

LCD7 NT

USER MANUAL

Software name: SW7LCD - 131_C343 -

Warning!!!

Electronic charts displayed by the chart plotter are believed to be accurate and reliable, but they are not intended to substitute for the official charts which should remain your main reference for all the matters related to the execution of a safe navigation.

For this reason we like to remind you that you are required to carry on board and use the officially published and approved nautical charts.

Caution!!!

- Please read through this manual before the first operation. If you have any questions, please contact the Company customer service or your local dealer.
- This chart plotter is not built to be submerged. It is built to a standard that allows it to be subjected to light rain and spray without causing permanent damage. Units that are subjected to submersion will be considered to have been abused and therefore not covered under the warranty program.
- Extensive exposure to heat may result in damage to the chart plotter.
- Connection to the power source with reversed polarity will damage the chart plotter severely. This damage may not be covered by the warranty.
- The chart plotter contains dangerous high voltage circuits which only experienced technicians can handle.
- The C-MAP data cartridge are available from you local dealer.

Attenzione!

L'esposizione del display ai raggi ultravioletti può accorciare la vita dei cristalli liquidi usati nel vostro plotter. Questo limite è dovuto alla tecnologia costruttiva degli attuali display.

Si raccomanda pertanto di tenere la macchina protetta dalla luce solare intensa e di coprire lo schermo quando non in uso.

Evitare inoltre che il display si surriscaldi per non causare una diminuzione di contrasto che, in casi estremi, può rendere lo schermo completamente nero.

Tale condizione è comunque reversibile durante il raffreddamento.

Warning!

Exposure of display to UV rays may shorten life of the liquid crystals used in your plotter. This limitation is due to the current technology of the LCD displays.

Ensure to protect your display from intense direct sunlight when not in use and whenever possible.

Avoid overheating which may cause loss of contrast and, in extreme cases, a darkening of the screen. Problems which occur from overheating are reversible when temperature decreases.

Achtung!

Ultraviolette Strahlen können die Lebensdauer vom Flüssigkristalldisplay verkürzen. Die derzeitige LCD-Technologie bedingt diese verkürzte Lebensdauer.

Schützen Sie daher Ihr LCD-Display vor direktem Sonnenlicht, wenn das Display nicht benutzt wird, wann immer die Möglichkeit besteht.

Überhitzung des Displays durch Sonneneinstrahlung führt zu einem Kontrastverlust und in extremen Fällen sogar in eine Schwärzung des Bildschirms.

Bei sinkenden Temperaturen normalisiert sich der Kontrast wieder und die Bildschirminformation wird wieder ablesbar.

Attention!

L'exposition de votre écran LCD aux ultra-violets lors de soleil intense réduira la durée de vie de l'afficheur de votre lecteur. Cette contrainte est liée à la technologie des écrans LCD.

Assurez-vous que votre appareil est bien protégé des rayons directs du soleil.

Une augmentation trop importante de température peut obscurcir des zones de votre écran et le rendre ainsi inutilisable (non couvert par la garantie).

Aviso!

La exposición de la pantalla a los rayos UV puede acortar la vida del cristal líquido usado en su plotter. Esta limitación se debe a la tecnología actual de las pantallas LCD.

Por ello se recomienda proteger la pantalla de la luz solar intensa y cubrirla cuando no se usa.

Evitar una exposición excesiva al sol puede reducir la vida útil de la pantalla.




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INTRODUCTION

The *LCD7 NT* is a computer specifically designed for nautical use, but more precisely, to ease and speed up all calculations which so far have been done manually (in the following pages we refer to *LCD7 NT* as the chart plotter).

The chart plotter is extremely easy to use. Your ship's position, courses and distances can be easily calculated through the use of a simple keyboard. This information can then be stored on a user cartridge, and can be recalled at any time.

This manual is structured as follows. Chapter 1 acquaints a new user with the chart plotter, its features and guides the first time user through basic set up. Chapter 2 contains information about the chart display to allow the user a personal setting of the chart plotter's display. Chapters 3 and 4 guide the user through using the chart plotter's charting and navigation capabilities. The user points management is described in Chapter 5, and Chapter 6 provides information about autopilot functions. Chapter 7 contains the user cartridge handling, and Chapter 8 is related to alarms and errors conditions. Refer also to the appendixes for more detailed information.

The following pages must be read carefully in order to discover all the powerful capabilities and features of this chart plotter.

❖ 1.1 - FEATURES

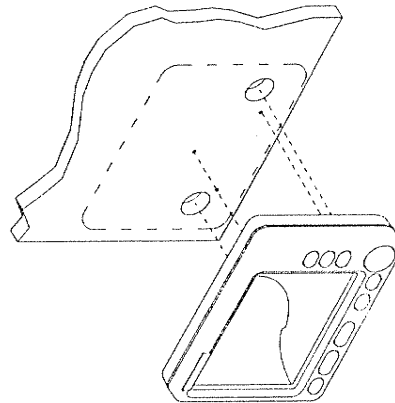
This chart plotter is extremely easy to use. Your ship's position, courses and distances can be easily calculated through the use of a simple keyboard. This information can then be stored on a user cartridge, and be recalled at any time. If connected to a positioning instrument (i.e. Loran-C, Satnav, Decca, GPS), the chart plotter displays the current position, speed, heading of the boat and its track. This data can be stored and recalled upon request.

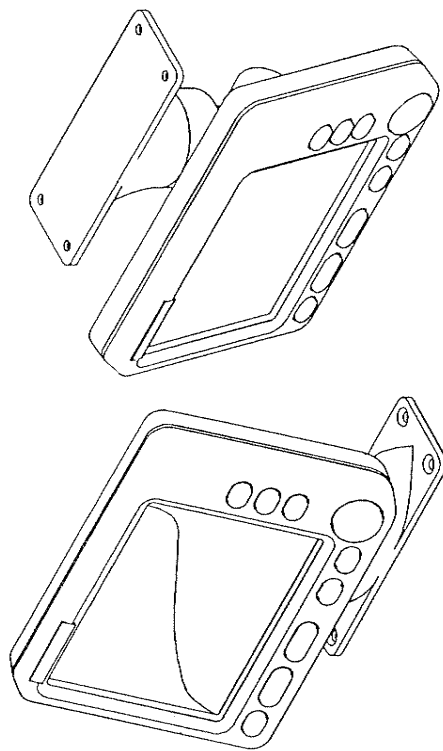
The following items are shipped with the chart plotter:

- N° 3 screws for external bracket
- On/Off warning sheet
- External mounting bracket
- Power supply and I/O cable "CONXALL 7F" 1,5 mt./5.9"
- **GPS VERSION ONLY** 11./23.6"
- User manual

