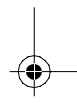
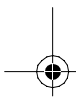
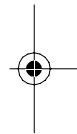
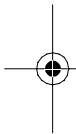


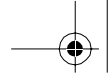


# **Ray240 VHF Radio** with Digital Selective Calling

## Users Manual

Document # 81219\_4  
Date: July 2006



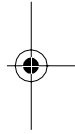
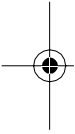


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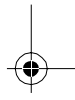
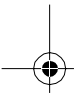
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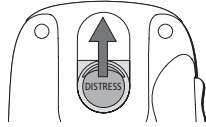
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# How to make an automatic Distress call

### Step 1

Slide up cover



### Step 2



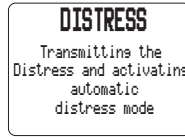
PRESS and HOLD for 5 SECONDS

### Step 3

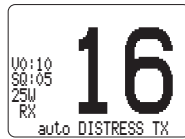


5 second countdown commences  
Display backlight flashes

### Step 4



### Step 5



LISTEN



FOR ACKNOWLEDGEMENT

### Step 6

Press and Hold PTT



THEN SPEAK



SLOWLY and CLEARLY

### MAYDAY, MAYDAY, MAYDAY

**This is....** (repeat name of vessel 3 times)

**MAYDAY**

**THIS IS....** (name of vessel spoken once)

**MY POSITION IS....** (latitude and longitude) or true bearing and distance from a known point).

**IF YOU DON'T KNOW, DON'T GUESS.**

**I AM....** (sinking, on fire, etc)

**I HAVE....** (number of persons on board and any other information - drifting, flares fired, etc)

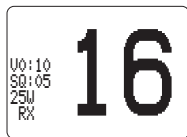
**I REQUIRE IMMEDIATE ASSISTANCE**

**OVER**

**RELEASE THE PTT SWITCH**

# How to make a Mayday call

## Step 1



**MAYDAY, MAYDAY, MAYDAY**

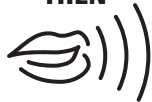
**This is....** (name of vessel, spoken 3 times)

## Step 2

**Press and Hold PTT**



**THEN**



**SLOWLY and CLEARLY**

**MAYDAY**

**This is....**(name of vessel spoken once)

**MY POSITION IS....**(latitude and longitude, or true bearing and distance from a known point - IF YOU DON'T KNOW, DON'T GUESS).

**I AM....**(sinking, on fire, etc)

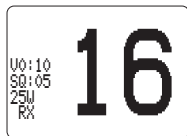
**I HAVE....** (number of persons on board and any other information - drifting, flares fired, etc)

**I REQUIRE IMMEDIATE ASSISTANCE**

**OVER**

RELEASE THE PTT SWITCH

## Step 3



D6790\_1

FOR ACKNOWLEDGEMENT AND INSTRUCTIONS

IF AN ACKNOWLEDGEMENT IS NOT RECEIVED THEN REPEAT THE DISTRESS CALL

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## Important Information

### Safety notices



#### WARNING

##### Electrical safety

**Make sure the power supply is switched off before you make any electrical connections.**



#### WARNING

##### Electromagnetic exposure

**Failure to observe the Antenna and EME Exposure guidelines may expose those within the Maximum Permissible Exposure radius to RF radiation absorption that exceeds the FCC MPE limit. It is the Radio Operator's responsibility to ensure that no one is within this radius before transmitting.**



#### WARNING

##### Navigation aid

**Although we have designed this product to be accurate and reliable, many factors can affect its performance. As a result, it should only be used as an aid to navigation and never replace common sense and navigational judgement. Always maintain a permanent watch so you can respond to situations as they develop.**



#### CAUTION

##### Compass safe distance

**The compass safe distance for any part of the Ray240 installation including transceiver, handset and speaker, measured in accordance with EN 60945, for the Ray240 is 0.9 m.**



## Purpose

This handbook contains important information on the installation, operation and maintenance of the US and European versions of the Ray240 VHF radio, which is intended for light marine use and covers the following models:

- E42001 Ray240 System - US and Canadian version.
- E42002 Ray240E System - European version.

To get the best results in operation and performance, please take the time to read this handbook thoroughly.

## FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. This device may not cause harmful interference.
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 Inc., could violate compliance with FCC rules and void the operator's authority to operate the equipment.

## 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 conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised.

## Antenna mounting and EME exposure

Ensure that the antenna is connected to the radio before transmitting.

Raymarine declares a Maximum Permissible Exposure (MPE) radius of 1.5 meters (per OET Bulletin 65) for this system, assuming 25 watts output to an omnidirectional antenna of 3dBi gain or less.

For watercraft with suitable structures, the antenna base must be at least 3.5 meters above the main deck to meet the MPE for persons up to 2 meters tall. For watercraft without such structures, the antenna must be mounted so that its base is a minimum of 1.5 meters vertically from the heads of all persons.





Do not transmit when anyone is within the MPE radius of the antenna, unless they are shielded from the antenna field by a grounded metallic barrier.

## Declaration of conformity

Raymarine UK Limited hereby declare that the products to which this handbook relates comply with the appropriate requirements and provisions of the R&TTE Directive 1999/5/EC.

The full Declaration of Conformity may be viewed on the relevant product pages at [www.raymarine.com](http://www.raymarine.com)

## Licensing requirements

### United States

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 US port. You can request a Restricted Radiotelephone Operator Permit from the Federal Communications Commission (FCC) by filing Form 753.

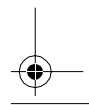
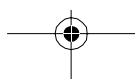
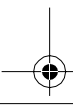
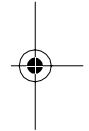
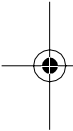
### Canada

A license is not required to operate this radio within the sovereign waters of Canada. You will require a license to operate this radio outside of these waters. To obtain Industry Canada licensing information, contact the nearest field or regional office or write to:

Industry Canada  
Radio Regulatory Branch  
300 Slater Street  
Ottawa  
Ontario  
Canada, K1A 0C8  
Attention: DOSP

### Europe

Regulations in some areas require that an Operator's license is obtained before operating a VHF radio. It is your responsibility to determine whether a license is required in your area before operating this equipment.



## Additional Information

The following additional information will be required for completing a license application in Canada or the US:

Industry Canada Certification Number	IC: 4069B-RAY240D
FCC ID	PJ5RAY240
FCC Type Accepted	Parts 2, 15 and 80
Output Power	1 watt (low), 25 Watts (high)
Modulation	Frequency
Frequency Range	156.000 - 165.000 MHz

## Maritime Mobile Service Identity

A nine-digit Maritime Mobile Service Identity (MMSI) number is required to operate the Digital Selective Calling (DSC) equipment in this radio.

### United States

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](http://www.boatus.com)), or  
 MariTEL ([www.maritelusa.com](http://www.maritelusa.com)).

Once obtained, you can program the MMSI number into your Ray240 using the Menu Operation described in this handbook.

### Canada

You can obtain an MMSI number from your nearest Industry Canada Office.

Once obtained you can program the MMSI number into your Ray240 using the Menu Operation described in this handbook.

### Europe

An MMSI number should be requested from the same agency that issues radio operator licenses in your area.

Once obtained, you can program the MMSI number into your Ray240 using the Menu Operation described in this handbook.

If regulations in your area do not permit you to program the MMSI number yourself, your Raymarine dealer can program the number for you.

For full details of programming your MMSI number into the Ray240 - see *Chapter 3: Installation*.

## Automatic Transmission Identification System

Some European inland waterways require the use of the Automatic Transmission Identification System (ATIS). An ATIS number can be requested from the same agency that issues radio operator licenses in your area.

The ATIS function must be enabled by your Raymarine dealer before you can enter an ATIS number into your Ray240.

## Waste Electrical and Electronic Equipment Directive



The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electronic and electrical equipment. Whilst the WEEE Directive does not apply to some of Raymarine's products, we support its policy and ask you to be aware of how to dispose of this product.

The crossed out wheeled bin symbol, illustrated above, and found on our product signifies that the product should not be disposed of in general waste or landfill.

Please contact your local dealer, national distributor or Raymarine Technical Services for information on product disposal.

## Handbook information

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.

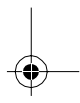
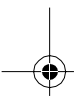
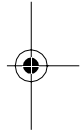
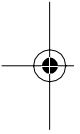
For the latest product information visit our website:

**[www.raymarine.com](http://www.raymarine.com)**



## Warranty

To register your new Raymarine product, please take a few minutes to fill out the warranty card. It is important that you complete the owner information and return the card to us to receive full warranty benefits.





## Chapter 1: General Information

### 1.1 What is the Ray240?

The Ray240 is a combined VHF radio and Class D Digital Selective Calling (DSC) system, using a phone style handset to access and control all functions. It enables you to make digitally selected calls, which are quicker and simpler to make than traditional voice calls using Channel 16. It can transmit and receive on all available US, Canadian and International Marine VHF channels.

Should a distress situation occur, using the Ray240 you can quickly raise an alert, automatically indicating your identity and position, and establishing distress communication on the emergency voice channel.

### 1.2 What is DSC?

The present VHF radio system requires users to listen until someone speaks, and then determine whether the call is for them - more often than not, it isn't. DSC makes sure that you receive messages, and alerts you to the fact that it is for you.

DSC is part of the Global Maritime Distress and Safety System (GMDSS), a maritime communication system - not just for emergency and distress messages, but also for all types of existing ship-to-ship and ship-to-shore routine communications.

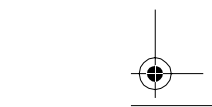
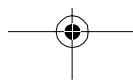
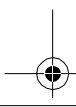
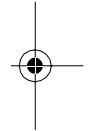
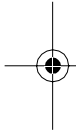
DSC is simply a tone signalling system, which operates on VHF Channel 70 and is similar to the tone dialling on your phone, but with the ability to include other information such as your boat's identification number, the purpose of the call, your position and the channel you want to speak on.

DSC calls can be divided into four categories:

- Calls to other ships.
- Group calls.
- Safety broadcasts.
- Distress alerts.

#### Calls to other ships

To call another ship or a coast station, you simply enter their dedicated Maritime Mobile Service Identity (MMSI) number, select your chosen VHF working channel and send the call - it's like using a telephone. Both your radio and the one you are calling automatically switch to the chosen channel for conversation.





## Group calls

When groups of ships need the same information (yacht races, club rallies etc.) a special group-call identity can be used to enable restricted broadcast messages.

## Safety broadcasts

Safety broadcasts from coast stations and other shipping automatically generate an alert to ensure that this vital information is not missed.

## Distress alerts

At the touch of a button, you can send your ship's identity, your position and the nature of your distress. The position given will be precise and the alert will be heard immediately by all DSC equipped vessels and coast stations within range. The message is automatically repeated at approximately 4 minute intervals until it is acknowledged either by a coast station or a vessel within radio range.

