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# **RayChart 620 and 630**

## Owner's Handbook

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# RayChart 620 and 630 Electronic Charting Systems

## Owner's Handbook

### SAFETY NOTICES



#### **1. HIGH VOLTAGE.**

The display unit contains high voltages. Adjustments require specialised service procedures and tools only available to qualified service technicians – there are no user serviceable parts or adjustments. The operator should never remove the display unit cover or attempt to service the equipment.

#### **2. NAVIGATION AID.**

This device is only an aid to navigation. Its accuracy can be affected by many factors, including equipment failure or defects, environmental conditions and improper handling or use.

It is the user's responsibility to exercise common prudence and navigational judgement, and this device should not be relied upon as a substitute for such prudence and judgement.

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## Preface

This handbook covers the following electronic charting systems from Raytheon Marine Company:

- RayChart 620 monochrome chartplotter
- RayChart 630 color chartplotter

It contains very important information on the installation and operation of your new equipment. In order to obtain the best results in operation and performance, please read this handbook thoroughly.

Raytheon Product Support or your local dealer will be available to answer any questions you may have.

## How this Handbook is Organized

This handbook is divided into the following chapters:

**Chapter 1:** Introduces the chartplotter's features and concepts.

**Chapter 2:** Explains how to start using the chartplotter, including instructions for turning it on, using the controls, changing the lighting, and using chart cards. This chapter also describes how to display navigational data. Simple exercises are included.

**Chapter 3:** Provides instructions for using the initial soft keys to set up on-screen routes, navigate to a point and measure distances.

**Chapter 4:** Explains how to use additional basic functions, such as track histories, marks and events. It also explains how to use the Man Overboard (MOB) function.

**Chapter 5:** Provides information on the stored data, such as waypoints, routes and events, and how you can review, edit and use them.

**Chapter 6:** Provides instructions for customizing the chartplotter defaults, such as the numerical units used, the equipment connected and the alarm settings, to suit your preferences. It also explains how to customize the screen display.

**Chapter 7:** Provides instructions for installing the chartplotter.

**Chapter 8:** Provides information on maintenance, and what to do if you experience problems with your chartplotter.

**Appendix A:** Lists the system specifications.

**Appendix B:** Defines the NMEA data received/transmitted by the chartplotter. A **glossary** (including a list of abbreviations), index and warranty information are included at the end of the handbook.

## How to Use this Handbook

This handbook is organized with the information about operating the chartplotter at the front, since you will probably use these chapters most often.

When you first receive your chartplotter, you should read Chapter 7, and install the equipment. Then read Chapters 1 and 2 to familiarize yourself with the controls of the chartplotter. You may also wish to read Chapters 3, 4 and 5.

When you are happy with the basics of using the chartplotter, read Chapter 6, decide how you wish to set up your defaults, alarms and the screen, and follow the instructions to make your changes.

Once you are on the water, you can follow the instructions in Chapters 3 and 4 to perform all your routine tasks, and refer to Chapter 5 for information about more advanced features.

If you experience any difficulties with your chartplotter, refer to Chapter 8.

Refer to the Glossary if there are any terms you are unfamiliar with.

**Note:** *The Quick Reference Card, included with your system, provides a useful summary of the chartplotter controls.*

## Text Conventions

Throughout this handbook, the dedicated (labelled) keys are shown in bold capitals; for example, **MENU**. The soft (unlabelled) key functions, menus and options are shown in normal capitals; for example, ROUTE.

Operating procedures, which may consist of a single key-press or a sequence of numbered steps, are indicated by the ► symbol in the margin.

Terms included in the glossary are shown in **bold** type.

*Exercises are shown in italic type, like this paragraph.*

## Warranty

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

## EMC Conformance

All Raytheon equipment and accessories are designed to the best industry standards for use in the leisure 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.

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# Contents

<b>Chapter 1: Introduction .....</b>	<b>1</b>
1.1 Overview .....	1
Features .....	1
Functions .....	2
Navigational Displays .....	2
1.2 The Chart Display .....	3
1.3 Operating Controls .....	5
The Trackpad and Cursor .....	5
Dedicated Keys .....	6
The Soft Keys .....	7
Soft Key Initial Functions .....	7
Other Soft Key Functions .....	8
Pop-Up Menus .....	8
Database Lists .....	8
<b>Chapter 2: Getting Started and Controlling the Chart Display .....</b>	<b>11</b>
2.1 Introduction .....	11
2.2 Switching the Chartplotter On and Off .....	11
2.3 Adjusting the Lighting and Contrast .....	13
2.4 Using Chart Cards .....	14
Inserting a Chart Card .....	14
Removing a Chart Card .....	15
Displaying the Chart Data .....	15
Displaying Information About Objects .....	16
Port Area .....	18
Tide Data .....	19
2.5 Controlling the Chart .....	20
Moving the Chart .....	20
Changing the Chart Scale .....	21
Changing the Chart Center .....	22
Displaying Navigation Data .....	24
Chart .....	24
Changing between Full Screen and Windows .....	25
Changing the Window Set Up .....	25
Navigation .....	26

---

<b>Chapter 3: Using the Initial Soft Keys .....</b>	<b>29</b>
3.1 Introduction .....	29
Safety .....	29
3.2 Setting Up and Using On-Screen Routes .....	30
Making a New On-Screen Route .....	31
Editing an Existing Route On-Screen .....	32
Editing Route Information .....	33
Using a Route .....	35
Following, Reversing and Stopping a Route .....	35
Advancing to the Next Leg of the Route .....	36
Erasing a Route .....	36
3.3 Using the GO TO Key .....	37
Navigating to a Target Point .....	37
Editing the Waypoint Details .....	37
Clearing or Changing a GO TO .....	38
3.4 Measuring Distances Using the RULER Key .....	39
<b>Chapter 4: Additional Basic Functions .....</b>	<b>41</b>
4.1 Introduction .....	41
4.2 Marks and Events .....	41
Placing and Deleting a Mark .....	42
Placing and Deleting an Event .....	43
4.3 Using Track Histories .....	43
Starting and Stopping a Track .....	44
Deleting the Current Track .....	44
Editing Track Controls .....	44
4.5 Man OverBoard (MOB) .....	46
4.6 Alarms and Timers .....	47
<b>Chapter 5: Using Stored Lists (EDIT) .....</b>	<b>49</b>
5.1 Introduction .....	49
5.2 The Waypoint List .....	50
Viewing the Waypoint List .....	50
Waypoint List Operations .....	51
Finding a Waypoint in the List .....	51
Editing a Waypoint or Adding a New Waypoint .....	52
5.3 The Current Route .....	53
Viewing the Current Route .....	53
Current Route Operations .....	54

---

5.4 The Route List .....	55
Viewing the Route List .....	55
Route List Operations .....	56
Route Details .....	57
Editing a Route or Building a New Route .....	57
5.5 Finding and Displaying a Waypoint .....	59
5.6 Displaying and Printing the Log .....	59
5.7 Printing the screen .....	60
<b>Chapter 6: Customizing the Chartplotter .....</b>	<b>61</b>
6.1 Introduction .....	61
6.2 Setting Up the Data .....	62
Changing the Parameters .....	62
Setting Up the System .....	63
Language .....	65
Units .....	65
Date and Time .....	65
Simulator .....	65
Help .....	65
Keypress Sound .....	66
Cursor Echo .....	66
GPS Input .....	66
Serial Output .....	66
Printer Baud Rate .....	66
Setting Up the Navigation Data .....	66
Heading .....	68
Magnetic Variation .....	68
Position Resolution .....	68
TD Settings Menu .....	68
Map Datum and Fix Datum .....	69
Position Correction .....	69
Head Up Response .....	69
Setting Up the Chartplotter .....	70
Waypoint Name .....	71
Waypoint Display .....	71
Course Vector .....	71
Heading Vector .....	71
Wind Vector .....	71
Tide Vector .....	72
Dead Reckoning .....	72
Cursor Data Box .....	72

---

Setting Up the Alarms and Timers .....	72
Alarms .....	73
Timers .....	73
Fix Status .....	74
Initializing the GPS .....	74
Setting Up a Differential Beacon .....	75
Memory C-Card .....	76
6.3 Customizing the Screen Display .....	78
Setting the Cartography Detail .....	78
Chart Orientation .....	79
Setting Up Windows .....	80
Changing Color Settings .....	82
<b>Chapter 7: Installation .....</b>	<b>85</b>
7.1 Introduction .....	85
EMC Installation Guidelines .....	86
7.2 Packing List .....	87
7.3 Planning the Installation .....	88
Selecting a Location .....	88
Connection Options .....	89
Cabling .....	90
7.4 Mounting the Chartplotter .....	90
Trunnion Mounting .....	90
Panel Mounting .....	90
7.5 Chartplotter Connections .....	92
Power/NMEA Connection .....	92
DC Power .....	93
NMEA Connection .....	93
Printer Connection .....	94
GPS Sensor Port .....	94
SeaTalk Connection .....	94
7.6 System Check and Initial Setup .....	95
System Check .....	95
Switch On and Initial Setup .....	95
EMC Checks Before Going to Sea .....	96

---

<b>Chapter 8: Maintenance and Problem Solving .....</b>	<b>97</b>
8.1 Routine Maintenance .....	97
Cabling and Connections .....	97
EMC Servicing and Safety Guidelines .....	97
Disposal .....	97
8.2 Problem Solving .....	98
Common Problems and Their Solutions .....	98
How to Contact Raytheon (US) .....	99
For Marine Product and Services Information .....	99
For Accessories and Parts .....	99
For Technical Support: .....	99
For Product Repair and Service .....	99
How to Contact Raytheon (Europe) .....	100
Accessories and Parts .....	100
Technical Support .....	100
Worldwide Support .....	100
<b>Appendix A: Specification .....</b>	<b>101</b>
<b>Appendix B: NMEA Data Received and Transmitted .....</b>	<b>103</b>
<b>Glossary .....</b>	<b>105</b>
G.1 Terms .....	105
G.2 Abbreviations .....	107
<b>Index .....</b>	<b>109</b>



# Chapter 1: Introduction

## 1.1 Overview

The chartplotter is a sophisticated electronic charting system, which uses GPS or dGPS data to make navigation as simple and accurate as possible.

The chartplotter displays chart information from the C-MAP NT® range of electronic chart cards (C-Cards), and position information from satellites. It can also display data available from other compatible instruments in your system.

The chartplotter is designed to be extremely easy to use, while providing powerful options for handling data and customizing the system to match your requirements. Everyday functions are available at the touch of a button, with as much or as little help as you need. The on-screen prompt and menu system, from which you can select the functions and options you require, simplifies even complex tasks such as editing stored route data.

The monochrome display unit can be installed either above or below deck; the color display unit must be mounted below. The display can be illuminated for night-time use.

### Features

- Large-screen waterproof display available in monochrome or color.
- Chart display with zoom and pan control; includes a background world map and two slots for C-MAP NT C-Cards providing large-scale cartography.
- Display of chart object information, including port and tide data.
- Vessel's position displayed, with optional heading, course, tide and wind vectors, and optional track history display.
- Display options include control of cartographic data and windows for displaying navigational data such as Course Deviation Indicator (CDI), Bearing Deviation Indicator (BDI), and data from other instruments.
- Plotter mode, which allows the use of the chartplotter at scales for which no chart information is available.
- Eight languages.
- Memory C-cards can be used to store and transfer route, waypoint, event and track history data.
- If two chartplotters are installed on the system, each can be operated independently, but the active route is displayed on both units.

## Functions

- Quick and easy on-screen route setup and control of up to 20 routes, 1000 waypoints.
- GOTO function navigating immediately to a waypoint.
- Event and mark recording.
- Edit and review functions for stored route, waypoint and event data.
- Setup options to customize the chartplotter according to your own system preferences, such as chart orientation (north up, course up or head up), display windows, and alarm setup.
- Ruler function for measuring chart distances.
- Centre options for centering the chart on the ship, cursor, or a specified position, and a Home Mode for displaying the vessel's current position and tracking information.
- Alarm reporting and control, and a range of timers including countdown and elapsed timers.
- Log record.
- Print option.

## Navigational Displays

The chartplotter is compatible with the SeaTalk® and NMEA 0183 standards. Full functionality of the chartplotter is achieved when it is part of an integrated system, with other equipment connected via SeaTalk or NMEA 0183. Data from this connected equipment, including position, waypoints and routes, is displayed on the chartplotter and is used in calculations. Details of connecting other equipment are given in *Chapter 7*.

## 1.2 The Chart Display

The chartplotter includes a small-scale world map, detailed navigation information is displayed when a chart card is installed.

The chartplotter screen includes a cursor data box which normally provides the following information:

- The cursor position, in either latitude and longitude or TDs, depending on your setup
- The vessel's Course Over Ground (COG) and Speed Over Ground (SOG)
- A scale ruler in the selected units (e.g. nautical miles)
- The units in which chart depth data is displayed
- The cursor's bearing (BRG) and range (RNG) from your vessel's current position

The cursor data box is also used to display the vessel's position and the range and bearing to the active waypoint, when the chartplotter is in Home Mode (see *Section 2.5*).

A sample chart display, in its default configuration with a chart card installed, is shown in the top illustration overleaf.

The chart display can show additional information, depending on the current data and on your setup selections, as shown in the example display in the bottom illustration overleaf. You can also display the cursor position from other compatible displays (see *Chapter 6*).

**Note:** *If required, you can use the setup options to change the units in which information is displayed, turn off the cursor data box and soft key labels, and change the chart orientation (see Chapter 6).*

The Chart Display

**Cursor data box**  
Shows the current cursor position as either Lat/Long or TDs

<b>CURSOR</b>	
50° 36.68 N	009° 47.60 E
<b>COG SOG</b>	
200°M	1.4 <sup>h</sup>
<b>DEPTH IN FEET</b>	
100 <sup>h</sup>	
<b>To Cursor</b>	
<b>BRG RNG</b>	
218°M	415.2 <sup>h</sup>

**Scale rule, in nautical miles**

**Chart boundary**

**Lat/Long grid**

**Vessel's heading vector**

**Vessel's current position**

**Cursor position, controlled by the trackpad**

**ROUTE** **GO TO** **RULER** **CENTER**

**Default soft key labels**  
These can be turned off. To redisplay them, press any soft key.

**Object data box**

<b>CURSOR</b>	
50° 36.68 N	009° 47.60 E
<b>COG SOG</b>	
200°M	1.4 <sup>h</sup>
<b>DEPTH IN FEET</b>	
100 <sup>h</sup>	
<b>To Cursor</b>	
<b>BRG RNG</b>	
218°M	415.2 <sup>h</sup>

**Objects: 1**  
NAB  
Tr Racon  
Fl.W.10s27m16M  
Horn(2).30s

**SPEED** 4.3<sup>kt</sup>

**DEPTH** 24.0<sup>ft</sup>

**HEADING** 200°M

**VMG** 3.9<sup>kt</sup>

**APP WIND** 2.3<sup>kt</sup>

**APP WIND** 238°P

**ON COURSE**

<b>WPT 001</b>	<b>001WPT</b>	
<b>XTE</b>	<b>BRG</b>	<b>RNG</b>
0.00 <sup>h</sup>	201°M	6.398 <sup>h</sup>

**Route leg**

**Active waypoint**

**Track history**

**Mark**

**Event**

**Customizable Window, showing navigation data and CDI**

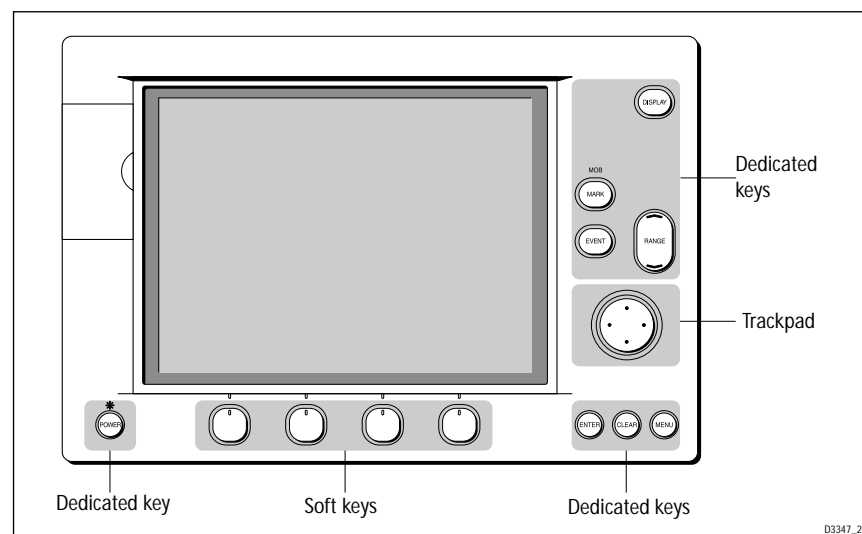
## 1.3 Operating Controls

To control the chartplotter, the keys on the display unit are used with on-screen facilities such as pop-up menus. These include:

- A trackpad providing up, down, left, right and diagonal control of an on-screen cursor.
- Eight dedicated (labelled) keys.
- Four soft keys with labels displayed on the screen.
- Pop-up menus, displayed on-screen, from which you select options.
- Database lists, displayed on-screen, which enable you to edit items.

**Note:** *The cursor is the cross symbol (⌘) visible on the display. You move the cursor with the trackpad and use it to select a position or item on the chart.*

The controls are shown on the following illustration. They are back-lit for night-time use. Many controls display a help message; you can switch help (and soft key labels) off as described in *Chapter 6*.



### The Trackpad and Cursor

The trackpad has several functions:

- To move the cursor around the chart screen
- To select an item from a pop-up menu or database list
- To adjust a variable soft key control
- To enter names in database lists

You can press on any of the four sides of the trackpad to move the cursor in that direction (up, down, left or right), or press two sections at the same time to move

diagonally. The cursor moves faster as you continue to press the trackpad. The current cursor position is shown in the cursor data box.

The cursor is displayed as a cross symbol (⌘) on the chart. It is used to:

- Select a position on the chart.
- Select an item e.g. waypoint, on the chart.
- Pan the chart display.

➤ *Try using the trackpad now to move the cursor around the chart. You can use short presses on the trackpad to move the cursor small distances, or press and hold to move the cursor quickly.*

*As you move the cursor to the edge of the display, the display pans across the chart so that the area you have moved to remains in view. If you continue to pan, the chart is redrawn on the screen at intervals.*

*If you move the cursor over an object for which there is information available, an Object Data Box appears at the top of the screen (see Chapter 2).*

## Dedicated Keys

These keys have fixed functions. Some keys can be used in two ways:

- **Press:** Press the key momentarily and then release it. This method is used for most key operations.
- **Press and hold:** Press the key and hold it down for the length of time stated (for example, 3 seconds), and then release it.

When you press a dedicated key, one of the following happens:

- a) The associated operation is performed, e.g. change chart scale (**RANGE**).
- b) A pop-up menu is displayed, providing further options.
- c) A set of soft keys is displayed, providing further functions.

As you press a key, a single audio beep confirms the key action. If the key-press is not valid for the current screen or mode, three rapid beeps sound to indicate that no response is available. If desired, you can turn the sound off as part of your set up procedure (see *Chapter 6*).

The dedicated keys are defined in the illustration on page 9.

## The Soft Keys

The four keys below the screen are called soft keys because their functions change according to the operation. The soft keys are grouped into related sets and subsets providing access to the various functions. The soft key labels are displayed on the screen just above the keys. The initial soft keys are displayed until you press a key, or select an item on the screen; the soft keys associated with the action are then displayed.

**Note:** *Throughout this manual the term soft key label is shortened to soft key. When you are instructed to press a soft key, this means press the key below the soft key label.*

You can control whether or not the soft key labels are displayed all the time, using the system set up as described in *Chapter 6*. If no labels are displayed, press one of the soft keys to make them appear. The labels disappear again if you do not press a key for 7 seconds.

Like the dedicated keys, when you press a soft key one of the following happens:

- a) The associated operation is actioned, e.g. GOTO.
- b) A sub-set of soft keys is displayed, providing further functions.
- c) A pop-up menu is displayed, providing further options.
- d) The appropriate database list (route, waypoint or track) is displayed.

As with dedicated keys, when you press a key, a single audio beep confirms the key action. If the key-press is not valid for the current screen or mode, three rapid beeps sound to indicate that no response is available.

### Soft Key Initial Functions

In the initial operating mode, the soft keys provide a quick method of performing the most commonly used tasks. These tasks are described in detail in *Chapter 3*.



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You use the soft keys to access the following functions:

ROUTE	Set up or edit an on-screen route of waypoints, and navigate towards them in turn
GO TO	Navigate towards a location you have indicated with the cursor
RULER	Measure distances and bearings on the chart
CENTER	Center the chart on the cursor, vessel or a specified position, or select Home Mode

If different soft keys are displayed, press the **CLEAR** key to select the initial functions.

### Other Soft Key Functions

In addition to the initial soft keys, the dedicated keys **MENU**, **EVENT**, **MARK**, **DISPLAY** or **POWER** provide access to different functions; these functions have associated soft keys as shown in the illustration on page 9.

Press **CLEAR** to return to the initial soft key display.

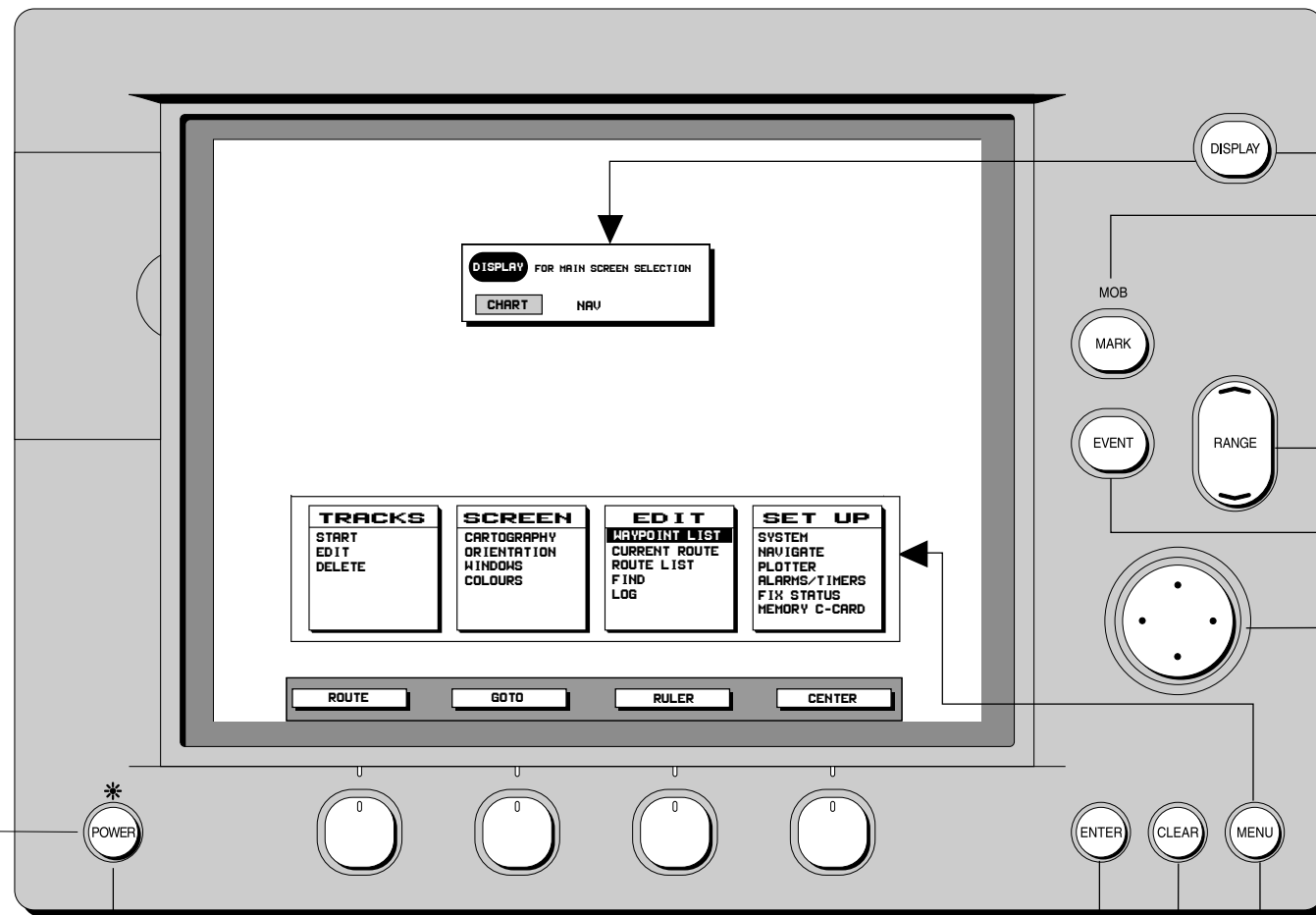
### Pop-Up Menus

Pop-up menus provide access to set up options. You use the trackpad to select an option from the menu, then use the appropriate keys to set the option. An on-screen prompt tells you which key to use. When appropriate, an *input box* will be displayed for you to enter information.