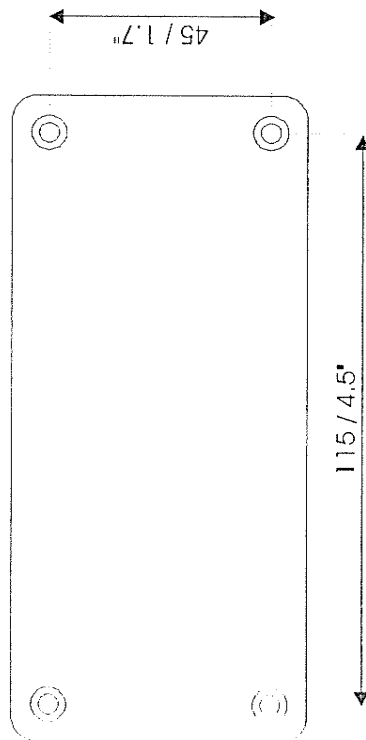
❖ 1.2 - INSTALLATION

The chart plotter is easily installed in most vessels (see App. F for connections). Bright sunlight on the screen can impair viewing. It is recommended that the chart plotter be located so that the screen is shaded as much as possible.



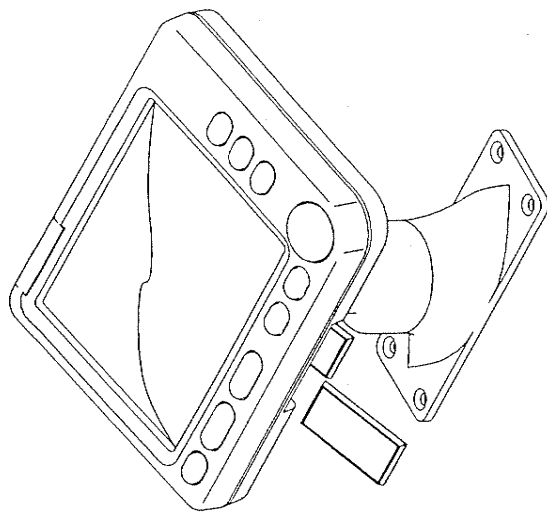


DESKTOP BRACKET FIXING TEMPLATE



❖ 1.3 - INITIAL SETTING

Before powering the chart plotter, connect the power cable, position the instrument and slide the cartridge into the slot.



The cartridges should be inserted into the slots with the code number not facing the screen.

The optional user cartridge recording all the desired information should be inserted into one of the two available slots.

❖ 1.4 - TURNING THE CHART PLOTTER ON/OFF

The chart plotter is turned On by pressing the **POWER** key. Similarly the chart plotter can be turned Off by holding the **POWER** key for a few seconds.

1.4.1) SCREEN BRIGHTNESS

The screen brightness can be controlled by pressing the **- LIGHT +** key.

Note

*Sometimes, in particularly poor light, the screen might appear blank, to regain the correct brightness simply press the **- LIGHT +** key. Go through the same procedure also when you are not sure if the **POWER** key is working properly when the chart plotter is turned On.*

The keyboard brightness is controlled the same way.

Contrast handling is made by the **CONTRAST** key.

Note

After a few time (user selectable, see par. 2.7.4) when no key is pressed, the screen and keyboard backlight is turned off. When a key is pressed again, the backlight is set to the previous value. This procedure suggested by the LCD's manufacturers and applied to all electronic devices (personal computers, echosounders, radars, ...) guarantees a long life of the LCD.

1.5 - AUTO-TESTING PROCEDURE

When powered On, the chart plotter starts a self-testing procedure which checks the internal memories (Eeprom and Ram) and shows any failure (Passed or Not Passed) on the screen. The cartridges are also examined and the following four abnormal situations are diagnosed:

"NOT PRESENT OR FAULTY" : this message appears in any of these three cases:

- no cartridge is inserted into the slot;
- the cartridge has not been entirely inserted into the slot;
- the cartridge is broken.

"FAULTY" : it indicates that the program has found a reading error. The reason is generally a damaged cartridge.

When the self-test is completed, the screen will be as follows:

SYSTEM UNIT TEST V. MX.YY (*)

- SYSTEM WORD: XXXX XXXX (**)
- EPROM TEST: PASSED
- RAM TEST: PASSED
- DATA : <MAP CARTRIDGE CODE>
- CODE : SW7LCD/95WD1 V. X.YY (***)

where:

- (*) the number of version displayed in the top right corner indicates system program version;
- (**) the code displayed near the "SYSTEM WORD" line indicates some system maintenance information which can change from a version to another but which do not represent any substantial change either to the software or to the manual;
- (***) for "C-CARD 1 and 2" lines, please see app. H;
- (****) the code displayed near the "CODE" line indicates:



Note

The release number, in the system program version and in the software version is subject to change without notice. This manual is valid too.

The user can freeze the System Test page pressing and holding down any key after the page is shown: when release the key the chart plotter go on and the chart plotter displays the Caution Notice.

This unit's displays are based on geographical data that C-MAP believes to be accurate.

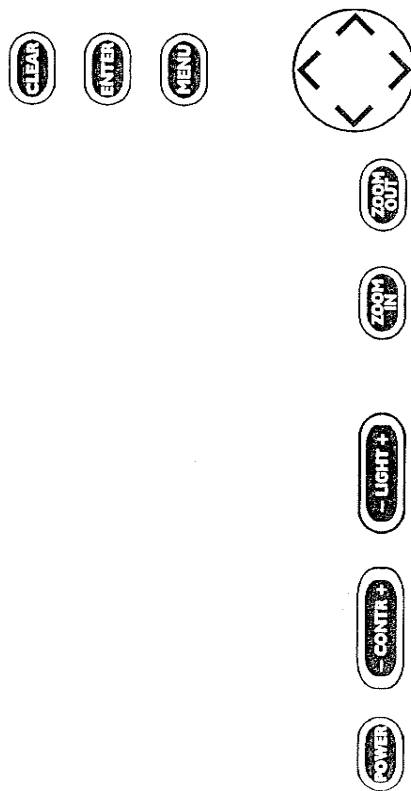
However, you should not rely on these visual map displays as your primary source of navigation.

This plotter is designed only to ease and speed up navigation calculations and must not be relied upon exclusively. Rather, this system should be used only as a backup to official government paper charts and traditional navigational methods. Displayed charts are only current on the date of issue shown on the chart cartridge.

Press 'ENT' to proceed

After pushing the **ENTER** key to exit Caution page, the screen will show the boundaries of all the Nautical Charts digitized in the cartridge (or the last chart used before turning off the chart plotter). The Cross-Hair is shown on the screen and can be moved by using the arrow keys.

❖ 1.6 - KEYBOARD DESCRIPTION



All operational functions are accessed by using the keyboard. Most functions are performed with the press of single key, but some less frequently used functions, especially those performed in setting up the chart plotter are selected by using the "menu" functions. The menu is a list of choices and will most often appear in the electronic chart display area, temporarily replacing the chart. Three beeps will advise you when a wrong key is pressed. Here is a brief description of the keys and their functions.

