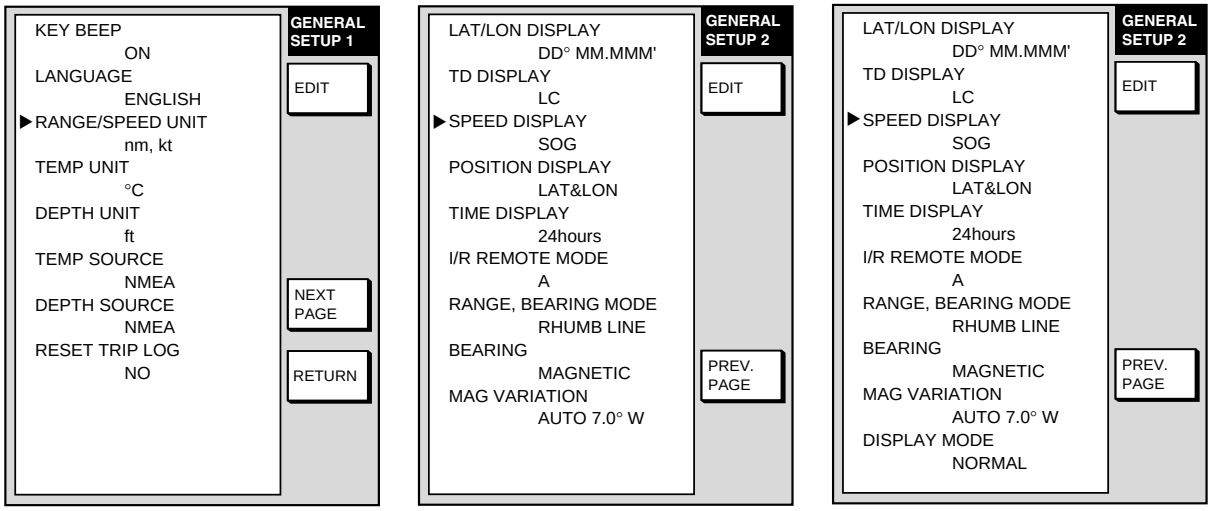
5. CUSTOMIZING YOUR UNIT

This chapter describes the various options which allow you to set up your unit to suit your needs.

5.1 Generic Setup

This paragraph shows you how to set up functions common to the plotter, radar and sounder displays, on the GENERAL SETUP menu, which you may display from any mode. These items include data, position and time formats, units of measurement, data sources, etc.

1. Show the plotter display and press the [MENU] key to display the main menu.
2. Press the SYSTEM CONFIGURATION soft key.
3. Press the GENERAL SETUP soft key.



Page 1 (MODEL-1700C series, MODEL-1700 series)

Page 2 (MODEL-1700C series)

Page 2 (MODEL-1700 series)

General setup menu

4. Press the NEXT PAGE or PREV. PAGE soft key to switch pages if necessary.
5. Use the cursor pad to select item.
6. Press the EDIT soft key.
7. Use the cursor pad to select option desired.
8. Press the RETURN soft key.
9. Press the [MENU] key to close the menu.

Contents of general menu

Item	Description	Settings	Default Settings
Key Beep	Turns key operation beep on/off.	On, Off	On
Language	Chooses menu language.	English, French, German, Italian, Portuguese, Spanish	English
Range/Speed Unit	Chooses unit of range and speed measurement.	nm, kt; km, km/h; sm, mph; nm & yd, kt, nm & m, kt; km & m, km/h, sm & yd, mph	nm, kt
Temp Unit	Chooses unit of water temperature measurement.	°C, °F	°F
Depth Unit	Chooses unit of depth measurement.	ft, m, fa PB (Passi/Braza)	Ft
Temp Source	Chooses source of water temperature data.	ETR (blackbox transducer), NMEA	NMEA
Depth Source	Chooses source of depth data.	ETR, NMEA	NMEA
Reset Trip Log	Resets distance run.	Yes, No	No
Lat&Lon Display	Chooses how many digits (or seconds) to display after decimal point in latitude and longitude position.	DD°MM.MM', DD°MM.MMM', DD°MM.MMMM', DD°MM'SS.S"	DD°MM.MMMM'
TD Display	Chooses TD type.	Loran C, Decca	Loran C
Speed Display	Chooses speed measurement method to use; speed-over-ground or speed-thru-water.	SOG, STW	SOG
Position Display	Shows position in LAT/LON or TD.	LAT/LON, TD	LAT/LON
Time Display	Chooses time notation.	12 hours, 24 hours	24 hours
I/R Remote Mode	Chooses remote controller mode.	A, B, C, D	A
Bearing Mode	A navigation device outputs both true and magnetic bearings. A magnetic bearing is true bearing plus (or minus) earth's magnetic deviation. Thus the equation for finding magnetic bearing is; true bearing ± x (magnetic variation) = magnetic bearing	True, Magnetic	Magnetic
Mag Variation	The magnetic variations for all areas of the earth are preprogrammed into this unit. The preprogrammed variation is accurate for most instances, however you may wish to manually enter a variation. For manual input, select Manual, hit the EDIT soft key, enter value and hit the RETURN soft key to finish.	Auto, Manual	Auto
Display Mode (MODEL-1700 series)	Reverses background (black) and foreground (white) colors.	Normal, Reverse	Normal

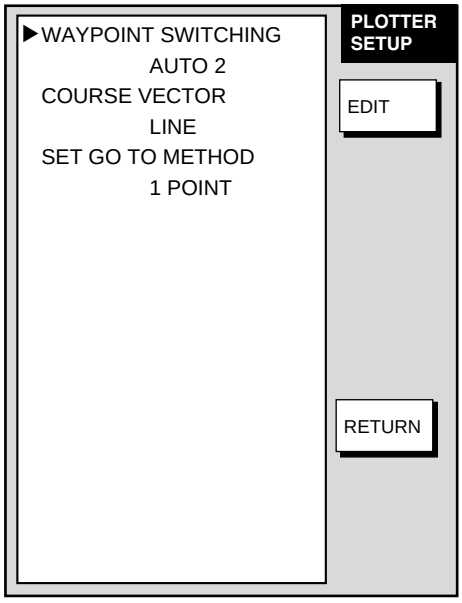
5.2 Plotter Setup

This paragraph provides the information necessary for setting up the plotter display. Be sure to show the plotter display before executing any procedure.

5.2.1 Navigation options

Navigation options, for example, waypoint switching method, may be set on the plotter setup menu.

1. Show the plotter display and press the [MENU] key open the main menu.
2. Press the PLOTTER SETUP soft key.



Display option menu

Contents of display option menu

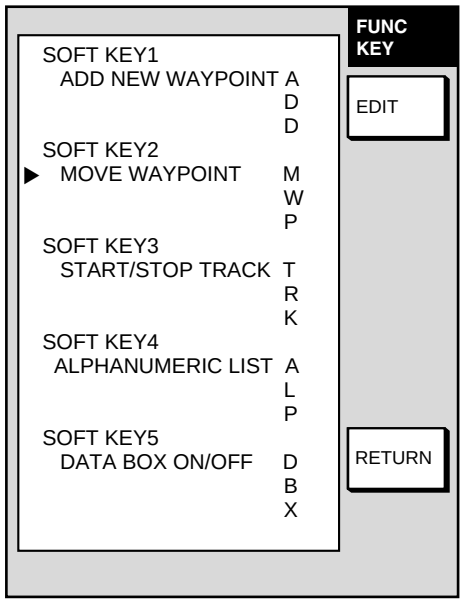
Item	Description	Settings	Default Setting
Waypoints Switching	Chooses waypoint switching method. See “switching waypoints” on page 2-28.	Auto 1, Auto 2, Manual	Auto
Course Vector	You may extend a line from the own ship position to show ship’s course. It may be a vector (length depends on ship’s speed) or a simple line (course bar)	Line, Vector, Off	Line
Set Go to Method	Sets the method by which to navigate to a quick point. See paragraph “2.12.1 Navigating to a quick point.”	1 Point, 35 Points, 35 Points & Port Service	1 Point

5.2.2 Soft key setup

The soft keys, shown when the soft keys are turned off, provide one-touch call up of a desired function.

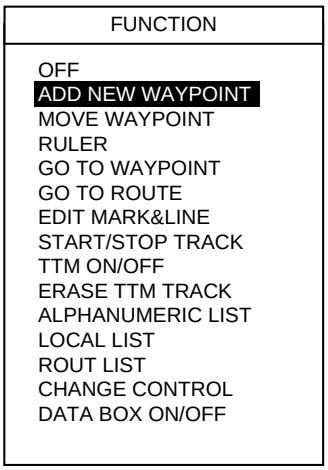
If the above settings are not to your liking you may change them as follows:

1. Press the [MENU] key.
2. Press the SOFT KEY SETUP soft key.



Soft key setup menu (plotter)

3. Select the function key (soft key) you want to program and press the EDIT soft key. A menu shows the functions available and the current selection is highlighted.



Soft key menu (plotter)

4. Select function desired and press the ENTER soft key or the [ENTER] knob. See the table below for description of each function.
5. Press the [MENU] key to close the menu.

Plotter soft keys

Function	Action	Function Key Label
NO FUNCTION	Assigns no function.	
ADD NEW WAYPOINT	Enters new waypoint, at cursor position.	ADD
MOVE WAYPOINT	Moves selected waypoint to different position.	MWP
RULER	Measures range and bearing between two targets.	RUL
GO TO WAYPOINT	Specify waypoint to set as destination.	GTW
GO TO ROUTE	Specify route to follow.	GRT
EDIT MARK & LINE	Displays mark & line menu.	EML
START/STOP TRACK	Starts/stops recording of own ship track.	TRK
TTM ON/OFF	Turns TTM (target track) display on/off.	TTM
ERASE TTM TRACK	Erases TTM track.	ETT
ALPHANUMERIC LIST	Displays waypoint alphanumeric list.	ALP
LOCAL LIST	Displays waypoint local list.	LCL
ROUTE LIST	Displays route list.	RTE
CHANGE CONTROL	Changes control in combination screen.	CHG
DATA BOX ON/OFF	Shows/hides data boxes.	DBX

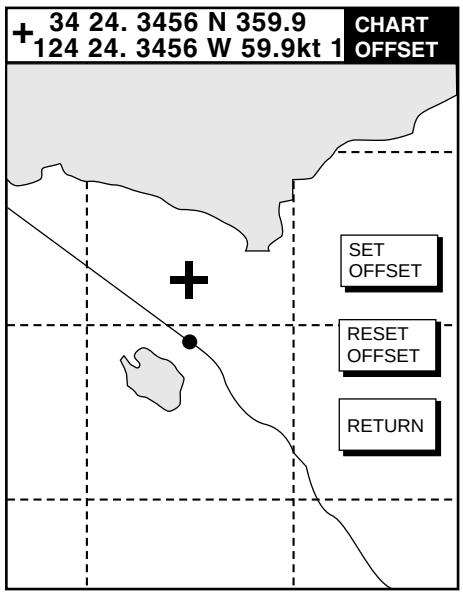
5.3 Chart Setup

This paragraph shows you how to setup digital charts, from offsetting chart position to turning chart attributes on or off.

5.3.1 Chart offset

In some instances position may be off by a few minutes. For example, the position of the ship is shown to be at sea while it is in fact moored at a pier. You can compensate for this error by offsetting chart position as shown in the procedure below. You can execute the procedure from any display mode.

1. Show the plotter display and press the [MENU] key followed by the CHART SETUP and CHART OFFSET soft keys.



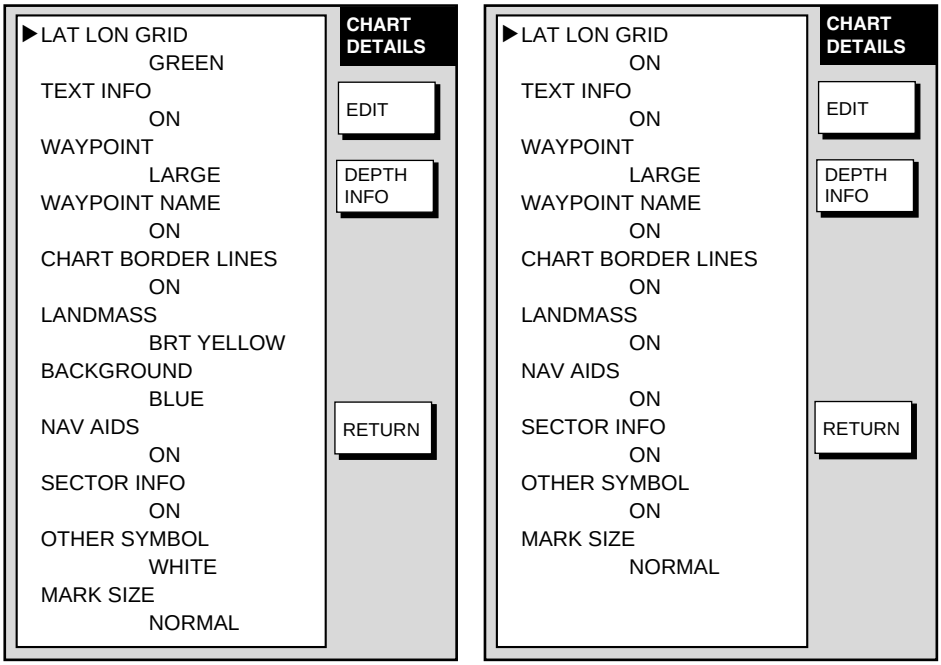
Plotter display, chart offset selected

2. Use the Omnipad to place the cursor at correct latitude and longitude position.
3. Press the SET OFFSET soft key.
4. Press the RETURN soft key to finish.
5. Press the [MENU] key to close the menu.

To cancel chart offset, press the RESET OFFSET soft key at step 3 in the above procedure.

5.3.2 FURUNO, Nav-Charts™ chart attributes

Charts attributes may be turned on or off from the chart details menu, which you may display pressing the [MENU] key followed by the CHART SETUP and CHART DETAILS soft keys.



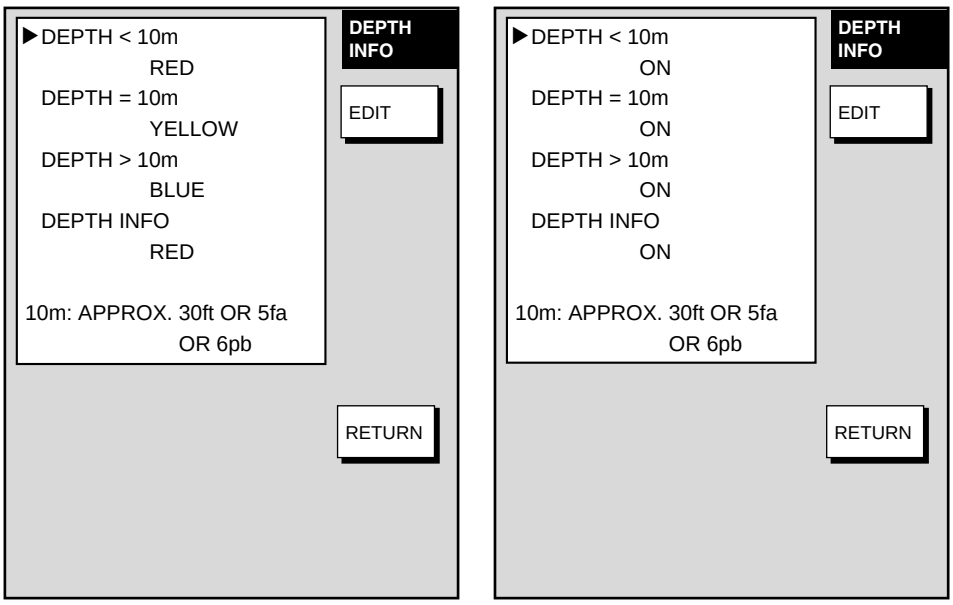
MODEL-1700C series MODEL-1700 series

Chart details menu (FURUNO, Nav-Charts™)

