The radio automatically save and return to normal operation after about 5 seconds of inactivity.

NOTE

The user-defined TX frequency may be changed automatically without indication depending on the change in the *frequency step size* selected (see *"Selecting The TX Offset"* on page 28).

Selecting A Receive Frequency

The various ways of selecting a receive frequency are as follows:

(i) Through The *Numeric Keypad (19)*

In MHz mode:

• *Enter the desired frequency*

NOTE

If the radio is left idle for more than 5 seconds, it will revert back to the original frequency. When all the 6 digits are entered, the receiver will tune itself to that frequency.

NOTE

If an invalid number is pressed, the valid number nearest to this number is shown. This ensures that selected frequency is within the allowed frequency band. Please also note that valid frequencies are also dependent on the *frequency step size* (see ***"Selecting the Frequency Step Size"*** on page 25). Only valid numbers are displayed.

*(ii) **Through The** Selector Knob (2)*

In MHz mode:

- • *Rotate the Selector Knob (2) to the desired frequency.*

*(iii) **Through** Numeric Keypad (19) **and** Selector Knob (2) **combination***

In MHz mode:

❶ *Enter the first few digits of the desired frequency through the Numeric Keypad (19).*

❷ *Press Toggle Light / Enter and Parameter Transfer Button (4) to commit the partially entered frequency.*

NOTE

Unentered digits are coerced to the nearest valid frequency.

❸ *Rotate the Selector Knob (2) until the desired frequency is displayed.*

NOTE

The frequency increments, or decrements, according to the selected *frequency step size*.

Selecting The TX Offset

For the AP 73, the transmit frequency can be the same as the receive frequency (no offset), or having a standard positive or negative offset, or it can be a user-defined TX frequency.

❶ *Press momentarily to toggle between no offset, standard positive, negative offset, or user-defined TX frequency (refer to the table below).*

Indicator(s)	Offset Mode
None	No offset (simplex)
+	Standard Positive Offset
-	Standard Negative Offset
+ -	User-defined TX Frequency

Programming A User-Defined TX Frequency

❶ *Press and hold until the "+ –" indicators begin to flash (takes about 3 seconds).*

NOTE
The *LCD Screen (18)* displays the current user-defined TX frequency.

❷ *Enter the desired TX frequency via one of the following method:*

(i) Through The Numeric Keypad (19)

① *Enter the desired TX frequency.*

NOTE
To fill in trailing zeros, press *Toggle Light / Enter and Parameter Transfer Button (4)*.

② *Press the Toggle Light / Enter and Parameter Transfer Button (4) to accepts the TX frequency and return to normal operation.*

(ii) Through The *Selector Knob (2)*

① *Rotate the Selector Knob (2) to the desired user-defined TX frequency.*

② *Press the Toggle Light / Enter and Parameter Transfer Button (4) to accepts the TX frequency and return to normal operation.*

(iii) Through *Numeric Keypad (19)* **and** *Selector Knob (2)* **combination**

In MHz mode:

① *Enter the first few digits of the desired TX frequency through the Numeric Keypad (19).*

② *Press the Toggle Light / Enter and Parameter Transfer Button (4) to commit the partially entered TX frequency.*

NOTE

Unentered digits are coerced to the nearest valid frequency.

---

③ *Rotate the Selector Knob (2) until the desired TX frequency is displayed.*

NOTE

The frequency increments, or decrements, according to the selected *frequency step size*.

---

④ *Press the Toggle Light / Enter and Parameter Transfer Button (4) to commit this TX frequency.*

IMPORTANT

The radio automatically exits this mode after 5 sec-
onds of inactivity. Partially entered frequency is
NOT stored.

NOTE

When receiving, the radio displays the selected RX
frequency whereas when transmitting, it displays
the selected TX frequency.

Memory Mode Operations

In the Memory mode, the radio operates on the selected memory channel and the **LCD Screen (18)** displays Ch.xxx (where xxx represents the selected channel number). For example, channel 08 is displayed as follows:

```
Ch.08
```

Selecting Memory Mode

If the **LCD Screen (18)** is displaying a frequency number, this means that the radio is currently operating in MHz mode. To operate in Memory mode:

• Press ⬮.

NOTE

If none of the 20 memory channels has been programmed, an *invalid keypress* tone sounds and the radio remains in the MHz mode (see **"Programming A Memory Channel"** on page 32).

Selecting A Memory Channel

• Rotate the **Selector Knob (2)** to the desired channel number.

NOTE

The channel number increments, or decrements, according to the available programmed memory channels. Empty channels are NOT displayed.

Programming A Memory Channel

There are 20 memory channels available. Each memory channel consists of a receive / transmit frequency pair, the type of TX offset and the offset frequency.

NOTE
Channels 19 and 20 are normally used to store the frequency limits for Programmable Band Scan operation (see *"Programmable Band Scan"* on page 34).

In MHz mode:

❶ *Select the desired frequency, type of TX offset and offset frequency (see* **"MHz Mode Operations"** *on page 25).*

❷ *Press and hold the* **Toggle Light / Enter and Parameter Transfer Button (4)** *until the* **LCD Screen (18)** *shows PCh.xxx (where xxx is the last channel selected in Memory mode).*

PCh.08
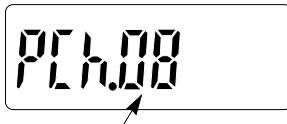
The channel number flashes if it is unprogrammed, and lights continuously if it is programmed.

❸ *Use the* **Selector Knob (2)** *to select the desired channel number.*

❹ *Press the* **Toggle Light / Enter and Parameter Transfer Button (4)** *again to program the selected memory channel.*

NOTE

The radio remains in MHz mode after successful programming of the channel.

CAUTION

If the selected memory channel was already pro-grammed (channel number lit continuously), the new frequency information overwrites the previous information.

Loading A Memory Channel

The data of a memory channel (receive and transmit frequencies, TX offset type and offset frequency) can be copied over into the MHz mode.

This allows you to tune the radio in the MHz mode from the point specified by the memory channel data.

In Memory mode:

❶ *Rotate the **Selector Knob (2)** to the desired mem-ory channel number.*

❷ *Press and hold **Toggle Light / Enter and Parame-ter Transfer Button (4)** for about 3 seconds.*

NOTE

A *valid keypress* tone sounds when the memory channel data has been successfully copied over to the MHz mode.

Scan Operations

Scan operation tells the radio to monitor a number of frequencies or channels. When there are some activities at a particular frequency or channel, the radio stops scanning and changes to that frequency or channel.