1.6.1) THE KEYBOARD KEYS AND THEIR FUNCTIONS

The **MENU** key

Press the **MENU** key to select the desired status on the bottom of the screen. The "status line" is displayed showing the next available status in order to come. Pressing the **MENU** key repeatedly scrolls through the status and the status line is shifted to the right, displaying a new active status in the status window with each press. The possible status are: FR-TO, HOME, PAN, GOTO, EVENT, MARKS, ROTTE #n, MENU, INFO. Press and holding down the **MENU** key for 2 seconds enables the Man Overboard (MOB) function (if it is receiving fix).

1. **FR-TO** (Range and Bearing)
This function is activated by pressing this key and will vary depending on whether you are operating in the Charting mode or in the Navigation mode (see par. 3.1 and par. 4.1).

2. **HOME**

When you have selected this option, press the **ENTER** key and the Home function is activated: the Cross-Hair is placed on the ship's position.

3. **PAN**

Selecting this option the area around the Cross-Hair will shift to the center of the screen (see par. 1.10).

4. **GOTO**

Selecting this option a Target appears on the screen, identified by a small circle (see par. 4.6).

5. **EVENT**

Selecting this option, an Event symbol is placed over the ship position.

6. **MARK**

Selecting this option, a Mark symbol is placed on the desired position (three different symbols of Mark are possible) (see par. 5.2).

7. **ROUTE #n**

Selecting this option a Waypoint is added to a selected route ("n" indicates the number of the route in use) (see par. 3.2).

8. **MENU**

By pressing the **ENTER** key when this option is highlighted the Main Menu appears on the screen. To pick from a vertical list of menu items, the up and down arrows are used to move up or down the list. For faster operation these keys allow you to "wrap around" (at the bottom of the menu list pressing the down arrow will cause a jump to the top, and while at the top, pressing the up arrow will cause it to jump to the bottom). To select a menu item or to choose among several choices in a horizontal row press the **ENTER** key. Press **MENU** to exit any menu or submenu and return to previous menu. Press **CLEAR** to return to the chart display and any changes you made to selections will be noted and stored in memory.

For example to select the desired language follow this procedure:

Selection of DESIRED LANGUAGE

1. Press **MENU** until "MENU" appears in the status window.
2. Press **ENTER** to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press **ENTER**: the Auxiliary Functions Menu will appear.

5. Use up or down arrow keys to highlight the Setup Menu (N. 3).
6. When you have highlighted that menu, press **ENTER**: the Setup Menu will appear.
7. Use up or down arrow keys to highlight language selection option (N. 1).
8. When you have highlighted that option, press **ENTER** to select the desired language. Every time the 'ENTER' key is pressed, one among the available languages is highlighted: highlight your choice.
9. Press **MENU** to return to previous menu or **CLEAR** to exit to charts.

In the following to reduce the manual length the above procedure ("extended procedure") is indicated as "short procedure":

Selection of DESIRED LANGUAGE

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/SETUP MENU (N. 3)/LANGUAGE (N. 1).
2. When you have highlighted that option, press **ENTER** to select the desired language. Every time the 'ENTER' key is pressed, one among the available languages is highlighted: highlight your choice.

Points 1-7 of extended procedure are resumed in the point 1 of short procedure, where only the names of selected menus are listed. Point 8 of extended procedure is the point 2 of the short procedure. Point 9 is always understood.

9. INFO

By pressing the **ENTER** key when this option is highlighted, it is possible to obtain all the available information about an object present on the chart

The **ENTER** key _____
This key is used to select the desired option or to activate a mode.

The **CLEAR** key _____
This key is used to exit into charts and to delete the user points.

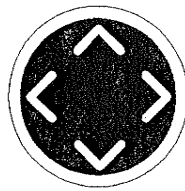
The **ZOOM IN** key _____
Pressing this key will show more detail in a smaller area, by changing the chart scale and "zooming in" on your display (see par. 1.9).

The **ZOOM OUT** key _____
This key operates similarly to the **ZOOM IN** key, except in the reverse, changing the scale and showing a wider, and less detailed view. For more information see par. 1.9.

The **BRIGHT** key _____
This key allows you to increase or decrease the brightness of the display back light and keyboard (see par. 1.4.1).

The **CONTR** key _____
This key allows you to control the contrast (see par. 1.4.1).

The **POWER** key _____
This key turns the chart plotter On or Off (see par. 1.4.1).



The _____ key _____
This key operates as the four arrow keys (up, down, right, left). It is used in menus to select the desired option and also to move the Cross-Hair on the screen.

❖ 1.7. CROSS-HAIR DESCRIPTION

The Cross-Hair, a small cross shown on the screen, is moved by pressing the arrow key. When you are in the split screen the cross hair position will appear in the data area of the screen:

```

CURSOR:
39 15.630 N
004 10.010 E
  
```

When you are in the full screen the Cross-Hair coordinates are shown in the text line at the top of the screen when you are in Charting mode:

```

+ 43 49.910 N
  009 47.180 E
  
```

1.8 - SCREEN DISPLAY DESCRIPTION

In the bottom right corner of the screen there is the "status window" of the chart plotter, where the name of the selected status is shown). This status window is active in either modes of map displaying.

The chart plotter can operate in split screen mode or in full screen mode. When you are in the split screen mode, the display is divided into two main parts, a left and a right window, with the right window being further divided into a top and bottom section.

The left window is the Electronic Chart Display. This is where you will see your charts, and under certain conditions, the menu items.

The right window is a Data Display window, which is divided into a top half, which is reserved for navigation or charting information, and a lower half, which is designed as a data window for general information, and under certain conditions, smaller menu selections.

In the full screen mode the charts are displayed in a full screen.

The right data display window will disappear and the top of the screen displays selected general information.

To switch between the two screen modes follow this procedure:

Selection of SCREEN MODE

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/CHART SETTINGS MENU (N. 5)/FULL DATA (N. 3).
2. Press **ENTER** to select full data ON/OFF.

1.8.1) THE DISPLAY SCREEN IN THE FULL SCREEN MODE

The full screen mode displays charts at full screen. At the top we display a line of data with information about the modes of operation, Latitude and Longitude of the Cross-Hair if you are in Charting mode, Latitude and Longitude of the received fix if you are in Navigation mode, in Navigation Area Amplifier mode or in Auto Zoom on Target mode, SOG and COG, and Distance and Bearing. The Charting mode is indicated as the Cross-Hair symbol, the Navigation mode as the ship symbol, the Auto Zoom on Target mode as the Target symbol and the Navigation Area Amplifier as an arrow from bottom left to top right.