### Database Lists

The waypoints and routes that you create on the chartplotter are stored in database lists. You can view these lists and select items for editing.

When a list is on-screen, associated soft keys are also displayed; you use the trackpad to select an item from the list, then use the appropriate soft key to perform the required action. For example, you can delete a waypoint or a route.



**DISPLAY**  
 Press to display current main screen mode.  
 Press to toggle the main screen modes, and use the soft keys to select the required window or a full-screen display.  
 The display times out to the normal display.  
 Press and hold for 5 seconds to print the current display

**MARK**  
 Press to display Mark soft keys  
 Choose Mark symbol.  
 Press PLACE MARK to place the mark symbol at the cursor position.  
 Press EXIT to finish.

**MOB**  
 Press and hold for 2 seconds to activate or cancel Man Overboard.

PLACE MARK    SELECT SYMBOL    DELETE MARK    EXIT

**Chart range scale control**  
 Press the top of the key to zoom out to a smaller-scale chart.  
 Press the bottom of the key to zoom in to a larger-scale chart.  
 Press and hold to change the scale faster.

**EVENT**  
 Press to display Event soft keys  
 Choose Event symbol.  
 Press PLACE EVENT to place event symbol at the vessel's position.  
 Press EXIT to finish.

PLACE EVENT    SELECT SYMBOL    DELETE EVENT    EXIT

**Trackpad**  
 Press the edge to move the cursor on the chart or in the menus.

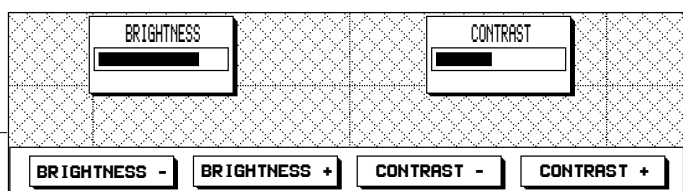
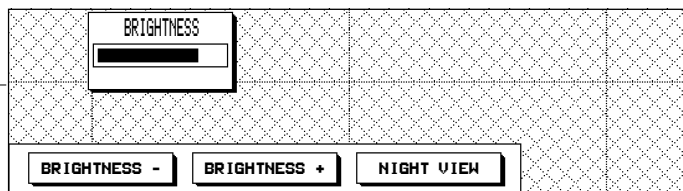
**MENU**  
 Press to display the Main Menu, with the last-used option highlighted.  
 Use the soft keys or trackpad to highlight the required option, and press ENTER.  
 Press CLEAR to finish.

**CLEAR**  
 Press to cancel an operation or display, and return to the previous display.

**POWER**  
 Press to turn on the display.  
 Press to access lighting control.  
 Press for 3 seconds to turn off the display.

**Soft keys**  
 Press to select the indicated function, or scroll round a menu list.  
 If no labels are displayed, press any soft key to display the default soft key labels.  
 Labels change when you press a dedicated key, as shown above the keys.

**ENTER**  
 Press to confirm a selection and (if appropriate) clear the current soft key labels. The key either performs the selected task, accepts changes, or leads to a display of further options.





# Chapter 2: Getting Started and Controlling the Chart Display

## 2.1 Introduction

This chapter provides information, instructions and simple exercises to get you started using the chartplotter. It will help you to become familiar with the chart display and the functions of the controls before you start using the chartplotter for routine navigation. It also explains how to change the back lighting, how to use chart cards and how to control the chart display.

More detailed information on operating the chartplotter is given in Chapters 3, 4 and 5.

## 2.2 Switching the Chartplotter On and Off

► To switch the chartplotter on and start operation:

1. Press and release the red **POWER** key.

The keys light up, and the display shows the last-used location. Over this is the chartplotter status screen, which includes:

- Software version number
- Database version number
- Chart number and description for any card in each of the two card slots.

After 10 seconds, the following caution is displayed:

### CAUTION

**The charts displayed on your Chartplotter are based on geographical data that C-MAP believes to be accurate. However you should not rely on these displays as your primary source of navigation, rather your Chartplotter should be used only as a backup to official government charts and traditional methods of navigation.**

**Note:** *You can now turn on and adjust the display backlighting and contrast, if required, as described later in Section 2.3.*

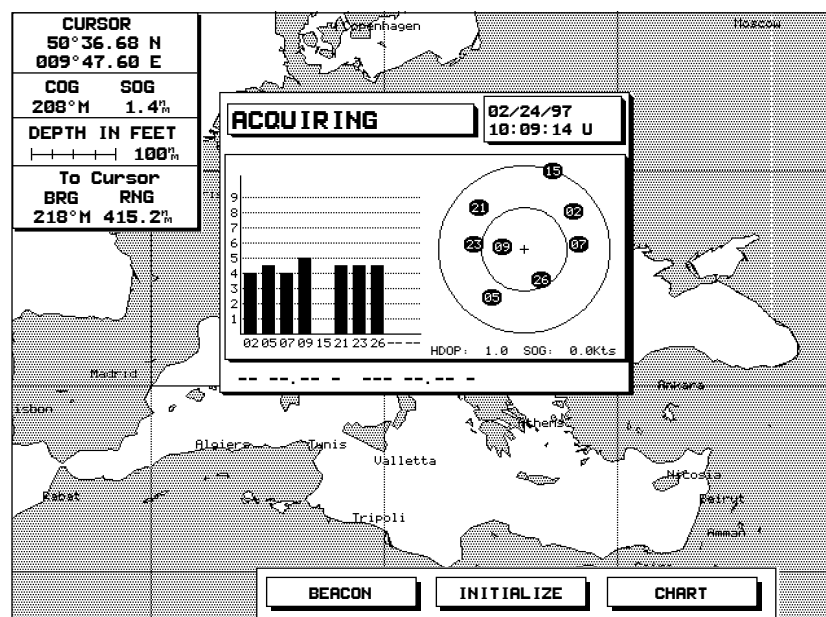
2. When you have read the notice, press the CONTINUE soft key to accept the caution.

The Fix Status window, providing GPS status information is displayed. The Fix Status window is illustrated and described on the following page.

3. To clear the Fix Status window and display the chart, press the CHART soft key. (You can redisplay the Fix Status window later if required, as described in *Chapter 6*.)

- To switch the chartplotter off, press and hold the POWER key for three seconds. A countdown timer is displayed, and if you release the key before the timer reaches zero the chartplotter will remain on. Otherwise, when the timer reaches zero the chartplotter display is cleared and the key lights go off.

### Fix Status Window



The right side of the window shows the satellite positions, with each satellite identified by a number. The bargraphs on the left indicate the signal strength for each of the currently located satellites. Initially, the chartplotter uses the predicted satellite positions, and the bargraphs are blank until the satellites are located.

The GPS searches for the strongest signals: at least four are required for an accurate position fix. If the signals from the currently located satellites are not strong enough, the GPS searches for other satellites and these are displayed in turn. If the fix is from another source (e.g. Loran) the display shows "Good Fix" but satellite positions may not be shown.

If a position fix has not been established, a "Fix Alarm" message is displayed. You can clear the alarm by pressing any key. The unit will beep every few seconds to indicate there is no position fix, until the position has been established.

The soft keys INITIALIZE and BEACON can be used to initialize the GPS and to manually set up a differential beacon. These functions are described in *Chapter 6*.

## 2.3 Adjusting the Lighting and Contrast

You can change the level of screen backlighting and monochrome screen contrast.

- A 630 Chartplotter with color display has six brightness levels and a day/night view setting.
- A 620 Chartplotter with a monochrome display has six brightness levels and 40 contrast levels.

**Note:** *The color display lighting can be dimmed but cannot be turned off.*

The control key lighting is bright when the screen backlighting is on. When the screen lighting is off, the keys are lit at a low level so that you can always find the keys.

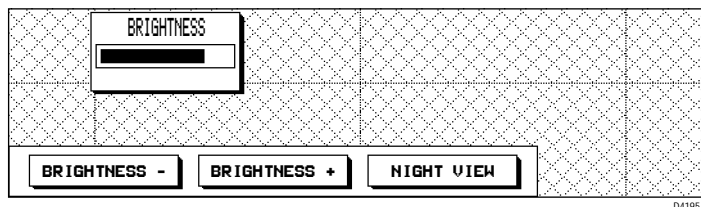
► To change the backlighting and contrast:

1. Press the **POWER** key. (Do not press and hold the key, or the power-off message will be displayed.)

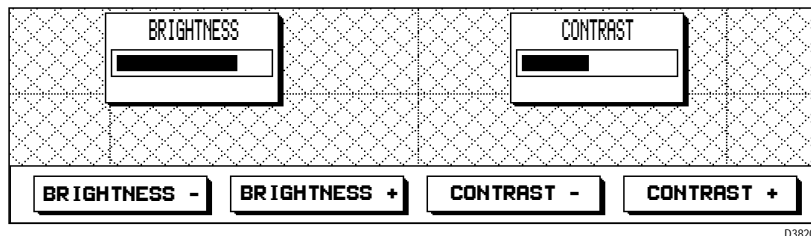
The brightness slider is displayed on the color screen; the soft keys provide control of the slider and the night /day setting.

Two sliders appear on the monochrome screen, showing the current settings for brightness and contrast; the soft keys provide control of the sliders.

### Color



### Monochrome



2. Press the appropriate soft key, to adjust the backlight brightness or the contrast to the required level. The brightness and contrast change as you adjust the sliders.

On the color display, press the NIGHT VIEW/DAY VIEW soft key to switch between the night and day setting.

3. Press **ENTER** or **CLEAR** to store the new settings and return to the previous display.

Alternatively, after several the seconds the lighting controls are removed and the screen returns to the previous display.

The new lighting and contrast levels are retained until you reset them or turn off the chartplotter.

At power-on, the monochrome screen lighting is always off, but the last-used contrast setting is retained.

The color screen powers-on at the last used settings for brightness and night/day view.

## 2.4 Using Chart Cards

The chartplotter has a built-in world map. Most areas are covered on a scale of about 300nm per inch on the screen, although some populated areas have details down to 30nm per inch on the screen. The chartplotter displays a scale indicator on the screen for all chart displays.

To use the chartplotter fully, charts with detailed information for the area in which you wish to navigate are required. These are available on C-MAP NT electronic chart cards (C-Cards), each of which can store as many as 20 charts in an electronic format. A single C-MAP chart normally provides as much information as is available in paper charts for that geographic area, with detail up to 0.05nm per inch.

The chartplotter allows you to install two chart cards at the same time. You can also use the slots for C-MAP Memory C-Cards, which allow you to store and retrieve data such as waypoints and routes.

**Note:** *You can insert and remove cards while a chart is displayed. The chart information is displayed when the chartplotter redraws the screen eg, when you pan outside the current area or use the **RANGE** key to change the chart scale. After removal of a card, chart information is retained until screen redraw. You should not insert or withdraw either card whilst a chart is redrawing.*

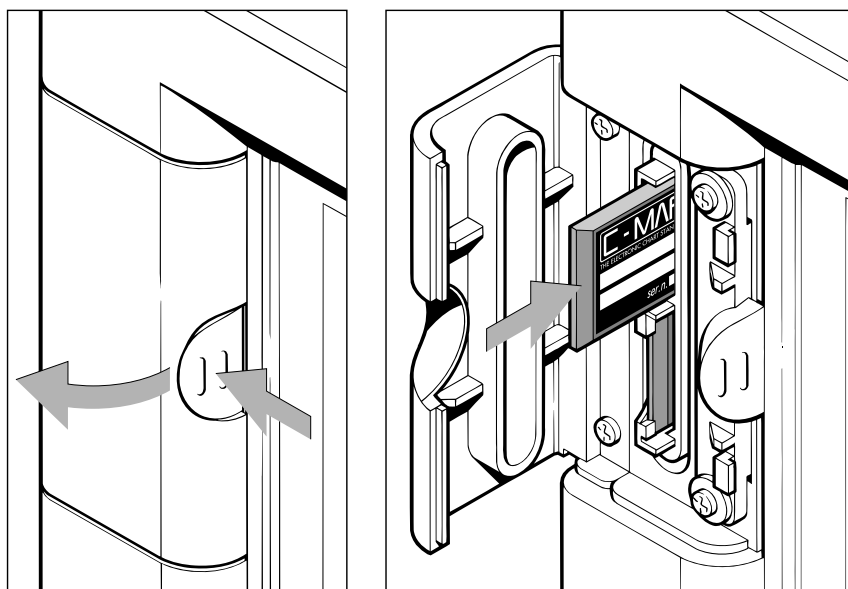
### Inserting a Chart Card

- To insert a chart card:
  1. Check that the card is the correct format (C-MAP NT C-Card), with the required chart stored on it.
  2. Open the card cover, at the top left of the chartplotter front panel, by pushing the latch to the left and then opening the cover as shown in the illustration on the following page.

3. Hold the card with the metal contacts facing left and the text “front insertion” towards the card slot. The C-MAP label will be facing right, as shown in the illustration.
4. Gently push the card into one of the two slots. It will only go in if it is the right way round.

Push the card in as far as it will go, then move it to the left so that the top is under the retaining pegs. Release the card so that it is held in place by the pegs.

5. Close the card cover so that it clicks shut, to stop water splashing into the chartplotter.
6. Display the chart information by pressing the **RANGE** key to change the chart scale.



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## Removing a Chart Card

- To remove a chart card:
  1. Open the card cover, at the top left of the chartplotter front panel, by pushing the latch to the left (see above).
  2. Press down the card you wish to remove, and move the top of the card to the right to clear the retaining pegs.
  3. Pull out the card.

## Displaying the Chart Data

The new chart information will be displayed when you move the cursor into an area covered by the new chart and zoom in.

The boundary of each chart digitized in the displayed card is shown as a box or rectangle. (You can switch off the chart boundaries display if you wish, as part of the chartplotter setup described in *Chapter 6*).

➤ To zoom in:

1. Use the trackpad to move the cursor inside one of the chart boxes, and press the lower part of the **RANGE** key.

That area is expanded so that you can see more detail. Note that the smaller the chart box is on the screen, the greater the amount of detail that is available when you zoom in.

**Note:** *You cannot zoom out further than the world map and, unless you have switched on the **Plotter Mode**, you cannot zoom in further than the most detailed chart.*

## Displaying Information About Objects

Chart cards include a number of displayed objects for which information is available, such as lights and buoys. Chart source data is also available and, if your chart includes port and tide data, this can be displayed. You can use the cursor to identify the object and display detailed information. In addition, position information is available for waypoints and events added using the chartplotter functions.

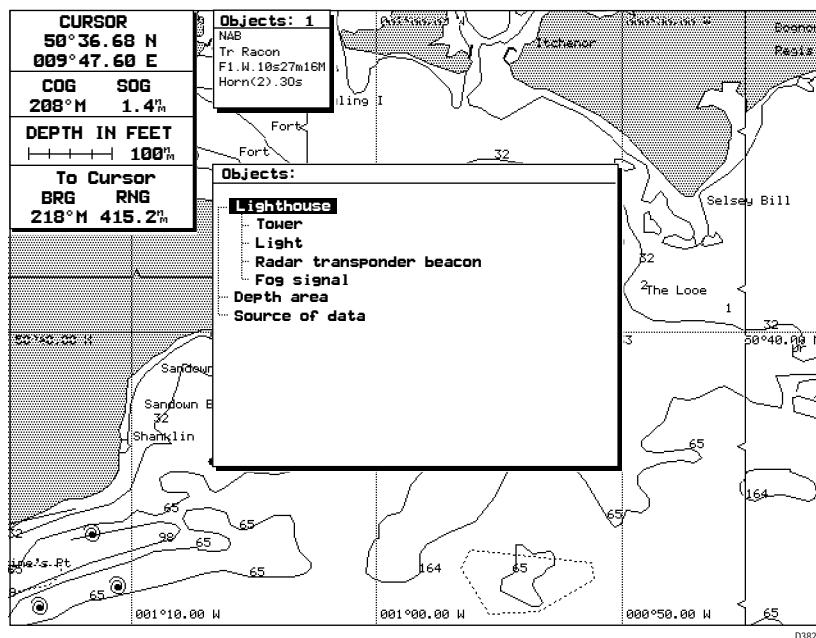
➤ To obtain the chart object information:

1. Move the cursor over the symbol for which you require the information. After a moment, an Object data box appears at the top of the screen, as shown at the top of the example below.
 

If the cursor is over more than one object for which information is available, the number of objects is shown and their descriptions are listed.
2. To view further details, press **ENTER**. The soft keys EXPAND, ALLINFO and NEAREST are displayed.
3. To obtain expanded information about the object(s):
  - a. Press the EXPAND soft key. The objects and any sub-objects are listed in a window in the center of the screen.
  - b. Use the trackpad to scroll up and down the list, and highlight the required object or sub-object.
  - c. Press **ENTER**. Any available information is displayed.
 

If there is more than one page of information for the object, you can page through it using the PAGE DN soft key, and go back to the beginning using the BACK soft key.
  - d. Press **CLEAR** to return to the expanded list, and select another object if required.

- e. Press **CLEAR** to clear the expanded information display, and return to the EXPAND and ALLINFO soft key display.




4. To obtain all the information available at this location:
  - a. Press the ALLINFO soft key.  
The information is displayed in the same way as the expanded data, but includes additional information such as the depth area and the source of the data.
  - b. Press **CLEAR** to clear the detailed information display, and return to the EXPAND and ALLINFO soft key display.
5. To obtain port information for the nearest ports:
  - a. Press the NEAREST soft key. The port facility symbols are displayed.
  - b. Use the trackpad to highlight the facility for which you require information, then press **ENTER**.
  - c. The nearest ports providing that facility are listed, with distance and bearing to the port. If you highlight a port name, then press **ENTER** the cursor moves to that port (redrawing the chart) and the details for that facility are displayed.  
**Note:** *The distance and bearing to port is a direct measurement and is not necessarily a safe route to the facility.*
  - d. Press **CLEAR**, the facility symbols for the selected port are displayed as described below.
6. Press **CLEAR** to return to the initial soft key display.

## Port Area


At large chart scales **port area** information is indicated by the symbol .

Where available, details for each facility can be displayed. In some areas the chart shows symbols for individual facilities. The facilities and their associated symbols are defined below.


- To obtain port facility details
  1. Place the cursor over the port symbol . The port facility symbols are displayed
  2. Press **ENTER** to display the soft keys EXPAND, ALL INFO and NEAREST.
  3. Press EXPAND or ALL INFO to list the port facilities in the object information pop-up.
  4. Use the trackpad to highlight the required facility then press **ENTER**. The details for that facility are displayed.
  5. Press **CLEAR** three times to return to the initial soft key display.

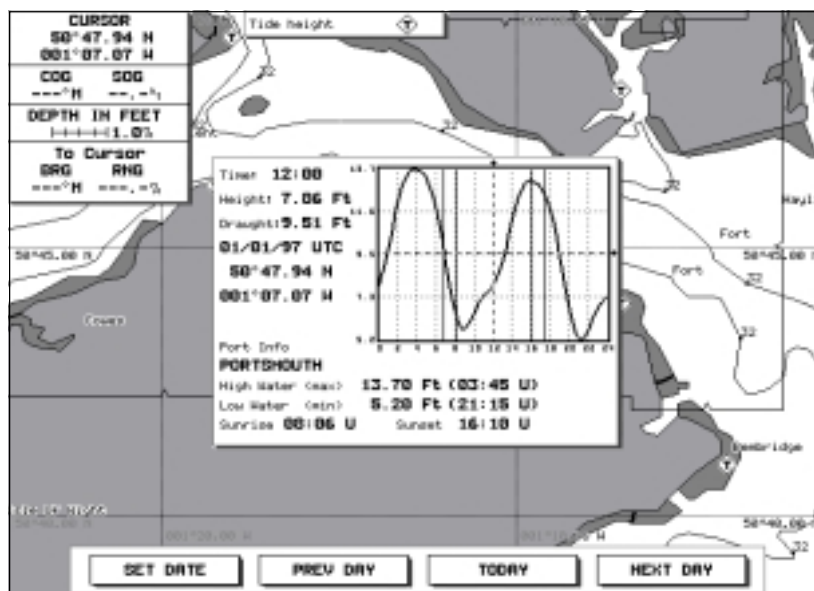
						
Health Emergency	Harbour Master	Coast Guard	Engine Repairs	Fuel Station	Water	Electricity
						
Port Marina	Police	Customs	Boat Yard	Accessories	Elect. Repairs	Sailmaker
						
Scuba	Pharmacy	Slipway	Boat Hoist	Crane	Visitor's Berth	Chandler
						
Bottle Gas	Post Office	Yacht Club	Hotel-Inn	Restaurant	Bank-Exchange Office	Showers
						
Laundrette	Public Toilets	Post Box	Public Telephone	Refuse Bin	Provisions	Car Parking
						
Caravan Site	Camping Site					

## Tide Data

The symbol  indicates **tide height** data is available for that position on the chart. The Raychart displays a graph of real time predictions of the maximum and minimum tide heights for the selected day. A digital readout provides sunrise and sunset as well as tide details for the selected day. Time is displayed in the selected local time zone.

**Note:** *Tide predictions are accurate for moderate weather conditions. However severe weather patterns can affect actual time and height.*

- To obtain tide height data:
  1. Place the cursor over the tide symbol . The tide height object data box and the soft keys EXPAND, ALL INFO and NEAREST are displayed.
  2. Press EXPAND. The data is displayed as illustrated below.



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The time and draught are represented by a dotted vertical and horizontal line on the graph. You can use the trackpad to move the lines; you move the vertical line to select a time for which the tide height is displayed.

You can use the soft keys and trackpad to change the date for which tide information is shown.

- To select a time, press the left or right side of the trackpad to move the cursor to the required time.
- To change the day press PREV. DAY, TODAY or NEXT DAY as required. Alternatively, press SET DATE; to change date, use the trackpad to move the cursor left/right to select the digit and up/down to increase/decrease the digit. The graph and tide data are updated.

## 2.5 Controlling the Chart

You control the chart display using the cursor and control keys. You start all operations with the initial soft keys displayed (this is referred to as the initial screen in the following sections).

When you have completed an action using the soft key sub-sets, to return to the initial screen, press **CLEAR**; you may need to press **CLEAR** several times to back-track through the sub-set hierarchy.

**Note:** *If you have set up your system so that the initial soft keys are not displayed all the time, press any soft key to display the labels.*

Although you can use your chartplotter with the whole screen devoted to the chart, you can also display navigation data in one or two **windows**, with the chart displayed in the rest of the screen. Navigation data windows are controlled using the **DISPLAY** key.

This section describes how to:

- Move around the chart by panning the display, changing the chart scale and changing the chart centre.
- Display navigation data.

**Note:** *The orientation of your chart (North Up, Course Up or Head Up) depends on your choice when you set up the chartplotter, as described in Chapter 6.*

**The chart controls are summarised in the illustration on page 9.**

### Moving the Chart

You will normally operate the chartplotter with the chart showing your vessel's current location. In the default North-Up orientation, the display is in **True Motion** mode, in which the vessel moves across the screen. You will need to move the chart if your vessel moves out of the area currently displayed, or if you wish to examine or place marks/waypoints in another area.

There are three ways in which you can move the chart:

- Use the **trackpad** to move the cursor to the edge of the chart. The chart will pan across (see *Section 1.3*). This method is useful if the area you wish to see is only just off the screen.
- Use the **RANGE** key to zoom out to a small scale chart, move the cursor to the centre of the required area, then zoom in on the new area. This method is useful if the area you wish to see is a long way away.
- Use the **CENTER** soft key to center the chart on one of a choice of positions: the vessel's position, the cursor position or a specified position.
- Automatically re-center the chart using the **HOME** option.