**Note:** *To transmit precise positions, the radio must be interfaced to your Global Positioning System (GPS). Otherwise, regular manual position updating is required.*

## 1.3 Can I use the Ray240 as part of an integrated system?

Your Ray240 can send and receive position information, e.g. latitude and longitude, using either of the following protocols:

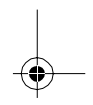
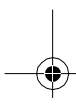
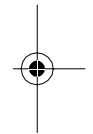
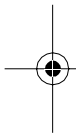
- National Maritime Electronics Association (NMEA) 0183.
- SeaTalk

enabling DSC integration with other instruments.

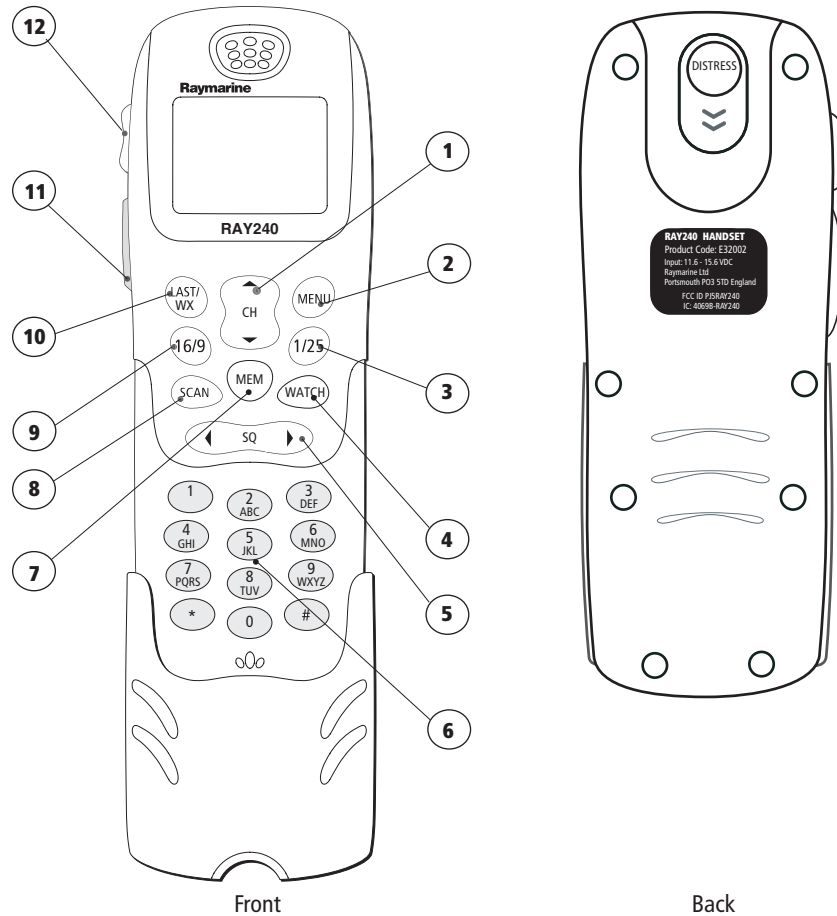
Using these protocols enables your Ray240 to send position information to other instruments in your system whenever it receives:

- a response to a DSC position request.
- a DSC Distress call.

You can also add an additional handset and active speaker to the standard Ray240, giving two fully functional stations with an intercom function. This is particularly useful where your boat has dual helms or a second navigation station.



## 1.4 How do I use the Ray240?



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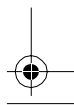
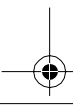
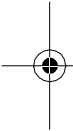
You can access all of the functions of the Ray240, with the exception of adjusting the active speaker volume, from the handset. The clearly marked buttons and alpha-numeric keypad make operation simple.

The **DISTRESS** button can be found beneath a sliding cover on the back of the handset. By simply sliding the cover up and pressing the button, the DSC Distress Call procedure is started.



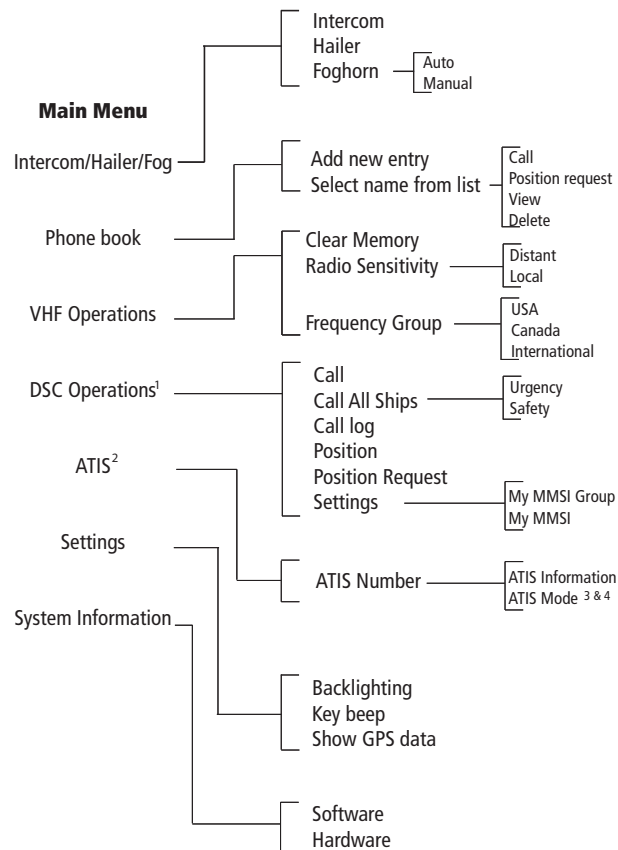
- 1. CHANNEL UP/DOWN** moves the selected channel up or down, or scrolls through the menus.
  - 2. MENU** Press to access the menus, or to select a menu option. Press and hold to access the phone book.
  - 3. 1/25** changes the transmitting power setting from 1 watt (low) to 25 watt (high) or vice versa.
  - 4. WATCH** Press to activate the Dual Watch function (2 channels). Press and hold to activate the Tri-Watch function (3 channels).
  - 5. SQUELCH** mutes any background noise. Also used for the backspace function when making alpha-numeric entries.
  - 6. Key pad** The alpha-numeric keypad has multi-tap operation, the same as a mobile phone.
  - 7. MEMORY** commits a channel to the radio memory.
  - 8. SCAN** starts the scanning of available channels. Press to start priority scanning. Press and hold to start non-priority scanning.
  - 9. 16/9 (16)** Press to power up the radio. Press and hold for 5 seconds to power off the radio. When using the radio, press to re-tune to the priority channel.
  - 10. LAST/WX (PRIV)** Press to return to either the last selected channel, or when navigating the menus to return to the previous screen. Press and hold to access the Weather channels. (Press and hold to access private channels).
  - 11. Push to Talk** Press and hold to send a voice message. Release to return to receive mode.
- Note:** *The maximum transmit time is limited to 5 minutes to prevent non-intentional transmissions from occupying the VHF channel.*
- 12. Volume** adjusts the volume of the handset up or down.

**Note:** *Differences for European versions of the radio are shown in brackets.*





## Which menu do I need?

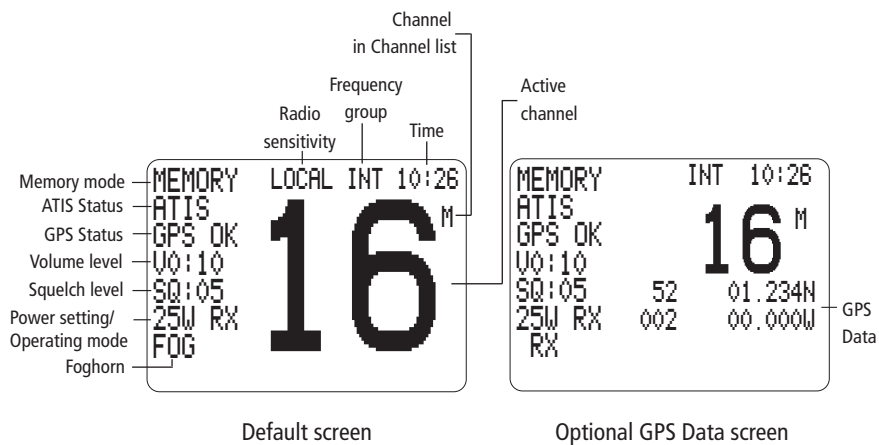


D6742\_2

- Notes:**
- (1) A Maritime Mobile Service Identity (MMSI) number is required to operate DSC functions.
  - (2) ATIS function only available on European models. An Automatic Transmission Identification System (ATIS) number is required to operate.
  - (3) ATIS Inland (Waterways) Mode - transmit power is limited to 1W on Channels 6, 8, 10, 11, 12, 13, 14, 15, 17, 71, 72, 74, 75 76 and 77 in accordance with regulations for European Inland Waterways.
  - (4) ATIS Sea Mode - transmit power restrictions are disabled for use at sea. DO NOT use this mode when operating on European Inland Waterways.

## What does the display tell me?

The liquid crystal display (LCD) screen will give you the following information depending on which screen you choose to display:



### Memory mode

shows when available channels are selected from the memory.

### ATIS Status

when shown indicates ATIS is active.:  
ATIS - Inland (Waterways ) mode  
SEA - Sea mode

### GPS Status

GPS OK - indicates position data available.  
NO GPS - indicates no GPS data available.

### Volume level

shows the current volume level. Adjustable from 0 to 10.

### Squelch level

shows the current squelch level. Adjustable from 0 to 10.

### Power setting

shows the power level. 1 Watt (low) or 25 Watts (high).

### Operating mode

shows which operating mode the radio is in., transmit (TX) or receive (RX).

### Radio sensitivity

shows when Local sensitivity level selected.

### Foghorn

shows when automatic foghorn is running.

### Frequency group

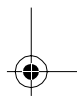
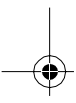
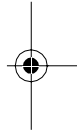
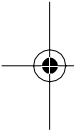
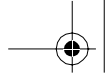
shows selected frequency group, USA, Canada or International.

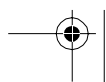
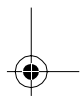
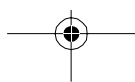
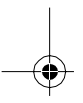
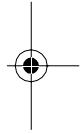
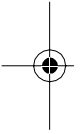
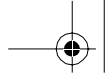
### Active channel

shows the channel on which the radio is currently operating.

### GPS Data

when available shows current position.





## Chapter 2: Operations

### 2.1 Introduction

This chapter shows you how to operate the controls of the Ray240 and use it to make the common Digital Selective Calling (DSC) calls.

Using the radio is simple. All of the functions, except adjusting the active speaker volume are controlled from the handset.

