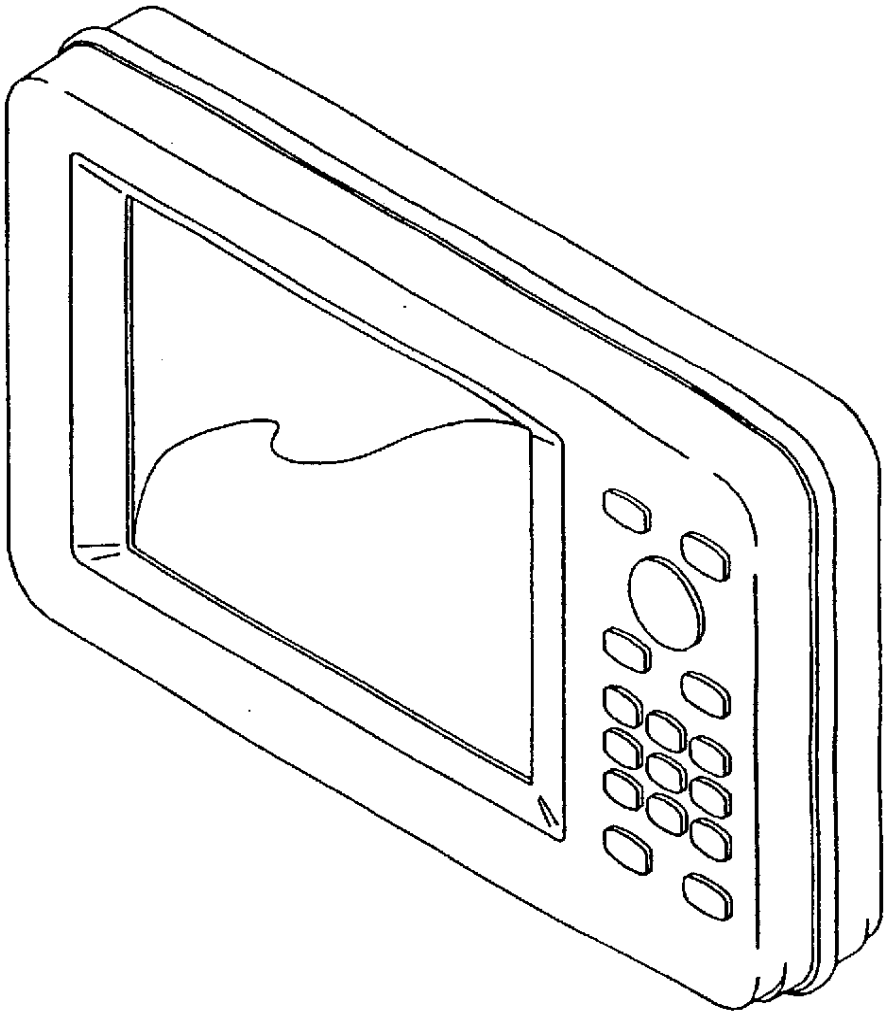
NAVADD 6000 NT

CE



USER MANUAL

Software name: SW14LCDNT

NAVADD 6000 NT

USER MANUAL

Software name: SW14LCDNT - Issue 133_A340 -

Warning!!!

Le carte elettroniche visualizzate dal plotter cartografico, pur derivando dalle pubblicazioni degli Istituti Idrografici Nazionali, non sostituiscono, agli effetti di legge, le versioni omologate dalle autorità ufficiali.

L'utilizzo del plotter cartografico implica la conoscenza di tale avvertenza da parte dell'utente.

Caution!!!

- *Il produttore garantisce i suoi prodotti come perfettamente funzionanti e approvati dai controlli di laboratorio.*
- *La garanzia di cui sono dotati i prodotti comporta la riparazione o la sostituzione delle parti che presentano difetti di costruzione o vizi di materiale.*
- *Tale garanzia è limitata ai guasti che intervengono entro 6 mesi dall'installazione, ma non oltre i 12 mesi dalla data di vendita dell plotter cartografico.*
- *La garanzia non è riconosciuta per danni provocati da uso improprio, manomissioni, riparazioni tentate o eseguite da altri.*
- *L'uso dei nostri prodotti implica, da parte dell'utente, la conoscenza e l'accettazione di tutte queste avvertenze.*

Attenzione! (I)

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! (GB)

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! (D)

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 Bildschirmes.

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

Attention! (F)

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 obscurer des zones de votre écran et le rendre ainsi inutilisable (non couvert par la garantie).

Aviso! (E)

La exposición de la pantalla a los rayos UV puede acortar la vida del cristal líquido usado en su ploter. 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 que la pantalla se caliente en exceso pues puede causar pérdida de contraste y, en caso extremo, la pantalla puede quedar totalmente negra.

Este problema revierte al enfriarse la pantalla.

TABLE OF CONTENTS

INTRODUCTION

The *NAVADD 6000 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 *NAVADD 6000 NT* as the chart plotter or simply 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 manual is structured as follows. Chapter 1 acquaints a new user with the plotter and its features, guides the first time user through basic set up. Chapter 2 contains information about chart display, to allow the user a personal setting of the plotter's display. Chapters 3 and 4 guides the user through using the 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 the plotter.

chapter 1
GETTING STARTED

1.1 - FEATURES

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. If connected to a positioning instrument (i.e. Loran-C, GPS, Decca), the plotter displays the current position, the speed, and the heading of the boat and its track. This data can be stored and recalled.
The user can choose to receive information from an external positioning instrument connected to the plotter.
The following items are shipped with the chart plotter:

- On/Off warning sheet;
- Glomex external bracket +3 screws M4 x 8;
- (CBC0FS0702) Power supply and I/O cable "Conxall 7F" (1.5 mt./5.8");
- Flush mounting template;
- 1 Ampère fuse + fuseholder;
- Instructions manual.

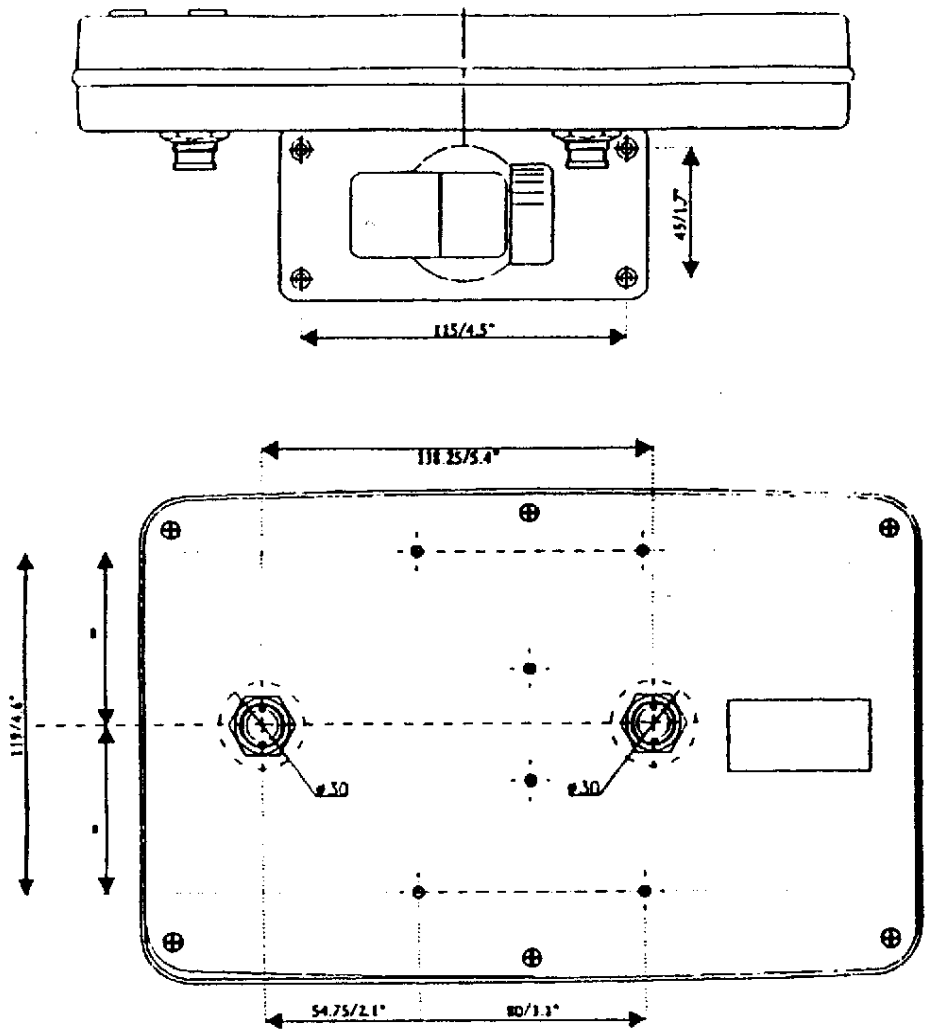
Note

The chart plotter with external GPS will be shipped with GPS Receiver Antenna and 15 mt. cable assembly.

1.2 - INSTALLATION

The chart plotter is easily installed on most vessels.
It can be mounted above or below the mounting bracket.
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.