**Note:** *If you have selected a chart display with one or two data windows, the chartplotter will treat the start of the data window as the edge of the chart.*

### Changing the Chart Scale

The **RANGE** key allows you to change the cartography scale so that you can see a smaller or larger area on the screen. Plotter mode is available to allow you to zoom into a smaller area, even when no chart data is available for that scale. *Chapter 6* describes how to set plotter mode on/off.

You can change the chart scale for two purposes:

- To see either more detail (a smaller area) or a larger area on the screen
- To move the display to another area of the chart, by zooming out to a small scale chart, then zooming in on another area

Small scale charts give you the wider view, but without the level of detail that you may need in order to navigate safely. The amount of detail that is visible depends on the amount available for that chart, and also on how you have specified the cartographic detail when you set up your chartplotter (see *Chapter 6*).

► To zoom in to a larger scale chart:

1. Use the trackpad to position the cursor in the area you wish to see in more detail.
2. Press the lower part of the **RANGE** key.

The section of the chart around the cursor is enlarged to fill the screen with a larger-scale chart showing more detail. The cursor is now positioned in the center of the screen.

The range scale indicated at the top left of the screen is updated.

**Note:** *If you hold down the **RANGE** key, the range scale display is redrawn quickly without the chart being redrawn. Simply release the key when the required scale is shown, and the chart will then be updated.*

3. If further chart enlargement is available using the current chart card you can press the bottom of the **RANGE** key to zoom in again, repositioning the cursor first if required.

An area of further chart detail is indicated by a chart boundary.

4. When no further chart detail is available, as you press the bottom of the **RANGE** key, the effect depends on whether you have set **Plotter Mode** on or off as follows:
  - If Plotter Mode is *off* (the default setting), the chartplotter beeps three times and the range scale remains unchanged.
  - If Plotter Mode is *on*, the range scale is increased and the display shows grid lines and no cartography. The letter “P” is displayed after the scale rule to

indicate that the chartplotter is in Plotter Mode.

The chart detail is restored when you return to a chart scale for which the information is available.

- To zoom out to a smaller scale chart, simply press the upper part of the **RANGE** key as many times as required. If no smaller scale chart is available, then the chartplotter beeps three times when you press the upper part of the **RANGE** key.

### Changing the Chart Center

You can move a chosen point to the center of the chart, using the CENTER soft key. The chosen point can be the vessel's position, the cursor position or a specified position.

You can also select **Home Mode**, which centers the vessel, homes the cursor and changes the cursor data box to provide information about your vessel's position. The chart moves to ensure that the vessel remains on-screen.

**Note:** *Changing the range scale always centers the chart on the cursor.*

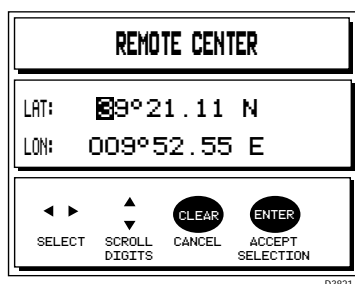
#### Centering the Chart

- To center the chart using the CENTER options:
  1. From the initial soft key display, press the CENTER soft key.

The following soft keys are displayed:



2. Press the soft key for the center option you require (or **CLEAR** to return to the initial screen):
  - CENTER BOAT moves the chart so that your vessel's position is at the centre of the chart, and repositions the cursor so that it is over the vessel
  - CENTER CURSOR moves the chart so that the point you selected with the cursor is at the centre of the chart
  - REMOTE CENTER displays an input box for you to enter the position for the new center
  - HOME moves the chart so that your vessel's position is at the centre of the chart, and enters Home Mode (see below)
3. If you pressed REMOTE CENTER, the input box displays the current cursor position, as latitude and longitude or TDs depending on your system.



Change the values to the screen centre, as follows:

- a. Move the cursor to the first digit you wish to change, using the left or right trackpad controls. When you move right from the latitude direction, the cursor moves to the first longitude digit.
  - b. Increase or decrease the number, using the up or down trackpad controls.
  - c. Repeat steps a and b until all the digits are set to the required values.
  - d. Press **ENTER** to set the position or **CLEAR** to cancel and return to the initial display.
4. The display returns to the CENTER soft keys display, with the new chart position. Press **CLEAR** to return to the initial display.

### Using Home Mode

When you select the HOME option, the chartplotter centres the vessel and changes to Home Mode. In this mode:

- The cursor is not displayed, but is fixed to the vessel's position
  - The cursor data box displays the vessel's current position; if you are tracking to a waypoint, it also displays the waypoint name, bearing and range
  - In Head Up or Course Up modes (see *Chapter 6*), the display changes to **Relative Motion**, in which the chart moves to keep the vessel in the centre of the display.
  - In North Up mode, the chart moves to ensure the vessel remains on-screen.
- To return to the standard cursor and motion mode, press the trackpad. The cursor re-appears and the cursor data box displays the cursor position data.

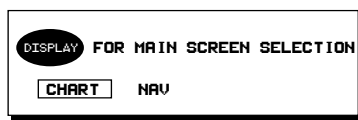
## Displaying Navigation Data

Although you can use your chartplotter with the whole screen devoted to the chart, you also have the option of displaying a wide range of navigational data.

This information is normally presented in one or two **windows**, with the chart displayed in the rest of the screen. Three options are available for displaying navigational data:

- Chart displayed Full Screen, with no additional data.
- Chart displayed with pre-defined navigational data in one or two Windows.
- Chart with Navigation insert displaying Bearing Deviation Indicator (BDI) or Course Deviation Indicator (CDI).

The navigational data windows are controlled using the **DISPLAY** key. When you press the **DISPLAY** key, the following prompt is displayed, with the last-used option highlighted:



Press **DISPLAY** to toggle between the two settings:

**CHART** Displays the last used option – Full Screen chart, or chart with window.

The soft keys let you select a FULL screen chart, or a chart with the current WINDOW(s) configuration. If Windows are selected, you can change the window configuration.

**NAV** Displays the chart and inserts the last-used navigation indicator at the bottom right of the screen. You can use the soft keys to select a BDI or CDI display.

The soft key labels disappear after 7 seconds if you do not make a selection.

The display options are described in more detail in the following sections.

## Chart

The CHART soft keys let you select either a Full Screen chart or a chart with data window(s). When you press the **DISPLAY** key to select the CHART option, the last used configuration is displayed.



Ten navigational data windows are available for display; six are pre-defined and supplied with the chartplotter, in addition four can be customized as part of your set up procedure, described in *Section 6.3*. You can display one or two data windows and select the window position.

The windows soft keys disappear after seven seconds if you do not make a selection.

### Changing between Full Screen and Windows

- You can change between the full screen display and windows display using the soft keys as follows:

FULL	Clears any data windows .
WINDOW	Displays the chart with navigational data, in the current default windows configuration.

Press **CLEAR** to return to the initial soft key display .

### Changing the Window Set Up

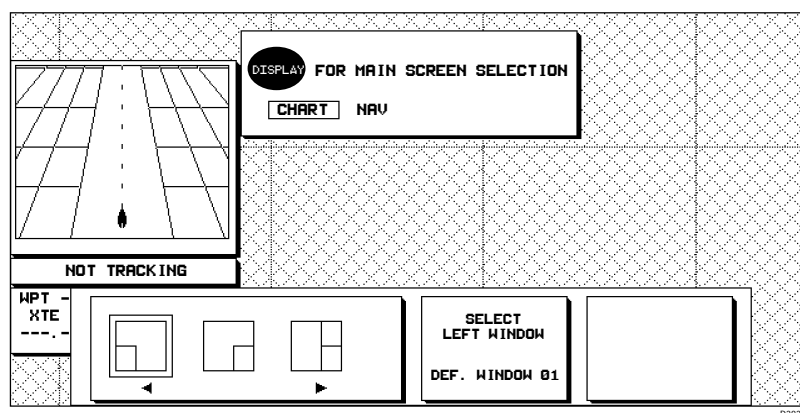
The WINDOW SET UP soft key lets you change the window configuration. You can select:

- The number of windows (1 or 2)
- The position of the windows on the screen
- The contents of the windows, by selecting from the list of predefined or customized windows available

#### Notes:

1. *It is recommended that you customize the windows, as described in Section 6.3, before you select a custom window for display.*
2. *If the help level is set to Level 1 (the factory setting), the windows are moved up the screen so that they do not overlap the soft keys. This means that you cannot select two windows in a full-height column: if you wish to do so, you must change the help setting to Level 0, as described in Chapter 6.*

- To change the window configuration:
  1. Press **DISPLAY** to display the Chart soft keys (see above).
  2. If a window is not already displayed, press the WINDOW soft key.
  3. Press the WINDOW SET UP soft key to display the selection keys and current settings, as shown in the following example.



4. Use the two left-hand soft keys to select the number and location of the windows. You can select:
  - One window at the bottom left of the chart display
  - One window at the bottom right of the chart display
  - Two windows, one above the other, in a full-height column at the right of the chart display

The display changes as you highlight the different settings.

5. Use the SELECT LEFT/BOTTOM WINDOW or SELECT RIGHT/TOP WINDOW soft key to scroll through the available data sets for the window.

Each time you press SELECT WINDOW, the next available set of data is displayed in the current window. These sets include the six default windows supplied with your chartplotter, plus the four custom windows you can set up as part of your display setup procedure (see *Chapter 6*).

6. When you are happy with your selections, press **ENTER** to return to the initial soft key display.

Alternatively, press **CLEAR** to cancel your selections and retain the previous configuration.

7. Press **ENTER**, or wait 7 seconds, to return to the initial soft key display.

## Navigation

The NAVigation display soft keys let you to select a chart display with either of the following:

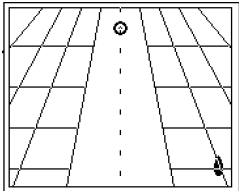
- **CDI**, the Course Deviation Indicator, which shows off-course error as the distance your vessel is from the current track
- **BDI**, the Bearing Deviation Indicator, which shows off-course error as the difference between your vessel's heading and the bearing to waypoint

When you press the **DISPLAY** key to select the NAV option, the indicator you last used (CDI or BDI) is shown.

The soft keys disappear after 7 seconds if you do not make a selection.

The CDI or BDI data is presented in a window at the bottom right of the screen, with steering data, as shown in the examples below:

**CDI (Course Deviation Indicator)**



Waypoint graphic, fixed until within 3nm then moves down the screen

Rolling range lines at 1nm intervals

Vessel graphic

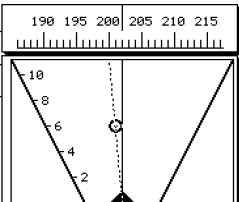
On-course indicator or direction to steer indicator  
 First arrow - XTE more than 0.01nm  
 Second arrow - XTE more than 0.05 nm

WPT 001	001WPT
XTE	BRG RNG
0.11	200°M 5.948

Waypoint sequence number and name, with cross track error, bearing and range to waypoint

**BDI (Bearing Deviation Indicator)**



Compass

Range, updated as the vessel moves

Waypoint graphic, moves as distance and bearing to waypoint change

On-course indicator or direction to steer indicator

WPT 001	001WPT
XTE	BRG RNG
0.11	200°M 5.948

Waypoint sequence number and name  
 Cross track error, bearing and range to waypoint

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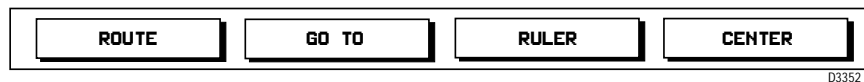
If there is no active waypoint, the message **NO ACTIVE WAYPOINT** is displayed in the window.



## Chapter 3: Using the Initial Soft Keys

### 3.1 Introduction

This chapter explains how to perform some basic chart operations using the trackpad, and the soft keys. The initial soft key display is shown below.



**Note:** *If you have set up your system so that the soft keys are not displayed all the time (Help Level 0), press any soft key to display the labels.*

This chapter covers the following topics:

- Setting up and using on-screen routes
- Using the GO TO key to navigate towards a selected point
- Measuring distances using the RULER key

Further basic functions, including track histories and placing marks and events, are described in *Chapter 4*. More advanced operation, involving the stored lists, is described in *Chapter 5*, including retrieving stored routes and making new routes using stored waypoints.

#### Safety

The chartplotter makes it very easy to mark a waypoint and track towards it. However, you should always check first that the route is safe. If you are using the chartplotter in combination with a SeaTalk autopilot, the autopilot will prompt for confirmation before it steers the vessel towards the waypoint.

If you have entered your route using a small-scale chart, zoom in to a larger scale to check for hazards, such as small shoals, that may not be shown on the smaller scale.

## 3.2 Setting Up and Using On-Screen Routes

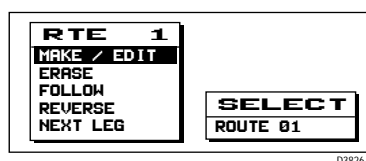
The ROUTE soft key provides a quick and easy method of setting up (or selecting) and using a route.

**Note:** You can also create, edit and control routes using the EDIT menu options, as described in Chapter 5.

The chartplotter can store up to 20 routes in the route list. When you want to create a new route, you can either select an empty position in the list, or select an existing route and edit it. You can also erase routes. If you need to keep more than 20 routes, you can save the information to a memory card (see Chapter 6).

**Note:** If you have two chartplotters on your system, the current route (active or selected) or GO TO on one chartplotter is displayed as Route 0 on the other chartplotter. It is therefore advisable to avoid using Route 0 when you create a route.

When you press the ROUTE soft key, a menu such as the following is displayed:



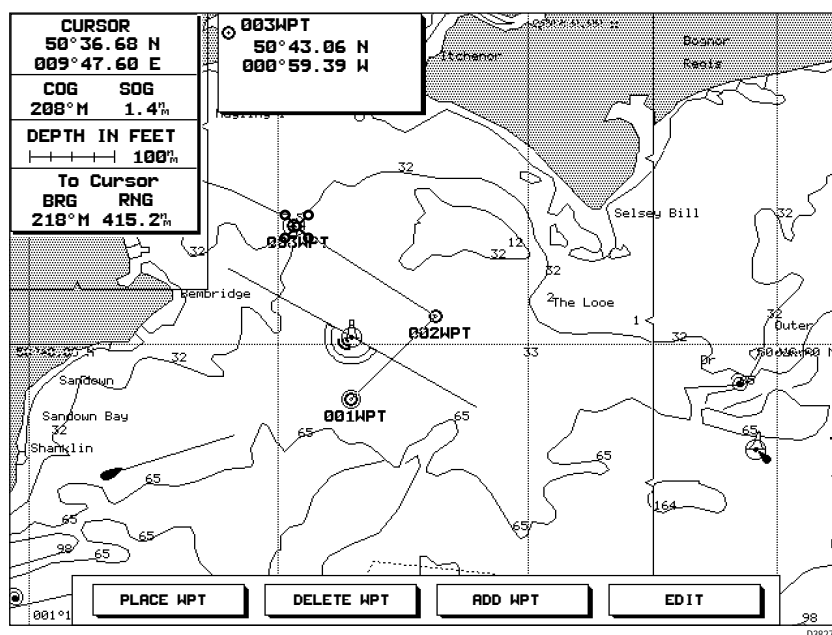
**Note:** The route number selection defaults to the last-used route. The available menu options depend on the contents of the selected route: If this route is empty, only the Make/Edit option is displayed; if the selected route is Route 0 and it is the active route from another chartplotter, the ERASE and REVERSE options are not displayed.

The menu options are as follows:

MAKE / EDIT	Used to set up a new route using the cursor. You can also use this option to edit an existing route, adding and removing waypoints, and to edit route information such as waypoint names and symbols.
ERASE	Used to clear the existing route from memory. This deletes the route, but not its component waypoints.
FOLLOW	Used to start tracking to the first waypoint on the route.
or OFF	Used to stop tracking. This soft key is displayed instead of FOLLOW when a route is already active.
REVERSE	Used to reverse the tracking order of the waypoints in the route.
NEXT LEG	Used to proceed to the next leg of the route.

## Making a New On-Screen Route

- To making a new route using the ROUTE soft key :
1. Move the cursor to the area in which you wish to make the route, and select a suitable chart scale.
  2. Press the ROUTE soft key to display the Route menu and the current route.  
**Note:** *If the selected position in the route list contains a route (the full list of ROUTE options is displayed), you can select ERASE to delete the route (see page 30), or continue with this procedure to add waypoints to the existing route.*
  3. If required, press the SELECT soft key to select an empty position in the list.
  4. Press **ENTER** to select the highlighted Make/Edit option.  
The soft key labels change, as shown in the illustration below.
  5. Use the trackpad to move the cursor to the position on the chart where you want your first waypoint to be.  
**Note:** You can position the cursor on an existing waypoint, if required. This waypoint will be included in the route, and a new waypoint will not be created.
  6. Press the PLACE WPT soft key.  
The waypoint appears on the screen at the current cursor position, together with the waypoint number assigned by the chartplotter.  
The first waypoint of a new route has a circle round the waypoint symbol, indicating that it will be the active waypoint if the route is made active.  
The cursor data box and object data box are updated to show the waypoint number and position, as shown in the example below.
  7. Move the cursor to the next waypoint position. A dotted line connects the cursor to the previous waypoint.
  8. Press PLACE WPT again. The waypoint is placed and the dotted line changes to a solid line.  
**Note:** *If you make a mistake, you can delete a wrongly-placed waypoint or insert an additional one, as described below.*
  9. Repeat steps 7 and 8 until you have placed all your waypoints. You can have up to 50 waypoints in a route.



Setting Up &  
Using On-screen  
Routes

10. When you have entered all your waypoints, press **CLEAR** to return to the initial screen.

Your route is displayed on the screen, but is not active.

- To add waypoints to a route using an external device such as the NavPlotter 100, use the MAKE /EDIT option as described above. You can then add waypoints using either the cursor and the PLACE WPT key, or using the external device. When an external waypoint is received, the cursor is positioned on it and the chart is centered.

## Editing an Existing Route On-Screen

You can edit the current route, even if it is active. You do this using the same screen you used for entering a new on-screen route.

- To add waypoints to the end of an existing route:
  1. Press the ROUTE soft key to display the Route menu and the current route selection.
  2. Use the trackpad, or press the ROUTE soft key, to highlight the MAKE/EDIT option, and press **ENTER**.

The cursor is connected to the last-placed waypoint with a dotted line, ready to add further waypoints to the route in the same way as for a new route.

You can now add, delete or insert waypoints, although you cannot delete a waypoint if you are tracking towards it.

**Note:** You can also use this option to delete waypoints that are not part of the current route, if you have selected the waypoint display option when you set up your chartplotter (see Chapter 6).

➤ To delete a waypoint:

**Note:** You cannot delete a waypoint if it is used in another route.

1. Use the trackpad to position the cursor over the waypoint you wish to delete.
2. Press the DELETE WPT soft key.
3. Press **ENTER** to confirm the deletion.

The waypoint disappears from the screen. If the waypoint was not at the end of the route, then the waypoints before and after the deleted waypoint are connected with a straight line.

Press **CLEAR** to return to the initial screen.

➤ To insert an additional waypoint in a route:

1. Position the cursor on (or close to) the line between two existing waypoints.
2. Press the ADD WPT soft key. The line changes from a solid line to a dotted line. (If the chartplotter beeps instead, move the cursor closer to the line and press ADD WPT again.)
3. Move the cursor to the required position. Dotted lines connect the cursor to the two existing waypoints.
4. Press **ENTER**. The new waypoint is placed, and named with the first available waypoint number.

Press **CLEAR** to return to the initial screen.

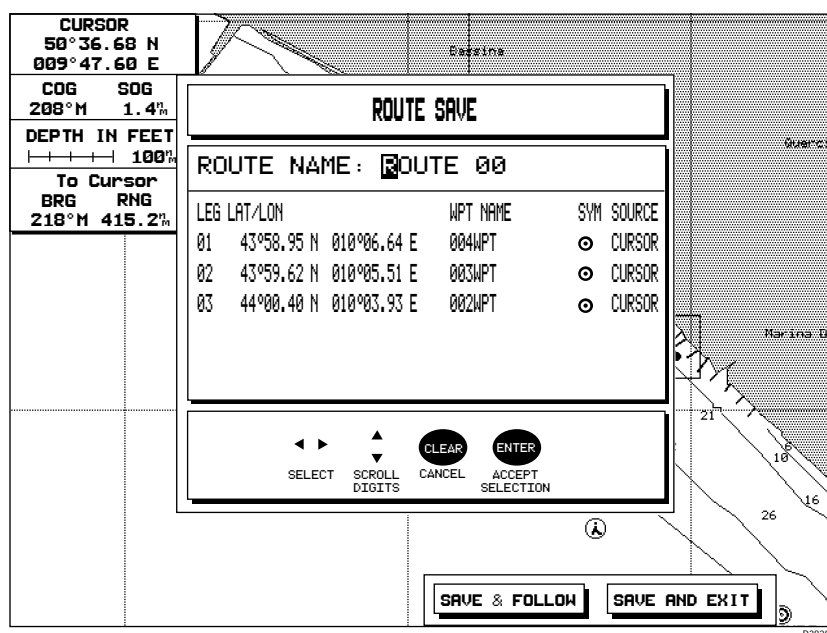
## Editing Route Information

Once you have created a route, you can edit the route information, including the route name and the waypoint names, symbols and positions.

➤ To edit the route information for the currently selected route:

1. Press the EDIT soft key from the MAKE/EDIT screen of the ROUTE menu.

The details of the current route are displayed on the screen, and the soft key labels change, as shown in the following example.



The route name is shown at the top of the route details. For each waypoint you placed, the following information is given:

- Leg** The leg number
- Position** The position of the waypoint at the end of this leg. The position is given as either latitude and longitude or TDs, depending on your setup selection.
- WPT Name** The waypoint name. The default name is in the format *xxxWPT*, where *xxx* is the waypoint number. Waypoints are listed in the Waypoint List in alphanumeric order by name (see *Chapter 5*). If you plan to use the Waypoint List, you may wish to name related waypoints so that they are grouped together in the list.
- Sym** The waypoint symbol. The default is a circle, but you can change it to any of the mark/event symbols (see page 42).
- Source** The source of the position information. For routes placed on-screen, this is always the cursor. If you edit the position, the source is updated to "EDIT".

You can change the route name or the waypoint positions, names or symbols.

2. Use the left or right sides of trackpad to move the cursor to the number, letter or symbol you wish to change. You can hold the trackpad down to move quickly, or press **ENTER** to skip to the start of the next field.
3. Use the top or bottom of the trackpad to increase or decrease the number, or change the letter or symbol.

4. Repeat steps 2 and 3 until the required information is displayed.
5. When you have finished editing the data, you can **either**:
  - Press the SAVE & EXIT soft key to save the changes and return to the initial screen
  - or
  - Press the SAVE & FOLLOW soft key to save the changes, return to the initial screen, and start navigating towards the first waypoint.

## Using a Route

When you have set up or selected a route, you can perform the following tasks:

- Follow or “initiate” the route (that is, start tracking towards the first waypoint)
- Retrace a route by following it in reverse order
- Advance to the next leg of the route
- Erase the route

You can also edit the route, even if it is active, as described above.

**Note:** *If you have two chartplotters on your system, the active route on one unit is also displayed on the second unit, where it will always appear as Route 00. You can use the Route menu options on the second unit to control the route tracking on the first unit.*

## Following, Reversing and Stopping a Route

When you have set up a route, you can start navigating towards the first waypoint. You can also follow a route in reverse order.

- If you did not initiate the route using the SAVE & FOLLOW soft key from MAKE/EDIT, you can do so as follows:
  1. If the Route menu is not already displayed, press the ROUTE soft key to display it.
  2. If the required route is not displayed, press SELECT until the route is displayed.  
Check the route display to confirm which waypoint will become active: this waypoint is displayed on the screen with a circle round it.
  3. If you wish to follow the route in the reverse order, use the trackpad or the RTE soft key to highlight the REVERSE option, and press **ENTER**. The circle moves to the waypoint at the opposite end of the route.
  4. Use the trackpad or the ROUTE soft key to highlight the FOLLOW option, and press **ENTER**.  
The chartplotter navigates towards the waypoint, unless a waypoint is already active.

If you are already navigating to a waypoint (either by following a route or using the GO TO option), a warning message is displayed (see page 39).

- To stop following the current route, select the OFF option from the ROUTE menu. This option replaces the FOLLOW option when the route is already active.