**Note:** Differences for the European versions of the radio are shown in brackets in the text.

### 2.2 The handset controls

#### How do I

#### ....power the radio On and Off?

**Power ON**

PRESS the **16/9 (16)** button to turn on the radio.

**Power OFF**

PRESS and HOLD the **16/9 (16)** button for 2 seconds.  
The radio enters low power standby mode.

In standby mode the Ray240 is inoperative and will not receive DSC calls, but your radio settings are retained.

To completely power down the Ray240, power must be switched off at the source.

#### ....adjust the handset volume?



PRESS the volume key on the side of the handset to adjust the handset volume up or down. Each press of the key raises or lowers the volume by one level.

**Note:** It is not possible to adjust the volume while the radio is in 'Menu' mode.

## How do I

### ....set the squelch?



PRESS this button to reduce background noise from the receiver. Press the right arrow to increase the squelch and the left arrow to decrease it. The optimum squelch setting is obtained by turning the squelch down until background noise is heard. Then increase the setting by one level to reduce this noise.

**Note:** *It is not possible to adjust the squelch setting while the radio is in 'Menu' mode.*

### ....change channels?



#### Channel UP/DOWN button

Press the Channel UP/DOWN button to change the channels sequentially.

**OR**



#### Keypad

By using the keypad you can directly select the required channel number. Pressing # selects the channel immediately. If you do not press # the channel is selected after 2 seconds.

### ....tune to the priority channel?



PRESS this button at anytime when using the radio to tune to the priority channel.

## How do I

### ....get the weather forecast?



PRESS and HOLD this button to access the Weather channels. Use the channel button to select W0 through to W9 depending upon which weather channel is required.

**Note:** *This function is only available when US/Canadian frequency groups are selected.*

### ....select private channels?



PRESS and HOLD this button to access the Private channels. Use the channel button to select the required Private channel.

**Note:** *This function is only available when International frequency group is selected. Private channels are enabled by your Raymarine dealer.*

### ...monitor channels?



#### Dual Watch (2 channels)

PRESS this button to start the Dual Watch function.

The radio keeps operating on the current channel, while monitoring the priority channel. If activity is detected on the priority channel it becomes active. When the priority channel is no longer active the radio resumes Dual Watch.

#### Tri-Watch (3 channels)

PRESS and HOLD this button to start the Tri-Watch function.

The radio will keep operating on the current channel, while monitoring the priority channel and the last channel. Activity detected on any of these channels will make it active. When that channel is no longer active the radio resumes Tri-Watch.

In both watch modes, removing the handset from the cradle halts the mode. You can transmit on the active channel. When the handset is replaced in the cradle the selected watch mode is resumed.

## How do I

### ....scan the channels?



#### Non-priority scanning

PRESS this button for non-priority scanning.

The radio will scan the channels in sequence for activity, automatically tuning to a channel if activity is detected.

#### Priority scanning

PRESS and HOLD this button to start priority scanning.

The radio scans the priority channel in between scanning each channel in sequence. If activity is detected on a channel the radio automatically tunes to that channel.

#### Scan a channel list

PRESS this button with a memorized channel list operative and only those channels contained in the list will be scanned.

In both scan modes, removing the handset from the cradle halts the mode. You can transmit on the active channel. When the handset is replaced in the cradle the selected scan mode is resumed.

### ....use the Memory?



#### Create a channel list

To create a channel list, select the first channel required, PRESS and hold this button.

PRESS and hold again to remove a channel from the list.

#### Use a channel list

When you have created a channel list, PRESS this button, you can now select channels from your channel list.

### ....change the transmitting power?



PRESS this button to change the transmitting power of the radio from 1 Watt (Low) to 25 Watt (High) and vice versa.



## How do I ....navigate the menus?



### **MENU**

PRESS this button to access the menus or to accept a menu option.



### **CHANNEL UP/DOWN**

PRESS this button to scroll through the menu options.



### **LAST/WX (PRIV)**

PRESS this button to return to the previous screen.  
PRESS and hold to exit the Menu.



### **16/9 (16)**

PRESS this button to return to the priority channel.



## How do I

### ....use the Menu shortcuts?



Press and hold to access the DSC Phone Book. For further information refer to - *How do I ....make an individual routine call?* on page 26



PRESS to move the cursor bar to the last item on the current display. If the cursor is on the last item, the next page, if available, is shown.  
PRESS and HOLD to move the cursor bar to the last item in the menu.



PRESS to move the cursor bar to the top item on the current display. If the cursor is on the top item, the previous page, if available, is shown.  
PRESS and HOLD to move the cursor bar to the first item in the selected menu.

### ....adjust the active speaker volume?



Turn the active speaker knob clockwise to turn the speaker on and increase the volume.  
Turn the knob counter-clockwise to decrease the volume and turn the speaker off.



## 2.3 Using the handset - station control

**Note:** *Applicable to installations with 2 handsets.*

In normal operation an installation with 2 stations has a primary and a secondary station. The primary station can access all menu functions, the secondary station has limited functionality. Station control enables the user to designate either station as the 'primary' station, utilizing full functionality.

When the Ray 240 is powered, no station has control. To take station control, one of the following must be carried out:

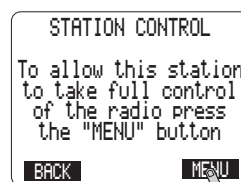
- taking the handset from the cradle.  
If the handset was out of the cradle at power-up it must be replaced in the cradle and then removed.
- pressing a handset button - the handset can be in or out of the cradle.
- pressing the PTT switch - the handset must be out of the cradle.

If you want to change the station in control, lift the handset of the other station, the Station Control menu is displayed.

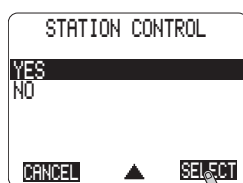
### STEP 1



### STEP 2



### STEP 3



You now have station control the following screen appears on the other handset

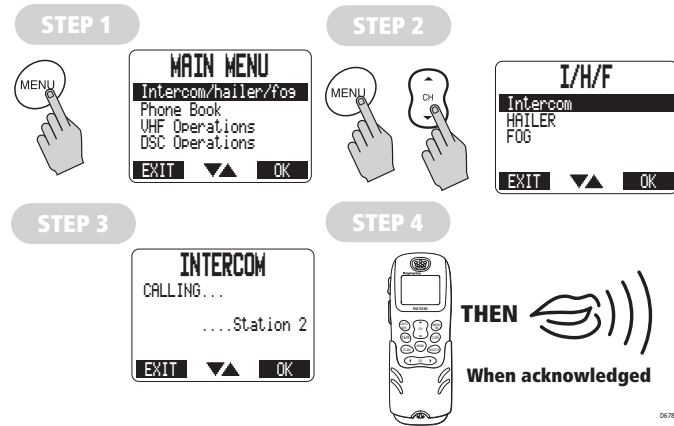


**Note:** *If the Ray240 is in standby mode, the handset used to activate the radio becomes the handset with station control.*

## 2.4 Using the handset

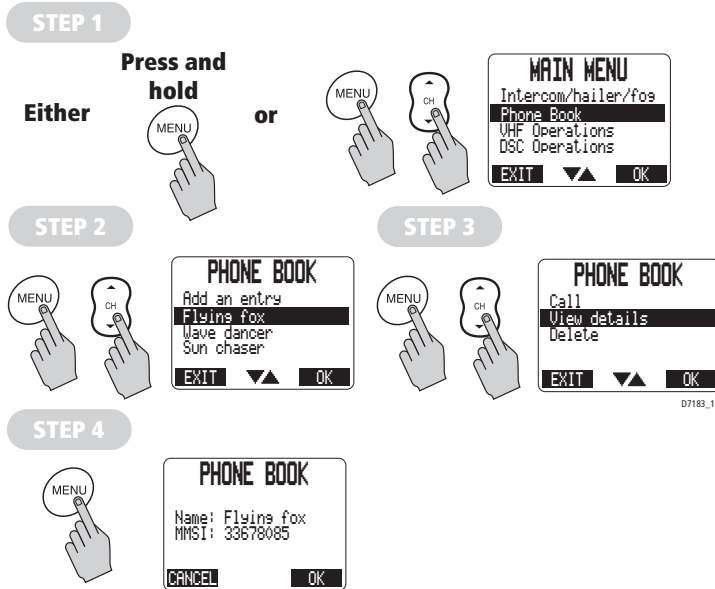
### How do I

#### ....use the intercom?



**Note:** The intercom function is only available when a second station is installed.

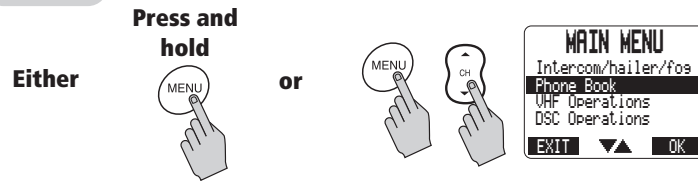
#### ....view phone book details?



## How do I

### ....add an entry to the DSC phone book?

#### STEP 1



#### STEP 2



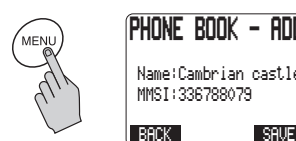
#### STEP 3



#### STEP 4



#### STEP 5



#### STEP 6



D7184\_1

- Notes:**
- (1) Boat names are limited to 15 characters.
  - (2) MMSI numbers can be entered as boat, group or shore numbers.
  - (3) Group MMSI numbers always start with a zero.


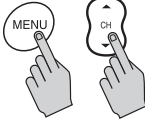
## 2.5 Using the handset - making and receiving DSC calls


### How do I

#### ....make an individual routine call?

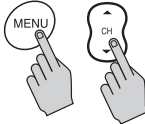

**STEP 1**

Press and hold

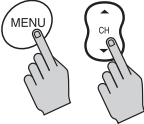

Either  or 





**STEP 2**


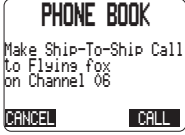

**STEP 3**


**STEP 4**

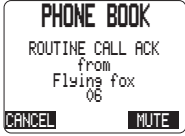
**STEP 5**


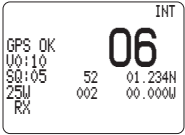
**STEP 6**





**STEP 7**



**STEP 8**

AUTOMATICALLY RE-TUNES TO SELECTED CHANNEL WHEN CALL ACCEPTED

Press and Hold PTT  THEN  YOUR MESSAGE

D7182\_2

**Note:** Ship-to-ship individual routine call shown. If call is made to a shore station they decide on the channel for communication.