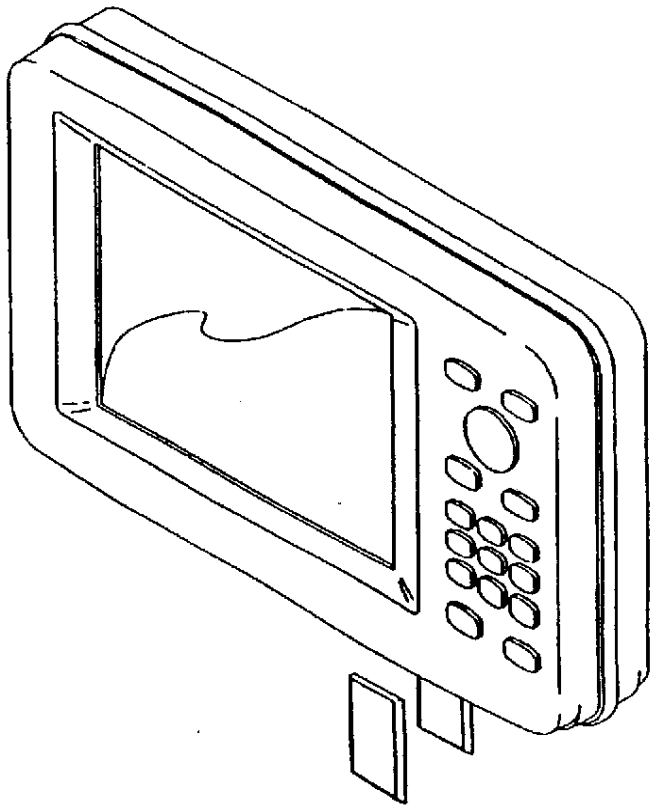
For the plotter with external GPS, the antenna should be mounted as high as possible. It should have the clearest line of sight to the horizon possible.
Adjacent antennas or other metallic objects can cause a degradation in GPS receiver performance. Remember to mount the antenna at least 70 cm./27.5" from VHF/UHF/MF transmitter antennas.



❖ 1.3 - INITIAL SETTING

Before turning on the chart plotter check for the correct voltage (10-35 volts dc) and the correct connection with the positioning instrument, and the correct insertion of the map cartridge into its slot as you see in the following figure (see also "EXTERNAL WIRING" appendix.
The cartridge should be inserted with the code numbers facing you.

The optional user cartridge to record all the desired information should be inserted in the same slot.



❖ 1.4 - TURNING THE CHART PLOTTER ON/OFF

The chart plotter is turned on by pressing the [POWER] key. Similarly the plotter can be turned off by holding down the [POWER] key for a few seconds.

Note

Sometimes, in particular bright sunlight, the screen might appear blank, to regain the correct brightness simply press the 'DIM' and 'A' keys. Go through the same procedure also when you are not sure if the 'POWER' key is working properly when the plotter is turned on.

1.4.1) SCREEN BRIGHTNESS

As mentioned before, the screen brightness can be controlled by pressing the [DIM] key: the [A DEST] key increases the contrast, the [B WP] key decreases it. Pressing the [C MARK] key steps through four levels of backlight.

Note

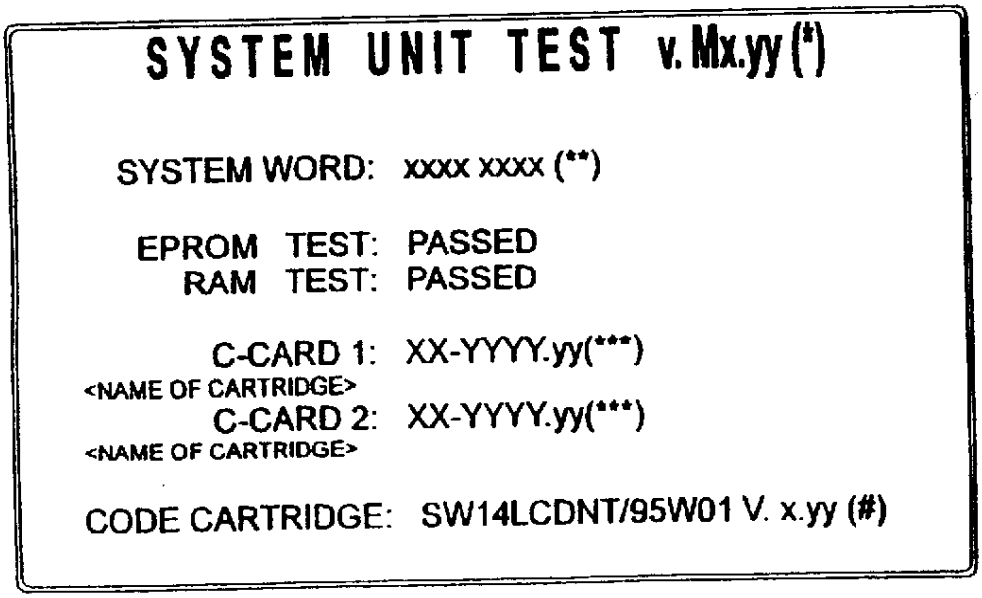
After 5 minutes that any key has been pressed, the screen and keyboard backlite is turned off When any key is pressed again, the backlite is set to the previous value. This procedure suggested by the LCD's manufacturers and applied to all electronics devices (personal computers, echosounders, radars, etc. ...) guarantees a long life of LCD.

❖ 1.5 - AUTO-TESTING PROCEDURE

When powered On, the chart plotter starts a self-testing procedure which checks the internal memories (Eprom 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:

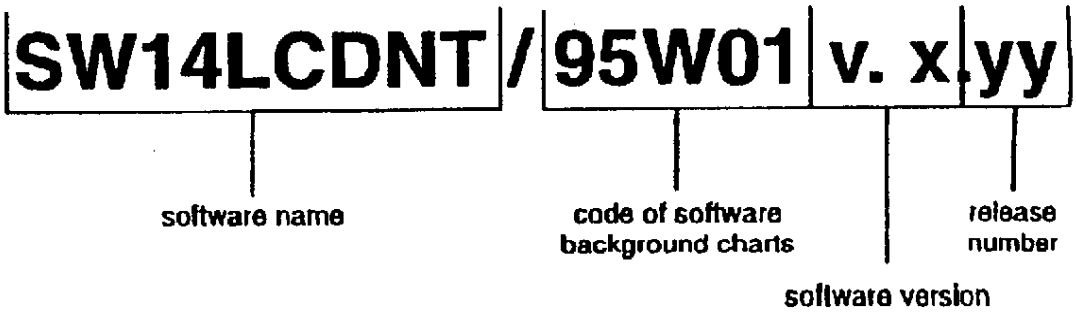
- "NOT PRESENT OR FAULTY": this message appears in any of these three cases:
  - no cartridge is inserted into the slot;
  - the cartridge has not been entirely inserted into the slot;
  - the cartridge is broken.
- "FAULTY" : it indicates that the program has found a reading error. The reason is generally a damaged cartridge.

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



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.

CAUTION

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.

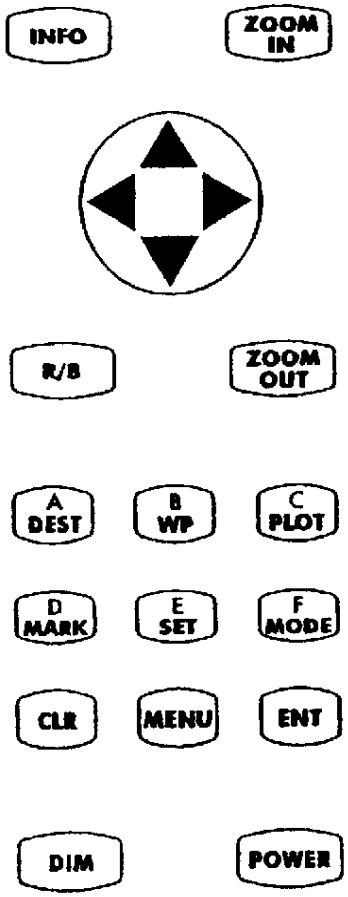
Operating System and Chart Software
Copyright 1987 - 1996 (C) C-MAP s.r.l.

Press ENTER to proceed

After pushing the [ENT] key to exit Caution page, the screen will show the boundaries of all Nautical Charts digitized in the cartridge (or the last chart used before turning off the chart plotter). The Cross-Hair, a small cross, is shown on the screen and can be moved by pressing the arrows on the keyboard.

❖ 1.6 - KEYBOARD DESCRIPTION

All the functions of the chart plotter can be performed by using the keyboard. Three beeps will advise you when a wrong key is pressed.



1.6.1) The keyboard keys and their functions

[DIM]: decreases or increases screen brightness.

POWER: turns the chart plotter ON/OFF.

ZOOM IN: zooms in on the map to show more detail of a smaller area.

ZOOM OUT: zooms out on the map to show less details of a larger area.

INFO: displays the available information on the point identified by the Cross-Hair. If pressed for 1 second, it selects the split or full screen mode.

R/B: displays distance and bearing between two points. Hold this key for 1 second to move the Cross-Hair in the center of the screen ("Home" function).

A DEST: enables and disables the Target functions.

B WP: selects Route Pad Menu to handle route management.

C PLOT: plots the desired track on the screen.

D MARK: stores and displays the point identified by the Cross-Hair or by the ship's position.

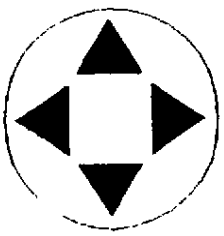
E SET: selects the Settings Menu.

F MODE: selects the Charting or the Navigation Mode and enables or disables tracking.

CLR: returns to previous menu and deletes selected stored information.

MENU: displays the Auxiliary Function Menu.

ENT: confirms entries into plotter's memory. If pressed for 1 second, it displays the Navigation Data Page.



: arrow key

Note

Chart plotter operations are made by pressing some keys. A key sequence can select a menu, an item in a menu or enable an option. In the following pages we use a simplified method to describe a key sequence.

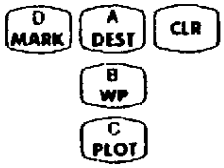
Example: to select the desired language, you must press the 'E' key, the 'B' key and then the 'A' key repeatedly to choose one among the five available languages. When the choice is made, press the 'CLR' key twice to return to charts. The key sequence is as follows:

Selection of DESIRED LANGUAGE

On certain occasions, if it is necessary to select specific keys within a sequence there is a different selection procedure:

Example: to select the desired Mark, you must press the 'D' key and then one among the 'A', 'B' or 'C' key to set one among the three available Mark types. When the choice is made, press the 'CLR' key to exit.
The key sequence is as follows:

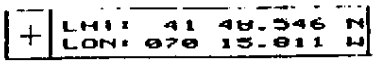
Selection of INSERT MARK



❖ 1.7 - CROSS-HAIR DESCRIPTION

The Cross-Hair, a small cross shown on the screen, can be moved by pressing the arrows on the keyboard.
When you are in split screen and if the Cross-Hair is not moved for at least one second, the geographical coordinates of that position will appear in the data area of the screen:

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



❖ 1.8 - SCREEN DISPLAY DESCRIPTION

The chart plotter can operate in the split screen mode or in the 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 an information window for general information, and under certain conditions, smaller menu selections.