Scan modes supported by the radio are:

(i) Programmable Band scan (MHz mode)

(ii) Memory Channel scan (Memory mode)

NOTE

Each frequency or channel is given the same priority i.e. *non-priority* scan.

IMPORTANT

The radio will not recall the scan state if it is powered off while scanning.

Programmable Band Scan

In the MHz mode, the radio scans over a preprogrammed range of frequencies usually specified in memory channels 19 and 20.

NOTE

User can specify the frequency range for scanning by programming the frequency limit into memory channel 19 (usually the lower limit) and memory channel 20 (usually the upper limit) (see *"Programming A Memory Channel"* on page 32).

Scanning A Frequency Range

In MHz mode:

❶ *Press* $\overset{\text{SCAN}}{\underset{\text{N-DEL}}{\boxed{\text{D}}}}$ *to begin scanning the preprogrammed frequency range.*

NOTE

The frequency range is scanned according to the frequencies specified in channels 19 and 20, and the selected frequency step size. If the operating frequency before scanning starts is within the scan range, the radio starts scanning from that frequency, otherwise, it starts from the frequency specified by memory channel 19 (or the lowest frequency in the band if channel 19 is blank).

NOTE

When the '**SCAN**' indicator flashes, scanning is in progress and the currently scanned frequency is displayed.

To change the scan direction:

• *Rotate the Selector Knob (2) anti-clockwise.*

NOTE

If activity is detected, the radio stops scanning and stays on the active frequency. The '**SCAN**' indicator remains on, and you will hear the conversation, provided the PL/DPL code (if required) is correct.

IMPORTANT

Radio resumes scanning after approximate 5 seconds (even if activity is still received). If received activity ceases, the radio resumes scanning after another 7 seconds, unless receive activity resumes.

---

❷ *Press* $\overset{\text{SCAN}}{\underset{\text{N-DEL}}{\boxed{\text{D}}}}$ *to stop scanning.*

NOTE

Pressing *Push-To-Talk (PTT) Button (6)*, a digit on the numeric keypad, 🔒✕ or # also ends the scanning.

NOTE

The '**SCAN**' indicator turns off when scanning is terminated and the radio displays the frequency where scanning stopped.

IMPORTANT

If both memory channels are left blank (unprogrammed), the radio scans the entire frequency band. If channel 19 is programmed but channel 20 is blank, the upper frequency limit becomes the highest frequency in the band. If channel 20 is programmed but channel 19 is blank, the lower frequency limit becomes the lowest frequency in the band. If the frequency stored in channel 19 is lower than that stored in channel 20, then scan proceeds in an incrementing order otherwise, scan proceeds in a decrementing order.

Transmitting During Band Scanning

When the scan is locked at a frequency:

• *Press Push-To-Talk (PTT) Button (6).*

IMPORTANT

As soon as *Push-To-Talk (PTT) Button (6)* is pressed, the radio exits band scanning and transmits the TX frequency which corresponds to the active RX frequency, plus or minus any selected TX offset. If the *user-defined* mode is selected ('**+**' and '**–**' indicators both on), the radio transmits the *user-defined* TX frequency.

Memory Channel Scan

In the Memory mode, the radio scans all *programmed* memory channels that are also in the channel scan list.

NOTE

The scan list is edited using the Special Programming mode (see **"Special Programming Mode (SPM)"** on page 46).

NOTE

Channels may be temporarily removed from the scan list using a Nuisance Channel Delete feature (see **"Nuisance Channel Delete"** on page 38).

Scanning Memory Channels

In Memory mode,

❶ *Press* $\overset{\text{SCAN}}{\underset{\text{N-DEL}}{\boxed{D}}}$ *to begin channel scanning.*

NOTE

When the '**SCAN**' indicator flashes, scanning is in progress and the *Home Channel* (the active channel before $\overset{\text{SCAN}}{\underset{\text{N-DEL}}{\boxed{D}}}$ was pressed) is displayed until activity is received on another channel.

The channels are scanned in an increasing order (from lowest to highest). To scan in a decreasing order:

• *Rotate the Selector Knob (2) anti-clockwise.*

NOTE

The radio scans through all channels in the prepro-grammed scan list. If activity is detected, the radio stops scanning and stays on the active channel. The '**SCAN**' indicator remains on, and you will hear the conversation, provided the PL/DPL code (if required) is correct. In Carrier squelch and Coded squelch modes, when activity is over and a 7-sec-ond "hang time" has expired, the display reverts to the *Home Channel* and scanning resumes.

To stop scanning:
- *Press* $\overset{\text{SCAN}}{\underset{\text{N-DEL}}{\boxed{\text{D}}}}$.

Transmitting During Channel Scanning

When the scan is locked at a channel:

- *Press Push-To-Talk (PTT) Button (6) to talk, release to listen.*

IMPORTANT

The radio transmits on the current active TX fre-quency. But, if *Push-To-Talk (PTT) Button (6)* is pressed before the scan is locked at any channel, the *Home Channel* TX frequency is used.

Nuisance Channel Delete

When the radio is scanning, it would stop at any chan-nel within the scan list that has activity. A channel that generates unwanted signals continuously is called a **Nuisance Channel**. To temporarily remove the chan-nel from the scan list:

- *Press and hold* $\overset{\text{SCAN}}{\underset{\text{N-DEL}}{\boxed{\text{D}}}}$ *for about 3 seconds while scan locks on the* **Nuisance Channel***.*

NOTE

Two medium-pitched "beeps" are sounded indicating the radio has temporary removed the **Nuisance Channel** from its scan list.

IMPORTANT

To add a deleted nuisance channel back into the scan list, exit and reenter the scan function or restart the radio.

DTMF Telephone Interconnect

Dual Tone Multiple Frequency (DTMF) tones are encoded by the radio to dial into (***access***) the landline telephone network and return (***deaccess)*** to conventional radio operation.

Once the telephone network has been accessed, phone numbers can be dialled either manually or from memory. The keypad provides support for DTMF digits **0** to **9**, and the characters **A**, **B**, **C**, **D**, ∗ and **#**.

NOTE

The radio is capable of storing a maximum of 9 preprogrammed phone numbers (up to 12 digits each).

