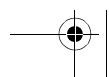
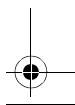
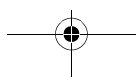
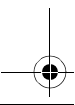
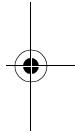
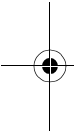


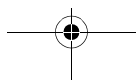
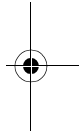
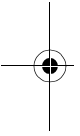
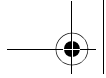
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Ray54 Marine VHF Radio

Owner's Handbook

Document number: 81231-1
Date: April2004





About this Handbook

Introduction

This handbook describes the Ray54 fixed VHF marine radio. The Ray54 provides two-way communications on all US, Canadian and International marine channels and seven weather channels.

Conventions Used

Throughout this handbook, the dedicated (labelled) keys are shown in bold capitals (for example: **SCAN/SAVE**). The LCD indicators and functions are shown in normal capitals (for example: TX).

- ▶ Operating procedures, which may consist of a single key-press or a sequence of numbered steps, are indicated by an arrow icon shown in the margin.

Technical Accuracy

To the best of our knowledge, the information in this handbook was correct as it went to press. However, our policy of continuous product improvement and updating may change specifications without prior notice. As a result, unavoidable differences between the product and handbook may occur from time to time. Raymarine cannot accept liability for any inaccuracies or omissions it may contain.

For the latest product information visit our website:

www.raymarine.com

Warranty

To register your new Raymarine product, please take a few minutes to fill out the warranty registration card found at the end of this handbook. It is very important that you complete the owner information and return the card to the factory in order to receive full warranty benefits.

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Important Information

Raymarine radios comply with the Federal Communications Commission (FCC) and Industry Canada requirements that regulate marine VHF radio usage for the US and Canada, respectively. Marine VHF radio users in the US must comply with all applicable FCC rules and regulations, some of which are described in this handbook.

This information was current at the time this handbook was printed. Up-to-date information, including licensing requirements, can be obtained on the FCC website at:

www.fcc.gov/wtb/marine

Official FCC forms can be obtained on the FCC website at:

www.fcc.gov/formpage.html

FCC Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved in writing by Raymarine, Incorporated could violate compliance with FCC rules and void the operator's authority to operate the equipment.

Station License

An FCC Ship Radio Station License and Call Sign are not required for most recreational vessels travelling in US waters. However, you must obtain a license if your vessel travels to foreign ports.

Ships that use MF/HF single side-band radio, satellite communications, or telegraphy must be licensed by the FCC. If necessary, you can obtain a Station License by filing FCC Form 605, which is available from the FCC website listed above.

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Operator License

An Operator License is not required to operate a VHF Marine Radio within US territorial waters. However, a license is required to operate the radio if you dock in a foreign port (including Canada and Mexico) or leave a foreign port to dock in a U.S. port. You can request a Restricted Radiotelephone Operator Permit from the FCC by filing Form 753.

INDUSTRY CANADA

You do not need a license to operate this radio within sovereign waters of Canada or the US. You will need a license to operate this radio outside of Canada or the US. To obtain Industry Canada licensing information, contact the nearest field or regional office, or write:

Industry Canada
Radio Regulatory Branch
Attention: DOSP
300 Slater Street
Ottawa, Ontario
Canada, KIA OC8

The following information about the radio is required to complete the license application:

Industry Canada Certification Number -----
FCC Type Number -----
FCC Type Accepted Parts 15 and 80-----
Output Power 1 watt (low) & 25 watts (high)-----
Modulation 16FE (FM)-----
Frequency Range 156.025-157.425-----

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Maritime Mobile Service Identity (MMSI)

The Ray54 includes equipment for Digital Selective Calling (DSC). A nine-digit Maritime Mobile Service Identity (MMSI) number is required to operate the DSC equipment. You can request an MMSI number from the FCC when you apply for a Station License. If your vessel does not require a license, you may obtain an MMSI by contacting either BoatUS (www.boatus.com) or MariTEL (www.maritelusa.com). Once obtained, you can program the MMSI number into your Ray54 as described in this handbook.



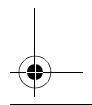
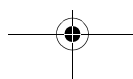
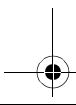
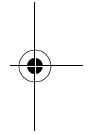
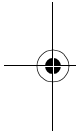
Group MMSI ID

A Group ID MMSI number can also be entered for vessels that are part of a group, such as a flotilla or racing fleet, enabling DSC communications within the group.

Remember:

- Maintain a radio watch on Channel 16. Channel 16 is used for distress and safety purposes only.
- VHF Channel 70 is used only for Digital Selective Calling (DSC). It can not be used for general-purpose calling.
- Your VHF transceiver has a high low power switch. Use low power whenever feasible. Unnecessary high-power operations can interfere with other important communications.
- Always use your radio call sign at the beginning and end of each transmission.
- Be sure only qualified persons operate your radio. You are responsible for control of your radio. Know the rules.
- Limit calls to other vessels to 30 seconds. If you receive no reply, wait 2 minutes; then try again. Keep communications brief and avoid chit-chat.
- Never transmit false distress messages, and never use profanity on the air.

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SAFETY NOTICE

Your Raymarine VHF radio generates and radiates radio frequency (RF) electromagnetic energy (EME). This equipment must be installed and operated in accordance with the instructions contained in this handbook. Failure to do so can result in personal injury and/or product malfunction.

EMC Conformance

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment. Their design and manufacture conform to the appropriate Electromagnetic Compatibility (EMC) standards but correct installation and use is required to ensure that performance is not compromised.

Antenna Mounting and EME Exposure

For optimal radio performance and minimal human exposure to radio frequency electromagnetic energy, make sure the antenna is:

- connected to the radio before transmitting
- properly mounted
- located where it will be away from people
- located at least three feet (1 meter) from the base station transceiver

CAUTION: Navigation Aid

Although we have designed this product to be accurate and reliable, many factors can affect its performance. Its performance can be affected by many factors including equipment failure or defects, environmental conditions, and improper handling or use. As a result, it should only be used as an aid to navigation and should never replace common sense and navigational judgement. Always maintain a permanent watch so you can respond to situations as they develop.

Safe Compass Distance

Safe Compass Distance is 1 meter for a common mechanical compass; other compass types may require greater distances. To be sure, you should locate the radio as far as possible from the compass. Test your compass to verify proper operation while the radio is also operating.

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Adjustments or Repair

Adjustments require specialized service procedures and tools only available to qualified service technicians – there are no user serviceable parts or adjustments.

The operator should never remove the cover or attempt to service the equipment.

Raymarine products are supported by a network of Authorized Service Representatives. Raymarine's Technical Services representatives or your local dealer will be available to answer any questions you may have. For information on Raymarine products and services, contact either of the following:

United States

Raymarine, Inc.
22 Cotton Road, Unit D
Nashua, NH 03063-4219
USA
Telephone: 1-603-881-5200
1-800-539-5539
Fax: 1-603-864-4756

Europe

Raymarine Ltd
Anchorage Park
Portsmouth, Hampshire
England PO3 5TD
Telephone: +44 (0) 23 9269 3611
Fax: +44 (0) 23 9269 4642

Or, you may contact us on the World Wide Web at:

www.raymarine.com

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Chapter 1: Introduction

1.1 Ray54 Fixed Station VHF Radio

The Ray54 marine VHF radiotelephone is a microprocessor-controlled transceiver that provides reliable simplex (single frequency) and semi-duplex (two frequency) communications. This handbook describes the physical and functional characteristics of the radio.

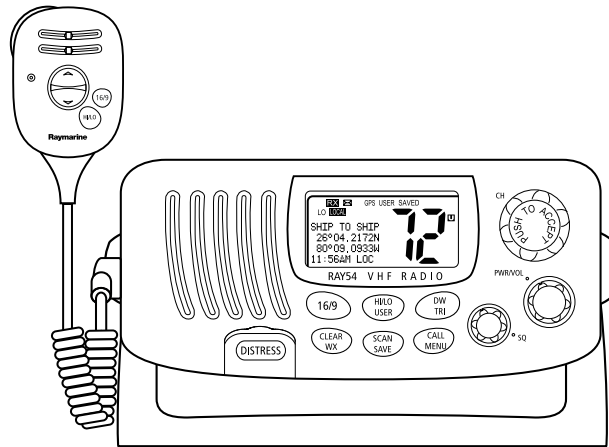


Figure 1-1: Ray54VHF Radio

The Ray54 provides two-way communications on all US, Canadian and International marine channels and ten weather channels. Refer to the Frequency Tables in Appendix B, which list all marine VHF channels available in your radio. You should familiarize yourself with these tables to ensure proper channel usage.