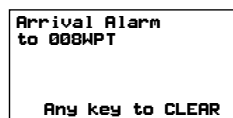
### Advancing to the Next Leg of the Route

When you reach the active waypoint, the chartplotter automatically makes the next waypoint in the route active.

The alarm buzzer sounds and a message is displayed when either of the following conditions is met:

- If you have set the Arrival Alarm and the vessel has reached the arrival circle specified for this alarm.
- Your vessel passes the target (that is, it crosses the line perpendicular to the route leg, and through the target).

The alarm is cleared after 7 seconds. You can clear the alarm earlier by pressing any key.



- You can also advance to the next leg even if you have not reached the current waypoint. From the ROUTE menu, highlight the NEXT LEG option and press **ENTER**. The chartplotter starts tracking from the vessel's current position towards the next waypoint.

### Erasing a Route

The chartplotter can store up to 20 routes. If you already have 20 routes and want to create a new route, you can erase a selected route.

**Note:** *If required, you can store routes on a Memory C-Card for future use, as described in Chapter 6, before deleting them from the chartplotter's memory.*

- To erase an existing route:
  1. Press the ROUTE soft key to display the Route menu.
  2. Press SELECT until the required route is displayed.
  3. Use the trackpad or ROUTE soft key to highlight the ERASE option, and press **ENTER**.
  4. Press **ENTER** to confirm the deletion.

The route disappears from the screen, and the route soft keys are cleared.

### 3.3 Using the GO TO Key

The GO TO initial soft key provides a quick method of navigating to a target point. You can select any target point (which is then stored as a new waypoint) or an existing waypoint.

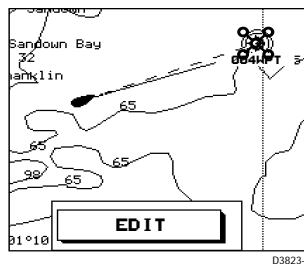
**Note:** You can also search for a specific waypoint and track towards it using the Waypoint List options (see Chapter 5).

#### Navigating to a Target Point

- To navigate to a target point:
  1. Use the trackpad to position the cursor on the target point.
  2. Press GO TO.

The chartplotter saves the target point as a new **waypoint** and starts tracking towards it. If your target point is an existing waypoint, its position is used and a new waypoint is not created.

If a waypoint is already active refer to *Clearing or Changing a GOTO below*.



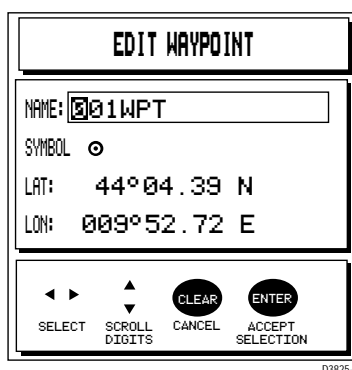
The waypoint is shown as a circle with a dot in the center, and is connected to the vessel's starting position with a dashed line. The waypoint is given a default name of the format `xxxWPT`, where `xxx` is the next available waypoint number.

3. Press the EDIT soft key, that is displayed for 7 seconds, if you wish to change any of the waypoint information for the new waypoint:

#### Editing the Waypoint Details

You can change the new waypoint's name, symbol and position within 7 seconds of requesting GOTO.

- To edit the waypoint details:
  1. Press the EDIT soft key. A window such as the following is displayed:

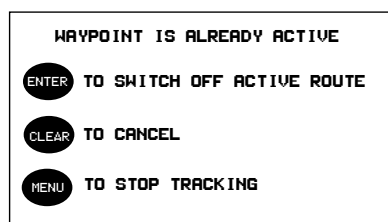


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2. Use the left or right sides of the trackpad to move the cursor to the number, letter or symbol you wish to change. You can hold the trackpad down to move quickly.
3. Use the top or bottom of the trackpad to increase or decrease the number, or change the letter or symbol.
4. Repeat steps 2 and 3 until the required information is displayed.
5. Press **ENTER** to save the details.

## Clearing or Changing a GO TO

If a waypoint is already active when you request a GO TO, the chartplotter displays the following message:



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The active waypoint may be a previous GO TO, or it may be the active waypoint in the current route.

- To change to the new waypoint (GO TO target point), press **ENTER**.
- To cancel the GO TO and continue navigating to the existing active waypoint, press **CLEAR**.
- To stop navigating to the active waypoint, press **MENU**.

**Note:** This means you can abandon a GO TO at any time by pressing GO TO then **MENU**. If you turned off the waypoint display when you set up your chartplotter, the waypoint disappears since only the active waypoint and the current route waypoints are displayed (see Chapter 6).

### 3.4 Measuring Distances Using the RULER Key

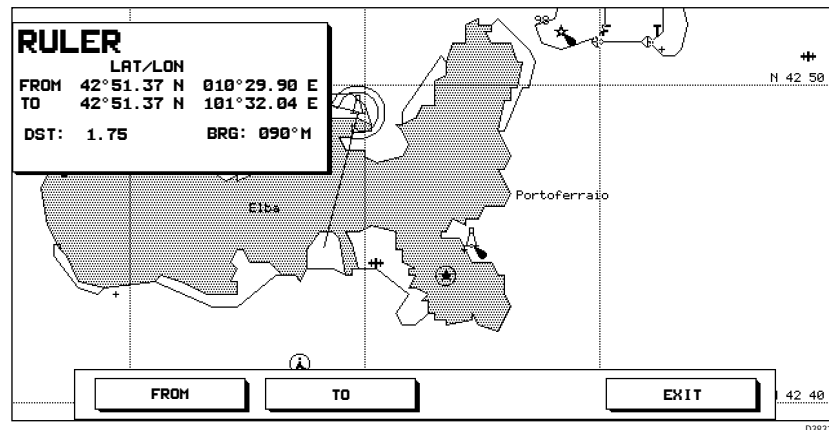
► You can obtain an accurate measurement of the distance between two points by using the RULER soft key, as follows:

1. From the initial soft key display, press the RULER soft key.

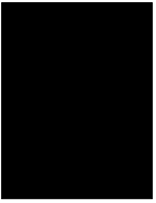
The soft key labels change, as shown in the example below.

2. Use the trackpad to move the cursor to the measurement start point.
3. Press FROM. The start point is marked with an “F”.
4. Use the trackpad to move the cursor to the measurement end point. A dotted line connects the From point to the cursor.
5. Press TO. The end point is marked with a “T”.

A dotted line connects the two points, and a ruler data box is displayed.



6. If required, repeat with further FROM and TO positions. The ruler information is updated each time you select a new FROM or TO location.
7. Press **CLEAR** or EXIT to clear the ruler display and return to the initial screen.



# Chapter 4: Additional Basic Functions

## 4.1 Introduction

This chapter explains how to use some further basic functions available on the chartplotter, using the dedicated keys and the menus.

To get the most out of your chartplotter, you should set up the basic data and customize the display, as described in Chapter 6. Once you have explored the display possibilities, you may wish to return to the customization and make further changes (see *Section 6.3*).

This chapter covers the following topics:

- Using marks and events
- Recording and displaying track histories
- Man Overboard (MOB)
- Controlling alarms and timers

## 4.2 Marks and Events

The chartplotter allows you to place symbols to record marks or events. You have a choice of 16 symbols that can be used for both marks and events.

Marks and events differ in the following ways:

- **Marks** are used to record features at the cursor position, such as fishing buoys and anchorages. They are only graphical symbols, and you cannot edit them or add information.
- **Events** are used to record features at your vessel's current position, such as a good fishing spot.

Events are special waypoints. The chartplotter assigns a unique identifier to each event, in the format *xxxEVT*, where *xxx* is the next available number.

The events are stored in the waypoint list, and can be recalled and edited later (see *Chapter 5*).

The Danger Zone mark (☒) has an associated invisible *exclusion zone* around it. You can specify the radius of the exclusion zone as part of your setup procedure (see *Section 6.2*). For the first nine danger zones, if your vessel enters the zone, an alarm will sound.

**Note:** *The danger zone alarm is only available for the first nine danger zones.*

Up to 1000 marks can be displayed on the screen at one time, and up to 1000 events or waypoints.

## Placing and Deleting a Mark

► To place a mark symbol at the cursor position:

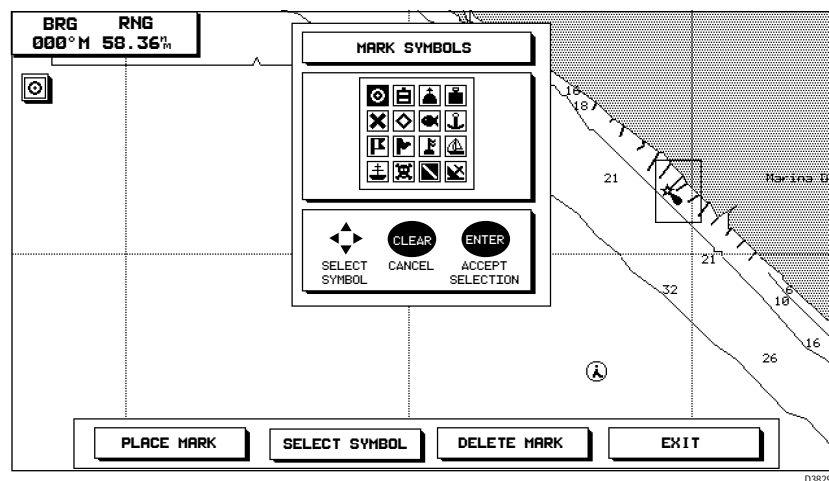
1. Press the **MARK** key.

The soft key labels change, as shown in the example on the following page.

The current mark symbol is shown below the cursor data box at the top left of the screen.

2. If you wish to choose a different symbol for your new mark, press the **SELECT SYMBOL** soft key. The Mark Symbols dialogue box is displayed in the centre of the screen.
3. Use the trackpad to move around the symbols until the required symbol is highlighted, and press **ENTER**.

The dialogue box is removed, and the new symbol is displayed under the cursor data box.



4. Position the cursor at the point where you wish to place the mark.
5. Press the **PLACE MARK** soft key to place the new mark at the cursor position.
6. Press **EXIT** or **CLEAR** to return to the initial soft key display.

► To delete a mark:

1. Press the **MARK** key, to display the Mark soft key labels.
2. Position the cursor over the mark you wish to delete.
3. Press the **DELETE MARK** soft key to delete the mark.
4. Press **EXIT** or **CLEAR** to return to the initial soft key display.

## Placing and Deleting an Event

The procedure for placing an event is the same as for placing a mark, except that you use the **EVENT** key and the event is always placed at the vessel's position. The event is marked with an event name in addition to the event symbol.

If the date, time, sea temperature and depth are available they are recorded with the event.

The procedure for deleting an event is the same as for deleting a mark, except that, since events are special waypoints, you are prompted to confirm the deletion.

## 4.3 Using Track Histories

The chartplotter TRACKS function allows you to mark on the chart the actual route that your vessel has followed, as if it had left a visible fixed wake.

While the track is turned on, it is recorded in the chartplotter's memory, and can be retrieved and displayed later if required. For example, you may wish to display a previous track, and then use the Route option to place waypoints along it that you can follow the same route again.

### **Caution:**

**In confined waterways, if you place waypoints onto a track you should be aware of GPS accuracy limitations.**

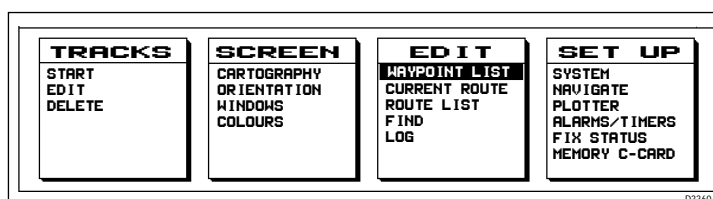
You can store up to 5000 track points in total, in up to 5 track files. The chartplotter issues a warning when 4000 points have been stored. Up to 5 track history files, including the current track, can be displayed on screen at one time. The track files stored in memory can be downloaded to a Memory C-Card (see *Chapter 6*). C-Card files can be retrieved for display at a later date.

The length of track that can be displayed is limited by the frequency of the track points. The more frequent the track points, the more accurate the track recorded, but the more memory is required. If you wish to display and record a long track, you may need to increase the gap (interval) between points. Once the memory is full, track points will start to disappear from the beginning of the track. The chartplotter allows you to specify the track interval, in terms of either distance or time.

You can check the number of track points recorded for each track file, by displaying the Tracks Edit window as described below.

## Starting and Stopping a Track

- To start and stop a track:
  1. From the initial soft key display, press the **MENU** key to display the main menus.



2. Use the trackpad or press the TRACKS soft key to highlight the START option, and press **ENTER**.

The option changes to STOP, indicating that Track History is turned on, and the chartplotter starts laying down track marks.

The track data is stored in the track file that is set as the current track (see below).

3. If you wish to turn Track History off again, highlight the STOP option and press **ENTER**.
4. Press **CLEAR** to clear the menus.

## Deleting the Current Track

Deleting a track clears all the track history data from the selected file, ready to use it for new data.

- To delete the current track:
  1. From the initial soft key display, press the **MENU** key to display the main menus.
  2. Use the trackpad or press the TRACKS soft key to highlight the DELETE option, and press **ENTER**.
  3. Press **ENTER** again to confirm the deletion.

The track data in the current track file is deleted.

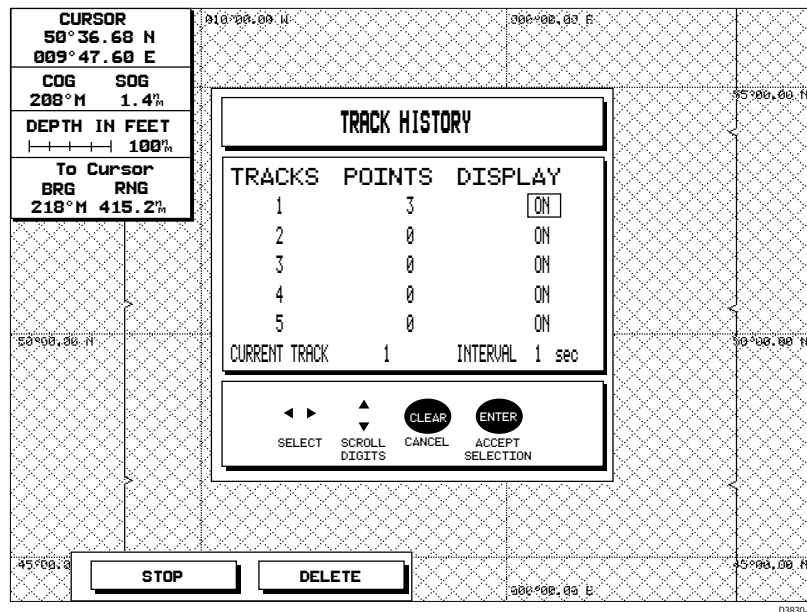
If the track is currently active, the old data is cleared from the file and the screen, but any new track history information is still stored in the current file.

4. Press **CLEAR** to clear the menus.

## Editing Track Controls

The EDIT option on the Tracks menu allows you to edit the controls for the current track and also any other tracks stored in memory. You can:

- Select one or more track histories for display.
  - Change the track file for the current track history data. If you do this after the track history has started, the chartplotter stops storing track data to the original track file and starts storing it in the new file.
  - Change the track interval for the current track. You can select one of the following intervals:
    - 1, 5, 10 or 30 seconds
    - 1, 3, 5, 10 or 30 minutes
    - 0.1, 0.5 or 1.0 nm
  - Start or stop a track history, or delete a selected track. These options perform the same functions as the START/STOP and DELETE options from the TRACKS menu.
- To edit the controls:
1. From the initial soft key display, press the **MENU** key to display the main menus.
  2. Use the trackpad or press the TRACKS soft key to highlight the EDIT option, and press **ENTER**. The Track History screen is displayed.



3. Use the trackpad sides to scroll around the fields, and the trackpad top and bottom to change the settings.  
You can toggle the Display option on or off for any track, change the current track file number, and change the track interval for the current track.
4. If required, press the START/STOP soft key to turn the current track on or, if it is already on, to turn it off.

5. To delete a track, select the track you wish to delete, and press the DELETE soft key. Press **ENTER** to confirm the deletion.
6. Press **ENTER** to accept your selections and return to the track history screen, with the new track settings.

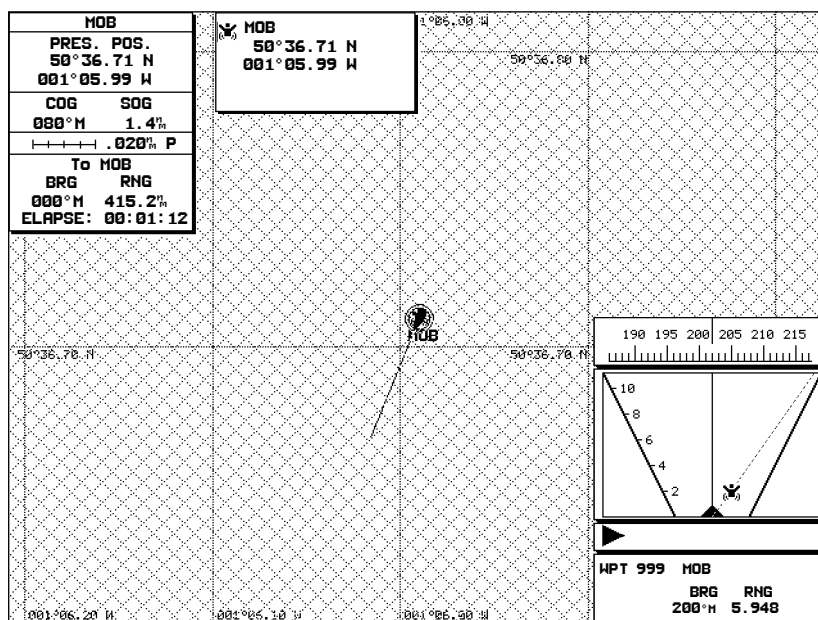
## 4.5 Man OverBoard (MOB)

If you lose a person or object overboard, and need to return to the location, you should use the Man OverBoard (MOB) function at once.

- To initiate the MOB procedure, press and hold the **MARK** key for two seconds.

The chartplotter then performs all the following tasks automatically:

- Marks the vessel's position, and displays the MOB symbol, with the position assigned as waypoint 999.
- Switches to a range scale of 0.05nm per inch, in North Up mode. If this scale is not available plotter mode is turned on.
- Places the cursor over the MOB waypoint, and displays the MOB symbol and position (Lat/Long or TDs) in the object data box.
- Starts (or resets) the elapsed timer, which is displayed in the cursor data box.
- Uses the MOB position as the destination waypoint, indicated by a circle around it.



**Note:** The MOB procedure can also be initiated or cancelled remotely if the appropriate SeaTalk message is received by the chartplotter.

- To cancel the MOB procedure, press and hold the **MARK** key for two seconds again.

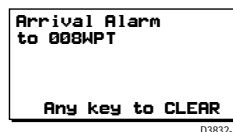
## 4.6 Alarms and Timers

The chartplotter reports the following alarms:

Alarm	Indicates:
Arrival	Your vessel has arrived at the active waypoint; it has either: entered the arrival circle (the radius of which is set in Set Up) or, has passed the perpendicular to the route leg through the waypoint.
Off course	Your vessel has exceeded the specified cross track error distance (set in Set Up) from the active route leg.
Anchor	Your vessel has moved from its anchor position by more than the distance specified in Set Up.
Countdown	The countdown timer has reached zero.
Clock	The time matches the alarm time set in Set Up.
Danger zone	Your vessel has entered the danger zone circle (the radius of which is set in Set Up) for the danger mark (☒).
Fix status	The chartplotter is no longer receiving position information from GPS, dGPS or other source.

The alarms are switched on or off, and the limits set, using the ALARMS/TIMERS option from the Set Up menu (see *Chapter 6*). This option also controls the elapsed time counter, which displays the time elapsed since the last reset in the cursor data box.

When an alarm is triggered, the alarm buzzer sounds and a window such as the following is displayed:



- To silence the alarm and clear the message, press any key. Alternatively, wait 7 seconds for the alarm to time out.

No action is taken by the chartplotter except for the Arrival Alarm. If you press a key, or after 7 seconds, the next waypoint becomes active. Alternatively, if you have arrived at the last waypoint in the route, the chartplotter stops navigating.

**Note:** *The chartplotter also repeats any SeaTalk alarms it receives, such as Depth and Wind alarms.*

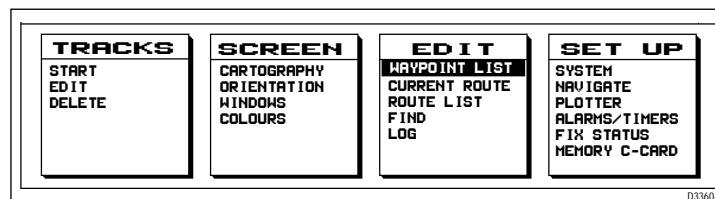


## Chapter 5: Using Stored Lists (EDIT)

### 5.1 Introduction

The chartplotter allows you to perform a number of tasks using the information you have stored. This information includes waypoints, routes, events, track histories and the log.

This chapter explains how to view, edit, use and print the stored information using the EDIT menu.



The tasks you can perform from this menu include:

- Finding and selecting an existing waypoint to steer towards immediately
- Adding a new waypoint or editing the details of an existing waypoint
- Making a new route by selecting existing waypoints from the waypoint list
- Selecting an existing route and starting to follow it
- Reviewing the route you are currently following, and moving on to the next leg
- Displaying calculated estimated times of arrival at waypoints, based on either current or planned speed over the ground

This chapter covers the following information:

- The Waypoint List
- The Current Route details
- The Route List
- Finding and Displaying a waypoint
- Displaying and Printing the Log
- Printing

Controlling and displaying track histories is described in *Chapter 4*.

## 5.2 The Waypoint List

Whenever you create a waypoint, it is added to the Waypoint List. The Waypoint List also includes any events you have marked, which have default names of the format xxxEVT, and waypoints sent from a master chartplotter as part of the active or selected route.

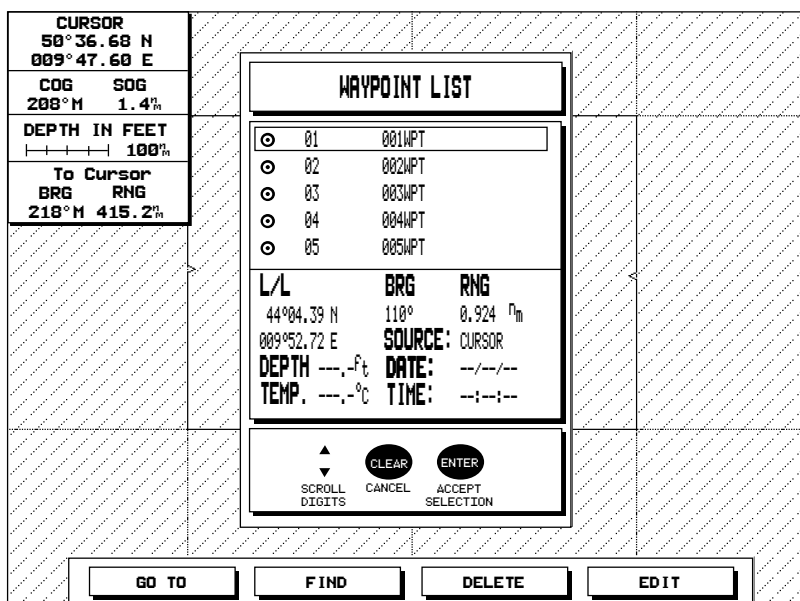
This option allows you to perform the following tasks:

- View the Waypoint List
- Find a waypoint of known name, and display its details
- GO TO a selected waypoint
- Delete a waypoint
- Edit the details of an existing waypoint, or add a new waypoint

### Viewing the Waypoint List

- To view the list:
  1. Press **MENU** to display the main menus.
  2. Use the trackpad, or press the EDIT soft key, to highlight the WAYPOINT LIST option on the EDIT menu.
  3. Press **ENTER**. The Waypoint List screen is displayed:

The Waypoint List



The list shows the waypoint symbol, number (assigned by the chartplotter) and name for each waypoint. The waypoints are listed in alphanumeric order by waypoint name.