## How do I ....make a group routine call?

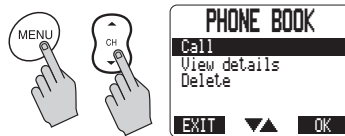
### STEP 1



### STEP 2



### STEP 3



### STEP 4



### STEP 5



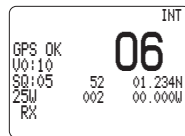
### STEP 6



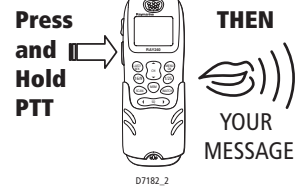
### STEP 7



### STEP 8



AUTOMATICALLY RE-TUNES TO SELECTED CHANNEL



D7182\_2

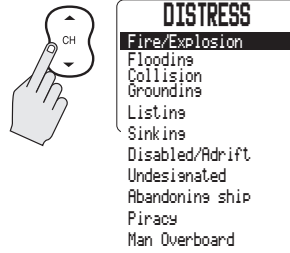
## How do I

### ....make a specified Distress call?

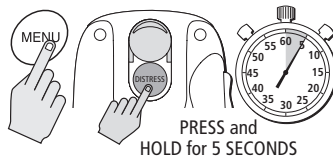
#### STEP 1



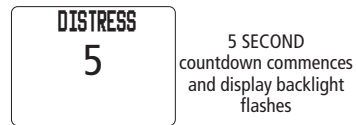
#### STEP 2



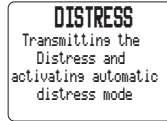
#### STEP 3



#### STEP 4



#### STEP 5



#### MAYDAY, MAYDAY, MAYDAY

**This is....** (repeat name of vessel 3 times)

#### MAYDAY

**THIS IS....** (name of vessel spoken once)

**MY POSITION IS....** (latitude and longitude) or true bearing and distance from a known point).

**IF YOU DON'T KNOW, DON'T GUESS.**

**I AM....** (sinking, on fire, etc)

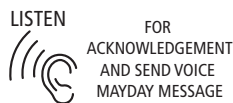
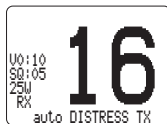
**I HAVE....** (number of persons on board and any other information - drifting, flares fired, etc)

**I REQUIRE IMMEDIATE ASSISTANCE**

**OVER**

**RELEASE THE PTT SWITCH**

#### STEP 6



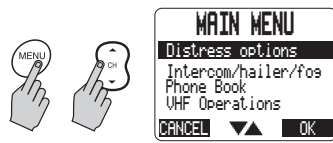


## How do I

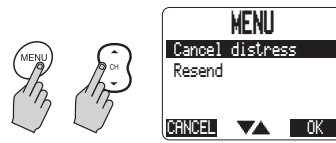
### ....cancel a Distress call?

**Note:** The 'Distress' option on the main menu is only available after a DSC distress call has been sent.

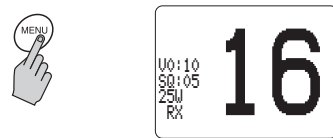
#### STEP 1



#### STEP 2



#### STEP 3



#### STEP 4

**Press and Hold PTT**



**THEN**



**ALL STATIONS, ALL STATIONS, ALL STATIONS**

**THIS IS..** (MMSI number and Vessel name or Call sign spoken 3 times)

**DISTRESS ALERT SENT....(time and date)  
IS CANCELLED**

**OVER**

SLOWLY and CLEARLY

## How do I

### .... receive a distress acknowledgement

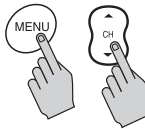
STEP 1



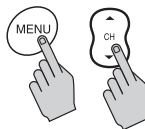
STEP 2



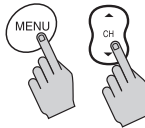
STEP 3



STEP 4



STEP 5



STEP 6



D8067\_1

STEP 6

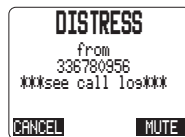


## How do I

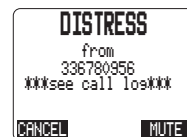
### .... receive a distress call?

An incoming DSC distress call will cause an audible alarm to sound and the display to flash. After 10 seconds the alarm volume rises to maximum unless muted by pressing the MUTE button.

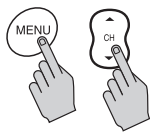
#### STEP 1



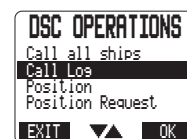
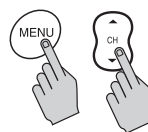
#### STEP 2



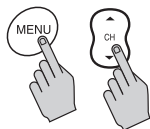
#### STEP 3



#### STEP 4



#### STEP 5



#### STEP 6



D8068\_1

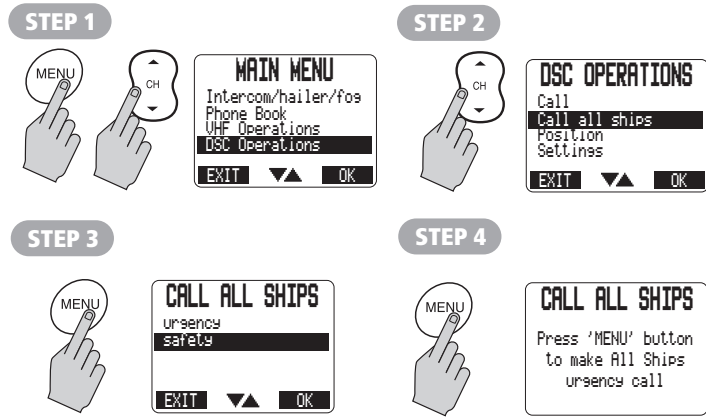
#### STEP 6



**Note:** The Call log will contain the name, time and position of the boat in distress.

## How do I

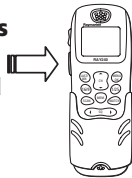
### ....make an All Ships Safety call?



Call sending acknowledged  
Radio returns to Channel 16

### STEP 5

Press  
and  
Hold  
PTT



THEN



SLOWLY and CLEARLY

### PAN PAN, PAN PAN, PAN PAN

**ALL STATIONS or individual Coast Guard Station** (spoken 3 times)

**THIS IS..** (MMSI number and Vessel name or Call sign spoken 3 times)

**MY POSITION IS....** (latitude and longitude) or true bearing and distance from a known point).  
**IF YOU DON'T KNOW, DON'T GUESS.**


**SHIPPING SHOULD BE AWARE OF**  
(submerged container)

**OVER**


## How do I

### ....make an All Ships Urgency call?

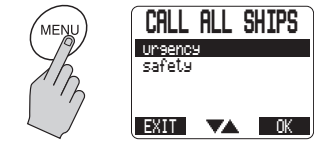
**STEP 1**




**STEP 2**



**STEP 3**




**STEP 4**




Call sending acknowledged  
Radio retunes to Channel 16

**STEP 5**

**Press and Hold PTT**



**THEN**

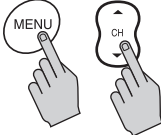


**SLOWLY and CLEARLY**

**PAN PAN, PAN PAN, PAN PAN**  
**ALL STATIONS or individual Coast Guard Station** (spoken 3 times)  
**THIS IS..** (MMSI number and Vessel name or Call sign spoken 3 times)  
**MY POSITION IS....** (latitude and longitude) or true bearing and distance from a known point).  
**IF YOU DON'T KNOW, DON'T GUESS.**  
**I HAVE...** (lost power and am drifting )  
**I REQUIRE ....** (state type of assistance required e.g. a tow urgently.)  
**OVER**

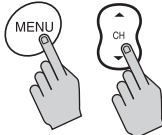
## How do I ....make a position request?

**STEP 1**



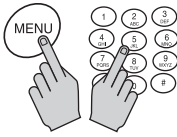
**MAIN MENU**  
Intercom/hailer/foe  
Phone Book  
UHF Operations  
DSC Operations  
EXIT ▼▲ OK

**STEP 2**




**DSC OPERATIONS**  
Call  
Call all ships  
Position  
Position Request  
EXIT ▼▲ OK

**STEP 3**




**POSITION REQUEST**  
<<Input MMSI>>  
CANCEL SELECT

**STEP 4**




**POSITION REQUEST**  
Enter the MMSI of the  
ship/shore station  
MMSI:  
CANCEL OK

**STEP 5**



**POSITION REQUEST**  
Send Position Request  
to 003562833  
CANCEL SEND

**STEP 6**



**POSITION REQUEST**  
Transmitting the  
request  
CANCEL OK

**STEP 7**

Re-tunes to  
working  
channel

U0:10  
SQ:05  
25W  
RX

**06**

## How do I

### ....receive a position request?

TBA

#### STEP 1



#### STEP 2



D7185\_2

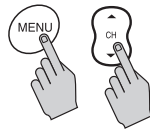
#### STEP 7

Re-tunes to  
working  
channel

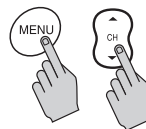


### .... access the DSC call log?

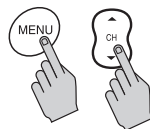
#### STEP 1



#### STEP 2



#### STEP 3



#### STEP 4

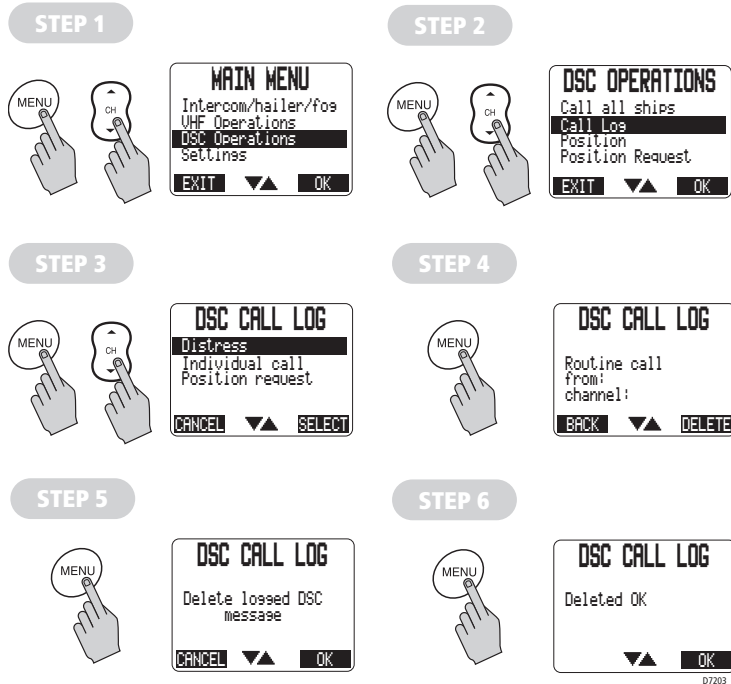


D7202\_2

- Notes:**
- (1) A maximum of 20 calls can be stored in the call log.
  - (2) Calls are stored as they are received. If the call log is full then the oldest entry will be discarded.
  - (3) A message is displayed on the screen if there are unread DSC calls in the call log. Unread calls are prefixed with an asterisk (\*) in the call log.