The follow picture shows the information in the text line:

+	43	49	910	N	SOG:	01	.0	knT	CURSOR	DST:	--	--	--	NM
a	009	47	180	E	COG:	068	°	M	TO	TGT	BRG:	--	--	M
	b					c					d			e

where:

- a) - the symbol "+" appears when you are in Charting mode (see par. 3.1), while the

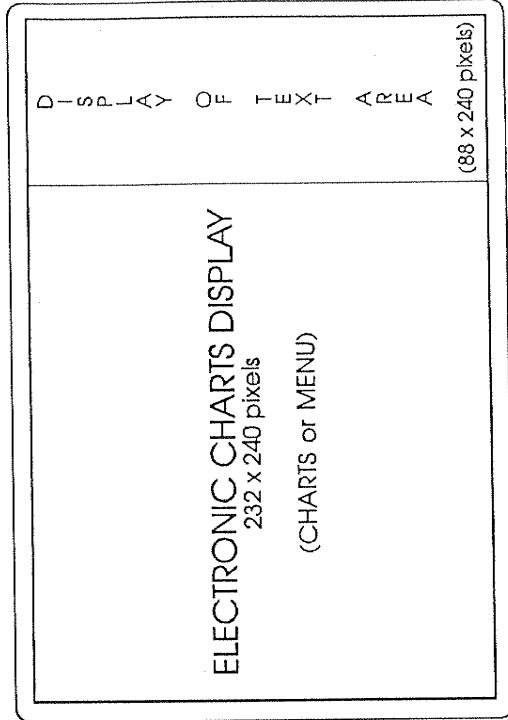
symbol "+" appears in Navigation mode (see par. 4.1). Here other two states are shown, the Target symbol that indicates the Auto Zoom on Target mode and an arrow from bottom left to the top right that indicates the Navigation Area Amplifier mode;

- ⑥ - current position if in Navigation mode, in Auto Zoom on Target mode or in Navigation Area Amplifier mode;
- ⑦ - ship speed over ground and ship course over ground;
- ⑧ - this message is shown in Charting mode if the Target has been inserted. Also in Charting, but with Target disabled, the message is substituted by "SHIP TO CURS", that appears in Navigation, in Auto Zoom on Target and in Navigation Area Amplifier too with Target disabled. In Navigation, in Auto Zoom on Target and in Navigation Area Amplifier with Target enabled, the message becomes "SHIP TO TARG";
- ⑨ - in place of DST, it is possible to show TTG or XTE and bearing to Target.

1.8.2) THE DISPLAY IN THE SPLIT SCREEN MODE

The screen is divided into two windows (320 x 240 pixels):

- the left one is used to show the Electronic Charts (232 x 240 pixels).
- the right one displays the main Navigational Data (88 x 240 pixels).



The follow picture shows information contained in the text area:

a	CHART DATUM
b	44 30.200 N
c	070 50.150 E
d	SDG: 010.2 KTS
e	COG: 198° M
f	CURS TO TARG
g	DST: 020.1 NM
h	BRG: 052° M
i	WGS84 SELECTED
	250.00 NM
	MENU

where:

- ① - It shows the actual FIX situation (***)
- ② - Current position in deg. LAT/LONG (°) received by the positioning equipment in use (Loran-C, Decca, Satnav etc...).
- ③ - Ship Speed Over Ground and ship Course Over Ground that can be either true or magnetic (°).
- ④ - Current position in deg. LAT/LONG of the Cross-Hair.
- ⑤ - This message is shown in Charting mode if the Target has been inserted. Also in Charting, but with Target disabled, the message is substituted by "SHIP TO CURS", that appears in Navigation, in Navigation Area Amplifier and in Auto Zoom on Target too with Target disabled. In Navigation, in Navigation Area Amplifier and in Auto Zoom on Target with Target enabled, the message becomes "SHIP TO TARG".
- ⑥ - In place of DST, it is possible to show TTG or XTE and bearing of the Target
- ⑦ - Here several messages are shown. For more information see par. 2.10.
- ⑧ - Chart scale on the screen (the number is the length in nautical miles of the segment on the screen).

Note

- (*) : If the positioning instrument is not connected or if its data is not properly received, then a series of diamonds will appear on the screen instead of decimals.
- (**) : The possible messages that might appear are the following:
- "NOT RECEIVED" : no data is received;
 - "WRONG FORMAT" : the received format does not correspond to the selected format or the data received does not have information on the ship's position;
 - "NOT GOOD" : the received format is correct but the information is declared invalid by the positioning instrument;
 - "CORRECTION ON" : the format is correct and understood and the fix correction is active;
 - "CORRECTION OFF" : the format is correct and understood, but the fix correction function is not active. This message appears only in virtual cartography. In cartography on the chart plotter substitutes the message "CORRECTION OFF" with one of the following:
 - "CHART DATUM"
 - "WGS84"
 - "< DATUM NAME >"

The "WRONG FORMAT" and "NOT RECEIVED" messages appear after 15 seconds after the condition persists. The "NOT GOOD" message appears after 30 seconds. The received fix conditions appears immediately. The specific alarm is activated after a good fix is not received for 1 minute.

❖ 1.9 - ZOOM IN AND ZOOM OUT FUNCTIONS

The zoom functions allow the user to select the desired charts scale by "zooming in", to display larger scales (more detail), and by "zooming out", to display smaller scales (less detail). By pressing the **Zoom In** key, you will see more details of a smaller area, and with the **Zoom Out** key, fewer details of a larger area.

Please note that in the Navigation mode, the plotter will show the area around the ship's position, while in Charting mode it will show the area around the Cross-Hair.

Note

The chart plotter turns off the cartography automatically after you have selected a scale where electronic charts are not available. In this mode of operation, called "virtual cartography", all the functions remain active. The message "TRACK PLOT MODE" appears on the screen. This function is available only if the "Plot Mode" option is enabled, see par. 2.6.6.

❖ 1.10 - PAN FUNCTION

Another way to home into parts of the screen while on the same map scale is done by activating the pan function.

The chart plotter features two different modes of operation: the Charting mode, in which all operations refer to the position of the Cross-Hair, and the Navigation mode, in which all operations refer to the ship's position (for more details refer to Chapt. 3 and 4).

In Charting mode when the Cross-Hair reaches one edge of the screen, the chart will move to show the part of the chart the cursor has been moved to. If the edge of the screen is also the edge of the chart, the chart plotter will choose a chart similar or at the closest scale available among the ones contained in the current cartridge. When the pan function is activated, the Cross-Hair with the location you want to see will shift to the center of the screen. To activate the pan function follow this procedure:

Selection of PAN function

1. Press **MENU** until "PAN" appears in the status window.
2. Press **ENTER** to select the pan function.

It is possible to activate the pan function at preset coordinates:

Selection of PAN at COORDINATES

1. Press **MENU** until "PAN" appears in the status window.
2. Press **ENTER** for more than 1 second, the exact coordinates of the Cross-Hair position will appear on the screen. Using the left and right arrows as a cursor, you can move the highlighted spaces and the coordinates can be changed by pressing the up and down arrows.
3. Press **ENTER** to confirm, and the new location will instantly appear on the screen. If coordinates are entered and the 'ENTER' key is pressed and the chart plotter beeps three times: it means that the coordinates are outside of the available charts in the current cartridge.
4. Press **EXIT** to exit.