The box below the list gives the following details for the highlighted waypoint:

- Position, in either latitude and longitude or TDs, depending on your setup
  - Bearing and range from your vessel's current position
  - Source of position data (cursor, edit, GPS etc)
  - Depth and temperature when the event waypoint was created, if available
  - Date and time that the waypoint was created
4. Use the trackpad top and bottom sides to move up and down the list, displaying the details for each waypoint in turn.

## Waypoint List Operations

With the Waypoint List displayed, you can use the soft keys to perform the following tasks:

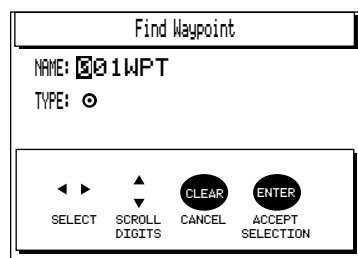
- |        |  |
|--------|--|
| GOTO   | Starts navigating towards the highlighted waypoint. The Waypoint List is cleared and the chart is displayed.                           |
| FIND   | Finds a specified waypoint in the Waypoint List (see below).   |
| DELETE | Deletes the highlighted waypoint from the list. If the waypoint part of an existing route, press <b>ENTER</b> to confirm the deletion. |
| EDIT   | Allows you to edit the highlighted waypoint, or add a new waypoint (see below).  |

**Notes:** *If a waypoint is used in two or more routes it cannot be deleted. You must first remove it from the routes as described in Section 3.2. You cannot delete an active waypoint.*

### Finding a Waypoint in the List

► To find a waypoint in the list:

1. Press the FIND soft key. The Find Waypoint window is displayed, with the currently highlighted waypoint name and symbol displayed.



2. Use the trackpad left and right sides to move to the first position in the waypoint name that you wish to edit.
3. Use the top and bottom sides to change the value. The chartplotter tries to match the waypoint as you change each character (from left to right), and provides the nearest character for which there is a match in the waypoint list.



## 5.3 The Current Route

The Current Route option allows you to view the currently selected route, with progress details, and to specify a planned Speed Over the Ground (SOG) to obtain an estimated time of arrival (ETA). You can also advance to the next leg of the route from this screen.

### Viewing the Current Route

- To view the Current Route information, select the CURRENT ROUTE option from the EDIT menu.

The Current Route screen is displayed, as shown below.

The screenshot shows the 'CURRENT ROUTE 1' screen with the following data:

<b>CURSOR</b>	
50°36.68 N	009°47.60 E
<b>COG</b>	<b>SOG</b>
208°M	1.4 <sup>kn</sup>
<b>DEPTH IN FEET</b>	
+++++ 100 <sup>ft</sup>	
<b>To Cursor</b>	
<b>BRG</b>	<b>RNG</b>
218°M	415.2 <sup>ft</sup>

CURRENT ROUTE 1		
CURRENT SOG: 1.0 Kts		
⊙ 01	006MPT	
⊙ 02	007MPT	
⊙ 03	008MPT	
⊙ 04	009MPT	
L/L	LEG BRG	LEG DIST.
44°03.70 N	179°	0.571 <sup>nm</sup>
009°51.85 E	ETA: --:--	
ELAPSE TIME: --:--		
TOTAL DISTANCE COV.: 0.0 <sup>nm</sup>		

Navigation controls: ↑ SCROLL DIGITS, ↓ SCROLL DIGITS, CLEAR, CANCEL, ENTER, ACCEPT SELECTION.

Bottom buttons: NEXT LEG, PLANNED SOG.

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The Current Route

The Current Route screen lists the waypoints for the current route, showing the waypoint symbol, sequence number in the route and name for each waypoint. The box below the list gives the following details for the highlighted waypoint:

- Position, in either latitude and longitude or TDs, depending on your setup.
- Route leg bearing and distance (from waypoint to waypoint or, for the first waypoint in a route, vessel to waypoint).

If the route is active, the following details are also provided:

- Estimated time of arrival (ETA) at the waypoint
- Total time elapsed since the start of the route
- Total distance covered since the start of the route

The ETA predictions are based on either the current or planned speed over the ground (SOG), as displayed above the list of waypoints, depending on your selection.

## Current Route Operations

With the current route summary displayed, you can use the soft keys to perform the following tasks:

- NEXT LEG** Jumps to the next leg of the route. This has the same effect as the NEXT LEG option from the ROUTE initial soft key menu.
- PLANNED SOG** Switches from Current SOG to Planned SOG to calculate the ETA for each waypoint.  
The Planned SOG value is displayed above the waypoint list instead of the Current SOG, and the ADJUST SOG soft key becomes available so that you can change the planned SOG value.
- or **CURRENT SOG** Switches from Planned SOG to Current SOG to calculate the ETA for each waypoint.
- ADJUST SOG** This soft key is only available if you have already selected the PLANNED SOG option, and displays the Planned SOG window. Use the trackpad to adjust the value, and press **ENTER** to accept the new value.

## 5.4 The Route List

Whenever you create a route, its details are added to the Route List. You can store data for up to 20 routes in the chartplotter's memory.

The Route List option allows you to perform the following tasks:

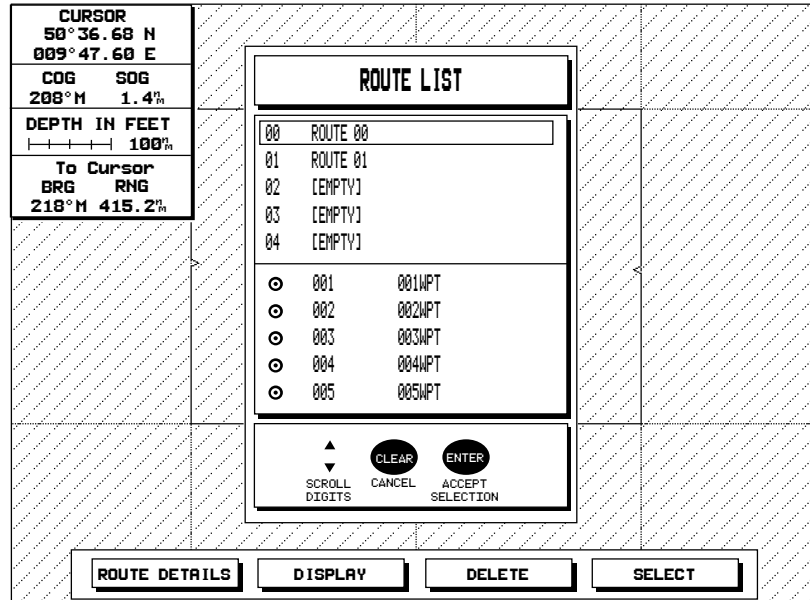
- View the Route List
- Display and edit the waypoints for a selected route
- Display a selected route on the chart
- Follow or reverse a selected route
- Delete a route
- Edit the details of an existing route, or construct a new route by selecting existing waypoints

You select the option in the same way as described for the Waypoint List option (see *Section 5.2*).

### Viewing the Route List

► To view the Route List:

1. Select the ROUTE LIST option from the EDIT menu.



The Route List

The first five waypoints are listed for the currently highlighted route.

2. Use the trackpad to scroll through the list.
3. If you cannot identify a route from its name and the first 5 waypoints, you can display it on the chart as described below.

## Route List Operations

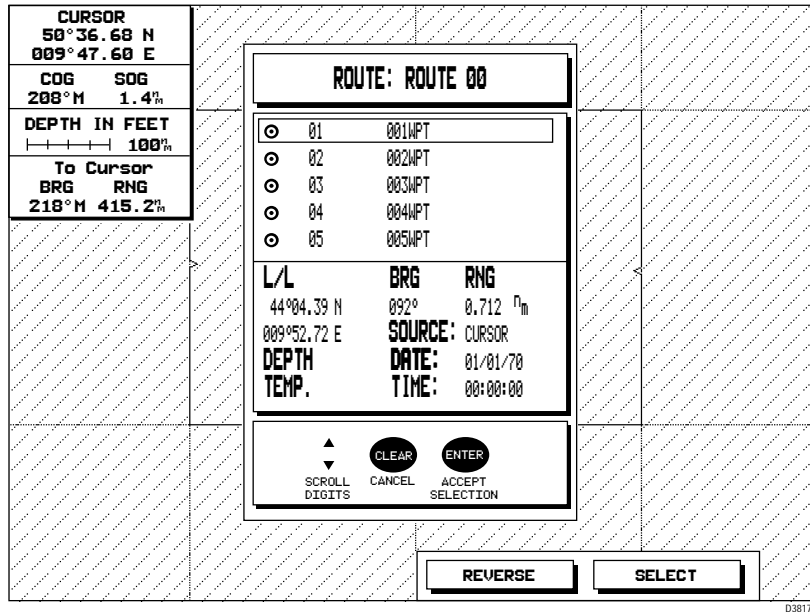
When the Route List is displayed, you can use the soft keys to display, delete, or follow a selected route, and display the details of the waypoints that make up the route:

ROUTE DETAILS	Displays the details of all the waypoints in the selected route, in the same format as the Waypoint List (see below), and allows you to follow the route or access the Route Edit screen
DISPLAY	Displays the <i>selected</i> route (see SELECT below) on the chart at an appropriate scale. After 7 seconds, the display returns to the Route List.
DELETE	Deletes the highlighted route. Press <b>ENTER</b> to confirm the deletion. Note that this only deletes the route from the route list – it does not delete the component waypoints.
SELECT	Selects the route so that it can be displayed or activated. When a route is selected, the SELECT soft key is replaced by either the FOLLOW soft key or, if the route is already active, the OFF soft key.
or FOLLOW	This soft key is displayed instead of SELECT if the highlighted route has been selected and is not already active. It activates the selected route, tracking towards the target waypoint. This has the same effect as the FOLLOW option from the ROUTE initial soft key menu.
or OFF	This soft key is displayed instead of SELECT or FOLLOW if the highlighted route has been selected and is active. It turns off the selected route.

**Note:** You can also reverse, select and activate a route from the Route Details screen (see below).

## Route Details

- To display the details of the currently highlighted route:
  1. Press the ROUTE DETAILS soft key. The Route Details screen is displayed.



This displays the details of the waypoints in the route, in the same format as the Waypoint List (see *Section 5.2*).

You can press the REVERSE soft key to reverse the order in which the waypoints will be followed in the route, then press SELECT followed by the FOLLOW soft key to start following the route. The soft key label is updated to OFF.

2. Press **CLEAR** to return to the Route List, or **ENTER** to go to the Route Edit screen (see below).

## Editing a Route or Building a New Route

You can edit an existing route, or build a new route, simply by selecting existing waypoints from the list.

- To edit an existing route or build a new route:
  1. Display the Route Edit page, either:
    - From the Route Details screen, by pressing **ENTER**, or
    - From the Route List, by highlighting the required route and pressing **ENTER**. Highlight an empty route if you wish to build a new route.



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The right side of the screen shows the Route Details window, and the left side shows the Waypoint List window.

Initially, cursor control is in the Route Details window.

2. Use the trackpad to highlight the position in the Route Details list where you wish to insert or delete a waypoint.
3. To delete a waypoint from the route, press the DELETE soft key.
4. To add a waypoint to the route:
  - a. Press the left side of the trackpad to move into the Waypoint List window.
  - b. Scroll up or down the list until the required waypoint or location is highlighted.
  - c. To find a specific waypoint, press the FIND soft key. The Find Waypoint window is displayed, as described in Section 5.2.
  - d. When you have found the required waypoint, press the ADD WPT soft key to add the waypoint to the route.
 

If you are inserting the waypoint into an existing route, the new waypoint is inserted immediately after the highlighted location, and all the other waypoints in the route are moved down the list. The new waypoint is now highlighted in the route list.
  - e. Control stays in the Waypoint List window, so you can continue to select waypoints and add them to the route.

f. Press the right trackpad edge to return control to the Route Details window.

If you made a mistake, you can use the DELETE soft key to remove the waypoint(s) from the route.

5. Press the EDIT RTE NAME key to edit the route name. Use the trackpad to change the letters and numbers, and press **ENTER** when you have finished.
6. When you have finished editing the route, press **ENTER** or **CLEAR** to return to the Route List.

## 5.5 Finding and Displaying a Waypoint

The FIND option on the EDIT menu is used to find a specified waypoint (or event) on the chart.

- To find a waypoint:
  1. With the main menus displayed, use the trackpad or the EDIT soft key to highlight the FIND option on the EDIT menu. Press **ENTER**.
  2. Use the trackpad to select the waypoint name. Start with the left-most character; as you change each character, the chartplotter displays the nearest match from the Waypoint List, and updates the waypoint symbol as appropriate.
  3. When the required waypoint name is displayed, press **ENTER**.  
The chart is repositioned, with the waypoint displayed in the centre of the screen. The waypoint data is shown in the object data box.

## 5.6 Displaying and Printing the Log

A log entry is created every 30 minutes and the log keeps data from the last 24 hours.

**Note:** *You cannot edit the log.*

- To display the log, select the LOG option from the EDIT menu.

The list shows the date and time of each log entry, plus the following details for the highlighted entry:

- Vessel's position
- Course Made Good (CMG) and Distance Made Good (DMG) since the previous log entry.

Use the trackpad to scroll up or down the list.

- To print the log:
  1. Check that:
    - Your printer is connected and switched on.
    - In the System Set Up menu, serial port is set to printer and the baud rate is correct (see *Chapter 6*).
  2. Press the PRINT soft key.

## 5.7 Printing the screen

The chartplotter provides a Print function that allows you to print any screen display.

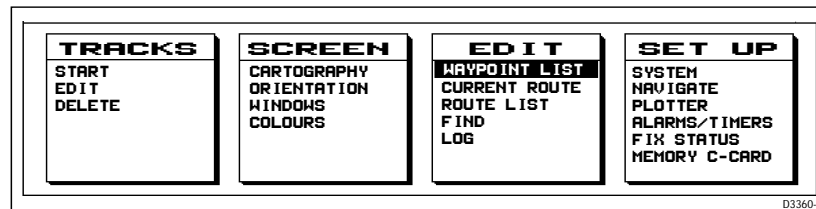
- To print a screen display:
  1. Check that:
    - Your printer is connected and switched on.
    - In the System Set Up menu, serial port is set to printer and the baud rate is correct.
  2. Press and hold the **DISPLAY** key for 5 seconds. At the end of this time, the chartplotter beeps 3 times, the cursor disappears, and the display information is sent to the printer.

## Chapter 6: Customizing the Chartplotter

### 6.1 Introduction

When you have installed your chartplotter and are familiar with its basic operation, you may need to set it up so that it obtains the correct information from the equipment that you have connected it to, operates according to your requirements, and displays information according to your preferences.

This is achieved using two of the Main Menus that are displayed using the **MENU** key: the SET UP menu and the SCREEN menu.



**Note:** *If you have a monochrome chartplotter, the SCREEN menu COLORS option is not available.*

Most of the options will only need to be set up when you first use your system. However, the SET UP menu also controls the alarms and timers, which you may wish to change from time to time. In addition, you may decide to change the way you have customized your screen and help levels as you become more familiar with your chartplotter system.

**Note:** *Where possible, the chartplotter uses settings from other SeaTalk instruments. The default settings may therefore already be set to your preferred value.*

This chapter covers the following topics:

- Setting up the data, including system defaults, alarms and the timer
- Customizing the screen display

## 6.2 Setting Up the Data

The chartplotter allows you to set up a number of parameters that control the way it operates. These are accessed from the SET UP menu.

The SET UP menu options control the following:

- System set up
- Navigation set up
- Chartplotter set up
- Alarms and timers set up
- Position fixer initial settings and reset
- Memory C-Card transfers

Before you make any changes:

1. Check the lists of parameters and options provided in the tables in this section.
2. Decide what changes, if any, you wish to make.
3. Fill in the required settings in the spaces provided in the tables.

Once you have done this, follow the instructions given below to make the changes.

### Changing the Parameters

► To change the set up parameters:

1. Press the **MENU** key to display the SET UP menu above the right hand soft key. The option you used last is currently highlighted.
2. Use the trackpad or SET UP soft key to highlight the required menu option, and press **ENTER**.

The requested set up menu is displayed, listing the parameters and their current settings and, for some items, menus of further parameters. For example, the SYSTEM set up menu is shown on the following page.

3. Use the up and down trackpad controls to move the highlight through the list.
4. When the required parameter or sub-menu is highlighted, press **ENTER**.  
For sub-menus, a further menu of parameters is displayed. Repeat steps 3 and 4 to select a parameter.

A window is displayed, listing the settings available, with the current setting highlighted. Alternatively, for numerical parameters, a single value (or OFF) is displayed, that can be adjusted.



5. Use the up and down trackpad controls to move the highlight bar through the options or to increase/decrease the parameter value.
6. Press **ENTER** to accept the new setting, or **CLEAR** to cancel the change. The options window is cleared from the menu.
7. When you have set all the required values, press **CLEAR**.

If you were in a sub-menu, the previous menu is displayed and you can continue changing the parameters.

If you were in one of the set up menus, you are returned to the initial soft key display.

## Setting Up the System

The **SYSTEM** option from the Set Up menu allows you to set up your system preferences.

The following table lists the System parameters or menus and their options, shows the factory default setting, and provides a space for you to make a note of your new default setting. Each parameter or menu is described in the following subsections.

Parameter/Menu	Options	Factory Default	New Default
Language	English, Italiano, Francais, Deutsch, Espanol, Norge, Svensk, Dutch	English	
Units Menu			
Distance	Nautical miles Statute miles Kilometers	Nautical miles	
Depth	Feet Fathoms Metres	Feet	
Temperature	Centigrade Fahrenheit	Centigrade	
Speed	Knots Miles per hour Kilometers per hour	Knots	
Date & Time Menu			
Time Format	24 hour 12 hour	24 hour	
Time Offset	UTC Local (offset value)	UTC (0)	
Date Format	MM-DD-YY DD-MM-YY	MM-DD-YY	
Simulator Menu			
Speed	Value	10.0 kts	
Heading	Value	000°T	
Starting Point	(Position)	-	
Activate Simulation	OFF ON	OFF	
Help	Level 0 Level 1	Level 1	
Keypress Sound	OFF ON	ON	
Cursor Echo	OFF ON	OFF	
GPS Input	NMEA NAVAID	NAVAID	
Serial Output	NMEA PRINTER	NMEA	
Printer Baud Rate	300, 600, 1200, 2400, 4800, 9600	9600	

## Language

Select the language in which you wish information to be displayed. The selected language will be used for screen text, labels, menus and options, but will not affect the chart information.

## Units

Choose your preferred units for distance, speed, depth and temperature. The units you set will be used to display all data, including information received from other instruments on the system.

## Date and Time

Set your preferred time (12 or 24 hour) and date (month-day-year or day-month-year) format.

Specify either UTC for universal time, or LOCAL and enter the current time offset. The local time offset is retained if you change to UTC, so you can switch between the two easily.

## Simulator

The simulator allows you to operate your chartplotter without position data. It generates a display with a moving vessel, so that you can practice using the controls in safety.

- To set up the simulator:
  1. Adjust the values to the required settings for the speed and heading.
  2. Select the Starting Point option, the chart is displayed.  
Move the cursor to the required starting position and press **ENTER**.  
The set up menu is redisplayed with the starting position.
  3. Set Activate Simulator to ON.

When the simulator is active, the word “SIMULATE” is displayed at the top of the screen above the cursor data box.

## Help

Choose one of the following help levels:

- |         |  |
|---------|--|
| Level 0 | The default soft key labels are only displayed if a soft key is pressed when no other operation is in progress, and they disappear if no operation is performed for 7 seconds. |
| Level 1 | The default soft key labels are displayed if no other operation is in progress.  |

### Keypress Sound

This option controls whether or not the chartplotter beeps when you press a key or when an alarm is activated.

### Cursor Echo

Cursor Echo ON allows the cursor position to be displayed on a radar display. Radar cursor position will be displayed if you switch ON cursor echo at your radar display.

**Note:** *If you have two or more chartplotters in your system, you must not switch ON cursor echo at more than one chartplotter. It is normal to switch ON cursor echo at the unit adjacent to the radar display.*

### GPS Input

The chartplotter can receive position data via a SeaTalk, NAVAID or NMEA connection. Where position information is available from more than one source, SeaTalk will always take precedence. You can select whether the NAVAID or NMEA has next priority.

### Serial Output

If you want to use a printer, select PRINTER, otherwise select NMEA. This avoids conflicts of printing NMEA data.

### Printer Baud Rate

Select the highest baud rate that is compatible with both your printer and the Raychart. Refer to your printer manual for further information.

## Setting Up the Navigation Data

The NAVIGATE option, illustrated below, from the Set Up menu allows you to set up your navigation preferences.

The following table lists the Navigate parameters and their options, shows the factory default setting, and provides a space for you to make a note of your new default setting. Each parameter is described in the following subsections.



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Parameter/Menu	Options	Factory Default	New Default
Heading	Magnetic True	Magnetic	
Magnetic Variation	AUTOMATIC Value, + or - in 0.1° steps	AUTOMATIC (value)	
Position resolution	.00 .000 TD	.00	
TD Settings Menu	GRI Slave 1 Slave 2 ASF 1 ASF 2 Alternate Solution	9970 W X +0.0 +0.0 OFF	
Map Datum		WGS 1984	
Fix Datum		WGS 1984	
Position correction		No correction	
Head Up Response	+/-10 +/-15 +/-20	+/-15	

Setting Up the Data

## Heading

Select either degrees magnetic or degrees true for your heading data. The units you set will be used to display all heading data, including information received from other instruments on the system.

## Magnetic Variation

The default setting for magnetic variation is Automatic, which means that the variation value is computed from a world magnetic model for the year and current position of the boat.

If no position is available, you can set a specific variation value. Use the trackpad to change from Automatic to a value, and increase or decrease the value in 0.1° steps. Press and hold the trackpad to change the value quickly.

## Position Resolution

When working with position information in latitude and longitude, you can display any position data to either two or three decimal places. Alternatively, you can select TD to display all your position information in Loran TDs.

## TD Settings Menu

If you are using a Loran position fixer, set the TD parameters to the required values.

The chartplotter allows you to select the following GRI numbers for active Loran chains:

GRI	Chain
4990	Central Pacific (Obselete)
5930	Canadian East Coast
5970	Commando Lion (Korea) (Obselete)
5990	Canadian West Coast
7170	Saudi Arabia South (Obselete)
7930	Labrador Sea (Obselete)
7960	Gulf of Alaska
7970	Norwegian Sea (Obselete)
7980	Southeast US
7990	Mediterranean Sea
8970	Great Lakes

8990	Saudi Arabia North (Obselete)
9940	US West Coast
9960	Northeast US
9970	North West Pacific (Obselete)
9980	Icelandic (Obselete)
9990	North Pacific

**Note:** *Obselete chains do not transmit, but allow old TD positions to be entered.*

### Map Datum and Fix Datum

The Map Datum is the geodetic datum to which position details are referenced on the chartplotter display. You can select a datum to match paper charts that you are using.

The Fix Datum is the geodetic datum to which position details received from the GPS are referenced. You should select the same datum as your GPS uses.

### Position Correction

If the displayed position does not agree with your known position, and you cannot correct it by selecting the appropriate map datum or fix datum, you can apply a position correction. The value of the current correction is displayed on this menu.

- To apply a position correction:
  1. Move the selection bar to the Position Correction option and press **ENTER**. The chart is displayed.
  2. Use the trackpad to move the cursor until the correct position is displayed in the cursor readout box.
  3. Press the **DONE** soft key to set the correction, press **NONE** to remove a previously set correction, or press the **CLEAR** soft key to exit without change.

### Head Up Response

The Head Up Response controls the damping of the chart rotation when Head Up mode is selected.

The default value is  $\pm 15^\circ$ , which means that the chart will only be rotated, and the screen redrawn, if your vessel's heading has changed by more than  $15^\circ$  in either direction from the current head up display. Select  $\pm 10$  for a more frequent response, or  $\pm 20$  for a less frequent response.

## Setting Up the Chartplotter

The PLOTTER option, illustrated below, from the Set Up menu allows you to set up your chartplotter display preferences.



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The following table lists the Plotter parameters and their options, shows the factory default setting, and provides a space for you to make a note of your new default setting. Each parameter is described in the following subsections.