In the full screen mode the maps are displayed in full screen. The right window will disappear and in the top of the screen will display single data with general information. In this screen mode it is possible to select the Main Menu and any Pad Menu.

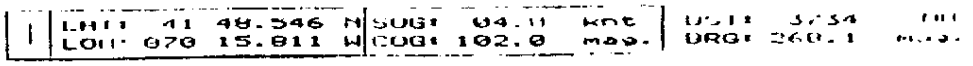
To switch between the two screen modes, press the [INFO] key for more than 1 second.

If you are in full screen, hold down for 1 second the [INFO] and the screen will return to split screen, and if you are in split screen, 1 second hold down the [INFO] key will display maps in full screen.

1.8.1) The display screen in the full screen mode

The full screen mode displays maps at full screen. The top of the screen will display a line of data with information about Charting or Navigation Mode of operation, Latitude and Longitude of the Cross-Hair if you are in Charting Mode, and Latitude and Longitude of the received fix if you are in Navigation Mode, SOG and COG, Distance and Bearing. The Charting mode is displayed as a Cross-Hair symbol, and the Navigation mode as the ship symbol.

The following picture shows the information in the text line:



where:

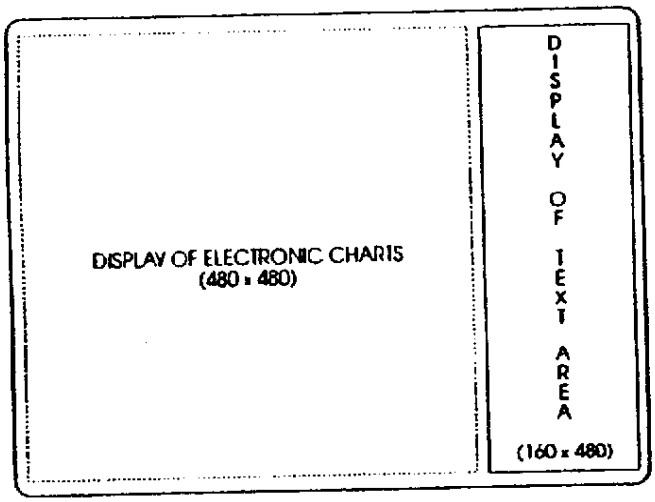
- The symbol "┼" appears when you are in Charting mode and the symbol "⊕" appears in Navigation mode.
- LAT/LON: current position of the Cross-Hair if in Charting Mode or ship's current position if in Navigation Mode;
- SOG : ship speed over ground;
- COG : ship course over ground;
- DST : distance to Target (in place of DST, it is possible to show TTG or XTE);
- BRG : bearing to target.

In full screen mode, when selecting a pad menu or for information about nav aids or user points, the top right corner of the screen shows a window with options or information.

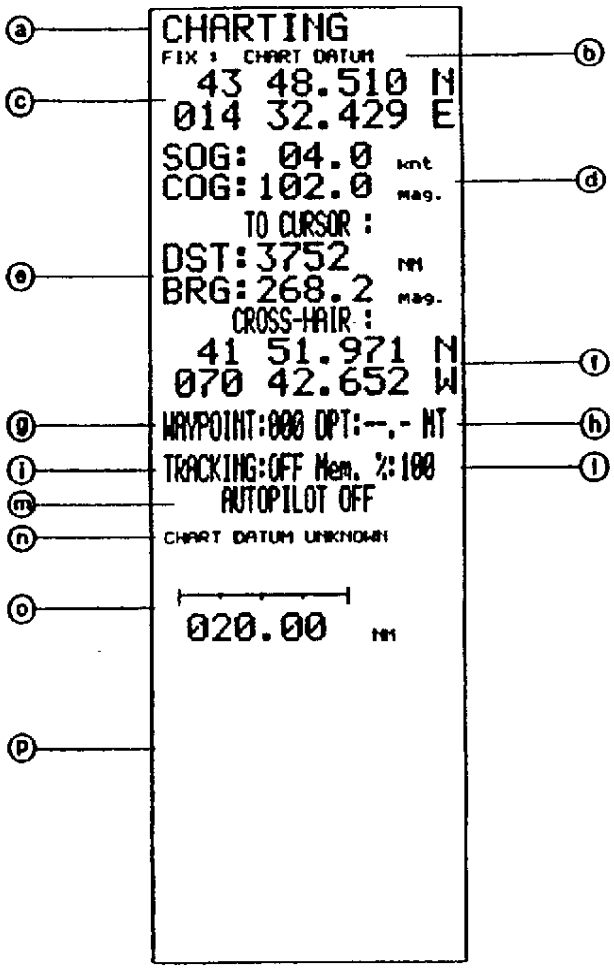
1.8.2) THE DISPLAY SCREEN IN THE SPLIT SCREEN MODE

The display screen has 640 x 480 pixels of resolution and it is divided into two windows:

- the left one (480 x 480 pixels) is used to show the Charts.
- the right one (160 x 480 pixels) displays the main Navigational Data.



The following picture shows the information displayed in the text area:



(a)- This is the current status in use and can be either CHARTING or NAVIGATION.

(b)- Shows the actual FIX situation (**).

(c)- Current position in deg. LAT/LONG (*) received by the positioning equipment in use (Loran-C, Decca, etc...).

(d)- Ship Speed Over Ground and ship Course Over Ground that can be either true or magnetic (*).

(e)- Distance to target in nautical miles (*).
Bearing of the target that can be either true or magnetic (*).

(f)- Current position in deg. LAT/LONG of the Cross-Hair (positioned by arrow keys).

(g)- Number of stored Waypoints.

(h)- Shows current depth selection unit that can be meters, feet or fathoms and depth value.

(h)- Shows the tracking status ON/OFF.

(l)- Percentage of memory still available.

(m) - Current Autopilot status.

(n) - This message is replaced by one of the following messages:
"CHART DATUM UNKNOWN"
"WGS84 NOT AVAILABLE"
"WGS84 DATUM SELECTED"
"DATUM <datum name>".

(o) - Scale of the chart on the screen (the number is the length in nautical miles of the segment on the screen).

(p) - This portion of the screen is to display menu options or auxiliary information.

Note

(*): If the positioning instrument is not connected or if its message 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 cartography OFF. In cartography ON the unit replaces the message "CORRECTION OFF" by one of the following: - "CHART DATUM"*
  - *"WGS84"*
  - *"<DATUM NAME>"*

The "WRONG FORMAT" and "NOT RECEIVED" messages appear after 15 seconds if the condition persists. The "NOT GOOD" message appears after 30 seconds. The received fix condition appears immediately. The specific alarm is activated if 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 display scale of the charts 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 detail in a smaller area, and with the [ZOOM OUT] less detail in a larger area.

Remember that, in 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 excludes actual cartography after maximum "zoom in" levels of the electronic charts are reached. In this mode of operation, called "virtual cartography", all the functiuons remain active. The message "TRACK PLOT MODE" appears on the screen. This function is vailable only if the Plotter Mode option is enabled, in the par. 2.6.5.

❖ 1.10 - 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 (see Chapters 3 and 4 for more details).

In Charting mode, when the Cross-Hair eventually reaches one edge of the screen the chart will shift in order to make visible the part of the chart in which the Cross-Hair is moving into. This operation is called an automatic pan. Note that if the edge of the screen is also the edge of the electronic chart, the chart plotter will look for the neighboring chart, in the current cartridge, with a similar scale or as close as possible.

❖ 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

By pressing the 'A' key repeatedly it is possible to select the desired language.

❖ 1.12 - DATA RETENTION

Even with the power OFF, the chart plotter retains in memory the following data which will be available for future use:

- Serial interface format selected (default: NMEA-0183);
- Last good position received from the positioning instrument;
- 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 the screen and cartography setting;
- Screen brightness;
- Cartographic display.

❖ 1.13 - DEFAULT SETTING

After a memory clear, the default values of the main parameters are reset to the following:

LAND SETTINGS	:	Natural Features	ON
		Rivers and Lakes	ON
		Cultural Features	ON
		Landmarks	ON
MARINE SETTINGS	:	Water Turbolence	ON
		Bathymetric Lines	ON
		Depth Areas Limit	5MT
		Spot Soundings	ON
		Bottom Type	ON
		Bathym. & Sound. Range	12000MT
NAVAL AIDS	:	Ports & Services	ON
		Attention Areas	OFF
		Tracks and Routes	ON
		Lights	ON
		Buoys and Beacons	ON
		Signals	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
		Smooth Scroll	ON
		Cartographic Objects	ON

		Plotter Mode	OFF
SETUP	:	Language	ENGLISH
		User Point Identifier	ON
		User Point Autonumber	ON
		External Waypoint	OFF
		COG Line at Boat	OFF
		Depth Unit	MT
FILTERS	:	Position Filter	OFF
		Speed Filter	OFF
		Filter step	0'05"
COMPASS	:	Heading	MAG
		Magnetic Variation	AUTO
FIX/COMPASS	:	Fix Correction	OFF
		Data Format	NMEA-0183
		Input Source	EXT 1
		Audible Alarm	ON
		Auto Alarm Clear	OFF
		Fix datum WGS84	ON
		Chart datum WGS84	ON
TRACKING	:	Automatic Replot	ON
		Tracking Step Unit	TIME
		Distance Step	1.0 NM
		Time Step	1 MIN
		Track	OFF
AUTOPILOT	:	Arrival Range	1.0 NM
		Output format	NMEA-0183

❖ 1.14 - INTO THE NEW CARTOGRAPHY

1.14.1) CE-95 TECHNOLOGY *OVERVIEW*

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 performan

ce of the data capturing process. Together with this improvement a new industry data structure standard, S57/S52 compatible, has been adopted. This new data is now being distributed as part of the CM-93 database for SOLAS class cartografic plotters and supplied to I Iydrographic Offices throughout the world.

