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HSB Series Chartplotter

owner's handbook

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HSB Series Chartplotter

Installation and Operation 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 unit 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 judgements, and this unit should not be relied upon as a substitute for such prudence and judgement.

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Preface

This handbook covers the chart aspects of the following HSB Series systems from Raytheon:

System	Display	Chartplotter	Radome
Chartplotter			
Raychart	RC520	Yes	No
Combined Pathfinder Radar/Chartplotter Systems			
RL72RC	RL70RC	Yes	2D 18"
RL74RC	RL70RC	Yes	4D 24"
Repeater Displays			
Repeater	RL70	No	–
Repeater	RL70RC	Yes	–
Repeater	RC520	Yes	–

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.

Raytheons Product Support representatives or your authorised dealer will be available to answer any questions you may have.

Warranty

To register your HSB Series 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 configuration is essential to maintain EMC performance.

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Chapter 1: Overview

1.1 Introduction

How this Handbook is Organised

This handbook describes the HSB Series Chartplotter RC520 and the charting functions of the combined Radar/Chartplotter RL70RC (refer to the *Pathfinder HSB Series Radar Handbook*, also provided with the combined system, for details on the radar functions). If you are using any HSB series 7" display unit as a chart repeater display you should refer to this handbook.

The handbook is organised as follows:

Chapter 1 provides an overview of the features and functions of the HSB Series Chartplotter. You should read this chapter to familiarise yourself with the system.

Chapter 2 provides an overview of the controls. It also explains how to start using the chartplotter and includes operating guidelines for typical scenarios; these guidelines introduce you to many of the chartplotter functions.

Chapters 3 provides detailed operating information for the main chartplotter functions - plotting waypoints and routes, following routes and showing tracks.

Chapter 4 provides detailed operating information for further chart functions, including measuring distances, man overboard and cursor echo. It includes instructions for setting up a differential GPS.

Chapter 5 provides instructions for setting up your chartplotter system to suit your preferences. You should read Chapter 5 to determine how to set up the system defaults.

Chapter 6 provides planning considerations and detailed instructions for installing the chartplotter. It should be referred to when you are ready to install the chartplotter.

Chapter 7 provides information on user maintenance, and what to do if you experience problems.

Appendix A lists the technical specifications for the Chartplotter.

A List of Abbreviations, an Index and warranty information are included at the end of the handbook.

Note: Installation of all HSB display units is the same, whether the unit is a chartplotter or a radar display. If you have both the *HSB Series Pathfinder Radar* or the *HSB Series Chartplotter Handbook* you can refer to either handbook for display unit installation details.

Terminology

The following terminology is used to describe chartplotter and radar systems:

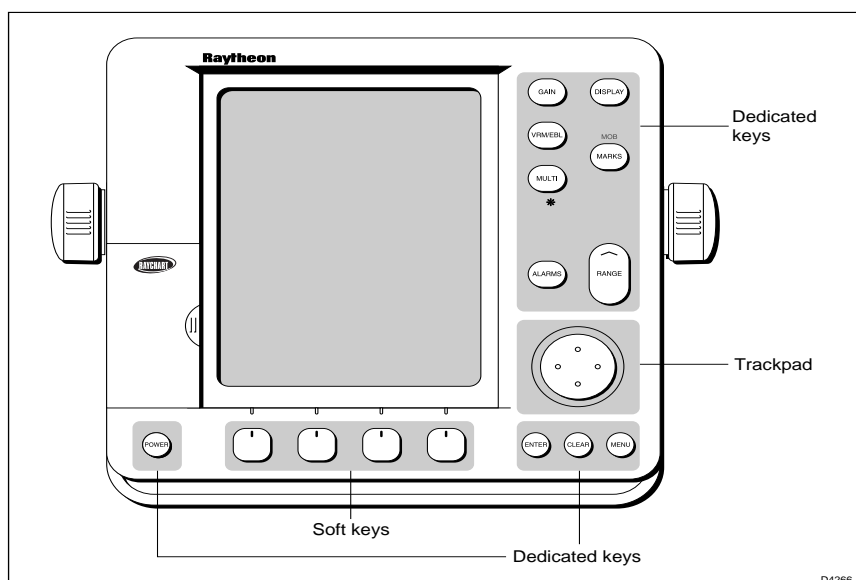
Master	A unit capable of sourcing specific data (such as radar or chart data).
Repeater	A unit capable of displaying data, such as radar, from the HSB.
Radar Display	Unit providing Radar Master and Chart Repeater functionality.
Chart Display	Unit providing Chart Master and Radar Repeater functionality.
Combined Display	Unit providing both Radar and Chart Master functionality.
Integrated System	Additional instruments are connected via the HSB, Seatalk or NMEA interfaces.
HSB™	High Speed Bus - links compatible display units. For full display and control between HSB series display units, the units must be connected via HSB and SeaTalk.

General

The HSB Series Chartplotter, or combined Radar/Chartplotter display unit is waterproof to CFR46 and can be installed either above or below deck. The unit includes:

- 7" LCD display
- Chartholder compartment containing two slots for the C-MAP NT® electronic chart cards.
- Eleven dedicated (labelled) control keys.
- Four soft keys (unlabelled) whose functionality changes.

The display and keys can be illuminated for night-time use.



The HSB (High Speed Bus) connection enables transfer of data between two compatible units. For example, the chart data is transferred from the chartplotter (the master display) via the HSB connection and can be displayed *and controlled* on any other HSB display (repeater display). In particular, you can connect your HSB Series Chartplotter to a remote HSB Series Radar to provide similar functionality to the combined Radar/Chartplotter.

Full functionality of the HSB Series Chartplotter is achieved when it is part of an integrated system, with other equipment (in addition to another HSB unit) connected via Seataalk or NMEA 0183. Data from this equipment including position, waypoints and routes, is displayed on the chartplotter and is used in calculations. Details on connecting other equipment are given in Chapter Six.

Display Unit Features

- Uses position information from GPS, dGPS or Loran-C technology
- Displays chart information from the C-MAP NT® chart cards (C-Cards)
- Displays and transfers Seatalk, NMEA and HSB data
- Provides full control of data from other HSB instruments
- Three full-screen operating modes: Radar, Chart, Data Log (if appropriate data is available)
- View radar and chart simultaneously and synchronise radar image with chart screen
- Half-screen windows to display additional data: Course Deviation Indicator (CDI), Bearing Deviation Indicator (BDI), navigation data
- Cursor echo across SeaTalk, and between chart and radar windows

Display Unit Functions

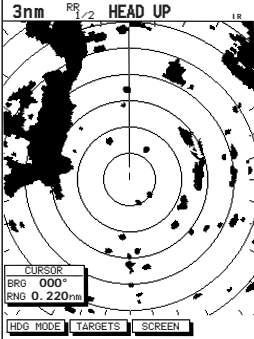
The HSB Series Chartplotter includes the following functions:

- Place, Move, Erase and Edit a Waypoint
- Goto Waypoint or Cursor
- Create, Save, Name, Edit and Follow a Route
- Review Route and Waypoint Lists
- Display vessel's track on-screen; Save and Name the Track for re-call to screen
- Measure Chart Distances and Bearings on-screen
- Set Up Alarms and Timers
- Man OverBoard (MOB) to navigate back to a missing person or object
- Differential GPS tuning page

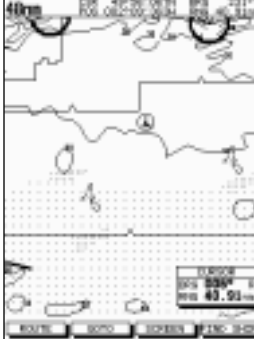
Operating Modes

If you have a combined Radar/Chartplotter Unit, or have an HSB Radar connected three full-screen modes as shown opposite are available (chart, radar and data log); data log mode is used to initiate and display a running log of vessel travel. You select the mode using the **DISPLAY** key as described in Chapter two.

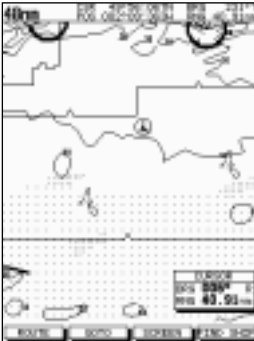
Operating Mode for Stand Alone Units

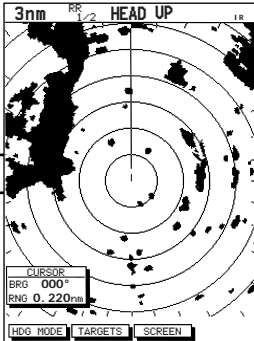


Chartplotter Display




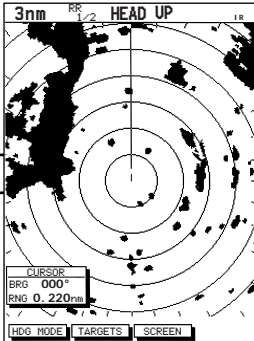
Additional Modes for Linked Radar Units (or combined Radar/Chartplotter)






DISPLAY





DISPLAY



TIME	POSITION	CMG	DMG
15:30	50°21:850N	346°h	6.86m
	001°20:610W		
16:00	50°18:010N	180°h	7.23m
	001°20:070W		
16:30	50°21:850N	012°h	7.23m
	001°19:280W		
17:00	50°18:500N	206°h	6.67m
	001°21:300W		
17:30	50°20:950N	043°h	5.74m
	001°18:280W		
18:00	50°19:860N	245°h	5.00m
	001°21:860W		
18:30	50°19:730N	093°h	4.63m
	001°18:030W		
19:00	50°20:930N	302°h	5.00m
	001°21:750W		
19:30	50°18:950N	145°h	5.74m
	001°18:850W		

STOP LOG CLEAR LOG

D4285-1

In addition, in chart or radar mode you can set *Windows On* to split the display into two half-screen windows for supplementary data display as described below. The upper window shows the selected mode (radar or chart); operating control defaults to the upper window, but you can switch control between the radar and chart window with a single key-press.

In addition, in chart or radar full-screen mode you can set *Windows On* to split the display into two half-screen windows for supplementary data display as described below. The upper window shows the selected mode (chart or radar); operating control defaults to the upper window, but you can switch control between the radar and chart window with a single key-press.

The following information, if available on your system, can be shown:

Full-Screen Mode	Half-Screen Window Options
Chart	CDI, BDI, Nav Data or Radar
Radar	CDI, BDI, Nav Data or Chart
Data Log	Not available

Half-screen Window Options

You can choose one of the following for display in the lower window:

- **CDI:** This gives the Course Deviation Indicator. It is a graphical display showing the deviation from the required track with reference to the target waypoint. The display also provides the cross track error (XTE) distance, and the range, bearing and time to go (TTG) to the target waypoint.
- **BDI:** This gives the Bearing Deviation Indicator. It is a graphical display showing the deviation from the required bearing with reference to the target waypoint. The display also provides the cross track error (XTE) distance, and the range, bearing and time to go (TTG) to the target waypoint.
- **Nav Data:** This shows nine data boxes, providing navigational data in the units specified in your set up. Note that up to six of these boxes are also available as a user-selectable group (see Section 5.3 System Parameters).
- **Radar display:** If radar data is available, either as a function of the combined display unit or via the HSB link, it can be displayed. Refer to the *Pathfinder HSB Series Radar Handbook* for detailed information.

Details on selecting windows are given in Chapter 2.

1.2 The Chartplotter Display

The chartplotter includes a small-scale world map that can be used for route planning. Detailed navigation information is displayed when a chart card is installed.

Once the position fix has been established, your vessel's position, if on screen, is shown as a boat shape, pointing in the direction of the current heading (or COG if heading data is not available). If no heading or COG data is available, the vessel is shown as a circle.

The chartplotter screen includes a status bar that displays chart scale, with either cursor position, range and bearing or, when the cursor is placed over the vessel, vessel position, Speed Over Ground (SOG) and Course Over Ground (COG).

Any waypoints you have placed are displayed (unless you turned them off in Chart Set Up as described in Chapter 5) and the current route is shown. Data boxes can be viewed on-screen by positioning the cursor over a waypoint, current route or chart object. The chartplotter screen can also show additional information, depending on your currently selected options, set up selections and data available from other equipment.

An example chart display, in its default configuration, with a chart card installed, is shown in the following illustration.

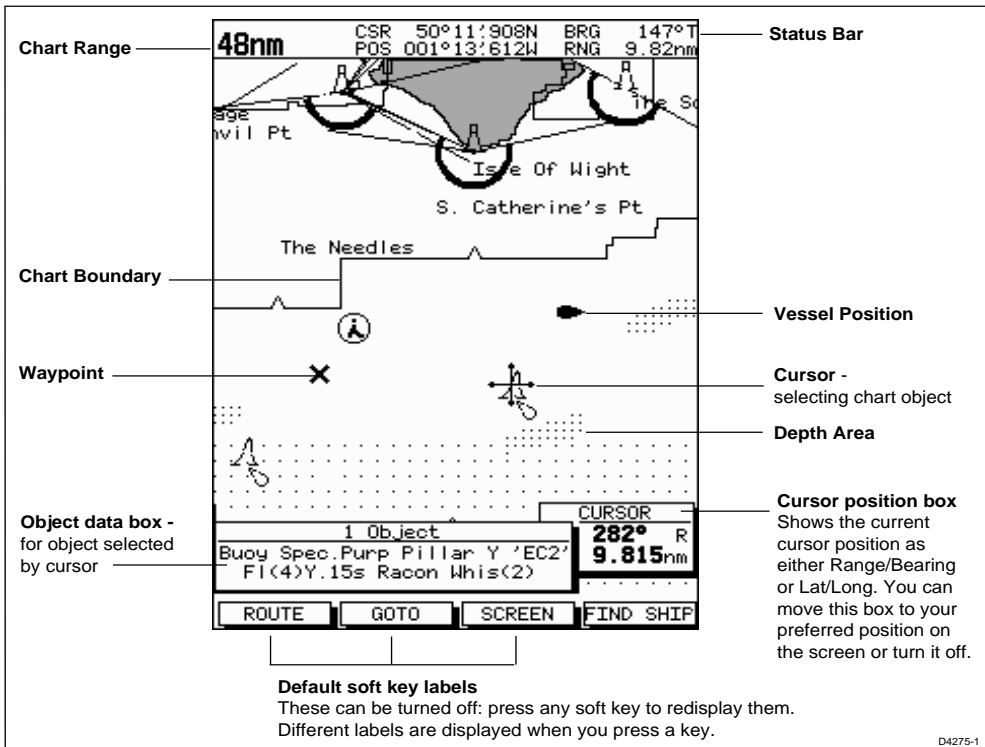
Several functions are available to control the display as follows:

- Zoom in/out and Pan the Display
- Offset the Chart or Centre the Chart around the Vessel
- Synchronise the Chart and Radar (if radar data is available)

Operation of these functions is described in Chapter 2.

Chartplotter Display Options

Set up options allow you to customise the chart by choosing what is, or is not displayed, how it is displayed (including language and units), heading mode and how the chartplotter operates with other HSB units. You can also view the cursor position and a variety of data from other equipment, e.g. speed, heading, depth, wind and tide information in a set of user-selectable data boxes. The cursor box and user-selected data boxes can be moved around the screen and they can be turned on or off.



Display options are provided in System Set Up and Chart Set Up as described in Chapter 5. In addition Screen Presentation Options, described in Chapter 2 are provided to switch:

- Cursor Box and Databoxes On/Off
- Chart Grid On/Off
- Custom Chart Details On/Off

Note: When you turn the display off and on again, most settings are retained, including the chart scale, gain setting, and data box positions.

1.3 Operating Controls

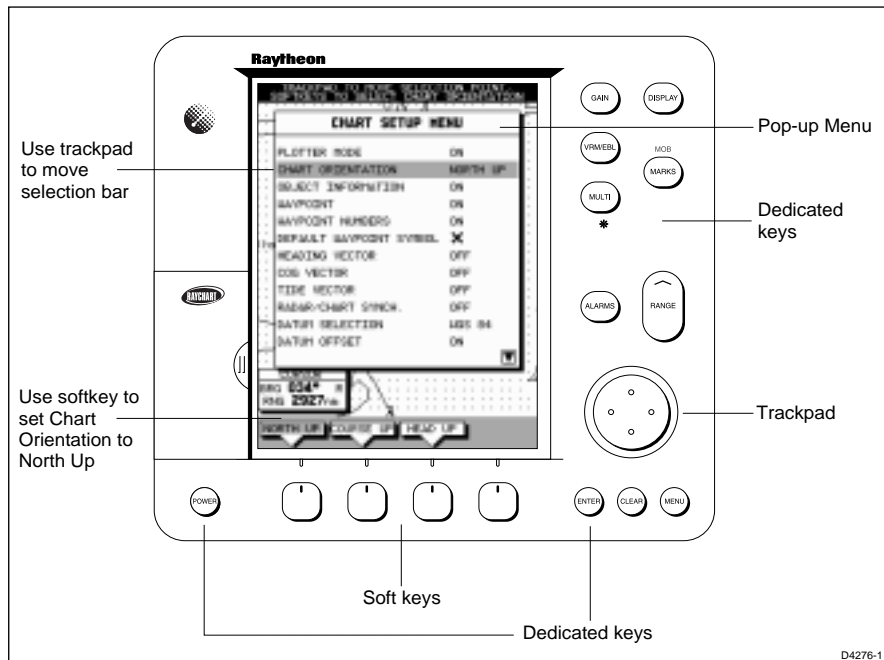
You operate the chartplotter in a variety of ways; the control keys on the display unit are used with on-screen facilities such as pop-up menus. These include:

- A trackpad providing up, down, left, right and diagonal control of an on-screen cursor.
- Eleven 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-hair 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. When you use a control, a help message is displayed at the top of the screen (temporarily replacing the status bar). You can switch help off as described in Chapter 5.

The following paragraphs describe the controls and on-screen facilities.



Trackpad and Cursor

The trackpad and 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 sections 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 (if selected).

Note: During many operations you cannot move the cursor around the screen; if you cannot move the cursor using the trackpad, check the default soft keys are displayed. If not, press **ENTER** until they are displayed.

The cursor is normally displayed as a crosshair. However, if you have not moved the cursor for more than five seconds, when you next move it the cursor is outlined by a circle so it is easier to locate on the screen.

The cursor is used to:

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

Context-Sensitive Cursor Control

The cursor is **context-sensitive**. When the cursor is positioned over special features on the chart display, a text label appears to identify the feature, as follows:

Text Label	Feature
A-B	Ruler line
BOX	Data box (any type)
COG	Course Over Ground vector
HDG	Heading vector
MRK	Radar Mark
MOB	Man Over Board marker

POS	Vessel's position
RTE	Route Leg
TIDE	Tide vector
WPT	Waypoint

Some items on the chartplotter screen, such as waypoints and chart objects have information associated with them. When you place the cursor over such objects, the information is displayed in a data box. In addition, soft keys are displayed for certain items. For example, when you place the cursor over a waypoint, the waypoint soft keys are displayed.

The context-sensitive cursor allows you to move databoxes.

Dedicated Keys

These keys have fixed functions; the functions are similar on all HSB Series displays. For example, **ALARMS** is used to set up the system alarms on both a chartplotter and a radar.

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 actioned, 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 required, you can turn the key beeps off as part of your set up procedure (see Chapter 5).

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 default 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.

The currently selected soft key option is shown by its grey background.

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

- a) The associated operation is actioned, e.g. GOTO WAYPOINT.
- 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. If required, you can turn the key beeps off as part of your set up procedure (see Chapter 5).

Pop-Up Menus

Pop-up menus usually provide set up options. When a pop-up menu is on-screen, a set of associated soft keys is also displayed.

You use the trackpad to select an option from the menu, then use the appropriate soft key to set the option. For example, you can specify the radius of the waypoint arrival alarm and you can toggle selected navigation data boxes on/off.

Database Lists

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

As with pop-up menus, when a database list is on-screen, a set of associated soft keys is also displayed; you use the trackpad to select an item from the list, then use the appropriate soft key to edit the item. For example, you can erase a waypoint or a route.

Chapter 2: Getting Started & Adjusting the Display

2.1 Introduction

This chapter provides information, instructions and a simple exercise to get you started using the HSB Series Chartplotter display unit. It also provides some typical scenarios that guide you through the common chartplotter functions. This chapter will help you to become familiar with the controls before you start using the chartplotter for routine navigation. There is often more than one method of performing a particular task. The scenarios show you one method; other methods are described in the full operating details in Chapters 3 and 4. When you become familiar with the system you can choose the method that suits you best.

If you have a combined Radar/Chartplotter, refer to the *HSB Series Radar Handbook* for information on power-up and on using the radar functions.

Conventions Used

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

Operating procedures, which may consist of a single key-press or a sequence of numbered steps, are indicated by a ► symbol in the margin. When the procedure requires you to press a soft key, the soft key icon is shown in the margin.

Simulator

The Chartplotter display includes a *simulator* mode, which allows you to practice operating your chartplotter without data from a GPS system. You will need to use the set up options to switch the display to simulator mode, as described in *Section 2.2 Switching the Display Unit On/Off*. You can use it in either of two ways:

- Before the chartplotter has been installed on your vessel. In this case, you only need to connect the Chartplotter display to a 12V or 24V DC power supply, connecting the red core from the power lead to positive (+) and the black core to negative (-); see Chapter 6 for full details.
- After the chartplotter has been installed on your vessel, but while in the marina or at anchor.

2.2 Switching the Display Unit On and Off

This section explains how to switch the chartplotter display on and off. The following description assumes that there is no radar scanner connected to the chartplotter.

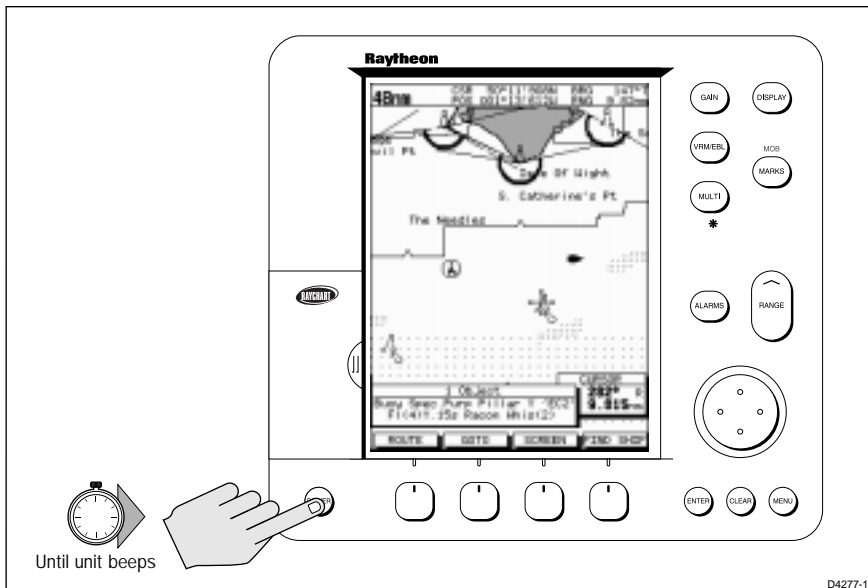
- To turn the chartplotter display on, press and hold the **POWER** key until the unit beeps. The keys light up and the following caution is displayed:

CAUTION

Raychart chart displays are based on cartographic data that C-MAP believes to be accurate. However, you should not rely on these displays as your primary source of navigation. Rather, your Raychart should be used only as a backup to official government charts and traditional methods of navigation.

When you have read and understood the caution, press the CONTINUE soft key. The chart is displayed.

If this is the first time the chartplotter has been turned on, and no chart card is installed, the display shows the small-scale world map at 0°/0°, and the default soft keys. Otherwise, the display shows the selected chart area and any data that were displayed when the display was last used.



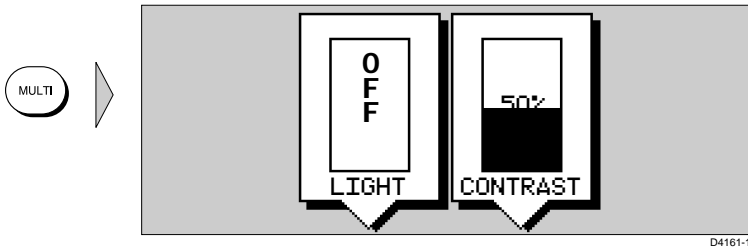
- To turn the display off, press and hold the **POWER** key for three seconds. A countdown timer is displayed; when it reaches zero a beep sounds, and the display and the key back-lights go off.

Changing the Lighting and Contrast

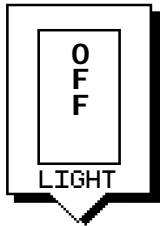
You can change the level of backlighting and contrast for the screen and the keys. The key lighting is set the same as the display lighting, except that it remains switched on at its lowest level even when the screen lighting is turned off, so that you can always find the keys.