Placing a Telephone Call

To place a call:

❶ *Press and hold the Push-To-Talk (PTT) Button (6).*

❷ *Dial the access code manually using the DTMF keys or press* 🖳 *then* 🔒✳ *to send the preprogrammed access code.*

❸ *Release the **Push-To-Talk (PTT) Button (6)** and wait for a dial tone.*

❹ *Press and hold the Push-To-Talk (PTT) Button (6) and either manually dial the telephone number or press* 🖳 *and the phone number location that stores the preprogrammed telephone number.*

❺ *Press the **Push-To-Talk (PTT) Button (6)** to talk; release to listen.*

NOTE

If you press a phone number location which has not been programmed, the radio will sound an Invalid Button Press tone and no further action is taken.

To hang up:

❶ *Press and hold the Push-To-Talk (PTT) Button (6).*

❷ *Manually dial the deaccess code or press* ⟨MEM⟩ *then* ▇#▇ *to send the preprogrammed deaccess code.*

Last Number Redial

Manually dialled phone numbers (up to 16 digits long) are stored in numeric location '**0**' for quick redial capabilities.They are sent exactly as preprogrammed telephone numbers are. After you receive a dial tone:

• *Press and hold **Push-To-Talk (PTT) Button (6)**, then press* ⟨MEM⟩ *and* ▇0▇ *.*

NOTE

Last Number Redial only stores manually dialled numbers and NOT preprogrammed telephone numbers. The number set is stored in phone location 0 until the radio is turned off or until another DTMF sequence is manually dialled.
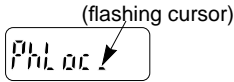

NOTE

If you attempt to perform a last number redial where no manual numbers have yet been dialled since radio power-up, the radio will sound an *Invalid Button Press* tone.


Storing a Phone Number

A maximum of 9 telephone numbers (up to 12 digits each) can be stored into the radio memory. Each phone number is stored and recalled via a unique number on the keypad in the range of **1** to **9**. The following procedure can also be used to store the access / deaccess codes (up to 8 digits each):

❶ *Press and hold* ⟨MEM⟩ *until you hear a second Valid Button Press tone (takes about 2 seconds).*

(flashing cursor)

PhLoc ▶

❷ *Enter a phone number location (in the range of **1** to **9**) to store a phone number or press* ⟨🔒✕⟩ *to store the access code or* ⟨ # ⟩ *to store the deaccess code.*

❸ *Enter the phone number (up to 12 digits long), or access / deaccess code (up to 8 digits long).*

NOTE

Valid digits are DTMF digits **0** to **9**, the characters **A**, **B**, **C**, **D**, ∗ and **#**, and pause digits.

NOTE

Pause digit (⟨🔒✕⟩ ⟨ # ⟩)causes the radio to wait in between transmission of the digits programmed before and after it. One or more pause digits can be entered between successive digits of the phone number (or access / deaccess code). When a pause digit is successfully entered, two beeps are heard; the display changes from '**A**' to '**-**'. Pause digits placed at the end of a phone number are not remembered by the radio.


NOTE

If you make a mistake, press ⟨MODE⟩ to scroll the cursor to the left and erase the incorrect entry. To view a numeric sequence of more than 6 digits, press ⟨OFF⟩ or ⟨MEM⟩ to scroll the cursor to the left or right.

NOTE

All undefined digits are represented by underscores on the **LCD Screen (18)**. A flashing '_' indicates the position for the next number entry. If you reach the maximum number of entries, the cursor position is under the last digit. An *Invalid Button Press* tone will sound if you attempt to enter more than the maximum number of digits.

---

❹ Press the **Toggle Light / Enter and Parameter Transfer Button (4)** to store the phone number (or access / deaccess code) into the designated location and return to normal operation.

Displaying a Stored Phone Number

❶ *Press* 🔘 *momentarily in the receive mode. A Valid Button Press tone is heard.*

❷ *Enter a one-digit phone number location (in the range of **1** to **9**) to view the stored phone number or press* 🔘✳ *to view the access code or* 🔘# *to view the deaccess code or* 🔘0 *to review the last number dialled.*

NOTE

If the keypad entry is valid, the **LCD Screen (18)** displays the first 6 digits of the stored phone number or code. For number sequences more than 6 digits, after 2 seconds the number begins auto-scrolling to the left in 1 second increments until the last digit is displayed. If the selected phone location is empty, an Invalid Button Press tone is heard.

Voice Selective Call (Optional)

To support Voice Selective Call (SelCall) operation, the radio must be equipped with an optional DTMF Decode board.

NOTE
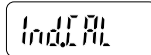
For more information about the availability of this option, contact your dealer.

If your radio is equipped with the Voice Selective Call option, your radio can be called individually by another user, or as part of a small group.
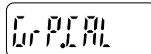
Receiving a Voice Selective Call

When the radio decodes a Voice Selective Call, the *LCD Screen (18)* indicates the type of SelCall message being received:

Individual Call	IndCAL
Group Call	GrPCAL
ALL Call	ALLCAL

NOTE

The radio will give an alert tone when it successfully decodes a Voice Selective Call. If either *Selective Call Tone Status* or *Alert Tone Volume* is set to '**OFF**' (see page 53 and 55), no tone is heard.

For an *Individual Call*, the radio automatically transmits an *Acknowledgement* message back to the calling radio, if an *Acknowledgement ID* has been

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programmed (see *"Edit Selective Call IDs"* on page 52).

When the radio decodes a Voice Selective Call, it enters the carrier squelch mode for a period of time. If there is no receive activity, the radio resumes the selected squelch mode and the *LCD Screen (18)* reverts to the appropriate receive mode display.

IMPORTANT

If the *Selector Knob (2)* is rotated or any buttons pressed while the *SelCall* signal is in progress, the *SelCall* message disappears and the *Selective Call* is lost.

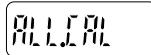---

Sending a Voice Selective Call

❶ *Press and hold the Push-To-Talk (PTT) Button (6).*

❷ *Dial the required Selective Call ID.*

❸ *Release the Push-To-Talk (PTT) Button (6).*

NOTE

For an *Individual Call*, the radio indicates that the call was received by generating two short ringing tones.

Special Programming Mode (SPM)

The Special Programming mode (SPM) allows you to edit all user-modifiable parameters within your radio, such as the *Channel Scan list*, *Phone Access / Deaccess codes*, and *Alert Tone Settings*. Certain parameters (such as the *Selective Call Tone Status*) are only accessible with the installation of an option board. Upon entry to the Special Programming mode, the radio initiates the *SPM Browse* menu which provides you with a menu of available parameters and their current settings.

Entering SPM

❶ *Turn the radio off (if it is on).*

❷ *Turn the radio on while holding ⬙ . Keep holding this button until a SPM start-up tone sounds.*

NOTE

At power-up, all display segments light up for about 2 seconds. If successful, the *LCD Screen (18)* displays ⸁⸱⸱⸱⸱.