Contents of chart details menu

Item	Description	Settings, Default Setting		Settings, Default Setting	
		MODEL-1700C series		MODEL-1700 series	
Lat&Lon Grid	Latitude and longitude grids	On: Red, yellow, green, light-blue, purple, blue, white. Off	On, Green	On, Off	On
Text Info	Geographic place, name	On, Off	On	On, Off	On
Waypoint	Waypoint size	Large, Small, Off	Large	Large, Small, Off	Large
Waypoint Name	Waypoint name	On, Off	On	On, Off	On
Index	Chart indices	On, Off	On	On, Off	On
Landmass	Landmass brilliance	Brt, Dim: Red, yellow, green, light-blue, purple, blue, white. Off	Brt, Yellow	Brt, Dim, Off	Brt
Background	Chart background color	Blue, Black	Black	Not shown on GD-1700C.	
Nav Aids	Navaid data on Nav-Charts™; lighthouse data on FURUNO charts	On, Off	On	On, Off	On
Sector Info	Lighthouse viewing sector on FURUNO charts	On, Off	On	On, Off	On
Other Symbol	Other map symbols	On: Red, yellow, green, light-blue, purple, blue, white. Off	On, White	On, Off	On
Mark Size	Mark size	Normal, Small	Normal	Normal, Small	Normal
Depth Info (soft key) (Depth contours for depths at right)*	< 10 m	On, Off	On, Red	On, Off	On
	10 m	On, Off	On, Yellow	On, Off	On
	> 10 m	On, Off	On, Blue	On, Off	On
	Depth Info	On, Off	On	On, Off	On

***** = Depth contour for MODEL-1700C series available in, red, yellow, green, light-blue, purple, blue, and white.



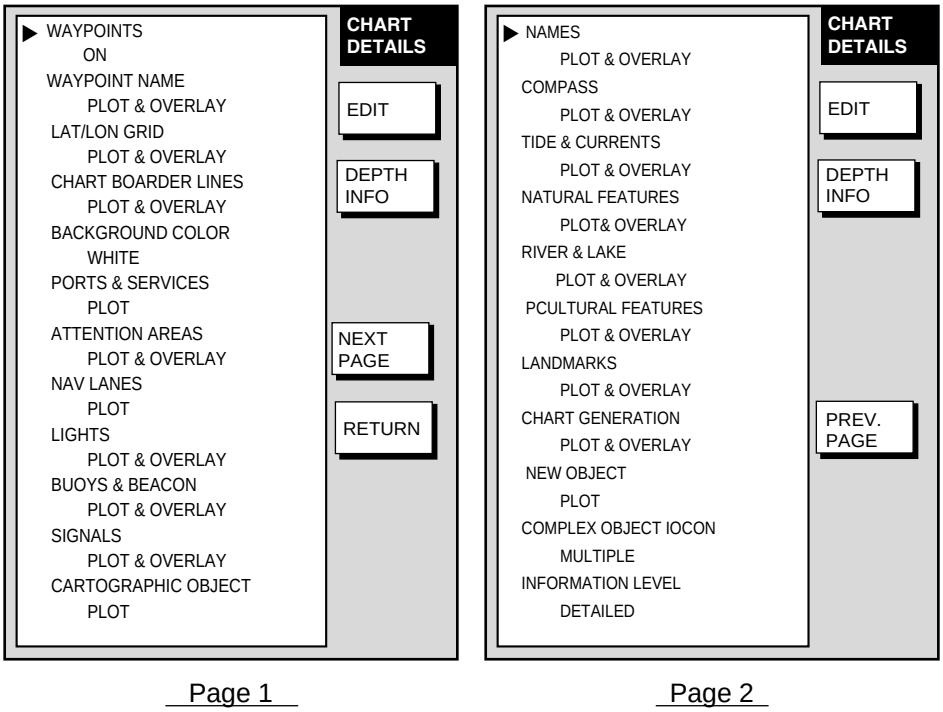
MODEL-1700C series MODEL-1700 series

Depth info menu (FURUNO, Nav-Charts™)

5.3.3 C-MAP chart attributes

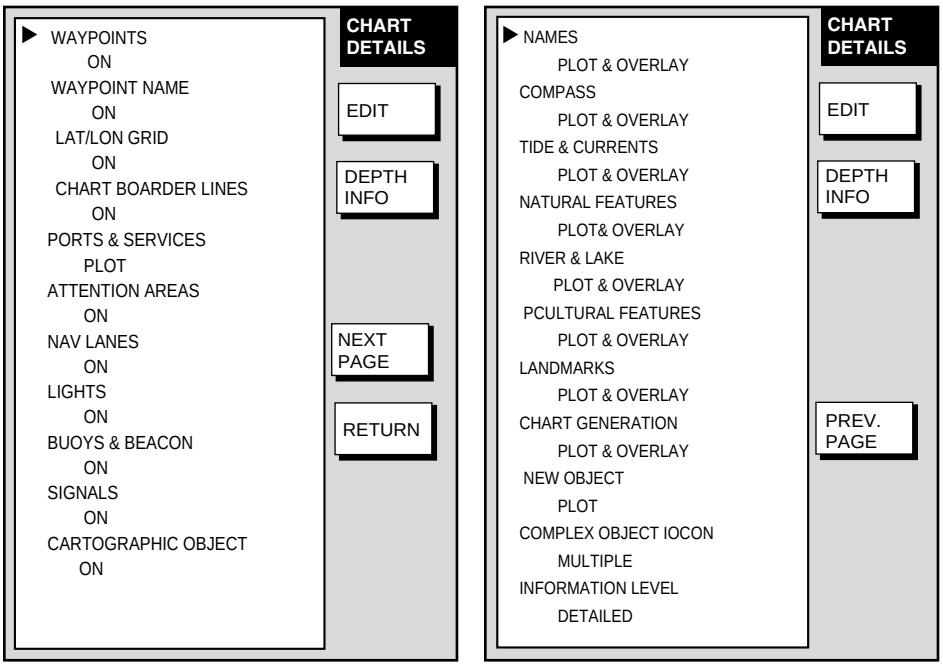
Charts attributes may be turned on or off from the chart details menu, which you may display pressing the [MENU] key followed by the CHART SETUP and CHART DETAILS soft keys.

MODEL-1700C series



Page 1 Page 2

MODEL-1700 series



Page 1 Page 2

Chart details menu (C-map)

Contents of chart details menu (C-map)

Item	Description	Settings	Default Setting	Settings	Default Setting
		MODEL-1700C series		MODEL-1700 series	
Waypoints	Waypoint display	Plot & Overlay, Plot Only, Off	Plot & Overlay	On, Off	On
Waypoint Name	Waypoint name	Plot & Overlay, Plot Only, Off	Plot & Overlay	On, Off	On
Lat&Lon Grid	Latitude and longitude grids	Plot & Overlay, Plot Only, Off	Plot & Overlay	On, Off	On
Chart Border Lines	Chart indices	Plot & Overlay, Plot Only, Off	Plot & Overlay	On, Off	On
Background (MODEL-1700C series only)	Chart background color	White, Black	White	Not shown on GD-1700C.	
Ports & Services	Port service icon display	Plot & Overlay, Plot, Off	Plot	On, Off	On
Attention Area	Attention area icon display	Plot & Overlay Contour, Plot, Plot Contour, Off	Plot Contour	On, Contour, Off	Contour
Nav lanes	Navigation lanes	Plot & Overlay, Plot, off	Plot	On, Off	On
Lights	Lighthouse icon, sector	Plot & Overlay (no sector), Plot (no sector), Off	Plot & Overlay	On, No Sector, Off	On
Buoys & Beacons	Buoys, beacons display	Plot & Overlay, Plot, Off	Plot Overlay	On, Off	On
Signals	Signals display	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
Cartographic Objects	Cartographic objects display	Plot & Overlay, Plot, Off	Plot	On, Off	On
Names	Names category icon	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
Compass	Compass category icons	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
Tide & Current	Tide display	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
Natural Features	Land outline	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
River & Lake	Rivers and lakes	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
Cultural features	Cultural features icon	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
Landmarks	Landmarks category icon	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On

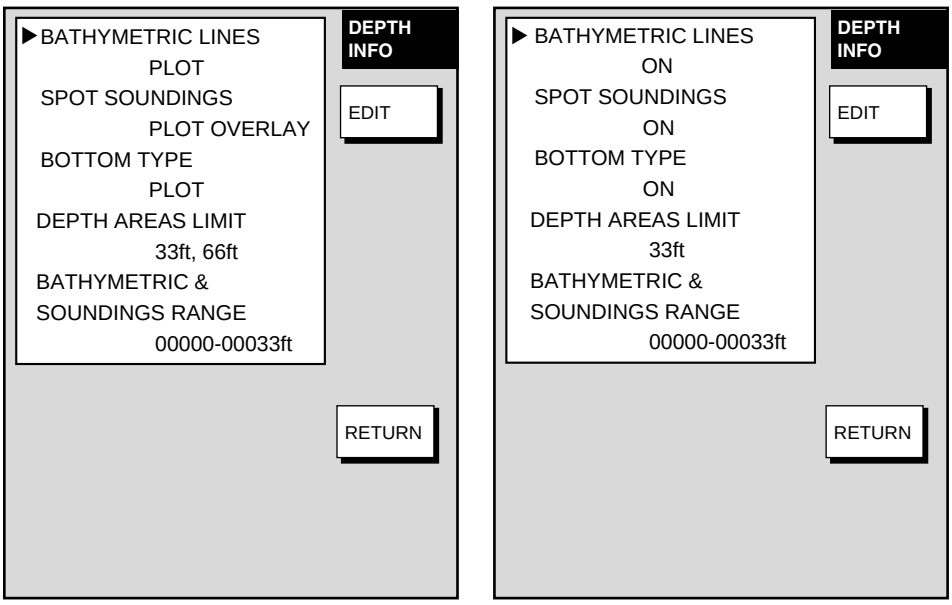
(Continued on next page)

Contents of chart details menu (continued from previous page)

Item	Description	Settings	Default Setting	Settings	Default Setting
		MODEl-1700C series		MODEL-1700 series	
Chart Generation	Chart generation category icon	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
New Object	New object category icon	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
Complex Object Icon	Single or multiple icon for object composed of several icons	Multiple, Single	Multiple	Multiple, Single	Multiple
Information Level	Basic or detailed data for objects	Basic, Detailed	Detailed	Basic, Detailed	Detailed
Depth Info (soft key) See illustration on next page	Bathymetric lines	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
	Spot Soundings	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
	Bottom Type	Plot & Overlay, Plot, Off	Plot & Overlay	On, Off	On
	Depth Areas Limit	0-48999ft (15000m, 8202fa, 8972pb)	20,164ft (6, 50m, 3, 27 fa, 3, 30pb)	0-48999ft (15000m, 8202fa, 8972pb)	33ft (10m, 6fa, 6pb)
	Bathymetric & Sounding Range	0-48999ft (15000m, 8202fa, 8972pb)	0-30ft (0-10m, 0-6fa, 0-6pb)	0-48999ft (15000m, 8202fa, 8972pb)	0-30ft (0-10m, 0-6fa, 0-6pb)

Settings key

Basic: Shows basic characteristics of objects.
Contour: Shows only national boundary.
Detailed: Shows detailed characteristics of objects.
Multiple: Shows multiple icons for complex objects
Off: Turns item off.
On: Turns item on.
Plot: Shows item on plotter display:
Plot (no sector): Sector not shown on track display.
Plot Contour: Shows contour on track display.
Plot & Overlay: Shows item on plotter and overlay displays.
Plot & Overlay (no sector): Shows item on track and overlay displays. Sector not shown on overlay.
Single: Shows single icon for complex objects..



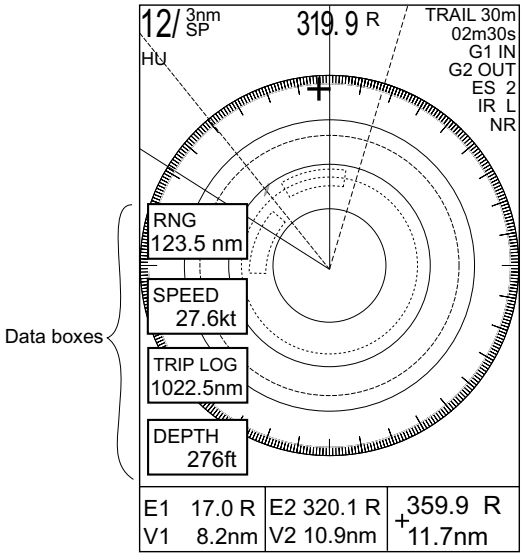
MODEL-1700C series MODEL-1700 series

Depth info menu (C-map)

5.4 Data Boxes Setup

You may separately select the data to show in the data boxes for the plotter, radar and sounder displays.

1. Display the plotter, radar or sounder display, whichever you want to set.
2. Press the [MENU] key to open the main menu.
3. Press one of the following sets of soft keys depending on the display selected at step 1.
   a) **Plotter mode:** PLOTTER OPTION, DATA BOX
   b) **Radar mode:** RADAR DISPLAY, DATA BOX
   c) **Sounder mode:** SOUNDER MENU, DATA BOX



Data box menu

4. Use the Omnipad to select an item and then press the EDIT soft key.
5. Select ON or OFF as desired.
6. Repeat steps 3 and 4 to turn other items on or off.
7. Press the RETURN soft key.
8. Press the [MENU] key to close the menu.

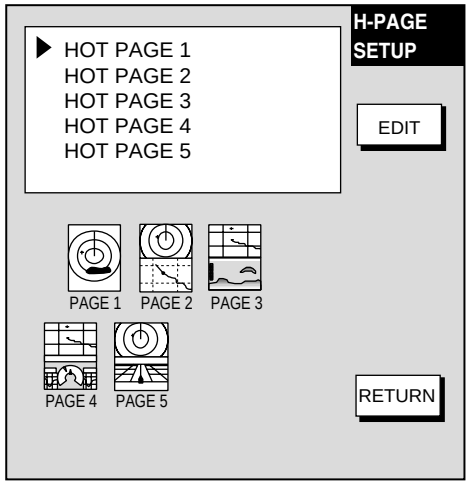
5.5 Hot Page Setup

On the full-screen selection window (see the figure at the top of the next page) five useful combination screens are preset at factory as “PAGE 1-5.” The default settings are

PAGE 1: Radar display
PAGE 2: Radar/plotter display
PAGE 3: Plotter/sounder display
PAGE 4: Plotter/compass display
PAGE 5: Plotter/highway display

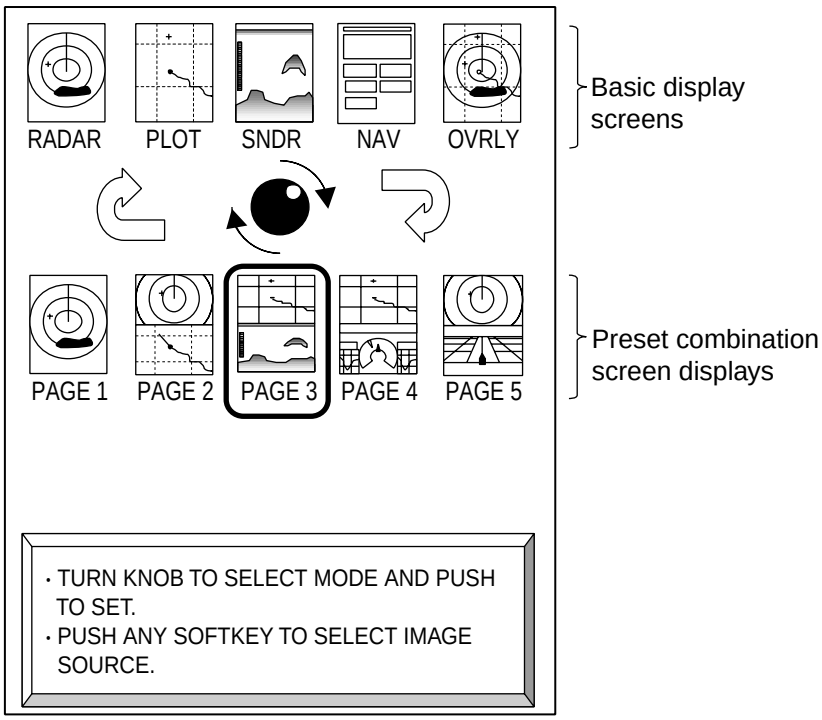
If the default settings are not to your liking you may change them as follows:

1. Press the [MENU] key followed by pressing the SYSTEM CONFIGURATION, HOT PAGE & NAV DISPLAY and HOT PAGE SETUP soft keys in that order.