1.2 Features

The Ray54 is designed and manufactured to provide ease of operation with excellent reliability. The Ray54 features:

- All Scan, Saved-channels Scan, and Priority Scan features
- Dual/Tri Watch Monitor modes
- 10 Weather Channels
- Dedicated key for switching to Priority Channel 16

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- Programmable Secondary Priority Channel key
- Waterproof to IPX-7 standard
- Large 2" x 1.5" LCD with 4 x 12 Dot Matrix Display
- Adjustable Backlight Control
- All USA, Canada and International Channels
- 10 Weather Channels with 1050Hz Alert Tone Detect
- GPS Input for Automatic Time and Position Update
- Channel Naming with Phonebook

Digital Selective Calling (DSC)

The Digital Selective Calling (DSC) protocol is a globally applied system used to send and receive digital calls. DSC uses a unique Maritime Mobile Service Identity (MMSI) number to direct DSC calls directly to your radio, much like a telephone number. When the DSC signal is received, the radio quickly switches over to Channel 70 and performs the corresponding operation.

Note: An MMSI number is required to operate the DSC equipment in this radio. You can program the MMSI number yourself one time only using the Menu Operation described in this handbook. Otherwise, your Raymarine dealer can program or change the number for you.

When a DSC call is received, the Ray54 Base Station automatically responds based on the type of call. When receiving a DSC call from another vessel or a coast station, an alert sounds and DSC data appears in the LCD – such as time of a call, the caller and the type and priority of a call.

DSC functions are described in *Chapter 5*:

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Chapter 2: Installation

2.1 Unpacking and Inspection

Use care when unpacking the unit from the shipping carton to prevent damage to the contents. It is also good practice to save the carton and the interior packing material in the event you must return the unit to the factory.

Equipment Supplied

The following is a list of materials supplied with the Ray54:

Table 2-1: Supplied Components

Part Number	Description
E43022	Ray54, White
E43023	Ray54, Charcoal Gray
81231	Handbook, Ray54
R49108	Power Cord, Ray54
R49128	NMEA Cable, Ray54
R49133	Speaker Cord, Ray54
R49093	Mounting Yoke for White Ray54
R49095	Mounting Yoke for Charcoal Ray54
R49094	Yoke Knob and Spacer for White Ray54
R49096	Yoke Knob and Spacer for Charcoal Ray54
R49104	Microphone Bracket for White Ray54
R49105	Microphone Bracket for Charcoal Ray54
R49109	Sun Cover, White
R49110	Sun Cover, Charcoal Gray

The following is a list of optional equipment for the Ray54:

Table 2-2: Optional Equipment

Part Number	Description
E46034	Flush Mount Kit, A Series VHF Radios

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2.2 Planning the Installation

When planning the installation of your Ray54, consider the following conditions to ensure dependable and trouble-free operation.

The Base Station Transceiver should be located in the room from which the ship is normally navigated.

The Base Station Transceiver is designed to be mounted horizontally or vertically on a flat bulkhead. Select a location that is non-metallic, dry, protected, well-ventilated, and free from high operating temperatures and excessive vibration. Provide sufficient space behind the transceiver to allow for proper cable connections to the rear panel connectors. Locate the transceiver as near as possible to the power source yet as far apart as possible from any devices that may cause interference such as motors, generators, and other on board electronics. The transceiver should be protected from prolonged direct exposure to rain and salt spray.

The transceiver is NOT designed to be mounted in engine compartments. Do NOT install the transceiver in a location where there may be flammable vapors (such as in an engine room or compartment, or in a fuel tank bay), water splash or spray from bilges or hatches, where it is at risk from physical damage from heavy items (such as hatch covers, tool boxes, etc.), or where it might be covered by other equipment. Locate the Base Station Transceiver and Handset at least 1 meter from the antenna.

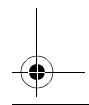
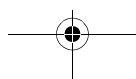
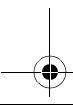
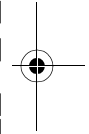
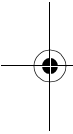
Safe Compass Distance is 1 meter for a common mechanical compass; other compass types may require greater distances. To be sure, you should locate the radio as far as possible from the compass. Test your compass to verify proper operation while the radio is also operating.

Mount the base station transceiver to allow easy access from the location where the ship is normally navigated.

Typical Mounting Methods

The Ray54 can be conveniently mounted on a chart table, bulkhead, overhead, or any other desired location. Refer to the following figure for typical mounting methods.

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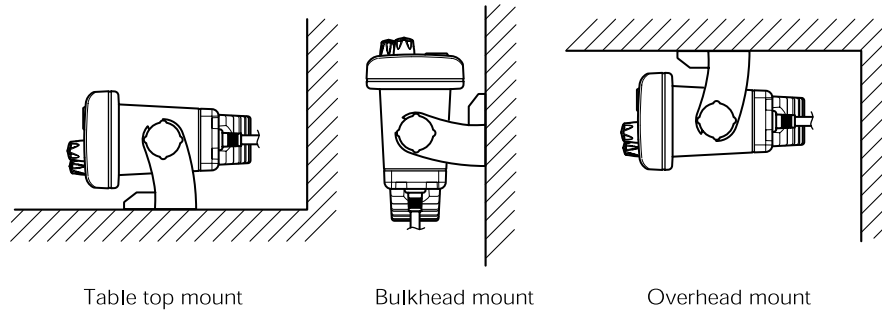


Figure 2-1: Typical Mounting Methods

CAUTION: Make sure there are no hidden electrical wires or other items behind the desired location before proceeding. Check that free access for mounting and cabling is available.

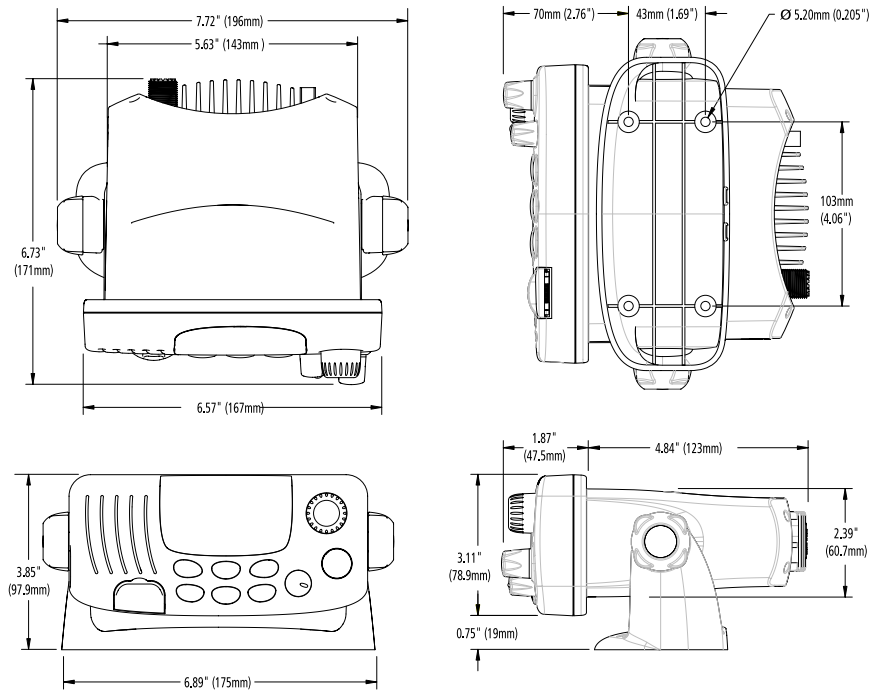


Figure 2-2: Mounting Dimensions

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Flush Mounting

In addition to the typical Mounting Methods, the Ray54 may also be flush mounted using the optional E46034 Flush Mount Kit. Instructions for installing the radio using the Flush Mount Kit are included with the kit. These kits are available from your Raymarine dealer.

2.3 Power Connections

The red and black power cord provides connections to DC power. The red (+) wire is connected to the positive terminal of the power source and contains a 7 amp in-line fuse. The black (-) wire is connected to the negative (ground) of the power source. Should the power connections be inadvertently reversed, the unit will not power up but no damage will occur. Check the polarity with a VOM (Voltage/Ohm Meter) and reconnect observing correct polarity. If the fuse ever needs replacement, be sure to use the same type and rating.