## How do I

### ...delete an entry from the DSC call log?



## 2.6 Receiving weather alerts

**Note:** Applies to Ray240, not Ray240E models.

Whilst the radio is in Dual or Tri-Watch modes, and a National Oceanographic and Atmospheric Administration (NOAA) weather channel has been selected, when a weather alert is received the radio will sound an audible alarm and automatically switch to the monitored weather channel so that the emergency broadcast can be heard.

## 2.7 Additional functions

In addition to those already described in this chapter, the Ray240 has further functions that can be accessed from the Main menus.

This section gives a brief description of these functions and what they do.



## Intercom/fog/hailer

### Intercom

for full details of using the intercom function refer to *How do I...use the intercom?* on page 24.

### Fog warnings

The Ray240 has in-built fog warning tones that can be transmitted through a hailer horn. These tones can be used in manual or automatic modes, but any volume adjustments will need to be made in manual mode before selecting automatic mode.

#### Manual mode

In manual mode a tone is transmitted whenever the PTT switch is pressed. Releasing the PTT will stop the tone.

#### Automatic mode

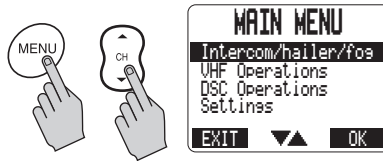
In automatic mode a signal is generated and transmitted by the unit at preset intervals not exceeding 2 minutes until cancelled. The available tones are:

Signal	Tone
Power boat Underway and making way	1 long tone
Powerboat Underway and not making way	2 long tones
Sailboat under sail Any type of boat that is: Fishing Not under command Restricted ability to maneuver Constrained by draught Towing	1 long, 2 short tones
Under tow	1 long, 3 short tones
Pilot	4 short tones
Boat at anchor (less than 100m in length)	1 short, 1 long, 1 short tone

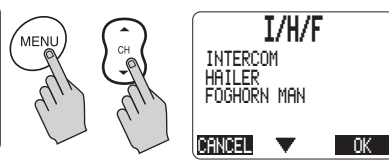
## How do I

### ....set up the automatic fog signal?

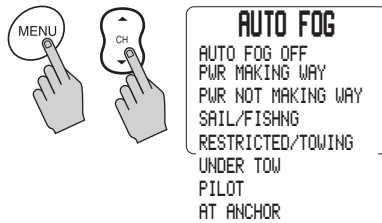
#### Step 1



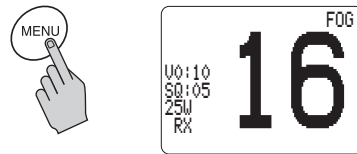
#### Step 2



#### Step 3



#### Step 4



D7174\_1

## Hailer

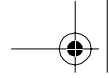
The hailer can be used to both listen and talk.

### Listen

With the hailer in listen mode, you can change the level of the listening volume in the handset ear piece by using the handset volume button. The volume can be adjusted at the active speaker by using the active speaker volume control.

### Talk

To use the hailer in talk mode, just press and hold the PTT. The volume of the hailer can be adjusted by using the volume button when the PTT switch is pressed.



## VHF Settings

### Radio Sensitivity

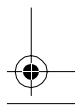
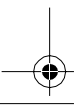
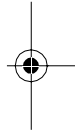
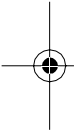
Enables the receiving sensitivity of the Ray240 to be reduced in areas of high traffic to decrease unwanted reception. This is also known as local mode.

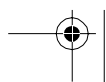
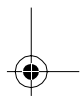
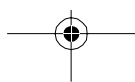
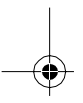
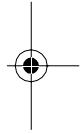
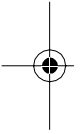
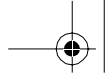
## Settings

### Handset Settings

Enables you to adjust the following:

- Keypad backlighting
- Keypad clicks
- Show GPS data





## Chapter 3: Installation

### 3.1 EMC Installation Guidelines

All Raymarine Equipment and accessories are designed to the best industry standards for use in the recreational marine environment.

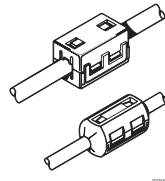
Their design and manufacture conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised. Although every effort has been taken to ensure that they will perform under all conditions, it is important to understand what factors could affect the operation of the product.

The guidelines given here describe the conditions for optimum EMC performance, but it is recognized that it may not be possible to meet all of these conditions in all situations. To ensure the best possible conditions for EMC performance within the constraints imposed by any location, always ensure the maximum separation possible between different items of electrical equipment.

For optimum EMC performance, it is recommended that wherever possible:

- Raymarine equipment and cables connected to it are:
  - At least 3 ft. (1m) from any other equipment transmitting or carrying radio signals. In the case of Single Side Band (SSB) radio, the distance should be increased to 7 ft. (2m).
  - More than 7 ft. (2m) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The equipment is supplied from a separate battery to that used for engine start. Voltage drops below 10 V, and starter motor transients, can cause the equipment to reset. This will not damage the equipment, but may cause the loss of some information and may change the operating mode.
- Raymarine specified cables are used. Cutting and rejoining these cables can compromise EMC performance and must be avoided unless doing so is detailed in the installation manual.

#### Suppression Ferrite



If a suppression ferrite is attached to a cable, this ferrite should not be removed. If the ferrite needs to be removed during installation it must be reassembled in the same position.

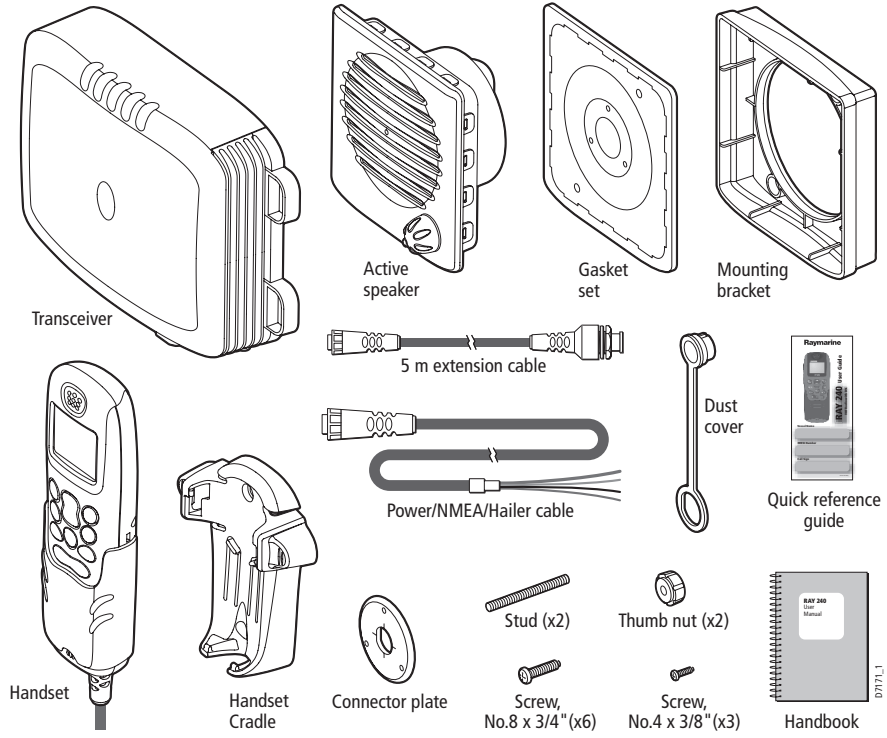
The illustration shows typical cable suppression ferrites used with Raymarine equipment. Always use the ferrites supplied by Raymarine.

#### Connections to other equipment

If your Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a suppression ferrite **MUST** always be attached to the cable near to the Raymarine unit.

### 3.2 What's in the box?

You will find these items in the box:



### Can I get optional extras?

You can obtain the following optional extras for the Ray240:

Description	Part No.
Second station includes handset, cradle and speaker and 5m extension cable	
Ray240	E45001
Ray240E	E45002
Handset only	
Ray240	E45009
Ray240E	E45010
Active speaker	E45003
Extension cable, 3m	E45011
Extension cable, 5m	E45012
Extension cable, 10m	E45013
Bulkhead Mounting Kit	E45014
Bracket (trunnion) Mounting Kit	E25009

### 3.3 Where should I install my radio?



#### CAUTION

##### Compass safe distance

**The compass safe distance for any part of the Ray240 installation including transceiver, handset and speaker, measured in accordance with EN 60945, for the Ray240 is 0.9 m.**

Before installing the Ray240 you should plan the installation, considering the following points:

#### Transceiver Unit

You should mount the transceiver unit on a bulkhead, below decks that is:

- dry, protected and well ventilated.
- free from high operating temperatures.



- free from excessive vibration.
- accessible for cable routing.
- at least three feet from the antenna.
- in such a position that accidental contact with the heatsink is avoided.

You must avoid mounting it:

- in an engine compartment.
- where there might be flammable vapors, such as in an engine room or compartment, or in a fuel tank bay.
- where there is water splash or spray from bilges and hatches.
- where it is a risk of physical damage from heavy items, such as hatch covers, tool boxes, etc.
- where it might be covered by any other equipment.

### Handset and cradle

You should mount the primary handset and cradle:

- where they are easily accessed from the location where the ship is normally navigated. Federal Communications Commission (FCC) law requires that the primary handset is located in the wheelhouse or a room adjacent to it.
- at least three feet from the antenna.

### Active speaker

You should mount the active speaker in a position where it is easy to hear and is convenient for your use.

### Antenna (not supplied)

You should use a good quality VHF antenna, designed for marine use installed in accordance with the following:

- ensure that the antenna is connected to the radio before transmitting.
- Raymarine declares a Maximum Permissible Exposure (MPE) radius of 1.5 meters (per OET Bulletin 65) for this system, assuming 25 watts output to an omnidirectional antenna of 3dBi gain or less.
- for watercraft with suitable structures, the antenna base must be at least 3.5 meters above the main deck to meet the MPE for persons up to 2 meters tall.
- for watercraft without such structures, the antenna must be mounted so that its base is a minimum of 1.5 meters vertically from the heads of all persons.



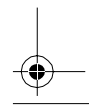
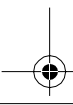
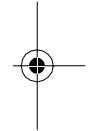
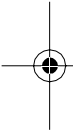


- as high as possible and free from obstruction for maximum range. VHF transmission is essentially line-of-sight.
- if you have to extend the length of the co-axial cable between the antenna and the radio, use one that is designed for minimum power loss over the cable length.