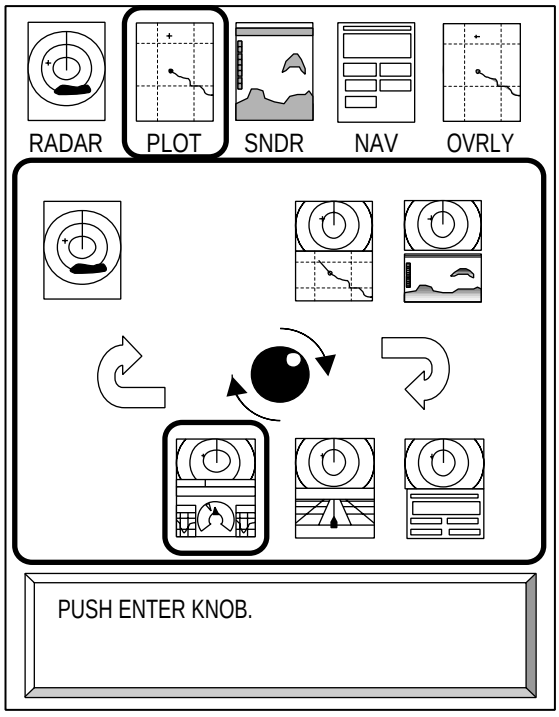
Hot page menu

2. Use the cursor pad to select the hot page number to set and then press the EDIT soft key. The full-screen selection window appears.



Full-screen selection window

3. Rotate the [ENTER] knob to select the basic mode desired and press the [ENTER] knob. The combination screen selection window appears.



Combination screen selection window

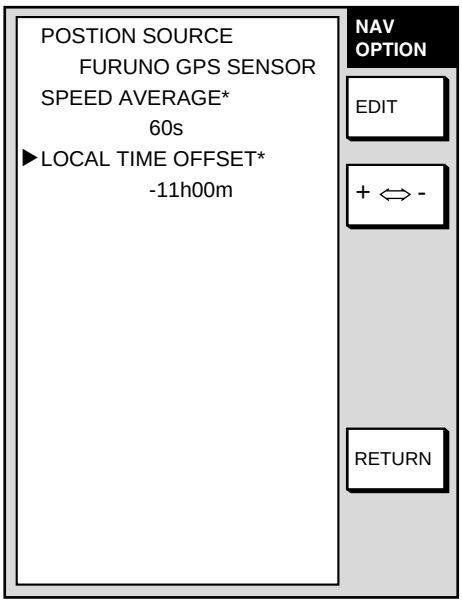
4. Rotate the [ENTER] knob to select the combination mode and push it to set.

5.6 Navigator Setup

In this section you will learn how to set up the position-fixing equipment connected to your unit.

5.6.1 Navigation data source

The nav source menu mainly selects the source of nav data and smooths position and speed. Press the [MENU] key followed by the SYSTEM CONFIGURATION, NAV OPTIONS and NAV SOURCE soft keys to display this menu.



* Non-blackbox navigator only.

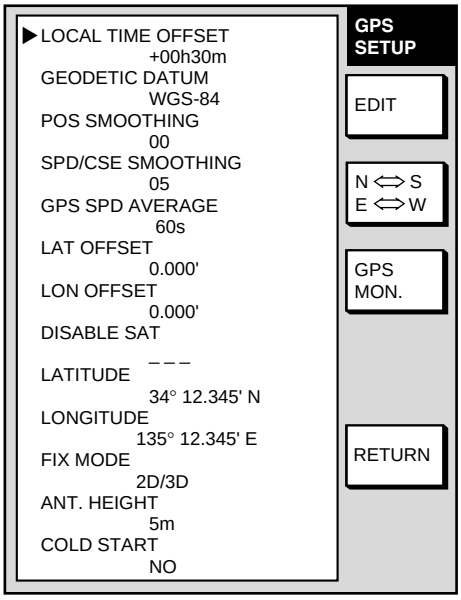
Nav source menu

Contents of nav source menu

Item	Description	Settings	Default Setting
Position Source	Chooses source of position data.	**FURUNO GPS Sensor:** Blackbox GPS unit **GP:** GPS navigator (via F. NET or NMEA connector) **LC:** Loran C (via F. NET or NMEA connector) **All:** Multiple navaid connection (via F. NET or NMEA connector)	All
Speed Average	Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting is 60 seconds, which is suitable for most conditions.	0-9999 sec	60 sec
Local Time Offset	GPS uses UTC time. If you would rather use local time enter the time difference between it and UTC. Use the +⇔- soft key to switch from plus to minus and vice versa.	-13:30 to +13:30	0

5.6.2 Blackbox GPS unit setup

The GPS unit setup menu sets up the blackbox GPS unit. Press the [MENU] key followed by the SYSTEM CONFIGURATION, NAV OPTIONS and GPS UNIT SETUP soft keys to display this menu.



GPS unit setup menu

Contents of GPS unit setup menu

Item	Description	Settings	Default Setting
Local Time Offset	Allows the user to use local time (instead of UTC time). Enter time difference between local time and UTC time.	-13:30 to +13:30 hr	0hr
Geodetic Datum	Your equipment is preprogrammed with most of the major chart systems of the world. Although the WGS-84 system, the GPS standard, is now widely used other categories of charts still exist. Select the chart system used, not the area where your boat is sailing. The default chart system is WGS-84.	See Appendix for full list.	WGS-84

(Continued on next page)

Contents of GPS unit setup menu (continued from previous page)

Item	Description	Settings	Default Setting
Position Smoothing	When the DOP or receiving condition is unfavorable, the GPS fix may change greatly, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 000 to 999 is available. The higher setting the more smoothed the raw data, however too high a setting shows response time to change in latitude and longitude. This is especially noticeable at high ship' speeds. 000 is the normal setting; increase the setting if the GPS fix changes greatly.	0-999 sec	0 sec (no position smoothing)
Spd/Cse Smoothing	During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter all zeroes.	0-999 sec	5 sec
GPS Speed Average	Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting is 60 seconds, which is suitable for most conditions.	0-9999 sec	60 sec
Lat Offset	Offsets latitude position to further refine position accuracy. Use the N⇔S soft key to switch coordinate.	9.999'S – 9.999'N	0.0' (no offset)
Lon Offset	As above but for longitude. Use the W⇔E soft key to switch coordinate.	9.999'E – 9.999'W	0.0' (no offset)

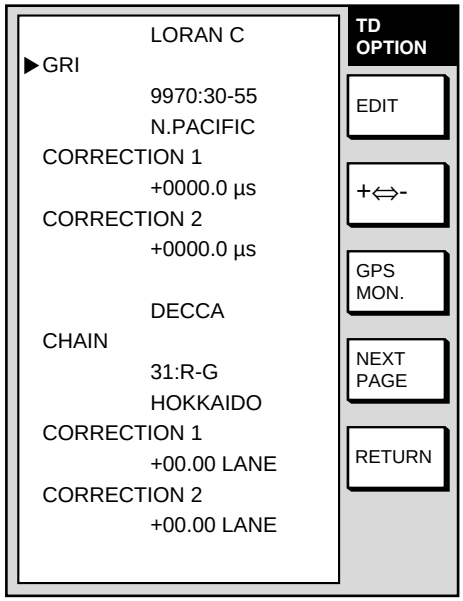
(Continued on next page)

Contents of GPS unit setup menu (continued from previous page)

Item	Description	Settings	Default Setting
Disable Sat	Every GPS satellite is broadcasting abnormal satellite number(s) in its Almanac, which contains general orbital data about all GPS satellites, including those which are malfunctioning. Using this information, the GPS receiver automatically eliminates any malfunctioning satellite from the GPS satellite schedule. However, the Almanac sometimes may not contain this information. If you hear about a malfunctioning satellite from another source, you can disable it manually. Enter satellite number (max. 3 satellites) in two digits and press the ENTER soft key.		None
Latitude	Sets initial latitude position after cold start. Use the N⇔S soft key to switch coordinate.	90°S – 90°N	45°35'N
Longitude	Sets initial longitude position after cold start. Use the W⇔E soft key to switch coordinate.	180°E – 180°W	122°30'W
Fix Mode	Chooses position fixing method: 2D (three satellites in view) , 2D/3D (three or four satellites in view whichever is greater)	2D, 2D/3D	2D/3D
Ant.Height	Enters the height of the GPS antenna unit above sea surface. For further details refer to the installation manual.	0-99 m	5 m
Cold Start	Clears the Almanac to receive the latest Almanac.	No, Yes	No
GPS Monitor (soft key)	Displays GPS satellite monitor. Requires blackbox GPS sensor or GPS navigator outputting talker GP. For further details see the chapter on Maintenance.		

5.6.3 TD display setup

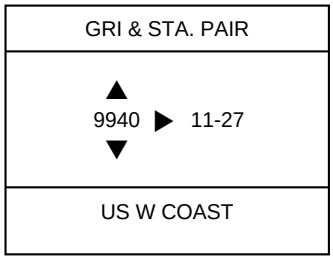
The TD option menu sets which Loran C or Decca chain to use. Press the [MENU] key followed by the NAV OPTIONS and TD OPTION soft keys to display this menu.



TD option menu

Displaying Loran C TDs

1. Select GRI and press the EDIT soft key to show the GRI & sta. pair window.

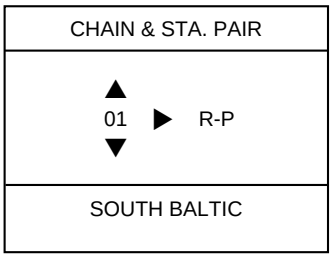


Loran GRI & station pair window

2. Select GRI code. Press ▸ to enable selection of station pair, and then select station pair. See the Loran C chain list at the end of this manual for GRI and station pairs.
3. Press the ENTER soft key to register your selection.
4. If necessary, you may enter a position offset to refine Loran C position accuracy. Select LORAN C CORRECTION1 or CORRECTION2 and press the EDIT soft key. Enter correction value and press the ENTER soft key. Use the +⇔- soft key to switch from plus to minus and vice versa.
5. Press the RETURN soft key.
6. Press the [MENU] key to close the menu.
7. Press the [MENU] key again followed by the SYSTEM CONFIGURATION and GENERAL SETUP soft keys.
8. Select “Loran C” from “TD Display.”
9. Press the [MENU] key to close the menu.

Displaying DECCA TDs

1. Select DEC CHAIN and press the EDIT soft key to show the chain sta. pair window.



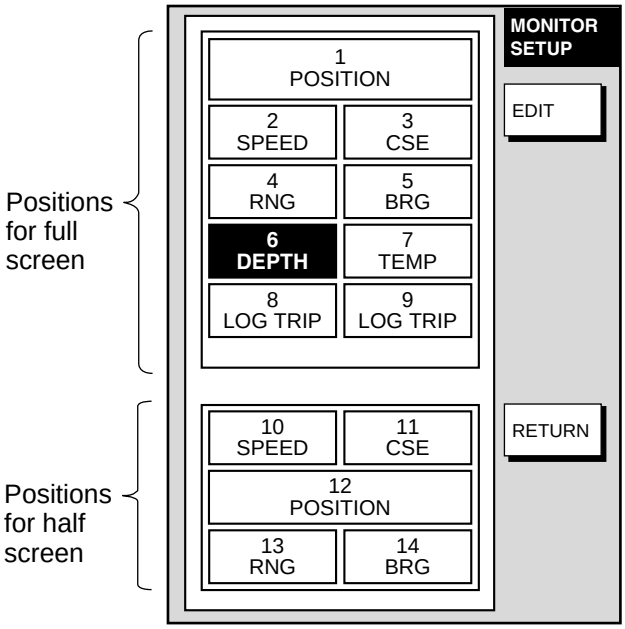
Decca chain and station pair window

2. Select Decca chain number. Press ▸ to enable selection of lane, and then select lane pair (R: red, G: green and P: purple). Refer to the Decca chain list at the end of this manual.
3. Press the ENTER soft key to register your selection.
4. If necessary, you may enter position offset to refine Decca position. Select DECCA CORRECTION1 or CORRECTION2 and press the EDIT soft key. Enter correction value and press the ENTER soft key. Use the +⇔- soft key to switch from plus to minus and vice versa.
5. Press the RETURN soft key.
6. Press the [MENU] key to close the menu.
7. Press the [MENU] key again followed by the SYSTEM CONFIGURATION and GENERAL SETUP soft keys.
8. Select “Decca” from “TD Display.”
9. Press the [MENU] key to close the menu.

5.7 Nav Data Display Setup

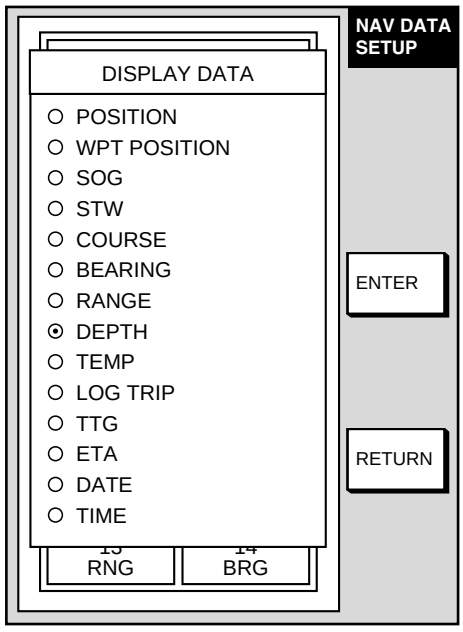
The nav data display provides various navigation data. You may select the data to display and where to display it, on the monitor setup menu.

1. Press the [MENU] key to open the main menu.
2. Press the PLOTTER MENU, SYSTEM CONFIGURATION, HOT PaGE & NAV DISPLAY, NAV DATA DISPLAY SETUP soft keys.



Nav data display setup menu

3. Use the Omnipad to select a position. Positions 1-9 are for the full-screen nav data display and positions 10-14 for the half-screen nav data display.
4. Press the EDIT soft key. The following display appears.



Display data window

5. Select the data to display and press the ENTER soft key.
6. Repeat steps 4-6 to set other locations.
7. Press the [MENU] key to finish.

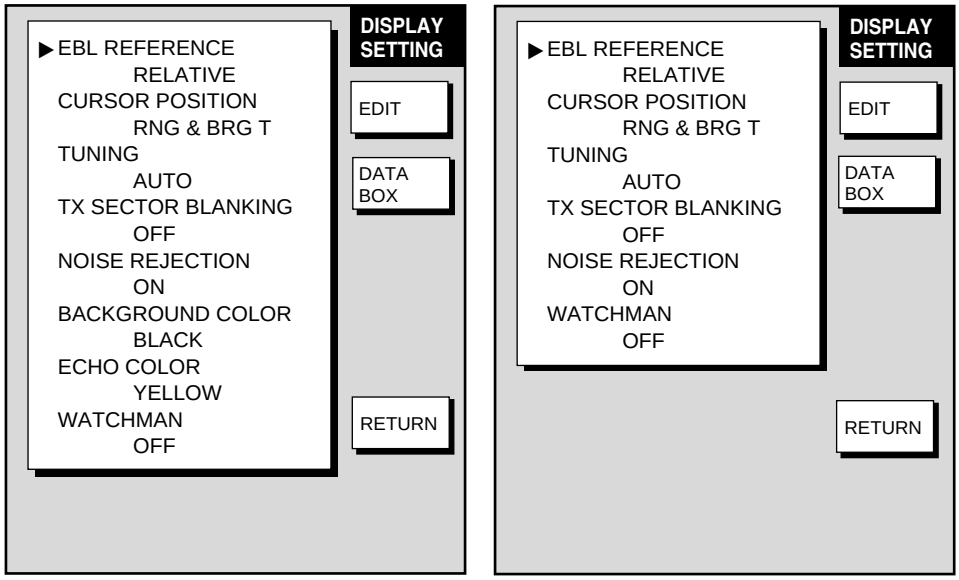
5.8 Radar Setup

This paragraph explains how to customize the radar display to suit your operational needs. Be sure to show the radar display before executing any of the procedures.

5.8.1 Radar display setup

The radar display may be set up from the display setting menu, which contains items such as EBL reference and cursor position format.

1. Press the [MENU] key to show the main menu.
2. Press the RADAR MENU soft key.
3. Press the DISPLAY SETUP soft key to show the display setup menu.