In most cases the length of the power cord should be adequate enough to reach the DC power source. If additional wire length is required, the cable can be extended by adding more cable as necessary. However, for power cable runs longer than 15 feet, larger wire diameter size should be used to prevent voltage line loss.

Your Ray54 should be connected to the nearest primary source of ship's DC power. A typical source may be a circuit breaker on the power panel or a fuse block near the unit. When connecting to either of these sources, the circuit breaker or other in-line fuse should be rated at 10 amps.

It is recommended that lugs be used to connect the power cable to the DC supply and the lug connections should be both crimped and soldered. This is very important in order to ensure adequate current draw to the equipment. Intermittent operation may result if an insufficient connection is made to the power source. The connection terminal should be clean, with no sign of corrosion.

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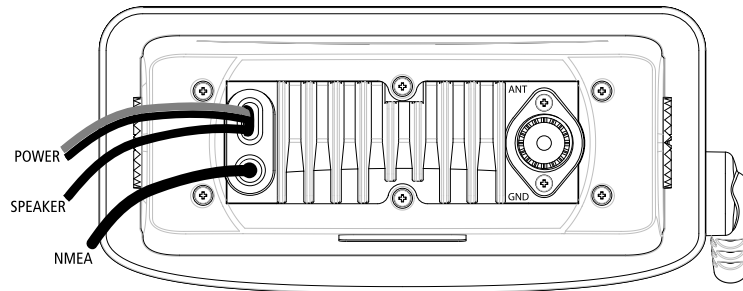


Figure 2-3: Wiring Connections

2.4 External Speaker Connections

Located just below the power cord is a cable for connection to an optional external speaker.

Connect the white(+) wire and black (-) wire to the speaker observing polarity as it is marked on the speaker. When connected, the external speaker will function simultaneously with the internal speaker.

CAUTION:

DO NOT short the white (+) wire to the black (-) wire. DO NOT short the black (-) Speaker wire to the black Power (-) wire.

2.5 NMEA Data

Inputting NMEA data will provide position information to the radio. The Ray54 accepts NMEA 0183 data from a position determining device (GPS, etc.) to provide the Latitude and Longitude position information that is transmitted during a DSC Distress Call.

When valid NMEA signal is detected, the GPS indicator appears on the LCD. When no valid NMEA signal is detected, the NO GPS indicator appears.

Connect the input(s) of the positioning device to the Yellow (NMEA+) and Green (NMEA-) wires in the NMEA cable.

An example of how to connect the NMEA cables and power supply using a suitable connector block is shown in the diagram below. For specific instructions how to connect your particular GPS, please refer to the handbook that came with that device.

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Note: For non-differential GPS, all return connections (-) must be tied to a common ground reference.

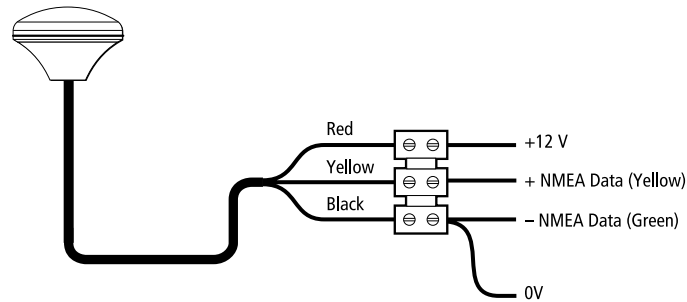


Figure 2-4: GPS Wiring

2.6 Antenna Connections

The coaxial VHF antenna cable connects to the Ray54 antenna cable on the rear panel using a PL259 VHF type connector. The antenna cable length can be critical to performance. If you are uncertain, contact a professional installer or call Raymarine Product Support. If a longer cable length is required, RG-58 (50 ohm) coaxial cable or equivalent cable can be used for runs up to a maximum of 50 feet. If the distance required is even greater, Raymarine recommends using low loss RG-213 or equivalent cable for the entire run to avoid excessive losses in power output.

If the antenna RF connector is likely to be exposed to the marine environment, a protective coating of grease (Dow Corning DC-4 or similar) can be applied to the connector before connecting it to the radio. Any other extensions or adapters in the cable run should also be protected by silicon grease and then wrapped with a waterproofing tape.

Antenna Mounting Suggestions

The best radio in the world is useless without a quality antenna and good location. Mounting the VHF antenna properly is very important because it will directly affect the performance of your VHF radio. A VHF antenna designed for marine vessels should be used.

- Since VHF transmission is essentially line-of-sight, mount the antenna at a location on the vessel that is free of obstruction to obtain maximum range.

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- If you must extend the length of the coaxial cable between the antenna and the radio, use a coaxial cable designed for the least amount of power loss over the entire cable length.

Antenna Mounting and EME Exposure

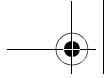
For optimal radio performance and minimal human exposure to radio frequency electromagnetic energy, make sure the antenna is:

- connected to the radio before transmitting
- properly mounted
- located where it will be away from people
- located at least three feet (91 cm) from the base station transceiver

2.7 Grounding

While special grounding is not generally required for VHF radiotelephone installations, it is good marine practice to properly ground all electronic equipment to the ship's earth ground system. The Ray54 can be connected to ground by attaching a wire to the screw labelled GND on the unit's rear panel just below the antenna connection. Then attach the other end of the wire to the nearest ship's earth ground connection point. The recommended wire to be used for such grounding is #10 AWG.

DRAFT



DRAFT

Chapter 3: Getting Started

3.1 Keypad and Rotary Knobs

Several of the keys on the front panel of the base station serve multiple purposes. For the most part, the function indicated on the first line of the key is accessed by pressing and releasing that key. The function indicated on the second line of the key is accessed by pressing and holding the key for three seconds.

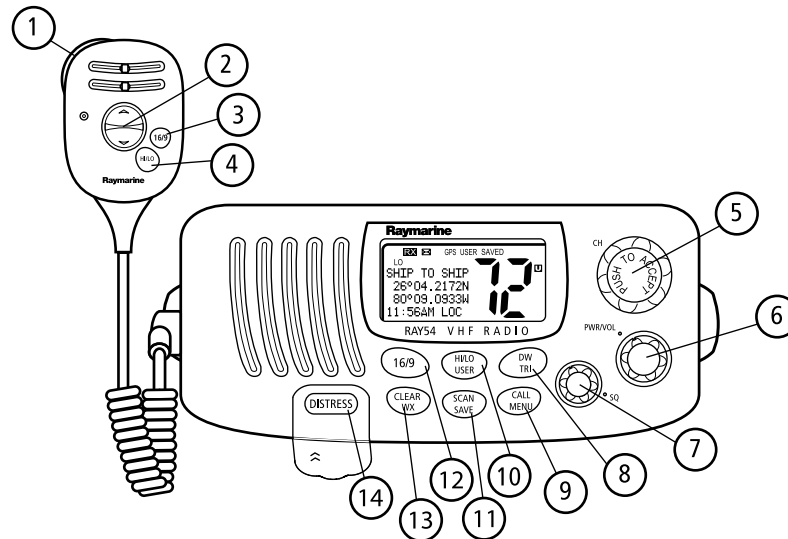


Figure 3-1: Ray54 Keys Layout

Handset Keys

Key Name	Press & Release (<3 sec.)	Press & Hold (>3 sec.)
1. PTT	Push-to-Talk	Push-to-Talk
2. UP/DOWN	Channel increment/decrement	Rapid channel change
3. 16/9	Switches between the Priority and Working Channels	Switches to Secondary Priority CH (9); If already tuned to secondary channel, programs a new secondary Priority Channel.
4. HI/LO	TX Power High/Low	TX Power High/Low

Base Station Rotary Keys

Key Name	Function
5. CH/PUSH	Channel increment/decrement and programming ENTER key
6. PWR/VOL	Power radio ON / OFF and adjust volume level
7. SQ	Adjust squelch threshold level

Base Station Push Keys

Key Name	Press & Release (<3 sec.)	Press & Hold (>3 sec.)
8. DW/TRI	Dual Watch Mode	Tri Watch Mode
9. CALL/MENU	Activate DSC functions	Activate Menu functions
10. HL/USER	TX Power High/Low	USER (Saved Memory Channel) Mode
11. SCAN/SAVE	Scan ON/OFF	SAVE/DELETE channel to/from memory
12. 16/9	Switches between the Priority and Working Channels	Switches to secondary Priority CH (9); If already tuned to secondary channel, programs a new secondary Priority Channel.
13. CLEAR/WX	Cancel function	Weather Channel Mode
14. DISTRESS	(under door) Activate Distress	Make Distress Call

Handset



1. PTT

Press this Push-to-Talk key to transmit.