### Cables

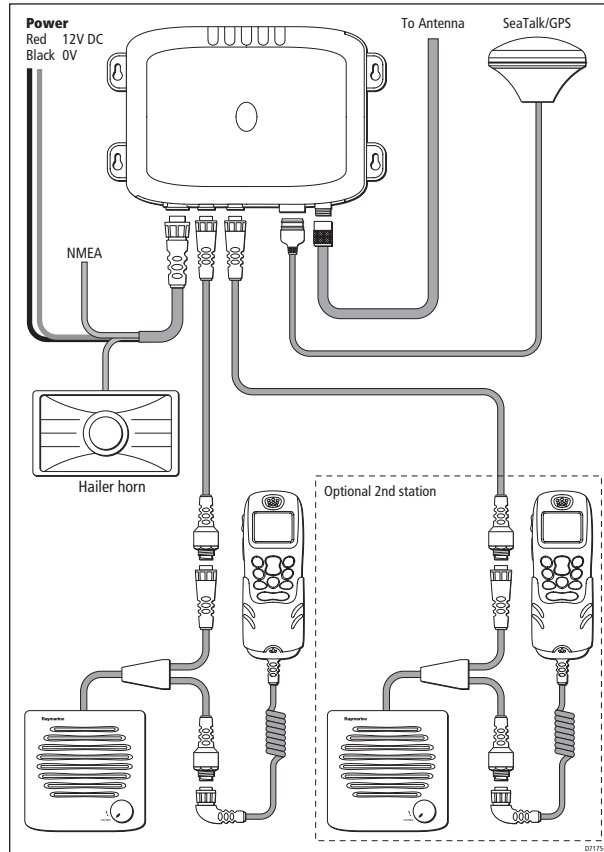
When planning the installation, consideration should be given to where cables are to be run:

- Try and avoid acute bends in cables.
- Secure and protect cables from physical damage and protect them from exposure to heat. Avoid running cable through bilges or doorways, or close to moving or hot objects.
- Where a cable passes through an exposed bulkhead or deck head, a water-tight feed-through should be used.



### 3.4 Typical installation

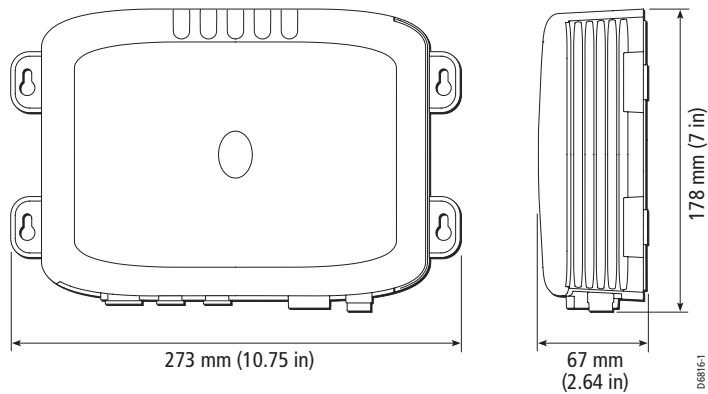
A typical installation for the Ray 240 is shown below:



### 3.5 How much space does the Ray240 need?

To help you plan the installation of your Ray240 and its associated components the dimensions are:

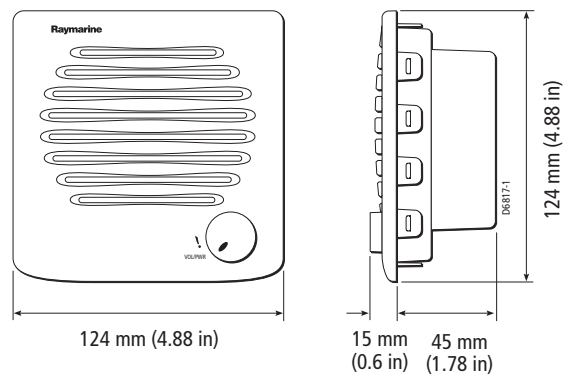
#### Transceiver Unit



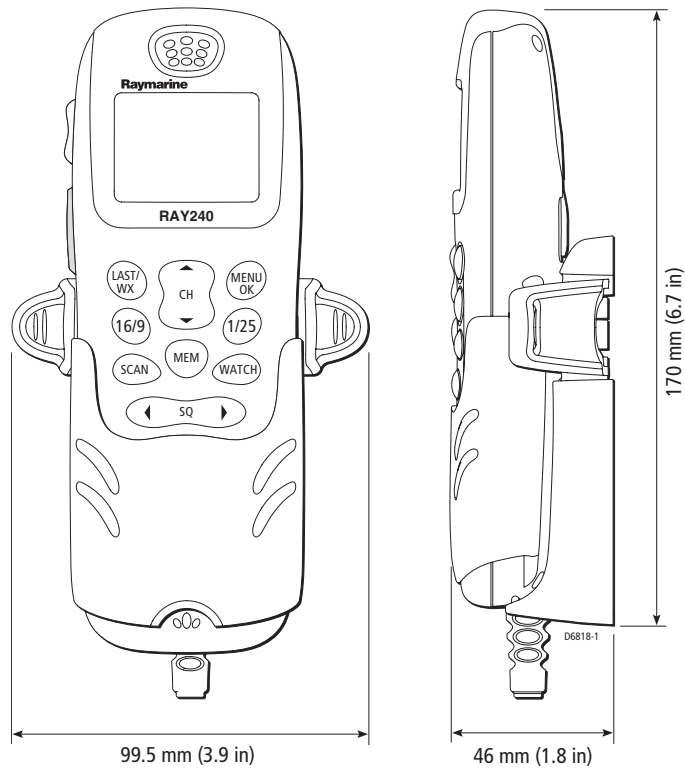
A 50mm air space should be left around the transceiver when installed to enable airflow and ventilation for cooling the heatsink.

**Note:** During normal operation, the transceiver unit heat sink will become warm. This does not affect the operation of the unit.

#### Active speaker



## Handset and Cradle



### 3.6 How do I make the electrical connections?

You should use the combined Power/Hailer/NMEA cable to make the electrical connections. This cable contains four wire pairs for connection to Direct Current (DC) power, National Marine Electronics Association (NMEA) input, and the Hailer/Horn speaker. The connections are:

Cable color	Connection
Red	12 Volt Positive
Black	12 Volt Negative
Yellow	Hailer +
Green	Hailer -



<b>Cable color</b>	<b>Connection</b>
--------------------	-------------------

Black	Not used
White	NMEA In +
Blue	NMEA In -
Brown	NMEA Out +
Orange	NMEA Out -
Black	Not used

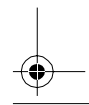
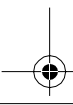
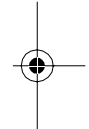
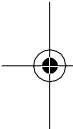
Raymarine recommend that unused connections have the tinned ends removed and the tails are taped back to the main cable sheath.

For optimal installation, use screened cables throughout, ensuring that the screen connection is continuous and terminates at the boat's earth.

The Ray240 base transceiver does not have an ON/OFF switch. It is therefore strongly recommended that your radio is connected to the boat's power supply through a dedicated power breaker to avoid unnecessary drain on the electrical system when your boat is not in use.

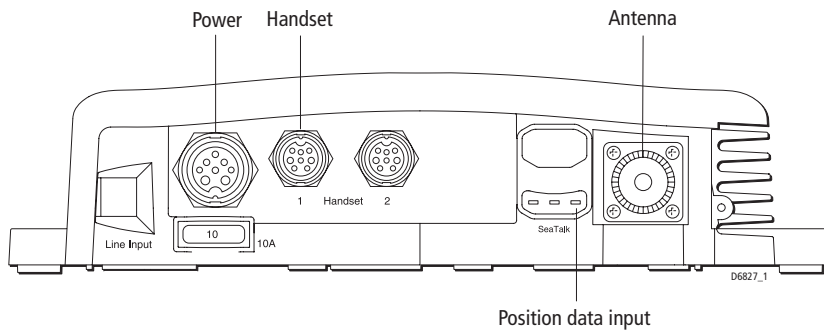
To ensure that the unit works correctly:

- You should connect the power cable to the DC supply using lugs (not supplied) that have been crimped and soldered.
- Use an antenna and mount that does not connect the co-axial cable outer to the ships earth.



## How do I connect the cables to the transceiver?

You connect the cables to the labelled connectors as follows:



## How do I connect the handset to the transceiver?

You should connect the handset cable to the transceiver using the bulkhead mounted connector. Full details of which are shown on the Installation Guide.

### 3.7 How do I get position data?

You can get position data for providing latitude and longitude information using either NMEA or SeaTalk connections.

#### SeaTalk data

If you have a SeaTalk instruments installed, this is the most convenient way to connect your radio for position data to be received. Using the SeaTalk Auxiliary Junction Box, Part No. R55006 (not supplied), enables Sea Talk and Global Positioning System (GPS) inputs to be connected in one place.

#### NMEA data

You should connect the White and Blue (NMEA + and -) wires of the combined cable to the output wires of the positioning device using a suitable connector block.

The following sentences are used by the Ray240:

- Received - GGA, GLL, GNS, RMC, ZDA.

For specific instructions on how to connect your particular GPS, refer to the handbook which came with that device.

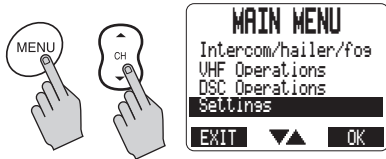
## 3.8 Setting up the Ray240

### How do I

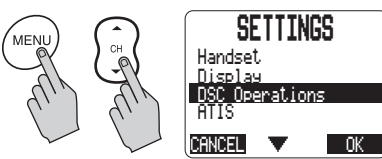
#### .... enter my boat's MMSI number?

 Have your MMSI number ready before you start


**Step 1**




**Step 2**

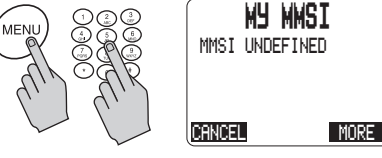


**Step 3**

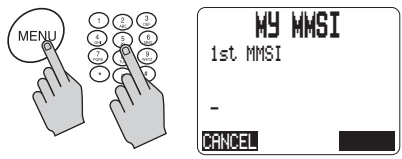


**Step 4**


 **CAUTION: MMSI NUMBER**  
You only get one chance to enter the MMSI number. Take care to get it right!



**Step 5**



**Step 6**



D7156\_1

- Notes:**
- (1) To change the MMSI number the radio must be returned to your Raymarine dealer.
  - (2) When setting up a group MMSI, the number must be pre-fixed by a zero.