► To change the lighting and contrast:

1. Press the **MULTI** key to display the soft key controls:



The last-used soft key is highlighted in inverse video.



2. Press the soft key below the LIGHT control, if it is not already highlighted.

Alternatively, you can press the trackpad left and right edges to move sideways between the controls to select the LIGHT soft key.

3. The LIGHT key toggles lighting ON/OFF.
4. Press the trackpad top or bottom edge to increase or decrease the setting, selecting one of the eight lighting levels. You can press and hold the trackpad to change the setting more rapidly. The lighting level is adjusted as you change the setting.
5. Press the appropriate soft key, or the right arrow on the trackpad, to select the contrast control. Adjust the setting in the same way as for the lighting. There are 64 different contrast levels.
6. Press **ENTER** to return to the default screen, with the new lighting and contrast levels retained.

If the lights are left ON when you switch off the display, the next time the display is switched on, the lights will be ON, but at the default level of 42%. The lighting level is retained until you reset it. The new contrast level is retained until you reset it, unless you set the control very low or very high; in this case, the contrast will be restored on power-up as follows:

Contrast set < 30%	restored to 30%
Contrast set > 70 %	restored to 70%

Chart Simulator

When the simulator is switched on, your initial simulated position is wherever the cursor was positioned. If you wish to practice using the chartplotter in a particular chart area, use the trackpad to pan to the chart area, then switch simulator ON.

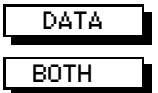
If you have a combined Pathfinder radar/chartplotter display, or you are using your chartplotter as a radar repeater you can also switch on the radar simulator

➤ To view a chart (and radar) image using simulated data:



1. Press **MENU** followed by the SYSTEM SET UP soft key. The system set up menu pop-up is displayed.

2. Use the trackpad to move the selection bar over the option SIMULATOR. The simulator soft keys are displayed.



3. Press either DATA to view the chart with simulated navigation data , or BOTH to view simulated radar and navigation data.

4. Press **ENTER** twice to return to the default display.

2.3 Using Chart Cards

The chartplotter has a built-in world map that can be used for route planning. Most areas are covered on a scale of about 500nm per inch on the screen (200nm per cm), although some populated areas have details down to 300nm on the screen.

To use the chartplotter as a navigation aid, charts with detailed information for the area you wish to navigate are required. The charts 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, and can be displayed down to a range of 1/64nm on the screen if the data is available.

Two card slots are provided on the display unit. Chart data from both slots can be downloaded.

The chart scale in use is indicated in the status bar - the number represents the distance (in nautical miles) displayed from the top of the screen to the bottom of the screen.

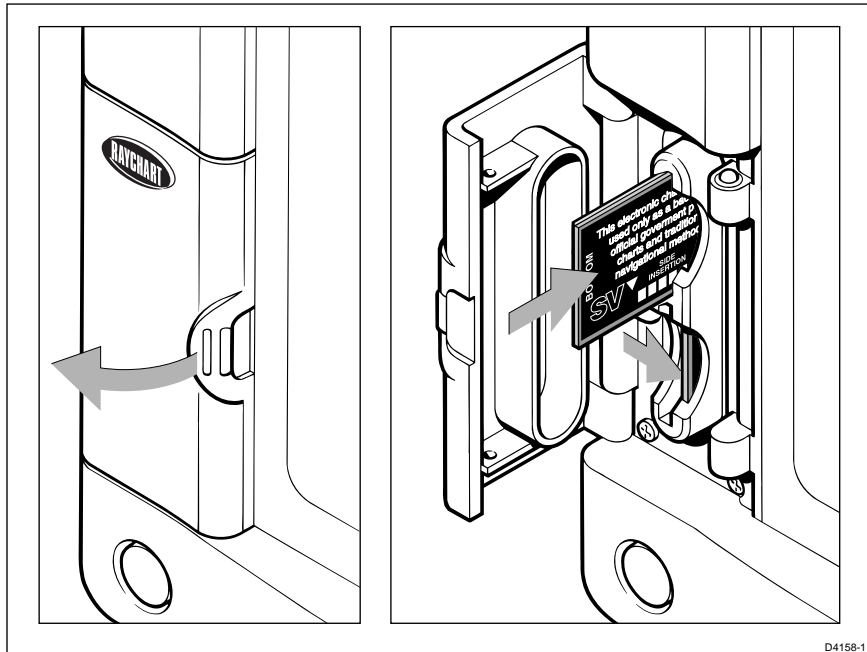
Note: You can remove and insert cards while a chart is displayed. The chart information is retained on-screen until the chartplotter redraws the screen: for example, when you pan outside the current area, or use the **RANGE** key to change the chart scale.

Data on a chart card is also available to a repeater display, which can be used independently of the master. When the master display is switched off chart data is retained on the repeater screen until the chart is redrawn.

Inserting a Chart Card

- To insert a chart card:
 1. Check that the card is a C-MAP NT C-Card with the required chart stored on it.
 2. Open the card cover, at the lower left of the display front panel.
 3. Hold the card with the title label towards the left and upside down, 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 correct way round. Push the card in as far as it will go, then move it to the right so that the top is under the retaining pegs. The card will be held in place by the pegs.

5. Close the card cover so that it clicks shut, to prevent water entering the display unit.



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Displaying the Chart Data

The new chart information will be displayed when you move the cursor into an area covered by the new chart or, if it is already in the area, change the range scale.

If a chart repeater is connected, the chart is also displayed on the repeater display. To see the chart you may need to zoom or pan, to redraw the chart area to the screen.

The boundary of each chart digitized in the current card is defined by a box or rectangle. (You can switch off the chart boundaries display if you wish, as part of the chartplotter set up described in Chapter 5.)

► 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.

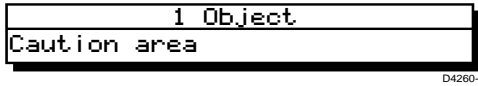
That area is expanded so that you can see more detail. Note that the smaller the chart box is on the screen, the greater the amount of detail that is available when you zoom in.

Unless you have turned on the **Plotter Mode** (see Section 5.4, Chart Set Up), you cannot zoom in further than the most detailed chart, and you cannot zoom out further than the world map.

Displaying Chart Information

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 context-sensitive cursor to identify the object and display detailed information.

- To obtain the chart object, port or tide information:
 1. Move the cursor over the symbol for which you require the information. An Object data box such as the following is displayed at the lower left corner of the screen:



2. To view further details, press **ENTER**. The details available are listed on-screen in an object information pop-up. Use the trackpad to move the selection bar over the required item then press **ENTER** to display the full details. Tide data includes a graph of height against time for a selected day. Data is also displayed for: height at a selected time; the date; time of sunrise, sunset, and twilight; and time of high and low water. To select the time, use the trackpad to move the cursor horizontally on the graph. To select the day, use the soft keys.
 3. Press **CLEAR** to remove the pop-up from the screen.
- To obtain chart source data, move the cursor so that is is not over an symbol, then press **ENTER**. An object information pop-up is displayed, providing source information for the selected land or depth area.

Removing a Chart Card

- To remove a chart card:
 1. Open the card cover, at the lower left of the display front panel.
 2. Press down on the card you wish to remove, and move the top of the card to the left to clear the retaining pegs. The card will spring half-way out, enabling you to grip the card and remove it from the slot.
 3. Remember to close the card cover so that is clicks shut, to prevent water entering the display unit.

2.4 Controlling the Display

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



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

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

This section describes how to:

- Select the full-screen mode and turn half-screen windows on/off.
- Move around the chart by panning the display, changing the chart centre and changing the chart scale. Synchronising the chart and radar images is also described here.
- Customise the screen presentation options.

The chart controls are summarised in the illustration on the fold-out page at the end of this section. This illustration shows the dedicated keys on the front side, the reverse side shows the hierarchical structure of the ROUTE and GOTO soft keys.

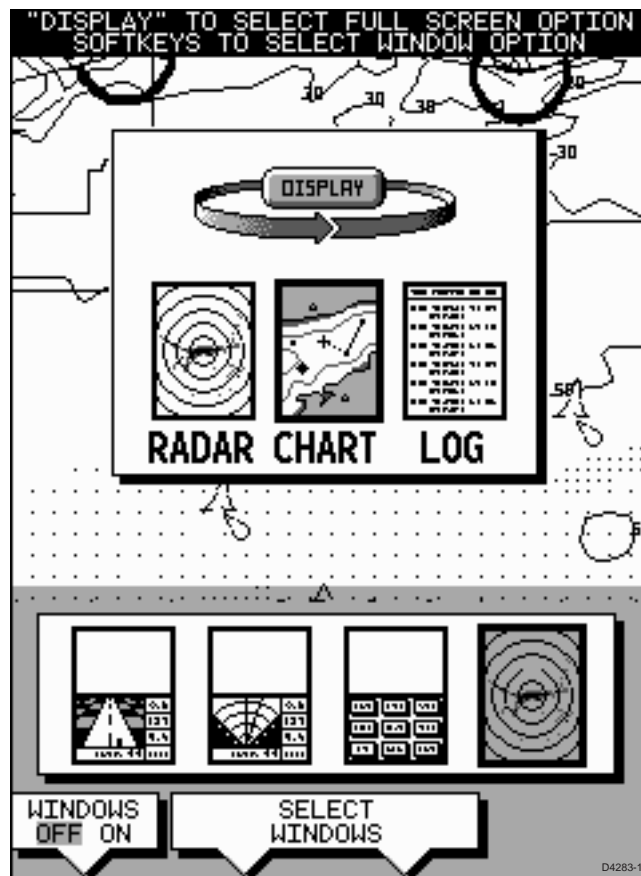
Selecting the Mode of Operation

You use the **DISPLAY** key to select the full-screen mode. If the data is available on your system, the following modes (described on page 6) may be selected:

- Chart screen
- Data log
- Radar screen

The **DISPLAY** key also accesses the soft keys for the half-screen window options.

- To change the mode:
 1. Press the **DISPLAY** key to show the DISPLAY pop-up, then press again to cycle through the modes available, as shown in the following diagram.



The selected mode is shown by a greyed icon and black border, it is displayed on the screen. The associated half-screen window soft keys are also displayed.

2. When the required mode is selected, press **ENTER** or **CLEAR**. The pop-up soft keys are cleared and the default soft keys are displayed.
3. When you press **DISPLAY** again, the pop-up and soft keys for the current full-screen mode are shown. The selected mode is shown full-screen. However, in Chart and Radar mode you can switch on half-screen windows for additional display, as described in the following section.

The Radar mode is described in the *HSB Series Pathfinder Radar handbook*. The Data Log mode is described in Chapter 4.

Selecting a Half-screen Window for Display

➤ To select a window:

1. From the full-screen Chart (or Radar) mode, press the **DISPLAY** key.

The following soft keys are displayed with an image of each available window:



2. To select a window, press either SELECT WINDOWS soft key until the required window is highlighted (if necessary, this will toggle windows on), then press **ENTER**.



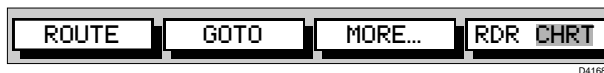
3. To toggle windows off, press the WINDOWS OFF ON soft key.

If any data boxes were displayed at the bottom of the full-screen image, they are moved to the upper window when you turn windows on.

Switching Control Between Radar & Chart Screens

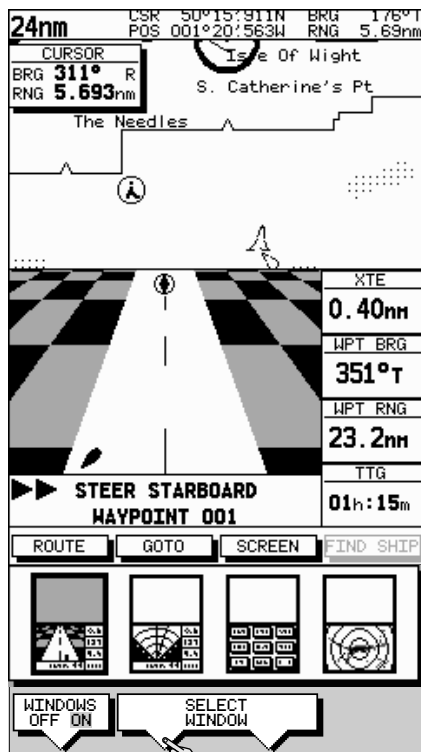
In a combined or integrated system, to switch control between radar and chart, you can change the full-screen mode. Alternatively, when you have both radar and chart displayed in half-screen windows the soft key RDR CHRT lets you toggle operating control between the radar and the chart window.

If a window is active and you switch windows off, control automatically returns to the full-screen mode.

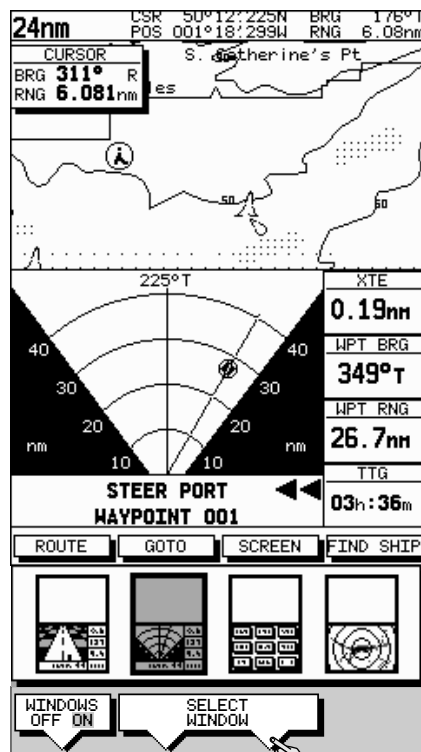


- To change the active window, press the RDR/CHRT soft key to toggle control between the radar and chart display. The current active display is highlighted in grey on the RDR/CHRT label and the cursor appears in that window.

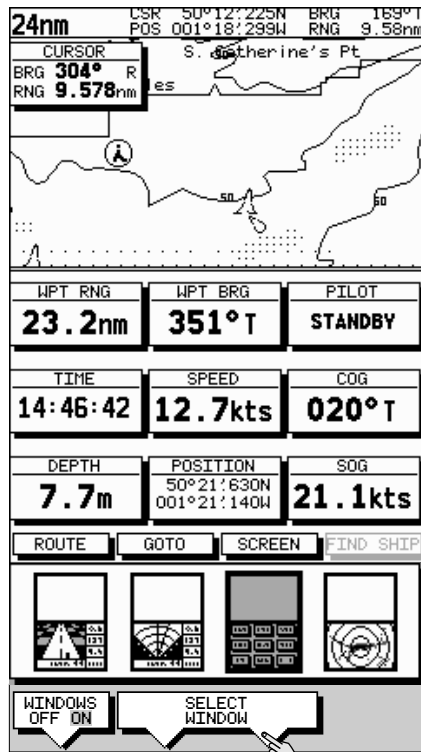
CDI Window



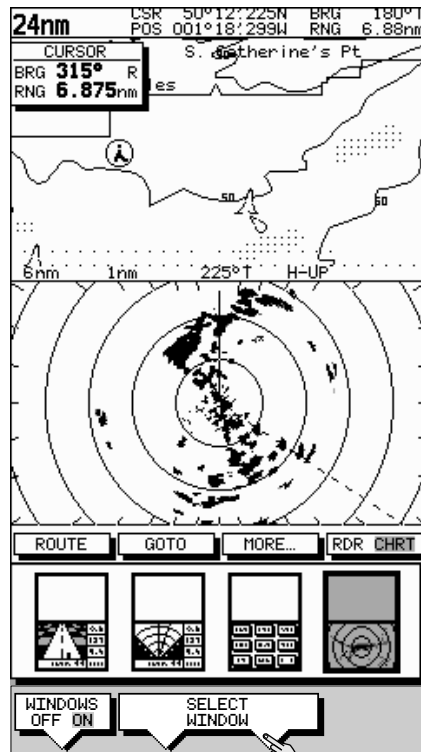
BDI Window



Navdata Window



Radar Window



Selecting the Mode of Operation

Returning to the Full-Screen Display

In an emergency, you may wish to return to full-screen display mode. You can turn windows off, as described above. Alternatively, to return to full-screen display without data boxes or windows:

- Press and hold the **DISPLAY** key for 2 seconds to return to the currently selected full-screen display.

Moving Around 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 *Standard 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 waypoints in another area. Alternatively, you can *home* the cursor onto the vessel using **FIND SHIP**; this function can also be used on a combined display to synchronise the radar and chart windows as described in *Using FIND SHIP*.

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

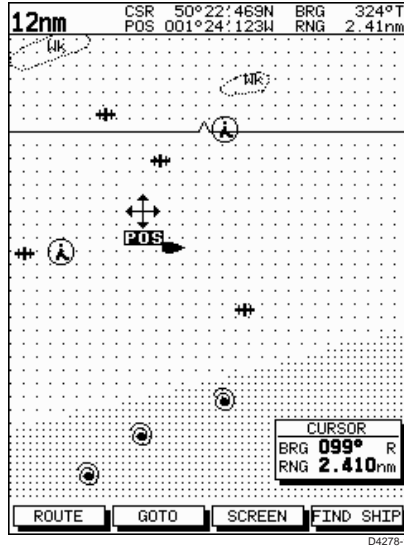
- Use the trackpad to move the cursor to the edge of the chart. The chart will pan across. This method is useful if the area you wish to see is only just off the screen.
- Use the context-sensitive cursor to change the chart centre.
- Automatically re-centre the vessel using the **FIND SHIP** soft key.
- Change the chart scale to zoom out and in to a new area. This method is useful if the area you wish to see is a long distance away.

Changing the Chart Centre

You can move the area of the chart displayed on the screen using the context-sensitive cursor. This allows you to centre your vessel in the middle of the screen, or to move the chart so that your vessel is displayed off-centre anywhere on the screen.

- To centre the chart:
 1. Use the trackpad to move the cursor to the vessel's position. The cursor text **POS** is displayed.
 2. Press **CLEAR**. The chart is moved so that your vessel's position is in the centre of the screen.

- To move your vessel's position off-centre:
 1. Move the cursor over your vessel's position until the letters POS are displayed.
 2. Press **ENTER** to take control of the chart position. The letters POS are now in inverse video, and the cursor symbol has changed to a four-way arrow. This indicates that the cursor can be used to move the chart in any direction.



3. Use the trackpad to move the cursor to the required position.
4. Press **ENTER** to select the position and return to normal cursor control. The chart is redrawn with the vessel position at the cursor. Alternatively, you can press **CLEAR** to abandon the move and leave the chart (and vessel) in its former position.

Using FIND SHIP

FIND SHIP has two functions, depending on your system configuration:

- In full-screen chart mode FIND SHIP is used to re-draw the chart with the vessel at the centre and the cursor homed onto the vessel.
- On a combined radar/chartplotter display, with chart and radar half-screen windows FIND SHIP can also be used to synchronise the radar and chart images.

Centre the Vessel



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When you press FIND SHIP the following occur:

FIND SHIP

- The chart is re-drawn with the vessel's position in the centre.
 - The cursor is homed onto the vessel position and moves with it.
 - When the vessel moves near the edge of the chart window, the chart is redrawn to place the vessel and cursor at the centre again.
 - Whilst homed, the status bar indicates vessel position, speed and course over ground.
- To release the cursor from homed mode press the trackpad to move the cursor away from the vessel's current position. The status bar shows the cursor position, range and bearing.

Synchronise the Radar and Chart

If you have a combined radar/chartplotter display, with chart and radar windows on, and you have selected Radar/Chart Synch in Chart Set Up (see Chapter 5). FIND SHIP also synchronises the radar and chart images as follows:

- The chart is redrawn so that its centre position matches that of the radar display. The radar is redrawn to the scale and heading mode of the chart.

Note: Depending on the topology of the coastline, the radar returns may not relate to the charted shoreline, the radar image will therefore be different to the chart display. For example, a gently sloping beach with a cliff several hundred metres beyond the charted coastline, the cliff is not shown on the chart but will be displayed on the radar image.

Changing the Chart Scale

The **RANGE** key allows you to change the chart scale so that you can see a smaller or larger area on the screen.

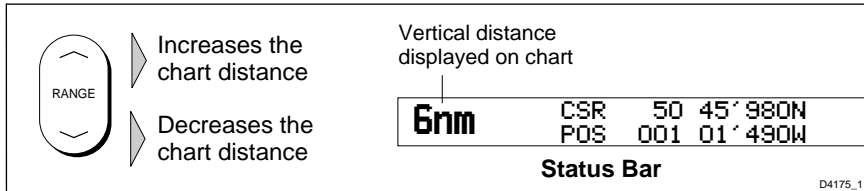
Plotter mode is available to allow you to zoom into a smaller area, even when no chart data is available for that scale. Chapter 5 describes how to set plotter mode on/off.

You can change the chart scale for two purposes:

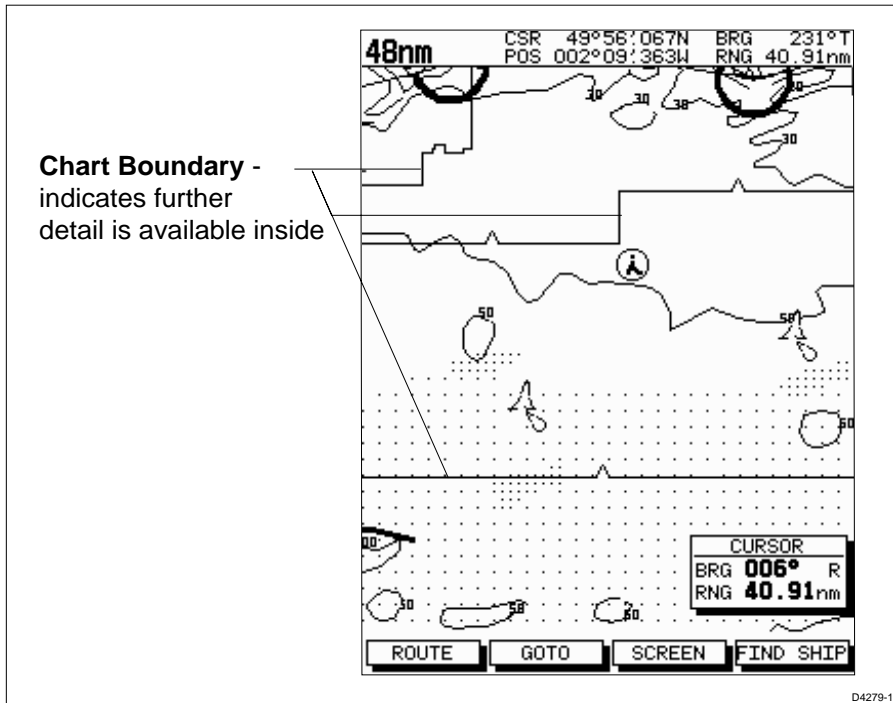
- To see either more detail (of a smaller area) or a larger area (in less detail) on the screen

- To move the display to another area of the chart, by zooming out to a small scale chart, then zooming in on another position

Each time you press the **RANGE** key, the chart scale changes to the next available setting. The status bar indicates the distance from top to bottom of the screen, in nautical miles.



- To change the scale quickly, press and hold the required arrow on the **RANGE** key.
The distance indicator at the left-hand end of the status bar is updated whenever you change the chart scale.
- To zoom in to a larger-scale (more detailed) 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 to zoom into the area.
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 centre of the screen.
The distance indicated at the top left of the screen is 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, re-positioning the cursor first if required.
An area of further chart detail is indicated by a box around the area as shown in the following illustration.



4. When no further chart detail is available, as you press the bottom of the **RANGE** key, the effect depends on whether **Plotter Mode** is on or off as follows:
 - If Plotter Mode is Off, the unit beeps three times and the chart scale remains unchanged, indicating the smallest chart scale is displayed.
 - If Plotter Mode is On, the scale is decreased and the message "NO CHART DATA" is displayed. The vessel, waypoints, routes and tracklines are displayed without cartography.

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

- To zoom out to a smaller-scale (less detailed) chart, simply press the upper part of the **RANGE** key as many times as required.

Customising the Screen Presentation Options

The SCREEN soft key lets you set the following screen presentation options on or off:



Cursor Data Box On and Off

The cursor data box provides the cursor’s position. If you wish to see a full chart, you can switch the data box off. The cursor data can be set up to appear in two data boxes; one showing range and bearing, the other showing latitude and longitude. This option will switch them on and off as a pair.

You can also move the cursor data box using the context-sensitive cursor.

- To switch the cursor data box on/off:



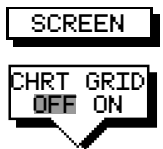
1. Press the SCREEN soft key.
2. Press the CRSR BOX soft key to toggle the setting from ON to OFF or from OFF to ON.

To return to the default soft key display, press **ENTER**.