❖ 1.11 - LANGUAGE SELECTION

The chart plotter can display messages in different languages. To activate such function please follow this procedure:

Selection of DESIRED LANGUAGE

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/SETUP MENU (N. 3)/LANGUAGE (N. 1).
2. When you have highlighted that option, press **ENTER** to select the desired language.

Every time the 'ENTER' key is pressed, one among the available languages is highlighted: make your choice.

❖ 1.12 - DATA RETENTION

Even with the power Off, the chart plotter retains the following data which will always be available for future use:

- Serial interface format selected (default: NMEA-0183)
- Last good position received from the positioning instrument with the last executed route
- Fix error and autocorrection status (enabled/disabled)
- Waypoints
- Marks and their identifier
- Compass calibration
- Percentage of memory still available for track recording
- Track recording status (enabled/disabled)
- Recorded distance and time between track point intervals
- Set autopilot alarm step
- Data regarding screen and cartography settings
- Keyboard and screen brightness
- Cartographic display

Note

Changing the software version or performing a ram clear the stored date is lost.

❖ 1.13 - DEFAULT SETTING

After a memory loss, the default values of the main parameters return to the following:

LAND SETTINGS :	Natural Features	ON
	Rivers and Lakes	ON
	Cultural Features	ON
	Landmarks	ON
MARINE SETTINGS :	Water Turbulence	ON
	Bathymetric Lines	ON
	Depth Areas Limit	5 MT
	Spot Soundings	ON
	Bottom Type	ON

NAVAL AIDS	Bathymetrics & Soundings Range	12000 MT
:	Ports and Services	ON
	Attention Areas	OFF
	Tracks and Routes	ON
	Lights	ON
	Buoys and Beacons	ON
	Signals	ON
	Cartographic Objects	ON
OTHER SETTINGS	Names	ON
:	Compass	ON
	Chart Generation	ON
	New Objects	ON
	Complex Object Icon	SINGLE
	Info Level	DETAILED
CHART SETTINGS	Coordinates	ON
:	Chart Boundaries	ON
	Full Data	OFF
	Chart info display	ON
	Depth Info	OFF
	Navigation Info	DTG
	Plotter Mode	OFF
SETUP	Language	ENGLISH
:	External Waypoint	OFF
	Cog Line at Boat	OFF
	Distance Unit	NM
	Speed Unit	KTS
	Depth Unit	MT
	Backlight Timeout	5 MIN
FIX & COMPASS	Fix Correction	OFF
:	Data Format	GPS
	Input Source	GPS
	Special Navigator	GPS
	Audible Alarm	ON
	Auto Alarm Clear	OFF
	Fix Datum WGS84	ON
	Chart Datum WGS84	ON
	Heading	MAG
	Magnetic Variation	AUTO
	Position Filter	OFF
	Speed Filter	OFF
	Filter Parameter	3
	Simulate	OFF
TRACKING	Track	OFF
:	Automatic Replot	ON
	Tracking Step Unit	DISTANCE
	Distance Step	1.0 NM

AUTOPILOT	Time Step	5 MIN
:	Output format	NMEA-0183
	Arrival Range	1.0 NM

❖ 1.14 · C-MAP 9.5 TECHNOLOGY OVERVIEW

1.14.1) INTO THE NEW TECHNOLOGY

Second generation data

The first generation data was originally captured on large digitizing tables, subject to the limitation of accuracy, manual skills of the operator and speed. To achieve a reasonable production output, completeness and accuracy had to be somehow compromised. This data also suffered from the problem of a simplified internal structure, which was impossible to change due to compatibility problems with the large number of installed plotters already in the market worldwide.

During the last two years, all C-MAP chart production was changed to a new advanced proprietary raster-to-vector technology which has totally revolutionized the performance of the data capturing process. Together with this improvement a new industry data structure standard, S57/S52 compatible, was adopted. This new standard is now being distributed as part of the CM-93 database for SOLAS class cartographic plotters and supplied to Hydrographic Offices throughout the world.

Second generation format

A second generation format has been developed to fulfil the needs of a wide range of plotters for the light marine market which are the target of this product. The result of this format is an optimization of memory, ease of processing and ability to use both monochrome and colour displays. This new format has been named **C-MAP 9.5**.

C-MAP 9.5 will be organized in seven scale ranges. Inside each range, data from different charts are clipped and merged together to obtain a seamless coverage.

Second generation hardware

The **C-MAP 9.5** database is available on a variety of media, but an innovative solid state cartridge, called **GCARD**, has been designed as the new standard. Its reduced size (24.0 x 44.2 x 2.4 mm) has been conceived to fit even in the smallest units, while its high-speed serialiser reduces the connection pin count to a mere 6. This unique feature dramatically increases its reliability, reduces the insertion force and offers flexibility of design.

Closed area geometry

Depth, intertidal, and bathymetric areas are now complete objects, with defined closed

area geometry, instead of just lines. This also improves the presentation of data, since it will allow the areas to be displayed with grayscale shading, or a wallpaper fill.

Restricted and regulated areas are categorized into specific objects and attributes. The data will be the same for any plotter, while the graphic display will be hardware-dependent. This means, for instance, that a caution area and restricted area will be two different objects in the database. It is available an 'info' function that will allow the user to access all information stored for each object.

Nav-Aids

Much more information is available for nav-aids (definition of composite objects, more effective encoding of light sectors, light characteristics, structures, colours, shapes, radio and radar signals, fog signals, etc.) The presentation could range from a perfect IHO-compliant graphic display on the more advanced units. The nav-aid data will be the same independent of the plotter and are accessible to the user through the 'info' function.

- Other improvements are:
- More detailed database.
- Better structured topology.
- Greater number of different objects.
- Spot soundings.

1.14.2) CARTOGRAPHIC FEATURES

Horizontally seamless cartography

Provides continuous panning within each of 7 layers composed of similar scales and quality charts. The horizontally seamless technology resolves the conceptual flaw present in previous competing seamless databases.

Scale integrity preservation

The number of stored scale levels (7) largely exceeds that of competing products, increasing speed and cartographic accuracy. In each scale level, only charts of comparable scale are merged.

Chart source identification

C-MAP NT is the only seamless cartography that provides source identification (chart number, etc.) as specified by the RTCM ECS standard.

Object oriented data structure

This advanced structure, besides incorporating the latest IMO concepts, is powerful enough to be applied to all GIS applications.

S57/DX90 Compatibility

This technology is compatible with the latest international IMO principles.