Parameter	Options	Factory Default	New Default
Waypoint Name	3 characters 6 characters 16 characters None	6 characters	
Waypoint Display	OFF ON	ON	
Course Vector	OFF SHORT LONG INFINITE	SHORT	
Heading Vector	OFF SHORT LONG INFINITE	SHORT	

Wind Vector	OFF ON	OFF
Tide Vector	OFF ON	OFF
Dead Reckoning	OFF ON	OFF
Cursor Data Box	OFF ON	ON

### Waypoint Name

This option controls the number of characters of each waypoint name that are displayed on the chart. Reducing or removing the waypoint name can sometimes improve the readability of the chart (all the characters are still shown in other displays).

### Waypoint Display

This option controls whether or not the waypoints and events are displayed on the chart. If you set it to OFF, only the waypoints in the current route and the active waypoint (if any) are displayed.

### Course Vector

When the Course Vector is switched on, your vessel is displayed on the chart with a dotted line extending from the bow indicating the current course. You can select the length of the vector line; an “infinite” vector extends to the edge of the chart.

The course vector shows the direction in which the boat is travelling (COG).

### Heading Vector

When the Heading Vector is switched on, your vessel is displayed on the chart with a solid line extending from the bow indicating the current heading. You can select the length of the vector line; an “infinite” vector extends to the edge of the chart.

### Wind Vector

When the Wind Vector is switched on, your vessel is displayed on the chart with a solid line extending from it indicating **W** (wind) angle.

The vector is only displayed if the required wind data is available from a wind instrument connected to your system.

## Tide Vector

When the Tide Vector is switched on, your vessel is displayed on the chart with a solid line extending from it indicating **T** (tide) angle.

The tide information is calculated from the speed through the water and the compass data, compared with COG and SOG information from the GPS. It is therefore only displayed if all this information is available.

## Dead Reckoning

If you set Dead Reckoning to ON, the chartplotter will calculate your position by dead reckoning if position data is lost. The dead reckoned position is calculated from your speed and heading (if available), and a dead reckoning indicator is shown at the top left of the display.

Set Dead Reckoning to OFF if you do not wish to use a calculated position.

## Cursor Data Box

This option controls whether or not the cursor data box is displayed. If you turn it off, only the depth units and scale rule are displayed at the top left of the screen.

## Setting Up the Alarms and Timers

You can set up the following navigational alarms and timers:

Parameter	Options	Factory Default	New Default
Arrival Radius Alarm	OFF Arrival radius value	OFF	
Off Course Alarm	OFF Value	OFF	
Anchor Alarm	OFF Value	OFF	
Danger Zone Alarm	OFF Value	OFF	
Countdown Timer	OFF ON (and value) RESET	OFF	
Elapsed Timer	OFF ON RESET	OFF	
Clock Alarm	OFF ON (and value)	OFF	

## Alarms

All the alarms default to OFF, that is, disabled. You can switch an alarm on and adjust its setting to any value, in steps of 0.01. When an alarm is set, it will be triggered when the alarm condition is met (see *Chapter 4*). All the alarms relate to a specified distance.

To switch an alarm ON and adjust its value, select the alarm then press the top side of the trackpad.

**Note:** *The alarm limits are not displayed on the chart.*

The alarms settings have the following functions:

- **Arrival alarm** specifies the radius of a circle around the waypoint: when your vessel enters this circle the alarm sounds
- **Off course alarm** specifies the distance from the route, at right angles to the route, beyond which the alarm sounds
- **Anchor alarm** specifies the distance from the anchor position beyond which the alarm sounds; you can only set this if a position fix is available
- **Danger zone alarm** specifies the radius of a circle around marks classed as dangerous (see page 41): when your vessel enters this circle the alarm sounds

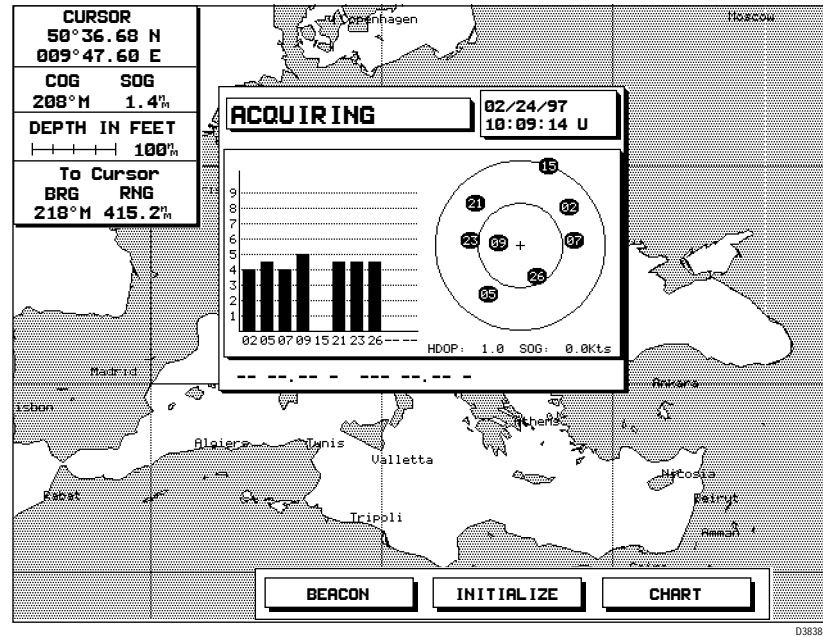
## Timers

The timer controls have the following functions:

- **Countdown timer** counts down from selected time (in hours, minutes and seconds); an alarm is triggered when the timer reaches zero
- **Elapsed timer** counts up from zero, and is displayed in the cursor data box on the chart
- **Clock alarm**, if set, sounds when the time data received by the system matches the time specified here (in hours, minutes and seconds); you can only select this if time data is being received

## Fix Status

The FIX STATUS option allows you to access the GPS position fix status window that is displayed when you turn on the chartplotter.



When a fix has been acquired, the text “Fix Good” is displayed at the top of the screen, and the vessel’s position at the bottom, together with the **HDOP** (precision) factor and the Speed Over Ground (SOG).

If required, you can initialize the GPS or perform manual setup of a differential beacon.

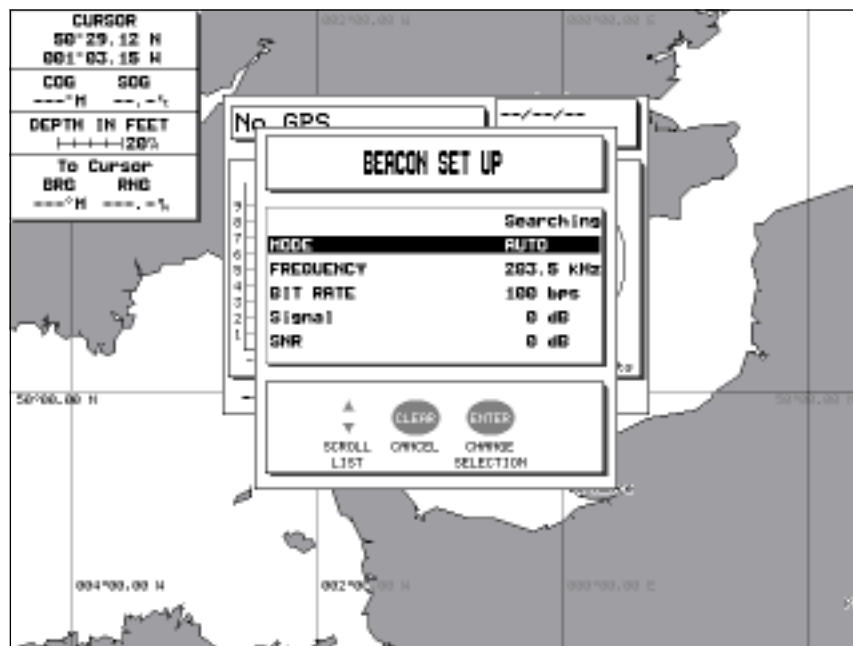
### Initializing the GPS

- To initialize the GPS:
  1. Press the INITIALIZE soft key. The current date, time and position settings are shown.
  2. Use the trackpad to edit the entries to the required values, and press INITIALIZE to send them to the position fixer.
  3. Alternatively, press the RESET soft key to reset the GPS.
  4. Press **CLEAR** or **ENTER** to return to the Fix Status screen, and CHART to return to the chart.

## Setting Up a Differential Beacon

Normally, your differential beacon receiver (if fitted) automatically picks up the transmitted differential signal. If there are two differential beacons competing in a region, you may wish to set up the beacon manually. The Beacon Set Up menu also indicates Beacon status and can be used to return to auto mode after having set up the beacon manually.

- To set up a differential beacon manually:
  1. Press the BEACON soft key. The current settings, read from the beacon receiver (if connected) are displayed as shown below:

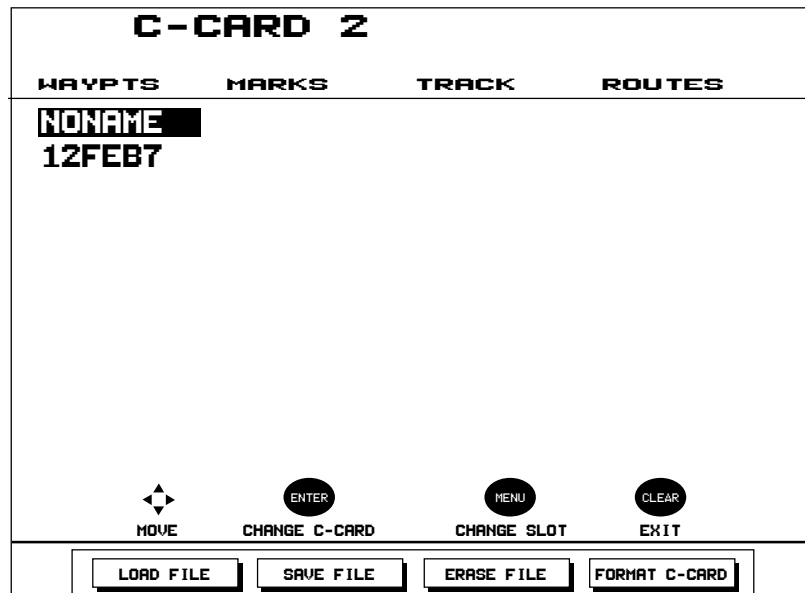


2. Press **ENTER**, then select **AUTO** or **MANUAL** mode. When manual mode is selected, you are prompted for frequency and bit rate. Use the trackpad to select the required bit rate, and to edit the beacon frequency to the required value.
3. Press **ENTER** to accept the changes, or **CLEAR** to cancel.
4. Press **CLEAR** or **ENTER** to return to the Fix Status screen, and **CHART** to return to the chart.

## Memory C-Card

The MEMORY C-CARD option allows you to save or load data to or from a Memory C-Card. Data is saved or loaded in files, by type: a file can be used to store one of the following: all waypoints; all marks; all tracks or an individual route. You can also change the C-Card and change the Card slot for these operations.

- To save the data from the chartplotter's memory to a C-Card:
  1. Insert a Memory C-Card into one of the chart slots, in the same way as for a chart card (see *Chapter 2*).
  2. Press **MENU** to display the menus.
  3. Use the soft key or trackpad to highlight the MEMORY C-CARD option on the SETUP menu, and press **ENTER**.



The list indicates the card slot and shows the names of the files, by type, stored on the current C-Card.

If the device is not available, press **MENU** to select the other slot for display.

4. Use the trackpad to select the type of data (Waypoints, Marks, Track or a Route) you wish to save.

**Note:** All data of the selected type is saved into the file, except for Routes where only the currently selected route is saved.

5. Press the SAVE FILE soft key.

The system prompts you for the name of the new file.

6. Change the default file name (NONAME) to the required name, using the trackpad left and right sides to select the character to change, and the top and bottom to change the character.

7. Press **ENTER** to accept the new name.  
The system saves all the data of the selected type into the named file on the C-Card, and updates the display with the filename. If you have inserted a new (unformatted) C-card, the chartplotter automatically formats it before saving the file.
  8. Press **CLEAR** to return to the chart display.
- To load data from a C-Card into the chartplotter's memory:
1. Insert the Memory C-Card into one of the chart slots and select the MEMORY C-CARD option, as described above.
  2. Use the trackpad to select the file you wish to load.
  3. Press the LOAD FILE soft key. The data is loaded into the chartplotter's memory.
    - Track or mark data replaces any existing data of the same type.
    - Waypoint data replaces any existing waypoints, and also deletes any existing routes.
    - A route file is loaded as Route 0. Waypoints in the route file are added to the waypoint list.
  4. Press **CLEAR** to return to the chart display.
- To erase data from a C-Card:
1. Display the file information for the card, as described above.
  2. Use the trackpad to select the file you wish to erase, and press the ERASE FILE soft key. Then press **ENTER** to confirm the deletion, or **CLEAR** to abandon the operation.  
Alternatively, to remove all the data from the card, press FORMAT C-CARD. Then press **ENTER** to confirm the deletion, or **CLEAR** to abandon the operation.
  3. Press **CLEAR** to return to the chart display.
- To change the C-Card:
1. When the C-Card files information is displayed, press **ENTER**. You are prompted to change the C-Card.
  2. Replace the memory C-Card then press **ENTER**. The information for the new card is displayed.
- To change the Card slot:
1. When the C-Card file information is displayed, press **MENU**. The information from the card in the other card slot is displayed.

## 6.3 Customizing the Screen Display

You can customize the display of your chartplotter so that all the information you require is available at the touch of a button. You can select the layout of the display and the level of cartographic detail you prefer.

You customize the display using the SCREEN menu, which is displayed when you press the **MENU** key. The SCREEN menu options control the following:

CARTOGRAPHY	Setting the cartographic detail
ORIENTATION	Setting the chart orientation
WINDOWS	Setting up the contents of the windows that can be displayed using the <b>DISPLAY</b> menus
COLORS	Setting up the colors used to display tracks, routes, symbols, vectors, the vessel and the cursor (available for color displays only)

### Setting the Cartography Detail

The CARTOGRAPHY option allows you to select the types of cartographic features that will be displayed or hidden. You can also enable or disable Plotter Mode.

**Note:** *Some cartographic details are automatically suppressed on small-scale charts, to avoid the chart appearing too cluttered.*

- To set your preferred levels of cartographic detail:
  1. Press **MENU** to display the main menus.
  2. Use the trackpad or the SCREEN soft key to highlight the CARTOGRAPHY option from the SCREEN menu, and press **ENTER**.  
The Map Configuration main menu is displayed.
  3. Use the trackpad to move up or down the list and highlight the menu you require, then press **ENTER** to accept your selection.  
The menu options and their current settings are then displayed, as shown in the following table.
  4. Use the trackpad to move up or down the list and highlight the item you require, then press **ENTER** to accept your selection, or **CLEAR** to cancel.  
The parameters for that option are then displayed.
  5. Use the trackpad to highlight the required setting, and press **ENTER**.
  6. When you have reset all the required values, press **CLEAR** to return to the Chart Configuration menu, and **CLEAR** again to return to the default display.

The following table lists the map configuration options and their default settings, and provides a space for you to make a note of your new default setting. Items can be set either OFF or ON, unless indicated.

Menu/Parameters		Factory Default	New Default
Land Settings Menu	Natural Features	ON	
	Rivers & Lakes	ON	
	Cultural Features	ON	
	Landmarks	ON	
Marine Settings Menu			
	Water Turbulence	ON	
	Depths Contours	ON	
	Depth Color 1 Limit (value) 6 ft		
	Depth Color 2 Limit (value) 50 ft		
	Depth Contours & Soundings		
	Range (max & min values)	0-33ft	
	Spot Soundings	ON	
	Bottom Type	ON	
Nav-Aids and Features			
	Ports & Services	ON	
	Attention Areas	CONTOUR	
	Tracks & Routes	ON	
	Lights	NO SECTOR	
	Buoys & Beacons	ON	
	Signals	ON	
	Cartographic Objects	ON	
Other Settings Menu			
	Names	ON	
	Compass	ON	
	Chart Generation	ON	
	New Objects	ON	
	Simplified Display	OFF	
	Info Level (Basic or Detailed)	DETAILED	
Chart Settings Menu			
	Lat/Lon Grid	ON	
	Chart Boundaries	ON	
	Plotter Mode	OFF	

## Chart Orientation

You can select the normal orientation of your chart according to your personal preference. The orientation can be one of the following:

- **North Up:** The chart is displayed with north upwards. This is the standard chart mode.
- **Course Up:** The chart is displayed with the active course leg upwards. When a new course leg becomes active, the chart rotates to keep course upwards. If no waypoint is active, the chart is drawn north up.

- **Head Up:** The chart is displayed with the vessel's current heading upwards. This is useful if you wish to compare the chart with a radar screen.

As the heading changes the chart will rotate, although some damping is provided to stop it swinging too wildly. You can set the amount of damping by adjusting the Head Up Response parameter in the system set up (see page 69).

When you first select Head Up Mode, or if you select Home Mode when in Head Up Mode, the cursor is homed on the vessel and the chartplotter display is in **Relative Motion** mode. In this mode, the chart moves to keep the vessel in the centre of the display. When you move the cursor away from the vessel, the display returns to normal **True Motion**, and the vessel moves across the chart.

**Note:** When the chart rotates in Course Up or Head Up mode, it may not be possible to display the chart text. In this case, markers are left at the text points which you can interrogate using the cursor (see Chapter 2).

➤ To select the orientation:

1. Press **MENU** to display the main menus.
2. Use the trackpad or the SCREEN soft key to highlight the ORIENTATION option from the SCREEN menu, and press **ENTER**. The soft key labels change, as follows:



3. Press the soft key corresponding to the chart orientation you require. The new chart orientation is displayed.
4. Press the EXIT soft key, or **CLEAR** to clear the soft key labels. The display reverts to the default soft keys display, with the new chart orientation.

## Setting Up Windows

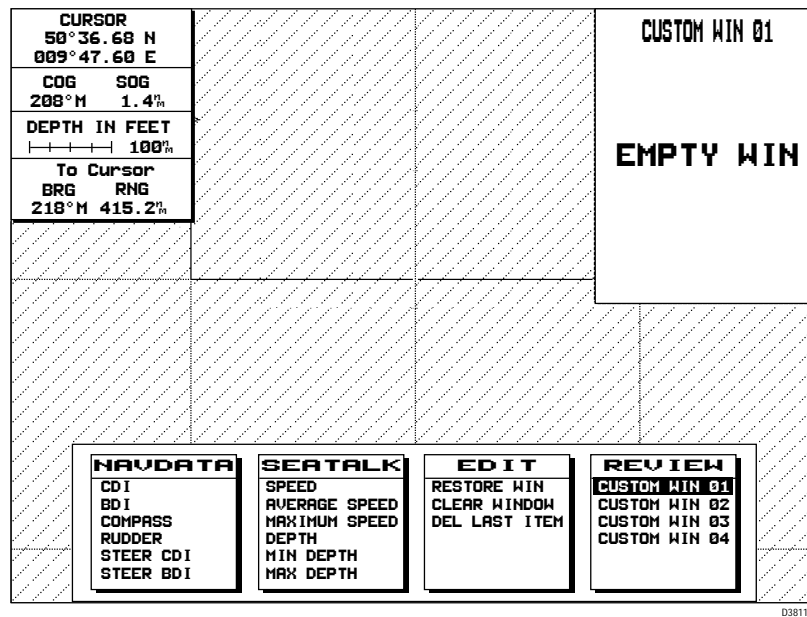
A powerful feature of the chartplotter is the ability to define your own windows so that, when you request a windowed display, precisely the data you require is displayed alongside the chart. You can define up to four customized windows. Six default windows are also provided.

The default windows are selected using the **DISPLAY** key options, as described in Chapter 2. These options allow you to select the data set to be displayed in either one or two windows, with a choice of window positions.

► To set up a customized window:

1. Press **MENU** to display the main menus.
2. Use the trackpad or the SCREEN soft key to highlight the WINDOWS option from the SCREEN menu, and press **ENTER**.

The Customize On Screen Data Windows screen is displayed, showing the last-used window selection. An example screen is shown below.



3. If the custom window you wish to set up or change is not already displayed, use the REVIEW soft key to display the required window.

Now you are ready to start specifying the data that will be displayed. The NAVDATA and SEATALK menus list all the data that is available for selection: further options can be seen by scrolling down the menus using the trackpad or soft keys.

4. Highlight one of the data options in either the NAVDATA or SEATALK menu, and press **ENTER**.

The data appears in the window at the top of the screen. Most of the SeaTalk items take up one line, but some (such as the FULL WPT selection) take up 2 lines. Some items, such as CDI, fill the entire window – the display will not change if there is insufficient space in the window.

5. If you make a mistake or change your mind, you can delete the last item using the DEL LAST ITEM option from the EDIT menu.

Alternatively, you can clear all the items in the window using the CLEAR WINDOW option. RESTORE WIN will restore a cleared window that has been saved.

6. Repeat step 4 until you have selected all the data items you require.

7. If you wish to set up another window, use the **REVIEW** soft key to select another window and repeat the procedure.
8. When you have finished defining windows, press **CLEAR** to return to normal operation.
9. You can now check the appearance of your windows using the **DISPLAY** key (see *Section 2.5*).

## Changing Color Settings

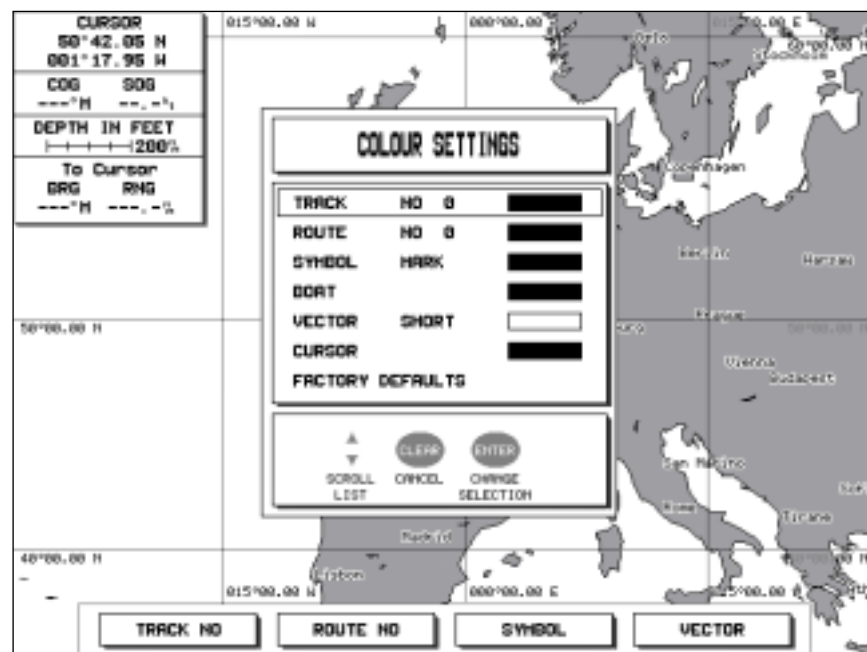
The color chartplotter includes options for setting the colors of the following:

- Tracks
- Routes
- Symbols (waypoints, marks and events)
- The vessel
- Vectors
- The cursor

**Note:** *You cannot change the colors of the charts and their associated objects.*

➤ To change the color settings:

1. Press **MENU** to display the main menus.
2. Use the trackpad or the **SCREEN** soft key to highlight the **COLORS** option from the **SCREEN** menu, and press **ENTER**. The following window is displayed:



D4209\_1

3. Use the up and down trackpad controls to select an item from the menu. Where necessary, press the appropriate soft key to select the specific item (TRACK, ROUTE, SYMBOL, VECTOR) to change.
4. Press **ENTER** to accept your selection. The available colors are displayed, use the up and down trackpad controls to select a color then press **ENTER** to accept the color (or **CLEAR** to cancel the selection).
5. When you have set all the required values, press **CLEAR** to return to the Screen Setup menu, and **CLEAR** again to return to the initial screen.