Chart Grid On and Off

The chartplotter display includes grid lines of latitude and longitude which you can use to help determine position on the chart. The grid lines can be switched on if required.

- To switch the grid on or off:



1. Press the SCREEN default soft key.
2. Press the CHART GRID soft key to toggle the setting from OFF to ON or from ON to OFF.

To return to the default soft key display, press **ENTER**.

Data Boxes

A group of up to six user-selected data boxes can be displayed, if the information is available on your system. You select the data boxes in the System Set Up menu as described in Chapter 5.

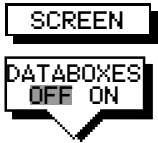
The default data box positions are along the bottom of the chart. Each box can be moved to the required position on the screen using the context-sensitive cursor.

At any time, you can switch the *group* of data boxes on or off using the SCREEN soft key. When first installed, the boxes are all OFF. When the display unit is switched off and on again, the data boxes return to their last-used states (On or Off) and positions.

Note: The SCREEN soft key does *not* control the nine Nav Data boxes that can be displayed in a half-screen window.

You need to select the data boxes you require using the System Set Up menu, as described in Section 5.3.

- To switch the group of data boxes on or off:



1. Press the SCREEN default soft key.
2. Press the DATABOXES soft key to toggle the setting from ON to OFF or from OFF to ON.

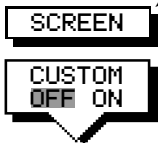
To return to the default softkey display, press **ENTER**.

- To move any data box:

1. Use the trackpad to position the cursor over the box until the letters BOX are displayed.
2. Press **ENTER** to take control of the box, use the trackpad to move it to the required position, and press **ENTER** again to set the box position.

Custom Options

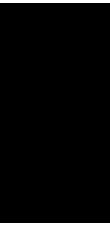
When chart details have been customised in the Chart Set Up menu (as described in Section 5.4) the SCREEN soft key can be used to switch the custom chart options on or off.



- To switch the customised options on or off:

1. Press the SCREEN default soft key.
2. Press the CUSTOM soft key to toggle the setting from OFF to ON or from ON to OFF.
All options that have been set to Custom are affected.

To return to the default soft key display, press **ENTER**.





2.5 Typical Scenarios

The following illustrations provide operating guidelines for typical navigation scenarios. These scenarios can be used as a training guide; they show you how to perform a particular operation and they introduce many of the chartplotter functions.

Each scenario indicates the key presses required to perform particular tasks. A typical chartplotter screen image is shown for each task.

The scenarios assume you have read the previous sections of this chapter and that you are familiar with the Operating Controls. Full operating details for each function are provided in Chapters 3 and 4.

Operating guidelines are provided for the following scenarios:

- **Working with Waypoints**
 - Place a Waypoint
 - Goto a Waypoint
- **Make and Follow a Routes**
 - Create a Route
 - Follow a Route
- **Review the Passage Plan**
 - View Route Information
 - Change the SOG, Hours and ETA.
- **Displaying the Radar Image and Synchronising Radar & Chart**
 - Changing the Full-Screen Mode & Selecting Half-Screen Windows
 - Radar and Chart Synchronisation (Find Ship)
 - Cursor Echo

Place and Goto A Waypoint

Place & Goto a Waypoint

1. Press MARKS

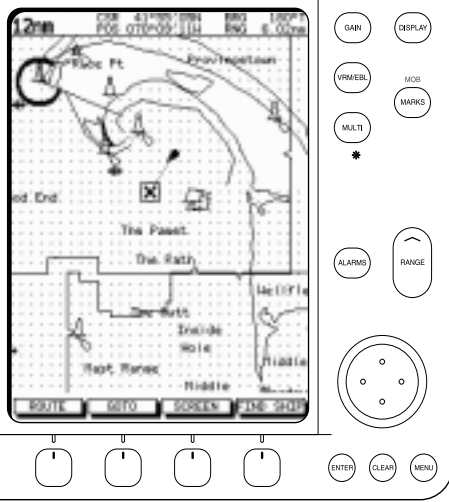
2. Position Cursor as required

Press the soft key

Press the soft key to go to the waypoint selected by the cursor.

The diagram illustrates the process in three stages:

- Stage 1:** The chartplotter screen shows a map with a cursor positioned over a point. A hand icon points to the 'MARKS' button on the right-hand control panel.
- Stage 2:** The cursor is now positioned over a specific point on the map. A hand icon points to the 'MARKS' button, which now has a star symbol next to it.
- Stage 3:** A pop-up window titled 'WAYPOINT 001' is displayed, showing the name 'MPT' and the range '2.2nm'. A hand icon points to the 'GOTO WAYPOINT' button at the bottom of the screen.



The diagram shows a navigation control panel. On the left is a chart display with a vessel icon and a target waypoint marked with an 'X'. The chart includes labels like 'Edge Pt', 'The Pass', 'The Rath', 'The Hole', and 'The Shop'. Below the chart are four buttons labeled 'ROUTE', 'GOTO', 'SCREEN', and 'THE SHOP'. To the right of the chart is a vertical column of buttons: 'GAIN', 'DISPLAY', 'VRMBU', 'MOB', 'MARKS', 'MULTI', a star symbol, 'ALARMS', and 'RANGE'. Below these is a circular dial with three dots. At the bottom right are 'ENTER', 'CLEAR', and 'MENU' buttons. A small '4' is in the top right corner of the panel area.

The vessel navigates towards the target waypoint

See:
3.2 Working with Waypoints
Go to an individual Target Point, page 63.

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Place & Goto a Waypoint

Make and Follow a Route

Make & Follow a Route

1

ROUTE GOTO SCREEN FIND SHIP

ENTER CLEAR MENU

Press the soft key

2

MAKE ROUTE EDIT ROUTE CLEAR ROUTE MORE...

ENTER CLEAR MENU

Press the soft key

3

GAIN DISPLAY

VIEWER MOB MARKS

MULTI *

ALARMS RANGE

PLACE WAYPOINT UNDO WAYPOINT ACCEPT ROUTE

ENTER CLEAR MENU

1. Position Cursor - in this example over an existing waypoint

2. Press the soft key

4

GAIN DISPLAY

VIEWER MOB MARKS

MULTI *

ALARMS RANGE

ENTER CLEAR MENU

Position Cursor for next waypoint, then press soft key. Repeat to plot all waypoints in sequence.

5

Press the soft key. The route becomes the current route.

6

Press the soft key

7

Press the soft key

8

The vessel starts to navigate to the first (target) waypoint in the route.

See:
3.3 Working with routes, Follow a route, page 61.
Altering the route, page 62.

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Review Your Passage Plan

Review Your Passage Plan

1 Press the soft key

2 Press the soft key

3 Press the soft key

4 1. Use the trackpad to move selection bar over required route.
2. Press the soft key

5 Time defaults to ETA - and assumes the current time is the start time.

1	PROVINCETON
2	LILWORTH COVE
3	EMPTY
4	EMPTY
5	EMPTY

WPT	POSITION	BRG	DISTANCE	TOTAL TIME
	°T	m	m	ETA
01	50°28'10N	246	0.5	0.5 10:34
	002°26'16W			
02	50°26'00N	092	6.9	7.4 11:03
	002°15'16W			
03	50°26'30N	020	0.5	8.0 11:08
	002°14'02W			

3min COG 100.0°/10N SOG 1.5 kts
POB 000°00'00.000 SOG 1.5 kts

INFO FOR ROUTE-LILLMORTH COVE

WPT	POSITION	BRG	DISTANCE	TOTAL TIME
	°T	°M	nm	nm HOURS
01	50°36:00N	246	0.5	0.5 00:00
	002°26:16M			
02	50°36:00N	092	6.9	7.4 00:29
	002°15:16M			
03	50°26:00N	020	0.5	9.0 00:32
	002°14:05M			

TIME
ETA: 00:00
ACTUAL
SOG: 15.0kts
PLANNED
SOG: 8.0kts

GAIN DISPLAY

VMEBL MOB

MULTI MAPPS

*

ALARMS RANGE

ENTER CLEAR MENU

See:
Displaying Route Information
page 55.

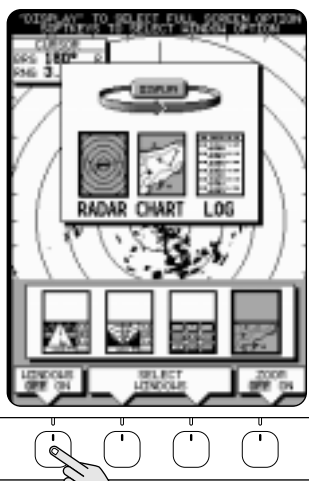
Change the TIME to HOURS - the display indicates it will take 32 minutes to reach the destination. You can change the PLANNED SOG; the display updates to indicate TIME required at the planned speed.

6

D4269-1a

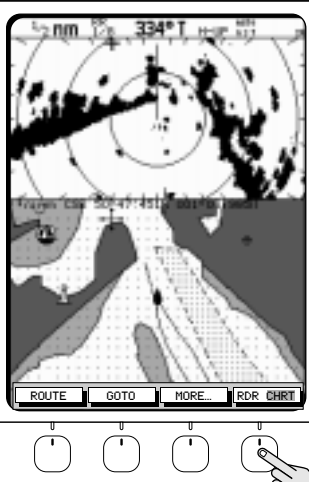
Displaying the Radar and Synchronising Radar & Chart

Identifying a Target



1

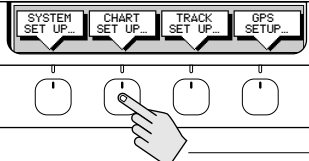
1. Press **DISPLAY** - then press twice more to select **RADAR**.



2

2. Press the soft keys to set windows **ON**. The Chart window is the default selection.

3. Press **ENTER**.

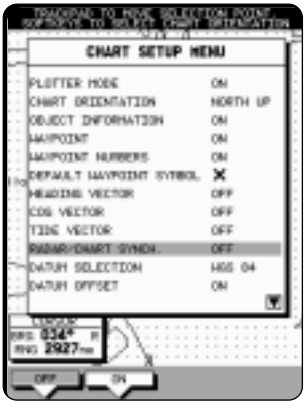


3

1. Press **MENU**.


2. Press the soft key

D4293-1

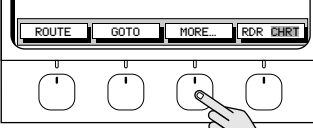


4

1. Move selection bar over Radar/Chart Synch.




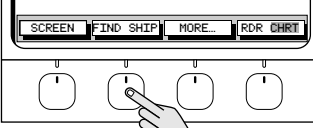
2. Press the soft key.
3. Press **ENTER** twice.



5


Press the soft key.

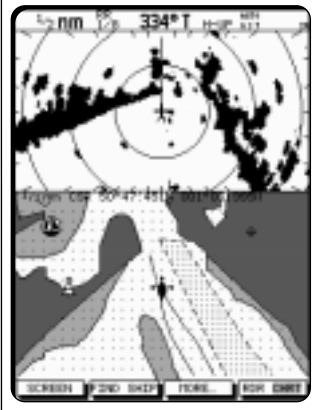




6

Press the soft key to synchronise the chart & radar images.






7

The radar and chart windows are synchronised and the cursor is 'homed' on the vessel

Move the chart cursor - you can see chart cursor move on the radar screen.

You can move the cursor over a radar target to determine its identity on the chart

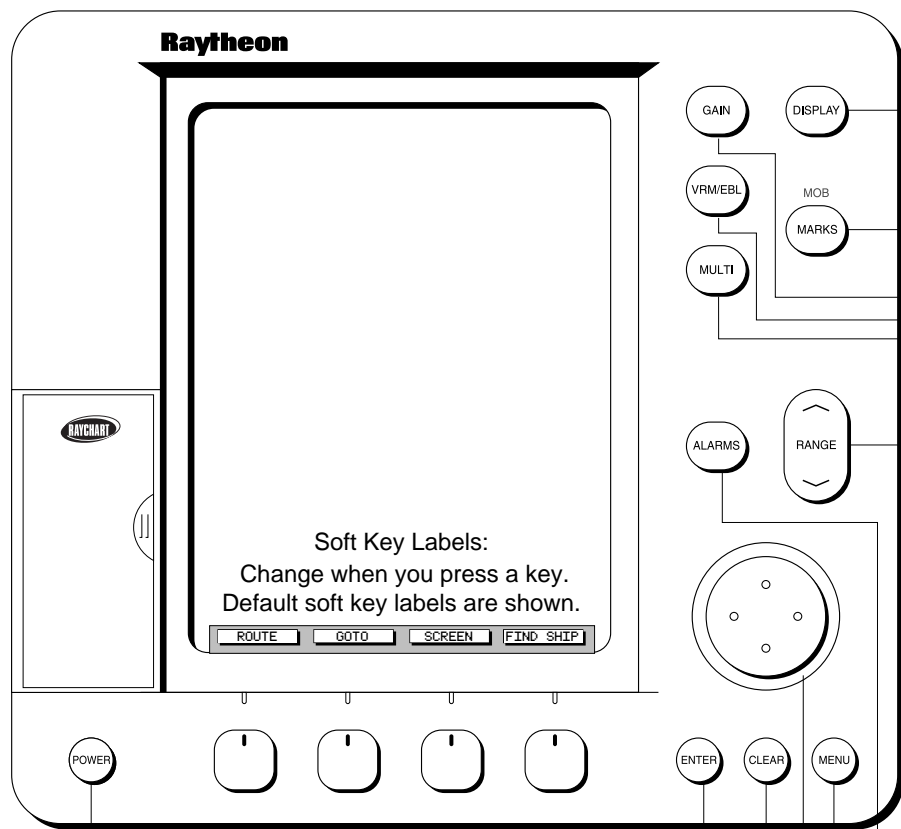


See:

- 2.4 Controlling the Chart Display
- 4.5 Cursor Echo
- 5.3 System Parameters
- 5.4 Chart Set Up

D4293-1a





Soft keys

Press to select option, or highlight option or slider. Labels change when you press soft/dedicated key. Elipses (...) after the text indicate that pressing soft key leads to further options.

ENTER

Confirms selection and (if appropriate) clears current soft key labels. It either performs the selected task, accepts changes, or leads to display of more options. When cursor text is displayed, takes cursor control of the object. When arrow-head cursor symbol is displayed, drops the object under cursor control.

CLEAR

Cancels operation in progress and returns to the previous display. Deletes an object/function under cursor control.

Trackpad

Controls cursor position on the screen, and also the sliders and setup options. Hold the trackpad down to move the cursor faster.

POWER

Press and hold until unit beeps to turn on display.

DISPLAY

Controls display mode windows.
- Press for display mode and soft keys display. ▶
- Press again to cycle through display modes, and **ENTER**.
- Press and hold for 2 seconds for full-screen display.

MARKS - MOB

Controls waypoint, and Man OverBoard function.
- Press to display waypoint soft keys. ▶
- Press and hold for 2 seconds to activate or cancel MOB.

GAIN

Not used in Chart mode.

VRM/EBL

Used to measure range and bearing to/between points.
- Position cursor at start point, and press VRM/EBL key to display the Ruler data box. Select end point using trackpad, and press **ENTER** to fix end position of ruler.

MULTI

Controls display lighting and contrast.
- Press to display sliders. ▶

RANGE

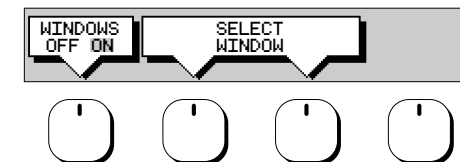
Controls chart scale. Displayed vertical distance is shown in the Status Bar.
- Press top of key to increase the chart distance.
- Press bottom of key to decrease the chart distance.
- Press and hold to change the scale faster.

ALARMS

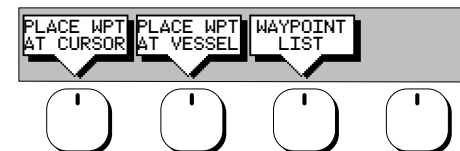
Used to set up the chartplotter alarms.
- Press to display the Alarms set up menu and soft keys, ▶ the soft keys correspond to the selected alarm.

MENU

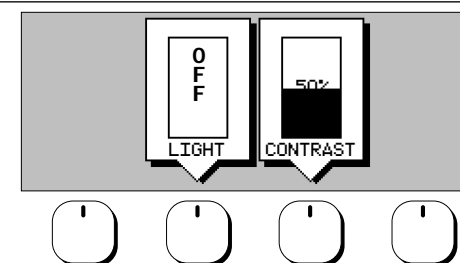
Provides access to setup options.
- Press to display soft keys. ▶



Press soft keys to toggle half-screen window on/off and to select lower window, press **ENTER** to finish.

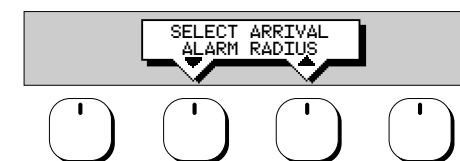


Press soft key to place waypoint at cursor or vessel, or display the waypoint list and associated softkeys.

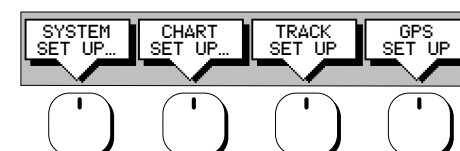


Select a slider using the soft key or trackpad. Toggle between off/on by pressing the soft key again. Adjust slider using trackpad, and press **ENTER** to finish.

ALARMS SET UP	
ARRIVAL ALARM	0.01nm
OFF TRACK ALARM	OFF
ANCHOR ALARM	OFF
COUNTDOWN TIMER	00:33:00
ALARM CLOCK	OFF




Use the trackpad to select the alarm, then use the softkeys to adjust parameters and/or toggle the alarm on/off. Press **ENTER** to finish.



Press soft key to display required setup menu, then use trackpad to select option and soft key to change setting. Press **ENTER** to close menu, and **CLEAR** to finish.


ROUTE

MAKE ROUTE



Use the soft keys to set up a series of waypoints as a route. Use the trackpad to move the cursor then press PLACE WAYPOINT, continue until the route is complete. Press ACCEPT ROUTE to finish.

EDIT ROUTE



Use the softkeys to edit the current route. Press UNDO WAYPOINT to remove the last waypoint in a route and PLACE waypoint to add a waypoint at the end of the route. Press ACCEPT ROUTE to finish.

CLEAR ROUTE


Press to clear the current route from the display, if it is not saved you are prompted to save the route.

MORE...

REVERSE ROUTE


Press to reverse the waypoint order in the current route.

SAVE ROUTE



Use to save and name the current route.


ROUTE LIST



Use the soft keys to manage the route database list. Use the trackpad to select a route then press the required softkey.

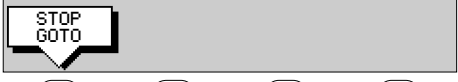
GOTO

GOTO WAYPOINT



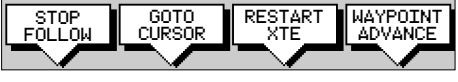
Use to navigate to a waypoint selected from the waypoint database list. Use the trackpad to select the waypoint then press the soft key to start the GOTO.

GOTO CURSOR



Press to navigate to the cursor position. When you press GOTO CURSOR, a temporary waypoint is added at the cursor position and the GOTO is started. Press STOP GOTO to cancel.

FOLLOW ROUTE



Press to follow the current route. Use the softkeys to cancel the follow, or to modify the route whilst it is being followed

Chapter 3: Waypoints, Routes and Tracks

3.1 Introduction

This chapter explains how to use the chart functions to navigate with your HSB Series display. It covers the following topics:

- Controlling waypoints, including placing, moving, editing and deleting waypoints.
- Working with routes, including creating a new route, managing routes using the route database and editing routes.
- Going to waypoints and following routes.
- Transferring Waypoints and Routes
- Using tracks, including showing tracks, track set up and saving tracks.

Further functions, including measuring distances and setting alarms are described in Chapter 4.

Safety

The chartplotter makes it very easy to mark a waypoint and travel 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 charts.

Note: Until you are familiar with interpreting the chart display, you should take every opportunity to compare the displayed objects with visual targets, such as buoys and coastal structures. You should practice harbour and coastal navigation during daylight and in clear weather conditions.

The equipment should not be used as a substitute for good navigational practice.

3.2 Working with Waypoints

Introduction

The HSB series Chartplotter enables you to place up to 998 waypoints: a waypoint is a position entered on a chart as a reference, or as a place to go to. All waypoints *placed on the chartplotter* are stored in a waypoint database list which includes symbol, position, bearing, range and additional data. All waypoints in the database are displayed on the screen, unless you set waypoint display off in the Chart Set Up menu, as described in Chapter 5. You can select a waypoint, either on-screen or from the list, for editing.

The waypoint is usually placed at the cursor position and can be part of a route; you can also place a waypoint at the vessel's current position; a waypoint at the vessel position includes additional information (if available) on the depth and temperature when it was placed. You can place waypoints before you install the chartplotter on your vessel.

Note: Radar marks may also be displayed on the screen if your chartplotter is a combined radar/chartplotter or is part of an integrated system; these are screen annotations - **you cannot go to marks, nor can they be included in routes.**

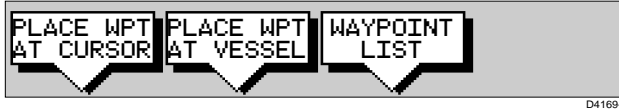
When you place a new waypoint, it is displayed using the default symbol of a cross. The waypoint is added to the waypoint list and named with the next available number. You can use the edit functions to change the symbol and name. When the cursor is positioned over a waypoint, the waypoint bearing and range are displayed.

Waypoints in the current route are available on other SeaTalk instruments that support current route transfer, for example, another HSB series chartplotter or ST80 Masterview. You can also transfer waypoints between the chartplotter and other NMEA or SeaTalk instruments using the Waypoint Transfer functions.

This section explains how to perform the following tasks using the on-screen cursor and the waypoint list:

- Placing a Waypoint
- Selecting a Waypoint
- Displaying Waypoint data
- Editing a Waypoint (symbol, name & position)
- Erasing a Waypoint
- Moving a Waypoint

- To access waypoint soft keys, press **MARKS**:



Placing a Waypoint

The *Place and Goto a Waypoint Scenario in Chapter 2* provides a simple example of how to place a waypoint.

- To place a waypoint at the cursor position or at the vessel position:
 1. Move the cursor to the required location, press **MARKS**.



2. Press either the PLACE WPT AT CURSOR or the PLACE WPT AT VESSEL soft key.

The waypoint is added to the waypoint list and named using the next available number.

The waypoint soft keys are displayed until you move the cursor away from the waypoint. You can use the EDIT WAYPOINT soft key to name the the waypoint as described in Editing Waypoints below.

- To place a waypoint using the Waypoint List:



1. Press **MARKS**, followed by the WAYPOINT LIST soft key. The Waypoint List and associated soft keys are displayed.

WAYPOINT LIST	
SYMBOL	NAME
⚓	WAYPOINT 001
X	WAYPOINT 002
X	WAYPOINT 003
X	WAYPOINT 004
X	WAYPOINT 005
POSITION	50°21' 966N 001°20' 368W
BRG _186°	BRG _21.0nm
TEMP ---°C	DEPTH ---m
DATE __/__/__	TIME --:--:--

GOTO WAYPOINT	EDIT WAYPOINT	MAKE NEW WAYPOINT	WAYPOINT TRANSFER
---------------	---------------	-------------------	-------------------

D4262-1



- 2. Press the MAKE NEW WAYPOINT softkey.
The waypoint is placed at the current vessel position, or if not available, the cursor position. It is added to the Waypoint List and named with the next available number.

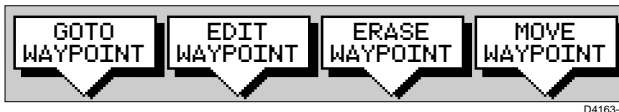
To return to the default softkey display, press **ENTER** twice.

Selecting a Waypoint

Positioning the cursor over a waypoint selects that waypoint and accesses the waypoint soft keys. These keys enable you to go to (described in Section 3.4), edit (symbol, name, position), erase or move the waypoint.

Selecting a waypoint from the List allows you to go to and edit (symbol, name, position, erase) the waypoint. The Waypoint List also provides options to make a new waypoint and transfer waypoints.

- To select a waypoint using the cursor:
 - 1. Move the cursor over the waypoint, until the letters WPT are displayed.
The Waypoint Data box (see Waypoint Data Display below) and the following soft keys are displayed:



The selected waypoint can be edited via these soft keys.

- To select a waypoint using the Waypoint List:



- 1. Press **MARKS**, followed by the WAYPOINT LIST soft key.
The Waypoint List and associated soft keys are displayed.
The list details all waypoints in alpha-numeric order. The selected waypoint is indicated by the grey selection bar; its position, bearing and range are provided.
- 3. Use the trackpad to move the selection bar up and down the list to highlight the required waypoint.