MODEL-1700C series MODEL-1700 series

Display setup menu

Contents of display setup menu

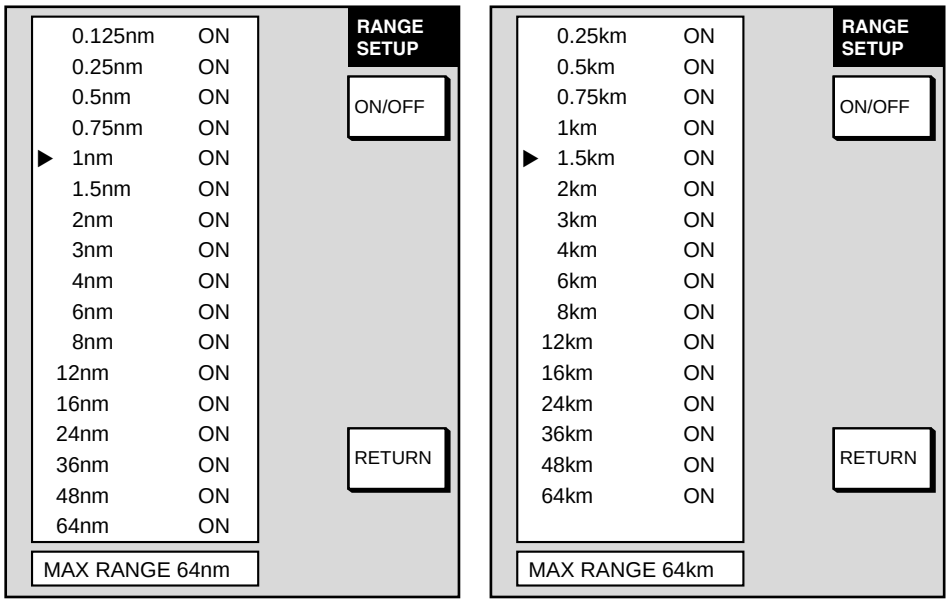
Item	Description	Settings	Default Setting
EBL Reference	References EBL bearing, shown in the EBL data box, to North (True) or heading (Relative)	True, Relative	Relative
Cursor Position	Chooses how to display cursor position.	L/L: Lat/Long position of cursor TD: Loran or Decca TDs RNG & BRG R: Range and bearing in relative bearing RNG & BRG T: Range and bearing in true bearing.	RNG & BRG R
Tuning	Selects receiver tuning method. For further details see paragraph 3.6 Tuning the Receiver.	Auto, Manual	Auto
TX Sector Blanking	Turns on/off blind sector, which shows area where no echoes are transmitted. Blind sector area is set at installation	On, Off	Off (0°)
Noise Rejection	Electrical noise, appearing on the screen as “speckles,” may be suppressed with the noise rejector. Note that there are some forms of interference which cannot be suppressed	On, Off	Off
Background (MODEL-1700C series)	Chooses colors of background, range rings and characters.	Color 1 Background: Black Rings: Green Characters: Green Color 2 Background: Blue Rings: White Characters: White Color 3 Background: Dark Blue Rings: White Characters: White Color 4 Background: Black Rings: Green Characters: Red	Color 1
Echo Color (MODEL-1700C series)	Chooses echo color.	Yellow, Green, Multi (Echoes shown in red, yellow or green in order of descending strength.)	Yellow
Watchman	Sets watchman stand-by interval. For further details see paragraph 3.23 Watchman.	5, 10, 20 min, Off	Off

5.8.2 Radar range setup

The radar has 16 (km) and 17 (nm) ranges, some of which you may not require. You may turn off ranges you do not require, from the range setup menu. After choosing the ranges desired change the range to activate range settings.

Note that at least two ranges (excluding maximum range) must be turned on. When less than two ranges are turned on a buzzer sounds.

1. Press the [MENU] key to show the main menu.
2. Press the RANGE SETUP soft key to show the range setup menu.



Range unit: nm Range unit: km

Range setup menu

3. Use the Omnipad to select the range which you want to turn on or off.
4. Press the ON/OFF soft key to turn the range on or off as appropriate.
5. Press the RETURN soft key.
6. Press the [MENU] key to close the menu.

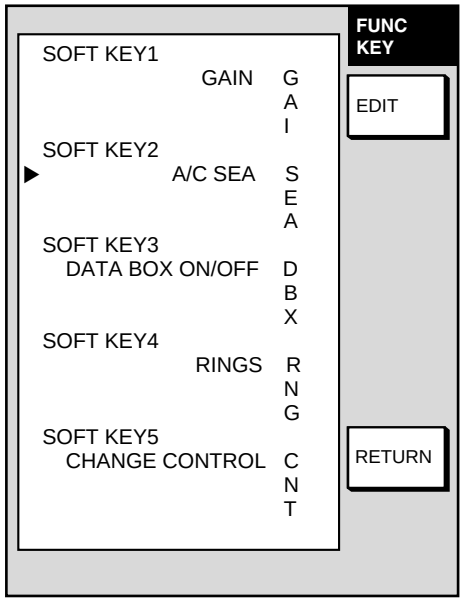
5.8.3 Function key setup

The function keys, shown when the soft keys are turned off, provide one-touch call up of a desired function. The default radar function key settings are

#1 function key: Gain
#2 function key: A/C SEA
#3 function key: Data box
#4 function key: Range rings
#5 function key: Change control

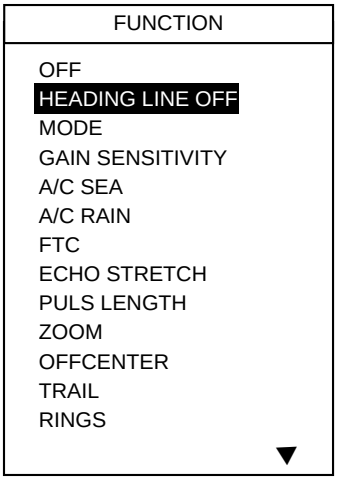
If the above settings are not to your liking you may change them as follows:

1. Show the radar display.
2. Press the [MENU] key.
3. Press the FUNCTION KEY SETUP soft key.



Function key menu (radar)

4. Select the function key you want to program and press the EDIT soft key. Use the cursor pad to scroll the screen if necessary.



Function menu (radar)

5. Select function desired and press the RETURN soft key. See the table on the next page for details.
6. Press the [MENU] key to close the menu.

Radar functions keys

Function	Action	Function Key Label
NO FUNCTION	Assigns no function.	
HEADING LINE	Turns heading line on/off.	HL
MODE	Selects presentation mode.	MOD
GAIN SENSITIVTY	Shows manual or automatic gain window depending on current gain mode.	GAI
A/C SEA	Shows manual or automatic A/C SEA window depending on current A/C SEA mode.	SEA
A/C RAIN	Shows manual or automatic A/C RAIN window depending on current A/C RAIN mode.	RAI
FTC	Displays FTC window. Adjust FTC with the [ENTER] knob.	FTC
ECHO STRETCH	Turns echo stretch on/off.	ES
PULSE LENGTH	Sets pulselength (long or short).	PLS
ZOOM	Touch-and-release to double size of cursor-selected target, in zoom window. Press again to fix cursor. Press and hold down to turn zoom off.	ZOM
OFFCENTER	Press to shift display center to cursor location. Press again to turn shift off and return cursor to display center.	SFT
TRAIL	Starts/stops target trails.	TRL
RINGS	Turns range rings on/off.	RNG
TLL	Outputs cursor position, in NMEA format, to navigator.	TLL
ALM	Displays alarm soft keys.	ALM
EBL	Displays EBL if it is off; enables control of EBL if its active.	EBL
VRM	Displays VRM if it is off; enables control of VRM if its active.	VRM
TTM	Turns TTM data on/off. Place cursor on TTM target to finds its data. Press and hold down to turn off TTM target and its data.	TTM

(Continued on next page)

Radar function keys (continued from previous page)

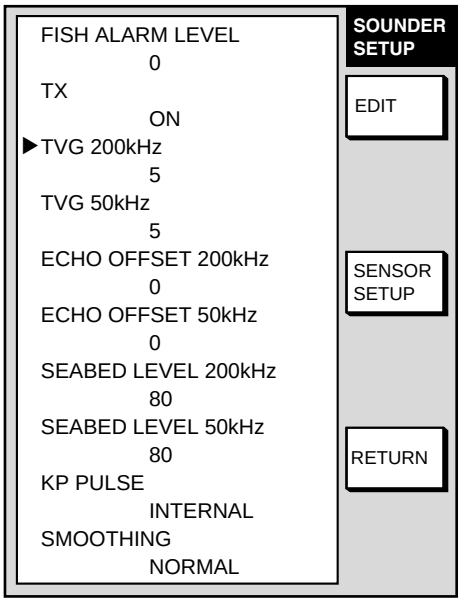
Function	Action	Function Key Label
WPT MARK	Turns waypoint marker on/off.	WMK
WATCHMAN	Turns watchman on/off	WTM
ACQ (For ARPA-equipped network radar)	Acquires and tracks cursor-selected target.	ARP
CHANGE CONTROL	Changes control in combination display.	CHG
RADAR SOURCE	Selects source or radar picture.	R-S
DATA BOX ON/OFF	Turns data boxes on/off.	DBX

5.9 Sounder Setup

This section shows you how to customize your sounder to your liking. You can set fish alarm sensitivity, fine tune sensors, etc.

5.9.1 System setup

1. Show the sounder display and press the [MENU] key.
2. Press the SYSTEM SETUP soft key.



Sounder setup menu

System setup menu description

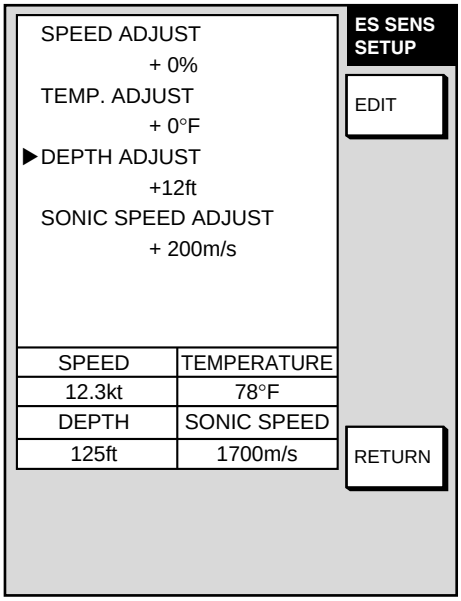
Item	Description	Settings	Default Setting
Fish Alm Lvl	Sets the fish alarm sensitivity; which echo strength will trigger the alarm.	**High:** only the strongest echoes trigger the alarm. **Normal:** Echoes from strong to medium strength trigger the alarm. **Low:** Any echo triggers the alarm.	Normal
TX	Turns TX power on/off. The default setting is ON.	On, Off	On

Item	Description	Settings	Default Setting
TVG (50 kHz, 200kHz)	TVG (Time Varied Gain) compensates for propagation attenuation of the ultrasonic waves. It does this by equalizing echo presentation so that fish schools of the same size appear in the same density in both shallow and deep waters. In addition, it reduces surface noise. Note that if the TVG level is set too high short range echoes may not be displayed.	0-9	5 (both 50 kHz and 200 kHz)
Echo Offset (50 kHz, 200kHz)	If the on-screen echo level appears to be too weak or too strong and the level cannot be adjusted satisfactorily with the gain control, adjust echo offset to compensate for too weak or strong echoes. The default setting for both 200 kHz and 50 kHz is zero.	-50 - +50	0 (both 50 kHz and 200 kHz)
Seabed Level (50 kHz, 200 kHz)	If the depth indication is unstable in automatic operation or the bottom echo cannot be displayed in reddish-brown by adjusting the gain control in manual operation, you may adjust the bottom echo level detection circuit, for both 50 kHz and 200 kHz, to stabilize the indication. Note that if the level is set too low weak echoes may be missed and if set too high the depth indication will not be displayed.	20- 200	80 (both 50 kHz and 200 kHz)
KP Pulse	Selects source of keying pulse.	Internal, External	Internal
Smoothing	Smooths echoes to present stable display. The higher the setting the greater the smoothing.	SM1-SM8, OFF	SM3
Sensor Setup (soft key)	Offsets speed, depth and water temperature indications.	See next section for details.	

5.9.2 Sensor setup

The sensor setup menu lets you compensate for speed, temperature and depth error in the sensor(s) connected to the blackbox sounder.

1. Show the sounder display and press the SENSOR SETUP soft key at the system setup menu to show the sensor setup menu. The current readout for speed, water temperature, depth and sonic speed are shown at the bottom of the menu.



Sensor setup menu

2. Select item to adjust and press the EDIT soft key.
3. Display appropriate value as below.

   Speed and temperature: Enter appropriate percentage. For example, if the water temperature readout is 77°F but the actual water temperature is 75.4°F, enter –2(%).

   Depth: Enter plus or minus value. For example, if the depth readout is 125 ft but the actual depth is 126 ft, enter +1(ft).

   Sonic speed adjustment: Sets the speed of sound used by the blackbox sensor. Normally no adjustment is required, however if echoes are returning too slow or too fast adjust the value as appropriate.

Sensor setup menu settings

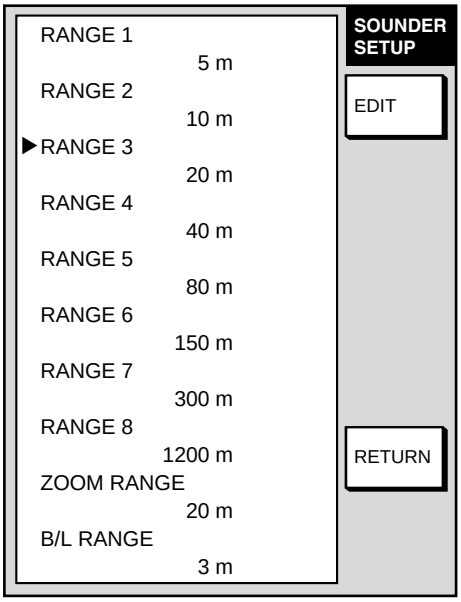
Item	Settings	Default Setting
Speed Adjust	-50 -+50%	0% (no offset)
Temp Adjust	-20 -+20°C, -40 - +40°F	0% (no offset)
Depth Adjust	-10 - +40 m; -30 – 130 ft; -6 - +25 fa, -6 – 25 pb	0 ft, m, fa, pb (no offset)
Sonic Speed Adjust	-500 - +500 m/s	0 m/s (no offset)

4. Press the RETURN soft key followed by the [MENU] key.

5.9.3 Sounding range, zoom range, bottom lock range

This paragraph shows you how to set custom ranges and choose zoom and bottom lock ranges.

1. Show the sounder display and press the [MENU] key to open the main menu.
2. Press the SOUNDER RANGE SETUP soft key to show the sounder range menu.



Sounder range menu

3. Select the range to change and press the EDIT soft key. For the zoom range the available settings are as below.
4. Use the cursor pad to set range desired.
5. Press the RETURN soft key.
6. Press the [MENU] key to finish.

Default ranges

Range 1	Range 2	Range 3	Range 4	Range 5	Range 6	Range 7	Range 8
5 m	10 m	20 m	40 m	80 m	150 m	300 m	1200 m
15 ft	30 ft	60 ft	120 ft	200 ft	400 ft	1000 ft	4000 ft
3 fa	5 fa	10 fa	20 fa	40 fa	80 fa	150 fa	650 fa
3 pb	6 pb	12 pb	24 pb	50 pb	100 pb	200 pb	700 pb

Setting range: 2 m –1200m, 7 ft – 4000 ft, 1 fa – 650 fa, 1 pb – 700 pb

Zoom range, Bottom lock range

Item	Settings	Default Setting
Zoom Range	2 m – 1200 m, 7 ft – 4000 ft, 1 fa – 650 fa, 1 pb – 700 pb	10 m, 30 ft, 10 fa, 10 pb
B/L Range	3 m, 10 ft, 2 fa, 2 pb 6 m, 20 ft, 3 fa, 3 pb	6 m, 20 ft, 3 fa, 3pb

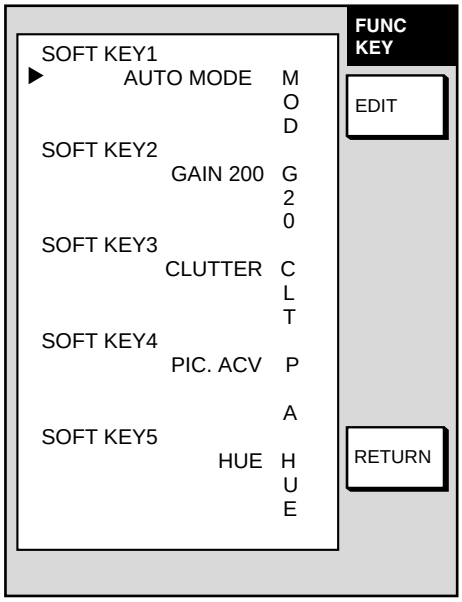
5.9.4 Function key setup

The function keys, shown when the soft keys are turned off, provide one-touch call up of a desired function. The default sounder function key settings are

#1 function key : Auto mode
#2 function key: Gain 200 kHz
#3 function key: Clutter
#4 function key: Picture advance
#5 function key: Hue

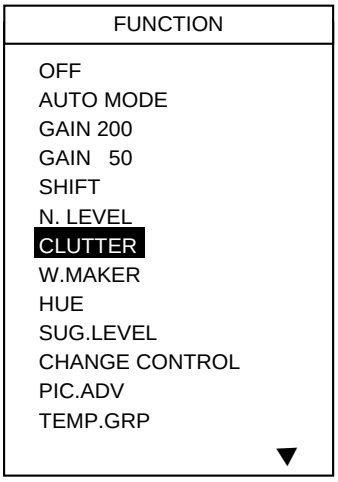
If the above settings are not to your liking you may change them as follows:

1. Show the sounder display.
2. Press the [MENU] key.
3. Press the FUNCTION KEY SETUP soft key.



Function key menu (radar)

4. Select the function key you want to program and press the EDIT soft key. A menu shows the functions available.



Function menu (sounder)

5. Select function desired and press the RETURN soft key. See the table on the next page for details.
6. Press the [MENU] key to close the menu.