2. UP/DOWN

Use the arrow keys to change the active channel number. Press and hold for rapid channel changing.



3. 16/9

Use this key to switch to the priority channel or to change the value of the Secondary Priority Channel.



4. HI/LO

Use this key to toggle the transmit power from HIGH to LOW.

Base Station



5. CH

Rotate this knob to change the current channel number and to change values in Menu mode or during programming. Press the knob to enter values selected in Menu mode or during programming.

PWR/VOL



6. PWR/VOL

Use this knob to turn the radio ON and OFF and to set the volume.



7. SQ

Use this knob to set the squelch threshold, which cuts off the receiver when the signal is too weak for reception of anything but noise.



8. DW/TRI

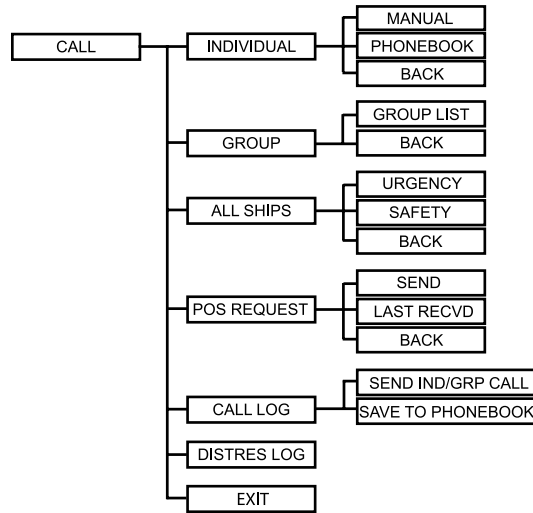
Press and release this key to select Dual Watch mode, which monitors the current working channel and CH 16 in cycle. Press and hold to select Tri Watch, which monitors CH 16, the current working channel and the channel you have set as the Secondary Priority Channel in cycle. See *Section 4.12*.

CALL MENU

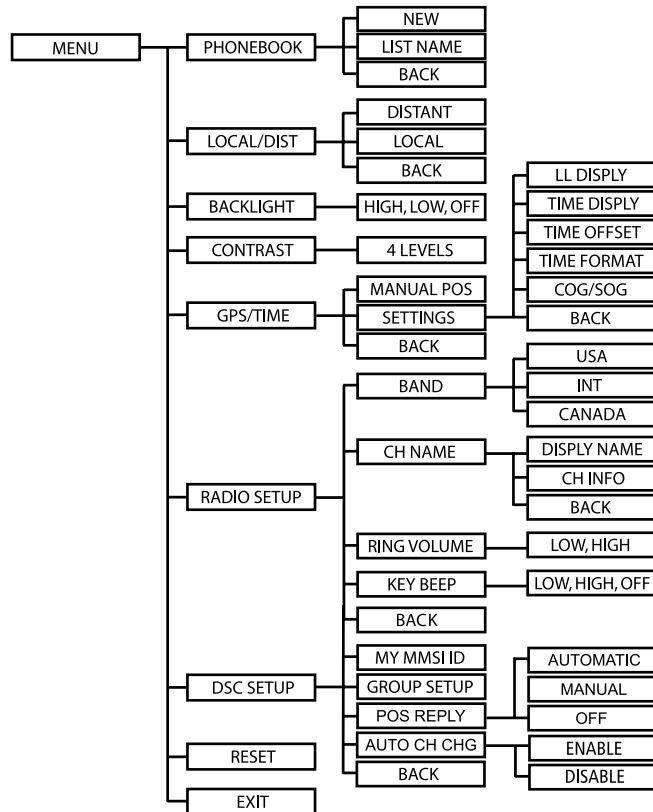
9. CALL/MENU

Press and release this key to select to enter DSC Call Mode, which is used for making DSC Calls and viewing the Call Logs and the calling Phonebook.

DSC Call menu structure is outlined here. It is detailed in *Chapter 5*:



Press and hold this key to select Menu Mode, which is used to setup the radio. The menu structure is outlined here. It is fully described in *Chapter 6*:



HI/LO
USER

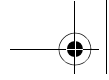
10. HI/LO/USER

Press and release this key to toggle the transmit power from HIGH to LOW. Press and hold to select User Channel Mode, which displays only the channels that you have saved to memory. User Mode is described in *Section 4.13*.

SCAN
SAVE

11. SCAN / SAVE

Press and release this key to enter one of the Scan Modes, which are described in *Section 4.10*. Press and hold to enter a channel into the radio's memory. This function is described in *Section 4.11*.



16/9

12. 16/9

Use this key to switch to the priority channel or to change the value of the Secondary Priority Channel.

CLEAR
WX

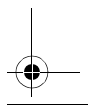
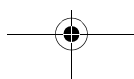
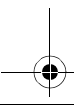
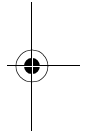
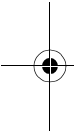
13. CLEAR/WX

Press and release to terminate a function and return to the last-used channel. Press and hold to select the Weather mode.

DISTRESS

14. DISTRESS

Push down the spring-loaded cover and press this key to make a DSC Distress Call. Instructions for making a Distress Call are described in *Section 5.5*.



3.2 LCD Display

The following describes the functional characters on the Ray54's LCD.

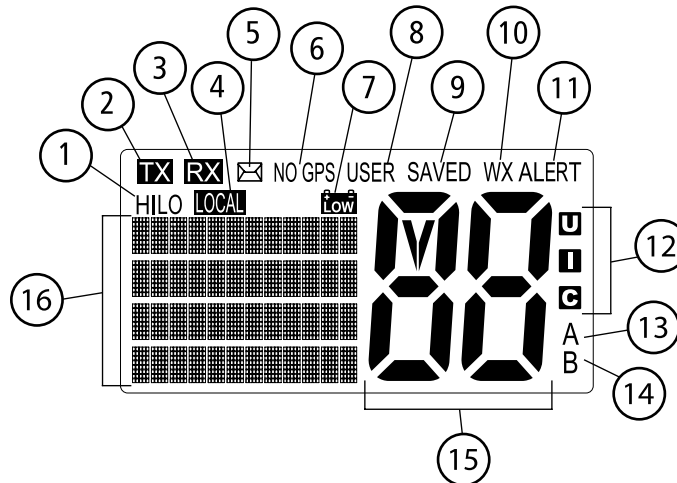


Figure 3-2: Ray54 LCD Layout

1. (HI/LO) TX Power

Indicates whether transmit power is set for 25 watts (HI) or 1 watt (LO).

2. (TX) Transmitting

Indicates the PTT is being pressed and the radio is transmitting.

3. (RX) Receiving

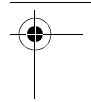
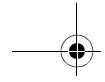
Indicates that the radio is receiving a radio signal.

4. (LOCAL) Local/Distant Mode

Indicates the radio is in Local Reception mode, which decreases receiver sensitivity in high traffic areas to decrease unwanted reception.

5. DSC Message

Indicates the radio has received a DSC call. Details of the call can be viewed in the DSC log. See *Section 5.8*.



6. NO GPS

When GPS appears, positional data is available. When NO GPS appears, the radio is not receiving positional data.

7. Battery Low

Indicates vessel battery voltage is low.

8 (USER) Favorite Channel Mode

Indicates the radio is in USER Mode. USER Mode displays only the channels that you have saved to memory, enabling you to easily scan your favorite channels while bypassing unwanted or seldom-used channels.

9. (SAVED) Memory Mode

Indicates the current channel has been saved in memory. Appears during Saved Scan mode. Only saved channels are scanned during USER mode.

10. (WX) Weather Channel

Weather channel mode is active. US and Canada only.

11. (ALERT) Weather Alert

A weather alert is being received. US and Canada only.

12. (U I C) Channel Set

Indicates which channel set is selected: US, International or Canadian.

13. (A) Simplex Channel

Indicates that the currently-selected channel is simplex; you transmit and receive on the same frequency.