The selected waypoint can be edited via the soft keys displayed.

Waypoint Data Display

Waypoint data can be viewed in two ways: you can use the context-sensitive cursor to select the waypoint and thus display the waypoint data box, or you can view waypoint details on the waypoint list.

Note: To permanently display the target waypoint data box, select it in the System Set Up menu (see Chapter 5) and use the SCREEN soft key to switch data boxes on.

- To display the waypoint data box:

Move the cursor over the waypoint. The waypoint data box is displayed, this indicates waypoint number/name, bearing and range.

Whilst the cursor is over the waypoint, the waypoint soft keys are displayed.

- To remove the waypoint data box either:

Move the cursor away from the waypoint, or

Press **CLEAR**; the waypoint soft keys are displayed until you move the cursor.

- To display the waypoint details from the waypoint list:



Select the waypoint in the list as described above.

The details for the selected waypoint are displayed in the lower half of the window. Temperature, depth, date and time are included (if available) for waypoints placed at the vessel position.

To remove the Waypoint List and return to the default soft key display, press **ENTER** twice .

Editing the Waypoint Details

You can change the name, symbol and position of any waypoint.

- To edit a waypoint:



1. Select the waypoint, using the cursor or the waypoint list, as previously described. The waypoint soft keys are displayed.

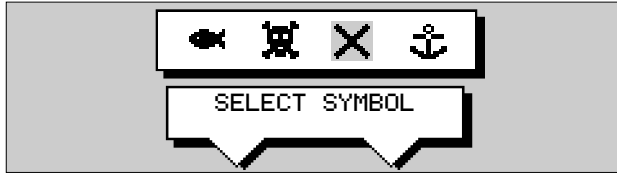


2. Press the EDIT WAYPOINT soft key. The Edit Waypoint soft keys are displayed:



D4166-1

- To edit the symbol, press the SYMBOL soft key.
Use the soft keys, shown in the following illustration, to highlight the required symbol, then press **ENTER**.



D4178-1

- To edit the waypoint name, press the NAME soft key.
The NAME WAYPOINT window is displayed.
Use the trackpad to enter or edit the name:
Use the left or right side of the trackpad to move the cursor to the character you wish to change.
Use the top or bottom of the trackpad to scroll through the characters.

When you have finished editing the name, to remove the window, press **ENTER**. The waypoint name replaces the waypoint number.



- Press the EDIT WAYPOINT soft key, followed by POSITION. The Waypoint Position pop-up is displayed.

Use the soft keys to select LAT, LON, BRG or RNG.

Use the trackpad to edit the value.

Use the left or right side of the trackpad to move the cursor to the character you wish to change.

Use the top or bottom of the trackpad to scroll through the characters.

Adjust each parameter until the waypoint position is correct.

When you have finished editing the position, press **ENTER**. The Waypoint Position window is removed from the screen and the default soft keys are displayed.

Press **ENTER** or **CLEAR** twice to return to the default softkeys.

Erasing a Waypoint

You cannot erase the target waypoint or waypoints that are used in routes. However, you can remove a waypoint from the current route - see Editing a Route in Section 3.3.

If you try to erase a waypoint that is used in a saved route you are warned "WAYPOINT IS USED IN A ROUTE & CANNOT BE DELETED"

- To delete a waypoint using the cursor:



1. Move the cursor over the waypoint, until the letters WPT are displayed. The waypoint soft keys are displayed.
2. Press the ERASE WAYPOINT soft key. The waypoint is removed from the screen and the Waypoint List is updated.
3. Press **ENTER** twice to update and remove the waypoint list. To return to the default soft key display, press **ENTER**.

- To delete a waypoint using the waypoint list:



1. Select the waypoint from the waypoint list as previously described. The waypoint list soft keys are displayed.
2. Press the EDIT WAYPOINT soft key, followed by ERASE WAYPOINT. The waypoint is removed from the screen and the waypoint list is updated.
3. Press **ENTER** twice to update and remove the waypoint list. To return to the default soft key display, press **ENTER**.

Moving a Waypoint

You can move any waypoint except the target waypoint (the waypoint you are following). You can use the Waypoint soft keys and cursor to move the selected waypoint, or you can edit the waypoint position.

Note: Take care when editing waypoints as it is possible to move waypoints that are used in routes stored in the Route Database List.

- To move a waypoint using the cursor:



1. Move the cursor over the waypoint, until the letters WPT are displayed. The waypoint soft keys are displayed.
2. Press MOVE WAYPOINT, the cursor changes to a four-headed arrow.
3. Move the cursor to the required waypoint position. Press **ENTER** to set the position and return to normal cursor control.

- To move a waypoint using the Waypoint Edit functions:



1. Select the waypoint using either the cursor or the waypoint list as described above. The waypoint soft keys are displayed.
2. To edit the waypoint position proceed as previously described in *Editing the Waypoint Details*.

3.3 Working with Routes

A route is made up of a series of waypoints (maximum 50). To make a route you place a series of waypoints on the chart.

When a route is created it becomes the current route and is displayed on-screen. The current route is maintained when you power-off. Only one route can be current and is displayed (if it is in the field-of-view) as solid lines connecting waypoints. If you are following the route, the current leg is shown as a dotted line and previous legs are removed from the screen (although the waypoints remain displayed). The current route (and its waypoints) is transferred via SeaTalk to a repeater chart display and other instruments. You can also use the Waypoint Transfer functions to transfer the route database to a repeater display.

Once you have created a route you can use the GOTO soft keys to follow the route. In addition, the GOTO default soft key provides various options as described in Section 3.4.

Up to 20 routes can be saved in the route database. You can then select a route from the database list as the current route.

The current route can be edited by adding and moving waypoints. The current route is always placed in the database list as route number 0, so you can edit the current route without affecting the original route in the database. Once a route has been saved, options are also provided to name a route, erase a route and to display route details.

You can use the route information to review your passage plan by adjusting the planned Speed Over Ground (SOG).

Notes:

1. The route database is stored locally, in the display unit on which it was created. Although the current route is automatically transferred, you need to use the WAYPOINT TRANSFER function, described in Section 3.5, to transfer the complete route database to a repeater display.
2. It is possible for the current route to be overwritten by a route from another unit on an integrated system, so it is advisable to save all routes.

This section explains how to perform the following tasks:

- Creating a new route.
 - Saving the current route in the database list.
 - Clearing the current route.
 - Retrieving a route from the database list as the current route.
 - Displaying route information, including the route leg data and waypoint details. Use the waypoint details to review your passage plans for different speeds.
 - Using the database list to erase and name existing routes.
 - Editing a route by adding, removing and moving waypoints.
- To access the route soft keys, press the default soft key ROUTE:



D4167-1A

Creating a New Route

Note: If there is a current route, it is cleared when you select MAKE ROUTE. If you are following the current route you are prompted to STOP FOLLOW. Press the YES soft key to continue, or NO to abandon route creation. If the route has not been saved you are prompted to save it.

The *Make and Follow a Route scenario in Chapter 2* provides a simple example of how to create a route.

You can edit a route after you have finished making it, as described in Editing a Route in the following sections.

- To make a new route by placing waypoints:

Note: You can pan the chart and change the scale whilst placing waypoints.

1. If necessary, 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, then press the MAKE ROUTE soft key.

The make route soft keys are displayed:



D4170-1



3. Move the cursor to the position on the chart where you want your first waypoint to be. Press the PLACE WAYPOINT softkey.

Note: You can position the cursor on an existing waypoint, if required – the text WPT indicates you are re-using the waypoint rather than placing a new one. This waypoint is included in the route when you press PLACE WAYPOINT.

The waypoint appears on the screen at the cursor position. The number displayed alongside the waypoint identifies its position in the route. The new waypoint is temporarily added to the waypoint list with the first available waypoint number. The waypoints in the current route are re-numbered to identify the new positions.

Note: if you Clear the route before it is Saved, the waypoint is removed.

4. Move the cursor to the next waypoint position. A dotted line connects the cursor to the last placed waypoint.



5. Press PLACE WAYPOINT again. The waypoint is placed and the dotted line changes to a solid line.

If you placed the waypoint incorrectly, you can delete the last-placed waypoint by pressing the UNDO WAYPOINT soft key.



6. Repeat steps 4 and 5 until you have placed all your waypoints. You can have up to 50 waypoints in a route.

7. When you have entered all your waypoints, either :

Press the ACCEPT soft key (or **ENTER**) to complete the route. Your route is displayed on the screen, and is the current route, but it is not active.



The first waypoint of a new route is outlined with a square, indicating that it will be the target waypoint when the route is activated. If selected, the waypoint data box is displayed for the target waypoint.

8. Press the MORE soft key to access the SAVE ROUTE function, or **ENTER** to return to the default display.

Note: The completed route is stored in the display unit, and will be re-displayed if you turn the unit off and on again. However, on an integrated system it is possible for a current route from another unit to overwrite this route; it is recommended that you Save the route as described.

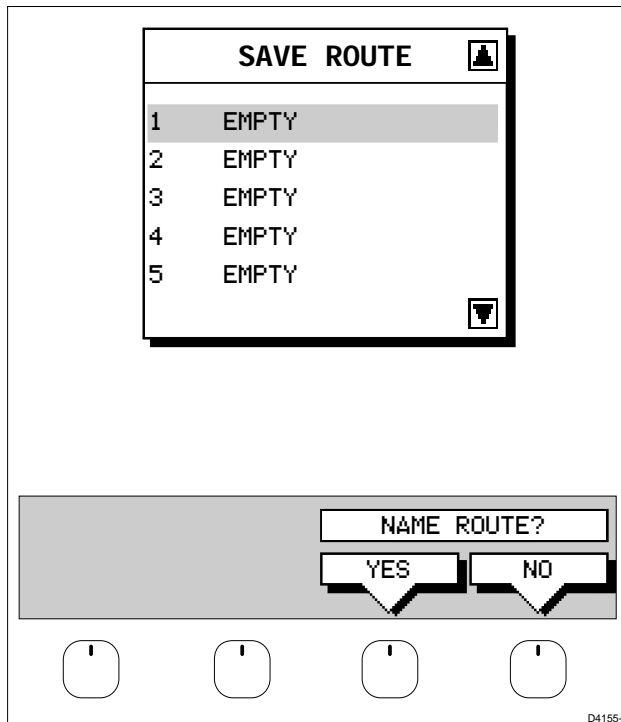
Saving the Current Route

You can save up to 20 named routes in the route database list. These routes can then be re-displayed and followed at a later date.

Note: If the current route has not been saved, when you attempt an operation that affects this route, e.g. CLEAR ROUTE, you are prompted to save it.

➤ To save and name the current route:

1. To access the SAVE ROUTE soft key, press the ROUTE soft key, followed by MORE.
2. Press the SAVE ROUTE soft key. The Route List pop-up and the NAME ROUTE soft keys are displayed.
3. The next available entry on the route list is highlighted.
(If required, you can use the trackpad to select another position in the list; this can be a blank slot, or an existing route that you no longer require).



4. If you do not wish to name or re-name the route, press the NO soft key (or **ENTER**) to clear the list. The route is saved and is listed as Route Not Named.

If you wish to name the route press the YES soft key. Use the trackpad to move the cursor right or left to the character you wish to edit. Then use the top or bottom of the trackpad to increase or decrease the letter or number.

5. Press **ENTER** to finish and clear the Name List, then to return to the default soft key display, press **ENTER** again.

Clearing the Current Route

You can clear the current route from the screen. When you select CLEAR ROUTE if the current route has not been saved, you have the option of saving it and, if you are following the current route, you have the option to stop.

- To clear the current route:



1. Press the ROUTE default soft key or place the cursor over a route leg until the text RTE is displayed. Press the CLEAR ROUTE soft key.
2. If you are following the current route the STOP FOLLOW soft keys are displayed. To cancel the CLEAR operation press NO. To stop following and clear the route press YES.
3. If the route has not been saved the SAVE ROUTE soft keys are displayed. To clear the route, without saving it in the route database, press NO. To save the route in the database, press YES. The Name route soft keys are displayed and you should continue as described in the previous section, Saving the Current Route.

The current route is cleared from the screen and the default soft keys are displayed. You can now use the ROUTE soft keys to make a route, or to show another route from the database.

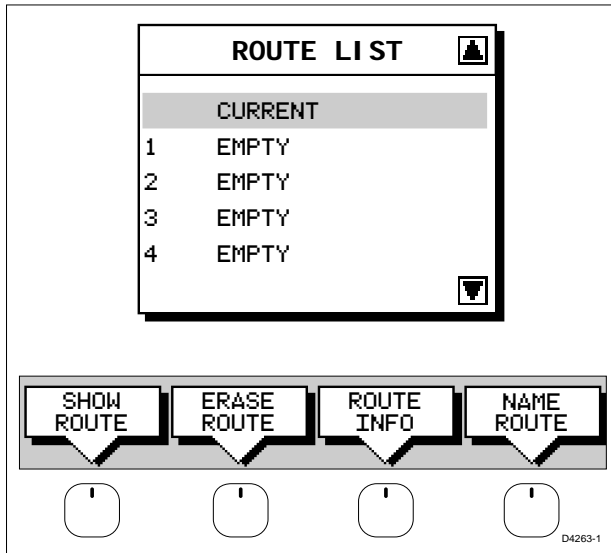
Retrieve a Route From the Database

You can select a route as the current route from the database list. The list is accessed from the second set of ROUTE soft keys.

- To select a route as the current route:



1. Press the ROUTE soft key, followed by MORE, then press ROUTE LIST. The route list is displayed. The grey selection bar indicates the selected route.



- Use the trackpad to select the required route then press the SHOW soft key. The route list is removed and the selected route is shown on screen as the current route.

Displaying Route Information

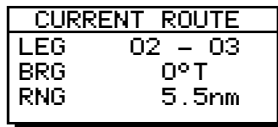
Displaying Route Information

You can display the following information that relates to your route:

- Route leg or waypoint information, using the context-sensitive cursor.
- Details of waypoints in the route, using the soft keys. You can use this information to review your passage plan.

Route Leg and Waypoint Information

- To display information about a route leg, move the cursor over the leg until the letters RTE are displayed. A Route Leg data box such as the following is displayed.



To remove the data box, move the cursor away from the route or press **CLEAR**.

- To display information about a route waypoint, move the cursor over the waypoint until the letters WPT are displayed. The waypoint data box is displayed, this box includes the route and waypoint number. To remove the data box, move the cursor away from the route or press **CLEAR**.

Using Route Information to Review Your Passage Plan

You can view data for all the waypoints in the current route, or any saved route.

You select the route from the database list and the information is displayed in a Route Information pop-up; the following details are provided for each waypoint:

- Position
- Bearing (from previous waypoint)
- Length of leg (from previous waypoint)
- Total Length
- Time (ETA or Elapsed)

Soft keys are provided to toggle the time between ETA or elapsed and to change the Speed Over Ground (SOG) value; the ETA for each waypoint is calculated using the selected SOG, so you can change the SOG to determine its effect on your ETA.

The *Review Your Passage Plan scenario in Chapter 2* provides a simple example of how to use the route information.

- To display information about any route in the database:



1. Press the ROUTE soft key, followed by MORE, then press ROUTE LIST. The route list is displayed. The grey selection bar indicates the selected route.



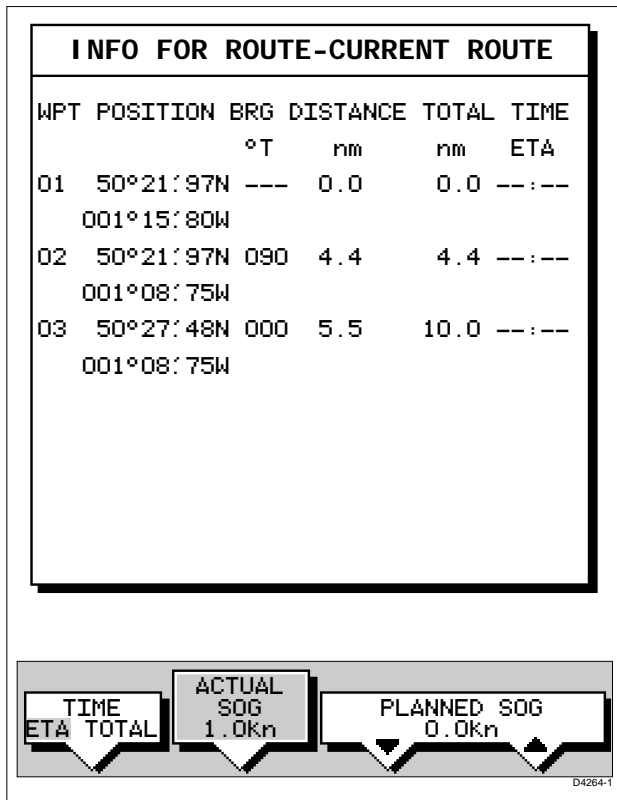
2. Use the trackpad to select the required route, then press the ROUTE INFO soft key.

The Route Information pop-up is displayed, listing the waypoints in the route and detailing bearing, length of each leg, total distance, and either the estimated time of arrival (ETA) or the elapsed time.

The soft keys allow you to toggle between ETA or total (elapsed) time, and to change the Speed Over Ground (SOG) value used in the time calculations. The current selections are highlighted.

- To change the SOG used for ETA calculations:

1. Press one of the PLANNED SOG keys to switch from actual to planned SOG.
2. Press the up or down PLANNED SOG keys to change the planned SOG value. The Time values in the Route Information list are updated.
3. Press the ACTUAL SOG key to use the actual SOG value rather than a planned one.



4. Press **ENTER** or **CLEAR** to clear the Route Information window, then **ENTER** or **CLEAR** to return to the route soft keys. To return to the default soft key display, press **ENTER**.

Using the Route List to Erase and Name a Route

You can delete a route and you can re-name a route by selecting the route on the route list.

➤ To select a route to delete or re-name:



1. Press the ROUTE soft key, followed by MORE, then press ROUTE LIST. The route list is displayed. The grey selection bar indicates the selected route.

Press the appropriate soft key – ERASE ROUTE or NAME ROUTE.



2. If you ERASE a route you are prompted to confirm. Press NO to cancel the operation, then **ENTER** if you wish to remove the route list. Press YES to erase the route from the list, then **ENTER** to remove the route list.



3. If you NAME a route, use the trackpad to move the cursor right or left to the character you wish to edit. Then use the top or bottom of the trackpad to increase or decrease the letter or number.
4. Press **ENTER** to clear the Name List, then to return to the default soft key display, press **ENTER** again.

Editing a Route

Once you have created a route, you can edit it by:

- Inserting a Waypoint into the route
- Adding waypoints at the end of the route
- Removing a Waypoint
- Reversing a Route
- Moving a Waypoint as described in Section 3.2

Any changes you make to the route affect only the current route. The current route is always held in position 0 in the database, so you need to Save the route if you want to keep the changes.

Inserting a Waypoint into a Route

You can use the context-sensitive cursor to insert one or more waypoints in the current route. However, if the route is being followed you cannot insert a waypoint into the current leg.

- To insert a new waypoint in the current route:
 1. Move the cursor over the route leg into which you wish to insert a waypoint, until the letters RTE and the route leg data box are displayed. The Route soft keys are displayed.
 2. Press **ENTER**. The cursor changes to a four-way arrow, controlling a new waypoint. The waypoint is connected to the existing waypoints on either side with a dashed line.
 3. Move the new waypoint to the required position, and press **ENTER** to drop it and return to normal cursor operation, or **CLEAR** to abandon the operation.

The new waypoint is temporarily added to the waypoint list and named with the first available waypoint number. The waypoints in the current route are re-numbered to identify the new positions.

Note: if you Clear the route before it is Saved, the new waypoint is removed.

Adding Waypoints at the End of the Route

➤ To add waypoints at the end of the route:



1. Press the ROUTE soft key, followed by the EDIT ROUTE soft key. The Make Route soft keys are displayed and the cursor is connected to the last-placed waypoint with a dotted line. You can add further waypoints to the route in the same way as for a new route.



2. Move the cursor to the required location, and press PLACE WAYPOINT soft key.



If you place the waypoint in the wrong position, press the UNDO WAYPOINT softkey.

Note: You can UNDO waypoints in the original route, not just the new ones.



3. Place as many waypoints as required, and press the ACCEPT soft key, then press **ENTER** to finish.

Removing a Waypoint from the Route

➤ To remove a waypoint from the current route:



1. Move the cursor over the required waypoint until the letters WPT are displayed. The waypoint soft keys are displayed.

2. Press the REMOVE WAYPOINT soft key. The waypoint is removed from the route and the route is re-numbered.

Alternatively, you can remove the last waypoint from a route by pressing the UNDO WAYPOINT soft key, as described above in *Adding Waypoints at the End of the Route*.

If the route has *not* been saved, the waypoint is erased.

If the route has been saved, the waypoint remains on the screen.

Reversing the Route

➤ To reverse the route, so you can Follow the route back:



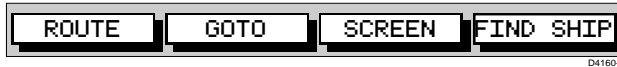
1. Either press the ROUTE soft key followed by MORE, or move the cursor over the required waypoint until the letters RTE are displayed. The route soft keys are displayed.

The route soft keys are displayed.

2. Press the REVERSE ROUTE soft key. The current route is reversed on the screen.

3.4 Following Routes and Going to Points

The default soft key GOTO accesses the functions to FOLLOW a route and GOTO a waypoint or cursor. When you select the target destination, the chartplotter calculates bearing, distance and cross track error; this information is passed to a helmsman or autopilot. You can also restart the cross track error (XTE) from the actual vessel position to set XTE to zero at that point.



When the chartplotter is following a route, the target destination is indicated by a square around the waypoint (or cursor marker) and a dotted line shows the intended track, from your start point or previous waypoint, to the target waypoint.

This section explains how to perform the following tasks:

- Follow a route either forwards, or in reverse order.
- Target Point Arrival
- Altering the route, including joining at a selected waypoint, advancing waypoints, and restarting XTE.
- Go to an individual point, either an existing waypoint or the cursor.
- Stop and Restart Follow/Goto.

An alarm is triggered when you approach a waypoint, this section describes what happens when you arrive at waypoints. Chapter 4 describes how to set the alarm.

Whilst you are following a route the chartplotter can display the vessel's actual track and the track can be recorded for later display. The Track function is described in the Section 3.5.

- To access the follow and goto soft keys, press the default soft key GOTO (the soft keys change if a follow or goto is already in progress):



Follow a Route

Note: The current route may have been created on this display, or created on another unit and received on this display via SeaTalk.

➤ To follow the current route:



1. Press the GOTO default soft key. The Goto/Follow soft keys are displayed.

Alternatively, place the cursor over a route leg until the letters RTE and the route soft keys are displayed.



2. Press the FOLLOW ROUTE soft key.

Your vessel's current position becomes the origin, and the first waypoint in the current route becomes the target waypoint.

The soft keys change as follows:



These options are described in the following sections.

➤ To follow the current route in reverse:



1. Press the ROUTE default soft key, followed by MORE, or place the cursor over a route leg until the letters RTE are displayed. The route soft keys are displayed.

2. Press the REVERSE ROUTE soft key. The current route is reversed on the screen.

3. Press the GOTO default soft key. The Goto/Follow soft keys are displayed.



4. Press the FOLLOW ROUTE soft key.

Your vessel's current position becomes the origin, and the first waypoint in the current route becomes the target waypoint.

The soft keys change as follows:



These options are described in the following sections.

Target Point Arrival

You can set up target alarms (see Chapter 4) to alert you when the vessel is approaching the target point. The arrival alarm is defined as a circle (not visible on the screen), with a specified radius around the target.

The alarm is triggered when either of the following conditions is met:

- The distance to the target point is less than that specified for the Arrival alarm.
 - Your vessel reaches the closest point of approach to the target (that is, it crosses the perpendicular to the track, and through the target).
- To cancel the Arrival alarm and go towards the next waypoint in the route,
 either press any key
 or wait for 10 seconds.

The target becomes the origin, the next waypoint becomes the target point, and the two are connected by a dotted line indicating the current leg. Any previous route leg is removed from the screen, but waypoints remain.

Altering the Route

You can use the soft keys to follow a route from a selected waypoint (Join a route), or if already following, you can advance to the next waypoint. You can also restart the cross track error, setting the current vessel position as the new origin.

In addition, you can move a selected waypoint as described in section 3.2, or remove a waypoint from the route as described in section 3.3.

Joining a Route

- To start tracking the current route at a selected waypoint:
1. Move the cursor over the required waypoint until the letters WPT and the waypoint soft keys are displayed.
 2. Press the FOLLOW FROM HERE soft key.
Your vessel follows the route, using the selected waypoint as the target point.
 3. To return to the default display, move the cursor away from the waypoint or press **CLEAR**.