NOTE

If the battery level is low, the display indicates ⸁⸱⸱⸱ and the '**BATT**' indicator flashes. The radio also sounds a *Low Battery* alert tone. Turn off the radio and replace or recharge the battery.

Exiting SPM

• *Turn off the radio to exit SPM.*

SPM Browse Menu

(Anti-Clockwise Rotation)

(Clockwise Rotation)

"Beep"

FIRST ITEM

Ac - Aut/Ac - SPC/Ac - HSE
Set Accessory Option

ScnLSt
Edit Channel Scan List

bt - NiC/bt - ALn
Set Battery Type

ErACln
Erase Single Channel

bS - OFF/bS - Nor/bS - Enh
Set Battery Saver Status

PhnAcc
Edit Phone Access Code

At - OFF / At - On
Alert Tone Volume

PhndEA
Edit Phone Deaccess Code

St - On / St - OFF
Set Sidetone Status

Ptt.Id
Edit PTT ID

Sc - On / Sc - OFF
§Set SelCall Tone Status

Acn.Id
§Edit Acknowledgment ID

tot.xxx†
Edit Time Out Timer

Ind.Id
§Edit Individual Call ID

GrP.Id
§Edit Group Call ID

ALL.Id
§Edit All Call ID

§Only displays with option board configured.
†xxx represents OFF, -01,-02,..., -10.

Editing SPM Parameters

Editing the Channel Scan List

❶ *In SPM, rotate the Selector Knob (2) to select the Edit Channel Scan List (ScnLSt) menu item.*

❷ *Use or to scroll through the channels (**01** to **20**).*

NOTE

The channel scan list does not wrap around to the opposite end of the list. Instead, an *Invalid Button Press* tone sounds when you have reached the upper or lower limit of the list.

NOTE

A flashing channel number indicates that the channel is excluded from the scan list.

---

❸ *Press the Toggle Light / Enter and Parameter Transfer Button (4) to toggle the status of a channel i.e. being included or excluded from the scan list.*

NOTE

A *Valid Button Press* tone sounds when the new setting is stored.

---

❹ *To exit this menu, select another menu item by turning the Selector Knob (2).*

Erase a Single Channel from Memory

❶ *In SPM, rotate the Selector Knob (2) to the Erase Single Channel (ErAChn) menu.*

❷ *Use or to scroll through the channels (**01** to **20**).*

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NOTE

A flashing channel number indicates that the channel is unprogrammed (erased).

❸ *Press Toggle Light / Enter and Parameter Transfer Button (4) to erase a programmed channel (non-flashing channel numbers).*

NOTE

A *valid keypress* tone sounds when the channel has successfully erased. Pressing *Toggle Light / Enter and Parameter Transfer Button (4)* on an unprogrammed channel results in an *invalid keypress* tone and the keypress is ignored.

❹ *To exit this menu, select another menu item by turning the Selector Knob (2).*

Editing the Phone Access / Deaccess Codes

❶ *In SPM, rotate the Selector Knob (2) to the Edit Phone Access (Ph̄ndAcc) or Edit Phone Deaccess (Phndēā) menu.*

❷ *Press ⏏ or ⏏ to enter the edit mode.*

NOTE

The *LCD Screen (18)* displays the current access / deaccess code. For a code which exceeds the 6-digit display length, the rightmost digit flashes to indicate that more digits exist on the right.

❸ *Enter the new access / deaccess code (up to 8 digits) using any of the numeric keys, A, B, C, D,* and #.*

NOTE

The *LCD Screen (18)* shows the new digits as they are being entered. When the cursor is flashing under a digit, the maximum number has been entered. Use or to scroll through the existing code and to erase unwanted digits.

NOTE

Pause digit ( )causes the radio to wait in between transmission of the digits programmed before and after it. One or more pause digits can be entered between successive digits of the phone access / deaccess codes. When a pause digit is successfully keyed, two beeps are heard; the display changes from '**A**' to '**-**'. Pause digits placed at the end of a phone number are not remembered by the radio.

❹ *Press the Toggle Light / Enter and Parameter Transfer Button (4) to store the new code and return to SPM Browse Menu.*

NOTE

A *Valid Button Press* tone sounds when the new setting is stored.

❺ *To abort data entry, select another menu item by turning the Selector Knob (2) or wait until the edit mode time-out (after 5 seconds of inactivity).*

Edit PTT ID

❶ *In SPM, rotate the Selector Knob (2) to the PTT ID (PTT.id) menu.*

❷ *Press or to enter the edit mode.*

NOTE

The *LCD Screen (18)* displays the current pro-
grammed PTT ID. For an PTT ID which exceeds the
6-digit display length, the rightmost digit flashes to
indicate that more digits exist on the right.

❸ *Enter the new PTT ID (up to 8 digits) using any of
the numeric keys, A, B, C, D,* and #.*

NOTE

The *LCD Screen (18)* shows the new digits as they
are being entered. When the cursor is flashing
under a digit, the maximum number has been
entered. Use ⟨QFS⟩ *or* ⟨MEM⟩ to scroll through the exist-
ing PTT ID and ⟨MODE⟩ to erase unwanted digits.

NOTE

Pause digit (🔒✱ #️)causes the radio to wait in
between transmission of the digits programmed
before and after it. One or more pause digits can be
entered between successive digits of the phone
access / deaccess codes. When a pause digit is
successfully keyed, two beeps are heard; the dis-
play changes from '**A**' to '**-**'. Pause digits placed at
the end of a phone number are not remembered by
the radio.

❹ *Press the Toggle Light / Enter and Parameter
Transfer Button (4) to store the new PTT ID and
return to SPM Browse Menu.*

NOTE

A *Valid Button Press* tone sounds when the new
setting is stored.

❺ *To abort data entry, select another menu item by
turning the Selector Knob (2) or wait until the edit
mode time-out (after 5 seconds of inactivity).*

Edit Selective Call IDs

NOTE

The radio must be equipped with a option DTMF Decode board to support the *Selective Call* Operation.

---

❶ *In SPM, rotate the Selector Knob (2) to the Acknowledgment ID* (Ꭿcn.Id) *or Individual Call ID* (Ind.Id) *or Group Call ID* (Grᴾ.Id) *or All Call ID* (ᎯLL.Id) *menu.*

❷ *Press* ▨ *or* ▨ *to enter the edit mode.*

NOTE

The *LCD Screen (18)* displays the current programmed ID number. For an ID which exceeds the 6-digit display length, the rightmost digit flashes to indicate that more digits exist on the right.