Enhanced chart data capture

Much more detail is extracted from the charts (spot soundings, depth areas, etc.) to satisfy the most demanding applications, setting it apart from competitive products.

Enhanced navigational aid data

Additional information on navigation aids provides for sophisticated graphic display.

Supplemental information

Many 1996 cartridge updates will incorporate a variety of boating related information (restaurants, refueling services, etc.).

Tidal tables

All 1996 cartridge updates will incorporate tidal information.

1.14.3) **C-MAP NT** **GO-CARD FEATURES**

High capacity

Memory capacity has been expanded to 16 Mbit (4 times the current cartridge & 2 times a PCMCIA). Circuitry provides for 48 Mbit expansion.

Smallest form factor in the industry

Advances in manufacturing technology have produced a cartridge of minimal size (24.0 x 44.2 x 2.4 mm) which is 6 times smaller than a PCMCIA.

Lowest pin count in the industry

The number of contact points has dramatically reduced to 6 (10 times less than a PCMCIA), thus increasing reliability, minimizing insertion force and allowing for remote cartridge readers and easy integration into any mechanical design.

Highest reliability

The greater the number of contact points the greater the chance of failure.

C-MAP's dramatic reduction in pin count has drastically reduced this problem.

1.14.4) INFORMATION ON UNDERWATER ROCKS ASSOCIATED WITH NAVIGATION AIDS

C-MAP electronic charts are produced by digitizing (vectorizing) official nautical charts issued by the Hydrographic Offices.

One of the most critical phases in this process is deciding how cartographic symbols and abbreviations represented on the chart must be encoded in digital format. At this regard, C-MAP maintains an internal standard called 'Encoding Specifications', that makes provision for the national symbols of each and every Hydrographic Office. Of course,



chapter 2 CUSTOMIZING THE DISPLAY

this Specification is updated regularly, as we go digitizing charts of a new Hydrographic Office, or when some relevant standard regarding electronic nautical charts (such as IHO S-57) is issued or revised.

The charts with underwater rocks associated with navigation aids have been digitized some years ago, according to an old version of the Encoding Specifications. At that time, underwater rocks were digitized by default beneath beacons or lighthouses (not buoys) placed at sea, because beacons and lighthouses are fixed structures that **MUST** be supported by a rock, or a concrete platform, or an islet, etc., and it was advisable to have something in the chart indicating the physical obstruction underneath the beacon or the lighthouse, in case the user would choose not to display the navigation aids on his plotter. Of course, underwater rocks were **NOT** digitized in association with buoys (that are floating devices), nor under beacons and lighthouses on shore.





C-MAP went through a major revision of its Encoding Specifications a couple of years ago, in coincidence with the issuing of S-57 by the IHO, and at that time it discontinued digitizing underwater rocks in association with fixed navigation aids. However, C-MAP still has many charts digitized in the past on which such rocks are present, and these must **NOT** be regarded as errors - they are just charts produced some years ago, according to different standards.

This brings of course to a different and more important question, i.e. whether the quality and the contents of the NT charts can be considered homogenous or not. A 'brand new' NT card does not necessarily contain new charts, digitized according to the latest standards and updated to the latest Notices to Mariners. A part of the CF-95/NT chart database is in fact derived from the traditional CF-85 database, from which it has inherited both the data contents and the updating status. Therefore, it may happen that a 'new' NT card contains new charts, updated to the latest encoding rules and Notices to Mariners, together with charts originally digitized five or six years ago in CF-85 format.

❖ 2.1 - MAP SETTINGS

One of the many advantages of C-MAP cartography is the ability to select the information you want to display.

The user may choose either to display or not on the screen the selected *objects*, depending on his specific requirements. These objects may be, for example, a Landing place, a Light float, a Lighthouse, a Lake and so on.

Considering the multitude of represented objects, these are gathered in sets called *categories*. Each category is represented in cartography by one *symbol*, which changes on the basis on details included in the representation. For example, the Landing place indicated above, belonging to the "Ports" category, is represented by  or by  or  depending on zoom level. The Light float, belonging to the "Lights" category, is always represented by the  symbol, independently of detail. For more information about categories, objects and symbols see table in par. 6.

Use the Map Settings Menu to select the objects to display on the screen. Note that there are objects which are always displayed on the screen, and the user cannot have the possibility to select or not their displaying. These objects are the following:

OBJECTS	CATEGORY
No data area	Areas Limits
Incomplete survey area	Cartographic objects
Fish haven	Caution areas
Airport	Composite objects
Anchorage	Composite objects
Channel edge	Composite objects
Deep water route	Composite objects
Defined water	Composite objects
Harbour	Composite objects
Mooring trot	Composite objects
Range system	Composite objects
Traffic Separation Scheme System	Composite objects
Area di profondità	Depths 1 (Shallow)
Dredged area	Depths 2
Intertidal area	Depths 3
Lighthouse	Lighthouse
Land area	Natural Features
Ice area	Natural Features (ICE)
Pingo	Natural Features (ICE)
Navigation mark [FIXED]	Navigation mark [FIXED]
Navigation mark [FLOATING]	Navigation mark [FLOATING]
Diffuser	OffShore Installation
Obstruction	OffShore Installation

cont.

Production installation OffShore Installation
Mooring/Warping facility Ports
Underwater rock Rocks
Wrecks Wrecks

The Map Settings Menu is subdivided in the following settings menu:

- Land Setting Menu (see par. 2.2)
- Marine Setting Menu (see par. 2.3)
- Naval Aids Menu (see par. 2.4)
- Other Settings Menu (see par. 2.5)
- Chart Settings Menu (see par. 2.6)

2.2 - LAND SETTINGS

The Land Setting Menu allows the user to activate the display of Natural Features, Rivers and Lakes, Cultural Features and Landmarks.

2.2.1) DISPLAYING OF NATURAL FEATURES

By selecting the "Natural Features On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Coastline	Natural Features
Dune	Natural Features
Hill	Natural Features
Land elevation	Natural Features
Land region	Natural Features
Salt plan	Natural Features
Slope Topline	Natural Features
Tree	Natural Features
Vegetation area	Natural Features

This function can be performed as follows:

Selection of NATURAL FEATURES DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/LAND SETTING MENU (N. 1)/NATURAL FEATURES (N. 1).
2. When you have highlighted that option, press **ENTER** to select the Natural Features On/Off. Every time the 'ENTER' key is pressed, the selection of Natural features is toggled On or Off.