Sounder functions keys

Function	Action	Function Key Label
MODE	Automatic sounder mode.	MOD
GAIN 200 kHz	Adjusts gain for 200 kHz.	G20
GAIN 50 kHz	Adjusts gain for 50 kHz.	G 5
SHIFT	Shifts range in manual operation.	SFT
NOISE LEVEL	Suppresses noise.	NLV
CLUTTER	Suppresses clutter.	CLT
WHITE MARKER	Sets white marker.	WMK
HUE (GD-1700C)	Sets hue.	HUE
SIGNAL LEVEL (GD-1700C)	Erases weak signals.	SLV
PICTURE ADVANCE	Sets picture advance speed.	P A
TEMP GRAPH ON/OFF	Turns temperature graph on/off.	T G
TVG 200	Sets TVG for 200 kHz.	TV2
TVG 50	Sets TVG for 50 kHz.	TV5
ECHO OFFSET 200	Offsets echo strength for 200 kHz.	EO2
ECHO OFFSET 50	Offsets echo strength for 500 kHz.	EO5
SMOOTHING	Sets smoothing rate.	SMZ
ZOOM RANGE	Sets zoom range for marker zoom display.	ZMR
B/L RANGE	Sets bottom lock range for bottom lock display.	BLR
CHANGE CONTROL	Changes control in combination display.	CHG
TLL	Outputs current position in NMEA format. Also inscribes line on sounder and registers position as a waypoint.	TLL
DATA BOX ON/OFF	Turns data boxes on/off.	DBX
NO FUNCTION	Assigns no function.	

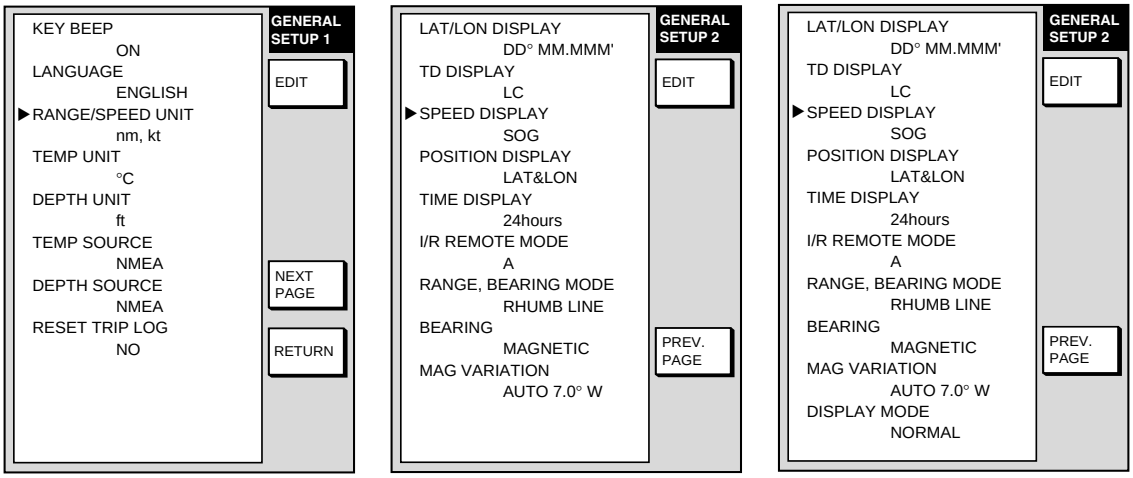
5.10 Data Port Setup

The display unit has four ports on its rear panel for connection of external equipment: GPS/NMEA port, GPS port, PC/NMEA/EXT BUZZ port and NavNet port. Set up these ports according to the equipment connected to them. The GPS/NMEA, GPS, and PC/NMEA/EXT BUZZ ports are set up on the port setup menu. For the NavNet port see the installation menu.

5.10.1 GPS/NMEA port (MODEL-1700 series only)

The navigator connected to the GPS/NMEA port can be set up on the GPS/NMEA port menu.

1. Press the [MENU] key to open the main menu.
2. Press the SYSTEM CONFIGURATION, SYSTEM SETUP, PORT SETUP and GPS/NMEA soft keys to show the GPS/NMEA menu.



Page 1 (MODEL-1700C series, MODEL-1700 series)

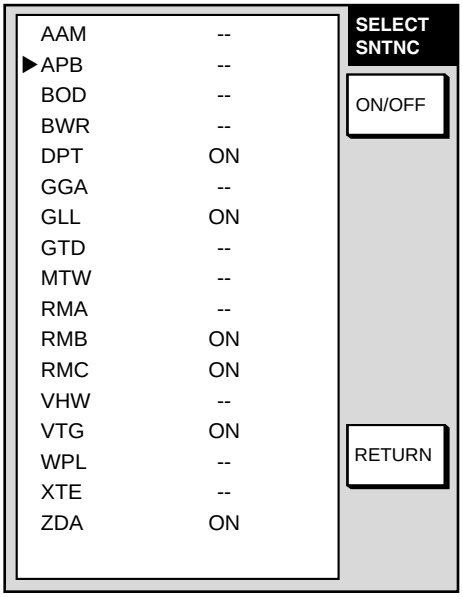
Page 2 (MODEL-1700C series)

Page 2 (MODEL-1700 series)

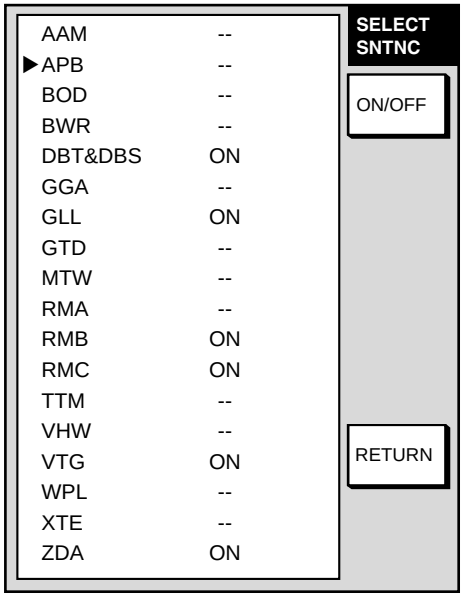
GPS/NMEA port menu

Contents of GPS/NMEA port setup menu

Item	Description	Settings	Default Setting
GPS Sensor Connected	Selects whether blackbox GPS unit is connected to the GPS/NMEA port.	Yes, No	No
Output Format	Selects NMEA output version of FURUNO GPS sensor.	NMEA Ver. 1.5, NMEA Ver. 2.0	NMEA Ver. 2.0
Lat/Lon Format	Selects latitude/longitude format to output.	DD °MM.MM', DD °MM.MMM, DD°MM.MMMM'	DD°MM.MMMM'
Output Destination	Selects whether to output route (sentence RTE) and waypoint data (sentence WPL) when destination is set.	Yes, No	No
Select Sentence (soft key)	Selects data sentence(s) to output. Select sentence with the Omnipad and press the ON/OFF soft key to show On or "- -" (Off) as appropriate. The data sentence menu below shows the default settings. **Note 1:** The depth sentences DBT and DBS may be selected together on Ver. 1.5; only DPT is available for Ver. 2.0. **Note 2:** BWC (great circle) and BWR (rhumb line) may be selected together.		



Version 2.0 (rhumb line)



Version 1.5, W/ARPA (great circle)

Data sentences

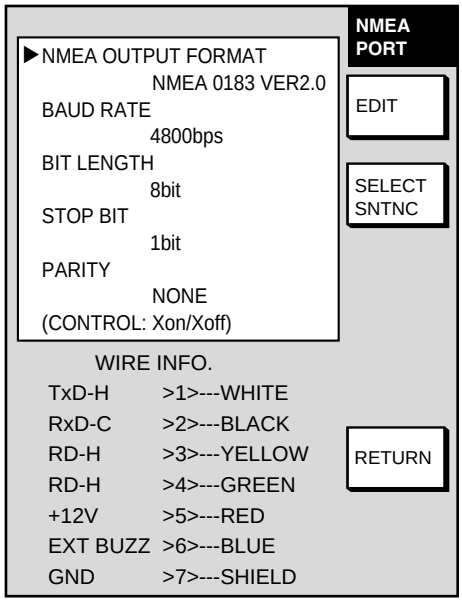
5.10.2 NMEA PORT menu

The NMEA port setup menu sets up the equipment connected to the NMEA port. The contents of the menu are similar to that of the GPS/NMEA PORT menu. You can display this menu by pressing the [MENU] key followed by the SYSTEM CONFIGURATION, SYSTEM SETUP, PORT SETUP AND GPS/NMEA soft keys.

5.10.3 PC/NMEA/EXT BUZZ. PORT menu

The PC/NMEA ext buzz port menu sets up of the equipment connected to the PC/NMEA EXT BUZZ port.

1. Press the [MENU] key to open the main menu.
2. Press the CONFIGURATION, SYSTEM SETUP, PORT SETUP AND GPS/NMEA soft keys to show the PC/NMEA/EXT BUZZ menu.



PC/NMEA/EXT BUZZ PORT menu

Contents of PC/NMEA/EXT BUZZ PORT menu

Item	Description	Settings	Default Setting
NMEA Output Format	SelectsNMEA output format	NMEA Ver. 1.5, NMEA Ver. 2.0	NMEA Ver. 2.0
Baud Rate	Sets baud rate of equipment connected to this port.	4800, 9600, 19200, 38400, 57600(bps)	4800(bps)
Bit Length	Sets character length.	8 bit, 7 bit	8 bit
Stop Bit	Sets number of stop bits.	1 bit, 2 bit	1 bit
Parity	Sets parity bit.	Even, Odd, None	None
Select Sntnc (soft key)	Sets Ver 2.0 sentences to output. For further details see the illustration and and table on page 5-36.		

6. DATA TRANSFER

This chapter provides information for saving and replaying memory cards, and uploading and downloading data.

6.1 Memory Card Operations

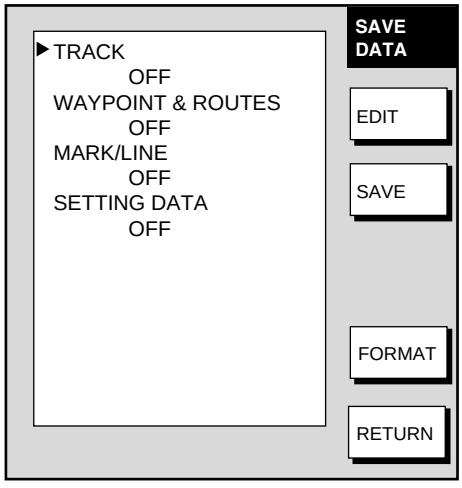
The memory cards function to store data, and the following data can be saved:

- Marks/lines
- Waypoints/routes
- Track
- Configuration (menu settings)

6.1.1 Formatting memory cards

Before you can use a memory card it must be formatted. This prepares the card for use with the system. Note that formatting a used card erases all saved data.

1. Insert the memory card you want to format into the card slot.
2. Press the [MENU] key followed by the SYSTEM CONFIGURATION, DATA TRANSFER, UPLOAD/DOWNLOAD DATA and SAVE DATA TO MEMORY CARD soft keys to show the save data menu.

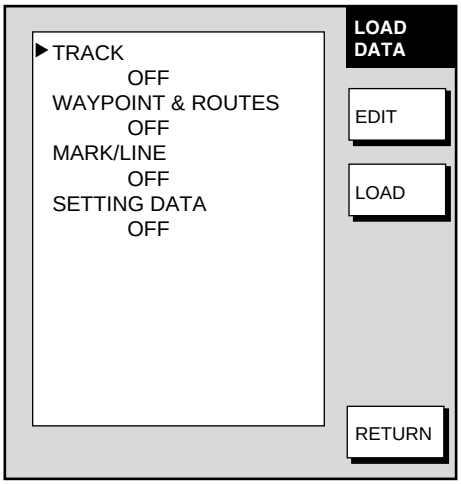


Save data menu

3. Press the FORMAT soft key. You are asked if you are ready to format the memory card.
4. Push the [ENTER] knob to format (or press the [CLEAR] key to escape). “NOW FORMATTING MEMORY CARD” appears. Do not remove the card while it is being formatting. When the formatting is completed, “FORMAT COMPLETED” appears.
5. Push the [ENTER] knob to finish.

6.1.2 Saving data to a memory card

1. Insert a formatted memory card into the slot.
2. Press the [MENU] key followed by the CONFIGURATION, DATA TRANSFER, UPLOAD/DOWNLOAD DATA and SAVE DATA TO MEMORY CARD soft keys to show the SAVE DATA display.



Load data menu

3. Select item to save.
4. Press the EDIT soft key.
5. Select ON.
6. Press the ENTER soft key.
7. Repeat from steps 4 to 7 to save other data if desired.
8. Press the SAVE DATA soft key. The message “NOW SAVING DATA TO MEMORY CARD. DO NOT TURN OFF THE POWER UNTIL SAVING IS COMPLETED.” appears.

When saving is completed, COMPLETE SAVING DATA appears. Press the [ENTER] knob.

Error messages

Various error messages appear to alert you to memory card-related error. These are tabulated below.

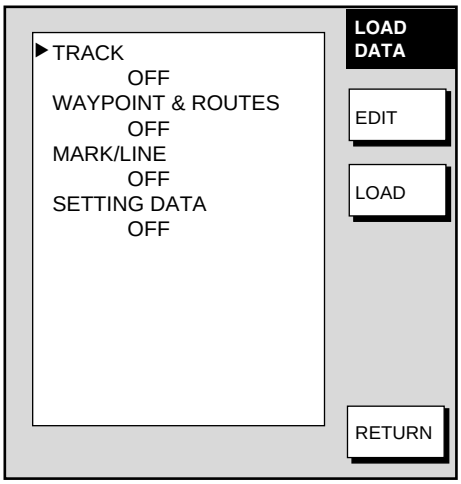
Error messages

Error Message	Reason	Remedy
Memory card not inserted. Insert card. Press “ENTER” key to continue.	Memory card not inserted.	Push the [ENTER] knob to return to the SAVE DATA display.
Memory card not formatted. Press “ENTER” key to continue.	Unformatted memory card.	Push the [ENTER] knob to return to the SAVE DATA display. Format the card referring to the previous page.
Wrong card inserted. Insert memory card. Press “ENTER” key to continue.	Chart card inserted instead of memory card.	Insert memory card.
Overwrite following data OK? (Track)	Data type to be recorded exists on memory card. (Two or more of same type of data cannot be recorded.)	Push the rotary encoder key to overwrite same data type on the card, or press the [CLEAR] key to escape.

6.1.3 Playing back from a memory card

Data (track, marks, waypoints, configuration) can be loaded from a memory card and displayed on the screen. This feature is useful for observing past data and setting up the equipment for a specific purpose (with “configuration”).

1. Press the [MENU] key followed by the SYSTEM CONFIGURATION and DATA TRANSFER soft keys.
2. Press the UPLOAD/DOWNLOAD DATA soft key.
3. Press the LOAD DATA FROM MEMORY CARD soft key to show the LOAD DATA menu.