Second generation format

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

C-MAP NT 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 NT** database is available on a variety of media, but an innovative solid state cartridge, called the **C-MAP NT** CARD, 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 serializer reduces the connection pin count to a mere 6. This unique feature dramatically increases the 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 improve 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
Most 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 C-CARD FEATURE

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 drammatic reduction in pin count has drastically reduced this problem.

chapter 2
CUSTOMIZING THE DISPLAY

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 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 grouped together 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, which belongs to the "Ports" category, is represented by ■ or by ⚓ or ⚓ depending on zoom level. The Light float, which belongs to the "Lights" category, is always represented by the symbol, independently of detail. See table on par. 6 for more information about categories, objects and symbols.
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 switch these off. These objects are the following:

OBJECT	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
Deep area	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)
Navigational mark (FIXED)	Navigational mark (FIXED)
Navigational mark (FLOATING)	Navigational mark (FLOATING)
Diffuser	OffShore Installation
Obstruction	OffShore Installation
Production installation	OffShore Installation
Mooring/Warping facility	Ports

(Cont

Underwater rock	Rocks
Wrecks	Wrecks

The Map Settings Menu is subdivided in the following settings menu:
- Land Setting Menu
- Marine Setting Menu
- Naval Aids Menu
- Other Settings Menu

❖ 2.2 - LAND SETTINGS

The Land Setting Menu allows the user to switch On/Off the display of Natural Features, Rivers and Lakes, Cultural Features and Landmarks.

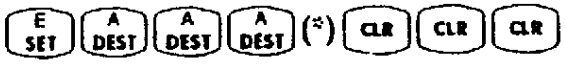
2.2.1) Displaying of Natural Features

"Natural Features On/Off" allows the user to switch On or Off the following:

OBJECT	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



Every time the 'A'(*) key is pressed, the selection of Natural features is toggled On or Off.

2.2.2) Displaying of Rivers and Lakes

"Rivers and Lakes On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Canal	Natural Features [RIVERS]
Canal bank	Natural Features [RIVERS]
Rapids	Natural Features [RIVERS]

Cont.

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

Every time the 'B' key is pressed, the selection of Rivers and Lakes is toggled On or Off.

2.2.3) Displaying of Cultural Features

"Cultural Features On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Cable, overhead	Cultural Dashed
Fence	Cultural Dashed
Pipeline, overhead	Cultural Dashed
Pylon	Cultural Dashed
Telepheric	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

Every time the 'C' key is pressed, the selection of Cultural Features is toggled On or Off.

2.2.4) Displaying of Landmarks

"Landmarks On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Building religious	Landmarks1

Building, single	Landmarks1
Cemetery	Landmarks1
Fortified structure	Landmarks1
Stloway route part	Landmarks1
Tank	Landmarks1
Chimney	Landmarks2
Dish aerial	Landmarks2
Flagstaff/Flagpole	Landmarks2
Flare stack	Landmarks2
Mast	Landmarks2
Monument	Landmarks2
Radar dome plane landing area	Landmarks2
Tower	Landmarks2
Windmill	Landmarks2
Windsock	Landmarks2

This function can be performed as follows:

Selection of LANDMARKS DISPLAY

Every time the 'D' 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 Water Turbolence, Depth Areas, Spot Soundings and Bottom Type.

2.3.1) DISPLAYING OF WATER TURBOLENCE

"Water Turbolence On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Tideway	Water Turbolence
Water Turbolence	Water Turbolence

This function can be performed as follows:

Selection of WATER TURBOLENCE DISPLAY

Every time the 'A'(*) key is pressed, the selection of Water Turbolence is toggled On or Off.

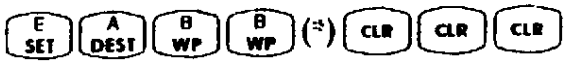
2.3.2) *Displaying of Bathymetric Lines*

"Bathymetric Lines On/Off" allows the user to switch On or Off the following:

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

This function can be performed as follows:

Selection of BATHYMETRIC LINES DISPLAY



Every time the 'B'(*) key is pressed, the selection of Bathymetric Lines is toggled On or Off.

2.3.3) *Selection of DepthS Areas Limit*

User sets a reference depth value and software fills with grey all the bathymetric areas that have starting depth area lower than the reference value. All other bathymetric 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:

Selection of DEPTHS AREAS LIMIT

After pressing the 'C' key, use the A DEST and B WP keys 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 ENT to confirm (or CLR to abort operation).

2.3.4) *Displaying of Spot Soundings*

"Spot Soundings On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Spot Soundings	Depths 2

This function can be performed as follows:

Selection of SPOT SOUNDINGS DISPLAY

Every time the 'D' key is pressed, the selection of Spot Soundings is toggled On or Off.

2.3.5) Displaying of Bottom Type

"Bottom Type On/Off" allows the user to switch On or Off the following:

OBJECT	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

Every time the 'E' key is pressed, the selection of Bottom Type is toggled On or Off.

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

After pressing the 'F' key, use the A DEST and B WP keys to change depth limit, than press ENT to confirm or CLR to abort.

❖ 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 and Signals.

2.4.1) *Displaying of Ports and Services*

"Ports and Services On/Off" allows the user to switch On or Off the following:

OBJECT	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
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

Every time the 'A' (*) key is pressed, the selection of Ports and Services is toggled On or Off.

2.4.2) *Displaying of Attention Areas*

"Attention Areas On/Off" allows the user to switch On or Off the following:

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
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

Every time the 'B' key is pressed, the selection of Attention Areas is toggled On or Off.

2.4.3) Displaying of Tracks and Routes

"Tracks and Routes On/Off" allows the user to switch On or Off the following:

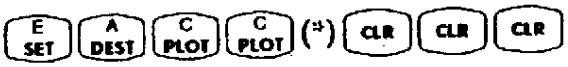
OBJECT	CATEGORY
Deep water route part	Tracks, Routes
Deep water route centreline	Tracks, Routes
Fairway	Tracks, Routes
Ferry route	Tracks, Routes
Navigation line	Tracks, Routes
Precautionary area	Tracks, Routes
Radar line	Tracks, Routes
Radar range	Tracks, Routes
Radio calling	Tracks, Routes
Recommended 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

Cont.

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



Every time the 'C' (*) key is pressed, the selection of Tracks and Routes is toggled On or Off.

2.4.4) Displaying of Lights

"Lights On/Off" allows the user to switch On or Off the following:

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

This function can be performed as follows:

Selection of LIGHTS DISPLAY

Every time the 'D' key is pressed, the selection of Lights is toggled On, without sectors or Off.

2.4.5) Displaying of Buoys and Beacons

"Buoys and Beacons On/Off" allows the user to switch On or Off the following:

OBJECT	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

Cont

Buoy, safe water	Buoys
Buoy, special purpose	Buoys
Buoy, generic	Buoys

This function can be performed as follows:

Selection of BUOYS AND BEACONS DISPLAY

E SET → A DEST → C PLOT → E SET → (*) → CLR → CLR → CLR

Every time the 'E' (*) key is pressed, the selection of Buoys and Beacons is toggled On or Off.

2.4.6) Displaying of Signals

"Signals On/Off" allows the user to switch On or Off the following:

OBJECT	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
Cairn	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

E SET → A DEST → C PLOT → F MODE → CLR → CLR → CLR

Every time the 'F' key is pressed, the selection of Signals is toggled On or Off.

❖ 2.5 - OTHER SETTINGS

The Other Settings Menu allows the user to switch On/Off the display of Names, Compass, Chart Generation, New Objects and to set the Complex Object Icon and the Info Level.

2.5.1) *Displaying of Names*

"Names On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Text	Cartographic Objects

This function can be performed as follows:

Selection of NAMES DISPLAY

Every time the 'A' (*) key is pressed, the selection of Names is toggled On or Off.

2.5.2) *Displaying of Compass*

"Compass On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Control Point	Compass, Distance
Local magnetic anomaly	Compass, Distance
Compass	Compass, Distance

This function can be performed as follows:

Selection of COMPASS DISPLAY

Every time the 'B' key is pressed, the selection of Compass is toggled On or Off.

2.5.3) *Displaying of Chart Generation*

"Chart Generation On/Off" allows the user to switch On or Off the following:

OBJECT	CATEGORY
Accuracy of data	MetaObjects
Compilation scale of data	MetaObjects
Horizontal datum of data	MetaObjects
Nautical publication information	MetaObjects
Sounding datum of data	MetaObjects
Survey reliability	MetaObjects
Survey source	MetaObjects
Units of measurament of data	MetaObjects
Vertical datum of data	MetaObjects

This function can be performed as follows:

Selection of CHART GENERATION DISPLAY

Every time the 'C' key is pressed, the selection of Chart Generation is toggled On or Off.

2.5.4) Displaying of New objects

New objects, objects defined after the software release, can be displayed or not on the screen, depending on your needs. This function can be performed as follows:

Selection of NEW OBJECTS DISPLAY

Every time the 'D' (*) key is pressed, the selection of New objects is toggled On or Off.

2.5.5) Selecting Complex Object Icon

Current official documentation S-57 supports "Complex Object". Complex objects are nautical object not containing attributes, but grouping other (element) objects in one logical unit. They have name that should describe the group. For example, Navigation aid, float, is the name of one complex object that should group all the navigation aid objects floating in the sea: lights, buoys, radar reflector. Very often, navigational aid objects are grouped in complex objects. This does not mean that object usually belonging to complex objects can not exist even as simple instances. One buoy of tower can exist both as stand alone object as it can exist as a part of one Navigational Aid, fixed or floating complex object. The decision when one object will be encoded in one or another way is influenced by many rules on paper charts. Sometimes, it is better to in one way, sometimes in another. Therefore, there can happen that one buoy on one scale level in one chart belong to a complex object, and on the more detailed level in another chart the same object with the same coordinates can be stand alone object.
By selecting the "Complex Object Icon" as "Multiple", the object is shown by a single icon which represented the component symbols. Instead by selecting "Single" (that is the default value) the object is represented by its all component symbols. This function can be performed as follows:

Selection of COMPLEX OBJECT ICON

Every time the 'E' (*) key is pressed, the selection of Icon, single or multiple is set to desired value.