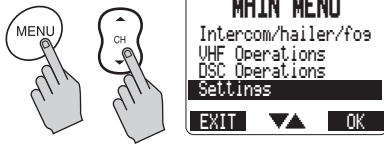
## How do I

### ...enter my ATIS number?

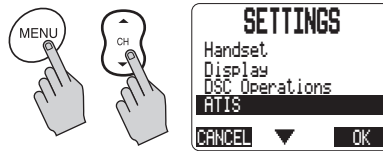


Have your ATIS number ready before you start

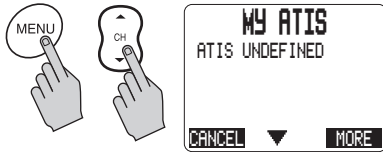
#### Step 1



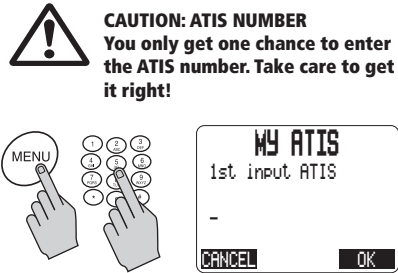
#### Step 2



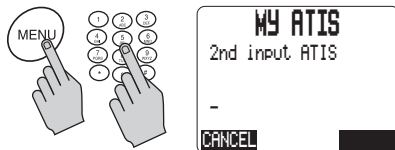
#### Step 3



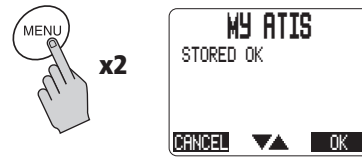
#### Step 4



#### Step 5



#### Step 6



D7157\_1

- Notes:**
- (1) This procedure is only applicable to the European version of the Ray240.
  - (2) The ATIS function must be enabled by your Raymarine dealer before you can enter your ATIS number.



## Chapter 4: Maintenance and Troubleshooting



### CAUTION

#### Cleaning

**Do not use solvents or other chemicals to clean this equipment.**

### 4.1 Introduction

The Ray240 is designed to provide long-term operation. It is recognized, however that environmental and other factors may result in the need for occasional service.

### 4.2 What maintenance can I do?

The Ray240 has no user serviceable parts or adjustments. Never remove the cover or attempt to service the product.

Your attention to a few basic points should ensure many years of service:

- Although the unit is waterproof, keep it as dry as possible.
- If you remove the handset, always fit the dust cap to the extension cable connector.
- Clean the exterior of the unit with a tissue or soft non-abrasive cloth.
- Regularly inspect the radio case and antenna for any physical damage.

### 4.3 How do I troubleshoot the Ray240?

All Raymarine products are, prior to packing and shipping, subjected to comprehensive test and quality assurance programs. However, if your Ray240 should develop a fault, please refer to the following table to identify the most likely cause and the suggested action required to return the radio to normal operation.

If you still have a problem after referring to the table below, contact your local Raymarine dealer, national distributor or Raymarine Technical Services Department for further advice.

Always quote the product serial number, which you will find printed on the unit.

<b>Problem</b>	<b>Possible cause</b>	<b>Suggested action</b>
Radio will not power up	(a) Loose wiring connection (b) 10 amp Fuse has blown	(a) Check all connections (b) Check 10 amp fuse and replace if necessary.
DSC functions are not working	MMSI number not entered	Check MMSI number has been entered correctly
Position data not shown	Information not being received from GPS	Check GPS is switched on and connected to the radio. Check units are interfaced correctly.

#### 4.4 How do I get technical support?

**To get Technical Support**

Complete product information and interactive help is available at:  
[www.raymarine.com](http://www.raymarine.com)

<p><b>North and South America</b></p> <p><b>Raymarine Technical Support</b>  1-800-539-5539  or  +1 603-881-5200</p> <p><b>Product Repair and Service</b>  Raymarine Product Repair Center  21 Manchester Street,  Merrimack,  NH 03054-4801  USA</p>	<p><b>Europe, Middle East, Africa and Australasia</b></p> <p><b>Raymarine Technical Support</b>  +44 (0) 23 9271 4713</p> <p><b>Product Repair and Service</b>  Raymarine plc  Anchorage Park  Portsmouth  PO3 5TD  England</p>
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**Help us to help you**  
To allow us to respond to your needs faster, please quote the Equipment type, Model number and Serial number when requesting service

D1477\_1b

## Appendix 5: VHF Channels

### US Marine VHF Channels

Type of Message	Appropriate Channel(s)
<b>DISTRESS, SAFETY and CALLING</b> Use this channel to get the attention of another station (calling) or in emergencies (distress and safety)	16
<b>INTERSHIP SAFETY</b> Use this channel for ship-to-ship safety messages and for search and rescue messages. Also to communicate with Coast Guard ships and aircraft	6
<b>COAST GUARD LIAISON</b> Use this channel to talk to the Coast Guard after first contact on Channel 16	22
<b>NON-COMMERCIAL</b> Working channel for voluntary boats. Messages must be about the needs of the ship. Typical uses include fishing reports, rendezvous, scheduling repairs and berthing information. Use Channels 67 and 72 only for ship-to-ship messages	9 <sup>6</sup> , 68, 69, 71, 72, 78, 79 <sup>4</sup> , 80 <sup>4</sup>
<b>COMMERCIAL</b> Working channels for working ships only. Messages must be about business or the needs of the ship. Use Channels 8, 67, 72 and 88 only for ship-to-ship messages.	1 <sup>5</sup> , 7, 8, 9, 10, 11, 18, 19, 63 <sup>5</sup> , 67, 72 <sup>7</sup> , 79, 80, 88 <sup>2</sup>
<b>PUBLIC CORRESPONDENCE (MARINE OPERATOR)</b> Use these channels to call the marine operator at a public coast station. By contacting a public coast station you can make and receive calls from telephones on shore. Except for distress calls, public coast stations usually charge for this service.	24, 25, 26, 27, 28, 84, 85, 86, 87, 88 <sup>2</sup>
<b>PORT OPERATIONS</b> These channels are used in directing the movement of ships in or near ports, locks or waterways. Messages must be about the operational handling, movement and safety of ships. In certain major ports Channels 11 and 12 are not available for general port operations messages. Use Channel 20 only for ship-to-coast messages. Channel 77 is limited to intership communications to and from pilots	1 <sup>5</sup> , 5 <sup>3</sup> , 12, 14, 20, 63 <sup>5</sup> , 65, 66, 73, 74, 77

## US Marine VHF Channels (Continued)

Type of Message	Appropriate Channel(s)
<b>NAVIGATIONAL</b> (Also known as the bridge-to-bridge channel) This channel is available to all ships. Messages must be about ship navigation, for example, passing or meeting other ships. <i>You must keep your messages short. Your power output must not be more than 1 watt.</i> This is also the main working channel at most locks and drawbridges.	13, 67 <sup>8</sup>
<b>MARITIME CONTROL</b> This channel may be used to talk to ships and coast stations operated by state or local governments. Messages must pertain to regulation and control, boating activities, or assistance to ships	17
<b>DIGITAL SELECTIVE CALLING</b> Is available for Digital Selective calling only and is not available for voice transmissions.	70
<b>WEATHER</b> On these channels you may receive weather broadcasts of the National Oceanic and Atmospheric Administration. These channels are only for receiving. You cannot transmit on them.	Wx-1 162.55 Wx-2 162.4 Wx-3 162.475

### Footnotes to table

1. Not available in the Great Lakes, St. Lawrence Seaway, or the Puget Sound and the Strait of Juan de Fuca and its approaches.
2. Only for use in the Great Lakes, St. Lawrence Seaway, or the Puget Sound and the Strait of Juan de Fuca and its approaches.
3. Available only in the Houston and New Orleans areas.
4. Available only in the Great Lakes.
5. Available only in the New Orleans area.
6. Available for intership, ship and coast general purpose calling by non-commercial ships.
7. Available only in the Puget Sound and the Strait of Juan de Fuca.
8. For channels 13 and 67, output power is fixed at 1 watt (low power) by regulation. In an emergency, you can override to high power by pressing the 1/25 button.

**Note:** Operators should check order of preference for channel use with local information for chosen area of operation.

### Important Notice

Channels 3A, 21A, 23A, 61A, 64A, 81A, 82A, and 83A are not for use by the general public in U.S. waters. These frequencies may be used only under authorization by the U.S. Coast Guard or under private land mobile license.

## International Marine VHF Channels

Type of Message	Appropriate Channel(s)
<b>DISTRESS, SAFETY and CALLING</b> Use this channel to get the attention of another station (calling) or in emergencies (distress) and safety)	16
<b>INTERSHIP SAFETY</b> Use this channel for bridge to bridge communications under the Global Maritime Distress Safety System (GMDSS).	13
<b>SEARCH and RESCUE OPERATIONS</b> Use of these channels is restricted to co-ordinate search and rescue operations	6 <sup>1</sup> , 10, 67, 73
<b>INTERSHIP</b> Use these channels for communications between ship stations	8, 9, 13, 15 <sup>2</sup> , 17 <sup>2</sup> , 69, 72, 77
<b>PUBLIC CORRESPONDENCE (Marine Operator)</b> Use these channels to make a call to the public telephone network. They are also known as 'link channels'	1, 2, 3, 4, 5, 7, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 60, 61, 62, 63, 64, 65, 66, 78, 79, 81, 82, 83, 84, 85, 86, 87, 88
<b>PORT OPERATIONS and SHIP MOVEMENT</b> These channels are used in directing the movement of ships in or near ports, locks or waterways. Messages must be about the operational handling, movement and safety of ships. These channels are assigned to a particular user, e.g marina or oil terminal.	5, 7, 9, 11, 12, 14, 18, 19, 20, 21, 22, 60, 61, 62, 63, 64, 65, 66, 68, 69, 71, 72, 74, 75, 76 <sup>3</sup> , 78, 79, 81, 82, 83, 84, 85, 86, 87, 88
<b>MARINA CHANNELS - UK ONLY</b> Use these channels for matters relating to mooring, berthing and race control.	80, M1 <sup>4</sup> , M2 <sup>4</sup>
<b>MARINE SAFETY INFORMATION - UK ONLY</b> Use of this channel is primarily for Search and Rescue operations, and the broadcasting of Marine Safety Information	15, 17
<b>DIGITAL SELECTIVE CALLING</b> Is available for Digital Selective calling only and is not available for voice transmissions.	70



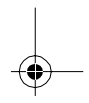
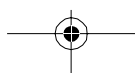
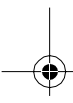
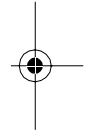
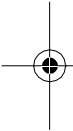
Footnotes to table:

1. This channel may also be used for communications between ship stations and aircraft engaged in co-ordinated search and rescue operations.
2. These channels may also be used for on-board communications provided the power emitted does not exceed 1 watt.
3. These channels should be restricted to navigation related communications only at power of 1 watt.
4. These channels are for use in UK territorial waters only.