Load data menu

4. Select item to load.
5. Press the EDIT soft key.
6. Select ON. Press the ENTER soft key or the [ENTER] knob. If the memory card does not contain the item selected, the buzzer sounds and ON cannot be selected.
7. After you select all items desired, press the LOAD DATA soft key to load data. The message “NOW LOADING DATA FROM MEMORY CARD. DO NOT TURN OFF THE POWER UNTIL SAVING IS COMPLETED.” appears.
8. After loading is completed, push the [ENTER] knob to finish.

Notes on loading data

Track: Since loaded track data is added to internal track, oldest track will be entered when the track memory capacity is exceeded.

Waypoint/route: The loaded data substitutes for previously stored.

Mark/line: The loaded data is added to internal data. When the mark/line memory becomes full no marks may be entered.

Configuration: The loaded data replaces current configuration settings. Push the [ENTER] knob to restart. If the memory card is ejected while loading or data could not be loaded, Push the [ENTER] knob to restart with default settings. Note that track memory capacity is not saved or loaded.

6.2 Uploading, Downloading Data

You can upload waypoint and route data to a PC and download the same data from a PC, through the PC/NMEA/EXT BUZZ connector at the rear of the display unit.

6.2.1 Setting communication software on the PC

Set communication software on the PC as follows:

Baud Rate:	4800 bps
Character Length:	8 bit
Stop bit:	1 bit
Parity:	None
X Control:	XON/XOFF

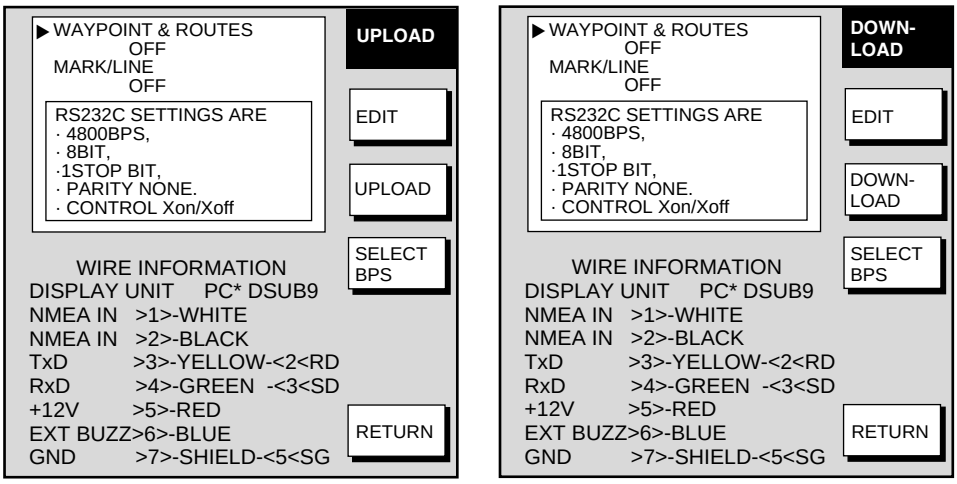
The following data can be downloaded/uploaded between a personal computer and this equipment:

- Waypoint data (In alphanumeric order)
- Route data (In order of route number)
- End of sentence

Note 1: There are two kinds of data for route data: route data and route comment data.
Note 2: DGPS position fix is not available when uploading or downloading data.
Note 3: Wiring information is provided on the PC/NMEA/EXT BUZZ PORT menu.

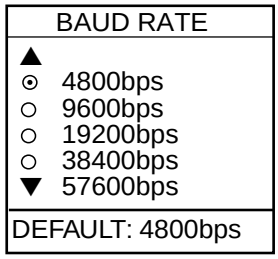
6.2.2 Uploading (downloading) data

1. Connect the PC to the equipment as shown below.
2. Press the [MENU] key to show the main menu.
3. Press the SYSTEM CONFIGURATION soft key.
4. Press the DATA TRANSFER soft key.
5. Press the UPLOAD/DOWNLOAD DATA soft key.
6. Press the DOWNLOAD WPT/RTE DATA TO PC or UPLOAD WPT/RTE DATA FROM PC as appropriate.



Upload and download menus

7. To change the baud rate, press the SELECT BPS soft key.



Baud rate window

8. Select baud rate and press the RETURN soft key.
9. Press the DOWNLOAD WPT/RTE or UPLOAD WPT/RTE soft key as appropriate. You are asked if you are ready to download (upload) waypoints and routes.
10. Press the [ENTER] knob to download (upload).

Waypoint data format

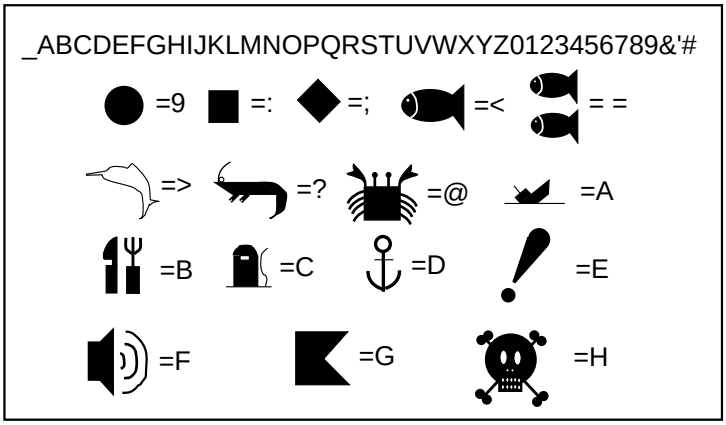
PFEC, GPwpl, llll.llll, a, yyyyy.yyy, a, c----c, c, c----c, a <CR><LF>
1 2 3 4 5 6 7 8

Waypoint data format

1: Waypoint latitude
2: N/S
3: Waypoint longitude
4: E/W
5: Waypoint name (Number of characters is fixed to 6 and space code is placed when the number of characters are less than 6.)
6: Waypoint color

7: Waypoint comment (1 byte for mark code + 13 characters of comment.)
1st byte of mark code: Fixed to “@”.
2nd byte of mark code: Internal mark code. See Note 1.
8. Information of marking waypoint. Always set to “A”.
“A”: Displayed
“V”: Not displayed

Note: Following characters can be used for comments:



Characters available for comment

Route data menu

$GPRTE, x, x, a, ccc, c----c, c----c, … , c----c <CR><LF>
1 2 3 4 5 6 12

Route data format

1: Number of sentences required for one complete route data (1 to 4). See Note 2.
2: Number of sentences currently used (1 to 4)
3: Message mode (Always set to C)
4: Route No. (001 to 300, 3 digits required)
5 through 12: Waypoint name (Max. 8 names, length of each waypoint name is fixed to 7 byte)

Note: A route can may contain 35 waypoints, and the GPRTE sentence for one route data may exceed 80 byte limitation. In this case, route data is divided into several GPRTE sentences (Max. 4 sentences). This value shows the number of sentences the route data has been divided.

Route comment data format

```
$PFEC, GPrtc,  xx,  c----c <CR><LF>
                1     2
```

Route comment format

1: Route No. (01 to 200, 3 digits required)
2: Route comment (Max. 16 characters, variable length)

The same characters of the comment for waypoint comment can be used.

End of sentence

```
$PFEC, GPxfr,  CTL, E <CR><LF>
```

End of sentence

6.3 Loading Waypoint Data from Yeoman

Connect the Yeoman equipment to the GPS/NMEA connector on this equipment and then follow the procedure below:

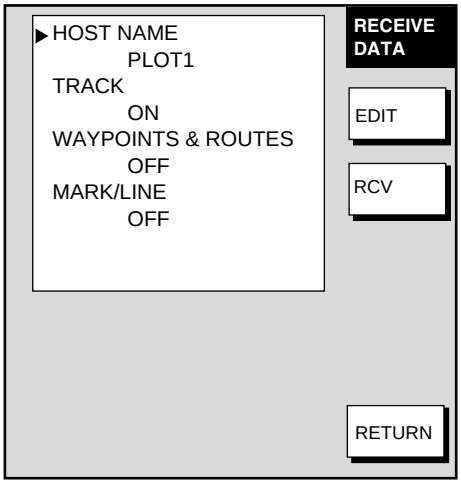
1. Press the [MENU] key.
2. Press the SYSTEM CONFIGURATION key.
3. Press the DATA TRANSFER soft key.
4. Press the RECEIVE DATA BY NavNet soft key.
5. You are asked if you are sure to receive waypoint data from yeoman equipment. Press the [ENTER] knob to receive the data.

   The message “NOW RECEIVING YEOMAN DATA. PUSH SOFTWARE KEY ‘STOP’ TO STOP RECEIVING.” Is displayed. If waypoint capacity is reached the message “WAYPOINTS ARE FULL. CAN NOT RECEIVE ANY DATA. PUSH ANY KEY TO STOP.” appears.
6. To stop receiving, press the STOP soft key.
7. After waypoints have been received, press the RETURN soft key followed by the [MENU] key.

6.4 Receving Data Via the NavNet

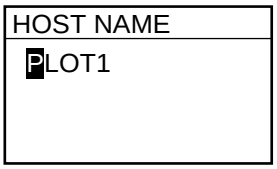
You can receive track, waypoint, routes, marks and lines via NavNet equipment outputting such data as below.

1. Press the [MENU] key.
2. Press the SYSTEM CONFIGURATION soft key.
3. Press the RECEIVE DATA BY NavNet soft key.



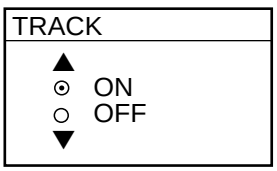
Receive data (NavNet) menu

4. Select HOST NAME and press the EDIT soft key.



Host name window

5. Use the [ENTER] knob to input host name and press the RETURN soft key. Use the CLEAR soft key to clear data selected with the cursor.
6. Select TRACK and press the EDIT soft key.



Track window

7. Select ON or OFF as appropriate and press the RETURN soft key.
8. Turn WAYPOINTS & ROUTES and MARK & LINE on or off as appropriate.

9. Press the RCV soft key to receive data.

   The message “NOW RECEIVING DATA.” is displayed. IF no data could be found the message “(HOST NAME)’ IS NOT FOUND.” appears.

10. When the transfer is completed, the message “DATA TRANSFER COMPLETED.” appears. Push the [ENTER] knob to finish.
11. Press the [MENU] key to close the menu.

7. MAINTENANCE, TROUBLESHOOTING

This chapter provides information necessary for keeping your unit in good working order and remedying simple problems.

⚠ WARNING

Do not open the equipment.

Hazardous voltage which can cause electrical shock exists inside the equipment. Only qualified personnel should work inside the equipment.

7.1 Periodic Maintenance

Regular maintenance is important for continued performance. A maintenance schedule should be established and should at least include the items tabulated below.

Maintenance program

Item	Check point	Remedy
Display unit connectors	Check for tight connection.	Tighten loosened connectors
LCD	The LCD will, in time, accumulate a coating of dust which tends to dim the picture. Wipe LCD lightly with soft cloth to remove dust.	Do not use chemical cleaners to clean any part of the display unit; they can remove paint and markings.
Ground terminal	Check for tight connection and corrosion.	Clean or replace as necessary.
Antenna unit	Check for loosened and corroded bolts.	Tighten loosened bolts. Replace heavily corroded bolts.
Antenna cable	• Check connection point for watertightness. • Check connector for tightness and corrosion. • Check cable for damage.	Replace damage parts

7.2 Replacement of Fuse, Battery

7.2.1 Replacement of fuse

The fuse on the power cable protects the equipment from reverse polarity of the ship's mains and equipment fault. If the fuse blows, find out the cause before replacing it. Use the correct fuse (12 V, 10A, 24 V, 5A). Using the wrong fuse will damage the equipment and void the warranty.

⚠ CAUTION

Use the proper fuse.

Use of a wrong fuse can cause fire or equipment damage.

7.2.2 Replacement of battery

A battery fitted on a circuit board inside the display unit preserves data when the equipment is turned off, and its life is about three years. When its voltage is low the battery icon ( ) appears at the top of the display. When the icon appears, contact your dealer to request replacement of the battery.

	Type	Code No.
Lithium battery	CR2450-F2 ST2	000-135-495

7.3 Simple Troubleshooting

This section provides simple troubleshooting which the user can follow to restore normal operation.

This section provides troubleshooting procedures for the blackbox GPS receiver. For other GPS receiver see its owner's manual.

Troubleshooting

If...	Then...
General	
you cannot turn on the power	• check for blown fuse. • check that the power connector is firmly fastened. • check for corrosion on the power cable connector. • check for damaged power cable. • check battery for proper voltage output (10.8 to 31.2 V)
there is no response when a key is pressed	• Turn off and on the power. If there still is no response the key may be faulty. Request service.
Plotter (equipped with blackbox GPS unit)	
position is not fixed within three minutes	• check if antenna connector is firmly fastened. • check for frequency deviation of GPS receiver on GPS monitor display.
position is wrong	• check that the correct geodetic chart system is selected, on the GPS setup menu. • enter GPS offset on the GPS setup menu.
track is not plotted	• plotting has been stopped. ("H" icon appears at the top of the display.) Press the TRACK RESUME soft key to start plotting again.
bearing is wrong	• check that correct magnetic variation is entered, on the general menu.
Loran or Decca TDs do not appear	• check that proper Loran or Decca chain codes are entered, on the TD option menu.
Loran TDs are wrong	• enter TD offset on the TD option menu.
ship's speed indication is not zero after the ship is stopped	• try to decrease speed smoothing on the GPS setup menu.

(Continued on next page)

Troubleshooting (continued from previous page)

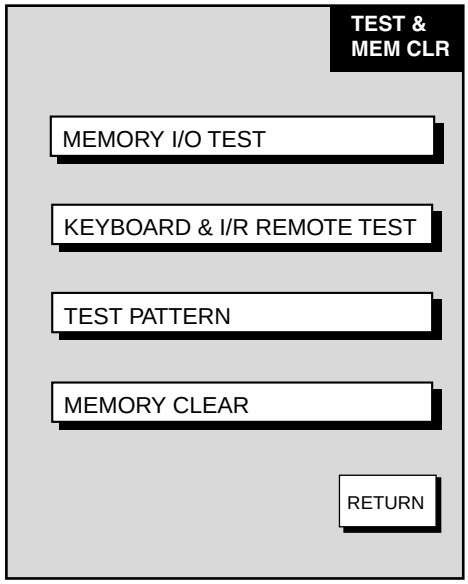
If...	Then...
Sounder (requires blackbox echo sounder)	
no picture but marks and characters appear	• check if picture advance speed is set to “0”.
picture appears but no zero line	• check for loosened transducer connector.
picture sensitivity is too low	• check gain setting, if using manual operation. • marine life or air bubbles may be clinging to transducer face. • water may be dirty. • bottom may be too soft to return a suitable echo.
depth is not displayed	• adjust gain to display the bottom echo (in reddish brown on color model). • correctly display bottom echo on the display.
noise or interference shows on the display	• check to be sure the transducer cable is not near ship’s engine. • check the ground. • other video sounders of the same frequency as yours may be operating in the vicinity.
water temperature graph appears but wrong or no readout	• check that sensor cable is tightly fastened.

7.4 Diagnostics

This paragraph provides the procedures for testing the equipment for proper operation. Four tests are provided: Memory I/O test, Keyboard test, Remote controller test, and Test pattern.

7.4.1 Displaying the test menu

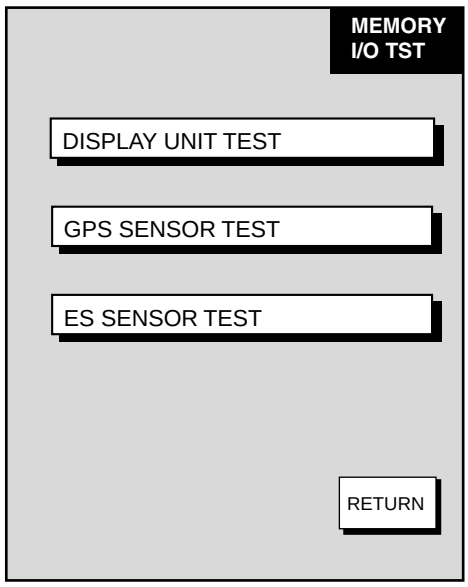
1. Press the [MENU] key to show the menu.
2. Press the SYSTEM CONFIGURATION soft key.
3. Press the TEST & CLEAR soft key.