---

❸ *Enter the new number (up to 8 digits) using any of the numeric keys, A, B, C, D,* and #.*

NOTE

The *LCD Screen (18)* shows the new digits as they are being entered. When the cursor is flashing under a digit, the maximum number has been entered. Use ▨ *or* ▨ to scroll through the existing ID and ▨ to erase unwanted digits.

NOTE

Pause digit CANNOT be entered with *Selective Call ID* therefore a '*' must not be followed immediately by a '#'.

---

❹ *Press the Toggle Light / Enter and Parameter Transfer Button (4) to store the new ID and return to SPM Browse Menu.*

NOTE

A *Valid Button Press* tone sounds when the new setting is stored.

---

❺ *To abort data entry, select another menu item by turning the Selector Knob (2) or wait until the edit mode time-out (after 5 seconds of inactivity).*

Editing Time Out Timer

❶ *In SPM, rotate the Selector Knob (2) to the Edit Time Out Timer (ᵗᵒᵗ.xxx) menu.*

NOTE

xxx represents one of �ᶠᶠ, -�, -�, ..., - �10. The default display of ᵗᵒᵗ.-� shows the time-out timer setting of one minute. If the display shows ᵗᵒᵗ.�ᶠᶠ, this indicates that the time-out timer is disabled. This means that there is no limit on the transmit time.

---

❷ *Use ⏚ or ⏛ to change the current status.*

CAUTION

The new setting is stored immediately.

---

❸ *To exit this menu, select another menu item by turning the Selector Knob (2).*

Setting the Selective Call Tone Status

NOTE

The radio must be equipped with a DTMF Decode board top support the *Selective Call Tone Status* operation.

Selective Call alert tones give an audible indication of receipt of a **Voice Selective Call** (*SelCall*). If disabled, the alert tones do not sound when *Voice Selective Call* messages are received by the radio.

NOTE

Setting the Alert Tone Volume to off disables all tones regardless of the setting of this parameter (see **"Setting the Alert Tone Volume"** on page 55).

---

❶ *In SPM, rotate the Selector Knob (2) to the Set SelCall Tone Status (Ꮝc - Ꮘn or Ꮝc - OFF) menu.*

❷ *Use ᴼᴾˢ or ᴹᴱᴹ to toggle between On and Off.*

CAUTION

The new setting is stored immediately.

---

❸ *To exit this menu, select another menu item by turning the Selector Knob (2).*

Setting the Sidetones Status

If transmit sidetones is disabled, DTMF sidetones such as phone number and PTT ID sidetones are not heard during transmission.

❶ *In SPM, rotate the Selector Knob (2) to the Set Sidetones Status (Ꮝt - Ꮘn or Ꮝt - OFF) menu.*

❷ *Use ᴼᴾˢ or ᴹᴱᴹ to toggle between On and Off.*

CAUTION

The new setting is stored immediately.

---

❸ *To exit this menu, select another menu item by turning the Selector Knob (2).*

Setting the Alert Tone Volume

❶ *In SPM, rotate the Selector Knob (2) to the Alert Tone Volume (𝘈𝘭𝘵-𝘖𝘍𝘍 or 𝘈𝘭𝘵-𝘖𝘯) menu.*

❷ *Use ✍ or ✍ to toggle between On and Off.*

NOTE

When 𝘈𝘭𝘵-𝘖𝘯 is chosen, the alert tone volume follows the volume control setting (see **"Adjusting the Volume"** on page 14).

CAUTION

The new setting is stored immediately.

---

❸ *To exit this menu, select another menu item by turning the Selector Knob (2).*

Setting the Battery Saver Status

When enabled, the Battery Saver feature increases the amount of time between battery replacement or charging. Battery power is conserved by turning off the receiver circuitry, except for periodic checks for carrier activity.

❶ *In SPM, rotate the Selector Knob (2) to the Set Battery Saver Status (𝘣𝘚-𝘖𝘍𝘍 - Off, or 𝘣𝘚-𝘯𝘰𝘳 - Normal, or 𝘣𝘚-𝘌𝘯𝘩 - Enhanced) menu.*

❷ *Use ✍ or ✍ to scroll through the three options.*

CAUTION

The new setting is stored immediately.

---

❸ *To exit this menu, select another menu item by turning the Selector Knob (2).*

NOTE

The Battery Saver feature is not active during channel scanning, when the *Push-To-Talk (PTT) Button (6)*is pressed, or when the radio is receiving a signal.

Setting the Battery Type

❶ *In SPM, rotate the Selector Knob (2) to the Set Battery Type (*b̶t̶ - A̶L̶n̶ - Alkaline (standard battery) or b̶t̶ - n̶C̶d̶ - NiCd (rechargeable battery)) *menu.*

❷ *Use the* ⟳ *or* ⟲ *to scroll through the options.*

CAUTION

The new setting is stored immediately.

❸ *To exit this menu, select another menu item by turning the Selector Knob (2).*

IMPORTANT

The *Battery Type* must be correctly set for **Low Battery Alert** to perform accurately.

Setting the Accessory Sense Option

This menu item determines the type of accessory in use by the radio (if any), such as a headset, earpiece, or speaker microphone. There are three options available: *Autosense*, *Headset Only* and *Speaker Microphone Only*.

❶ *In SPM, rotate the Selector Knob (2) to the Set Accessory Option (*A̶c̶ - A̶u̶t̶ - Autosense or A̶c̶ - S̶P̶C̶ - Speaker Microphone Only or A̶c̶ - H̶S̶t̶ - Headset Only*) menu.*

❷ *Use* ⟳ *or* ⟲ *to scroll through the three options.*

CAUTION

The new setting is stored immediately.

---

❸ *To exit this menu, select another menu item by turning the Selector Knob (2).*

NOTE

When *Autosense* is selected, the radio checks the accessory jack to see what type of accessory is connected. When *Headset Only* is selected, the radio supports only an earpiece or headset, and all external PTT inputs are ignored. When *Speaker Microphone Only* is selected, the radio assumes that an accessory with an external PTT switch will be used to transmit voice. The radio's internal microphone will not transmit voice whenever an accessory is connected.

IMPORTANT

The radio should be turned off when an audio accessory with a microphone is connected to the radio. This is to ensure the proper operation of the *Push-To-Talk (PTT) Button (6)*.

Factory Reset Feature

This feature is intended to allow the user to erase certain programmable parameters and restore the radio to the factory default settings. The radio, upon factory reset, clears all memory channels stored in the non-volatile memory area, clears all phone number storage locations, and restores the default settings to the different user-modifiable parameters (coded squelch type, squelch level, channel-step size, etc.).