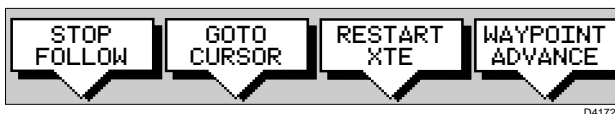


Advancing to a Waypoint

- Once you are following a route, you can advance to the next waypoint, even if you have not reached the current target waypoint:

GOTO

1. If necessary, press the GOTO default soft key to display the Goto/ Follow soft keys.



WAYPOINT
ADVANCE

2. Press the WAYPOINT ADVANCE soft key. The current leg of the route is abandoned and the the next waypoint becomes the target. The display is updated to show the new route leg.

Restart Cross Track Error (XTE)

Whilst you are following a route, or going to a target point, you can restart the XTE. This sets the XTE to zero and moves the origin to the actual vessel position.

Reset XTE is useful if you find yourself off track and want to go straight to your target, rather than get back onto the original track.

- To restart XTE:

GOTO

1. Press the GOTO default softkey, the Follow/Goto soft keys are displayed.

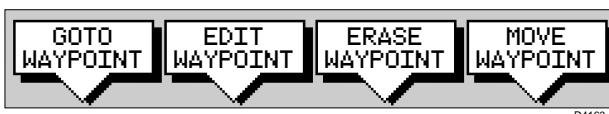
RESTART
XTE

2. Press the RESTART XTE soft key. The current vessel position the waypoint.

Going To an Individual Target Point

Rather than following a route, you can go directly to a selected target point, this can be an existing waypoint (not in the current route), or the cursor position.

- To navigate directly to an existing waypoint:
 1. Use the trackpad to position the cursor over the required waypoint until the letters WPT and the waypoint soft keys are displayed.



Alternatively, you can select the waypoint from the waypoint list as described in section 3.2



2. Press the GOTO WAYPOINT soft key.
Navigation to the selected waypoint begins. The soft key STOP GOTO is displayed.
3. To return to the default soft key display, move the cursor away from the waypoint.

➤ To navigate directly to the cursor position:



1. Use the trackpad to position the cursor as required.
2. Press the GOTO default soft key, followed by GOTO CURSOR.
If navigation is currently in progress you are warned "Already following route. Cancel route and goto cursor?".

To cancel the GOTO cursor operation, press NO.

To continue with the GOTO cursor operation (and stop the current GOTO ROUTE), press YES.

The chartplotter places a temporary waypoint as the target and starts to navigate towards it. The waypoint is shown as a square with a dot in the centre, and is connected to the vessel's starting position with a dashed line.

The soft key STOP GOTO is displayed.

Note: The temporary waypoint is not added to the waypoint list; when the GOTO is complete, or is stopped, the temporary waypoint is erased.

3. To return to the default soft key display, move the cursor away from the waypoint.

Stop Follow or Stop Goto

➤ To stop following the route or target point either:



If necessary, press the GOTO soft key, then press the STOP GOTO/FOLLOW soft key.

Or:



Move the cursor over any waypoint in the current route, then press the STOP GOTO/FOLLOW soft key.

The dotted line from your vessel to the target waypoint disappears.



If you subsequently use the FOLLOW ROUTE soft key to restart navigation, the route is followed from the point at which it was stopped. This is indicated by a square around the target waypoint. If you want to follow from another waypoint you can initiate the follow then use the WAYPOINT ADVANCE soft key to step through the route.

3.5 Transferring Waypoints and Routes

Displayed Seatalk Waypoints

In an integrated system, when a route is made current on any Seatalk equipment it is sent to all SeaTalk instruments, including this chartplotter; this route will override any other current route. When GOTO waypoint or GOTO cursor is in operation it is considered a route

The current route can be edited on any instrument with route edit capability.

Note: Transferred waypoints are not automatically saved by the chartplotter, however you can save the route locally, thus adding the waypoints to the local waypoint list.

Managing Database Lists

There are three methods of maintaining database lists. The method you choose will depend on the links available (SeaTalk, NMEA or HSB), and whether you want to transfer individual waypoints or the complete waypoint and route list:

- If waypoints are transmitted by other equipment on SeaTalk or NMEA, you can receive them on the chartplotter. When this option is enabled, any waypoints sent on SeaTalk or NMEA are transferred and appended, one-by-one, to the *open* waypoint list; routes sent on NMEA are appended to the route list. You can use this function to add waypoints from a PC connected via NMEA.
- You can send the waypoint **and** route lists from the chartplotter to other instruments via NMEA using the SEND WPT LIST function. Sending the waypoint list does not affect **current** routes. The NMEA link could be to a PC.
- You can transfer the waypoint **and** route lists from one chartplotter to another across an HSB link using COPY WPTS FROM HSB.

CAUTION

The function COPY WPTS FROM HSB replaces the existing waypoint and route lists with the transferred lists.

➤ To receive incoming waypoints:

1. To display the waypoint list press **MARKS** followed by the WAYPOINT LIST softkey. Press the WAYPOINT TRANSFER soft key.





2. Press the soft key RECEIVE WPTS FROM ST/NMEA.
When waypoints are transmitted by other equipment they are added to the open waypoint list on the chartplotter. Routes transmitted on NMEA are appended to the route list.
3. To disable waypoint transfer, press the soft key STOP RECEIVING WAYPOINTS.
Alternatively, press **ENTER**, or **CLEAR**, twice to close the Waypoint List.

➤ To send the waypoint list:



1. Display the waypoint list as previously described, then press the WAYPOINT TRANSFER soft key.
2. Press the soft key SEND WPT LIST ON NMEA.



The waypoint and route lists are transmitted from the chartplotter to other instruments on NMEA.

➤ To receive the waypoint and route lists:



1. Display the waypoint list as previously described, then press the WAYPOINT TRANSFER soft key.
2. Press the soft key COPY WPTS FROM HSB.



The waypoint list is transmitted to the chartplotter from another instrument on HSB.

CAUTION

Any existing waypoint and route lists are overwritten.

3.6 Using Tracks

The Track function is used to mark on-screen the trail 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 display unit's memory. You specify the interval at which track points are made, a line is drawn on-screen between each point. Up to 5000 track points can be saved in total, in up to 5 track files (each a maximum of 1000 points).

The track remains on-screen, even following a Power off/on, until you clear the track.

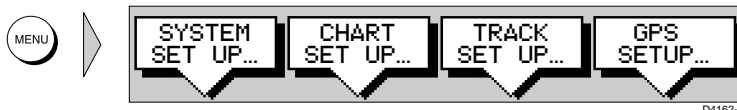
A track can be saved and retrieved for display at a later date. For example, you may wish to display a previous track, and then place waypoints along it that you can follow. You can only display one track at a time; you must clear a current track from the screen if you want to display a saved track.

This section describes how to:

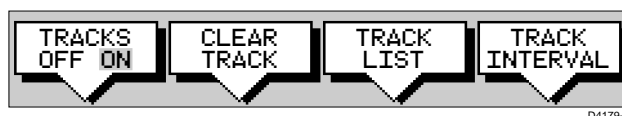
- Setting up a track, including how to specify the interval.
- Clearing the current track.
- Managing tracks, using the track list, including Saving, Naming, Erasing and Showing a track.

► To access the track controls:

1. From the chart display, press the **MENU** key to display the chart set up soft keys.



2. Press the TRACK SETUP soft key to display the Track soft keys:



The following instructions assume you have the track soft keys displayed.

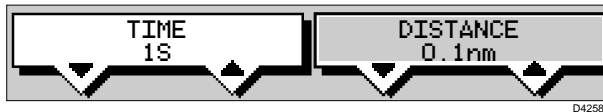
Setting Up a Track

You use the track soft keys to switch the track on and to specify the interval at which track points are saved. The interval default is a distance of 0.1nm. The maximum track length is 1000 points, when the track has reached this length, the first points are overwritten. The track is saved until you switch it off.

► To set up a track:



1. Press the TRACK INTERVAL soft key.
Press the appropriate soft key to set either a time interval or a distance interval; press the UP arrow to increase the interval, the DOWN arrow to decrease the interval.
Press ENTER to return to the track soft keys.



2. Press the TRACKS OFF ON soft key to toggle tracks on.
Your vessels trail will be displayed on-screen, with a line joining the points at the selected interval.

Clearing the Current Track

You can clear the current track from the screen. When you select CLEAR, if the current track has not been saved, you have the option of saving it.

► To clear the current track:



1. Press the CLEAR TRACK soft key.
2. If the track has not been saved the SAVE TRACK soft keys are displayed.
To clear the track without saving it in the Track List, press NO.
To save the track in the list, press YES. The Name track soft keys are displayed and you should continue as described in the following section, Saving and Naming a Track.

The current track is cleared from the screen and the default soft keys are displayed.

Managing Tracks

Although it is easy to set up a track, and this track is retained even if you turn off your display, you can store a number of different tracks so that you can review them at a later date. This section explains how to perform the following tasks:

- Saving and naming a track.
- Naming, Erasing and Showing an existing track.

Saving and Naming a Track

You can save up to 5 named tracks in the Track List. These tracks can be re-displayed at a later date.

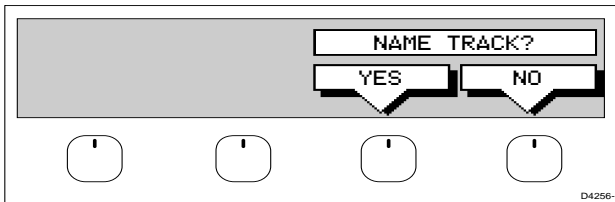
► To save and name the current track:



1. Press the TRACK LIST soft key. The track list pop-up and associated soft keys are displayed.
2. The next available entry on the track list is highlighted. (If required, you can use the trackpad to select another position in the list; this can be a blank slot, or an existing track that you no longer require).



3. Press SAVE TRACK. The name track soft keys are displayed.



4. If you do not wish to name or rename the track, press the NO soft key (or **ENTER**) to clear the list. The track is saved and is listed as Track Not Named.

If you wish to name the route press the YES soft key. Use the trackpad to move the cursor right or left to the character you wish to edit. Then use the top or bottom of the trackpad to increase or decrease the letter or number.

5. Press **ENTER** to finish and clear the Track List, then to return to the default soft key display, press **ENTER** again.

Naming, Erasing and Showing a Track

➤ To name an existing track, erase a track or show a track, you select the track from the track list, then press the appropriate soft key as follows:



1. Press the TRACK LIST soft key. The Track List is displayed. The grey selection bar indicates the selected track.
Select the required track then press the appropriate soft key.



2. If you NAME a track, use the trackpad to move the cursor right or left to the character you wish to edit. Then use the top or bottom of the trackpad to edit the letter or number. Press **ENTER** finish the operation.



3. If you ERASE a track you are prompted to confirm.
Press NO to cancel the operation, then **ENTER** if you wish to remove the track list.
Press YES to erase the track from the list, then **ENTER** to remove the track list.



4. If you SHOW a track, and you have a current track on screen, you are prompted to save the track. Proceed as previously described in Clearing the Current Track.
Alternatively, press the NO soft key to cancel the SHOW TRACK operation.
The track list is removed and the selected track is displayed.

Chapter 4: Further Chart Operations

4.1 Introduction

This chapter explains how to use the additional functions that are provided on the HSB series chartplotter and combined radar/chartplotter.

It covers the following topics:

- Measuring distances and bearings on the chart, using the VRM/EBL key
- Setting alarms and timers
- Man Overboard (MOB)
- Cursor Echo
- GPS Setup
- Data Log Mode

In order to use some of these functions, you may need the following additional data from equipment connected to your system via a HSB, SeaTalk, or NMEA link:

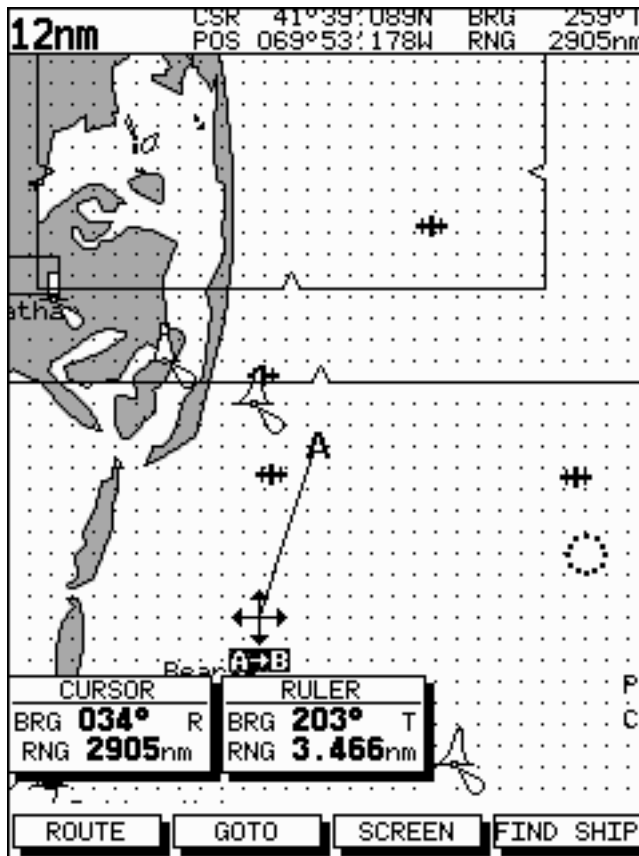
Data	Example source	Integrated functions available
Heading COG	Compass* GPS	- North Up or Course Up heading modes - MOB (if speed data also available)
Radar data	Radar system (via HSB)	- Radar data, either full-screen or in a half-screen window
Position	GPS system	- Waypoints - Position, COG, SOG and time data in Data Box and Nav Window - MOB - Data Log
Other data	Transducers	- Data Box and Nav Window data displays, including speed, depth, wind, temperature

* If heading data is available via both NMEA and SeaTalk, NMEA data takes priority. For all other data, SeaTalk data takes priority (see Section 6.3).

4.2 Measuring Distances Using the VRM/EBL Key

You can obtain an accurate measurement of the distance and bearing between two points by using the VRM/EBL key.

- ▶ To place a ruler line and Ruler data box:
 1. Position the cursor on the starting point from which you wish to measure.
 2. Press **VRM/EBL**.
A Ruler data box is displayed showing the bearing and distance from the starting point to the cursor position. The values will be zero until you move the cursor. The character "A" appears at the cursor location.
 3. Use the trackpad to move the cursor to the measurement end point.
A line connects the cursor to the starting point, and the Ruler data box is updated to show the bearing and length of the line.



Measuring Distances Using the VRM/EBL Key

4. Press **ENTER** to fix the end point of the ruler line, and return to normal cursor control. The letter “B” marks the location of the end point on the chart.
- To re-position one end of the ruler line:
1. Move the cursor over the ruler line towards the end that you want to re-position, until the letters A-B are displayed.
 2. Press **ENTER** to take cursor control of the ruler. The ruler end moves to the cursor which changes to a four-headed arrow.
 3. Move the cursor to the required position. The ruler data box is updated.
 4. Press **ENTER** again to set the position and return to normal cursor control.
Alternatively, press **CLEAR** to reset the ruler to the previous position.
- To clear the ruler line and ruler data box either:
- Move the cursor over the ruler line, until the letters A-B are displayed, then press **CLEAR**.
- or:
- Press **VRM/EBL**, the ruler soft keys are displayed. Press RULER OFF ON to toggle the ruler line and data box off.
- To clear the ruler data box:
- Press **VRM/EBL**, the ruler soft keys are displayed. Press RULER DATABOX OFF ON to toggle the ruler data box off.
- To move the Ruler data box, using the context-sensitive cursor:
1. Move the cursor over the box until the letters BOX are displayed, and press **ENTER** to take cursor control of the box.
 2. Use the trackpad to move the box to its new location, and press **ENTER** to drop it and return to normal cursor operation.

4.3 Alarms and Timers

Alarm Reporting

The chartplotter reports the following alarms, that are set using the **ALARMS** key:

Alarm	Indicates:
Arrival	Your vessel has arrived at the active waypoint: it has either reached the arrival circle (the radius of which is specified) or, has reached its closest point of approach (defined by a line passing through the waypoint and perpendicular to the route leg).
Off Track	Your vessel has exceeded the specified distance (maximum cross track error) from the active route leg.
Anchor	Your vessel has drifted from its anchor position (set when the alarm was turned on) by more than the specified distance.
Countdown	The countdown timer has reached zero.
Alarm Clock	The time matches the specified alarm time.

The alarms are switched on or off, and the limits set, using the **ALARMS** key menu.

When an alarm is triggered, the alarm buzzer sounds and a pop-up window describing the alarm is displayed.

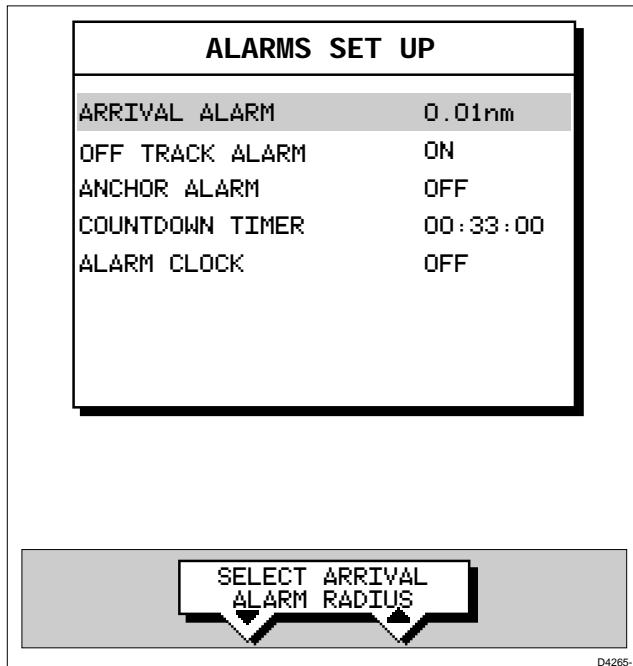
- To silence the alarm and clear the message, press any key. If the alarm was generated by the chartplotter, the appropriate action is taken. For example, following an arrival alarm, the next route leg is activated.

External Alarms

All SeaTalk system alarms (except autopilot alarms) are received and displayed on the chartplotter. You can silence these alarms by pressing any key. No other action is taken by the chartplotter except to silence the alarm.

Setting Alarms and Timers

- To set up an alarm or timer:
1. Press the **ALARMS** key. The Alarms Set Up list is displayed, showing the current settings.



2. Use the trackpad to move the selection bar up or down the list. As each line is highlighted, the soft key labels are updated to show the current settings and controls, as shown in the example above.
3. Use the up or down soft keys to change the variable controlling the alarm. For example, for the arrival alarm you can adjust the radius from the waypoint at which the arrival alarm will be triggered.
The alarm distances can be set in the range 0.01 to 9.99 nm, in steps of 0.01nm. The timer is set in minutes and seconds, and the alarm clock in hours and minutes.
4. If required, press the ALARM soft key to toggle the alarm on or off. If you turn an alarm off, its value is retained and will be used when you turn the alarm on again.
Note: You can turn all the alarms and timers on and off, except for the Arrival Alarm which is always on.
5. Press **ENTER** to save the changes and clear the list. Alternatively, to abandon the changes, press **CLEAR**.

4.4 Man Overboard (MOB)

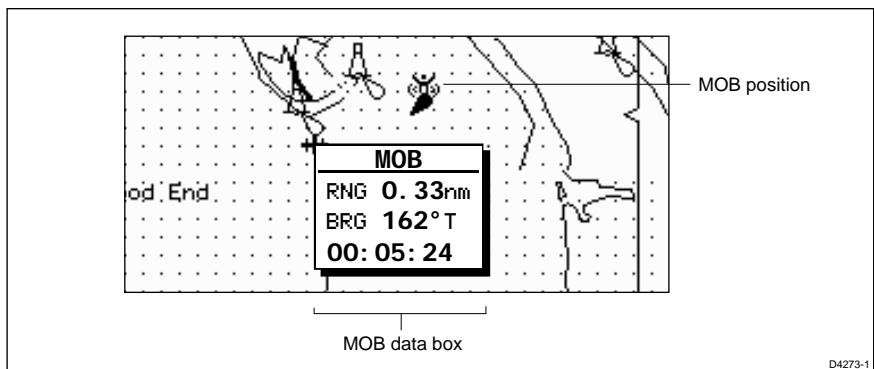
If you lose a person or object overboard, and need to return to the location, you should use the Man Overboard (MOB) function.

You can select the type of data used for the MOB position using the set up menus (see Chapter 5).

Note: To obtain MOB position, you need either of the following:

- Position data from a GPS or equivalent device
- Heading and speed data, so that the position can be calculated by dead reckoning

- To initiate the MOB procedure, press and hold the **MARKS** key for two seconds. The system then performs the following tasks automatically:
 - Redraws the chart at 1/2 nm (even if cartography is not available).
 - Marks the current position with a MOB symbol which replaces any current active waypoint and route.
 - Displays the MOB data box, showing the bearing and distance from your vessel to the MOB waypoint position, and the elapsed time since the MOB was initiated.
 - As your vessel moves from the MOB position, a dotted line is displayed connecting the MOB symbol and the vessel's current position.



- Sounds a 4-second alarm pattern every 30 seconds.
- Sends an MOB message (including bearing and distance) to other units in the system, via the SeaTalk connection.
- To cancel the MOB, press and hold the **MARKS** key for 2 seconds. The chart is re-drawn at its previous scale, and the MOB symbol and data box are removed.

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

4.5 Cursor Echo

In a combined radar/chart display, or in a system with a radar display connected via Seataalk, you can set the display to enable cursor echo. Cursor echo (accessed from System Set Up, described in Chapter 5) enables you to display a radar cursor on the chart picture, or a chart cursor on the radar picture (you cannot display a remote chart cursor in a chart window).

The following options are provided:

- **Local cursor:** echoes the cursor position between chart and radar windows on a combined display.
- **Remote Cursor (SeaTalk):** displays the cursor from a radar display connected via SeaTalk.

When the appropriate option is switched on, the display shows its own cursor, plus the cursor of the other display with appropriate cursor text (RDR or CHT) to indicate its origin. This means that you could move the cursor over a target on the radar display, and check the identity of the target by looking at the radar cursor position on the chart plotter.

4.6 GPS Setup

GPS set up page provides you with information and the status of the tracked navigation satellites. It also provides soft keys to RESTART your SeaTalk GPS which instructs the GPS to re-acquire the satellite fix, and to SET UP a SeaTalk Differential GPS, by manually retuning it to a different differential beacon.



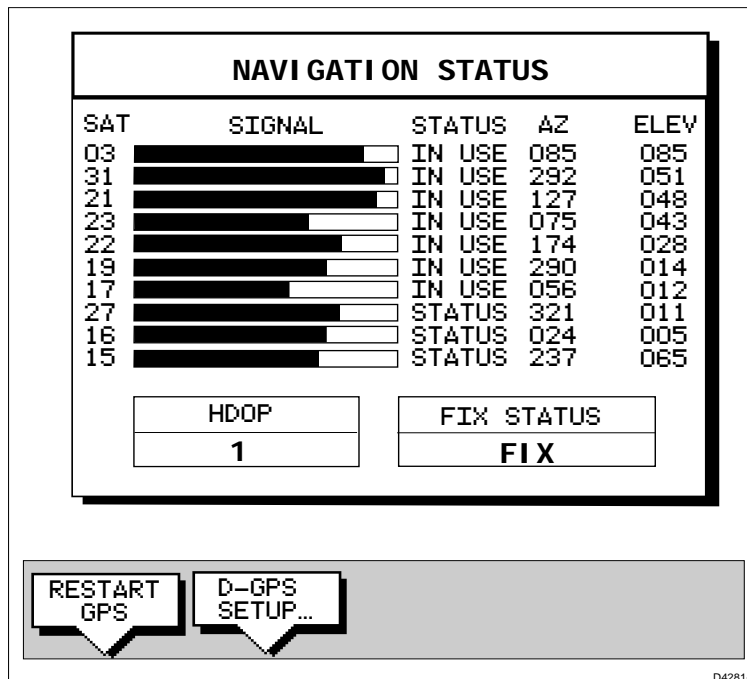
To select GPS Set Up , press MENU, then press the GPS SETUP... soft key.

The Navigation Status pop-up window, shown on the following page, is displayed. This window provides, for each tracked satellite, the satellite number, its signal strength, azimuth angle and elevation angle from your vessel.

- To reacquire the satellite fix, press RESTART GPS.



The GPS restarts; it can take several minutes for the GPS to acquire the satellite fixes.



D-GPS
SETUP...

► To tune a differential GPS to another beacon:

1. Press D-GPS SETUP, the Differential GPS Setup pop-up is displayed with MODE and BEACON SELECT soft keys.
2. Press MODE AUTO MAN to toggle the GPS to manual tuning.
3. Press BEACON SELECT, use the soft keys to set the required beacon frequency and bit rate.