14. (B) Receive-only Channel

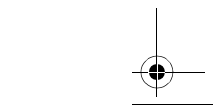
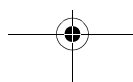
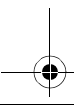
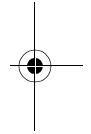
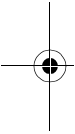
Indicates that you cannot transmit on the currently-selected channel; it is receive-only. Used with Canadian channels only.

15. Channel Number

Displays the current channel number.

16. Dot Matrix Display

Indicates special conditions or radio functions.



Chapter 4: General Operations

4.1 Turning the Power ON and OFF

Turn the **PWR/VOL** knob clockwise until it clicks.

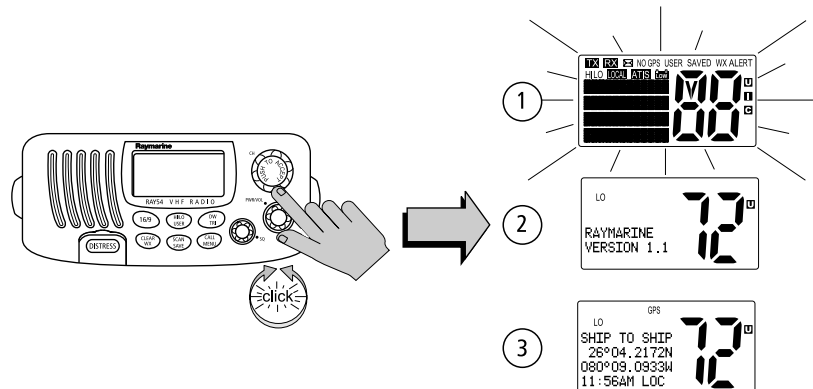
When the unit powers up in Normal mode it:

1. Beeps, illuminates the backlight at full brightness, and displays all segments and indicators for 2 seconds.
2. Displays RAYMARINE and the software version number on the dot matrix display.
3. Recalls the last CH number, TX power settings and operation mode.
If no last-used setting data exists, goes to CH 16 and high TX Power.

When GPS Data is available, extended position data is also displayed with the offset time on the dot matrix display. This information will be displayed when display option for the position and time is enabled on the Menu. See *Section 6.6*.

► To turn the unit OFF:

Rotate the Volume knob completely counterclockwise until it clicks.



4.2 Setting the Volume

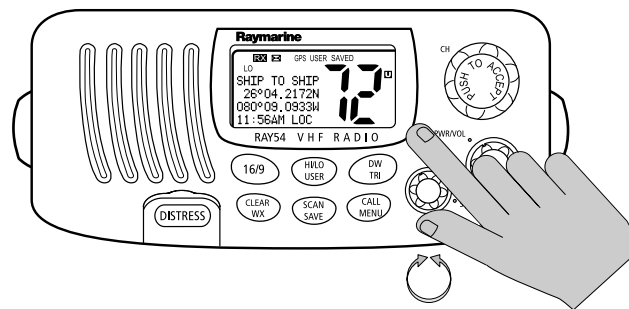
Adjust the **PWR/VOL** knob to control the loudspeaker volume level. Turn clockwise to increase the volume; counterclockwise to decrease the volume.

Note: Key press beep volume is also controlled by the VOL level.

4.3 Setting the Squelch

The Squelch circuit sets the threshold for cutting off the receiver when the signal is too weak for reception of anything but noise.

To properly set the squelch, rotate the **SQ** knob counterclockwise until audio is heard. Then rotate clockwise until background noise disappears.



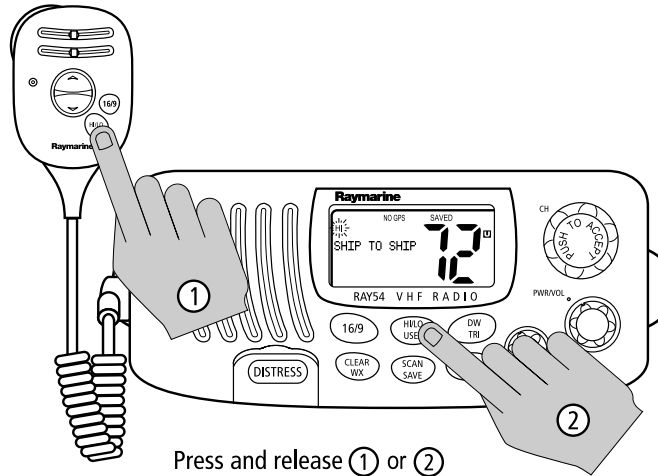
4.4 Setting the Power Output

H/LO
USER

The choice of power output is dependent upon the distance of transmission and transmitting conditions.

Press and release the HL/USER key on the base station or handset to toggle the TX power from LOW (1 watt) to HIGH (25 watts). The corresponding LO or HI indicator appears on the LCD.

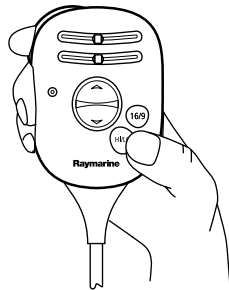
Initial contact should always be attempted using low power. You should switch to high power only when contact can not be made on low power in emergency situations. This procedure is specified by the FCC but is also part of marine communications courtesy.



Press and release ① or ②

Note: Some channels are limited by regulation to be low power only. If the HI/LO operation request is denied, an error tone beeps.

Overriding the Low Output Power Restriction



In the US, channels 13 and 67 can temporarily override the low power restriction.

- To override the LO power restriction on channels 13 or 67 and transmit at high power:

Press and hold the **PTT** key on the handset as you press and hold the **HI/LO** key. The TX power is set to HI power for as long as you hold down the **HI/LO** key.

4.5 Setting the Channel

On the handset...

Press and release the UP arrow to increment the channel number.

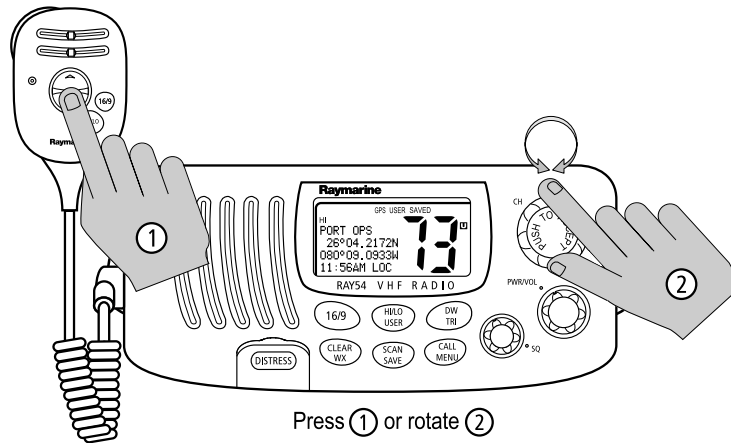
Press and release the DOWN arrow to decrement the channel.

Press and hold either key for rapid channel scrolling.

On the base station...

Rotate the **CH** knob clockwise to increment the channel number.

Rotate the **CH** knob counterclockwise to decrement the channel number.



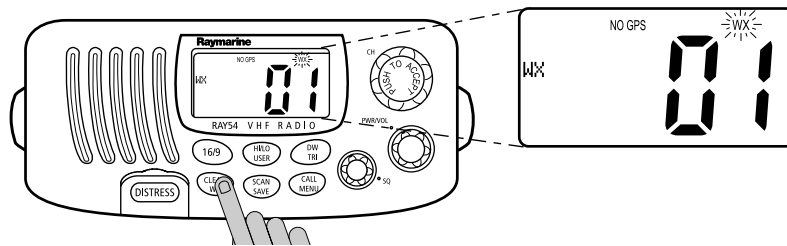
4.6 Selecting a Weather Channel

CLEAR
WX

The US National Oceanic and Atmospheric Administration (NOAA) broadcasts continuous weather reports and severe weather alerts, as needed. The Ray54 is programmed to receive 10 NOAA weather channels and sound an alarm if a weather alert is received.

Press and hold the **CLEAR/WX** key to enter Weather mode. The **WX** indicator appears on the LCD.

Rotate the **CH** knob to change the WX channels 1 through Channel 10.



Press and hold the **CLEAR/WX** key again to return to normal operation.