NOTE

The *Factory Reset* feature does not clear the IDs or access / deaccess codes.

---

❶ *In SPM, press and hold Push-To-Talk (PTT) Button (6) while keying* **1** , **3** , **5** , **7** , **9** *in sequence.*

NOTE

As the sequence is entered, the *LCD Screen (18)* (which is initially cleared) displays an ⍾ for each digit entered.

NOTE

Any incorrect digit entered results in an *invalid keypress* tone, the *LCD Screen (18)* is cleared again and the you must reenter the sequence, starting with the first digit. Once the sequence has been entered successfully, the *LCD Screen (18)* displays *ErA5Er*, indicating that the reset procedure is ready to be activated.

---

❷ *Press Toggle Light / Enter and Parameter Transfer Button (4) to confirm the reset process (pressing any other key or releasing Push-To-Talk (PTT) Button (6) cancels the process and returns the radio to the SPM Browse menu).*

NOTE

The display blanks when the reset is in progress. When the process is successfully completed, it returns to *SPM Browse Menu*.

LCD Segments and Indicators
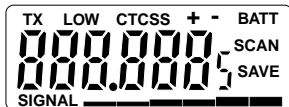
Indicators

TX - Lights up when radio is transmitting.

LOW - Lights up when radio is in low transmit power mode.

CTCSS - Lights up continuously for Coded Squelch mode; *Off* for Carrier Squelch mode; Flashes for Signalling Squelch mode (if available).

SCAN - Flashes when radio is scanning; Lights up continuously when scan is suspended.

BATT - Flashes when battery voltage is low.

SAVE - Flashes quickly when Normal Battery Saver mode is enabled; Flashes slowly when Enhanced Battery Saver mode is enabled; Nothing displayed when Battery Saver is disabled.

+/- - Plus sign (+) lights up for positive standard TX offset; Minus sign (-) lights up for negative standard TX offset; Both *On* indicates user-programmed TX frequency; Both *Off* indicates no TX offset.

Indicators with Segments

SIGNAL - uses six bar segments to indicate the relative receive (Rx) signal strength. **SIGNAL** lights up upon receiving a Rx signal strength greater than 10 dB SINAD. As the signal strength increases, additional bar segments light up, starting from the left-most bar segment.

Alert Tone Indicators

Successful Power-Up

A short, high-pitched tone when the radio is turned on indicates that the radio has passed its power-up self-test and is ready for use.

Unsuccessful Power-Up

A short, low-pitched tone immediately following the *Successful Power-Up* tone indicates that the radio has detected an error and has failed to power-up properly.

Valid Button Press

A short, high-pitched tone indicates that the last button pressed was valid.

Invalid Button Press

A short, low-pitched tone indicates that the last button pressed was invalid.

Low Battery

Three low-pitched tones indicate a low battery condition.

DTMF Sidetones

Each DTMF tone is heard as it is transmitted.

Time-Out Timer Alert

A low-pitched continuous tone indicates that your present transmission has been disabled.

Individual Selective Call Decode

Two short ringing tones indicate that an *Individual Selective Call* has been decoded by the radio. The radio automatically sends an *Acknowledgment ID*.

Acknowledgment ID Decode

A short ringing tone indicates that a correct *Acknowledgment ID* has been decoded by the radio.

Group and All Call Selective Call Decode

Two medium-pitched tones indicate that a Group or All Call Selective Call has been decoded by the radio.

Nuisance Channel Delete

During channel scanning, two medium-pitched tones indicate that an unwanted channel has been temporarily deleted from the scan list.

Information For Safe, Efficient Operation

Exposure To Radio Frequency Energy

In August 1996 the Federal Communications Commission (FCC) adopted updated RF energy exposure guidelines for wireless products regulated by the FCC. Those guidelines are consistent with the safety standards* previously set by both U.S. and international standards bodies.   The design of your Motorola two-way radio complies with the FCC guidelines and these standards.

*American National Standards Institute (C95.1 - 1992);

*National Council on Radiation Protection and Measurements (NCRP-1986);

*International Commission on Non-Ionizing Radiation Protection (ICNRP- 1986)

To assure optimal radio performance and to insure that exposure to RF energy is within the guidelines in the above standards, the following operating procedures should be observed:

For Portable Two-way Radios:

- For hand held operation, the radio should be held in a vertical position with the microphone one to two inches (2.5 to 5 cm) away from the mouth, and the antenna should be kept one to two inches (2.5 to 5 cm) from the head or body when transmitting.

- For body worn operation, the antenna should be kept at least one inch (2.5 cm) from the body when transmitting.

Electromagnetic Interference/compatibility

Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed or otherwise configured for electromagnetic compatibility.

• Turn your radio OFF in any facilities where posted notices instruct you to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

• Turn your radio off when on board aircraft when instructed to do so. Any use of the radio must be in accordance with Federal Aviation Administration (FAA) and FCC regulations or crew instructions.

CAUTION

• Do not use the radio with a damaged antenna. If a damaged antenna comes into contact with the skin, a minor burn may result.

• All batteries can cause property damage, injury or burns if a conductive material such as jewelry, keys or beaded chains touches exposed terminals. The material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse or other container with metal objects.

Potentially Explosive Atmospheres

Areas with potentially explosive atmospheres are often, but not always, clearly marked. They include fuelling areas such as below deck on boats, fuel or chemical transfer or storage facilities; areas where the air contains chemicals or particles, such as grain, dust, or metal powders; and any other area where you

would normally be advised to turn off your vehicle engine.

WARNING

- Turn your radio OFF when in any area with a potentially explosive atmosphere, unless it is a type especially qualified for such use (for example, FMRC Approved). Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

- Do not replace or charge batteries in a hazardous atmosphere. Contact sparking may occur while installing or removing batteries and cause an explosion.

Blasting Caps And Areas

WARNING

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

For Vehicles With An Air Bag

WARNING

An air bag inflates with great force. Do not place objects, including portable or mobile two-way radios, in the area over the air bag or in the air bag deployment area. If improperly installed or placed wireless equipment is in the air bag deployment area and the air bag inflates, serious injury could result.

Recycling / Disposal of NiCd Batteries

The U.S. Environmental Protection Agency (EPA) classifies used NiCd batteries as hazardous waste, unless certain exemptions apply.

At the end of your battery's useful life, it can be recycled. However, recycling facilities may not be available in all areas. Under various state or local laws, such batteries must be recycled or disposed of properly, and cannot be dumped in landfills or incinerators.