2.5.6) SELECTING OF INFO LEVEL

The user can select information about displayed objects. This information can have different detail levels depending on user needs. There are two information levels: "Detailed" (default value) or "Basic". By selecting the "Basic" level, information obtained by the info function about an object is related on the particular characteristics of that object. Selecting the "Detailed" level gives increased information, for example the digitizing date. This function can be performed as follows:

Selection of INFO LEVEL

Every time the 'F' key is pressed, the selection of Info Level is set to desired value.

❖ 2.6 - CHART SETTINGS

The Chart Settings Menu allows the user to switch On or Off the display of coordinates, chart boundaries,smooth scroll and cartographic objects.

2.6.1) DISPLAYING OF COORDINATES

Latitude and Longitude grids can be displayed on the screen through the following procedure:

Selection of COORDINATES DISPLAY

Every time the 'A'(*) key is pressed, the selection of Lat/Lon Grid is toggled On or Off.

2.6.2) DISPLAYING OF CHART BOUNDARIES

The boundaries of the charts cpntained in the data cartridge can be displayed by pressing the following keys:

Selection of CHART BOUNDARIES DISPLAY

Every time the 'B' key is pressed, the selection of maps boundaries is toggled On, Off or Auto. When "Auto" has been selected, if we are in background charts only the first charts

level contained in the ⊕CARD are displayed, if we are in a charts level contained in the ⊕CARD the next four charts levels are displayed.

Note

All boundaries have indents (small arrow) which point to the inner area of the chart.

2.6.3) Selection of Smooth Scroll

It is possible to set the Smooth Scroll On/Off. If this option is set Off, when the Cross-Hair bumps one edge of the screen, the map redraws.
The following keys must be pressed to activate this function:

Selection of SMOOTH SCROLL

Every time the 'C' key is pressed, the selection of Smooth Scroll is toggled On or Off.

2.6.4) Displaying of Cartographic Objects

"Cartographic Objects On/Off" allows the user to switch On or Off the following:

OBJECT	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

Every time the 'D' key is pressed, the selection of Cartographic Objects is toggled On or Off.

2.6.5) Selection of Plotter Mode

The user can select "Plotter Mode" On which allows zoom-in and panning everywhere

regardless the existence of data. Follow the procedure:

Selection of PLOTTER MODE ON/OFF

Every time the 'E'(*) key is pressed, the selection of Plotter Mode is toggled On or Off.

Note

While in virtual cartography (Plotter Mode On) setting Plotter Mode Off from menu, the chart plotter displays the previous scale level with charts. The same behaviour exiting from charts coverage panning with the Cross-Hair (in Charting) or due to a ship movement (in Navigation) while in Plotter Mode Off.
When Plotter Mode On, it is also possible to have virtual cartography between two subsequent scale levels with charts.

❖ 2.7 - SETUP FUNCTIONS

The Setup Functions Menu allows the user to select the desired language (see par. 1.11), to enable or disable the display of user point identifier, to enable or disable the External Waypoint option (see par. 3.2.7), to set On or Off the Course Line and to choose the unit for depth.

2.7.1) COG LINE AT BOAT

The plotter can display on the screen the Course Line or COG Line at Boat. The origin of this line is the ship' position and the direction is the direction of the boat. To select the Course Line follow the procedure:

Selection of COG LINE AT BOAT DISPLAY

Every time the 'E'(*) key is pressed, the selection of course line is toggled On or Off.

2.7.2) DEPTH UNIT SELECTION

It is possible to choose one of the different depth units [meters (MT), feet (FT) or fathoms (FM)].
The following keys must be pressed to select the unit:

Selection of DEPTH UNIT

Every time the 'F' key is pressed, the selected unit, MT, FT, FM, is shown on the screen. Highlight your choice.

❖ 2.8 - TRACKING FUNCTIONS

As long as the chart plotter is connected to a positioning instrument, the plotter will not only display the past course, but will store all points in its memory. A line connects such points and represents the past course.
If you are in the split screen mode, the percentage of memory still available will always be displayed right in the middle of the data area of the screen, next to the tracking status. When the memory is filled, the plotter will continue to record new positions, but the oldest part of the track will be lost as new points are added.

2.8.1) Turning the track memorizing function On/Off

This function can simply be turned On or Off by following the procedure:

Selection of TRACK MEMORIZING ON/OFF

Note

It is not possible to turn the tracking on if this chart plotter is not receiving a valid fix: when you press the 'B' key the plotter emits three beeps.

If you are in the split screen mode, the track status is shown on the right part of the screen. If the tracking function is On, the chart plotter can store a fix when the distance from its last stored position is greater than a defined distance or after a defined time (See par. 2.8.3).

2.8.2) Choosing the track memorizing type

The track memorizing type can be selected by following this procedure:

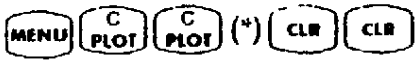
Selection of TRACKING STEP UNIT

By pressing the 'B' key repeatedly, you can select the desired memorizing type, distance or time.
The chart plotter can store a plot when the distance from its last stored position is greater than a defined distance (if distance has been selected) or after a defined time (if time has been selected).

2.8.3) CHOOSING THE TRACK RECORDING SETUP

When the tracking is On and the interval of the track is Distance, the chart plotter can store a fix when the distance from its last stored position is greater than a defined distance (1.0, 0.50, 0.10, 0.05 and 0.01 nautical miles).
The tracking step can be selected by pressing the following keys:

Selection of TRACK MEMORY DISTANCE STEP



Each time the 'C' (*) key is pressed, the selected distance step is shown on the screen

When the function of tracking is On and the interval of the track is Time, the chart plotter can store a fix after a defined time (5, 3, 1 minutes and 5, 15, 30 seconds).
The time interval can be selected by pressing the following keys:

Selection of TRACK MEMORY TIME STEP

Each time the 'D' key is pressed, the selected time step is shown on the screen.

2.8.4) PLOTTING TRACK

The chart plotter also displays the segment connecting the last memorized point with the preceeding one. The past course is automatically displayed on the screen if the auto replot function is selected. The full track will be plotted gradually. Plotting starts at your present position and works backwards to fill the entire track. While sections of the track are being drawn, the user has full use of the keyboard.

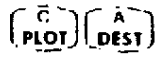
To activate the automatic course replot function, follow these steps.

Selection of AUTOMATIC REPLOT

The 'A' key toggles the selection On or Off.

Otherwise, if auto replot is not chosen, the following keys must be pressed to redraw the past course:

Selection of REPLOT OF PAST COURSE



Note

If the track plotting has been made or the track is not storing in memory, when you press the 'A' key the chart plotter emits three beeps.

After screen changes, you must press 'PLOT' and then the 'A' keys again in order to obtain the complete display of the past course.
While the manual track replot is being drawn the keyboard will be deactivated.

2.8.5) Deleting the memorized track

All the stored tracks can be deleted by pressing:

Selection of DELETING TRACK

After pressing the 'E' key, press 'ENT' to confirm deletion; any other key aborts operation. If you have pressing the 'E', an "OK" message will be shown in the place of "E".

❖ 2.9 - COMPASS FUNCTIONS

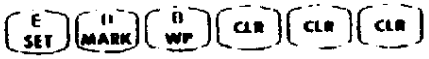
The user can insert data refering to compass deviation, or select between magnetic or true headings, or setting the magnetic variation.

2.9.1) Compass Calibration

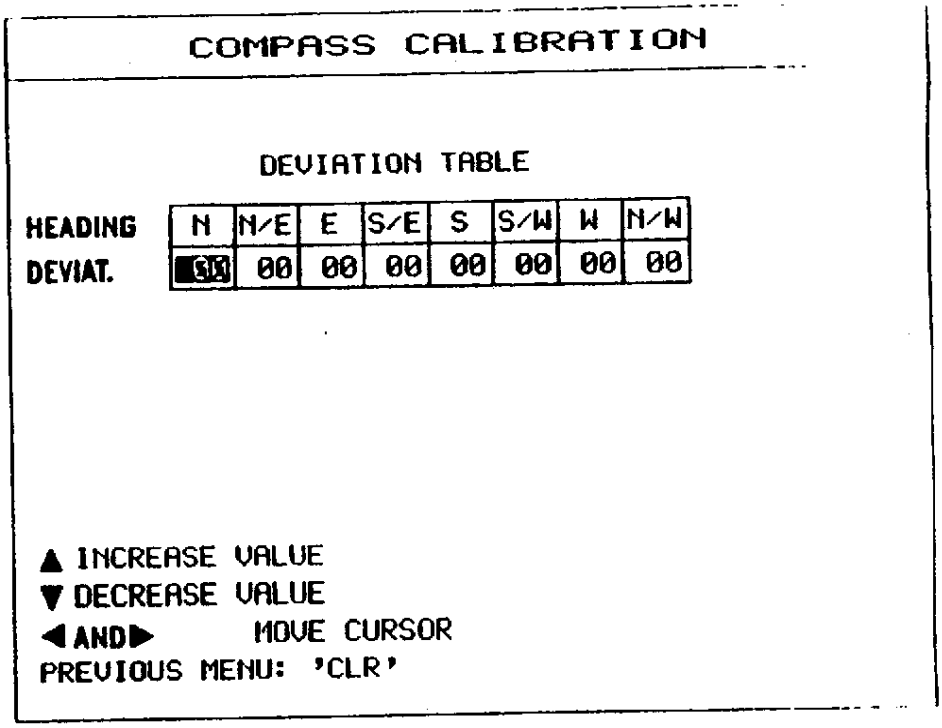
The variation table is used to have a Magnetic value readout on the chart plotter comparable to the value given by the compass of the boat. In other words, because of the compass of the boat must be compensated (due to iron masses, etc., ...), we use the same values to compensate (in the opposite direction) the values given by the chart plotter. This means that, for example, if the BRG to next waypoint readout in the chart plotter display is "X" Mag. degree, if you steer the boat reading "X" Mag. degree from the

compass, you are steering toward the next waypoint as well. The following keys must be pressed to select this option:

Selection of COMPASS CALIBRATION



After pressing the 'B' key, the following table will appear on the screen



The deviation table can be updated by following this procedure for every section of the above display:

- to move the cursor into the chosen square, the left and right arrow keys is pressed,
- to change the number in the square, the up and down arrow keys are pressed (compass deviation at the angle).