Test menu

7.4.2 Memory I/O test

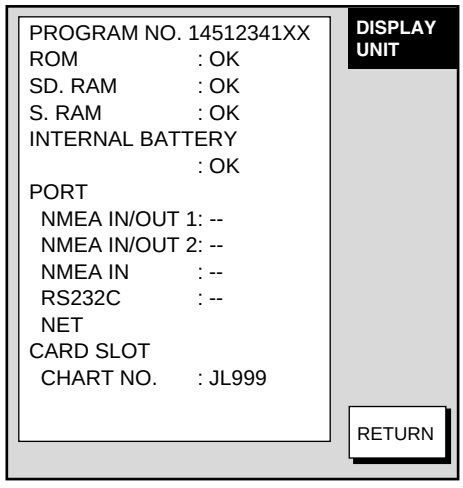
The memory I/O test conducts a general check of the system, displaying various program numbers and device status. Press the [MENU] key followed by the SYSTEM CONFIGURATION and MEMORY I/O TEST soft keys. Then press appropriate soft key to select a test.



Memory I/O test menu

Display unit test

Press the DISPLAY UNIT TEST soft key at the memory I/O test menu to test the display unit. The equipment displays program version, checks devices and show the number of the chart card inserted in the chart slot (if inserted). Results for device checks are shown as OK or NG (No Good). For any NG request service. "--" means no equipment connected.

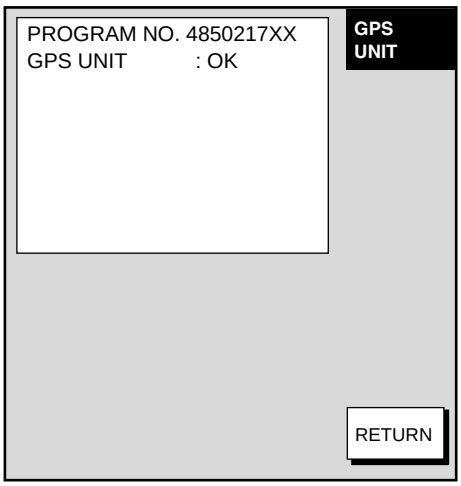


XX = Program Version No.

Display unit test results

GPS sensor test (blackbox GPS unit)

Press the GPS SENSOR TEST soft key at the memory I/O test menu to check the blackbox GPS unit. The equipment displays GPS sensor program version, and checks the GPS unit for proper operation, displaying OK or NG (No Good) as the result. For NG request service.

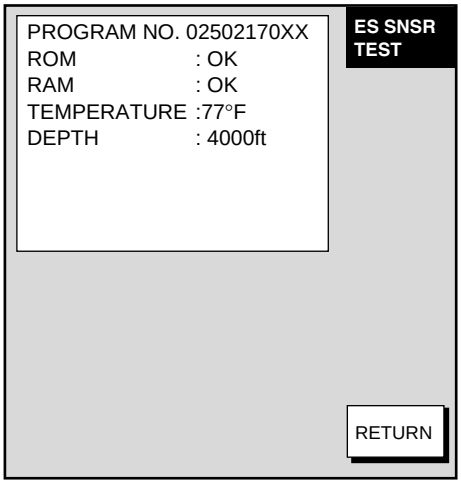


XX = Program Version No.

GPS sensor test results

ES sensor test (blackbox echo sounder)

Press the ES SENSOR TEST soft key at the memory I/O test menu to check the blackbox echo sounder unit. The equipment displays echo sounder program version, checks the ROM and RAM, and displays temperature and depth. The results of the ROM and RAM check are shown OK or NG (No Good). For NG request service.



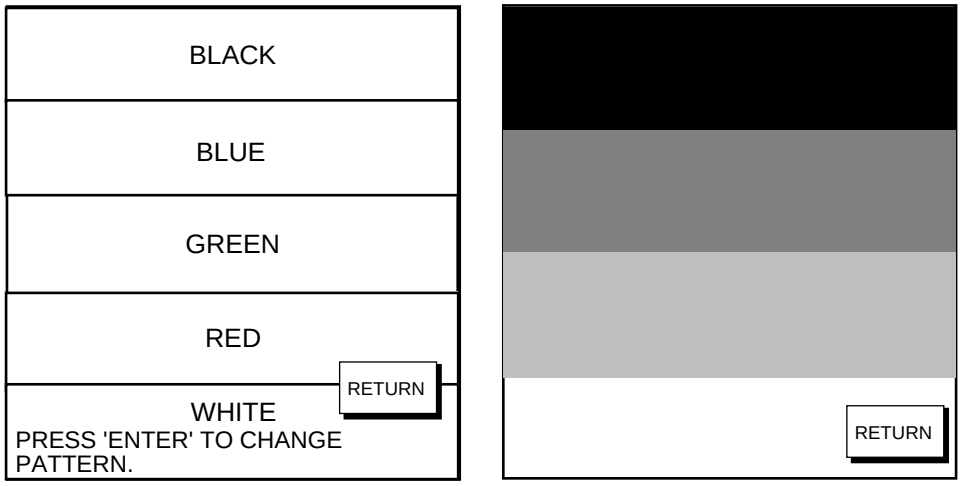
XX = Program Version No.

ES sensor test results

7.4.3 Test pattern

The test pattern test checks the display for proper display of colors (MODEL-1700C series) or tones (MODEL-1700 series).

1. Press the [MENU] key to show the menu.
2. Press the SYSTEM CONFIGURATION soft key.
3. Press the TEST & CLEAR soft key.
4. Press the TEST PATTERN soft key.



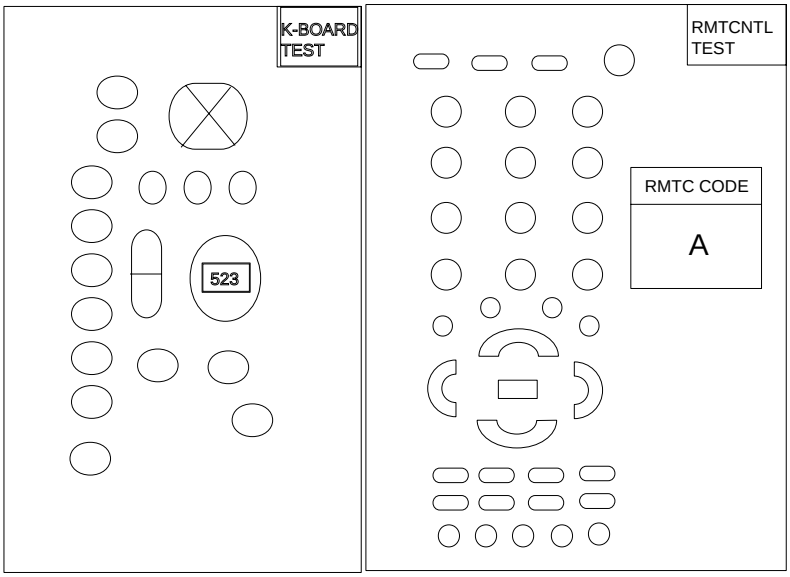
Test patterns

5. For the MODEL-1700C series, press the [ENTER] knob to show white, red, green, blue and black colors.
6. Press the RETURN soft key to finish.
7. Press the [MENU] key to close the menu.

7.4.4 Keyboard test

The keyboard test checks all the controls for proper operation.

1. Press the [MENU] key to show the menu.
2. Press the SYSTEM CONFIGURATION soft key.
3. Press the TEST & CLEAR soft key.
4. Press the KEYBOARD & I/R REMOTE TEST soft key.



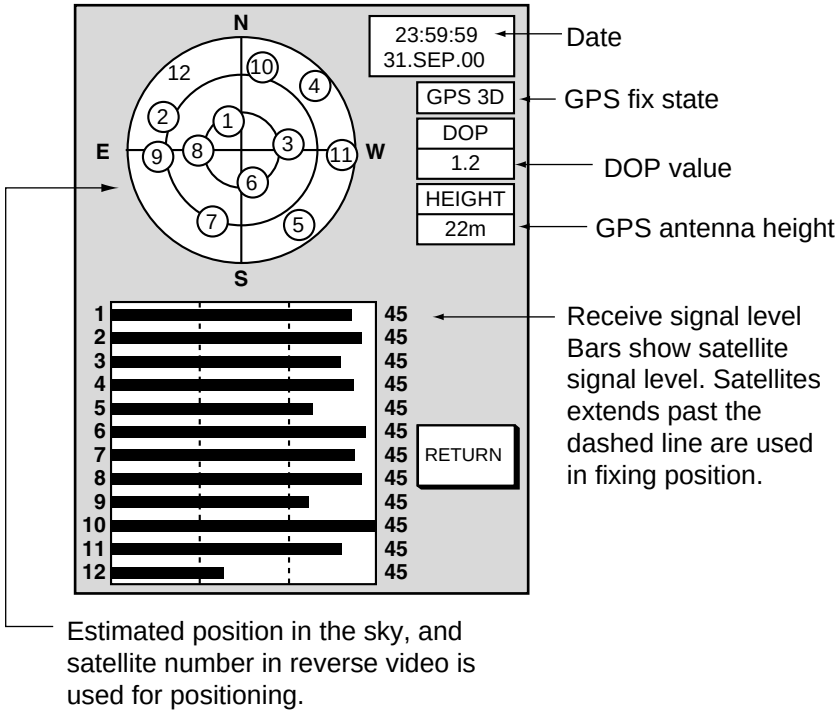
Screen for testing keyboard, remote controller

5. Operate each control on the keyboard or remote controller one by one. A key is functioning properly if its on-screen location “lights” when the key is pressed. The digits at the on-screen location for the [ENTER] knob on the display unit increment upward or downward with clockwise and counterclockwise rotation of the knob, respectively.
6. Press the [CLEAR] key three times to escape from the test.
7. Press the [MENU] key to close the menu.

7.5 GPS Monitor Display

The GPS monitor provides data about the GPS satellites.

1. Press the [DISP] key to show the plotter display.
2. Press the [MENU] key.
3. Press SYSTEM CONFIGURATION, NAV OPTIONS and GPS UNIT SETUP soft keys to display the GPS SETUP menu.
4. Press the soft key GPS MON.

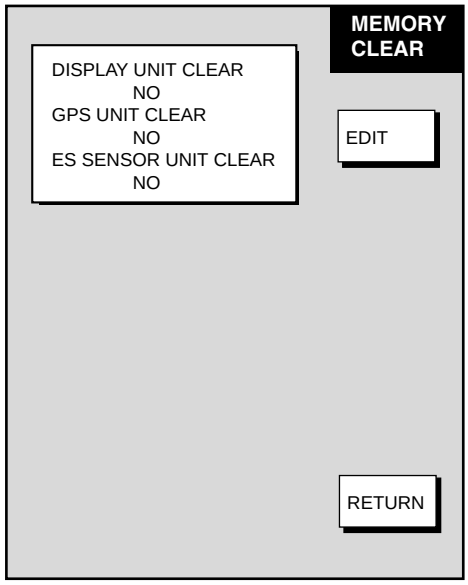


GPS monitor display

7.6 Clearing Memories

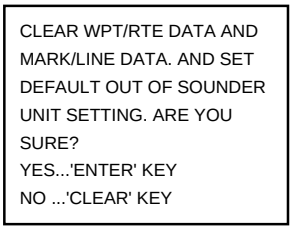
Your equipment has a memory bank for each of the plotter, radar and sounder sections. These memories can be cleared collectively or individually to start operation afresh, with default settings.

1. Press the [MENU] key to open the menu.
2. Press the CONFIGURATION soft key.
3. Press the USER OPTION soft key.
4. Press the MEMORY CLEAR soft key.

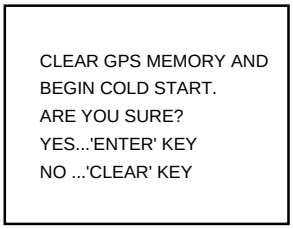


Memory clear menu

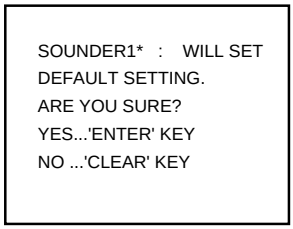
5. Select the memory to clear.
6. Press the EDIT soft key. One of the following displays appear.



DISPLAY UNIT CLEAR



GPS UNIT CLEAR



*: ETR HOST name

SOUNDER UNIT CLEAR

Windows for clearing memory

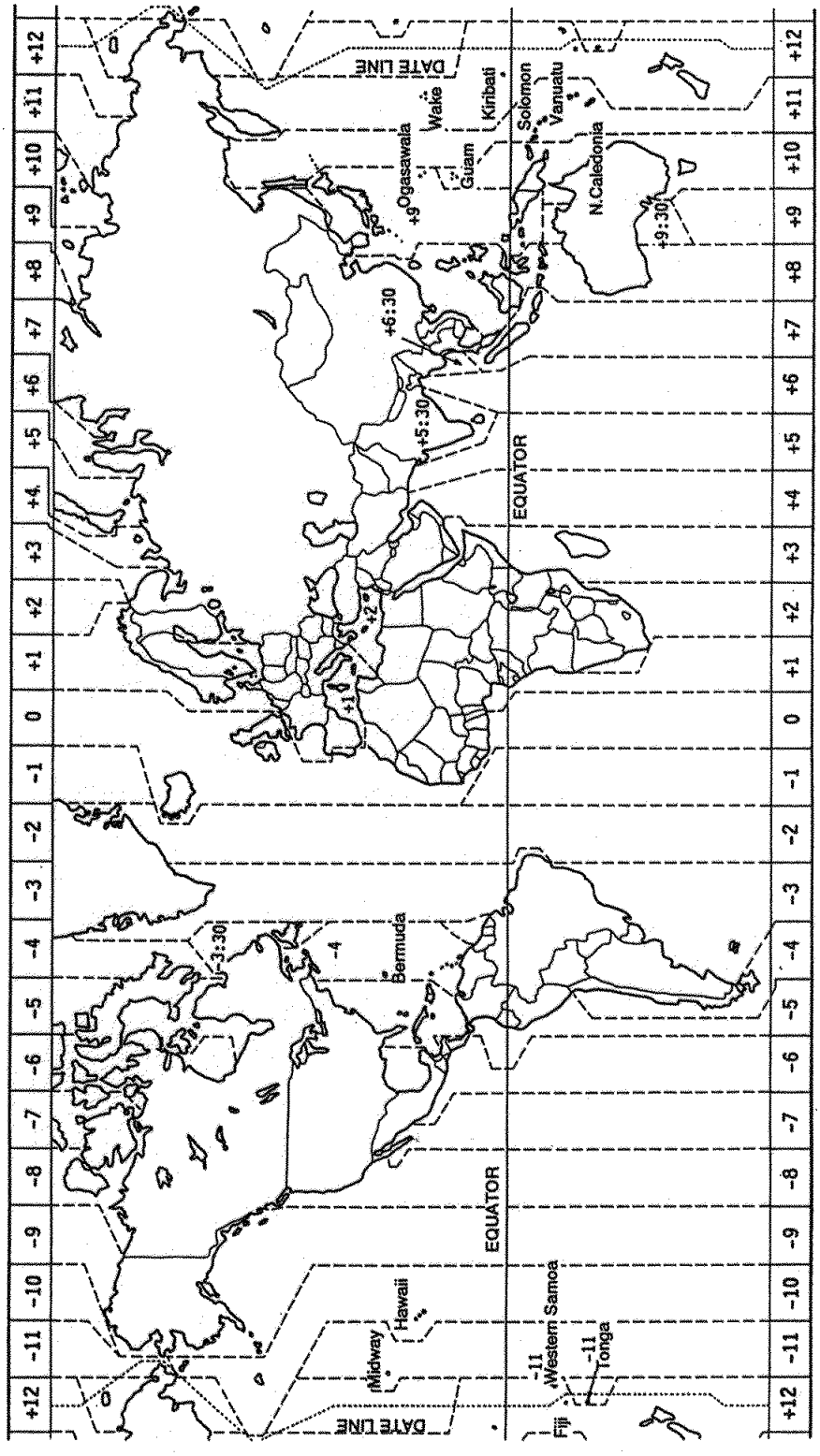
7. Select YES and press the ENTER soft key. You are asked if you are sure to clear the memory.
8. Push the [ENTER] knob to clear the memory.