The status of the selected beacon is displayed in the pop-up.

Press **ENTER** to select the beacon and exit this function.

Press **ENTER** again to return to the Navigation Status window, then

ENTER to return to the MENU soft keys.

4.7 Data Log Mode

You can set the chartplotter to log course data every thirty minutes. Up to 48 log entries are held, when 48 entries have been made, the chartplotter will start overwriting the first entries.

You start the log using soft keys provided in Data Log Mode. When you select Data Log Mode the log is displayed full-screen. If the screen is full, you use the trackpad to scroll the list and view further log entries. Each line in the log shows:

- Time of log entry
- Position at time of log entry
- Course Made Good (CMG) since last log entry
- Distance Made Good (DMG) since last log entry

Once you have enabled the data log, you can use the **DISPLAY** key to change full-screen mode; data continues to be logged, but you must change to Display Log Mode to view it.

You can stop the log at any time and you can clear the log from memory.

- To activate Data Log Mode:
 1. Press **DISPLAY**, the DISPLAY pop-up is shown.
 2. Press **DISPLAY** again, until LOG is selected, then press **ENTER**.
- To start recording log entries:

START LOG

Press the START LOG soft key. As shown in the following illustration, the chart plotter records the time and vessels position. Every thirty minutes the time, new position, distance made good and course made good are recorded.

The START LOG soft key changes to STOP LOG.

TIME	POSITION	CMG	DMG
15:30	50°21:890N 001°20:610W	346° _M	6.86 _{KM}
16:00	50°18:010N 001°20:070W	180° _M	7.23 _{KM}
16:30	50°21:850N 001°19:290W	012° _M	7.23 _{KM}
17:00	50°18:500N 001°21:300W	206° _M	6.67 _{KM}
17:30	50°20:990N 001°18:280W	043° _M	5.74 _{KM}
18:00	50°19:660N 001°21:960W	245° _M	5.00 _{KM}
18:30	50°19:730N 001°18:030W	093° _M	4.63 _{KM}
19:00	50°20:930N 001°21:750W	302° _M	5.00 _{KM}
19:30	50°18:550N 001°18:650W	145° _M	5.74 _{KM}

STOP LOG CLEAR LOG

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- To stop recording log entries:

STOP LOG

Press the STOP LOG soft key.

- To clear the log entries:

CLEAR LOG

Press the CLEAR LOG soft key, you are prompted "Are You Sure". To cancel the CLEAR LOG operation press the NO soft key. To continue press the YES soft key, all log entries are deleted, but the data log remains active.

Chapter 5: Setting Up the Chartplotter

5.1 Introduction

Once you have installed your system and are familiar with its basic operation, you may wish to set it up to operate according to your requirements, and display information according to your preferences.

This is achieved using the soft key controls that are displayed when you press the **MENU** key.

In most cases, you will only need to use the **MENU** key options when you first set up your system. However, you may decide to change the way you have customised some aspects, such as the screen and help settings, as you become more familiar with your system.

Once you have set the values, they remain as the default settings until you reset them; they are retained even when you power off your display unit.

This chapter covers the following topics:

- Changing the default set up parameters
- System parameter functions and default settings
- Chartplotter-specific parameter functions and default settings

It is advisable to check the functions of the parameters, and decide on the new settings, before making the changes.

Note: If you have a combined Radar/Chartplotter display, the SYSTEM SET UP menu from the chart display is the same as that accessed from the radar display. An additional set up menu is available for the radar functions when you are in Radar mode. Refer to the *HSB Series Pathfinder Radar Handbook* for details.

5.2 Changing the Set Up Parameters

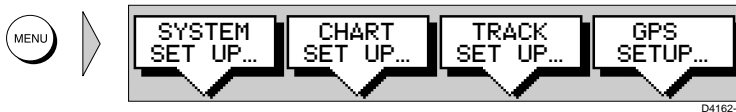
The set up parameters are divided into two sections:

- **System**, controlling the aspects of the system that are not specific to the chartplotter
- **Chart**, controlling the chartplotter, including waypoint information, vectors and radar/chart synchronisation.

This section provides instructions for displaying and changing the default values. The following sections list the parameters and their possible settings, and describe the function of each parameter in turn.

► To set the default parameters:

1. Press the **MENU** key to display the set up soft keys for the current full-screen mode. For Chart Mode, they are as follows:



2. Press the soft key for the set up you require.

The requested set up menu is displayed, listing the parameters and their current settings.

3. Use the trackpad to move the selection bar up and down the list. An arrow is displayed at the top or bottom right-hand corner if you can scroll the list to display further parameters.

As each line is highlighted, the soft key labels are updated to show the settings available.

- For parameters that have a numeric value, or more than four possible settings, a scroll list is displayed above two of the soft keys.
- For some parameters, a soft key provides access to a sub-menu of further options.

4. Press the soft key corresponding to the desired setting or, for scroll lists, use the soft keys to scroll forwards or backwards through the list until the required setting is highlighted. This setting is retained when you move the selection bar on to the next parameter in the menu list.
5. Once you have reset all the required values, press **ENTER** to clear the menu and return to the set up soft keys.

6. Press **ENTER**, **MENU** or **CLEAR** to clear the soft keys and return to the normal display.

You can return all the settings to their original factory settings, if required, by performing a factory reset as described in Chapter 7.

5.3 System Parameters

The following table lists the System 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 is described in the following subsections.

Menu	Options	Factory Default	New Default
DATA BOXES			
POSITION	OFF, LAT/LONG, TDs	OFF	
SPEED	OFF or ON	OFF	
DEPTH	OFF or ON	OFF	
COG	OFF or ON	OFF	
SOG	OFF or ON	OFF	
TIME	OFF or ON	OFF	
DATE	OFF or ON	OFF	
WIND	OFF, APP, TRUE or BOTH	OFF	
WAYPOINT	OFF, LAT/LONG, or RNG, BRG, TTG	OFF	
XTE	OFF or ON	OFF	
HEADING	OFF or ON	OFF	
LOG/TRIP	OFF or ON	OFF	
PILOT	OFF or ON	OFF	
VMG	OFF, WIND, WPT or BOTH	OFF	
TEMPERATURE	OFF or ON	OFF	
TIDE SET/DRIFT	OFF or ON	OFF	
BEARING MODE	MAGNETIC TRUE	TRUE	
CURSOR REFERENCE	MAG/TRUE RELATIVE	RELATIVE	
CURSOR READOUT	OFF LAT/LONG RNG/BRG BOTH	RNG/BRG	
DAY/NIGHT	DAY/NIGHT	DAY	
HELP	OFF/ON	ON	
SOFT KEYS	OFF/ON	ON	
KEY BEEP	OFF/ON	ON	

Menu	Options	Factory Default	New Default
MOB DATA	DR POSITION	DR	
MENU TIMEOUT PERIOD	NO TIMEOUT 10, 20, 30 SECONDS	NO TIMEOUT	
DISTANCE UNITS	NAUTICAL MILES STATUTE MILES KILOMETRES KILOYARDS	NAUTICAL MILES	
SPEED UNITS	KNOTS MILES PER HOUR KILOMETRES PER HOUR	KNOTS	
DEPTH UNITS	METRES FEET FATHOMS	METRES	
TEMPERATURE UNITS	CENTIGRADE FAHRENHEIT	CENTIGRADE	
VARIATION SOURCE	AUTO MANUAL (value)	AUTO	
CURSOR ECHO			
LOCAL CURSOR	OFF or ON	ON	
REMOTE CURSOR	OFF or ON	OFF	
DATE FORMAT	DD/MM/YY MM/DD/YY	DD/MM/YY	
TIME FORMAT	12 HOUR 24 HOUR	24 HOUR	
TIME OFFSET	UTC, or local offset value: Plus or minus up to 12 hours, in whole hours	UTC	
LANGUAGE	ENGLISH (UK), ENGLISH (US), DANISH, FRENCH, GERMAN, DUTCH, ITALIAN, NORWEGIAN, PORTUGUESE, SPANISH, SWEDISH, FINNISH	ENGLISH (UK)	
SIMULATOR	OFF DATA RADAR BOTH	OFF	

Data Boxes

Press the SELECT BOXES soft key to display the data box sub-menu. This allows you to select up to 6 data boxes that you wish to be able to display on the chart screen.

Note: A fixed set of 9 of these data items are available for display in the Nav Data window.

Data boxes provide regularly used data in a compact form so that most of the chart can still be seen. The ones you select here can be turned on and off (as a group) during normal chart use, and you can also move them individually using the context-sensitive cursor.

Note that in addition to these grouped data boxes, cursor readout, VRM/EBL data, waypoint data, MOB data and simulator status boxes are displayed when selected or when the appropriate function is active.

Bearing Mode

The mode (magnetic or true) of all the bearing and heading data displayed. This is indicated by “M” or “T” in the BRG or COG field of the Chart status bar.

Cursor Reference

The mode of the bearing data displayed for the cursor readout. The bearing information can be displayed in either of two forms:

- **Relative:** The bearing relative to your vessel's heading. This option is only available in Chart mode if you have heading data from a compass.
- **Mag/True:** The actual bearing in either degrees magnetic or degrees true.

If you choose this mode, the selection you made for the previous parameter (Bearing Mode) °M or °T is displayed in the cursor (Rng/Brg) data boxes.

Cursor Readout

This option controls whether the cursor data is shown in latitude and longitude or in range and bearing. Alternatively, you can show both types of readout, in separate boxes, or turn the cursor data box off.

You can also turn the cursor readout box(es) on and off during normal operation, via the SCREEN default soft key (see Chapter 2).

Day/Night

This option allows you to change the chart presentation between “day” and “night” modes.

In the normal day presentation, black objects are displayed on a white background. If you select NIGHT presentation, the picture is reversed, so that white objects are shown on a black background to reduce the intensity of the image.

Help

When Help is set to ON, a prompt appears when selecting a soft key or menu choice, and when using the context-sensitive cursor. The help message is cleared when the action is completed.

Soft Keys

When the Soft Keys option is set to ON, the default soft key labels are displayed along the bottom of the screen.

When the Soft Keys option is set to OFF, the default soft key labels are only displayed when a soft key is pressed, and they disappear if no operation is performed for 10 seconds.

Key Beep

This option controls whether or not the keys make a noise when you press them.

MOB Data

This option controls whether MOB data is based on position data, or on dead reckoning (DR). Dead reckoning normally provides a better indication of the course to an object in the water, on the assumption that your vessel and the object are both subject to the same tide and wind effects.

Menu Timeout Period

With no timeout set, menus and soft key labels remain displayed until you clear them by pressing **ENTER**, **CLEAR** or the appropriate dedicated key.

If you select a timeout value, the menus and soft key labels will be cleared if a key is not pressed for the specified number of seconds.

This setting does not affect the default soft key labels, which are controlled by the Soft Keys option previously described.

Units

You can set the 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. However, the distance units do not affect the chart scale, which is always in nautical miles.

Variation Source

The variation value is the difference between True and Magnetic direction data for heading or bearing values. The Variation Source option provides soft keys for selecting Auto or Manual variation mode, displays the current variation value for each and highlights the currently selected mode.

Auto Mode

If you select Auto mode, the chartplotter obtains the value of variation automatically, normally from received SeaTalk or NMEA data. The variation value that is used depends on the data available, and is selected in the following order of priority:

1. Variation value from the same source as the heading data:
 - If heading data is being taken from NMEA, then variation is also taken from NMEA
 - If heading is taken from SeaTalk, then SeaTalk variation is used
2. Variation value from a different source:
 - If heading data is being taken from NMEA, but no NMEA variation is available, then variation is taken from SeaTalk
 - If heading is taken from SeaTalk, but no SeaTalk variation is available, then variation is taken from NMEA
3. A calculated variation value, using position data, if no SeaTalk or NMEA value is available
4. The current manual variation value, if no SeaTalk or NMEA value and no position data is available

Manual Mode

If you select Manual mode, by pressing either of the MANUAL keys, you can specify the local variation value according to the area in which you are operating. Press the appropriate MANUAL key to adjust the variation up or down, to a maximum of 30° East or West.

This value is then transmitted to any other SeaTalk instruments on your system. It is retained if you turn the display off and on again.

In Manual mode, incoming NMEA variation is ignored. However, if the variation is changed on another SeaTalk instrument, the new value is used and the manual value that is displayed is updated.

Note: The Manual variation value defaults to 0°, so it is important to set a value if variation is not available from an external source.

Cursor Echo

You can set up your system so that radars and chartplotters connected via SeaTalk can display each other's cursor.

Press the CURSOR ECHO soft key to display the cursor echo soft keys. The following options can be toggled ON or OFF:

- **Local Cursor:** echoes the cursor position between open windows on the same display
- **Remote Cursor (SeaTalk):** displays the cursor from another radar or chartplotter connected via SeaTalk

Cursor echo functions so that you can display a radar cursor on the chart picture, or a chart cursor on the radar picture (you cannot display a remote chart cursor in a chart window). When the appropriate options are switched on, each display shows its own cursor, plus the cursor of the other display with appropriate cursor text (RDR or CHT) to indicate its origin. This means that you could move the cursor over a target on the radar display, and check the identity of the target by looking at the radar cursor position on the chart plotter.

If you set the options to OFF, no cursor echo information is displayed.

Date and Time Settings

Set your preferred date format (DD/MM/YY or MM/DD/YY) and time format (12 or 24 hour). If you wish to display local time, use the soft keys to change from UTC to the required time offset. This can be up to plus or minus 12 hours, in hourly steps.

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 letters displayed by the context-sensitive cursor. The language setting also affects the display format for lat/long position information. Chart text, provided by the chart card, is not affected.

Simulator

The simulator allows you to operate your chart or combined chart/radar display without data from external data sources. The options have the following functions:

- **Data** provides simulated numerical data. When the display unit is switched on, the vessel is positioned at the cursor and can be controlled by functions such as follow and goto.
- **Radar** on a combined radar/chartplotter, provides a simulated radar picture, with example targets. The picture does not change if you change the range, although the range rings are adjusted .
- **Both** on a combined radar/chartplotter, provides simulated data and radar picture.

Note: On a radar master display, you cannot view a simulated image whilst the scanner is in transmit mode.

If you switch the simulator on during transmit mode, the scanner is set to standby, and you will be unable to re-select transmit mode until the simulator is switched off.

Note: The simulated data over-rides any real data that your display unit is receiving from externally connected equipment.

When the simulator is switched on, a SIMULATOR data box is displayed during operation, showing the simulation selected.

5.4 Chart Set Up Parameters

The CHART SET UP option allows you to set up the chartplotter according to your system configuration and your personal preferences.

The following table lists the Chart Set up 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
CUSTOMISE CHART	See below for details		
PLOTTER MODE	OFF ON	ON	
CHART ORIENTATION	NORTH UP COURSE UP HEAD UP	NORTH UP	
OBJECT INFORMATION	OFF ON	ON	
WAYPOINT	OFF ON	ON	
WAYPOINT NUMBERS	OFF ON	OFF	
DEFAULT WAYPOINT SYMBOL	Fish, skull, X or anchor symbol	X	
HEADING VECTOR	OFF, 3 MINS, 10 MINS INFINITE	OFF	
COG VECTOR	OFF, 3 MINS, 10 MINS INFINITE	OFF	
TIDE VECTOR	OFF, 10 MINS, 1 HOUR INFINITE	OFF	
RADAR/CHART SYNCH	OFF ON	OFF	
DATUM SELECTION	WGS 84, LOCAL	WGS 84	

Customise Chart

This provides a list of chart options, enabling you to specify how the chart features are displayed. Most options can be toggled between on, off and custom - custom passes on/off control to the SCREEN soft keys (see *Customising the Screen Presentation Options in Chapter 2*).

The following features can be set using Customise Chart:

- chart text (on, off, custom)
- chart boundaries (on, off, custom)
- spot soundings (on, off, custom)
- depth shading limit (set the limit)
- depth contours (on, off, custom)
- depth contour display (set the upper and lower limits)
- nav marks (on, off, custom)
- light sectors (on, off, custom)
- caution and routing data (on, off, custom)
- marine features (on, off, custom)
- land features (on, off, custom)
- icon display (simple, detailed, custom)

Chart Orientation

The chart orientation is normally North Up, but can be changed to Course Up or Head Up if heading data is available. The orientation modes give the following displays:

- **North Up:** The chart is displayed with north upwards. As you change heading, the ship's heading marker moves. This is the default mode, and is the only mode available if there is no heading data.
- **Course Up:** The chart is stabilised and displayed with the currently selected course upwards. If you select a new course, the picture rotates to display the new course upwards.
The reference used for the Course Up depends on the information available. The first available in the following is used:
 1. A locked heading over a SeaTalk connection
 2. The heading at the time Course Up was selectedTo update the Course Up reference whilst Course Up is the current mode, re-select Course Up from the set up menu.
- **Head Up:** The chart is displayed with the vessel's current heading upwards. As the heading changes the chart will rotate.

Object Information

You can set Object Information ON or OFF. When set ON, object information is displayed in normal chartplotter operation when the cursor is placed over a chart object for two seconds. When set OFF, no information is displayed.

Waypoint Options

Waypoint controls whether or not the waypoints are shown on the Chart display, with their appropriate symbols. The active waypoint, and waypoints in the current route are always shown.

Waypoint Numbers controls whether or not the waypoint numbers are shown for any waypoints in the current route.

Default Waypoint Symbol lets you select the symbol you want used for waypoint display.

Vectors

Heading, Tide and Course Over Ground vectors can be displayed as a line from your vessel. The length of the vector is determined by your choice of SOG and the time period. An infinite vector extends to the edge of the chart screen.

Heading Vector indicates your current heading.

COG Vector indicates your course over ground.

Tide Vector indicates the tide angle. Tide information is calculated from the speed through water, compass and position data.

Datum Selection

You can select either WGS 84 or LOCAL datum. In LOCAL mode, you are presented with a list of datums; use the trackpad to scroll through the list, then press **ENTER** to select the option and close the menu.

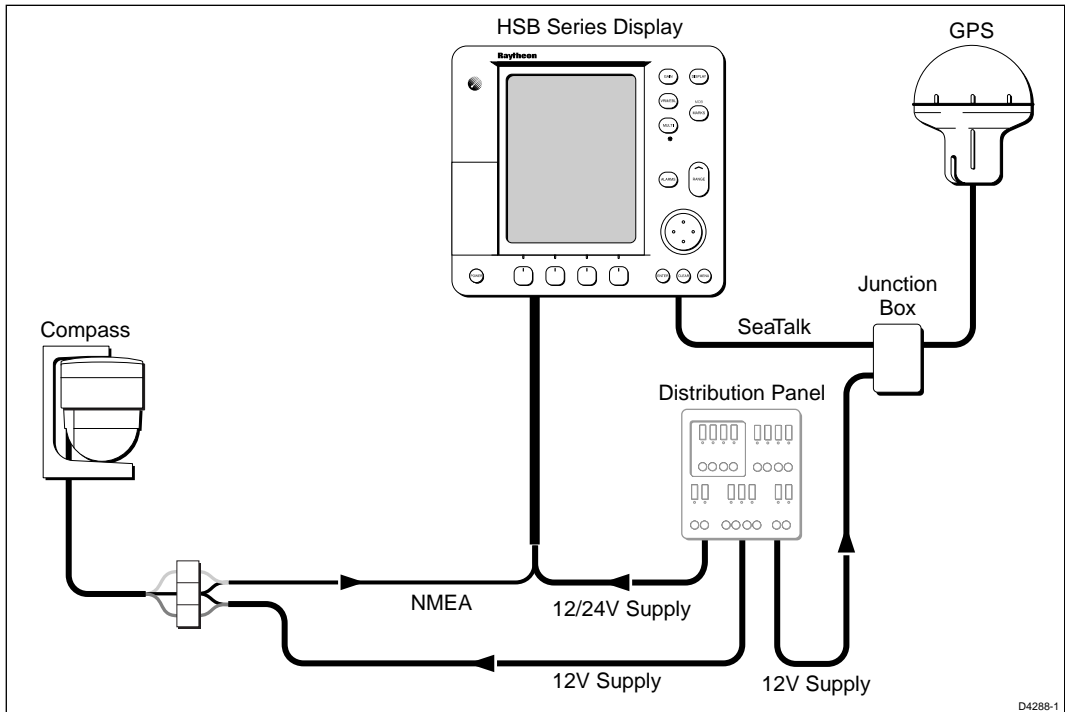
When you change datum selection, the system attempts to set any connected GPS to the new mode, using SeaTalk and NMEA set up commands. A message shows whether the set up was successful or not.

Chapter 6: Installation

6.1 Introduction

This chapter provides instructions to assist you in planning the installation of the HSB Series Chartplotter aboard your vessel, whether you are installing a simple system such as that shown below, or an integrated system such as those shown in *Section 6.5 Integrated Systems*.

Note: This chapter provides information on installing an HSB Series display unit. You can refer to this chapter when installing any HSB display unit such as a repeater or combined radar/chartplotter display. If you are installing a combined radar/chartplotter system, refer to the scanner installation details provided in the *Pathfinder HSB Series Radar Handbook*.



Note: If you wish to practice using the radar display before installation, you can set it up by connecting a 12V or 24V DC power supply (connecting the red core from the power lead via a 6.3A quick blow fuse to positive and the black core to negative) and using the simulator mode, as described in *Chapter 2 Getting Started*.

EMC Installation Guidelines

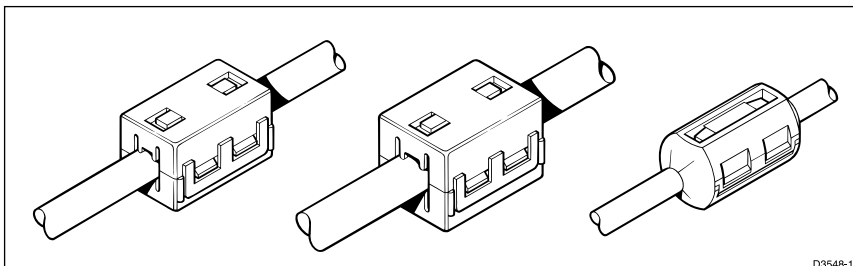
All Raytheon equipment and accessories are designed to the best industry standards for use in the leisure marine environment.

Their design and manufacture conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to maintain EMC performance and CE compliance. 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 1m (3ft) 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 2m (7ft).
- More than 2m (7ft) 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 10.7V 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 mode of operation.
- 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 must 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.



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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.

Planning the Installation

Before you install your system, you should spend some time planning the installation, giving consideration to:

- **Location**
 - Siting the display unit for ease of use
 - Providing access for servicing the equipment

Section 6.3 provides further details regarding location of the display unit.

- **Integrated Systems**
 - What other instruments need to be connected to your chartplotter
 - How do these instruments interface to the chartplotter (Seatalk, NMEA and/or HSB)

Section 6.4 provides information on these interface and defines the data that can be transferred via SeaTalk and NMEA.

- **Cable runs**
 - What cables, in addition to the power cable, are required
 - Cables must be run to avoid physical damage, exposure to heat and acute bends

Section 6.5 provides cable details, including recommended lengths.

The remaining sections of this chapter cover the following topics:

- Unpacking and inspecting the components
- Location of the Display Unit
- Integrated Systems
- Cable Runs
- Mounting the Display Unit
- HSB Series System Connections
- System Check and Initial System Set Up

6.2 Unpacking and Inspecting the Components

Unpack your HSB Series Chartplotter carefully, to prevent damage to the equipment. It is good practice to save the carton and packing for future use, in case you need to return any units for service.