2.9.2) True or Magnetic Headings and Bearings

The chart plotter can work in either magnetic or true (geographic) headings. If magnetic readings are selected the variation is computed automatically for every zone in which the chart is displayed. You can toggle between the Magnetic Heading display mode and the True Heading display mode by pressing the following keys

Selection of TRUE OR MAGNETIC

[E SET][D MARK][A DEST][CLR][CLR]

By pressing the 'A' key repeatedly it is possible to select true or magnetic headings and bearings.

2.9.1) *Magnetic Variation*

It is possible to calculate the Magnetic Variation in an Automatic or Manual Mode. To select one of these methods, press the following keys:

Selection of MAGNETIC VARIATION AUTO/MANUAL

[E SET][D MARK][C PLOT][CLR][CLR]

By pressing the 'C' key repeatedly it is possible to select auto or manual magnetic variation.

To select the step for calculation of magnetic variation press the following keys:

Selection of MAGNETIC VARIATION STEP

[E SET][D MARK][D MARK](*)[CLR][CLR]

After pressing the 'D' (*) key, to insert the desired value press the left and right arrow keys and then the [ENT] key to confirm the input (or the [CLR] key to abort operation).

❖ 2.10 - WGS84 COORDINATE SYSTEM

The coordinate system, or datum, utilized to establish Lat/Lon position often differs from chart to chart.
As such, a single point on the earth may have slightly different coordinates on two (or more) different charts. Wherever possible, C-MAP electronic charts are enabled with conversion factors for Latitude/Longitude, to shift from the local/original datum of the chart to the internationally recognized standard datum: WGS84.
Thus the user may select to have charts expressed in their local/original coordinates or in WGS84.

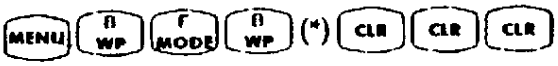
To set the datum to WGS84:

Selection of FIX DATUM AS WGS84

[MENU][B WP][F MODE][A DEST][CLR][CLR][CLR]

To set the datum to the original chart datum press the following keys:

Selection of CHART DATUM AS WGS84



The 'A' and 'B' (*) keys then toggle the selection On or Off until returning to the charts.

The plotter software is enabled with a series of messages which display to the user:
- the local chart datum
- the availability of conversion into WGS84
- and which datum is currently being used for chart positions.

See the following figure.

DEPENDS ON ORIGINAL CHART DATA		USER SELECTABLE		CHART DATA INFORMATION	FIX STATUS INFORMATION (In CORRECTION OFF)
CHART DATUM UNKNOWN	WGS 84 CORRECTION NOT PRESENT	CHART DATUM = WGS 84 set OFF	FIX DATUM = WGS84 NO	"DATUM NOT AVAILABLE"	"FIX: LOCAL DATUM"
			FIX DATUM = WGS84 YES	"DATUM NOT AVAILABLE"	"FIX: WGS84"
		CHART DATUM = WGS 84 set ON	FIX DATUM = WGS84 NO	"WGS84 DATUM SELECTED"	"FIX: LOCAL DATUM"
			FIX DATUM = WGS84 YES	"WGS84 DATUM SELECTED"	"FIX: WGS84"
	WGS 84 CORRECTION PRESENT	CHART DATUM = WGS 84 set OFF	FIX DATUM = WGS84 NO	"CHART DATUM UNKNOWN"	"FIX: LOCAL DATUM"
			FIX DATUM = WGS84 YES	"CHART DATUM UNKNOWN"	"FIX: LOCAL DATUM"
		CHART DATUM = WGS 84 set ON	FIX DATUM = WGS84 NO	"WGS84 DATUM SELECTED"	"FIX: WGS84"
			FIX DATUM = WGS84 YES	"WGS84 DATUM SELECTED"	"FIX: WGS84"
CHART DATUM KNOWN	WGS 84 CORRECTION PRESENT	CHART DATUM = WGS 84 set OFF	FIX DATUM = WGS84 NO	"CHART DATUM <name datum>"	"FIX <name datum>"
			FIX DATUM = WGS84 YES	"CHART DATUM <name datum>"	"FIX <name datum>"
		CHART DATUM = WGS 84 set ON	FIX DATUM = WGS84 NO	"WGS84 DATUM SELECTED"	"FIX: WGS84"
			FIX DATUM = WGS84 YES	"WGS84 DATUM SELECTED"	"FIX: WGS84"

❖ 2.11 - SYMBOLS AND ABBREVIATIONS

CE-95 TECHNOLOGY

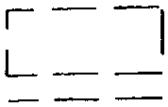
Symbols	Category Objects
	**Areas, Limits** Cargo transhipment area; Contiguous zone; Continental shelf area; Custom zone; Dumping ground; Exclusive economic zone; Fishery zone; Fishing ground; Free port area; Harbour area (administrative); Incineration area; Log pond; Military practice area; National territorial area; Restricted area; Sea area; Sea-plane landing area; Spoil ground; Straight territorial sea baseline; Submarine transit lane; Territorial sea area; No data area.
	**Airport area** Airport area.
	**Anchorage area** Anchorage area.
	**Anchor** Anchor.
	**Anchor berth** Anchor berth.
	**Beacon** Beacon, cardinal <*type*>; Beacon, isolated danger <*type*>; Beacon, lateral <*type*>; Beacon, safe water <*type*>; Beacon, special purpose <*type*>; Beacon, generic <*type*> *type:* Lattice
	

to be continued Cont.

Generic

Tower

Withy



Bottom type
Seabed area.

Building, religious
Building, religious.

Building, single
Building, single.

Buoys
Buoy, cardinal <*type*>; Buoy, installation <*type*>; Buoy, isolated danger <*type*>; Buoy, lateral <*type*>; Buoy, safe water <*type*>; Buoy, special purpose <*type*>; Buoy, generic <*type*>.

type:

Barrel

Can, cylindrical

Conical

Pillar

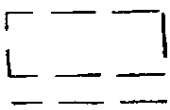
Spar, Spindle

Spherical

Super

Cairn
Cairn.

Cartographic objects
Closing line; Cartographic symbol; Cartographic line; Cartographic area; TEXT; Line, generic Text; Area, generic; National Character Set Text; Incomplete survey area.



Caution Areas
Caution area.

Cont.

Cemetery
Cemetery.

Chimney
Chimney.

Coastguard station
Coastguard station.

Compass
Compass.

Compass, Distance
Local magnetic anomaly.

Composite objects
Airport; Anchorage; Channel edge; Deep water route; Defined water; Harbour; Range system; Lighthouse; Mooring trot; Navigation mark, afloat; Navigation mark, fixed; Traffic Separation Scheme System.

Control point
Control point.

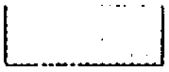
Crane
Crane.

Cultural Dashed
Cable, overhead; Fence; Pipeline, overhead; Pylon; Telepheric; Tunnel entrance.

Cultural Features
Bridge; Built-up area; Railway; Road crossing; Road part; Runway; Sloping ground; Square.

Cont.

Depths 1 (Shallow)
Depth area; Depth contour.



Depths 1 (Medium)
Depth area; Depth contour.

Depths 1 (Deep)
Depth area; Depth contour.

Depths 2
Dredged area; Spot Soundings; Shallow water blue.

Depths 3
Intertidial area; Zero meter contour.

Dish aerial
Dish aerial.

Extended navigational
Extended navigational.

Flagstaff/Flagpole
Flagstaff/Flagpole.

Flare stack
Flare stack.

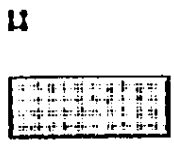
Fish haven
Fish haven.

Fishing facility
Fishing facility.

Fog signal
Fog signal.

Cont.

Fortified structure
Fortified structure.



Lake
Lake.

Landmarks
Tower.

Light
Light.

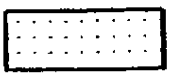
Light vessels
Light vessels.

Lights House(*)
Light House.

Marine farm/culture
Marine farm/culture.

Mast
Mast.

Meta objects
Accuraty of data; Compilation scale of data; Horizontal datum of data; Nautical publication information; Production information; Sounding datum of data; Survey reliability; Survey source; Units of measurament of data; Vertical datum of data.



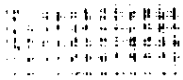
Mooring/Warping facility
Mooring/Warping facility.

Monument
Monument.

Cont.

Natural Features
Coastline; Dune; Hill; Lake shore; Land area; Land elevation; Land region; Salt Pan; Slope Topline; Tree; Vegetation area.

Natural Features [ICE]
Ice area; Pingo.

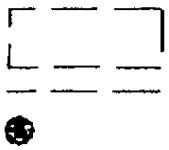


Natural Features [RIVERS]
Canal; Canal bank; Rapids; River; River bank; Waterfall.

Navigational aid, generic
Navigational aid, generic.

Navigational mark fixed(*)
Navigational mark fixed.

Navigational mark floating(*)
Navigational mark floating



Offshore Installation
Cable, submarine; Cable area; Diffuser; Obstruction; Offshore production area; Pipeline, submarine/on land; Pipeline area; Production installation.

Offshore platform
Offshore platform.

Pile
Pile.

Ports
Berthing facility; Causeway; Checkpoint; Dam; Distance mark; Dock area; Dry dock; Dyke area; Dyke crown; Floating dock; Gate; Gridiron; Harbour facility; Hulk; Landing place; Landing stairs; Lock basin; Oil barrier; Pontoon; Ramp; Shoreline construction; Slipway; Weir; Small craft facility.

Production Objects
Correction marker.

Cont.

Radar dome
Radar dome.

Radar, Radio, Electronic Positioning System
Radar station; Radar transponder beacon; Radio station_refco.

Radar Reflector
Radar Reflector.

Rescue station
Rescue station.