**Note:** *You can set all the colors back to their factory defaults. To do so, highlight the **FACTORY DEFAULTS** option, press **ENTER** to confirm that you wish to reset the colors.*



# Chapter 7: Installation

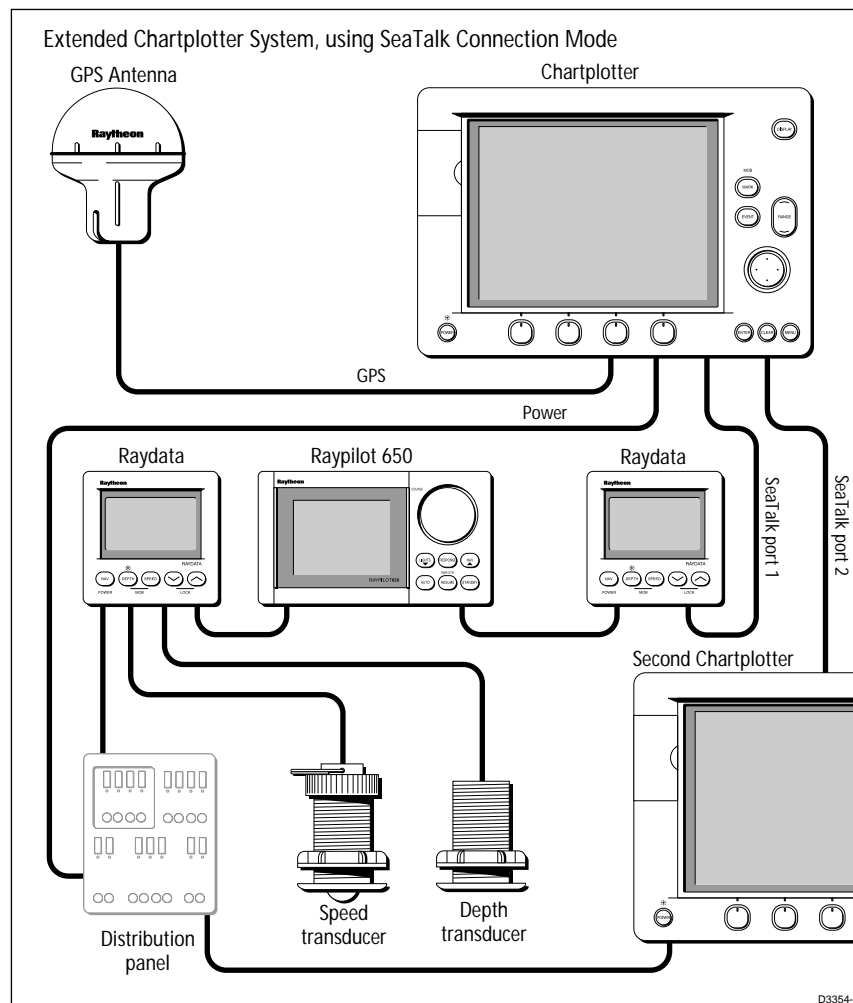
## 7.1 Introduction

This chapter explains how to install the chartplotter. Installation should only be undertaken by a competent installer.

The chartplotter can be trunnion (yoke) or panel mounted. It must be connected to a power supply and to a source of position data (for example, a GPS), and can also be connected to other units via the SeaTalk, Navaid or NMEA connections.

You can install more than one chartplotter as part of a larger system. Details of the current route or GO TO are sent to the second unit.

An example of an integrated system is shown in the following diagram.



**Note:** *Before attempting any installation, you should read the Electromagnetic Compatibility (EMC) installation guidelines provided below.*

This chapter covers the following topics:

- Packing list
- Planning the installation
- Mounting the chartplotter
- Chartplotter connections
- System check and initial setup

If you are connecting your chartplotter to a larger system, you should refer to the installation instructions for the other units and for connection to the SeaTalk bus.

## EMC Installation Guidelines

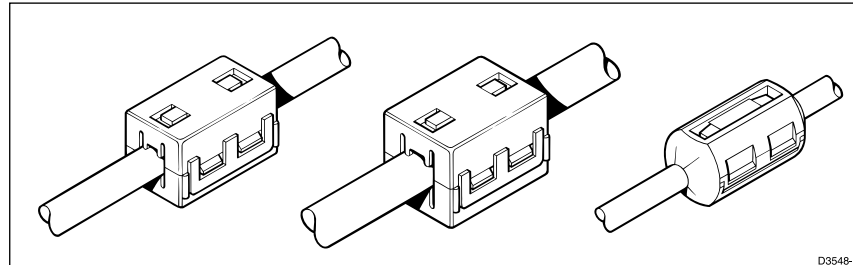
All Raytheon equipment and accessories are designed to the best industry standards for use in the leisure marine environment.

Their design and manufacture conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is essential to ensure that EMC performance is maintained. 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.

To avoid the risk of operating problems, all Raytheon equipment and cables connected to it should be:

- At least 3 feet (1m) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 7ft (2m).
- More than 7ft (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 should be supplied from a different battery than the one used for engine start. Voltage drops below 10v in the power supply to our products can cause the equipment to reset. This will not damage the equipment, but will cause the loss of some information and can change the operating mode.
- Genuine Raytheon cables should be used at all times. Cutting and rejoining these cables can compromise EMC performance and so should be avoided unless doing so is detailed in this handbook.
- If a suppression ferrite is attached to a cable, this ferrite should not be removed. If the ferrite has to be removed during installation it must be reassembled in the same position.

The following illustration shows the range of suppression ferrites fitted to Raytheon equipment.



If your Raytheon equipment is going to be connected to other equipment using a cable not supplied by Raytheon, a suppression ferrite **MUST** always be fitted to the cable close to the Raytheon unit.

## 7.2 Packing List

Your chartplotter display should be supplied with the following:

- Trunnion (yoke) bracket, fitted to the display with two knobs
- Self-tapping screws (4) for fixing trunnion bracket
- Power cable
- SeaTalk cable
- Display cover
- Panel mounting kit, consisting of thumb studs (4), thumb nuts (4), and fixing template
- This handbook
- Quick reference card

If you have purchased the ChartPlotter GPS System the package will also include the Raytheon Raystar 112 GPS.

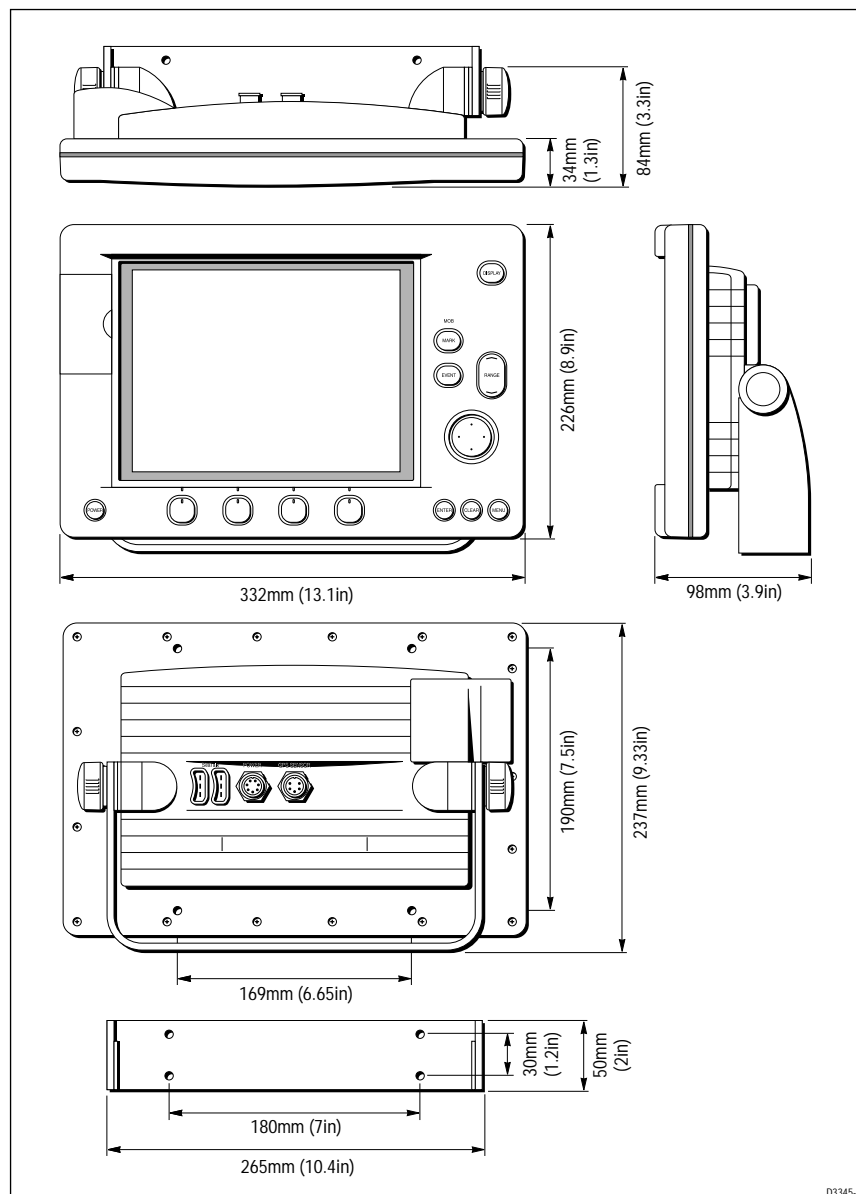
## 7.3 Planning the Installation

Before starting the installation, you need to select a suitable location and mounting method for the chartplotter, and consider the connection options and cabling requirements.

### Selecting a Location

The chartplotter can be mounted in two ways:

- Attached to a bulkhead, using the trunnion bracket already fitted to the display
- On a panel (tabletop or console), using the mounting kit provided



Although the chartplotter is designed to meet the CFR46 waterproofing standard, it is advisable to mount it, whenever possible, so that it is not exposed to the direct effects of salt spray or direct sunlight.

The monochrome chartplotter is provided with a sun cover. It is designed for above or below deck installation. The color chartplotter is designed only for below deck installation. When installing the chartplotter ensure it is:

- Protected against physical damage
- At least 230mm (9in) from a compass
- At least 1m (3ft) from radio receiving equipment
- Accessible from behind for ease of installation and cable running

You should also consider visibility of the display to the helmsman

**Note:** *LCD displays have a specific viewing angle for optimum visibility, which is normally within 30° of head-on viewing. You may wish to apply power to the chartplotter and view the display in various locations before mounting the unit permanently.*

## Connection Options

The chartplotter can communicate with other instruments using any of the following data interfaces:

- **SeaTalk**, using the dedicated SeaTalk ports.
- **GPS**, using the GPS Sensor port .
- **NMEA**, using the Power/NMEA port.

Navigation data can be received from all three ports. If data is available on more than one, then data from the SeaTalk port will have priority.

SeaTalk information can be selected for display via data windows (see *Section 6.3*). Data derived from the chartplotter is supplied to other instruments on SeaTalk.

The GPS Sensor port is only suitable for connection of Raytheon GPS units with a matching connector.

The NMEA connection on the Power/NMEA port can be used to connect third party GPS's and to connect a printer.

## Cabling

Plan your cable runs before you start the installation. Consider the following points:

- All cables should be adequately cleated and protected from physical damage or exposure to heat
- Acute bends must be avoided
- Where a cable passes through an exposed bulkhead or deckhead, a watertight gland or “swan neck” tube should be provided

## 7.4 Mounting the Chartplotter

The chartplotter can be mounted using the trunnion (yoke) bracket already fitted, or panel mounted using the supplied mounting kit.

### Trunnion Mounting

- To mount the chartplotter using the trunnion bracket:
  1. Loosen the trunnion knobs on each side of the chartplotter, and remove the trunnion from the unit.
  2. Mark the locations of the trunnion screw holes on the mounting surface.
  3. Use the screws supplied to fix the trunnion at the marked locations.
  4. Fit the chartplotter to the trunnion, adjust the display angle and tighten the knobs.

### Panel Mounting

- To mount the chartplotter on a panel or console (as shown in the illustration on the following page):
  1. Select a clear location at least 350mm (13¾ in) by 250mm (9¾ in).

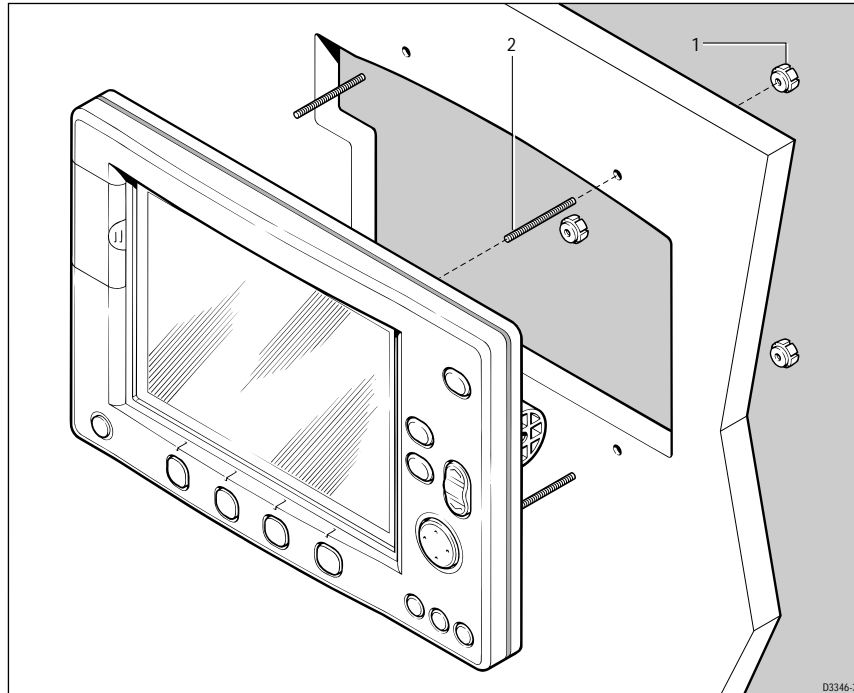
**CAUTION:**

**Make sure there are no hidden electrical wires or other items behind the desired location before proceeding.**

**Check that you have free access for mounting and cabling. You will require access at the back of the chartplotter to tighten the thumb nuts.**

2. Unpack the panel-mounting kit.
3. Using the supplied template, trace out the appropriate screw hole locations for panel mounting, and the display unit opening.
4. Drill a 12.7mm (½ in) pilot hole in each corner of the cut-out area.
5. Using a suitable saw, cut along the outside edge of the cut-out line.
6. Remove the trunnion (yoke) knobs and bracket from the chartplotter. Make sure that the unit fits in the cut-out area.

7. Drill four 5mm ( $\frac{3}{16}$  in) holes in the marked locations.
8. Complete the installation of the power data cabling, GPS input, and any other accessory cables to the console (see *Section 7.5*).



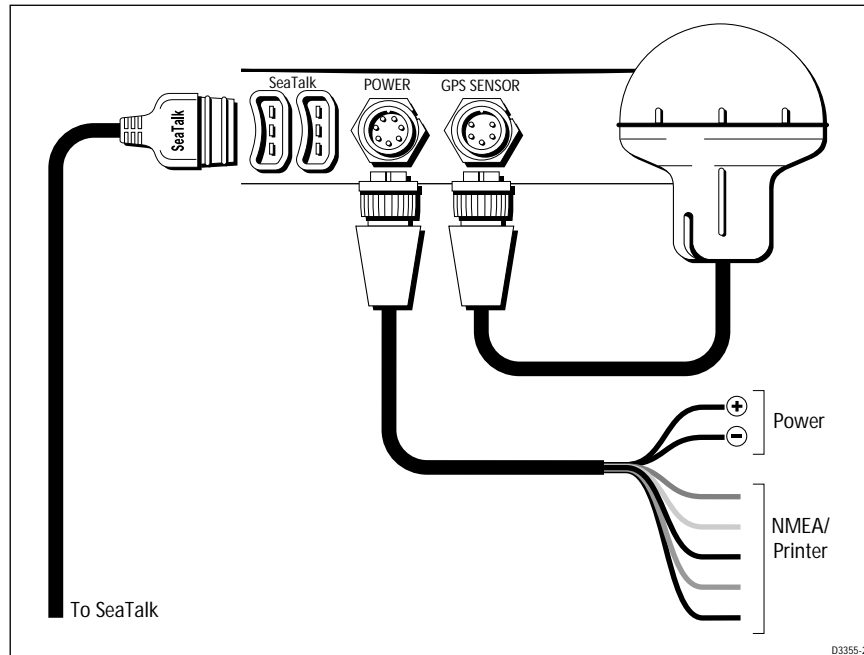
**1** Gasket **2** Thumb nuts (4 off) **3** Thumb studs (4 off)

9. Slide the unit into the panel cut-out. A suitable sealant may be used between the gasket (1) and panel to prevent moisture entering the panel.
10. Fix the chartplotter to the panel using the four thumb studs and four thumb nuts supplied.

## 7.5 Chartplotter Connections

The chartplotter has four rear panel connectors, as follows:

1. SeaTalk: two 3-pin flat connectors
2. Power: 7-pin male connector
3. GPS SENSOR: 5-pin male connector



### POWER Connection

Use the cable supplied to connect the following at the rear POWER connector, as shown above:

- Power
- NMEA In
- NMEA Out
- Printer

The pin functions are listed in the table below.

Pin No.	Function	Color
1	Battery negative	Black
2	Battery positive (12 - 32 VDC)	Red
3	NMEA data input (+ve)	White
4	NMEA input (-ve) - common	Green
5	Printer ready	Grey
6	NMEA data out OR printer out	Yellow
7	Data output common	Brown
	Not connected	Screen

### DC Power Connection

The chartplotter is intended for use on ships' DC power systems operating in a nominal range of 12 - 32 V (absolute maximum range 10.7 to 44V DC).

The connections should be made at a power distribution panel via an isolation switch. Check that all connections are clean.

- Connect the power supply using the standard power cable supplied, as follows:
  1. Connect the moulded power plug to the power connection on the rear of the chartplotter. Run the free end back to the vessel's distribution panel.
  2. Cut the cable to length and connect the red wire, via a fuse, to the +ve battery terminal and the black wire to 0V (-ve battery terminal). Protect the circuit with a 5A fuse/circuit breaker.
  3. Cut any unused cores short, or use a suitable junction box to connect to NMEA equipment and/or a printer.

#### CAUTION:

**To minimise the risk of fire and other hazards, if you do not have a breaker in your power circuit, you must fit an in-line, quick-blow fuse to the positive (red) lead of the power cable**

**Note:** *If the power connections are accidentally reversed the system will not work. Make sure that the input power leads are connected for correct polarity, using a volt meter.*

### NMEA Connection

You can use this port to interface the chartplotter with other equipment capable or receiving/transmitting data to the NMEA 0183 standard. Appendix B defines the data received and transmitted on the NMEA port.

## Printer Connection

If you connect a printer to your chartplotter, you can print any display, including charts, routes and waypoint details. The chartplotter supports baud rates in the range 300 to 9600.

Refer to your printer manual for connection and setup information.

### Notes:

1. The printer is connected to the **POWER** connector. To use a printer instead of NMEA output, select the **PRINTER** option in the Set Up menu.
2. When the chartplotter is off, NMEA data is passed through the **POWER** connector. To prevent NMEA data being printed, switch on the chartplotter before you switch on the printer; switch off the printer before the chartplotter.

## GPS Sensor Connection

If you are using a compatible GPS, connect it to the GPS SENSOR connector.

The GPS connector's pin functions, referenced to the chartplotter, are listed in the table below.

Pin No.	GPS Function
1	+12V DC
2	0V DC
3	Ground I/O
4	Data in from GPS
5	Data out to GPS
6	Not used (differential)

## SeaTalk Connection

The chartplotter can be connected to an existing SeaTalk system, by connecting the supplied SeaTalk cable to the SeaTalk connector on the rear of the chartplotter. The data is passed from instrument to instrument via the SeaTalk cable(s).

**Note:** *The SeaTalk connector cannot be used to power the chartplotter. Power is not supplied to other SeaTalk equipment.*

## 7.6 System Check and Initial Setup

Once you have installed your chartplotter and made all the connections, you need to check and test your installation before using the system for navigation.

You may wish to read *Chapters 2 to 6*, and familiarize yourself with the operation of the chartplotter, before performing the initial setup.

### System Check

Before performing the power-on test, check the following:

- All securing screws are fully tightened
- All connections have been made
- All connecting wires are secured and protected as necessary

**Note:** If you are the boat owner and have performed the installation yourself, you should ask your dealer to check the installation before going to sea.

### Switch On and Initial Setup

1. Press the **POWER** key to switch on the display unit.
2. Press the CONTINUE soft key to clear the navigation notices.
3. Press the CHART soft key to clear the Fix Status screen, and any key to clear the alarm message.

**Note:** A *good fix* is an indication that position data is being received.

4. If you have other equipment connected via the NMEA and NAVAIDS ports, set the priority as follows:
  - a. Press **MENU** to display the menu options, use the trackpad or right-most soft key to highlight the SYSTEM option on the SET UP menu, and press **ENTER**.
  - b. Use the trackpad to highlight the GPS Input selection option, press **ENTER** to list the options. Highlight the required option and press **ENTER** again.
  - c. Press **CLEAR** to return to the chart.
5. To speed up your initial position fix, select the FIX STATUS option from the SET UP menu, press the INITIALIZE soft key, and use the trackpad to edit the position data to match your current position. Refer to *Section 6.2* for further information.

You can perform additional customization, as described in *Chapter 6*.

## **EMC Checks Before Going to Sea**

Always check the installation before going to sea to make sure that it is not affected by radio transmissions, engine starting etc.

In some installations, it may not be possible to prevent the equipment from being affected by external influences. In general this will not damage the equipment but can lead to it resetting, or momentarily may result in faulty operation.

## Chapter 8: Maintenance and Problem Solving

This chapter provides information on routine maintenance and on possible causes of problems you may experience with your chartplotter.

### 8.1 Routine Maintenance

The chartplotter is a sealed unit. Maintenance procedures are therefore limited to cleaning and periodical checks.

**Note:** *Never use chemical or abrasive materials to clean the chartplotter. If the unit is dirty, wipe it with a clean, damp cloth.*

#### Cabling and Connections

Periodically check the cabling for chafing or damage to the outer casing, and replace any damaged cables.

Make sure that the connections to the vessel's DC power are clean and tight.

#### EMC Servicing and Safety Guidelines

This chartplotter unit contains no user serviceable parts. Raytheon equipment should be serviced only by authorized Raytheon service engineers. They will ensure that service procedures and replacement parts used will not affect performance. There are no user serviceable parts in any Raytheon product.

Some products generate high voltages, and so never handle the cables/connectors when power is being supplied to the equipment.

Always report any EMC related problem to your nearest Raytheon dealer. We review all such information to improve our quality standards.

#### Disposal

This unit contains a lithium battery and a CCFL lamp (cold cathode fluorescent lamp). Care should be taken when disposing of this equipment. Local ordinances and/or regulations may apply and must be adhered to.

## 8.2 Problem Solving

All Raytheon products are, prior to packing and shipping, subjected to comprehensive test and quality assurance programmes. However, if this unit should develop a fault, please refer to the following table to identify the most likely cause and the corrective action required to restore normal operation.

If you still have a problem after referring to the following table, contact your local dealer, national distributor or Raytheon Product Support Department for further advice.

Always quote the product serial number. This number is printed on the rear of the chartplotter, below the connectors.

### Common Problems and Their Solutions

<b>Problem</b>	<b>Correction</b>
No power input.	<ol style="list-style-type: none"> <li>1. Make sure that the power supply cable is sound and that all connections are tight and free from corrosion.</li> <li>2. Check polarity of the DC power cables for proper connection. Reconnect leads if necessary.</li> <li>3. Check in-line fuse. Replace if necessary.</li> <li>4. Check vessel's power (battery) for correct voltage readings (12-32V DC).</li> </ol>
Poor chart definition.	Adjust contrast setting and/or backlight level.
No position information.	<ul style="list-style-type: none"> <li>Check the GPS/Loran connection.</li> <li>Check the GPS/Loran receiver/antenna.</li> <li>Check your estimated latitude and longitude.</li> <li>Check the time and date, and correct if necessary.</li> <li>Check the source of the position input.</li> </ul>
No SeaTalk data received.	Check the SeaTalk connector and the SeaTalk network.
No NMEA data received.	Check the NMEA connector and the NMEA equipment.

If you still have a problem after referring to the table above, contact your local dealer or Raytheon Product Support Department for further advice.

## How to Contact Raytheon (US)

### For Marine Product and Services Information

Visit the Raytheon World Wide Web site for the latest information on the newest Raytheon Marine electronic equipment and systems at:

*www.raymarine.com*

### For Accessories and Parts

Many Raytheon accessory items and parts can be obtained directly from your authorized Raytheon dealer. However, if you are in need of an item not available from the retailer, please contact Raytheon Customer Service at 1-800-539-5539 extension 2333 or (603) 647 7530 extension 2333. Customer Service is available Monday through Friday 8:15 AM to 5:00 PM Eastern Standard Time.