Motorola fully endorses and encourages the recycling of NiCd batteries. The following is a list of recycling facilities around the world, where you can ship your NiCd batteries post paid to be recycled:

United States

INMETCO
P.O. Box 720
245 Porteville Road
Ellwood City, PA 16117
Tel:(412) 758-5515
Fax:(412) 758-9311

Europe

S.N.A.M.
Rue de la Garenne
Z.I. Chesnes Tharabie -BP733
Saint Quentin Fallavier
38297 La Verpilliere Cedex,
France
Tel: 033-74-94-59-85
Fax: 033-74-94-13-18

Asia

Hanil Metal Recycle Co. Ltd.
2404 Palryong-dong
Changwon-Shi
Kyongsangnam-Do, Korea
Tel: 082-551-93-1911
Fax: 082-551-96-0050

Japan

Marubeni Co.
Head Office/Attn. B6B2
4-2 Ohtemachi 1-Choma
Ciyoda-Ku, Tokyo, Japan

Nippon Recycle Ctr., Corp.
6-3-19, Nishitamma, Kita-Ku
Osaka, 530, Japan
Tel: 081-6-311-9071
Fax: 081-311-0949

You should consider the methods of collecting, labeling, and shipping used NiCd batteries. Consult your federal, state, or local EPA for specific legal requirements and for recycling options in your area.

Motorola, as a responsible corporate citizen, has always been concerned with the protection of the environment. Please feel free to call our toll-free number,1-800-422-4210, for further battery information.

Licensing & Service Information

Licensing

This radio operates on FM radio communication frequencies and is subject to the **rules and regulations of the local communications governing agencies**. These agencies may require that all operators using general mobile radio frequencies obtain a radio license before operating their equipment. To determine the specific requirements, contact your local communications governing agency. This agency can supply information required to properly obtain and complete the license application form and various operational issues.

Service

Because this unit contains a radio transmitter, most local governments prohibit anyone from making internal adjustments to the transmitter unless specifically licensed to do so by government regulations. If your radio fails to operate or any operational difficulties arise, contact your local Motorola dealer.

Proper repair and maintenance procedures assure efficient operation and long life for this radio.

Troubleshooting

Radio is dead.

Possible Problem (1): Batteries may be dead (alkaline) or not properly charged (NiCd).

*Solution :**If the display does not light, or the 'BATT' indicator flashes on and off, you should replace the alkaline batteries, or if you are using NiCd batteries, recharge them.***

Possible Problem (2): Batteries may not be positioned correctly in the radio.

*Solution :**See "Installing and Removing Batteries" on page 8 for the appropriate battery installation instructions.***

NiCd battery does not charge or last long enough.

Possible Problem (1): Battery may be incorrectly charged.

*Solution :**If you use a desktop charger, make sure the battery is positioned properly in the charger base. If you are using a wall charger, make sure that the LED on the charger glows red, indicating correct charging status. See "Charging with Wall Charger" on page 11 and "Charging with Desktop Charger" on page 12.***

Possible Problem (2): Battery may not be fully charged.

*Solution :**Turn radio off while charging battery. Charging time will be doubled if the radio is turned on while charging.***

Possible Problem (3): The battery life is based on a duty cycle where the radio is transmitting 5%, receiving 5%, and in standby mode 90% of the time. Usage that differs from this will change the typical battery life expectancy accordingly.

Solution : *If you use your radio for a longer period of time than the standard duty cycle, you may need to recharge your battery again.*

Possible Problem (4): Battery or charger contacts may be dirty.

Solution : *Clean battery and charger contacts often.*

Alkaline Battery does not last long enough (<10 minutes).

Possible Problem (1): Operating the radio at high power with alkaline batteries.

Solution : *When used with alkaline batteries, the radio should operate at low power unless absolutely necessary.*

NOTE

It is recommended to operate your radio in Low Power when using alkaline batteries. Using alkaline batteries in High Power might result a *Low Battery Alert* (3 low pitched tones) shortly after transmitting. This is NOT a malfunction. The alert sounds because alkaline batteries cannot maintain the power needed to transmit at High Power for a long interval. However, APC is immediately activated when this alert sounds. It automatically adjusts the radio's power requirements to maintain the radio's operation. Without APC, the radio would instead reset itself and refuse to transmit.

Radio will not talk to other radios in system.

Possible Problem (1): Radios may be on different frequencies, or having different Coded Squelch Codes.

Solution : *Verify that frequencies and Coded Squelch Codes are the same for all radios in your talk group.*

Hearing other conversations or noise on your radio.

Possible Problem (1): Users do not have exclusive use of frequencies. Frequencies must be shared using proper radio etiquette.

Solution : *Use proper radio etiquette.*

NOTE

Coded squelch screens out other users' conversations on your radio, but other users who share your frequency may still hear your conversations.

Limited talk range.

Possible Problem (1): Using your radio in basements, steel structures, concrete buildings, automobiles, or heavy foliage decreases its range.

Solution : *These are standard characteristics of transmitters. External magnetic mount antennas are recommended for best range when communicating in an automobile. If the radio supports the High/ Low Power Output option, check that the radio is not in Low Power Transmit Mode; the "LOW" indicator on the LCD lights in this mode.*

Possible Problem (2): Operating the radio while it is close to your body (i.e. in a pocket or on a belt) and while you are using audio accessories decreases its range because of the shielding effect of your body.

Solution : *The higher the radio is held, the better the talk range. Use of audio accessories is only recommended in close range situations for best results.*

Possible Problem (3): The Carrier Squelch Level may be set too high.

Solution : *Set the Carrier Squelch Level to a lower value (see "Setting Squelch Level" on page 20).*

You hear constant static from speaker.

Possible Problem (1): The alkaline batteries may be weak (or the NiCd battery may be discharged).

Solution : *Press and hold the PTT while looking at the LCD. If the 'BATT' indicator flashes continuously while still holding the PTT, the batteries should be replaced or recharged.*

Possible Problem (2): When using your radio around computers or electronic equipment, you may hear static or interference from these devices.

Solution : *Enable Coded Squelch. Coded squelch screens out this type of interference (see "Changing Squelch Modes" on page 18).*

You have tried a solution for any of the above symp-

toms, without success.

Possible Problem (1): The radio may need to be repaired.

Solution : **If the unit is still under warranty, return it to the place of purchase for repairs, or contact your nearest Motorola dealer listed in your local yellow pages.**

Accessories

NOTE

Please note that all accessories may not be available in all markets. Contact your dealer for more information.