2.2.2) DISPLAYING OF RIVERS AND LAKES

By selecting the "Rivers and Lakes On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Canal	Natural Features [RIVERS]
Canal bank	Natural Features [RIVERS]
Rapids	Natural Features [RIVERS]
River	Natural Features [RIVERS]
River bank	Natural Features [RIVERS]
Waterfall	Natural Features [RIVERS]
Lake shore	Natural Features
Lake	Lake

This function can be performed as follows:

Selection of RIVERS AND LAKES DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/LAND SETTING MENU (N. 1)/RIVERS AND LAKES (N. 2).
2. When you have highlighted that option, press **ENTER** to select the Rivers and Lakes On/Off. Every time the 'ENTER' key is pressed, the selection of Rivers and Lakes is toggled On or Off.

2.2.3) DISPLAYING OF CULTURAL FEATURES

By selecting the "Cultural Features On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Cable, overhead	Cultural Dashed
Fence	Cultural Dashed
Pipeline, overhead	Cultural Dashed
Pylon	Cultural Dashed
Telepherie	Cultural Dashed
Tunnel entrance	Cultural Dashed
Airport area	Cultural Features
Bridge	Cultural Features
Built-up area	Cultural Features
Railway	Cultural Features
Road crossing	Cultural Features
Road part	Cultural Features
Runway	Cultural Features
Sloping ground	Cultural Features
Square	Cultural Features

This function can be performed as follows:

Selection of CULTURAL FEATURES DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/LAND SETTING MENU (N. 1)/CULTURAL FEATURES (N. 3).

2. When you have highlighted that option, press **ENTER** to select the Cultural Features On/Off. Every time the 'ENTER' key is pressed, the selection of Cultural Features is toggled On or Off.

2.2.4) DISPLAYING OF LANDMARKS

By selecting the "Landmarks On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Building, religious	Landmarks1
Building, single	Landmarks1
Comentery	Landmarks1
Fortified structure	Landmarks1
Siloway route part	Landmarks1
Tank	Landmarks1
Chimney	Landmarks2
Dish aerial	Landmarks2
Flagstaff/Flagpote	Landmarks2
Flare stack	Landmarks2
Mast	Landmarks2
Monument	Landmarks2
Radar dome plane landing area	Landmarks2
Tower	Landmarks2
Windmill	Landmarks2
Windmotor	Landmarks2

This function can be performed as follows:

Selection of LANDMARKS DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/LAND SETTING MENU (N. 1)/LANDMARKS (N. 4).
2. When you have highlighted that option, press **ENTER** to select the Landmarks On/Off. Every time the 'ENTER' key is pressed, the selection of Landmarks is toggled On or Off.

2.3 - MARINE SETTINGS

The Marine Setting Menu allows the user to switch On/Off the display of Depth Areas, Spot Soundings and Bottom Type.

2.3.1) DISPLAYING OF WATER TURBULENCE

By selecting the "Water Turbulence On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Tideway	Water Turbulence
Water Turbulence	Water Turbulence

This function can be performed as follows:

Selection of WATER TURBULENCE DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/MARINE SETTING MENU (N. 2)/WATER TURBOLENCE (N. 1).
2. When you have highlighted that option, press **ENTER** to select the Water Turbulence On/Off. Every time the 'ENTER' key is pressed, the selection of Water Turbulence is toggled On or Off.

2.3.2) DISPLAYING OF DEPTH LINES

By selecting the "Depth Lines On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Depth contour	Depths 1
Shallow water blue	Depths 2
Zero meter contour	Depths 3

This function can be performed as follows:

Selection of DEPTH LINES DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/MARINE SETTING MENU (N. 2)/DEPTH LINES (N. 2).
2. When you have highlighted that option, press **ENTER** to select the Depth Lines On/Off. Every time the 'ENTER' key is pressed, the selection of Depth Lines is toggled On or Off.

2.3.3) SELECTING OF DEPTH LIMIT

User sets a reference depth value and software fills with grey all the depth areas that have starting depth area lower than the reference value. All other depth areas are white. So, if the reference depth is 0, all areas are white, if it is 99,999 all areas are grey.

This function can be performed as follows:

2.3.6) SELECTION OF BATHYMETRICS & SOUNDINGS RANGE

It is possible to select the range for the Bathymetrics and Soundings in the interval [0, 12000]MT, if you have selected meters in the par. 2.7.4 (if you have selected feet, the range is [0, 39369] FT or if you have selected fathoms, the range is [0, 6593] FM). To select the range, follow this procedure:

Selection of BATHYMETRICS & SOUNDINGS RANGE

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/MARINE SETTING MENU (N. 2)/BATHYMETRICS & SOUNDINGS RANGE (N. 6).
2. When you have highlighted that option, press **ENTER** to select the Bathymetrics & Soundings Range. After pressing the 'ENTER' key is pressed, use the up and down arrow keys to insert the desired value.

2.4 - NAVAL AIDS

The Naval Aids Menu allows the user to switch On/Off the display of Ports and Services, Attention Areas, Tracks and Routes, Lights, Buoys and Beacons, Signals and Cartographic Objects.

2.4.1) DISPLAYING OF PORTS AND SERVICES

By selecting the "Ports and Services On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Pile	Pile
Berthing facility-up area	Ports
Causeway	Ports
Crane	Ports
Dam	Ports
Distance mark	Ports
Dock area	Ports
Dry dock	Ports
Dyke area	Ports
Dyke crown	Ports
Floating dock	Ports
Gate	Ports
Gridiron	Ports
Harbour facility	Ports
Hulk	Ports
Landing place	Ports
Landing stairs	Ports
Lock basin	Ports
Oil barrier	Ports

cont.

Selection of DEPTH LIMIT

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/MARINE SETTING MENU (N. 2)/DEPTH LIMIT (N. 3).
2. When you have highlighted that option, press **ENTER** to select the Depth Limit. After pressing the 'ENTER' key, use the up or down arrow key to change the depth value in the [0, 30000] range (the depth unit, MT, FT or FM has been selected in the par. 2.7.3): when the desired value has been inserted, press **ENTER** to confirm.

2.3.4) DISPLAYING OF SPOT SOUNDINGS

By selecting the "Spot Soundings On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Spot Soundings	Depths 2

This function can be performed as follows:

Selection of SPOT SOUNDINGS DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/MARINE SETTING MENU (N. 2)/SPOT SOUNDINGS (N. 4).
2. When you have highlighted that option, press **ENTER** to select the Spot Soundings On/Off. Every time the 'ENTER' key is pressed, the selection of Spot Soundings is toggled On or Off.

2.3.5) DISPLAYING OF BOTTOM TYPE

By selecting the "Bottom Type On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Sand waves	Bottom Type
Seabed area	Bottom Type
Spring	Bottom Type
Weed/Kelp	Bottom Type

This function can be performed as follows:

Selection of BOTTOM TYPE DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/MARINE SETTING MENU (N. 2)/BOTTOM TYPE (N. 5).
2. When you have highlighted that option, press **ENTER** to select the Bottom Type On/Off. Every time the 'ENTER' key is pressed, the selection of Bottom Type is toggled On or Off.