**Note:** *Operators should check order of preference for channel use with local information for chosen area of operation.*

**Important Notice**

The international frequency mode is not legal for use while operating in U.S waters. The TX/RX frequencies available in the International frequency mode were agreed upon by the attending countries at the 1968 International Telecommunications Union meeting in Geneva, and are legal for use in International waters only.



## Canadian Marine VHF Channels

Type of Message	Appropriate Channel(s)
<p><b>DISTRESS, SAFETY and CALLING</b> Use this channel to get the attention of another station (calling) or in emergencies (distress and safety)</p>	16
<p><b>INTERSHIP SAFETY</b> Use this channels for ship-to-ship safety messages and for search and rescue messages. Also to communicate with Coast Guard ships and aircraft</p>	6, 26, 77
<p><b>COAST GUARD LIAISON</b> Use this channel to talk to the Coast Guard after first contact on Channel 16</p>	4 <sup>1</sup> , 19, 21, 61 <sup>1</sup> , 62 <sup>1</sup> , 81, 82, 83
<p><b>NON-COMMERCIAL</b> Working channel for voluntary boats. Messages must be about the needs of the ship. Typical uses include fishing reports, rendezvous, scheduling repairs and berthing information. Use Channels 67 and 72 only for ship-to-ship messages</p>	68, 69, 71
<p><b>COMMERCIAL</b> Working channels for working ships only. Messages must be about business or the needs of the ship. Use Channels 8, 67, 72 and 88 only for ship-to-ship messages.</p>	4 <sup>1</sup> , 7, 8, 18, 61 <sup>1</sup> , 62 <sup>1</sup> , 64, 65 <sup>2</sup> , 67 <sup>3</sup> , 69 <sup>3</sup> , 71, 73 <sup>3</sup> , 78, 79, 80
<p><b>PUBLIC CORRESPONDENCE (MARINE OPERATOR)</b> Use these channels to call the marine operator at a public coast station. By contacting a public coast station you can make and receive calls from telephones on shore. Except for distress calls, public coast stations usually charge for this service.</p>	1, 2, 3, 23 <sup>4</sup> , 24, 25 <sup>5</sup> , 26, 27 <sup>6</sup> , 28 <sup>1</sup> , 60, 84, 85, 86, 87, 88
<p><b>PORT OPERATIONS</b> These channels are used in directing the movement of ships in or near ports, locks or waterways. Messages must be about the operational handling, movement and safety of ships. In certain major ports Channels 11 and 12 are not available for general port operations messages. Use Channel 20 only for ship-to-coast messages. Channel 77 is limited to intership communications to and from pilots</p>	11, 12, 14, 20 <sup>2</sup> , 65 <sup>7</sup> , 66 <sup>8</sup> ,
<p><b>NAVIGATIONAL</b> (Also known as the bridge-to-bridge channel) This channel is available to all ships. Messages must be about ship navigation, for example, passing or meeting other ships. <i>You must keep your messages short. Your power output must not be more than 1 watt.</i> This is also the main working channel at most locks and drawbridges.</p>	5, 10, 13, 74, 77,

## Canadian Marine VHF Channels

Type of Message	Appropriate Channel(s)
<b>BOATER CALLING CHANNEL</b> Use this channel for calling other leisure ships	9
<b>DIGITAL SELECTIVE CALLING</b> Is available for Digital Selective calling only and is not available for voice transmissions.	70
<b>MARIME SUPPORT OPERATIONS</b>	72, 73
<b>CANADIAN COAST GUARD</b> These channels are reserved for use by the Canadian Coast Guard only	19, 22, 81, 82, 83

### Footnotes to table:

1. Pacific Coast only.
2. Great Lakes only.
3. East Coast only.
4. Pacific Coast, Inland Waterways of British Columbia and the Yukon only.
5. Pacific Coast and Lake Winnipeg only.
6. Pacific Coast, Atlantic Coast and Great Lakes only.
7. St. Lawrence River, power limited to 1 watt.

**Note:** *Operators should check order of preference for channel use with local information for chosen area of operation.*



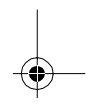
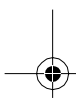
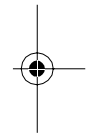
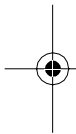


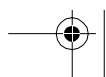
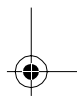
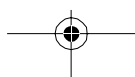
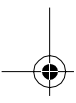
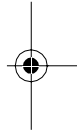
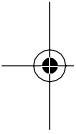
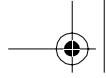
## Appendix 5: VHF Channels

61

<b>Country</b>	<b>Channel Designation</b>	<b>Channel use</b>
United Kingdom	M1	Pleasure Boat
	M2	Pleasure Boat
Denmark	L1	Pleasure Boat
	L2	Pleasure Boat
Finland, Norway & Sweden	L1	Pleasure Boat
	L2	Pleasure Boat
	L3	Pleasure Boat
Netherlands	31	NL Marina
	37	UK Marina
Denmark, Finland, Norway & Sweden	F1	Fishing Boat
	F2	Fishing Boat
	F3	Fishing Boat

These National channels have been allocated for the specific use within those countries listed. To use them you must have the appropriate license and your Ray240 must be programmed by an authorized Raymarine dealer to use the national channels that are approved for your country.



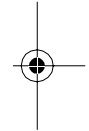
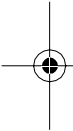




## Appendix 6: Technical specification

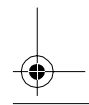
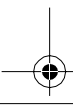
### Transmitter

Channels	All available US, International and Canadian VHF Marine Band
Frequency Stability	$\pm 1.5$ kHz
Frequency Range	155.000 - 165.000 MHz
Channel Spacing	25 kHz
Power Output	25 W / 1 W
Modulation	Frequency modulation
Modulation Audio Response	+1 to -30dB of 6db/ octave 300 Hz to 3000 Hz
FM Hum & Noise level	< -40 dB
Audio Distortion	< 10%
Spurious & Harmonic (25W)	better than 80 dB
Antenna Impedance	50 ohms



### Receiver

Channels	All available US, International and Canadian VHF Marine Band
Frequency Range	155.000 - 165.000 MHz
Frequency Stability	$\pm 1.5$ kHz
Usable Sensitivity (20dB) SINAD	< 0.4 $\mu$ V
Squelch Sensitivity	< 0.2 $\mu$ V
Adjacent Channel Rejection	> 70 dB
Spurious Image Rejection	> 70 dB
Inter modulation Rejection	> 68 dB





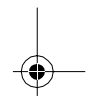
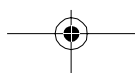
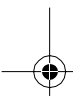
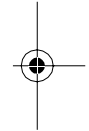
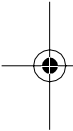
Audio Output (active speaker)	5W
Audio distortion	< 5%
Hum & Noise in Audio	< -40 dB

## Hailer

Output - 4 Ohms	22W
- 8 Ohms	10W

## Operating requirements

Input Voltage	12V nominal (10.8 to 15.6)
Current consumption (single handset system)	
Receive	400 mA
Standby	110 mA
Current 25W @ 13.8V transmit	< 6 amps
Temperature Range	14 <sup>0</sup> F to + 122 <sup>0</sup> F (-10 <sup>0</sup> C to +50 <sup>0</sup> C) operational -4 <sup>0</sup> F to + 158 <sup>0</sup> F (-20 <sup>0</sup> C to +70 <sup>0</sup> C) non-operating
Water Protection	Handset - submersible to IPX 7 Active speaker - waterproof to CFR 46 Transceiver unit - drip resistant



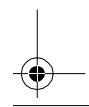
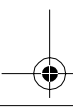
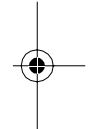
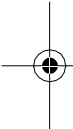


## Appendix 7: Hints and Tips

### Phonetic Alphabet

To help make call letters more clearly understood, and to assist in spelling out similar sounding or unfamiliar word, radiotelephone users employ the international phonetic alphabet.

<b>A</b>	ALPHA	<b>N</b>	NOVEMBER
<b>B</b>	BRAVO	<b>O</b>	OSCAR
<b>C</b>	CHARLIE	<b>P</b>	PAPA
<b>D</b>	DELTA	<b>Q</b>	QUEBEC
<b>E</b>	ECHO	<b>R</b>	ROMEO
<b>F</b>	FOXTROT	<b>S</b>	SIERRA
<b>G</b>	GOLF	<b>T</b>	TANGO
<b>H</b>	HOTEL	<b>U</b>	UNIFORM
<b>I</b>	INDIA	<b>V</b>	VICTOR
<b>J</b>	JULIET	<b>W</b>	WHISKEY
<b>K</b>	KILO	<b>X</b>	X-RAY
<b>L</b>	LIMA	<b>Y</b>	YANKEE
<b>M</b>	MIKE	<b>Z</b>	ZULU

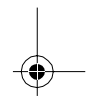
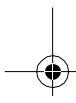
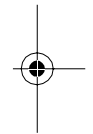
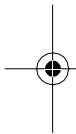




## Prowords

Prowords can be used to simplify and speed up radio communications.

<b>Proword</b>	<b>Meaning</b>
<b>ACKNOWLEDGE</b>	Have you received and understood?
<b>CONFIRM</b>	My version is..... is that correct?
<b>CORRECTION</b>	An error has been made; the correct version is.....
<b>I SAY AGAIN</b>	I repeat.... (e.g. important words)
<b>I SPELL</b>	What follows is spelt phonetically
<b>OUT</b>	End of work
<b>OVER</b>	I have completed this part of my message, and I am inviting you to reply
<b>RECEIVED</b>	Receipt acknowledged
<b>SAY AGAIN</b>	Repeat your message (or the part indicated)
<b>STATION CALLING</b>	Used when a station is uncertain of the identity of a station which is calling

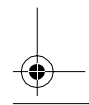
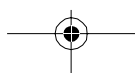
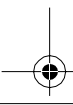
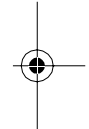
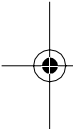




## Appendix 8: List Of Abbreviations

### Abbreviation Meaning

A	Amperes
ATIS	Automatic Transmission Identification System
dB	Decibels
dc	Direct Current
DSC	Digital Selective Calling
DTMF	Dual Tone Multi-Frequency
EMC	Electromagnetic Compatibility
EME	Electromagnetic Energy
FCC	Federal Communications Commission
GMDSS	Global Maritime Distress and Safety System
GPS	Global Positioning System
Hz	Hertz
kHz	Kilo Hertz
LCD	Liquid Crystal Display
MHz	Mega Hertz
mm	millimeters
MMSI	Maritime Mobile Service Identity
NMEA	National Marine Electronics Association
NOAA	National Oceanographic and Atmospheric Administration
PTT	Push To Talk
RF	Radio Frequency
RX	Receiver
SWR	Standing Wave Ratio
TX	Transmit





**Abbreviation    Meaning**

UK	United Kingdom
V	Volts
VHF	Very High Frequency