Rocks
Underwater rock.

Sand waves
Sand waves.

Services
Pilot boarding place.

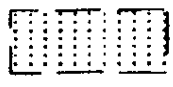
Signals
Chain/Wire; Top mark.

Signal station
Signal station, traffic; Signal station, warning.

Silo
Silo.

Source of data
Source of data.

Spring
Spring.



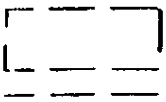
Tracks, Routes
Deep water route part; Deep water route centreline; Fairway; Ferry route; Navigation line; Precautionary area; Radar line; Radar range; Radio calling-in point; Recommended route centreline; Recommended track;

to be continued

Cont.

Recommended traffic lane part; Traffic separation line; Traffic separation scheme boundary; Traffic separation scheme crossing; Traffic separation scheme lane part; Traffic separation scheme round about; Traffic separation zone; Two-way route part.

Tank
Tank.

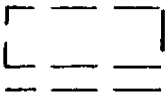


Water Turbulence
Tideway; Water turbulence.

Weed/Kelp
Weed/Kelp.

Windmill
Windmill.

Windmotor
Windmotor.



Wrecks
Wreck.

Note

In the "Symbols" column of the previous table, the categories are identified by one or more symbols. See, for example, Wrecks category: it can be shown on the electronic chart by area ( ), line (——) or exact point ( ) if you are respectively in the area, line or exact point.
Buoy, Tower, Light, Fog signal can be displayed in two different modes: as single object or as composition of various single icon objects.

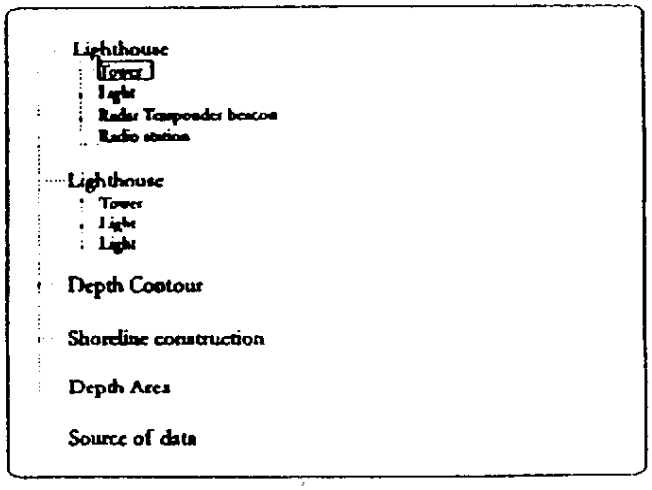
2.11.1) *Information about cartographic objects*

Detailed information is available for any object present on the chart.
To obtain information about an object follow the procedure:

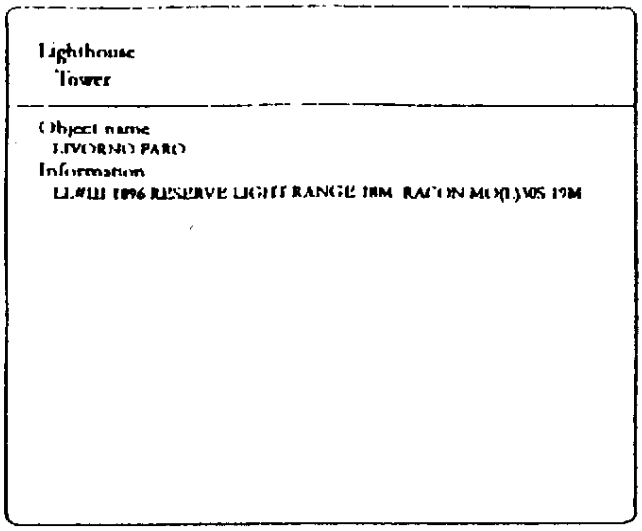
Selection of INFORMATION PAGE

1. Press [INFO] to select the Info option. If in the range of the Cross-Hair there is present a cartographic object, a page is opened at whole screen where a list of all objects (in a tree structure), found in the range of the Cross-Hair, is displayed; if there are complex objects (i.e. it is a collection of objects logically related) there is also a list of the component objects.
2. To select the desired object, use the up and down arrow keys: the object appears in a square.
3. When the desired object has been selected, press the [ENT] key to expand the information on it. If the information is contained in several pages, press the [MENU] key to select the following pages and the [CLR] key to return to previous page.
5. Press the [CLR] key to exit from information page.

An example of information page is the following:

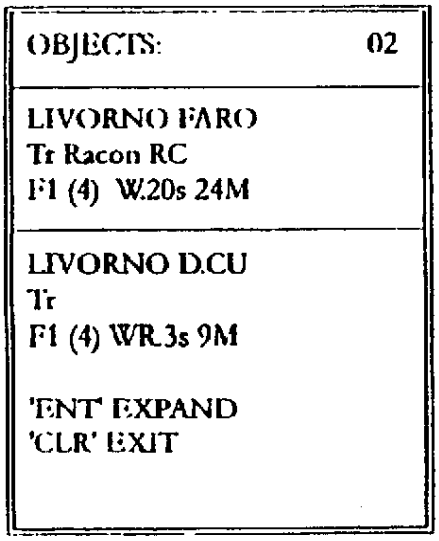


Here two complex objects, Lighthouse, each one is represented by the list of related components (Tower, Light, Radar Trasponder beacon, Radar station for the first and Tower, Light, Light for the second) and four not complex objects, Depth Contour, Shoreline construction, Depth Area, Source of Data, appear. Moving by the up and down arrow keys to select the desired object (the first Tower in the example) that appear in a square, and then pressing [ENT] the desired information is displayed on the screen.



Note that for some objects ("point" objects, i.e. objects that are not lines or areas) an automatic info option is available. After 1 second of the last Cross-Hair moving, if in the range of the Cross-Hair (a square of 7 pixels side) there are any objects, an information window is opened on the screen. In the first row, near the "OBJECTS" indication, the total number of objects (max 20) is shown; in the following rows are displayed what objectsthey are (if the object is complex, an short info is displayed). To obtain all information press the [ENT] key.

An example of short information window is the following:



In the example two "point" objects are found in the range of the Cross-Hair, each one complex. A short info is displayed. Pressing the [ENT] key the first page indicated above is displayed.

chapter 3
CHARTING MODE

3.1 - INTRODUCTION

The chart plotter features two different modes of operation: the Charting mode, in which all operations refer to the position of the Cross-Hair (this is used to prepare the navigation) and the Navigation mode, in which all operations refer to the ship's position (which is used to monitor the navigation, provided that a positioning instrument is connected and working properly).
Charting and Navigation modes are entered by pressing the following keys:

Selection of OPERATION MODE

By pressing the 'A' key, alternately, the plotter will operate on Charting or on Navigation mode.

Note

It is not possible to enter Navigation mode if you are not receiving a valid fix.

The actual operating status of the plotter is shown on the screen: if you are in the split mode it appears in the top right side of the screen, and if you are in full screen it is represented by a symbol in the left top side of the screen (the Charting Mode as the Cross-Hair symbol, the Navigation Mode as the ship symbol).
The Charting mode allows you to plan your course. You do not need to have a position finding device connected to your plotter in order to use this mode of operation.

3.2 - PLANNING COURSES

The number of routes is only limited by the number of the available waypoints. Of all these routes, only one is the active route: this is called the route "in edit" and it is drawn with a dotted line with the last waypoint shown as a full dot. This is the one from where new waypoints are added or old ones deleted.

3.2.1) Adding waypoints

In navigational terms, a "waypoint" is any point on earth to which one intends to navigate at some time. A sequence of waypoints makes up a route plan, sometimes called a planned route.

A route plan can be created by pressing the [B WP] key, moving the Cross-Hair to a desired location and pressing the [A DEST] key. A waypoint will appear on the screen on the position identified by the Cross-Hair.

By moving the Cross-Hair and pressing the [A DEST] key a route is created on the display. Dashed segments connecting the new point and the last one of the route will be shown. This symbol, a full dot indicating the last point of the route, will be moved to the last new point.

Note

If the "User Point Identifier" option in the Screen Setting Menu is set ON (See par. 5.5), waypoints appear on screen identified by a number: in each route there is a waypoint number 1 (001), a waypoint number 2 (002), and so on. These numbers are the same that the user finds in the Route Data Report (See par. 3.2.7).

The user may also create waypoints at specific points by latitude and longitude. Once in the Route Menu, move the Cross-Hair is to any position desired. Now hold the [A DEST] key for more than one second, release it and the coordinates of the point identified by the Cross-Hair will appear on the screen. The Latitude and the Longitude of the point are shown on the screen, and the user can change them, by moving the cursor with the left and right arrow keys and defining values with the up and down arrow keys. Press the [ENT] key.

The [CLR] key aborts the operation.

Note

The "Adding waypoint" option has two possible effects: a new route will be created or an old one will be extended (if you edit an old route (See par. 3.2.3) before pressing the 'A' key).

3.2.2) Deleting waypoints

By pressing the [B WP] and then the [B WP] key, the user can delete the last waypoint of the route "in edit" (see par. 3.2.3), that is identified by a full dot.
The dashed segment connecting the last waypoint and the previous waypoint is deleted

and the full dot is moved to this point, that becomes the new last waypoint of the route.

3.2.3) CHANGING THE ACTIVE ROUTE (ROUTE "IN EDIT")

After pressing the [D WP] key to change the active route, place the Cross Hair on any waypoint of the route you want to edit, and then press the [C PLOT] key. The desired route becomes the route "in edit" and it is shown with a dot line.

Note

Only the route "in edit" is shown with a dashed line. The others are displayed with straight line.

To create a new route, the user must press the [C PLOT] and then the [A DEST] keys (See par. 3.2.1).

3.2.4) REVERSING ROUTE DIRECTION

If the user wishes to follow a route plan in reverse, the chart plotter will allow this by pressing the [B WP] and the [C PLOT] keys to edit the desired route and pressing the [D MARK] key. Reversing the direction of the route "in edit" allows the user to edit the other side of the route. In this case, the first waypoint becomes the last waypoint of the route, marked by the full dot.
Reversing a route plan is most typically used to return to where the voyage originally started, perhaps several days after having arrived at the final destination.