Pontoon	Ports
Ramp	Ports
Shoreline construction	Ports
Slipway	Ports
Weir	Ports
Small craft facility	Ports
Coastguard station	Services
Pilot boarding place	Services
Rescue station	Services
Signal station, traffic	Services
Signal station, warning	Services

This function can be performed as follows:

Selection of PORTS AND SERVICES DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/NAVAL AIDS MENU (N. 3)/PORTS AND SERVICES (N. 1).
2. When you have highlighted that option, press **ENTER** to select the Ports and Services On/Off. Every time the 'ENTER' key is pressed, the selection of Ports and Services is toggled On or Off.

2.4.2) DISPLAYING OF ATTENTION AREAS

By selecting the "Attention Areas On/Off" option, these objects can be displayed or not on the screen:

OBJECT	CATEGORY
Anchor berth	Areas, Limits
Anchorage area	Areas, Limits
Cargo transhipment area	Areas, Limits
Contiguous zone	Areas, Limits
Continental shelf area	Areas, Limits
Custom zone	Areas, Limits
Dumping ground	Areas, Limits
Exclusive economic zone	Areas, Limits
Fishery zone	Areas, Limits
Fishing ground	Areas, Limits
Free port area	Areas, Limits
Harbour area (administrative)	Areas, Limits
Incineration area	Areas, Limits
Log pond	Areas, Limits
Military practice area	Areas, Limits
National territorial area	Areas, Limits
Restricted area	Areas, Limits
Sea area	Areas, Limits
Sea-plane landing area	Areas, Limits
Spoil ground	Areas, Limits
Straight territorial sea baseline	Areas, Limits
Submarine transit lane	Areas, Limits
Territorial sea area	Areas, Limits
Caution area	Caution areas
Fishing facility	Caution areas
Marine farm/culture	Caution areas

cont.

Cable, submarine	Offshore Installation
Offshore platform	Offshore Installation
Offshore production area	Offshore Installation
Pipeline, submarine/on land	Offshore Installation
Pipeline area	Offshore Installation

This function can be performed as follows:

Selection of ATTENTION AREAS

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/NAVAL AIDS MENU (N. 3)/ATTENTION AREAS (N. 2).
2. When you have highlighted that option, press **ENTER** to select the Attention Areas On/Off. Every time the 'ENTER' key is pressed, the selection of Attention Areas is toggled On or Off.

2.4.3) DISPLAYING OF TRACKS AND ROUTES

By selecting the "Tracks and Routes On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Deep water route part	Tracks, Routes
Deep water route centreline	Tracks, Routes
Fairway	Tracks, Routes
Ferry route	Tracks, Routes
Navigation line	Tracks, Routes
Precautionary area	Tracks, Routes
Radar line	Tracks, Routes
Radar range	Tracks, Routes
Radio calling	Tracks, Routes
Recommended route centreline	Tracks, Routes
Recommended track	Tracks, Routes
Recommended traffic lane part	Tracks, Routes
Traffic separation line	Tracks, Routes
Traffic separation scheme boundary	Tracks, Routes
Traffic separation scheme crossing	Tracks, Routes
Traffic separation scheme lane part	Tracks, Routes
Traffic separation scheme roundabout	Tracks, Routes
Traffic separation zone	Tracks, Routes
Two-way route part	Tracks, Routes

This function can be performed as follows:

Selection of TRACKS AND ROUTES DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/NAVAL AIDS MENU (N. 3)/TRACKS AND ROUTES (N. 3).
2. When you have highlighted that option, press **ENTER** to select the Tracks and Routes On/Off. Every time the 'ENTER' key is pressed, the selection of Tracks and Routes is toggled On or Off.

2.4.4) DISPLAYING OF LIGHTS

By selecting the "Lights On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Light	Lights
Light, moiré effect	Lights
Light float	Lights
Light vessel	Lights

This function can be performed as follows:

Selection of LIGHTS DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/NAVAL AIDS MENU (N. 3)/LIGHTS (N. 4).
2. When you have highlighted that option, press **ENTER** to select the Lights On/No sectors/Off option. Every time the 'ENTER' key is pressed, the selection of Lights is toggled on, without sectors or off.

2.4.5) DISPLAYING OF BUOYS AND BEACONS

By selecting the "Buoys and Beacons On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Beacon, cardinal	Beacons
Beacon, isolated danger	Beacons
Beacon, lateral	Beacons
Beacon, safe water	Beacons
Beacon, special purpose	Beacons
Beacon, generic	Beacons
Buoy, cardinal	Buoys
Buoy, installation	Buoys
Buoy, isolated danger	Buoys
Buoy, lateral	Buoys
Buoy, safe water	Buoys
Buoy, special purpose	Buoys
Buoy, generic	Buoys

This function can be performed as follows:

Selection of BUOYS AND BEACONS DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/NAVAL AIDS MENU (N. 3)/BUOYS AND BEACONS (N. 5).
2. When you have highlighted that option, press **ENTER** to select the Buoys and Beacons On/Off. Every time the 'ENTER' key is pressed, the selection of Buoys and Beacons is toggled On or Off.

2.4.6) DISPLAYING OF SIGNALS

By selecting the "Signals On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Radar station	Radar, Radio, Electronic Positioning System
Radar transponder beacon	Radar, Radio, Electronic Positioning System
Radio station_refco	Radar, Radio, Electronic Positioning System
Anchor	Signals
Caim	Signals
Chain/Wire	Signals
Fog signal	Signals
Radar reflector	Signals
Top mark	Signals
Navigational aid, generic	Signals
Extended navigational aid, generic	Signals

This function can be performed as follows:

Selection of SIGNALS DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/NAVAL AIDS MENU (N. 3)/SIGNALS (N. 6).
2. When you have highlighted that option, press **ENTER** to select the Signals On/Off. Every time the 'ENTER' key is pressed, the selection of Signals is toggled On or Off.

2.4.7) DISPLAYING OF CARTOGRAPHIC OBJECTS

By selecting the "Cartographic Objects On/Off" option, these objects can be displayed or not on the screen:

OBJECTS	CATEGORY
Closing line	Cartographic Objects
Cartographic symbol	Cartographic Objects
Cartographic line	Cartographic Objects
Cartographic area	Cartographic Objects
Line generic Text	Cartographic Objects
Area, generic	Cartographic Objects
National Character Set Text	Cartographic Objects

This function can be performed as follows:

Selection of CARTOGRAPHIC OBJECTS DISPLAY

1. Select: MAIN MENU/AUXILIARY FUNCTIONS MENU (N. 2)/MAP SETTING MENU (N. 2)/NAVAL AIDS MENU (N. 3)/CARTOGRAPHIC OBJECTS (N. 7).
2. When you have highlighted that option, press **ENTER** to select the Cartographic Objects On/Off. Every time the 'ENTER' key is pressed, the selection of Cartographic Objects is toggled On or Off.