Please have the Raytheon item or part number ready when calling if placing an order (See the Optional Accessory List). If you are not sure which item is appropriate for your unit, you should first contact the Technical Support Department at 1-800-539-5539 ext. 2065 to verify your requirements.

### For Technical Support:

For technical support, call 1-800-539-5539 extension 2444 or (603) 647-7530 extension 2444. The Raytheon Fax number is 1-603-634-4756.

Our Technical Support Specialists are available to answer questions about installing, operating and trouble-shooting all Raytheon products. Questions may be addressed directly to our Technical Support Department; for details see the Raytheon World Wide Web site at:

*www.raymarine.com.*

### For Product Repair and Service

In the unlikely event your Raytheon unit should develop a problem, please contact your authorized Raytheon dealer for assistance. The dealer is best equipped to handle your service requirements and can offer time saving help in getting the equipment back into normal operation.

In the event that repairs can not be obtained conveniently, product service may also be obtained by returning the unit to Raytheon's Product Repair Center using the prepaid UPS shipping tag supplied with your unit to:

Raytheon Product Repair Center  
676 Island Pond Road  
Manchester, NH 03109-5420

The Product Repair Center is open Monday through Friday 8:15 a.m. to 5:00 p.m. Eastern Standard Time. All products returned to the Repair Center are registered upon receipt. A confirmation letter will be sent to you acknowledging the repair status and the product's reference number. Should you wish to inquire about the repair status of your unit, contact the Product Repair Center at 1-800-539-5539 extension 2118. Please have the product reference number, or unit serial number, ready when you call. We will do everything possible to make the repair and return your unit as quickly as possible.

## How to Contact Raytheon (Europe)

In Europe, Raytheon support, service and accessories may be obtained from your authorised dealer, or contact:

Raytheon Marine Company  
Anchorage Park, Portsmouth  
PO3 5TD, England  
Tel (+44) 1705 693611  
Fax (+44) 1705 694642

Our technical support staff may also be reached via the Raytheon Electronics World Wide Web site:

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

### Accessories and Parts

Many Raytheon accessory items and parts are available through your authorised Raytheon dealer.

If you are uncertain about what item to choose for your Raytheon unit, please contact our Customer Services Department prior to placing your order.

### Technical Support

The Customer Services Department handles enquiries concerning installation, operation, fault diagnosis and repair. Please refer to the lists of component part numbers and optional accessories in the installation chapter of this manual, and have the Raytheon part number ready when speaking with your dealer.

## Worldwide Support

Please contact the authorised distributor in the country. A list of worldwide distributors is supplied with your system.

## Appendix A: Specification

This appendix provides the physical and electrical specification for the chartplotter.

CE	conforms to 89/336/EEC(EMC), EN60945:1997	
Size	226 mm x 332 mm x 84 mm (8.9 in x 13.1 in x 3.3 in), excluding trunnion	
Weight	1.8 kg (64 oz)	
Environmental	Waterproofing	To CFR46; suitable for external mounting
	Temp Range - Operating	Mono: 0°C to 70°C., Colour: 0°C to 50°C
	Temp Range - Storage	Mono: -20°C to 70°C, Colour: -20°C to 60°C
	Humidity	20% to 95% RH
Mounting	Trunnion (yoke) or panel	
Power	Input	12Vdc to 32Vdc nominal 10.7Vdc to 44Vdc Absolute maximum range
	Consumption- Typical	Mono: 4 W Colour: 10 W
	Consumption - Maximum	Mono: 9 W Color: 18 W (Power consumption of an external GPS to be added)
Controls	8 defined keys, 4 soft keys and trackpad	
Display type	640 x 480 VGA quality LCD either: colour with 64 colours or: monochrome with 4 grey scales	
Display size	10.4 in diagonal (211 mm x 158 mm) - colour 9.7" diagonal (196 mm x 148 mm) - monochrome	
Interfaces	SeaTalk receive and transmit NMEA 0183 receive and transmit Printer	
Position data	GPS, dGPS	
Cartography	C-MAP NT C-Cards	
Software update	Via C-Card	
Memory	Capacity:	Waypoints/events: 1000 (20 routes of 50 waypoints) Marks: 1000 Track histories: 5000 points, 5 files
	Protection:	Built in Lithium battery giving 3 to 5 years storage
	External:	C-MAP Memory C-Cards for data storage/retrieval



## Appendix B: NMEA Data Received and Transmitted

The following table defines the data received/transmitted on the NMEA port.

<b>Data</b>	<b>Received</b>	<b>Transmitted</b>
Heading	HDG, HDM, HDT, VHW	HDG
Locked Heading		HSC
Position (LAT/LON)	GGA, RMC, RMA, GLL	GLL, GGA, RMC
Speed Over Ground	RMC, RMA, VTG	RMC, VTG
Course Over Ground	RMC, RMA, VTG	RMC, VTG
Time (UTC)	GLL, GGA, RMC	GLL, GGA, BWC, RMC
Date	GGA	GGA
Sats and HDOP	GGA	GGA
Satellite Data	GSA, GSV,	
Current Waypoint Identifier		APB, BWC, XTE, RMB
Bearing to Waypoint		APB, BWC, RMB
Distance to Waypoint		BWC, RMB
Cross Track Error (XTE)		APB, RMB, XTE
Variation	RMC, HDG	RMC, HDG
Waypoint Arrival Status		APB, RMB



# Glossary

This glossary explains the terms and abbreviations that may be unfamiliar to the reader.

## G.1 Terms

Active	A waypoint that has been confirmed as the destination or interim destination.
Bearing	The direction of an object from the observer. Can be stated as an angle relative to either true or magnetic North.
Course	The intended or actual direction of travel. Can be stated as °Magnetic or °True.
Current	A waypoint or route that has been identified as the intended track of the vessel.
Dedicated key	A key with a permanently defined function or functions. These keys are labelled on the front panel of the chartplotter.
Heading	The direction in which the vessel is pointing.
Home Mode	The mode in which the cursor is hidden, and the cursor data box gives the vessel's position and the range and bearing to the current waypoint (if any).
Latitude	Angular measure 0 to 90° North or South from the equator. On a North up chart, these are lines drawn from right to left.
Longitude	Angular measure 0 to 180° East and West of the prime meridian (0°) at Greenwich, England. On a North up chart, these are lines drawn from top to bottom.
Orientation	The chart orientation, which can be head up, course up or north up.
Panning	Moving the "window" on the displayed chart to bring a new area into view.
Plotter Mode	The mode in which, when no cartographic information is available at the current range, only a lat/long grid is displayed. If it is switched off in setup (the default setting), only ranges for which cartographic information is available can be selected.
Relative Motion	The mode in which the chart moves to keep the vessel's location in the centre of the display.
Route	A sequence of waypoints, used to define an intended path to a destination.

SeaTalk	The Raytheon standard for data communications.
Soft key	A key without a printed label, whose function depends on the context in which it is used. The current function is indicated by a label on the screen immediately above the soft key.
Time out	The automatic clearing of a message or the soft key labels after, for example, 7 seconds.
True Motion	The mode in which the chart remains fixed and the vessel moves across the display. This is the normal display mode.
Variation	The difference in degrees between “True North” and “Magnetic North”.
Waypoint	Any location that has been stored in memory with Lat/Long or TD as the coordinates, which is to be used as a destination or a turning point on the route to the destination.
Window	A boxed area inset on the main screen, containing information.

---

## G.2 Abbreviations

BDI	Bearing Deviation Indicator
BTW	Bearing To Waypoint
CDI	Course Deviation Indicator
CMG	Course Made Good
COG	Course Over Ground. The actual direction of your vessel's movement over the ground.
dGPS	Differential Global Positioning System
DMG	Distance Made Good
DTG	Distance To Go
EMC	Electro-Magnetic Compatibility
ETA	Estimated Time of Arrival
GPS	Global Positioning System
HDOP	Horizontal Dilution Of Precision. The multiplicative factor that modifies ranging error. It is caused solely by the geometry between your vessel and your set of satellites.
MOB	Man OverBoard
NMEA	National Marine Electronics Association (interconnection standard)
SOG	Speed Over Ground. The rate of movement of the vessel over the ground.
TD	Time Difference. The difference in time of arrival (measured in microseconds) of the two Loran signals, one from the master transmitting station and the other from the selected secondary.
TTG	Time To Go
VMG	Velocity Made Good. The component towards your destination based on your vessel's current speed.
WPT	Waypoint
XTE	Cross Track Error



# Index

## A

Active - definition 105

Adding

Waypoint - External Capture 32

Waypoint On-Screen 31, 32

Waypoint to the List 49, 52

Alarms

Anchor 47, 72, 73

Arrival 36, 47, 72, 73

Clock 47

Controlling 41

Danger Zone 47, 72, 73

Fix Status 47

Handling 47

Off Course 47, 72, 73

Set Up 72, 73

Silencing 47

Alarms & Timers Set Up 62

ALLINFO soft key 16

Anchor Alarm 47, 72, 73

Arrival Alarm 36, 47, 72, 73

## B

BDI 26

Bearing 3

definition 105

Bearing Deviation Indicator (BDI) 24, 26

## C

Cabling 90, 97

Cartography

Setting Detail 78

CDI 26

CENTER Soft Key 7, 20, 22

Changing

between Full Screen & Windows 25

Chart Centre 20, 22

Chart Scale 20, 21

GO TO 38

Set Up Parameters 62

Windows Set Up 25

Chart Boundaries 79

Chart Card 3, 14

Inserting 14

Number and Description Display 11

Removing 15

Chart Centre

Changing 20, 22

Chart Controls 20

Chart Data

Displaying 15

Port 17, 18

Tide 19

Chart Depth 3

Chart Display 3

Chart Object

Displaying Information 16

Chart Orientation 3, 20

Set Up 79

Chart Scale 3, 14

Changing 20, 21

Chart Units 3

Chartplotter

Off 12

On 11

Set Up 62, 70

CLEAR Dedicated Key 8, 20

Clock Alarm Timer 47, 72, 73

COG (Course Over Ground) 3

Color Display

Lighting 13

Color Set Up 82

Color Settings 78

Connection Options 89

Connections 92, 97

GPS 94

NMEA 92

Power 92

SeaTalk 94

Contrast Control 13

Monochrome Display 13

Controlling the Chart 20

Conventions Used iv

Countdown Timer 47, 72, 73

Course

definition 105

Course Deviation Indicator (CDI) 24, 26

Course Up 79

Course Vector 70, 71

Current - definition 105

Current Route 49, 53

Operations 54

Viewing 53

Cursor 5

Bearing 3

Color 82

Data Box 3, 4, 71

On/Off 72

Echo 64, 66

Position 3

Range 3

Customising the Display 78

Customizing the Chartplotter 61–83

**D**

- Danger Zone 41
  - Danger Zone Alarm 47, 72, 73
  - Data
    - From Other Equipment 2, 80, 89
    - Navigation 20, 24
  - Data Box
    - Cursor 3, 4
    - Object 4, 16
  - Database List 5, 8
  - Date and Time 64, 65
  - Dead Reckoning 71, 72
  - Dedicated Key
    - definition 105
  - Dedicated Keys 5, 6
    - CLEAR 8, 20
    - DISPLAY 8, 20, 24, 80
    - EVENT 8, 43
    - MARK 8, 42, 46
    - MENU 8, 50, 61, 62, 78, 80, 81
    - POWER 8, 11, 13
    - RANGE 14, 20, 21
  - Deleting
    - Current track 44
    - Event 43
    - Mark 42
    - Route. *See* Erasing a Route
    - Route from the List 56
    - Waypoint from the List 51
    - Waypoint On-Screen 33
  - Depth 3
  - Depth Range 17
  - Differential Beacon Manual Setup 75
  - DISPLAY Dedicated Key 8, 20, 24, 80
  - Displaying
    - Chart Data 15
    - Chart Object Information 16
    - Navigation Data 20, 24
    - Route 56
    - the Log 59
    - Waypoint 59
  - Disposal 97
- E**
- EDIT menu option 49–60
  - Editing
    - Route 57
    - Route Information On-Screen 33
    - Route On-Screen 30, 32
    - Track Controls 44
    - Waypoint Details 49, 51, 52
    - Waypoint Details (GO TO) 37
  - Elapsed Timer 72, 73

**EMC**

- Checks Before Going to Sea 96
  - Conformance iv
  - Installation Guidelines 86
  - Servicing Guidelines 97
- Erasing**
- Route 30, 35, 36
- Estimated Time of Arrival 49, 54
- EVENT Dedicated Key 8, 43
- Events 41
- Deleting 43
  - Placing 43
- EXPAND Soft Key 16

**F**

- Finding a Waypoint 49, 51, 59
- Fix Datum 67, 69
- Fix Status 11, 74
- Fix Status Alarm 47
- Following a Route 30, 35, 49, 56
- Full Screen Display 24, 25

**G**

- GO TO**
- Clear 38
  - Soft Key 7, 37
  - Using the Soft Key 29
  - Waypoint 51
- GPS**
- Connection 89, 94
  - Initializing 74
  - Input 64, 66

**H**

- Head Up 80
- Head Up Response 67
- Heading
  - definition 105
- Heading Units 67, 68
- Heading Vector 70, 71
- Help 5
  - On/Off 5
- Help from Raytheon 99, 100
- Help Level 64, 65
- Home Mode 3, 22, 23
  - definition 105

**I**

- Initial Set Up 95
- Initializing GPS 74
- Input Selection 66
- Inserting a Chart Card 14
- Installation 85–96

**K**

- Keypress Sound 64, 66
- Keys
  - Dedicated 5, 6
  - Soft 5, 7

**L**

- Language 64, 65
- Lat/Long Grid 79
- Latitude - definition 105
- Lighting Control 13
  - Color Display 13
- List
  - Route 49, 55
  - Waypoint 49, 50
- Lists of Stored Data 49–60
- Location 88
- Log
  - Displaying 59
  - Printing 59
- Longitude - definition 105
- Loran
  - Setting Up 68

**M**

- Magnetic Variation 67, 68
- Maintenance 97–100
- Making a Route
  - from Waypoint List 57
  - On-Screen 30
- Man Overboard (MOB) 41, 46
- Map Datum 67, 69
- MARK Dedicated Key 8, 42, 46
- Marks 41
  - Deleting 42
  - Placing 42
- Measuring Distances 29, 39
- Memory C-Card 14, 76
  - Set Up 62
- MENU Dedicated Key 8, 44, 50, 61–83, 62, 78, 80, 81
- MOB 46
  - Symbol 46
- Monochrome Display
  - Contrast 13
- Motion Modes 80
- Mounting the Chartplotter 90
- Moving
  - the Chart 20

**N**

- Navaid
  - Data 89
- Navdata 81
- Navigating to a Point 37
- Navigation Data
  - Displaying 20, 24, 25, 26
  - Setting Up 62, 66
- NavPlotter 32
- Nearest Port Data 17
- Next Leg 30, 35, 36, 49, 54
- NMEA 66
  - Connection 89, 92, 93
  - Data 80, 89
- North Up 79

**O**

- Object
  - Data Box 4, 16
  - Information 16
- Off Course Alarm 47, 72, 73
- Operating Controls
  - Cursor 5
  - Database List 5, 8
  - Dedicated Keys 5, 6
  - Pop-up Menus 5, 8
  - Soft Keys 5, 7
  - Trackpad 5
- Orientation 3, 20
  - definition 105
  - Set Up 78, 79

**P**

- Packing List 87
- Panel Mounting 90
- Panning - definition 105
- Panning the Display 20
- Placing
  - Event 43
  - Mark 42
- Plotter Mode 16, 21, 79
  - definition 105
- Pop-up Menus 5, 8
- Port Data 17, 18
- Position
  - Cursor 3
  - Vessel 3, 23
- Position Correction 67, 69
- Position Fixer Set Up 62
- Position Resolution 67, 68
- Power Connection 92, 93
- POWER Dedicated Key 8, 11, 13
- Power-on Sequence 11

- Printer
  - Baud Rate 64, 66
  - Connection 89, 94
- Printing 49, 60
  - the Log 59
- Problem Solving 98
- R**
- Range 3
- RANGE Dedicated Key 20, 21
- RANGE Dedicated Keys 14
- Relative Motion 23, 80
- Relative Motion - definition 105
- Removing a Chart Card 15
- Reversing a Route 30, 35, 57
- Reviewing a Route 49
- Route
  - Color 82
  - Current 49, 53
  - definition 105
  - Deleting 56
  - Details 56, 57
  - Display 56
  - Editing Information 33
  - Editing On-screen 30, 32
  - Editing Using Lists 57
  - Erasing 30, 35, 36
  - Following 30, 35, 49, 56
  - List 49, 55
    - Operations 56
    - Viewing 55
  - Making from Waypoint List 49, 57
  - Making On-Screen 30, 31
  - Next Leg 30, 35, 36, 49
  - On-Screen 30-36
  - Reversing 30, 35, 57
  - Reviewing 49
  - Selecting 31, 56
  - Selecting from List 49
  - Setting Up On-Screen 29, 30
  - Switching Off 30, 35, 36, 56
  - Using 35
  - Using On-screen 29
- ROUTE Soft Key 7, 30, 31, 54
- RULER Soft Key 7, 29, 39
- S**
- Safety i, 29, 97
- Scale 3, 14
  - Changing 20, 21
- Screen Customisation 78
- SeaTalk 2, 66
  - Connection 94
  - Data 80, 81, 89
  - definition 106
  - Ports 89
- Selecting
  - Route 31, 56
  - Waypoint 49
- Set Up
  - Initial 95
  - Menu 62-77
- Setting Up 61-83, 62
  - Alarms 62, 73
  - Alarms and Timers 72
  - Cartography Detail 78
  - Chartplotter 62, 70
  - Color 78, 82
  - Differential Beacon 75
  - Memory C-Card Transfers 62
  - Navigation Data 62, 66
  - Orientation 78, 79
  - Position Fixer 62
  - Routes On-Screen 30
  - System 62, 63
  - Timers 62
  - Windows 25, 78, 80
- Silencing an Alarm 47
- Simulator 64, 65
- Soft Key
  - definition 106
- Soft Key Labels 3, 7
- Soft Keys 5, 7
  - CENTER 7, 20, 22
  - GO TO 7, 37
  - Initial Functions 7
  - ROUTE 7, 30, 31, 54
  - RULER 7, 29, 39
  - Using 29
- SOG (Speed Over Ground) 3
  - Current 54
  - Planned 54
- Specification 101
- Starting a Track 44
- Stopping
  - GO TO 38
  - Route 35, 36, 56
  - Track 44
- Stored Lists 49-60
- Switching the Chartplotter On/Off 11
- Symbol
  - Color 82
  - MOB 46
  - Waypoint 34
- System Set Up 62, 63
- System Test 95

**T**

TD Settings 67, 68  
Tide Data 19  
Tide Vector 71, 72  
Time Out - definition 106  
Timers 47  
    Clock Alarm 72, 73  
    Controlling 41  
    Countdown 47, 72, 73  
    Elapsed 72, 73  
    Set Up 72  
Trackpad 5  
Tracks 43  
    Color 82  
    Controls 44  
    Deleting 44  
    Displaying 41  
    Recording 41  
    Starting 44  
    Stopping 44  
True Motion 20, 80  
    definition 106  
Trunnion Mounting 90

**U**

Units 3, 64, 65  
Using a Route 35  
Using the Initial Soft Keys 29–39

**V**

Variation - definition 106  
Vectors 71  
    Color 82  
Vessel  
    Color 82  
    Position 3, 23  
Viewing  
    Current Route 53  
    Log 49  
    Route List 55  
    Waypoint List 50

**W**

Warranty iv  
Waypoint  
    Adding from Lists 49, 52  
    Adding On-Screen 31, 32  
    definition 106  
    Deleting from List 51  
    Deleting On-Screen 33  
    Details 71  
    Display 70

    Displaying 59  
    Editing Details 49, 51  
    Editing Details (GO TO) 37  
    External Capture 32  
    Finding in the Waypoint List 49, 51  
    Finding on the Chart 59  
    GO TO 51  
    List 49, 50  
        Operations 51  
        Viewing 50  
    Name 34, 70, 71  
    Selecting from the Waypoint List 49  
    Symbol 34  
Wind Vector 71  
Windows 20, 24, 25  
    definition 106  
    Set Up 25, 78, 80  
World Map 3, 14  
World Wide Support 100

**Z**

Zoom 21



# Limited Warranty Certificate

Raytheon Marine Company warrants each new Light Marine/Dealer Distributor Product to be of good materials and workmanship, and will repair or exchange any parts proven to be defective in material and workmanship under normal use for a period of 2 years/24 months from date of sale to end user, except as provided below.

Defects will be corrected by Raytheon Marine Company or an authorized Raytheon dealer. Raytheon Marine Company will, except as provided below, accept labor cost for a period of 2 years/24 months from the date of sale to end user. During this period, except for certain products, travel costs (auto mileage and tolls) up to 100 round trip highway miles and travel time of 2 hours, will be assumed by Raytheon Marine Company only on products where proof of installation or commission by authorized service agents, can be shown.

## Warranty Limitations

Raytheon Marine Company Warranty policy does not apply to equipment which has been subjected to accident, abuse or misuse, shipping damage, alterations, corrosion, incorrect and/or non-authorized service, or equipment on which the serial number has been altered, mutilated or removed.

Except where Raytheon Marine Company or its authorized dealer has performed the installation, it assumes no responsibility for damage incurred during installation.

This Warranty does not cover routine system checkouts or alignment/calibration, unless required by replacement of part(s) in the area being aligned.

A suitable proof of purchase, showing date, place, and serial number must be made available to Raytheon Marine Company or authorized service agent at the time of request for Warranty service.

Consumable items, (such as: Chart paper, lamps, fuses, batteries, styli, stylus/drive belts, radar mixer crystals/diodes, snap-in impeller carriers, impellers, impeller bearings, and impeller shaft) are specifically excluded from this Warranty.

Magnetrons, Cathode Ray Tubes (CRT), hailer horns and transducers are warranted for 1 year/12 months from date of sale. These items must be returned to a Raytheon Marine Company facility.

All costs associated with transducer replacement, other than the cost of the transducer itself, are specifically excluded from this Warranty.

Overtime premium labor portion of services outside of normal working hours is not covered by this Warranty.

Travel cost allowance on certain products with a suggested retail price below \$2500.00 is not authorized. When/ or if repairs are necessary, these products must be forwarded to a Raytheon Marine Company facility or an authorized dealer at owner's expense will be returned via surface carrier at no cost to the owner.

Travel costs other than auto mileage, tolls and two (2) hours travel time, are specifically excluded on all products. Travel costs which are excluded from the coverage of this Warranty include but are not limited to: taxi, launch fees, aircraft rental, subsistence, customs, shipping and communication charges etc..

Travel costs, mileage and time, in excess to that allowed must have prior approval in writing.

TO THE EXTENT CONSISTENT WITH STATE AND FEDERAL LAW:

(1) THIS WARRANTY IS STRICTLY LIMITED TO THE TERMS INDICATED HEREIN, AND NO OTHER WARRANTIES OR REMEDIES SHALL BE BINDING ON RAYTHEON MARINE COMPANY INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(2) Raytheon Marine Company shall not be liable for any incidental, consequential or special (including punitive or multiple) damages.

All Raytheon Marine Company products sold or provided hereunder are merely aids to navigation. It is the responsibility of the user to exercise discretion and proper navigational skill independent of any Raytheon equipment.

**United States of America**

Raytheon Marine Company  
Recreational Products  
676 Island Pond Road  
Manchester, NH 03109-5420  
U.S.A.

Tel 603-647-7530  
Fax 603-634-4756

**UK, Europe, Middle East, Far East**

Raytheon Marine Company  
Recreational Products  
Anchorage Park, Portsmouth  
PO3 5TD, England

Tel (44) 1705 693611  
Fax (44) 1705 694642  
Fax Customer support (44) 1705 661228

---

**Raytheon**

**Factory Service Centers**

**United States of America**

Raytheon Marine Company  
address as above

**UK, Europe, Middle East, Far East**

Raytheon Marine Company  
address as above

---

Stick barcode label here

Purchased from

Purchase date

Dealer Address

Installed by

Installation date

Commissioned by

Commissioning date

Owner's name

Mailing address

---

This portion of card should be completed and retained by the owner.