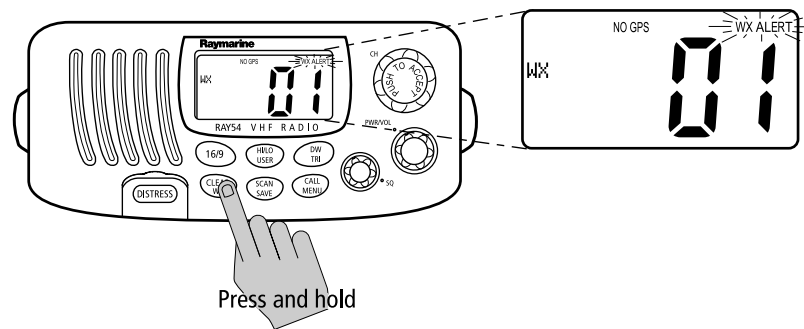
Note:

1. *WX broadcasts can only be heard in the US and Canada.*
2. *When Dual or Tri Watch is activate in the WX mode, the watch monitors the current WX channel and Priority channel(s).*

3. During Weather mode, the PTT, SCAN/SAVE, and HILO/USER keys are disabled and an error beep sounds if pressed.

Weather Alert Operation

Weather Alert is toggled ON and OFF by pressing and holding **CLEAR/WX** key in the weather mode. The ALERT indicator illuminates.



When Weather Alert function is enabled and the radio is tuned to the normal working channel, the last-used weather channel is checked every four minutes for weather alert tone. If the alert tone is detected, the WX and ALERT indicators flash and a short alarm tone sounds.

The radio automatically turns to the currently-monitored WX channel where the weather alert has been detected. The alert is detected in all modes of operation (Standby, Dual and Tri Watch, Scan, etc.)

4.7 Selecting the Priority Channel

16/9

The Ray54E provides you with a dedicated key for switching to the Priority Channel 16.

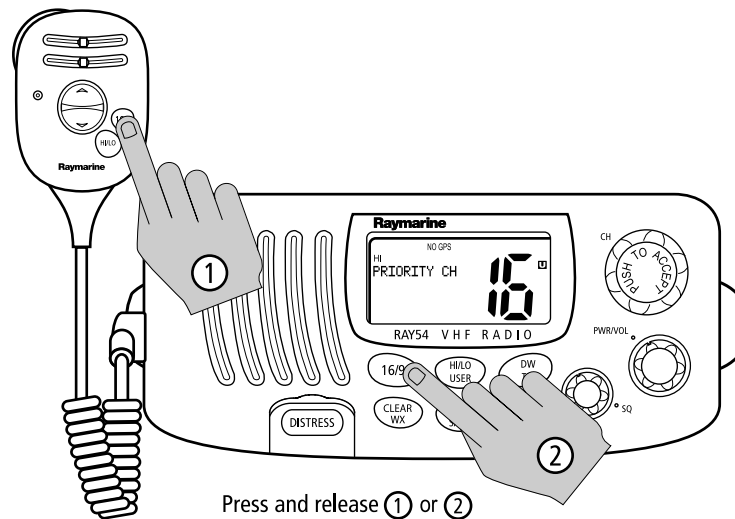
If not already tuned to the Priority Channel 16, **press and release the 16/9** key to switch to CH16 at high power.

PRIORITY CH appears in the dot matrix display.

If already on CH 16, **press and release the 16/9** to return to the last-used working channel.

Note: When the priority channel is selected, it is always set to **HIGH** transmit power. You may reduce power if desired by pressing the **HI/LO** key.

The **16/9** key also can be used to cancel all modes and switch to CH 16.



Note: When you press the 16/9 key, the radio always switches to **HIGH** power. You can use the **HL/USER** key to change to **LOW** power.

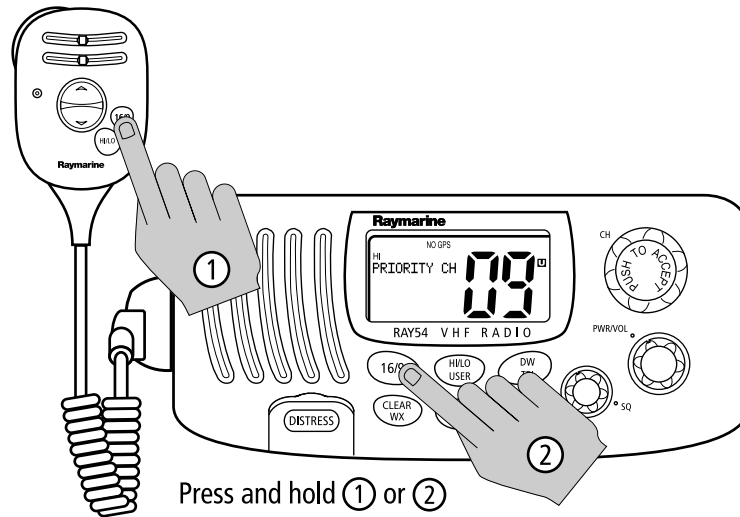
4.8 Selecting the Secondary Priority Channel

16/9

The Ray54E enables you to program the **16/9** key to store a Secondary Priority Channel. The default is CH 9.

If on a working channel, **press and hold** the **16/9** for greater than 3 seconds to switch to the Secondary Priority Channel at high power. The default is CH 9.

PRIORITY CH appears in the dot matrix display.



Press and hold ① or ②

If on primary Priority CH16, **press and hold** the **16/9** for greater 3 seconds to switch to the Secondary Priority Channel at HI power. The default is CH 9. If already on the Secondary Priority Channel, **press and release** the **16/9** key to switch to Priority Channel 16 at high power.

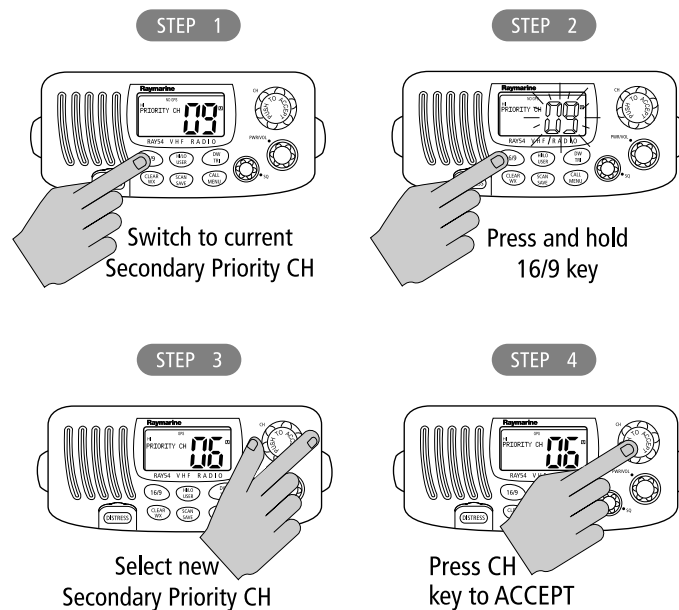
Reprogramming the Secondary Priority Channel

1. Switch to the Secondary Priority Channel.
2. **Press and hold** the **16/9** key for greater 3 seconds to switch to Reprogram mode. An alert tone sounds and the current Secondary Priority Channel flashes.
3. Change the channel number with the **CH** key.

4. **Push** the **CH** key to **ACCEPT** the new Secondary Priority selection. An alert tone sounds to indicate that the Secondary Priority Channel has been changed.

Press and release the **CLEAR/WX** key to terminate the programming and return to the last-used channel.

Note: *During the reprogramming of the Secondary Priority Channel, the PTT, WX and DW/TRI keys are disabled and sound error beep if pressed.*



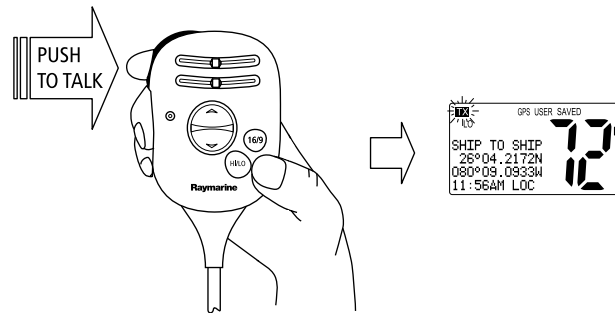
4.9 Transmitting



Press and hold the Push-to-Talk (**PTT**) key on the handset to transmit on the selected channel, then release to receive. The TX indicator appears during transmission.