Check that you have all the correct system components. These depend on your system package, as follows:

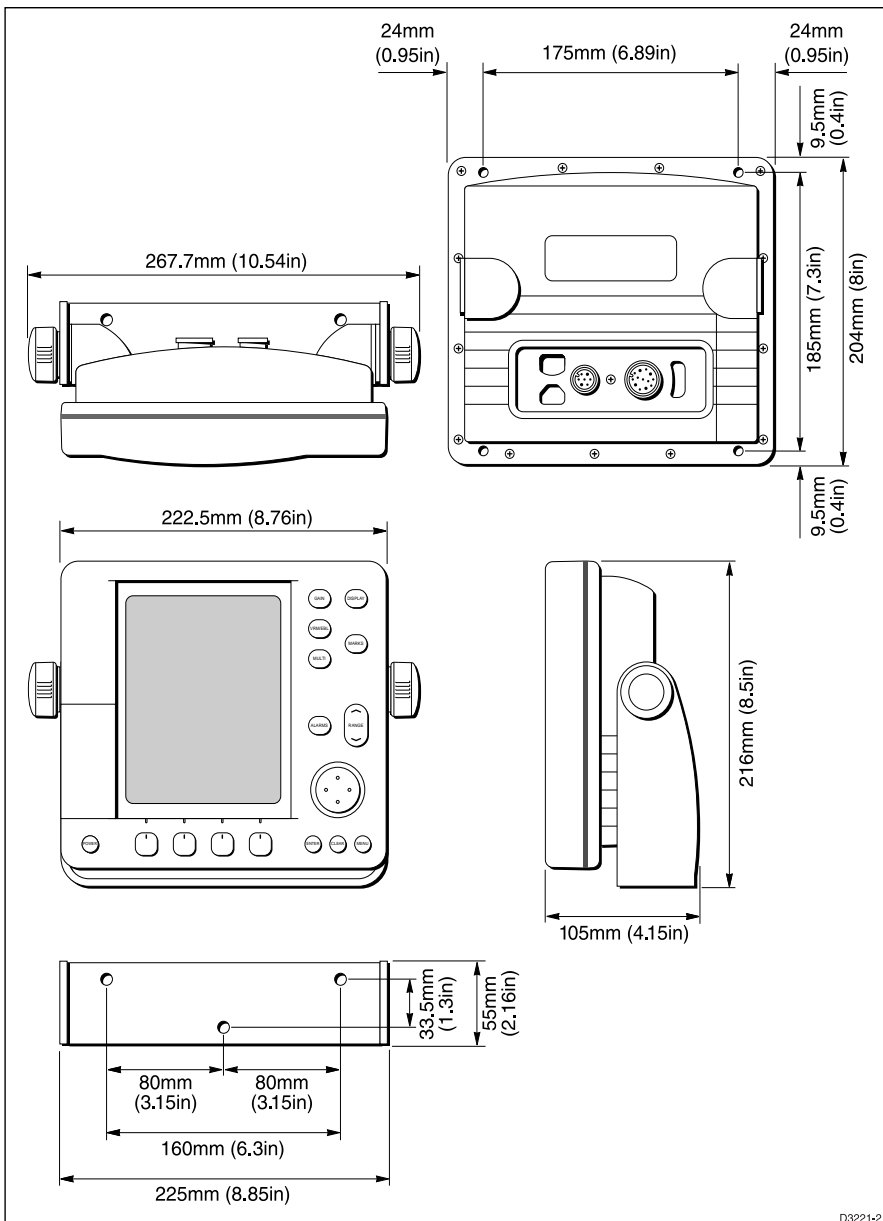
Item	Part No.	Supplied with:	Option for:
7" LCD Display	M92670	Light grey: RL70RC	-
	M92733	Dark grey: RL70RC	-
	R32005	Light grey: RC520	-
	R32007	Dark grey: RC520	-
7" LCD Display Accessories			
Sun cover (light grey)	D331	Light grey: RL70RC, RC520	- -
Sun cover (White)	D356	Dark grey: RL70RC, RC520	- -
Handbook, Radar	81149	RL70RC	-
Handbook, Chart	81150	All	-
Quick Reference Card, Radar	86032	RL70RC	-
Quick Reference Card, Chart	86033	All	-
Mounting bracket assy.	W143	All	-
Trunnion knobs (x2)	W145	All	-
Flush mount kit	M92708	-	All
Power cable	W144	All	-
Seatalk cable assembly			
Flat moulded plugs both ends:			
1m (3ft 3in) long	W284	-	All
3m (9ft 9in) long	W285	-	All
5m (16ft 3in) long	W286	-	All
9m (29ft 3in) long	W287	-	All
Flat to male round connector:			
0.3m (12in) long	D187	-	All
Flat to female round connector:			
0.3m (12in) long	D188	-	All
Flat moulded plug one end only:			
1m (3ft 3in) long	D229	-	All
Ferrite clamp	R55007	-	All
Seatalk junction box	D244	-	All
Seatalk auxilliary junction box	R55006	RL70RC, RC520	-
HSB cable assy			
- 1m	R55001	-	All
- 3m	R55002	-	All
- 6m	R55003	-	All
- 10m	R55004	-	All
NMEA OUT cable assy. 1.5m	R55005	All	-

6.3 Location

This section provides information that affects the possible locations of the display unit, and its position relative to the power supply.

Selecting the Display Unit Site

The display unit can be mounted using the trunnion (yoke) bracket already fitted, or console mounted using the optional flush-mounting kit. The dimensions of the display unit, including the bracket, are shown in the following diagram.



Selecting the Display Unit Site

When planning the installation of your display unit, the following points should be considered to ensure reliable and trouble free operation:

- **Convenience:** The display unit should be installed in a convenient position, where it can be viewed straight on or with a viewing angle of less than 35°. You may wish to apply power before you install the display unit, to determine the best viewing angle prior to fixing.

The mounting location should be easily accessible to allow operation of the front panel controls.

- **Access:** There must be sufficient space behind the display to allow cable connections to the rear panel connectors, avoiding tight bends in the cable.
- **Interference:** The selected location should be far enough away from devices that may cause interference, such as motors and generators (see the EMC guidelines earlier in this section).
- **Magnetic compass:** Mount the display unit at least 1m away from a magnetic compass.
- **Cable runs:** The display unit must be located near a DC power source. The power cable supplied is 1.5m, but a longer cable can be used if required: refer *Section 6.6 Cable Runs*.
- **Environment: Do not restrict airflow at the rear of the display unit; ventilation is required at the rear to prevent the unit overheating.**

The display should be protected from physical damage and excessive vibration. Although the display is waterproof, it is good practice to mount it in a protected area away from prolonged and direct exposure to rain and salt spray.

6.4 Integrated Systems

The HSB series displays can be linked via the HSB network to transfer chart and radar data between units; this enables a second, repeater display to be used to view and control the chart or radar. The display unit can also receive external signals to drive various features, such as the North Up mode and waypoint display. These signals can be received from equipment such as nav aids, fluxgate (compass) sensors, and SeaTalk data networks. The display unit can also transmit data.

Note: External equipment cannot be powered from the display's SeaTalk interface.

The display can communicate with other units connected via any of the following three data standards:

- **HSB™:** High Speed Bus
An In/Out connector, for an HSB series repeater or radar display.
- **SeaTalk®:** Raytheon's own SeaTalk standard
An In/Out connector, normally used to transfer navigation and MOB data. Also used for heading data (if not provided via NMEA). This connection is necessary for full functionality between HSB series displays.
- **NMEA 0183:** the National Marine Electronics Association (NMEA) 0183 interconnection standard, Version 2.3 April 1998. NMEA inputs are compatible with earlier versions of NMEA.
Two NMEA/Power input connectors, normally used for non-SeaTalk Compass (heading) data. Also used for navigation data (if not provided via SeaTalk).
An NMEA Out connector, used to transmit navigation data.

A junction box is available to attach a SeaTalk GPS (or any other SeaTalk instrument). This junction box enables the SeaTalk bus and power to be connected to the GPS.

Data Conversion

The HSB Series displays convert some information across the communications links as follows:

- | | | |
|---------|----|-------------------------|
| NMEA In | to | NMEA Out and
SeaTalk |
| SeaTalk | to | NMEA Out |

This enables data received by the display to be passed to other instruments. For example, if you have a master and a repeater display,

you only need to connect NMEA In to the master display, which will pass the data to the repeater via SeaTalk.

Note: To transfer NMEA data, the display must be powered ON.

The following paragraphs describe these data standards and define the data that is transferred. The diagrams on the following pages show examples of integrated systems: the first includes SeaTalk instruments and an HSB repeater display; the second example shows NMEA instruments and an HSB repeater display.

Data Standards

HSB

The High Speed Bus (HSB) provides extremely rapid transfer of data between master and repeater displays. Any two devices that conform to the HSB standard can be inter-connected. With an HSB and a SeaTalk connection most data available can be controlled and displayed by either unit (Guard zones cannot be viewed or controlled on the chartplotter display, nor on a repeater display that is not directly connected to a scanner. Likewise, radar timed transmission is not available on a repeater display).

For example, you could connect an HSB Radar display and an HSB Chartplotter display, to enable you to display and control both radar and chart data on either or both displays. The HSB series displays allow you to select either type of data for display, or display both types at the same time, in half-screen windows.

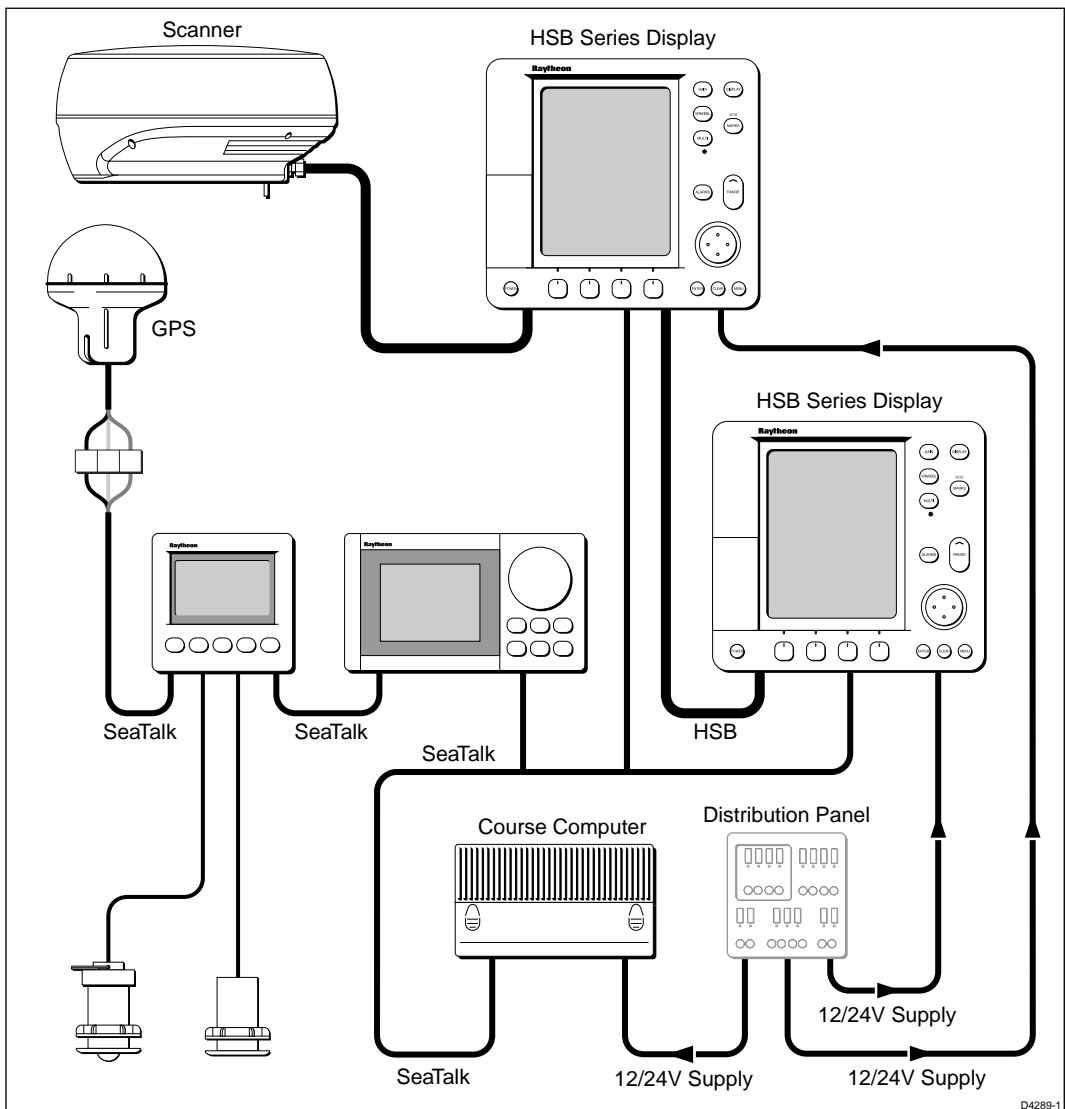
When two displays are used, the following functionality will be obtained at each display (assuming a radar scanner is connected to Display 1)

Scanner Connected	Display 1		Display 2	
	Type	Functionality	Type	Functionality
No	RC520	Chart master	RL70	Chart repeater
No	RC520	Chart master Chart repeater (disp.2)	RC520 or RL70RC	Chart master Chart repeater (disp.1)
Display 1	RL70RC	Radar master Chart master	RL70	Radar repeater Chart repeater
Display 1	RL70RC	Radar master Chart master Chart repeater (disp.2)	RC520 or RL70RC	Chart master Chart repeater (disp. 1)
Display 1	RL70	Radar master	RL70	Radar repeater
Display 1	RL70	Radar master Chart repeater	RC520 or RL70RC	Chart master Radar repeater

SeaTalk

The SeaTalk standard was originally developed by Autohelm (part of the Raytheon group), and allows compatible instruments to be connected by a single cable carrying power and data in/out. This means that additional instruments and functions can be added to a SeaTalk system, simply by plugging them into the network.

SeaTalk is a precise, high-speed, bi-directional protocol which is flexible enough to adapt to any number of instrument heads, without a central processor. SeaTalk equipment can also communicate with non-SeaTalk equipment via the NMEA standard.



Integrated System with Repeater Display and SeaTalk Instruments

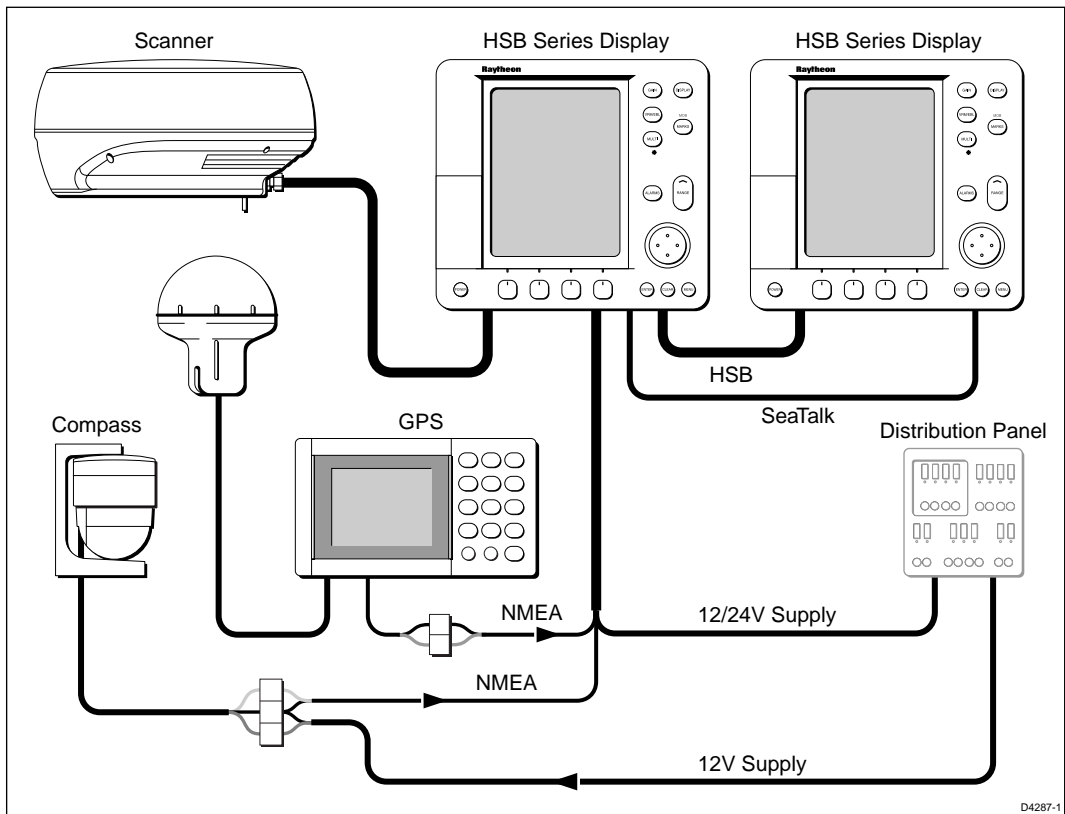
Data Standards

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NMEA

The NMEA 0183 Data Interface Standard was developed by the National Marine Electronics Association of America. It is an international standard that enables equipment from many different manufacturers to be connected together and to share information.

The information is passed in “sentences”, each of which has a three-letter sentence identifier. When you check to see if one piece of equipment will “talk” to another, make sure that the two pieces of equipment both use the same sentence identifiers. For example: VTG carries Course and Speed Over Ground data; GLL carries latitude and longitude; DBT carries water depth; MWV carries relative wind angle and wind speed data.



Integrated System with Repeater Display and NMEA Instruments

The NMEA 0183 standard carries similar information to SeaTalk. However, it has the important difference that one cable will only carry information in one direction. For this reason NMEA 0183 is generally used to connect a data receiver and a transmitter together: for example, a compass sensor transmitting heading to a radar, or a GPS sensor (or Chart Plotter) transmitting position and navigation data to a radar.

SeaTalk and NMEA Data Received and Transmitted

The following table provides information on the sources and priorities of navigation data displayed by the HSB series chartplotter display unit.

Data Received	SeaTalk Input Priority	NMEA Source
Position (LAT/LON)	✓	GGA RMC RMA GLL
Position (Loran C TD's)	—	GLC GTD RMA
Speed Over Ground and Course Over Ground	✓	RMC RMA VTG
Waypoint Identifier	✓	RMB APB BWC BWR
Bearing to Waypoint	✓	RMB BWC BWR
Distance to Waypoint	✓	RMB BWC BWR
Cross Track Error (XTE)	✓	RMB APB XTE
Depth	✓	DBT DPT
Apparent Wind Angle and Speed	✓	MWV
Boat Speed Through Water	✓	VHW
Total Log and Trip Log	✓	VLW
Water Temperature	✓	MTW
Average Boat Speed through the Water	✓	—
Heading	✗	HDG HDM HDT VHW
Locked Heading	✓	—
Magnetic Variation	✓	RMC RMA HDG
Rudder Angle	✓	—
Time	✓	ZDA GGA RMC GLL BWC BWR
Date	✓	ZDA RMC
MOB data	✓	—
Cursor Position	✓	—
Autopilot Status	✓	—

* If Magnetic Heading is not available, the True Heading and Variation (if available) are used to generate the magnetic heading.

The HSB series chartplotter display unit transmits the following data, if available, on **either** SeaTalk **or** NMEA Out:

Data Output	SeaTalk	NMEA
Position	✓	GGA GLL RMC
Speed Over Ground and Course Over Ground	✓	RMC VTG
Waypoint Identifier	✓	APB BWC RMB
Bearing to Waypoint	✓	APB BWC RMB
Distance to Waypoint	✓	BWC RMB
Cross Track Error (XTE)	✓	APC RMB
Depth	✓	—
Apparent Wind Angle and Speed	✓	—
Boat Speed Through Water	✓	—
Total Log and Trip Log	✓	—
Water Temperature	✓	—
Heading	✓	—
Magnetic Variation	✓	—
Time	✓	BWC GGA GLL RMC ZDA
Date	✓	RMC ZDA
MOB data	✓	—
Cursor Position	✓	—
EBL/VRM Positions	—	—
Heading mode	—	—
Radar display range	—	—

6.5 Cable Runs

You need to consider the following before installing the system cables:

- You need to fit the power cable. Additional cables will be required if you are installing an integrated system.
- All cables should be adequately cleated and protected from physical damage and exposure to heat - avoid running cables through bilges or doorways, or close to moving or hot objects.
- Where a cable passes through an exposed bulkhead or deckhead, a watertight gland or *swan neck* tube should be provided.

You need to run the following cables:

- **Power/NMEA Input cable**, supplied with the display unit. This has a connector plug at one end for connecting to the display unit, and 7 cores at the other for connecting the power supply and (optionally) NMEA inputs (see Section 6.7).
- **HSB Cable**, optional
- **SeaTalk cable**, optional, with SeaTalk connector(s) at one or both ends.
- **NMEA Output cable**, optional, with a NMEA OUT connector at one end only.

Power Cable

The HSB series display is intended for use on ships' DC power systems operating in the 10.7 to 32VDC range (that is, 12V and 24V systems, not 32V systems). A 1.5m (5ft) power cable is supplied for connecting the ship's DC power to the radar.

If a longer power cable run is required, use the supplied power cable to connect to the display unit. Then use a suitable connector block to connect the free end to the extension cable. The supplied power cable has a cross-section of 2.0mm².

Note: For vessels with 24V power systems, the power cable may be extended by up to 20m using a wire gauge of 1.5mm² (AWG 16) or greater.

For vessels with 12V power systems, longer power cable runs may require larger wire gauges to minimise any voltage drop in the cable. In order to determine the correct supply cable size if the power cable must be extended, estimate the length of cable between the ship's main

power source and the connector block, and then select the wire size indicated by the distance following table.

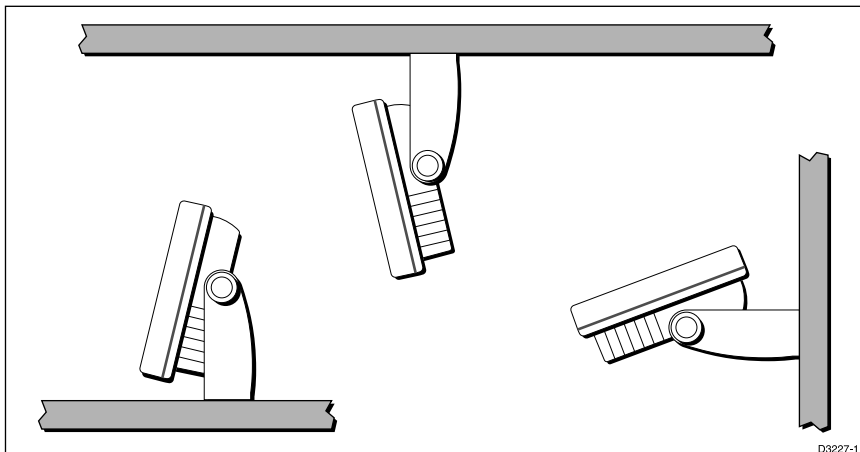
Maximum Extension Power Cable Lengths (m), 12V Systems						
Inter-Unit Cable(s)	Power Cable Core					
	mm ² : 1.5	2.0	2.5	4.0	6.0	10.0
	AWG: 16	15	14	12	10	8
Maximum extension	11.0	15.0	20.0	30.0	45.0	70.0

6.6 Mounting the Display Unit

The display unit can be mounted using the trunnion (yoke) bracket already fitted, or console mounted using the optional flush-mounting kit (see section 6.2).

Trunnion (Yoke) Mounting

The display unit can be conveniently mounted on a dash area, chart table, bulkhead or deckhead, as shown in the following diagram.



1. Loosen the trunnion knobs and remove the trunnion from the display 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 display unit to the trunnion, adjust the display angle and tighten the knobs.

Console Mounting

The display unit can be console mounted if required, using the optional flush-mounting kit (M92708).

CAUTION:

Make sure there are no hidden electrical wires or other items behind the location before proceeding. Make sure there is sufficient rear access for mounting and cabling.

1. Check the selected location for the unit. A clear, flat area at least 230mm (9in) wide by 210mm (8¼in) high, with at least 152mm (6in) of clearance behind the panel, is required.
2. Unpack the flush-mounting kit.
3. Using the supplied template, trace out the display unit opening.
4. Drill a 12.7mm (½in) pilot hole in each opposing corner of the cut-out area.
5. Using a suitable saw, cut along the inside edge of the cut-out line.
6. Remove the trunnion (yoke) knobs and bracket from the display unit. Make sure that the unit fits in the cut-out area.
- 6a. If the optional screw fitting is required, drill four 5mm holes as indicated on the template.
Screw the studs into the holes provided at the rear of the display.
7. Connect the DC power cable, and any other accessory cables to the display avoiding tight bends in the cables.
8. Place the gasket on the unit and slide the unit into the panel cut-out.
9. Use the supplied kit to secure the unit to the console.
- 9a. Alternatively, fit a spacer over each of the four studs and secure with the thumb nuts.

6.8 HSB Series System Connections

Grounding the Chartplotter

It is important that an effective RF ground is connected to the chartplotter. You must ground the system by connecting the drain wire (screen) of the Power/NMEA Input cable to the nearest ground point of the ship's RF ground system.

If you need to extend the wire, the extension wire should be an 8mm braid or 6.0mm² (AWG 10) multi-stranded cable.

If your vessel does not have an RF system, connect the drain wire to the nearest suitable ground point

DC Power Connection

The HSB series display is intended for use on ships' DC power systems operating in the 10.7 to 32VDC range (12V and 24V systems, not 32V systems). The connections should be made at a DC power distribution panel, through an isolation switch or circuit breaker that is fused or trips at not greater than 10A. Check that all connection terminals are clean.

The DC system should be either:

- Negative grounded, with the negative battery terminal connected to the ships ground.
- Floating, with neither battery terminal connected to the ships ground.