Battery & Charging Accessories:

HTN8232_	110V - Standard Charging Adapter (Wall)
HTN9002_	220V - Standard Euro Charging Adapter (Wall)
PMLN4097_	Alkaline Battery Case
PMNN4002_	Ni-Cd Rechargeable High Capacity Battery Pack
PMNN4003_	Ni-Cd Rechargeable Low Capacity Battery Pack
PMTN4020_	110V - Rapid Desktop Battery Charger / Insert
PMTN4021_	110V - Standard Desktop Battery Charger / Insert
PMTN4022_	220V - Rapid Desktop Battery Charger / Insert with Euro Plug
PMTN4023_	220V - Standard Desktop Battery Charger / Insert with Euro Plug

Antennas:

PMAD4012_	VHF 9cm Antenna, 136-155 MHz
PMAD4013_	VHF 9cm Antenna, 155-174 MHz
PMAD4014_	VHF 14cm Antenna, 136-155 MHz
PMAD4015_	VHF 14cm Antenna, 155-174 MHz
PMAE4003_	UHF 9cm Antenna, 430-470 MHz
HLN8262_	External Antenna Adapter (BNC)

Audio & Signalling Accessories for all models:

HMN9787_	Light Weight Headset with Swivel Boom Mic (w/out VOX)
BDN6647_	Medium Weight Headset with Swivel Boom Mic (w/out VOX)
BDN6706_	Ear Microphone with VOX interface (VOX included)
HMN9725_	Remote Speaker Microphone
HMN9036_	Earbud with Clip Microphone and PTT
HLN9132_	Earbud

Carrying Cases & Accessories:

PMLN4124_	Replacement Spring Action Belt Clip (Black)
HLN8255_	3" Spring Action Belt Clip (Black)
HLN8240_	2.5" Belt Clip (Black)
HLN9985_	Waterproof Bag

Radio to Radio Cloning Accessory:

PMLN4068_	Radio to Radio cloning cable
PMLN4074_	Programming cable

LIMITED WARRANTY
MOTOROLA RADIO PRODUCTS

This express limited warranty covers the Product manufactured by MOTOROLA Radio Products Group and applies to any warranty already mentioned. MOTOROLA assumes no obligations or liability for additions or modifications to this warranty unless specifically made in writing and signed by an authorised officer of MOTOROLA.

MOTOROLA cannot be responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system as a whole under this warranty.

This warranty sets forth the full extent of MOTOROLA'S responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at MOTOROLA'S option, is the sole and exclusive remedy of purchaser/user of the Product. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE **HEREBY EXCLUDED**. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS OR OTHER INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH PRODUCT, TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

Notwithstanding anything contained herein, MOTOROLA shall not be liable for any of the following situations:

A) Defects or damage resulting from use of the Product in other than its normal and customary manner.

B) Defects or damage from misuse, accident, water, liquid or neglect.

C) Defects or damage from improper or unauthorised testing, operation, main-tenance, service, repair, installation, alteration, modification, or adjustment.

D) Product which has had the serial number removed or made illegible.

E) A Product which, due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with Motorola's published specifications or the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from Motorola.

F) Scratches or other cosmetic damage to Product surfaces that does not af-fect the operation of the Product.

MOTOROLA shall have no liability whatsoever with respect to any claim of patent infringement which is based upon the combination of the Product or parts furnished hereunder with software, apparatus or devices not furnished by MOTOROLA, nor will MOTOROLA have any liability **whatsoever** for the use of ancillary equipment or software not furnished by MOTOROLA which is attached to or used in connection with the Product.

HOW TO GET WARRANTY SERVICE : Provide proof of purchase and deliver or send the Product item, transportation and insurance prepaid to an authorized warranty service location. Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you contact the company that sold you the Product, it can facilitate your obtaining warranty service. You can also call Motorola for assistance :
65-2812053 (Singapore) or 86-10-68438231 (Beijing).

Radio Specifications

General

	VHF	UHF
Frequency:	144 - 146 MHz	430 - 432 MHz
Channel Capacity:	20 Channels	
Power Supply:	7.5 Volt +/- 20%	
Dimensions • with Standard Capacity NiCd Battery: • with High Capacity NiCd Battery/Alkaline Batteries:	130mm x 57mm x 29.5mm 156mm x 57mm x 29.5mm	
Weight: • with Standard Capacity NiCd Battery: • with High Capacity NiCd Battery: • with the Alkaline Batteries:	404 g 454 g 429 g	

Average Battery Life @ (5-5-90 Duty Cycle) • Standard Capacity NiCd Battery: • High Capacity NiCd Battery: • Alkaline Batteries (with the Adaptive Power Control Technology™):	Low Power	High Power	Low Power	High Power
	6.5 Hrs.	4 Hrs.	6.5 Hrs.	4 Hrs.
	13Hrs.	8 Hrs.	13 Hrs.	8 Hrs.
	18 Hrs. (1W to 100mW)	16 Hrs. (5W to 100mW)	18 Hrs. (1W to 100mW)	16 Hrs. (4W to 100mW)

Sealing:	Passes rain testing per IP54
Shock & Vibration:	Impact resistance polycarbonate housing passes EIA RS-316B
Dust & Humidity:	Weather resistant housing passes EIA RS-316B

Receiver

	VHF	UHF
Channel Spacing:	25 kHz	
Frequency:	144-146 MHz	430 - 432 MHz
Sensitivity 12 dB EIA SINAD**:**	0.25 µV	

	VHF	UHF
Intermodulation EIA:	-65 dB	-60 dB
Freq. Stability (-30˚C to +60˚C):	0.0005%	
RF Image Rejection:	-65 dB	-60 dB
Audio Output @ <5% Distortion: (7.5V / room temperature)	500 mW	

Transmitter

	VHF		UHF	
RF Output Ni-Cad @ 7.5V:	Low 1W	High 5W	Low 1W	High 4W
Frequency:	144-146 MHz		430-432 MHz	
Channel spacing:	25 kHz			
Freq. Stability (-30˚C to +60˚):	0.0005%			
Spurs/Harmonics: Second Harmonic:	-60 dB -50 dB			
Audio Response: (from 6 dB/oct. Pre-Emphasis, 300 to 3000Hz:	+1, -3 dB			
Audio Distortion: @ 1000 Hz, 60% Rated Max. Dev.	<5%			
FCC Modulation:	FM Designator 16K0F3E, 16K0F2D, 16K0F1D			

NOTE

All specifications are subject to change without notice.

END OF DOCUMENT