APPENDIX

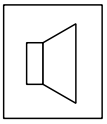
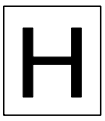
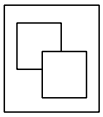
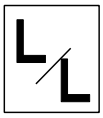
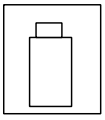
Geodetic Chart List

001: WGS84
002: WGS72
003: TOKYO : Mean Value (Japan, Korea, and Okinawa)
004: NORTH AMERICAN 1927 : Mean Value (CONUS)
005: EUROPEAN 1950 : Mean Value
006: AUSTRALIAN GEODETIC 1984 : Australia and Tasmania Island
007: ADINDAN : Mean Value (Ethiopia and Sudan)
008: : Ethiopia
009: : Mall
010: : Senegal
011: : Sudan
012: AFG : Somalia
013: AIN EL ABD 1970 : Bahrain Island
014: ANNA 1 ASTRO 1965 : Cocos Island
015: ARC 1950 : Mean Value
016: : Botswana
017: : Lesotho
018: : Malawi
019: : Swaziland
020: : Zaire
021: : Zambia
022: : Zimbabwe
023: ARC 1960 : Mean Value (Kenya, Tanzania)
024: : Kenya
025: : Tanzania
026: ASCENSION ISLAND 1958 : Ascension Island
027: ASTRO BEACON "E" : Iwo Jima Island
028: ASTRO B4 SOR. ATOLL : Tern Island
029: ASTRO POS 71/4 : St. Helena Island
030: ASTRONOMIC STATION 1952 : Marcus Island
031: AUSTRALIAN GEODETIC 1966 : Australia and Tasmania Island
032: BELLEVUE (IGN) : Efate and Erromango Islands
033: BERMUDA 1957 : Bermuda Islands
034: BOGOTA OBSERVATORY : Colombia
035: CAMPO INCHAUSPE : Argentina
036: CANTON ISLAND 1966 : Phoenix Islands
037: CAPE : South Africa
038: CAPE CANAVERAL : Mean Value (Florida and Bahama Islands)
039: CARTHAGE : Tunisia
040: CHATHAM 1971 : Chatham Island (New Zealand)
041: CHUA ASTRO : Paraguay
042: CORREGO ALEGRE : Brazil
043: DJAKARTA (BATAVIA) : Sumatra Island (Indonesia)
044: DOS 1968 : Gizo Island (New Georgia Island)
045: EASTER ISLAND 1967 : Easter Island
046: EUROPEAN 1950 (Cont'd) : Western Europe
047: : Cyprus
048: : Egypt
049: : England, Scotland, Channel, and Shetland Islands
050: : England,Ireland, Scotland, and Shetland Islands
051: : Greece
052: : Iran
053: : Italy Sardinia
054: : Italy Sicily
055: : Norway and Finland
056: : Portugal and Spain
057: EUROPEAN 1979 : Mean Value
058: GANDAJIKA BASE : Republic of Maldives
059: GEODETIC DATUM 1949 : New Zealand
060: GUAM 1963 : Guam Island
061: GUX 1 ASTRO : Guadalcanal Island
062: HJORSEY 1955 : Iceland
063: HONG KONG 1963 : Hong Kong
064: INDIAN : Thailand and Vietnam
065: : Bangladesh, India, and Nepal
066: IRELAND 1956 : Ireland
067: ISTS 073 ASTRO 1969 : Diego Garcia
068: JHONSTON ISLAND 1961 : Johnston Island
069: KANDAWALA : Sri Lanka
070: KERGUELEN ISLAND : Kerguelen Island
071: KERTAU 1948 : West Malaysia and Singapore
072: LA REUNION : Mascarene Island
073: L.C. 5 ASTRO : Cayman Brac Island
074: LIBERIA 1964 : Liberia
075: LUZON : Philippines (Excluding Mindanao Island)
076: : Mindanao Island
077: MAHE 1971 : Mahe Island
078: MARCO ASTRO : Salvage Islands
079: MASSAWA : Eritrea (Ethiopia)
080: MERCHICH : Morocco
081: MIDWAY ASTRO 1961 : Midway Island
082: MINNA : Nigeria
083: NAHRWAN : Masirah Island(Oman)
084: : United Arab Emirates
085: : Saudi Arabia
086: NAMIBIA : Namibia
087: MAPARIMA, BWI : Trinidad and Tobago
088: NORTH AMERICAN 1927 : Western United States
089: : Eastern United States
090: : Alaska
091: : Bahamas (Excluding San Salvador Island)
092: : Bahamas San Salvador Island
093: : Canada (Including Newfoundland Island)
094: : Alberta and British Columbia
095: : East Canada
096: : Manitoba and Ontario
097: : Northwest Territories and Saskatchewan
098: : Yukon
099: : Canal Zone
100: : Caribbean
101: : Central America
102: : Cuba
103: : Greenland
104: : Mexico
105: NORTH AMERICAN 1983 : Alaska
106: : Canada
107: : CONUS
108: : Mexico, Central America
109: OBSERVATORIO 1966 : Corvo and Flores Islands (Azores)
110: OLD EGYPTIAN 1930 : Egypt
111: OLD HAWAIIAN : Mean Value
112: : Hawaii
113: : Kaual
114: : Maui
115: : Oahu
116: OMAN : Oman
117: ORDNANCE SURVEY OF GREAT BRITAIN 1936 : Mean Value
118: : England
119: : England, Isle of Man, and Wales
120: : Scotland and Shetland Islands
121: : Wales
122: PICO DE LAS NIVIES : Canary Islands
123: PITCAIRN ASTRO 1967 : Pitcairn Island
124: PROVISIONAL SOUTH CHILEAN 1963 : South Chile (near 53°s)
125: PROVISIONAL SOUTH AMERICAN 1956 : Mean Value
126: : Bolivia
127: : Chile Northern Chie (near 19°s)
128: : Chile Southern Chile (near 43°s)
129: : Colombia
130: : Ecuador
131: : Guyana
132: : Peru
133: : Venezuela
134: PUERTO RICO : Puerto Rico and Virgin Islands
135: QATAR NATIONAL : Qatar
136: QORNOQ : South Greenland
137: ROME 1940 : Sardinia Islands
138: SANTNA BRAZ : Sao Maguel, Santa Maria Islands (Azores)
139: SANTO (DOS) : Espirito Santo Island
140: SAPPER HILL 1943 : East Falkland Island
141: SOUTH AMERICAN 1969 : Mean Value
142: : Argentina
143: : Bolivia
144: : Brazil
145: : Chile
146: : Colombia
147: : Ecuador
148: : Guyana
149: : Paraguay
150: : Peru
151: : Trinidad and Tobago
152: : Venezuela
153: SOUTH ASIA : Singapore
154: SOUTHEAST BASE : Porto Santo and Medeira Islands
155: SOUTHWEST BASE : Faial, Graciosa, Pico, Sao Jorge, and Terceira Islands
156: TIMBALAI 1948 : Brunel and East Malaysia (Sarawak and Sadah)
157: TOKYO : Japan
158: : Korea
159: : Okinawa
160: TRISTAN ASTRO 1968 : Tristan da Cunha
161: VITI LEVU 1916 : Viti Levu Island (Fiji Islands)
162: WAKE-ENIWETOK 1960 : Marshall Islands
163: ZANDERIJ : Suriname
164: BUKIT RIMPAH : Bangka and Belitung Islands (Indonesia)
165: CAMP AREA ASTRO : Camp Mcmurdo Area, Antarctica
166: G. SEGARA : Kalimantan Islands(Indonesia)
167: HERAT NORTH : Afghanistan
168: HU-TZU-SHAN : Taiwan
169: TANANARIVE OBSERVATORY 1925 : Madagascar
170: YACARE : Uruguay
171: RT-90 : Sweden
172 : Pulkovo 1942 : Russia

World Time Chart



Icons

Icon	Meaning
	North marker. Shows North in course-up and automatic course-up modes.
	Correct chart and suitable scale - full chart reliability.
	Chart overenlarged.
	• Chart card not inserted. • Wrong chart card inserted. • Chart scale too small.
	Alarm setting violated.
	Track is not being recorded or plotted.
	Chart offset applied.
	Voyage-based route’s waypoints are being entered manually.
	Latitude and longitude position offset applied.
	Voltage of battery on circuit board in display unit is low. Contact your dealer about replacement.

SPECIFICATIONS OF MARINE RADAR
MODEL 1722/1732/1742/1762
MODEL 1722C/1732C/1742C/1762C

1. GENERAL

(1) Indication System

M1722/1732/1742/1762 PPI Daylight display, raster scan, 4 tones monochrome LCD

M1722C/1732C/1742C/1762C PPI Daylight display, raster scan, color LCD

(2) Range, Pulse length (PL) & Pulse Repetition Rate (PRR)

Range (nm)	Pulse length (μs)	PRR (Hz approx.)
0.125 to 1.5	0.08	2100
1.5 to 3	0.3	1200
3 to 48*	0.8	600

*Maximum Range: M1722/C: 24nm, M1732/C: 36nm, M1742/C: 36nm, M1762/C: 48nm

(3) Range Resolution 29 m

(4) Bearing Resolution M1722/C: 6.7°, M1732/C: 5.5°, M1742/C: 5.0°, M1762/C: 3.9°

(5) Minimum Range 41 m

(6) Bearing Accuracy ±1°

(7) Range Ring Accuracy 0.9 % of range or 8 m, whichever is the greater

2. SCANNER UNIT

MODEL1722/C:

(1) Radiator Micro-strip

(2) Polarization Horizontal

(3) Antenna Rotation Speed 23 rpm nominal

(4) Radiator Length 45 cm

(5) Horizontal Beamwidth less than 5.2°

(6) Vertical Beamwidth 25°

(7) Sidelobe Attenuation less than -20 dB

MODEL1732/C:

(1) Radiator Printed waveguide array

(2) Polarization Horizontal

(3) Antenna Rotation Speed 24 rpm nominal

(4) Radiator Length 60 cm

(5) Horizontal Beamwidth less than 4°

(6) Vertical Beamwidth 20°

(7) Sidelobe Attenuation less than -18 dB

MODEL1742/C:

(1)	Radiator	Slotted waveguide array
(2)	Polarization	Horizontal
(3)	Antenna Rotation Speed	24 rpm nominal
(4)	Radiator Length	60 cm
(5)	Horizontal Beamwidth	less than 3.5°
(6)	Vertical Beamwidth	30°
(7)	Sidelobe Attenuation	less than -20 dB

MODEL1762/C:

(1)	Radiator	Slotted waveguide array
(2)	Polarization	Horizontal
(3)	Antenna Rotation Speed	24 rpm nominal
(4)	Radiator Length	100 cm
(5)	Horizontal Beamwidth	less than 2.4°
(6)	Vertical Beamwidth	27°
(7)	Sidelobe Attenuation	less than -24 dB

3. TRANSCEIVER MODULE

(1)	Frequency and Modulation	9410 MHz ±30MHz (X band), P0N
(2)	Peak Output Power	M1722/1742/1722C/1742C: 2 kW nominal, M1732/1762/1731C/1762C: 4 kW nominal
(3)	Modulator	FET Switching Method
(4)	Intermediate Frequency	60 MHz
(5)	Tuning	Automatic
(6)	Receiver Front End	MIC (Microwave IC)
(7)	Bandwidth	7 MHz
(8)	Duplexer	Circulator with diode limiter
(9)	Warming up	M1722/1722C: 60 sec. approx. M1732/1742/1762(C): 90 sec. approx.

4. DISPLAY UNIT

(1) Picture Tube

M1722 /1732/1742/1762	7 inch rectangular monochrome LCD 240(H) x 320(V) dots, Effective radar display area: 240 x 240 dots
M1722C/1732C/1742C/1762C	6.5 inch rectangular color LCD 234(H) x 320(V) dots, Effective radar display area: 234 x 234 dots

(2) Range, Range Ring Interval, Number of Rings

Range (NM)	0.125	0.25	0.5	0.75	1	1.5	2	3	4	6	8	12	16	24	36	48
Ring Interval (NM)	0.0625	0.125	0.125	0.25	0.25	0.5	0.5	1	1	2	2	3	4	6	6	4
Number of Rings	2	2	4	3	4	3	4	3	4	3	4	4	4	4	6	12

Maximum range: M1722/C: 24nm, M1732/1742(C): 36nm, M1762/C: 48nm

(4) Markers — Heading Line, Bearing Scale, Range Rings,
Variable Range Marker (VRM), Electronic Bearing Line (EBL),
Alarm Zone, Waypoint Mark (navigation input required)

(5) Alphanumeric Indications — Range, Range Ring Interval, Interference Rejection (IR),
Variable Range Marker (VRM), Electronic Bearing Line (EBL),
Stand-by (ST-BY)
Guard Alarm (G(IN), G(OUT)), Echo Stretch (ES),
Range and Bearing to Cursor, L/L Position*, Echo Tailing (TRAIL),
Trailing Time, Watchman (WATCHMAN),
Ship's speed* (SPD), Ship's Course*
Water temperature**, Water depth**
*: Navigation data required, **: Echo sounder data required

(6) Input Data — IEC 61162-1/ NMEA 0183 Ver.1.5

Own ship's position:	GGA>RMC>RMA>GLL
Ship's speed:	RMC>RMA>VTG>VHW
Bearing (True):	HDT>HDG[*1]>HDM[*1]>VHW
Bearing (Magnetic):	HDM>HDG[*1]>HDT[*1]>VHW
Course:	RMC>RMA>VTG
Waypoint (Range, Bearing):	RMB>WPL>BWR>BWC
Loran time difference:	RMA>GLC>GTD
Water depth:	DPT>DBT>DBS>DBK
Wind:	MWV>VWT>VWR
Water Temperature:	MTW
Time:	ZDA

[*1]: calculated by magnetic deviation

(7) Output Data

Alarm signal — 12 VDC, 100 mA or less

5. PLOTTER FUNCTION

(1) Projection — Mercator

(2) Usable Area — 85° latitude or below

(3) Effective Area — 133.4 x 97.3 mm

(4) Display pixels — 234 x 320 dots

(5) Position Indication — Latitude/longitude, Loran C LOP or DECCA LOP

(6)	Effective Projection Area	0.125 nm to 1,024 nm (at equatorial area)
(7)	Track Display	Plot interval: by time (0 to 99 min. 59 sec.) or by distance (0 to 99.9 nm)
(8)	Colors	Red, yellow, green, purple, light-blue, blue, white
(9)	Memory Capacity	Track/mark: 8000 points, Waypoint: 999 points
(10)	Storage Capacity	Simple route: 200 routes with 35 waypoints each
(11)	MOB	1 point
(12)	Quick Routes	1 course with 35 waypoints max.
(13)	Electronic Chart	FURUNO chart card or NAVIONICS chart card available C-MAP chart card also available for C-MAP NT Model
(14)	Alarms	Arrival and Anchor watch, Cross track error and proximity alarms, Ship's speed in and out alarms, Water temperature, Trip alarm

5. POWER SUPPLY

(1)	Rated Voltage/Current	
	M1722	12-24 VDC: 3.7-1.8 A
	M1732	12-24 VDC: 3.8-1.9 A
	M1742	12-24 VDC: 3.9-2.0 A
	M1762	12-24 VDC: 4.2-2.1 A
	M1722C	12-24 VDC: 4.4-2.2 A
	M1732C	12-24 VDC: 4.5-2.3 A
	M1742C	12-24 VDC: 4.6-2.3 A
	M1762C	12-24 VDC: 4.9-2.4 A
(2)	Rectifier (PR-62: option)	100/110/115/200/220/230 VAC, 1 phase, 50/60 Hz

6. ENVIRONMENTAL CONDITION

(1)	Ambient Temperature	Scanner Unit: -25°C to +70°C
	(IEC 60945)	Display Unit: -15°C to +55°C
(2)	Relative Humidity	93 % or less at +40°C
(3)	Waterproofing	Scanner Unit: IPX6
	(IEC 60529)	Display Unit: IPX5
(4)	Bearing Vibration	IEC 60945

7. COATING COLOR

(1)	Display Unit	N3.0
(2)	Scanner Unit	
	M1722/1732 (C)	N9.5 (upper), 2.5PB3.5/10 (lower)
	M1742/1762 (C)	N9.5

8. COMPASS SAFE DISTANCE

(1) Display Unit

M1722/1732/1742/1762	Standard: 0.90 m	Steering: 0.60 m
M1722C/1732C/1742C/1762C	Standard: 0.90 m	Steering: 0.60 m

(2) Scanner Unit

M1722/C	Standard: 1.25 m	Steering: 0.85 m
M1732/C	Standard: 1.40 m	Steering: 1.10 m
M1742/C	Standard: 2.10 m	Steering: 1.60 m
M1762/C	Standard: 1.00 m	Steering: 0.75 m