Note: *International regulations and good communications practice dictate that you should not interfere with other communications. Before transmitting, listen to make sure the channel is clear.*

The radio is equipped with a timeout timer in the event of a stuck key. After **PTT** has been held continuously for 5 minutes, transmission is discontinued and the radio automatically returns to receive mode. An Error beep is emitted 10 seconds before the time out is triggered and TX flashes on the display until **PTT** is released.



The TX time out timer is reset once the **PTT** key is released.

Note: *If the current channel is receive-only, an alarm sounds when PTT is pressed, indicating such a transmission is not permitted.*

4.10 Using the Scan Modes

SCAN
SAVE

The Ray54 is equipped with three types of scan options: All Scan, Saved (Memory) Scan and Priority Scan. If there are no channels in memory, the default is All Scan.

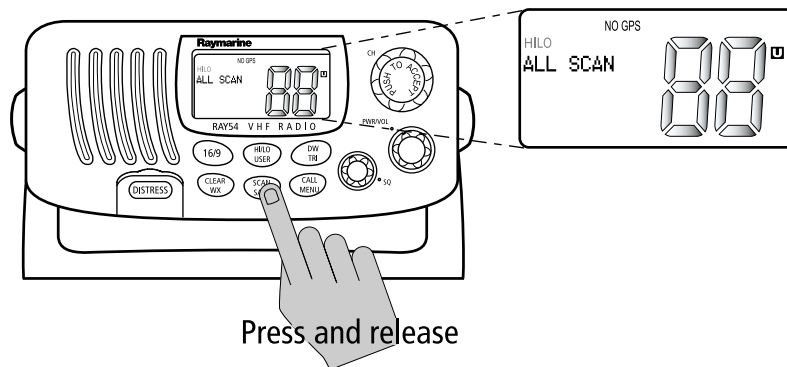
This function automatically searches for broadcasting channels. If a TX signal is received, the scan stops on the receiving channel as long as it is present. If the signal is lost for five seconds, the radio resumes scanning.

During the Scan Modes:

- Press the Channel UP/DOWN key or rotate the CH knob to change the scan direction. UP(CH key)/clockwise (CH knob) increments the channel while DOWN (CH key) /counterclockwise (CH knob) decrements it.
- Press **PTT** to halt the scan and transmit at the displayed channel.
- Press and release **SCAN/SAVE** to terminate the SCAN mode and return to the last-used channel.
- Press and release **CLEAR/WX** to terminate the SCAN mode and return to the last-used channel.
- **DW/TRI** and **HILO/USER** keys will not function and sounds an error beep if pressed.

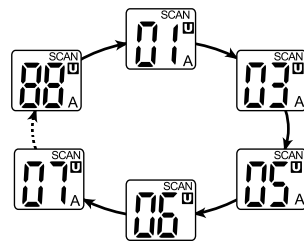
All Scan

Press and release the **SCAN/SAVE** key when no channels are stored in memory to activate the All Scan function.



Press and release

ALL SCAN appears on the dot matrix display.



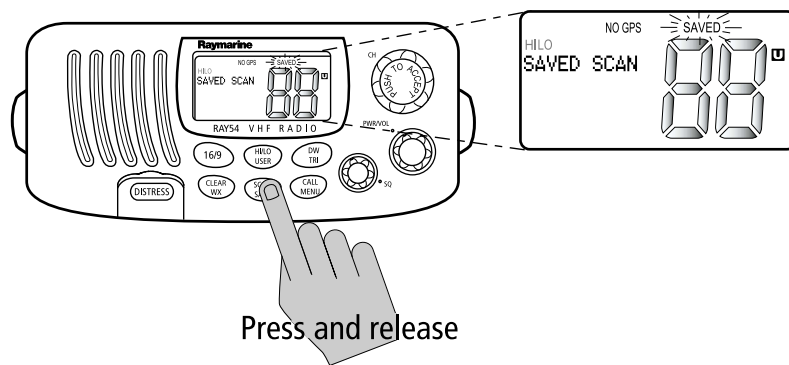
In All Scan mode, all channels in the channel set are scanned in sequence, assuming no channels have been stored in memory. After the last channel number has been scanned, the cycle repeats.

All Scan is demonstrated in the figure to the left.

Note: Whenever Weather Alert is activated, the WX Alert channel is also monitored during All Scan. If the WX Alert tone is detected, the scan is halted to broadcast the Weather Alert message.

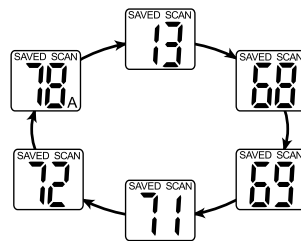
Saved (Memory) Scan

Press and release the **SCAN/SAVE** key when there is at least one channel in memory to activate the Saved Scan function.



Press and release

SAVED SCAN appears on the dot matrix display.



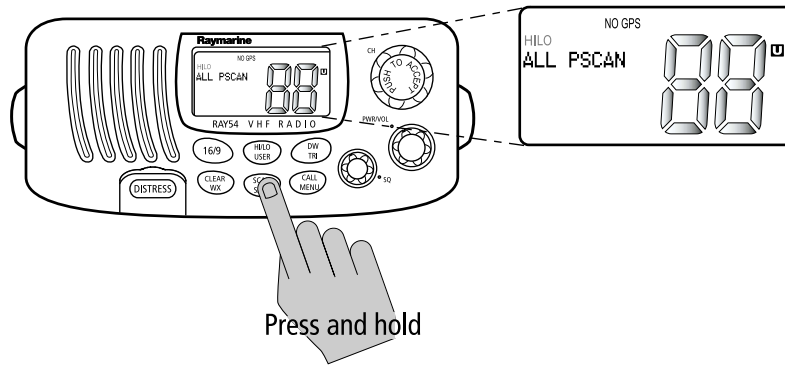
In Saved Scan mode, only the channels that have been saved in memory are scanned in sequence. After the last saved channel number has been scanned, the cycle repeats.

Saved Scan is demonstrated in the figure to the left.

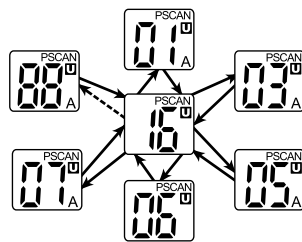
Note: Whenever Weather Alert is activated, the WX Alert channel is also monitored during Saved Scan. If the WX Alert tone is detected, the scan is halted to broadcast the Weather Alert message.

Priority All Scan

SCAN SAVE Press and hold the **SCAN/SAVE** key while All Scan is active to initiate Priority Scan.



ALL PSCAN appears on the dot matrix display.



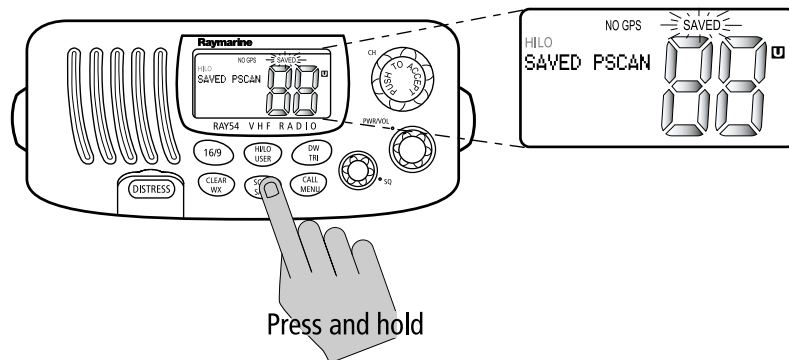
Priority Scan searches for activity on all channels but alternates scanning the Priority Channel 16 after each channel.

Priority Scan is demonstrated in the figure to the left.

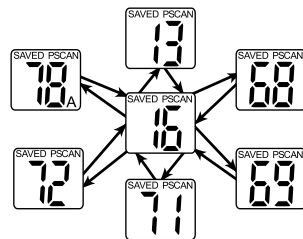
Note: Whenever Weather Alert is activated, the WX Alert channel is also monitored during Priority All Scan. If the WX Alert tone is detected, the scan is halted to broadcast the Weather Alert message.

Priority Saved Scan

Press and hold the **SCAN/SAVE key while Saved Scan is active to initiate Priority Saved Scan.**



SAVED PSCAN appears on the dot matrix display.



Priority Saved Scan is much like Priority Scan except that the radio alternates searching for activity on the Priority Channel 16 and the channels stored in memory.

Priority Saved Scan is demonstrated in the figure to the left.