3.2.5) DELETING A ROUTE

After pressing the [B WP] key, press the [E SET] key to delete the route "in edit". This route will disappear from the screen.
If you have planned several routes and you want to delete any of them, just put the routes to delete "in edit" and go through the same procedure. If you want to delete only the last part of the route instead of the 'E' key, press the 'B' key (See par. 3.2.2).

3.2.6) DELETING ALL ROUTES

It is possible to delete all routes at once. The Clear Routes option can be selected by pressing the following keys:

Selection of DELETING ALL ROUTES

MENU A DEST E SET ENT CLR CLR

After pressing the 'ENT' key to confirm the deleting, the message "OK" is shown on the screen in the place of "E" in the displayed menu.
Press the CLR key to abort operation.

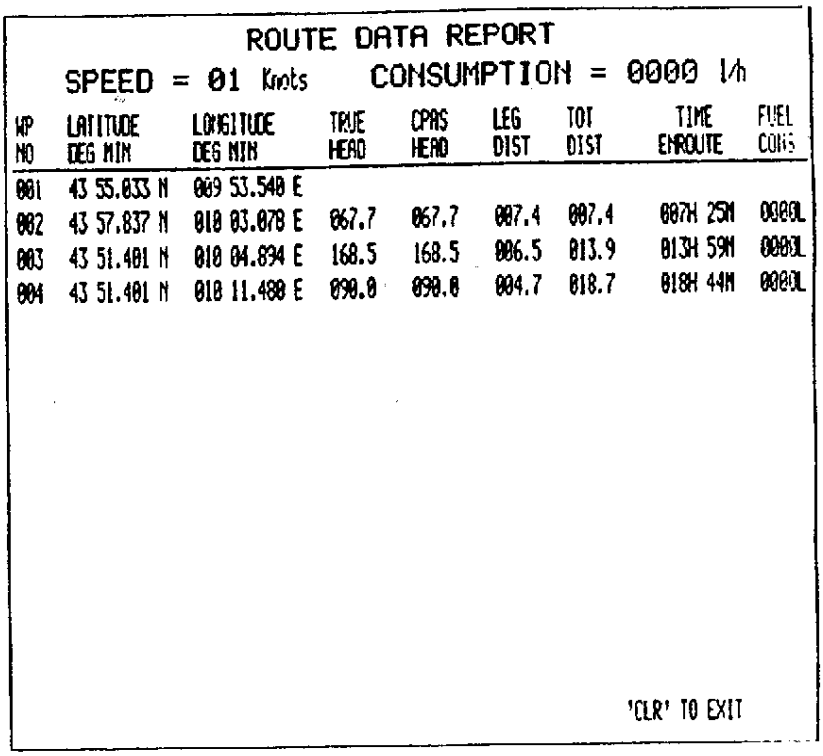
3.2.7) ROUTE DATA REPORT

To display the navigation data of the route "in edit", press the B WP and then the F MODE keys. Data will be displayed on separate pages (screens): to proceed from one page to the other, the ENT key must be pressed, and to exit from this function, press the CLR key. At the beginning of the first page there will be information on speed and fuel consumption. At first the speed field is displayed in reverse video: press the INFO key to change the unit, from knots (knots) to kilometers per hour (km/h) or vice versa; then insert the value by pressing the arrow key and then the ENT key to confirm the input.

The reverse video is shifted on the consumption field, press the INFO key to change the unit from liter per hour (l/h) to Gallon per hour (Gall/h) or vice versa, then press the arrow key to change value and the ENT key again.
Now, displayed, is the information about the waypoints of the active route (the route "in edit"). Every page shows information about 11 waypoints: if the active route has less than 11 waypoints, the next pages are not displayed on the screen (and the message "'ENT' TO PROCEED" is not shown). The coordinates of each waypoint from number 1 to number 11 with data regarding distances and headings will be displayed in the first page. In the second page the information will be the same, but with regards to waypoints from number 12 to number 22, and so on for the other pages (their number depending on the number of waypoints of the route "in edit"). The data is displayed as follows:

WP NO.	:	waypoint number
LATITUDE DEG. MIN.	:	Latitude in degrees
LONGITUDE DEG. MIN.	:	Longitude in degrees
TRUE HEAD	:	true heading
CPAS HEAD	:	compass heading
LEG DIST.	:	distance in nautical miles between waypoints of each segment of the course
TOT. DIST.	:	total distance from the first waypoint, calculated in nautical miles
TIME ENROUTE	:	total navigation time from the starting waypoint, at set speed and power
FUEL CONS.	:	total fuel consumption from the starting waypoint, at set speed and power

The measurement unit is selected by the plotter on the basis of total consumption. The time and the consumption of fuel for each segment of a course are computed on the basis of average speed and fuel consumption previously selected.



ROUTE DATA REPORT

SPEED = 01 Knots CONSUMPTION = 0000 l/h

WP NO	LATITUDE DEG MIN	LONGITUDE DEG MIN	TRUE HEAD	CPAS HEAD	LEG DIST	TOT DIST	TIME ENROUTE	FUEL CONS
001	43 55.033 N	009 53.548 E						
002	43 57.837 N	010 03.078 E	067.7	067.7	007.4	007.4	007H 25M	0000L
003	43 51.401 N	010 04.894 E	168.5	168.5	006.5	013.9	013H 59M	0000L
004	43 51.401 N	010 11.488 E	090.0	090.0	004.7	018.7	018H 44M	0000L

'CLR' TO EXIT

3.2.8) *Information about a desired waypoint*

On the screen is displayed the waypoint coordinates and distance and bearing to the next waypoint. If the waypoint is the last point of route, on the screen the message "TO END" is not shown, if it is the first of the route the message "PAST" is not displayed.

3.2.9) *External Waypoint option*

The coordinates of a waypoint, received from a GPS or a Loran connected to the plotter, can be stored into the plotter, if the GPS or the Loran are NMEA/0183 protocol compatible and support the $BWC sentence (this symbol remains on the screen for 30 seconds).
The user may save it by placing a waypoint or a Mark on that symbol.
As soon as the unit receives another $BWC sentence with the coordinates of a new waypoint, the symbol moves to the new point.
This feature is available only if the option External Waypoint is set On.
The external waypoint feature can be selected by pressing:

Selection of EXTERNAL WAYPOINT DISPLAY

E SET | B WP | D MARK | CLR | CLR

The 'D' key toggles the selection On or Off.

❖ 3.3 - DISTANCE AND BEARING BETWEEN TWO POINTS ON THE MAP

The distance and bearing between two given points can be immediately obtained by the following procedure:

- the Cross-Hair must be placed over the first point;
- press the R/B key;
- move the Cross-Hair to the second point;
- press the R/B key again.

The first point is marked by an "A", while the second by a "B", and the two points are connected by a straight line. A cross will identify the beginning and the end of the "A-B" line. The distance, in nautical miles, between "A" and "B" and the bearing is displayed.

To cancel the "A/B" segment press the CLR and then the C PLOT key: the point "A" and "B" and the line connecting these two points will disappear from the screen.

chapter 4
NAVIGATION MODE

4.1 - INTRODUCTION

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. It is used to monitor the conduct of the navigation, provided that a positioning instrument is connected and working properly.

The [F MODE] key commands the Navigation and the Charting modes: if you are in the split screen mode the word "NAVIGATION" or "CHARTING" appears in the Data Window of the screen, in the upper right corner, if you are in the full screen mode the Cross-Hair symbol (⊞), for Charting, or the ship symbol (+), for Navigation, are shown at the left top side of the screen.

A blinking circled cross indicates the ship's position in both Navigation and Charting modes. Its dimensions are slightly smaller compared to those of the Cross-Hair and a short line indicates the ship heading.

When the plotter is turned On, it is always set to Charting mode. It may happen that the ship's position is out of the chart shown in the screen. To find the chart with the ship's position on it, simply press the following keys:

Selection of OPERATION MODE

[F MODE] [A DEST] [CLR]

By pressing the 'A' key, alternately, the plotter will operate in Charting or Navigation mode.

Note

It is not possible to enter Navigation mode if it is not receiving a valid fix.

When in Navigation mode, all the operations and calculations refer to the ship's position and not to the Cross-Hair anymore.

The zoom functions in Navigation mode are always related to the ship's position.

Unlike the Charting mode, when the Cross-Hair "bumps" the edge of the chart no

redraw will take place. However, a redraw will take place if your vessel position nears the edge of the display, showing you the next section of the chart, and keeping your vessel in view. Your boat will never leave the chart while in the Navigation mode.

❖ 4.2 - INCOMING SIGNAL STATUS INDICATION

The chart plotter also indicates the quality of incoming information from the positioning instrument. If the positioning system is properly connected, and the data received is valid, the coordinates of the ship's position will be shown on the screen, and a crossed circle, representing the ship's position on the screen, will blink. The following messages might appear:

- 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.

Note

The message "CORRECTION OFF" appears only in cartography off. In cartography on the chart plotter substitues the message "CORRECTION OFF" with one of the following: "CHART DATUM", "WGS84", "< Datum Name >"

If the ship is sailing in a area not covered by the chart digitized into the data cartridge, the chart plotter displays "OUT OF MAPS" instead of "CORRECTION ON/OFF". With the return of the ship in the covered area, the proper information will be shown again.

If there are problems with the information received, the chart plotter will display one of the following:

- WRONG FORMAT : the received format does not correspond to the selected format or the received data 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.
- NOT RECEIVED : no data is received.

The "WRONG FORMAT" and "NOT RECEIVED" messages appear after 15 seconds that the condition persists, the "NOT GOOD" message appears after 30 seconds. The specific alarm is set when a good fix is not received for 1 minute. On the screen diamond symbols appear in place of the last decimal digits in the fix, the symbol representing the ship's position stops flashing remaining fixed, and the chart plotter emits a series of beeps. If a fix has never been received, diamond symbols are displayed. If a fix has been received, the chart plotter will display the coordinates of the last position memorized with the last