CAUTION:

If you do not have a breaker in your power circuit, you must fit an in-line 6.3A quick-blow fuse to the positive (red) lead of the power cable.

This unit is not intended for use on "positive" ground vessels.

The power cable Earth screen connections must be connected to the ship's ground.

Power for External Equipment

External equipment cannot be powered from the display's SeaTalk interface.

It must be powered from the ship's supply or via a SeaTalk bus.

For systems where the ship's power source is 24V only, you may need to install a 24V to 12V DC converter. This is only necessary if the products being connected to the display are:

- SeaTalk compatible (for example, compass, GPS and instruments), and there is no existing SeaTalk bus
- NMEA compatible, but operate only from 12V (for example, compass, GPS and some navigators)

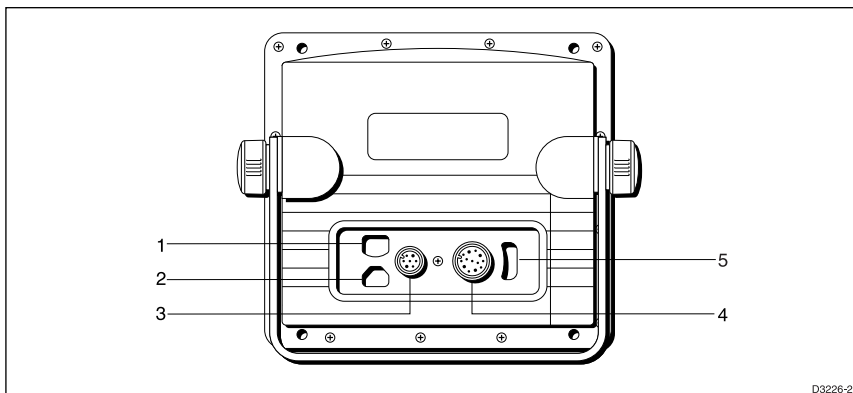
The DC~DC converter must conform to the following specification:

Input	21 to 32 V DC
Output	13.6V DC, isolated
Load	Continuous current rating, in excess of load (see Appendix A: Specification)

Display Unit Connections

The rear of the HSB Series display provides the following connection sockets:

- **HSB**, for connecting to another HSB Series display (such as a radar or second chartplotter display)
- **SeaTalk**, for SeaTalk data input and output and connecting to another HSB Series display (such as a radar or second chartplotter display)
- **NMEA Output**
- **Power/NMEA Input**, for 12V or 24V DC power connection and two NMEA 0183 inputs
- **Scanner** connection, this is only used if you have a combined Pathfinder radar/chartplotter



1 NMEA Output 2 HSB 3 Power and NMEA Input 4 Scanner 5 SeaTalk

The following sections detail the Display Unit connectors.

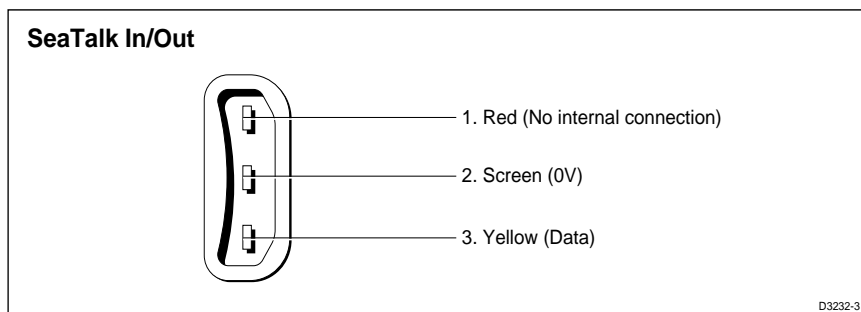
HSB Connection

You can connect any two HSB displays, using an HSB cable connected between their HSB connectors on the rear of each display unit.

Note: The HSB cables are fitted with ferrite clamps at each end to ensure EMC conformance.

SeaTalk Connection

The SeaTalk input/output should be connected at the rear SeaTalk 3-pin connector. This appears as follows, when viewed from outside:



The pin functions are as follows:

Pin No.	Function	Colour
1	+12V	Red
2	0V	Screen
3	Data	Yellow

Note: If you use the SeaTalk connector, you must fit a ferrite (part number R55007) to the cable for EMC CE conformance. The ferrite must be clipped to the cable as close to the connector as possible.

Note: The display unit does not supply 12V via the SeaTalk connector. A separate power connection to your SeaTalk unit is required (except where SeaTalk is connected only between two HSB displays).

SeaTalk data, if present, is the primary source for all navigational data except the heading (see Section 6.4).

Note: If you are connecting an active compass to the chartplotter, you should use an NMEA input channel (see *Power and NMEA Input Connection* below) rather than the SeaTalk interface, unless the compass is connected via a SeaTalk bus.

To connect the display unit to the SeaTalk bus, connect a standard SeaTalk cable between the SeaTalk connector on the rear of the display and a SeaTalk instrument or the SeaTalk bus.

Standard SeaTalk cables are available in a range of lengths (part numbers W284 to W287), and cables for connecting to older SeaTalk units are also available (part numbers D187 or D188).

NMEA Output to External Nav aids

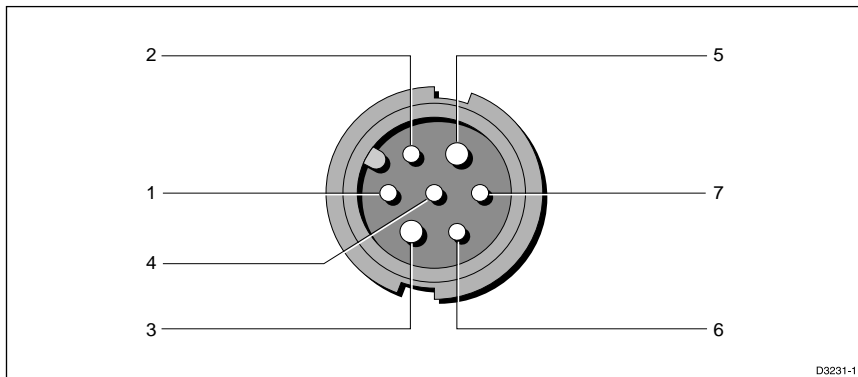
The NMEA Output cable should be connected to the upper, left connector on the rear of the display unit.

Note: The NMEA Output cable is fitted with a ferrite clamp to ensure EMC conformance.

Note: The display unit does not supply power via the connector. A separate power connection to your NMEA units is required.

Power and NMEA Input Connection

The DC power and NMEA input should be connected at the rear Power/ NMEA J5 seven-pin connector. The connector (viewed from the outside) and pin functions are shown in the following diagram and table.



Pin No.	Function	Colour
1	Channel 1 NMEA data input (+ve)	Orange
2	Channel 1 NMEA return (-ve)	Yellow
3	Battery negative	Black
4	Screen (drain wire)	No insulation
5	Battery positive (10.7 - 32 VDC)	Red
6	Channel 2 NMEA data input (+ve)	Green
7	Channel 2 NMEA return (-ve)	Blue

Note: The power cable is fitted with a ferrite clamp to ensure EMC conformance.

Power Connection

The RED wire must be connected to the feed from the positive (+) battery terminal and the BLACK wire to the feed from the negative (-) battery terminal. The shielded wire should be connected to the ship's RF ground as previously described in *Grounding the Chartplotter*.

Any unused cores should be insulated and taped back.

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.

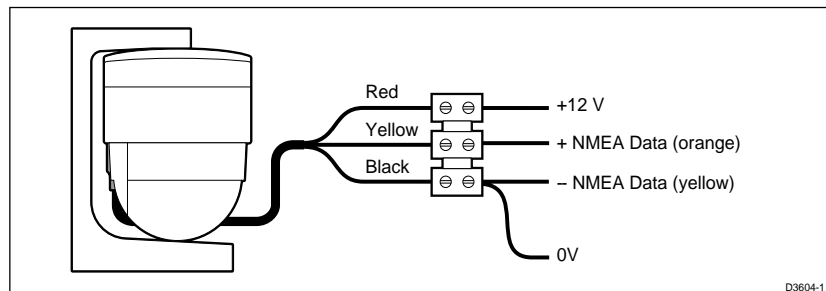
NMEA Connection

An NMEA interface is typically used to connect a non-SeaTalk compass or GPS system to the chartplotter.

Connect the input(s) to the orange and yellow cores (Channel 1) and/or the green and blue cores (Channel 2).

Note: Nav aids cannot be powered from the radar.

For example, to connect a Raytheon Heading Sensor to the NMEA Channel 1 input, connect the cables and power supply using a suitable connector block, as shown in the diagram below. If fitted, it may be convenient to connect the power to the Seataalk junction box described below.



Using the SeaTalk Auxiliary Junction Box to Connect a SeaTalk GPS

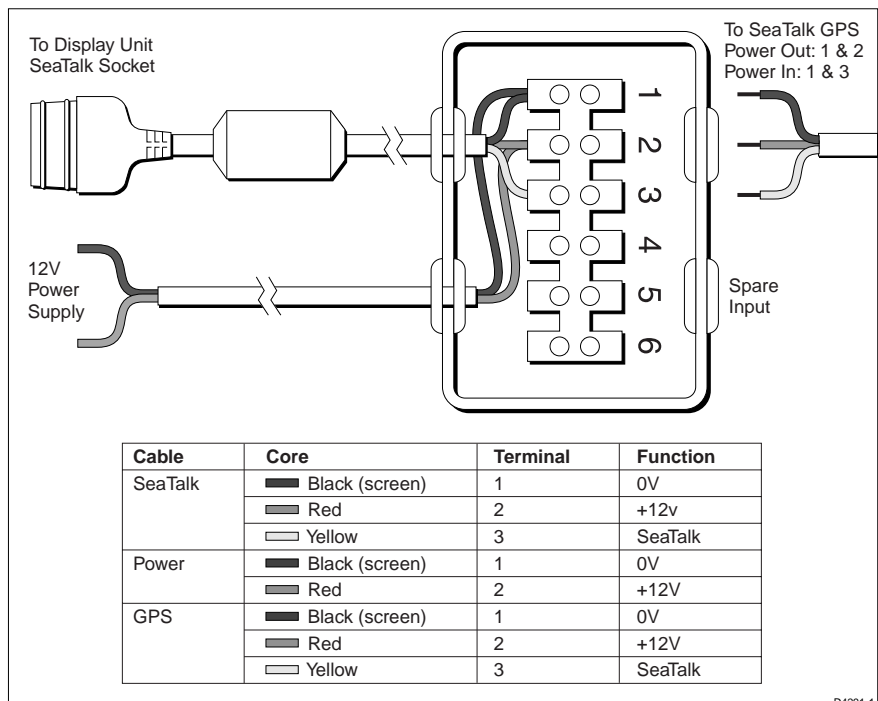
A junction box (provided with the RL70RC, optional with the RL70) is used to connect the SeaTalk GPS system (or any other SeaTalk instrument) to the HSB Series display unit. This junction box enables the SeaTalk bus, power and GPS to be connected.

If power is not already available (via another SeaTalk instrument), the junction box can be used to apply power to the Seataalk bus for other applications. The junction box may also be used for other purposes, e.g. supplying power to a flux gate compass and routing the compass data to the HSB series display NMEA In connection, or alternatively, for connecting a NMEA GPS system.

The junction box includes:

- Seataalk cable and connector to attach to display unit
- Power Cable to connect to 12V power (if required)
- Input connections to connect SeaTalk cable from external equipment
- Spare connections for another instrument

The illustration below shows how to connect the junction box:



Using the SeaTalk Auxiliary Junction Box

6.8 System Check and Initial Switch On

Once you have installed your Chartplotter and made all the connections, you need to check your installation before using the system for navigation. If you encounter any problems, refer to Chapter 7.

You may wish to read Chapters 2, 3 and 4, and familiarise yourself with the operation of the Chartplotter, before performing the initial set up.

System Check

Before performing the functional test, check the following:

- All securing bolts are fully tightened and mechanical locking arrangements as specified are in place
- 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, ask your authorised installation dealer to check the installation before going to sea.

Initial Switch On

To switch on the display unit, press and hold the **POWER** key until the unit beeps.

If the display switches on in Radar (following a magnetron warm-up sequence) or Data Log mode, press **DISPLAY** to show the Display pop-up. Press **DISPLAY** again, as necessary, to select Chart mode, then press **ENTER**.

If necessary, adjust the lighting and contrast (see Section 2.2).

If required, change the default language settings as follows:

1. Press the **MENU** key to display the setup soft key labels.



2. Press the **SYSTEM SET UP** soft key.
The **SYSTEM SET UP** menu is displayed, listing the parameters and their current settings. The complete list, which you can scroll down, is shown in the following illustration.

SYSTEM SET UP MENU	
DATA BOXES	
BEARING MODE	TRUE
CURSOR REFERENCE	RELATIVE
CURSOR READOUT	RNG/BRG
DAY/NIGHT	RNG/BRG
HELP	ON
SOFT KEYS	ON
KEY BEEP	ON
MOB DATA	DR
MENU TIMEOUT PERIOD	NO TIMEOUT
DISTANCE UNITS	NAUTICAL MILES
SPEED UNITS	KNOTS
DEPTH UNITS	METRES <input type="checkbox"/>
TEMPERATURE UNITS	CENTIGRADE
VARIATION SOURCE	AUTOMATIC
CURSOR ECHO	
DATE FORMAT	DD/MM/YY
TIME FORMAT	24 HOUR
TIME OFFSET	UTC
LANGUAGE	ENGLISH (UK)
HSB STATUS	NOT CONNECTED
SIMULATOR	OFF

D3850-2

3. Use the trackpad to move the selection bar down to the LANGUAGE option. The soft key labels are updated.
4. Use the soft keys to highlight the required language.
5. Press **ENTER** to return to the setup soft key labels.
6. Press **CLEAR** to return to the normal chart screen.

Checking the Chartplotter Operation

To confirm your chartplotter is operating correctly, perform the following checks:

1. Without a chart card fitted, verify that the world map is visible. Press the trackpad left/right, up/down and check cursor movement and normal scrolling action.
2. Insert a chart cartridge for the area of your vessel. Use the RANGE key to zoom-in to check that the new chart cartridge is being displayed.
3. Ensure that position data is available at the display via NMEA or SeaTalk. Check the cursor is fixed on the vessel symbol which is correctly positioned at the centre of the chart display.



Chapter 7: Maintenance and Problem Solving

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

7.1 Maintenance

Warnings



The chartplotter display unit contains **high voltage**. Adjustments require specialised service procedures and tools only available to qualified service technicians - there are no user serviceable parts or adjustments and **the operator should not attempt to service the equipment**. The operator should not remove the rear cover of the display or any internal covers in the scanner.

Always turn the radar system off before carrying out any routine maintenance on the scanner or nearby equipment.

Routine Checks

The Chartplotter display is a sealed unit. Maintenance procedures are therefore limited to the following periodical checks:

- Wipe the display clean with a damp cloth.
- Examine the cables for signs of damage, such as chafing, cuts or nicks
- Check that the cable connectors are firmly attached

EMC Servicing and Safety Guidelines

- Raytheon equipment should be serviced only by authorised Raytheon service engineers. They will ensure that service procedures and replacement parts used will not adversely affect performance. There are no user serviceable parts in any Raytheon product.
- High voltages are generated in the display unit. 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 will use any such information to improve our quality standards.

7.2 Resetting the System

There are three types of reset available for the HSB Series Chartplotter:

- **Factory Reset:** This resets all values back to their original factory settings.

CAUTION:

The factory reset clears the Waypoint and Route databases.

- **Power-On Reset:** When you turn the display off and on again, the screen reverts to the chart picture with all windows cleared.
- **Chart Picture Reset:** Press and hold the **DISPLAY** key for two seconds to return the screen to the full-screen chart picture with all windows and grouped data boxes cleared.

At power-on, the last-used values are retained for all the options, except for those listed in the following table which are reset to the factory default each time.

Item	Power-on setting
Heading Mode	North Up
Alarm	ON, with last-used value
Zoom	OFF
Windows	OFF
Contrast Level	Within 30-70% range, if last-used value outside this range
Backlight Level	ON at 42% if previously selected

► To perform a factory reset:

1. Press **MENU**.
2. Press the SYSTEM SET UP soft key to display the System Set Up page (see Chapter 5 for details).
3. Press and hold **MENU** for 5 seconds.

A countdown timer is displayed. If you release the **MENU** key before the timer reaches zero, the reset is not performed.

When the reset request has been accepted, the chartplotter re-starts.

The factory default settings are listed in Chapter 5.

7.3 Problem Solving

Prior to packing and shipping, all Raytheon products are 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 table, contact your local dealer, national distributor or Raytheon Product Support Department for further advice.

Always quote the product serial number. The display unit serial number is printed on the back of the unit.

Common Problems and Their Solutions

Problem	Correction
Display does not function.	<ol style="list-style-type: none"> 1. Make sure that the power supply cable is sound and that all connections are tight and free from corrosion. 2. Check the fuse.

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 in this manual on page 2). 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 via the Internet at:

rmc_tech_raytheon@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 timesaving 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 or Eastern Daylight Savings 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 Marine in Europe

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

Raytheon Marine Company
Anchorage Park, Portsmouth
PO3 5TD, England
Tel (01705) 693611
Fax (01705) 694642

Our technical support staff may also be reached via the Internet. Questions may be addressed directly to:

techsupra@raytheon.com.

Or visit the Raytheon Electronics World Wide Web site:

www.raymarine.com

Technical Support

The Customer Services Department handles enquiries concerning installation, operation, fault diagnosis and repair.

Accessories and Parts

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

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

Worldwide Support

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



Appendix A: Specification

HSB Series 7" LCD Displays

General

Approvals	
CE - conforms to	89/336/EEC (EMC). EN 60945:1997
FCC - conforms to	Part 80 (47CFR) and Part 2 (47CFR)
Size	222 x 204 x 75 mm (8.8" x 8" x 3"), excluding bracket
Weight	1.2Kg (2.6lbs)
Mounting	Trunnion with panel mount option
Power	External 10.7 - 32V DC required 10W consumption with full backlighting Floating earth/fully isolated
Environmental	Waterproof to CFR46; suitable for external mounting EMC in accordance with BS EN 60945 Temperature range: -10°C to +70°C Humidity limit: up to 95% at 35°C
Controls	11 defined keys, 4 soft keys and trackpad
Cursor	Context sensitive, provides range/bearing or Lat/Lon
Display Type	7" Film Super Twist Neumatic -(FSTN) LCD, monochrome with 4 grey scales
Resolution	320 x 240 (¼VGA) portrait
Display Size	7" diagonal (143 x 111mm)
LCD Contrast	64 levels, front panel operation
Illumination	Screen: 8 levels of backlighting Keypad: 3 levels of backlighting
Languages	UK English, US English, Danish, French, German, Dutch, Italian, Norwegian, Portugese, Spanish, Swedish, Finnish
Connectors	13 pin scanner 3 pin HSB input/output 3 pin SeaTalk input/output 7 pin power plus 2 NMEA input channels 4 pin NMEA output
Interfaces	1 x SeaTalk, receive and transmit 1 x HSB, receive and transmit 2 x NMEA 0183, receive 1 x NMEA 0183, transmit C-MAP cartridge reader - 2 slots (RL70RC, R520)
Man Overboard (MOB Mode)	Mark placed with course line; readout shows range, bearing, Lat/Lon of MOB and time elapsed since MOB

Screen Functions	Full, half and quarter screens available dependant on function
Data Boxes	Up to six user selectable information boxes

Chartplotter Features

Cartography	C-MAP® NT micro cartridges available from C-MAP® Chart of the world built in
Display Windows	Chart, data, BDI, CDI, Navdata
Chart Scaling	1/64nm (if cartographic data is available) to 4000nm
Presentation Modes Course up	North up (selectable True or Magnetic) Head up or Course up
Waypoints	1000 waypoints entered via cursor, Lat/Lon, range and bearing from present position or at vessels position. 16 character name can be assigned
Waypoint Transfer	HSB, current route via Seataalk, NMEA
Routes	A route plan may contain up to 50 waypoints. Up to 20 routes can be stored in the units internal memory
Track History	5 tracks with up to 1000 points in each can be stored in the units internal memory
Alarms alarm clock	Programmable arrival, cross track error, anchor drift, position fix/data loss warning, countdown timer and alarm clock
Navigation Information	Own ships position in Lat/Lon, XTE, TTG and SOG/COG selectable. Mileage scale ruler. Bearing and distance to waypoint. Bearing and distance to cursor, Seataalk data (see 'interfacing' section)
Variation Source	Auto (SeaTalk/NMEA/Internal algorithm) or Manual
Chart/Radar Synchronisation	User selectable in split screen mode provided radar data available

Interfacing

High Speed Bus	Fully independant use of remote Chart data if present on HSB. Full remote control and display of Radar data if present on HSB
SeaTalk Input	Depth, Speed Over Ground & Course Over Ground, Position, Waypoint number, range, bearing and time to go, Speed through water, Time, Cross Track Error, Heading, Wind, Date, Log/Trip, Pilot Status, Temperature, Man Overboard, and cursor position
NMEA Input	NMEA 0183 (GLL, GGA, GLC, GTD, VTG, BWC, BWR , RMA, RMB, RMC, XTE, VHW, HDG, HDM, HDT, DBT, DPT and ZDA)
SeaTalk Output	Cursor data, Guard zone alarm and Navigational data bridged from NMEA
NMEA Output	APB, BWC, GGA, GLL, RMB, RMC, VTG, ZDA

Abbreviations

A	Amp
ANSI	American National Standards Institute
AWG	American Wire Gauge
BDI	Bearing Deviation Indicator
Brg	Bearing
CDI	Course Deviation Indicator
CFR	Code of Federal Regulations
COG	Course Over Ground
CTR	Centre
db	deciBels
DC	Direct Current
DR	Dead Reckoning
EBL	Electronic Bearing Line
EMC	Electro Magnetic Compatability
FCC	Federal Communication Commission
FLT	Float - floating EBL/VRM
ft	feet
FTC	Fast Time Constant
GPS, dGPS	Global Positioning System, differential Global Positioning System
GRD	Guard Zone
HDG	Heading
HSB	High Speed Bus
Hz, GHz, MHz	Hertz, GigaHertz, MegaHertz
IEEE	Institute of Electrical & Electronic Engineers
in, "	inch

Kg	kilogram
kW	kilo Watt
lat	latitude
lbs	pounds
LCD	Liquid Crystal Display
lon	longitude
M	Magnetic
m	metres
MBS	Main Bang Suppression
mm	millimetre
MOB	Man OverBoard
MRK	Mark
nm	nautical mile
NMEA	National Marine Electronics Association
POS	Position (of vessel)
RF	Radio Frequency
Rng	Range
rpm	Revolutions Per Minute
SHM	Ships Heading Marker
SOG	Speed Over Ground
T	True
TTG	Time To Go
V	Volts
VMG	Velocity Made Good
VRM	Variable Range Marker
WPT	Waypoint
XTE	Cross Track Error
yds	yards
ZMB	Zoom Box

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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 includes 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
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
Anchorage Park, Portsmouth
PO3 5TD, England

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

Raytheon

Factory Service Center

United States of America

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

UK, Europe, Middle East, Far East

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

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.



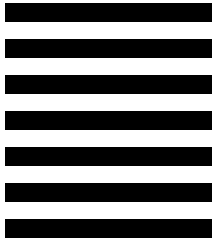
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 369 MANCHESTER NH

POSTAGE WILL BE PAID BY ADDRESSEE

Attn: Warranty Department
Raytheon Marine Company
676 Island Pond Road
Manchester NH 03109-9953
USA



Note: This information is held by Raytheon Marine only and shall not be made available to any other companies. Raytheon Marine may send you mailshots/details of any new products.

Please tick this box if you do not wish to receive any further information from Raytheon Marine.



NO STAMP REQUIRED IF POSTED IN THE UK.

Raytheon Marine Company
Recreational Products
Freepost PT 1127
Portsmouth
PO3 5BR

North and South America

Detach and mail this portion within **48 hours**.

To validate the warranty, the customer or dealer must fill in the requested information below and mail to address shown on front.

Retain other portion for your records.

Stick barcode label here

Purchased from _____

Purchase date _____

Dealer address _____

Installed by _____

Installation date _____

Commissioned by _____

Commissioning date _____

Owner's name _____

Boat's name _____

Mailing address _____

UK, Europe, Middle East and Far East

Detach and mail this portion within **48 hours**.

To validate the warranty, the customer or dealer must fill in the requested information below and mail to address shown on front.

Retain other portion for your records.

Stick barcode label here

Purchased from _____

Purchase date _____

Dealer address _____

Installed by _____

Installation date _____

Commissioned by _____

Commissioning date _____

Owner's name _____

Boat's name _____

Mailing address _____