Note: Whenever Weather Alert is activated, the WX Alert channel is also monitored during Priority Saved Scan. If the WX Alert tone is detected, the scan is halted to broadcast the Weather Alert message.

Press and hold **SCAN/SAVE for 3 seconds to exit Priority/Priority Saved Scan and return to All/Memory Scan.**

Press and release the **CLEAR/WX key to exit Priority/Priority Saved Scan and return to the last-used channel.**

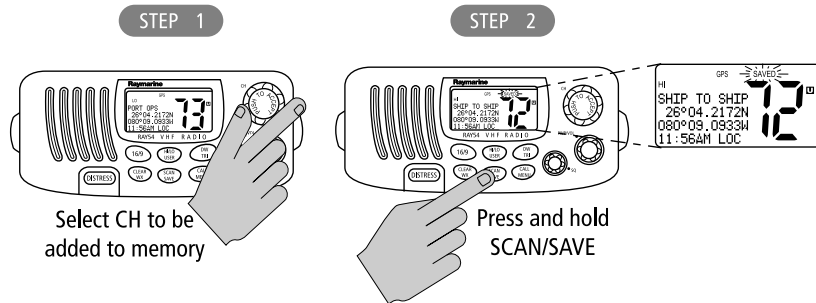
4.11 Adding Channels to Memory

SCAN
SAVE

The Ray54 can store any channel. The stored channels are the ones scanned in the Saved (Memory) Scan mode.

► To Add Channels to Memory

1. During normal operation mode, use the **CH** knob to select the desired channel for programming.
2. **Press and hold** the **SCAN/SAVE** key for 3 seconds.



The **SAVED** icon appears to indicate the current channel has been saved in memory. Any number of channels can be saved as memory channels. Separate memory channel groups exist for USA, International, and Canadian frequency sets.

► To Delete Channels from Memory

1. During the normal mode, use the **CH** knob to select the channel to be deleted.
2. **Press and hold** the **SCAN/SAVE** key for 3 seconds.

The selected channel is deleted from memory.

To view the channels set in memory, switch to **USER** mode, as described in *Section 4.13, USER Channel Mode*.

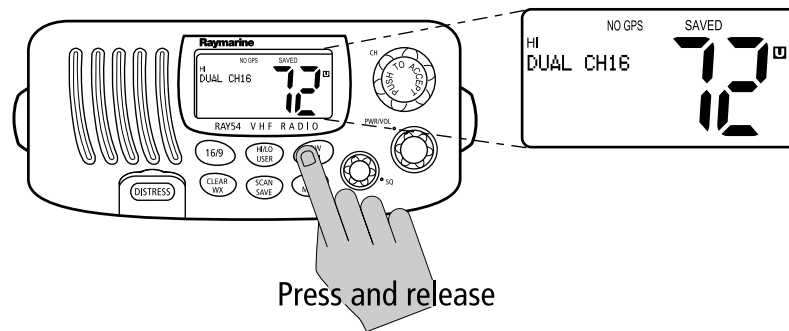
4.12 Using the Monitor Modes

DW
TRI

The Watch Modes monitor the programmed Priority Channel and other user-selected channel(s). The watch is halted when activity is detected on a monitored channel. The Ray54 is equipped with 2 types of monitor operations: Dual Watch and Tri Watch.

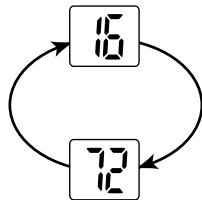
Dual Watch

Press and release the **DW/TRI** key to activate the Dual Watch mode.



Press and release

DUAL CH16 appears in the dot matrix display.



Dual Watch monitors the current working channel and Channel 16 in cycle.

Dual Watch is demonstrated in the figure to the left; the sample working channel is CH 72. Whenever Weather Alert is activated, the WX Alert channel is also monitored during Dual Watch.

Press and release the **DW/TRI** key to terminate Dual Watch and return to the previous working channel.

Press and hold the **DW/TRI** key to terminate Dual Watch mode and go into Tri Watch mode.

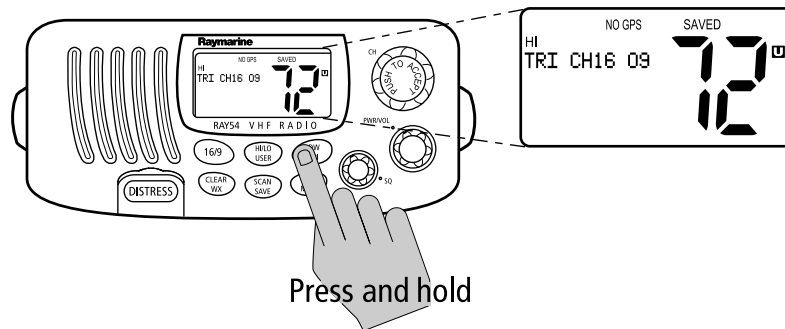
Press and release the **CLEAR/WX** key to terminate Dual Watch mode and return to the last-used channel.

Press and release the **16/9** key to terminate Dual Watch mode and switch to the Priority Channel.

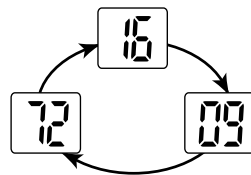
Note: During Dual Watch mode, the SCAN/SAVE, USER, WX and CH keys are inactive and sounds an error beep if pressed.

Tri Watch

Press and hold the **DW/TRI** key for 3 seconds to activate Tri Watch mode.



TRI CH16 09 appears on the dot matrix display.



Tri Watch monitors in cycle Channel 16, the current working channel and the channel you have set as the Secondary Priority Channel.

Tri Watch is demonstrated in the figure to the left; the sample working channel is CH 72.

Note: Whenever Weather Alert is activated, the WX Alert channel is also monitored during Tri Watch.

Press and release the **DW/TRI** key to terminate Tri Watch and return to the previous working channel.

Press and release the **16/9** key to terminate Tri Watch mode and switch to the Priority Channel.

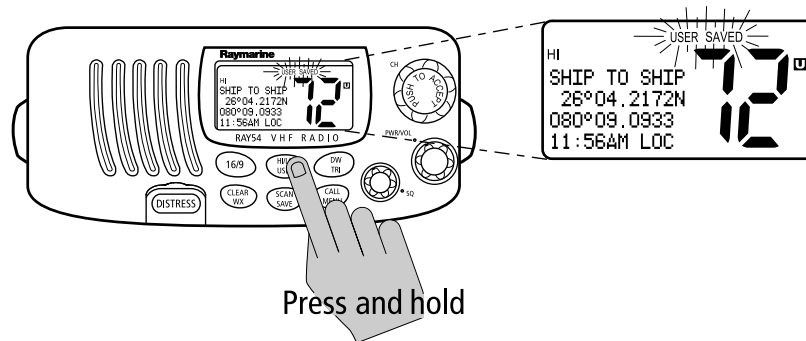
Press and release the **CLEAR/WX** key to terminate Tri Watch mode and return to the last-used channel.

Note: During Tri Watch Mode, the SCAN/SAVE, USER, WX and CH keys are inactive and sounds an error beep if pressed.

4.13 USER Channel Mode

HI/LO
USER

Press and hold the **HL/USER** key while in normal operation mode to enter User Mode. The **USER** and **SAVED** indicators appear.



USER Channel Mode displays only the channels that you have saved to memory, which enables you to easily use your favorite channels while bypassing unwanted or seldom-used channels during a scan.

Note: *The procedure for saving a channel to memory is outlined in Section 4.11, Adding Channels to Memory.*

While in User Mode:

- Press and release the **SCAN/SAVE** key to start Memory Scan mode.
- Press and hold the **SCAN/SAVE** key to delete the current channel from memory list.
- Press **16/9** to end User mode and switch to the Priority Channel.

Press and release the **CLEAR/WX** key to quit User mode and return to the last-used working channel.

Press and hold the **HL/USER** key for 3 seconds to quit User mode and return to the last-used working channel.

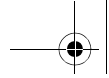
Note: *You cannot switch Channel sets while in User Mode.*

4.14 DSC Call Operation

CALL
MENU

Press and release the **CALL/MENU** key while in normal operation mode to enter Call Mode.

DSC Call mode is fully described in *Chapter 5*:



4.15 Menu Mode Operation



Press and hold the **CALL/MENU** key while in normal operation mode to enter Menu Mode.

Menu mode is fully described in *Chapter 6*:

